

SPECIFICATIONS FOR:

GREATER ST MARY MISSIONARY BAPTIST
CHURCH COMPLEX
LAKE CHARLES, LOUISIANA

PROJECT NO. 2316

MARCH 2025

KING
ARCHITECTS, INC.

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

KAI Project No. 2316

Project Manual

MARCH 2025

KING ARCHITECTS, INC

SECTION 00 01 07

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

PROJECT NUMBER: 2316

DATE OF SPECIFICATIONS
DATE OF DRAWINGSMARCH 2025
MARCH 2025

We hereby certify these plans and specifications were prepared by us or under our direct personal supervision and that we are duly licensed professionals in our specific scope of licensure under the laws of the State of Louisiana.

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GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX**LAKE CHARLES, LOUISIANA****KAI PROJECT NO: 2316**

TABLE OF CONTENTS

DIVISION 00	BIDDING & CONTRACT REQUIREMENTS	PAGES
00 01 01	PROJECT TITLE PAGE.....	00 01 01 1-1
00 01 07	SEALS PAGE.....	00 01 07 1-1
00 01 10	TABLE OF CONTENTS.....	00 01 10 1-4
00 01 15	LIST OF DRAWINGS.....	00 01 15 1-1
00 11 13	ADVERTISEMENT FOR BIDS.....	00 11 13 1-2
00 21 13	INSTRUCTIONS TO BIDDERS.....	00 21 13 1-8
00 24 13	SCOPE OF WORK.....	00 24 13 1-1
00 25 13	PRE-BID MEETING.....	00 25 13 1-2
00 31 32	GEOTECHNICAL DATA.....	00 31 32 1-42
00 41 13	LOUISIANA PUBLIC WORK BID FORM.....	00 41 13 1-1
00 41 43	LOUISIANA UNIFORM PUBLIC WORK UNIT PRICE FORM.....	00 41 43 1-1
00 43 13	BID BOND.....	00 43 13 1-1
00 43 25	SUBSTITUTION REQUEST FORM (DURING PROCUREMENT).....	00 43 25 1-4
00 43 36	PROPOSED SUBCONTRACTORS LISTING FORM.....	00 43 36 1-1
00 45 19	NON-COLLUSION AFFIDAVIT OF PRIME BIDDER.....	00 45 19 1-1
00 45 19.13	AFFIDAVIT (R.S. 38:2224 2190 2290-2296).....	00 45 19.13 1-2
00 45 19.16	ATTESTATION FORM.....	00 45 19.16 1-2
00 45 19.19	VERIFICATION OF EMPLOYEES AFFIDAVIT.....	00 45 19.19 1-1
00 45 26	CERTIFICATION REGARDING UNPAID WORKER'S COMPENSATION INSURANCE.....	00 45 26 1-1
00 45 43	RESOLUTION FORM.....	00 45 43 1-1
00 45 63	ROOFING MANUFACTURER GUARANTEE.....	00 45 63 1-1
00 45 63.13	APPROVED APPLICATOR LETTER.....	00 45 63.13 1-1
00 51 00	NOTICE OF AWARD FORM.....	00 51 00 1-1
00 52 13	CONTRACT BETWEEN OWNER & CONTRACTOR AND PERFORMANCE AND PAYMENT BOND.....	00 52 13 1-15
00 55 00	NOTICE TO PROCEED FORM.....	00 55 00 1-1
00 62 11	SUBMITTAL TRANSMITTAL FORM.....	00 62 11 1-1
00 62 76.13	SALES TAX EXEMPTION CERTIFICATE (LDR FORM R-1020).....	00 62 76.13 1-1
00 63 13	REQUEST FOR INFORMATION (RFI) FORM.....	00 63 13 1-1
00 63 57	CHANGE ORDER REQUEST FORM.....	00 63 57 1-1
00 63 63	CHANGE ORDER FORM.....	00 63 63 1-1
00 65 19	RECOMMENDATION OF ACCEPTANCE.....	00 65 19 1-1
00 65 83	BENEFICIAL OCCUPANCY.....	00 65 83 1-1
00 72 13	GENERAL CONDITIONS (A201-2017).....	00 72 13 1-38
00 73 00	SUPPLEMENTARY CONDITIONS.....	00 73 00 1-10
00 73 16	INSURANCE REQUIREMENTS FOR CONSTRUCTION.....	00 73 16 1-4
00 80 00	FEDERAL CLAUSE ATTACHMENT.....	00 80 00 1-10
DIVISION 01	GENERAL REQUIREMENTS	
01 10 00	SUMMARY OF WORK.....	01 10 00 1-3
01 21 00	ALLOWANCES.....	01 21 00 1-2
01 25 00	SUBSTITUTION PROCEDURES.....	01 25 13 1-3
01 26 00	CONTRACT MODIFICATION PROCEDURES.....	01 26 00 1-2
01 29 00	PAYMENT PROCEDURES.....	01 29 00 1-3
01 31 00	PROJECT MANAGEMENT AND COORDINATION.....	01 31 00 1-6
01 32 16	CONSTRUCTION SCHEDULING.....	01 32 16 1-10
01 33 00	SUBMITTAL PROCEDURES.....	01 33 00 1-7
01 41 26	PERMIT REQUIREMENTS.....	01 41 26 1-1
01 42 00	REFERENCES.....	01 42 00 1-5
01 42 16	DEFINITIONS & STANDARDS.....	01 42 16 1-1
01 45 00	QUALITY CONTROL.....	01 45 00 1-2
01 45 13	PROCEDURES AND CONTROLS.....	01 45 13 1-2

01 50 00	TEMPORARY FACILITIES AND CONTROLS.....	01 50 00 1-7
01 56 26	TEMPORARY FENCING CHAINLINK.....	01 56 26 1-1
01 57 19	TEMPORARY ENVIRONMENTAL CONTROLS.....	01 57 19 1-5
01 58 13	TEMPORARY PROJECT SIGNAGE.....	01 58 13 1-2
01 60 00	PRODUCT REQUIREMENTS.....	01 60 00 1-3
01 73 00	EXECUTION.....	01 73 00 1-7
01 73 29	CUTTING AND PATCHING.....	01 73 29 1-1
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.....	01 74 19 1-7
01 77 00	CLOSEOUT PROCEDURES.....	01 77 00 1-4
01 78 39	PROJECT RECORD DOCUMENTS.....	01 78 39 1-2
DIVISION 02	EXISTING CONDITIONS	
02 41 00	DEMOLITION.....	02 41 00 1-3
02 41 19	SELECTIVE DEMOLITION.....	02 41 19 1-6
DIVISION 03	CONCRETE	
03 20 00	CONCRETE REINFORCING.....	03 20 00 1-4
03 30 00	CAST-IN-PLACE CONCRETE.....	03 30 00 1-20
03 39 35	CONCRETE SEALER.....	03 35 00 1-3
03 48 16	PRECAST CONCRETE SPLASH BLOCKS.....	03 48 16 1-3
DIVISION 04	MASONRY	
04 05 13	MASONRY MORTARING.....	04 05 13 1-2
04 21 13	BRICK MASONRY.....	04 21 13 1-8
DIVISION 05	METALS	
05 05 00	COMMON WORK RESULTS FOR METALS.....	05 05 00 1-3
05 12 00	STRUCTURAL STEEL.....	05 12 00 1-3
05 21 19	OPEN WEB STEEL JOISTS FRAMING.....	05 21 19 1-2
05 50 00	METAL FABRICATIONS.....	05 50 00 1-3
05 51 00	PRE-FABRICATION METAL STAIRS.....	05 51 00 1-4
DIVISION 06	WOOD, PLASTICS & COMPOSITES	
06 10 00	ROUGH CARPENTRY.....	06 10 00 1-4
06 16 40	GYPSUM SHEATHING.....	06 16 40 1-4
06 20 00	FINISH CARPENTRY.....	06 20 00 1-3
06 61 19	QUARTZ SURFACING COUNTERTOP.....	06 61 19 1-6
DIVISION 07	THERMAL AND MOISTURE PROTECTION	
07 19 23	SILOXANE WATER REPELLENTS.....	07 19 23 1-4
07 21 00	THERMAL INSULATION (ROOF LINER SYSTEM).....	07 21 00 1-6
07 21 00.1	THERMAL INSULATION	07 21 00.1 1-6
07 25 00	WEATHER BARRIER.....	07 25 00 1-6
07 41 13.13	STANDING SEAM ROOF PANELS.....	07 41 13.13 1-8
07 60 00	FLASHING AND SHEET METAL.....	07 60 00 1-3
07 71 23	GUTTERS AND DOWNSPOUTS.....	07 71 23 1-4
07 84 13	PENETRATION FIRESTOPPING.....	07 84 13 1-3
07 92 00	JOINT SEALERS.....	07 92 00 1-2
DIVISION 08	OPENINGS	
08 11 00	STEEL DOORS AND FRAMES.....	08 11 00 1-6
08 11 13	HOLLOW METAL DOORS AND FRAMES.....	08 11 13 1-4
08 14 00	WOOD DOORS.....	08 14 00 1-4
08 33 23	OVERHEAD COILING DOORS.....	08 33 23 1-8
08 41 13	ALUMINUM FRAMED ENTRANCES AND STOREFRONTS.....	08 41 13 1-5

08 70 00	BUILDING HARDWARE.....	08 70 00 1-3
08 71 00	DOOR HARDWARE.....	08 71 00 1-10
08 80 00	GLASS AND GLAZING.....	08 80 00 1-4
DIVISION 09	FINISHES	
09 29 00	GYPSUM BOARD.....	09 29 00 1-9
09 51 00	ACOUSTICAL CEILINGS.....	09 50 00 1-6
09 65 13.13	RESILIENT WALL BASE.....	09 65 13.13 1-6
09 65 19.23	VINYL TILE FLOORING.....	09 65 19.23 1-4
09 68 13	TILE CARPETING.....	09 68 13 1-6
09 91 13	EXTERIOR PAINTING.....	09 91 13 1-9
09 91 23	INTERIOR PAINTING.....	09 91 23 1-11
DIVISION 10	SPECIALTIES	
10 14 16	PLAQUE.....	10 14 16 1-2
10 14 23	PANEL SIGNAGE.....	10 14 23 1-2
10 21 13.19	SOLID PLASTIC TOILET COMPARTMENTS.....	10 21 13.19 1-3
10 22 23	OPERABLE WALLS.....	10 22 23 1-1
10 28 13.13	COMMERCIAL TOILET ACCESSORIES.....	10 28 13.13 1-4
10 44 16.13	PORTABLE FIRE EXTINGUISHERS.....	10 44 16.13 1-2
10 73 16.13	METAL CANOPIES.....	10 73 16.13 1-3
DIVISION 11	EQUIPMENT	
NOT USED		
DIVISION 12	FURNISHINGS	
NOT USED		
DIVISION 13	SPECIAL CONSTRUCTION	
13 34 19	METAL BUILDING SYSTEMS.....	13 34 19 1-10
DIVISION 14	CONVEYING EQUIPMENT	
NOT USED		
DIVISION 21	FIRE SUPPRESSION	
21 00 00	FIRE PROTECTION GENERAL PROVISIONS.....	21 00 00 1-12
21 11 00	SPRINKLER PIPING.....	21 11 00 1-12
21 13 19	SPRINKLER SYSTEMS.....	21 13 19 1-12
DIVISION 22	PLUMBING	
22 00 00	PLUMBING GENERAL PROVISIONS.....	22 00 00 1-11
22 05 00	COMMON WORK RESULTS FOR PLUMBING.....	22 05 00 1-6
22 05 19	PLUMBING PIPING.....	22 05 19 1-7
22 07 00	PLUMBING INSULATION.....	22 07 00 1-2
22 11 23	NATURAL GAS PIPING.....	22 11 23 1-12
22 13 19	PLUMBING SPECIALTIES.....	22 13 19 1-5
22 14 00	DRAINAGE AND VENT SYSTEMS.....	22 14 00 1-6
22 40 00	PLUMBING FIXTURES.....	22 40 00 1-5
DIVISION 23	HVAC	
23 00 10	MECHANICAL GENERAL PROVISIONS.....	23 00 10 1-14
23 00 20	BASIC MECHANICAL REQUIREMENTS.....	23 00 20 1-6
23 05 10	ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT.....	23 05 10 1-5
23 05 29	HANGERS AND SUPPORTS.....	23 05 29 1-5
23 05 53	MECHANICAL IDENTIFICATION.....	23 05 53 1-5
23 05 93	TESTING, ADJUSTING, AND BALANCING.....	23 05 93 1-5

23 07 13	INSULATION.....	23 07 13 1-3
23 31 13	METAL DUCTS.....	23 31 33 1-15
23 33 00	DUCT ACCESSORIES.....	23 33 00 1-5
23 37 13	DIFUSERS, REGISTERS, AND GRILLES.....	23 37 13 1-3
23 74 12	PACKAGED UNITS.....	23 74 12 1-5
23 80 00	AIR CONDITIONING, HEATING, AND VENTILATION.....	23 80 00 1-4
23 80 25	VRF EQUIPMENT.....	23 80 25 1-23

DIVISION 25 INTEGRATED AUTOMATION

NOT USED

DIVISION 26 ELECTRICAL

26 00 01	ELECTRICAL GENERAL PROVISIONS.....	26 00 01 1-13
26 05 00	BASIC MATERIALS AND METHODS.....	26 05 00 1-9
26 05 26	GROUNDING.....	26 05 26 1-4
26 05 71	ACCEPTANCE TESTING.....	26 05 71 1-5
26 05 72	OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY.....	26 05 72 1-5
26 05 73	OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY.....	26 05 73 1-8
26 05 74	OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY.....	26 05 74 1-6
26 09 23	OCCUPANCY SENSORS.....	26 09 23 1-2
26 27 13	ELECTRICAL DISTRIBUTION SYSTEM.....	26 27 13 1-6
26 41 13	LIGHTNING PROTECTION.....	26 41 13 1-5
26 43 13	SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS.....	26 43 13 1-5
26 51 00	LIGHTING FIXTURES.....	26 51 00 1-4

DIVISION 27 COMMUNICATIONS

27 05 00	TELE/DATA RACEWAY SYSTEM.....	27 05 00 1-2

DIVISION 28 ELECTRONIC SAFETY AND SECURITY

28 31 10	INTELLIGENT COMMUNICATING FIRE DETECTION SYSTEM.....	28 31 10 1-23

DIVISION 31 EARTHWORK

31 00 00	EARTHWORK.....	31 00 00 1-6
31 10 00	SITE CLEARING.....	31 10 00 1-3
31 10 13	SITE PREPARATION.....	31 10 13 1-3
31 24 23	EXCAVATION EMBANKMENT GRADING & SHAPING SUBBASE.....	31 24 23 1-2
31 31 16	TERMITE CONTROL.....	31 31 16 1-2
31 63 29	DRILLED CAST-IN-PLACE CONCRETE SHAFTS.....	31 63 29 1-8

DIVISION 32 EXTERIOR IMPROVEMENTS

32 16 00	CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS.....	32 16 00 1-5
32 92 13	HYDROMULCH.....	32 92 13 1-3

DIVISION 33 UTILITIES

33 05 33	DRAIN PIPE.....	33 05 33 1-1
33 10 00	WATER DISTRIBUTION.....	33 10 00 1-6
33 30 00	SANITARY SEWERAGE.....	33 30 00 1-6
33 40 00	STORM DRAINAGE UTILITIES.....	33 40 00 1-4
33 41 00	STORM UTILITY DRAINAGE PIPING.....	33 41 00 1-7
33 41 16.16	GEOCOMPOSITE FIELD SUBDRAINAGE.....	33 41 16.16 1-4
33 42 00	STORMWATER CONVEYANCE.....	33 42 00 1-1
33 42 31	CATCH BASINS.....	33 42 31 1-4

DIVISION 34 TRANSPORTATION

NOT USED

DIVISION 35	WATERWAY AND MARINE CONSTRUCTION
NOT USED	

END OF TABLE OF CONTENTS

LIST OF DRAWINGS

BUILDING "A"

G-100	PROJECT INFORMATION
CH-S-200	ROOF FRAMING PLAN
CH-A-100	MASTER SITE PLAN
CH-A-200	OVERALL FLOOR PLAN
CH-A-201	FLOOR PLAN - NW QUADRANT
CH-A-202	FLOOR PLAN - NE QUAD
CH-A-203	FLOOR PLAN - SE QUAD
CH-A-204	FLOOR PLAN - SW QUAD
CH-A-300	NORTHEAST ELEVATION
CH-A-301	SOUTHEAST ELEVATION
CH-A-302	SOUTHWEST ELEVATION
CH-A-303	NORTHWEST ELEVATION
CH-A-304	BLDG SECTIONS
CH-A-305	BLDG SECTIONS
CH-A-306	BLDG SECTION
CH-A-400	INTERIOR ELEVATIONS
CH-A-401	INTERIOR ELEVATIONS
CH-A-402	INTERIOR ELEVATIONS
CH-A-403	INTERIOR SECTIONS
CH-A-404	INTERIOR SECTIONS
CH-A-500	WALL SECTIONS
CH-A-501	WALL SECTIONS
CH-A-502	MISC DETAILS
CH-A-503	ENTRANCE WALL
CH-A-600	ENLARGED DETAILS - PLAN SECTIONS
CH-A-601	ENLARGED DETAILS - PLAN SECTIONS
CH-A-602	ENLARGED DETAILS - PLAN SECTIONS
CH-A-603	ENLARGED DETAILS - PLAN SECTIONS
CH-A-800	ROOM FINISH SCHEDULE
CH-A-801	DOOR SCHEDULE

CIVIL

C-0.0	SWPP PLAN, DETAILS & NOTES
C-0.1	DEMOLITION PLAN AND NOTES
C-1.0	CIVIL SITE LAYOUT PLAN AND NOTES
C-1.1	GRADING AND PAVEMENT JOINT PLAN
C-1.2	DRAINAGE PLAN AND NOTES
C-1.3	CIVIL DETAILS AND SECTIONS

ELECTRICAL

CC-E-001	ELECTRICAL SITE PLAN
CC-E-100	LIGHTING PLAN
CC-E-LC1	LIGHTING CONTROL PANEL
CC-E-200	POWER & SPECIAL SYSTEMS PL.
CC-E-300	SPECIAL SYSTEMS PL.
CC-E-400	HVAC POWER PL.
CC-E-500	ELECTRICAL SCHEDULES & DETAILS

CC-E-600	ELECTRICAL SCHEDULES & DETAILS
CC-E-700	ELECTRICAL DETAILS
CC-E-800	ELECTRICAL PANEL SCHEDULE
CC-E-900	ELECTRICAL RISER DIAGRAM

MECHANICAL

M-100	HVAC PLAN
M-200	MULTI PURPOSE HVAC
M-300	HVAC SCHEDULES
M-400	HVAC DETAILS

PLUMBING

P-100	PLUMBING PLAN
P-101	ENLARGED PLUMBING PLAN
P-200	PLUMBING PLAN MULTI-PURPOSE BLG
P-300	PLUBING DETAILS & SCHEDULES
M-100	PLUMBING RISERS

STRUCTURAL

S-100	FOUNDATION PLAN
S-101	TYPICAL FOUNDATION DETAILS & SECTIONS
S-102	FOUNDATION SECTIONS & DETAILS

ALTERNATE #1

BUILDING "B" - MINISTRY CENTER

MC-D-100	FIRST FLOOR DEMO
MC-D-101	DEMO 2ND FLOOR
MC-A-200	FIRST FLOOR PLAN
MC-A-201	SECOND FLOOR PLAN
MC-A-202	ENLARGED PLANS
MC-A-300	NORTH & WEST ELEVATIONS
MC-A-301	SOUTH & EAST ELEVATIONS
MC-A-302	BUILDING SECTIONS
MC-A-400	INTERIOR ELEVATIONS
MC-S-100	CONCRETE OVERLAY
MC-A-801	ROOM FINISH - WINDOW SCHEDULE
MC-A-800	SCHEDULES

ELECTRICAL

MC-E-101	LIGHTING PLAN MULTI-PURPOSE
MC-E-LC1	LIGHTING CONTROL PLAN
MC-E-201	POWER & DATA MULTI-PURPOSE
MC-E-301	SPECIAL SYSTREMS
MC-E-401	HVAC POWER PLAN
MC-E-501	ELECTRICAL SCHEDULES & DETAILS
MC-E-601	ELECTRICAL SCHEDULES & DETAILS
MC-E-701	ELECTRICAL DETAILS
MC-E-801	ELECTRICAL PANEL SCHEDULE
MC-E-901	ELECTRICAL RISER DIAGRAM

EAST CAMPUS

D-100	DEMOLITION PLAN

ALTERNATE # 2
BUILDING "C"

A-300 EXTERIOR ELEVATIONS

BUILDING "D"

A-300 EXTERIOR ELEVATIONS

ADVERTISEMENT FOR BID

Greater St Mary Missionary Baptist Church does hereby advertise for sealed bids and will open same on: **THURSDAY, OCTOBER 2nd, 2025 at 2:00 PM**, at King Architects, Inc, 1312 Sampson Street, Westlake, LA 70669 for:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

Bona fide bidders may obtain a digital copy of the proposed contract documents in PDF format, including plans and specifications, from King Architects, Inc. at office@kingarchitects.net. Or complete physical, paper documents may be obtained upon deposit of \$200.00 for each set of documents at 1312 Sampson St., Westlake, LA 70669. Deposit is fully refundable for the first set of documents to all bona fide prime* bidders upon return of the documents in good condition no later than ten (10) days after receipt of bids.

Prime bidders are defined as licensed General Contractor bidding this job as such.

Preference is given to materials, supplies, and provisions that are produced manufactured, or grown in Louisiana, quality being equal to articles offered by competitors outside the State.

A **MANDATORY PRE-BID Conference** for general contractors with the Project Architect will be held at the project site on **MONDAY, SEPTEMBER 15TH, 2025 at 10:00 AM**. Bidders must be present the entire meeting in order to bid.

All bids must be accompanied by bid security equal to five percent (5%) of the sum of the base bid and all alternates, and must be in the form of a certified check or cashier's check drawn on a bank insured by the FDIC, or the Bid Bond Form contained in the bidding documents, which shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent (10%) of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents, all in accordance with LSA-R.S. 38:2218. No Bid Bond indicating an obligation of less than five percent (5%) by any method is acceptable.

The successful bidder shall be required to furnish a Performance and Payment Bond written by a company licensed to do business in Louisiana, in an amount equal to 100% of the Contract amount, written by a surety company licensed to do business in Louisiana with an A.M. Best Rating of "A-" or better, all in accordance with LS R.S. 38:2219. The bond shall be countersigned by a person who is under contract with the surety company or bond issuer as an insurance agent in this State, and who is residing in this State.

Bids shall be accepted only from contractors who are licensed under LS R.S. 37:2150-2163 for the classification of **Building Construction**. No bid may be withdrawn for a period of forty-five (45) days after receipt of bids, except under the provisions of LS R.S. 38:2214.

The Owner reserves the right to reject any and all bids for just cause. In accordance with LS R.S. 38:2212(B)(1), the provisions and requirements of this Section, and those stated in the Bidding Documents shall not be waived by any entity. Awarding or rejecting bids shall be in accordance with LA Public Bid Law Statues.

The public shall incur no obligation to the Contractor until the Contract between Greater St Mary Missionary Baptist Church and the Contractor is fully executed.

Official action on this bid will be taken within forty-five (45) days by Greater St Mary Missionary Baptist Church.

All bids must be plainly marked on the outside of the envelope:

BID FOR: **GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX**
Contractor's Name
State of Louisiana License Number

GREATER ST MARY MISSIONARY BAPTIST CHURCH

ADVERTISEMENT SHALL RUN: American Press – **AUGUST 22ND, 29TH, AND September 5th**.

KING ARCHITECTS, INC.

SECTION 00 11 16

INVITATION TO BID

Greater St Mary Missionary Baptist Church Complex, hereinafter termed the Owner, does hereby invite to bid on a General Contract for Complex at 1401 Moeling Street, Lake Charles, Louisiana 70601. The bids shall be on a lump sum basis.

A **MANDATORY Pre-Bid Conference** for general contractors will be held at the Project Site on MONDAY, SEPTEMBER 15th, 2025 at 10:00 AM., local time. Bidders must be present the entire meeting in order to bid.

The Owner will receive bids **NO LATER THAN: THURSDAY, OCTOBER 2ND, 2025 at 2:00 PM., local time.**

AT: King Architects, Inc (KAI), 1312 Sampson Street, Westlake, Louisiana 70669. Attention Barry King.

Bids may be mailed or delivered to the address above. Bids received after this time will not be accepted. Bids will be publicly opened and read aloud at the time and date mentioned.

The Owner, unless designated to another entity, supervises the bidding and awarding of all construction contracts, approves contracts, change orders, requests for payment and ensures that on-site inspections are accomplished

Bona fide bidders may obtain a digital copy of the proposed contract documents in PDF format, including plans and specifications, from King Architects, Inc. at office@kingarchitects.net. Or complete physical, paper documents may be obtained upon deposit of \$200.00 for each set of documents at 1312 Sampson St., Westlake, LA 70669. Deposit is fully refundable for the first set of documents to all bona fide prime* bidders upon return of the documents in good condition no later than ten (10) days after receipt of bids.

Prime bidders are defined as licensed General Contractor bidding this job as such.

Preference is given to materials, supplies, and provisions that are produced manufactured, or grown in Louisiana, quality being equal to articles offered by competitors outside the State.

All bids must be accompanied by bid security equal to five percent (5%) of the sum of the base bid and all alternates, and must be in the form of a certified check or cashier's check drawn on a bank insured by the FDIC, or the Bid Bond Form contained in the bidding documents, which shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent (10%) of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents, all in accordance with LSA-R.S. 38:2218. No Bid Bond indicating an obligation of less than five percent (5%) by any method is acceptable.

The successful bidder shall be required to furnish a Performance and Payment Bond written by a company licensed to do business in Louisiana, in an amount equal to 100% of the Contract amount, written by a surety company licensed to do business in Louisiana with an A.M. Best Rating of "A-" or better, all in accordance with LS R.S. 38:2219. The bond shall be countersigned by a person who is under contract with the surety company or bond issuer as an insurance agent in this State, and who is residing in this State.

Bids shall be accepted only from contractors who are licensed under LS R.S. 37:2150-2163 for the classification of **Building Construction**. No bid may be withdrawn for a period of forty-five (45) days after receipt of bids, except under the provisions of LS R.S. 38:2214.

The Owner reserves the right to reject any and all bids for just cause. In accordance with LS R.S. 38:2212(B)(1), the provisions and requirements of this Section, and those stated in the Bidding Documents shall not be waived by any entity. Awarding or rejecting bids shall be in accordance with LA Public Bid Law Statutes.

Official action on this bid will be taken within forty-five (45) days by Greater St Mary Missionary Baptist Church.

All bids must be plainly marked on the outside of the envelope:

BID FOR:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

Contractor's Name

State of Louisiana License Number

-----+

ARTICLE 1 - DEFINITIONS
1.1 The Bidding Documents include the following:

Title Page
 Seals Page
 Table of Contents
 List of Drawings
 Invitation to Bid
 Instruction to Bidders
 Scope of Work
 Pre-Bid Meeting Form
 Geotechnical Data, if applicable
 Louisiana Public Work Bid Form
 Louisiana Public Work Unit Price Form, if applicable
 Bid Bond
 Allowance Form, if applicable
 Substitution Request Form (During Procurement)
 Proposed Subcontractor Listing Form
 Non-Collusion Affidavit of Prime Bidder
 Attestation Form
 Verification of Employees Affidavit
 Certification Regarding Unpaid Workers' Compensation Insurance
 Resolution
 Notice of Award
 Contract Between Owner and Contractor (AIA A101-2017)
 Notice to Proceed
 Performance and Payment Bond (AIA A312-2010)
 Submittal Transmittal Form
 Application for Payment Certificate (AIA G702 & 703-1992)
 Request for Information (RFI) Form
 Change Order Request Form
 Change Order
 Certificate of Substantial Completion (AIA G704-2017)
 General Conditions of the Contract for Construction (AIA A201-2017)
 Supplementary Conditions
 Specifications, Divisions 01 – 35 dated MARCH, 2025
 Drawings Sheets Numbered G0.0 thru E-1.0, dated MARCH 2025
 Any Addenda Issued during the bid period and acknowledged in the Bid Form.

1.1.1 Forms turned in with bid. The Louisiana Uniform Public Work Bid Form (Section 00 41 13), Unit Prices Form, if applicable (Section 00 41 43), Bid Bond Form (Section 00 43 13), and a Corporate Resolution (Section 00 45 43) or written evidence of the authority of the person signing the bid are the **only** forms that are to be turned in by the date and time specified.

1.1.2 Forms turned in within ten (10) days after the bid opening. The Subcontractor's Listing (Section 00 43 36), the Louisiana Non-Collusion Affidavit of Prime Bidder (LA-R.S. 38:2224) (Section 00 45 19), the Attestation (LA-R.S. 38:2227) (Section 00 45 19.16), Verification of Employees Affidavit (LA-R.S. 38:2212.10) (Section 00 45 19.19), Certification Regarding Unpaid Workers' Compensation Insurance (LA-R.S. 23:1726(B)) (Section 00 45 19.19), the Roofing Manufacturing Warranty Letter (Section 00 45 63) and Approved Applicator Letter (Section 00 45 63.13), if applicable

1.2 All definitions set forth in the General Conditions of the Contract for Construction, A.I.A. Document A201, or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written on graphic instruments issued by the Architect prior to the opening of bids which modify or interpret the bidding documents by additions, deletions, clarifications, corrections, and prior approvals.

-
- 1.4 A Bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bidding Documents.
 - 1.5 Base Bid is the sum stated in the Bid for which the Bidder offers to perform the work described as the Base, to which work may be added for sums stated in Alternate Bids.
 - 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or subtracted from the amount of the base bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.
 - 1.7 A Bidder is one who submits a bid for a prime contract with the Owner for the work described in the proposed contract documents.
 - 1.8 A Sub bidder is one who submits a bid to a Bidder for materials and/or labor for a portion of the work.
 - 1.9 Where the word "Architect" is used in any of the Documents, it shall refer to the Prime Designer of the project, an Architect, Engineer or Landscape Architect.

ARTICLE 2 - BIDDER'S REPRESENTATION

- 2.1 Each Bidder by making his bid represents that:
 - 2.1.1 He has read and understands the Bidding Documents and his Bid is made in accordance therewith.
 - 2.1.2 He has visited the site and has familiarized himself with the local conditions under which the work is to be performed.
 - 2.1.3 His bid is based upon the materials, systems and equipment described in the Bidding Documents as advertised and as modified by Addenda.
- 2.2 The Bidder must be fully qualified under any state or local licensing law for Contractors in effect at the time and at the location of the work before submitting his bid. In the State of Louisiana, Revised Statutes 37:2150, et seq. will be considered, if applicable. The Contractor shall be responsible for determining that all of his Sub bidders or prospective Subcontractors are duly licensed in accordance with law.

ARTICLE 3 - BIDDING DOCUMENTS

- 3.1 Copies
 - 3.1.1 Bidding Documents may be obtained from the Architect as stated in the Advertisement for Bids.
 - 3.1.2 Complete sets of Bidding Documents shall be used in preparing bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretation resulting from the use of incomplete sets of Bidding Documents.
 - 3.1.3 The Owner or Architect in making copies of the Bidding Documents available on the above terms, do so only for the purpose of obtaining bids on the work and do not confer a license or grant for any other use.
- 3.2 Interpretation or correction of Bidding Documents.
 - 3.2.1 Bidders shall promptly notify the Architect of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.
 - 3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect, to reach him at least seven days prior to the date of receipt of bids.
 - 3.2.3 Any interpretation, correction or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not

rely upon such interpretations, corrections and changes.

3.3 Substitutions

- 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.
- 3.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Architect at least **ten (10)** days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the Proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.
- 3.3.3 If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

3.4 Addenda

- 3.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of Bidding Documents.
- 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- 3.4.3 Addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening bids, excluding Saturdays, Sundays, and any other legal holidays; however, if the necessity arises to issue an addendum modifying plans and specifications within the seventy-two hour (72) period prior to the advertised time for the opening of bids, then the opening of bids shall be extended for at least seven but not more than twenty-one working days, without the requirement of readvertising. The addendum shall state the revised time and date for the opening of bids. The Owner shall be consulted prior to issuance of such an Addendum and shall approve such issuance.
- 3.4.4. Each Bidder shall ascertain from the Architect prior to submitting his bid that he has received all Addenda issued, and he shall acknowledge their receipt on the Bid Form.

ARTICLE 4 - BIDDING PROCEDURE

4.1 Form and Style of Bids.

- 4.1.1 Bids shall be submitted on the form provided by the Architect in these bidding documents; see Section 00 41 13.
- 4.1.2 All blanks on the Bid Form shall be filled in by the typewriter or manually in ink.
- 4.1.3 Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.
- 4.1.4 Any interlineations, alteration or erasure must be initialed by the signer of the Bid or his authorized representative.
- 4.1.5 Bidders are cautioned to complete all Alternates should such be required in the Bid Form. Failure to submit alternate prices will render the Proposal informal and may cause its rejection.
- 4.1.6 Bidder shall make no additional stipulation on the Bid Form nor qualify his Bid in any other manner.
- 4.1.7 The Bid shall include the legal name of Bidder and statement whether Bidder is a sole proprietor, a partnership, a corporation, or any other legal entity, and the bid shall be signed by the person or persons legally authorized to bind

the Bidder to a contract. A Bid submitted by any agency shall have a current Power of Attorney attached certifying agent's authority to bind Bidder.

- 4.1.8 On any Bid in excess of fifty thousand dollars (\$50,000.00), the Contractor shall certify that he is licensed under R.S. 37:2150-2163 and show his license number on the Bid above his signature or his duly authorized representative.

4.2 Bid Security

- 4.2.1 No Bid shall be considered or accepted unless the bid is accompanied by bid security in an amount of not less than five percent (5%) of the Base Bid and all additive Alternates. The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or on the Bid Bond Form (Section 00 43 13) contained in these bidding documents, which shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent (10%) of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents, all in accordance with LSA-R.S. 38:2218. No Bid Bond indicating an obligation of less than five percent (5%) by any method is acceptable.

Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Contract Documents, within ten (10) days after written notice that the instrument is ready for his signature.

Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

- 4.2.2 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all bids have been rejected.

4.3 Submission of Bids

- 4.3.1 Bids shall be sealed in an opaque envelope and will be received until the time specified and at the place specified in the Advertisement for Bids. It shall be the specific responsibility of the Bidder to deliver his sealed bid to King Architects, Inc. and prior the announced time for the opening of bids. Later delivery of a bid for any reason, including late delivery by United States Mail, or express delivery, shall disqualify the bid. The bid envelope shall be identified on the outside with the name of the project, and the name, address, and license number of the Bidder as required by R.S. 37:2163. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof. Such bids shall be sent by Registered or Certified Mail, Return Receipt Requested, addressed to: King Architects, Inc., 1312 Sampson Street, Westlake, LA 70669.
- 4.3.2 Bids shall be deposited at the designated location prior to the time on the date for receipt of bids indicated in the Advertisement for Bids, or an extension thereof made by Addendum. Bids received after the time and date for receipt of bids will be returned unopened.
- 4.3.3 Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.
- 4.3.4 Oral, telephonic, or telegraphic bids or modifications to bids are invalid and will not receive consideration. Owner will not consider notation written on outside of Bid Envelope which have the effect of amending the Bid.

4.4 Modification or Withdrawal of Bid

- 4.4.1 A bid may not be modified, withdrawn or canceled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and the Bidder so agrees in submitting his bid, except in accordance with Act III of 1983 which states, in part, "Bids containing patently obvious

mechanical, clerical, or mathematical errors may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty-eight hours of the bid opening excluding Saturdays, Sundays and legal holidays”.

- 4.4.2 Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.
- 4.4.3 Withdrawn Bids may be resubmitted up to the time designated for the receipt for bids provided that they are then fully in conformance with these Instructions to Bidders.
- 4.4.4 Bid Security shall be in an amount sufficient for the Bid as modified or resubmitted.

ARTICLE 5 - CONSIDERATION OF BIDS

5.1 Opening of Bids.

- 5.1.1 The properly identified bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the Base Bids and Alternates, if any, will be made available to Bidders.

5.2 Rejection of Bids

- 5.2.1 The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by any required bid security or data required by the Bidding Documents or a Bid in any way incomplete or irregular.

5.3 Acceptance of Bid

- 5.3.1 Any bid shall include no more than three alternates. Alternates, if accepted, shall be accepted in the order in which they are listed on the bid form. Determination of the low bidder shall be on the basis of the sum of the base bid and any alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the low bidder. LA. R.S. 38:2212 (A) (3) (e); Act 868.
- 5.3.2 It is the intent of the Owner to award a contract to the lowest responsible Bidder in accordance with the requirements of the Bidding Documents, and if the bid does not exceed the funds available.

ARTICLE 6 - POST BID INFORMATION

6.1 Post Bid Documents.

- 6.1.1 Within 10 days after bids are opened, the Contractor, identified as the apparent low bidder, will make the following submittals to the Architect. A tentative list of all Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to special design) proposed for principal portions of the work, as well as the proposed Superintendent. Also provide a designation of the work to be performed by the Contractor with his own forces. No bids shall be received within 24 hours before a weekend or legal holiday, unless deemed necessary by the Owner.

It is recognized that the acceptance or rejection of alternates contained in the bid proposal may ultimately determine the low bidder on the project. In the event a Contractor, other than the Contractor identified as the apparent low bidder at the bid opening, becomes the low bidder as a result of such selection of alternates, this Contractor shall make the submittals required by this section within 24 hours after notification by the Owner.

- 6.1.2 The Contractor will be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the proposed subcontractors to furnish and perform the work described in the section of the specifications pertaining to such proposed Subcontractors' respective trades.
- 6.1.3 The Architect will notify the Contractor if the Owner, after due investigation, has reasonable and substantial objection to any person or organization on the Contractor's list of proposed Subcontractors. If there are objections the Contractor

shall submit alternative Subcontractor(s) for their approval.

- 6.1.4 Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and the Architect upon the awarding of a contract must be used on the work for which they were proposed and accepted and shall not be changed except upon the recommendation of the Architect and approved by the Owner in the form of a change order. Any changes on the tentative 24-hour list submitted by the Contractor prior to the awarding of the contract must be requested in writing to the Architect with proper justification. Any change in the tentative List of Subcontractors will require recommendation from the Architect to the Owner. The recommendation and approval of the Owner must be made in writing.
- 6.1.6 The lowest responsible bidder on this project shall execute a Non-Collusion Affidavit of Prime Bidder which is found within this bid package, see Section 00 45 19. The Non-Collusion Affidavit form shall be submitted to the Owner through the Architect ten (10) days after the opening of bids
- 6.1.7 In accordance with LA-R.S. 38:2224 2190 2290-2296, the lowest responsible bidder on this project shall execute an Affidavit which is found within this bid package, see Section 00 45 19.13. The Affidavit form shall be submitted to the Owner through the Architect ten (10) days after the opening of bids.
- 6.1.8 In accordance with La. R.S. 38:2227, the lowest responsible bidder on this project must submit the completed Attestation Affidavit (Past Criminal Convictions of Bidders) form found within this bid package; see Section 00 45 19.16. The Attestation Affidavit form shall be submitted to the Owner through the Architect within ten (10) days after the opening of bids.
- 6.1.9 The lowest responsible bidder on this project shall execute a Manufacturer's Warranty letter from the manufacturer that they approve installing the specified roof system. This manufacturer shall be one that has received prior approval or is named in the specifications. The Manufacturer' Warranty letter shall be submitted to the Owner through the Architect ten (10) days after the opening of bids
- 6.1.10 The lowest responsible bidder on this project shall execute an Approved Applicator's letter from the manufacturer that the manufacturer will issue the roof system and include the name of the applicator acceptable to the manufacturer for installing the specified roof system. This manufacturer shall be one that has received prior approval or is named in the specifications. The Approved Applicator Letter shall be submitted to the Owner through the Architect ten (10) days after the opening of bids

6.2 Additional Submissions

- 6.2.1 A breakdown of the contract into the 35 Divisions of the C.S.I. shall be provided to the Architect (Schedule of Values). No payments will be made to the Contractor until this is received.
- 6.2.2 A copy of applicable state, parish, or municipal licenses legally required for General Contractor and subcontractors shall be provided to the Architect. No payments will be made to the Contractor until this is received.
- 6.2.3 Federal and state tax identification numbers on General Contractors and subcontractors shall be provided to the Architect. NO payments will be made to the Contractor until this is received.

ARTICLE 7 - PERFORMANCE AND PAYMENT BOND

7.1 Bond Required.

- 7.1.1 The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be countersigned by a person who is contracted with the surety company or bond issuer as an agent of the company or issuer, and who is licensed as an insurance agent in this State, and who is residing in this State, in an amount equal to the 100% of the Contract amount. By issuing such Performance and Payment Bond, the surety acknowledges they are on the current U.S. Department of the Treasury Financial Management Service List of approved bonding companies and complies with all other provisions of R.S. 38:2219.

7.2 Time of Delivery and Form of Bond.

- 7.2.1 The Bidder shall deliver the required bond to the Owner simultaneous with the execution of the Contract.
- 7.2.2 Bond shall be in the form furnished by the Contractor, entitled Contract Between Owner and Contractor and Performance and Payment Bond, a copy of which is included in the Contract Documents; see Section.
- 7.2.3 The Bidder shall require the Attorney-In-Fact who executes the required bond on behalf of the surety to affix thereto a certified and current copy of his power of attorney.

ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 Form to be Used.

- 8.1.1 Form of the Contract to be used shall be furnished by the Contractor, a copy of which is bound in the Bidding Documents; see Section 00 52 13.

8.2 Award

- 8.2.1 In accordance with Louisiana Law, if the Contractor is awarded to the Bidder, he shall at the time of the signing of the Contract execute the Non-Collusion Affidavit included in the Contract Documents.
- 8.2.2 Before award of the contract, the successful Bidders shall furnish to the Owner a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the Bid to sign on behalf of the Contractor.

ARTICLE 9 - COMPLETION TIME AND LIQUIDATED DAMAGES

- 9.1 The Bidder shall agree to fully complete the contract within **730** consecutive calendar days, subject to such extensions as may be granted under Section 4.3.7.1.1 of Supplementary Conditions, Delays and Extensions of Time: in the General Conditions and the Supplementary Conditions, and acknowledges that this construction time will start on or before the date specified in the written Notice to Proceed or the Contractor will be subject to pay to the Owner Liquidated Damages in the amount of **One Thousand Dollars (\$1,000.00)** per day for each day of delay beyond the period indicated provided extension has not been granted as indicated in the contract documents.

ARTICLE 10 - BUILDING MATERIAL EXCLUSIONS

- 10.1 All building materials shall be free of asbestos.
- 10.2 All plumbing materials shall be free of lead.
- 10.3 All paints shall be free of lead.
- 10.4 All contractors should use the least hazardous materials on all jobs. Material Safety Data Sheets (MSDS) shall be given to the owner on all materials used.

ARTICLE 11 – PRE-BID CONFERENCE

- 11.1 A Pre-Bid Conference shall be held at the project site at least 7 days before the date for receipt for bids. The Architect shall coordinate the setting of the date, time and place for the Pre-Bid Conference and shall invite in writing the Owner, and all who have received sets of the Bidding Documents to attend. The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Contract Documents, and to receive comments and information from interested Bidders.
 - 11.1.1 A **MANADATORY PRE-BID** Conference (for General Contractors Only) will be held at the project site, on **MONDAY, SEPTEMBER 15TH, 2025 at 10:00 am.**

- 11.2 Any revision of the Bidding Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an Addendum issued in accordance with Paragraph 3.4 of the Instructions to Bidders.

ARTICLE 12 - APPLICABILITY

- 12.1 Any article located in the Instructions to Bidders found to be in conflict with the General Conditions and/or Supplementary Conditions will take precedence over the latter two set of Articles.

ARTICLE 14 - MISCELLANEOUS PROVISIONS

- 14.1 The General Contractor shall repair, replace, or pay for the relocation of telephones and wiring, fire alarms, intercoms, bells, TV cable, security system wiring and equipment, and any other cable type installation that may be damaged, cut or removed during the construction.
- 14.2 The General Contractor will be responsible for the removal and relocation of any playground equipment that needs to be moved due to construction.
- 14.3 The Owner is hereby recognized as a statutory employer of Contractor's employees, including but not limited to Contractor's direct employees, immediate employees, and statutory employees. This contract recognizes the existence of a statutory employer relationship between the Owner and Contractor in accord with Act 315 of 1997.

END OF SECTION 00 21 13

SCOPE OF WORK

The Project entails furnishing labor, materials, tools and equipment necessary to construct the Sanctuary, Remodel Multi-Purpose Building, and New Veneer on Garage and Mercy Center as per bid documents. The installation of all new materials shall be performed in strict accordance with the Manufacturer's installation instructions and approved shop drawings.

THURSDAY, SEPTEMBER 15TH, 2025 at 10:00 AM

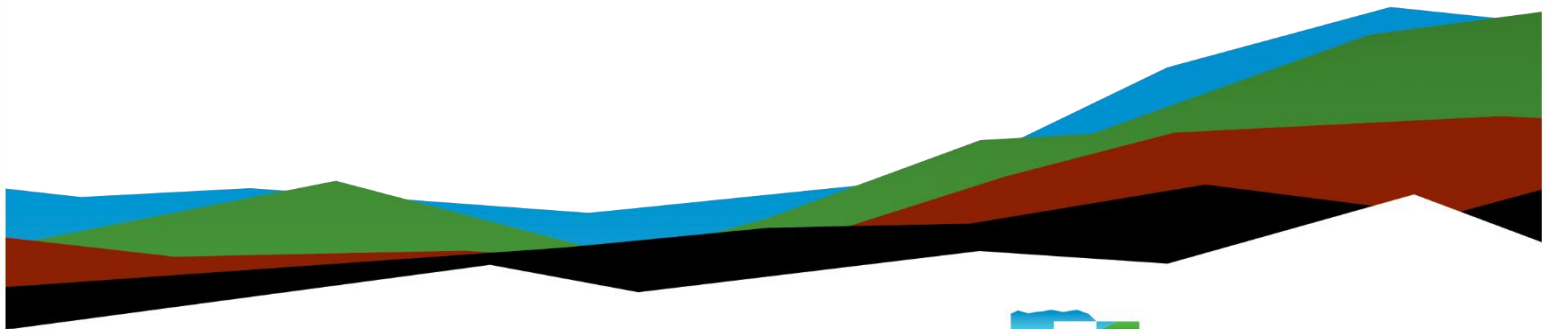
[illegible]

Greater Saint Mary Baptist Church – New Building

Geotechnical Engineering Report

Prepared for:

King Architects, Inc
1312 Sampson St
Westlake, LA 70669



Nationwide
Terracon.com

- Facilities
- Environmental
- Geotechnical
- Materials



220 Prater Road
Sulphur, LA 70663
P (337) 478-5345
Terracon.com

November 26, 2024

King Architects, Inc
1312 Sampson St
Westlake, LA 70669

Attn: Mr. Jack Clark
P: (337) 309-0072
E: Jack@kingarchitects.net

Re: Geotechnical Engineering Report
Greater Saint Mary Baptist Church – New Building
1401 Moeling Street
Lake Charles, Louisiana
Terracon Project No. EU245067 (Rev. 1)

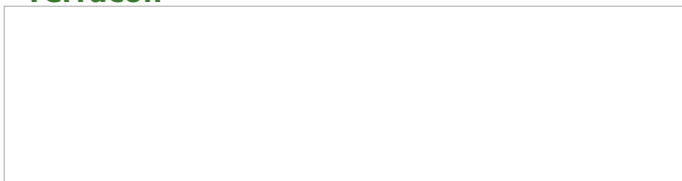
Dear Mr. Clark:

We have completed the scope of Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. PEU245067 dated October 1, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and a floor slab for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon



Lynne E. Roussel, P.E.

Principal | Office Manager

Trent A. Whitley, P.E.

Senior Engineer

Table of Contents

Introduction..... 1

Project Description..... 1

Site Conditions 2

Geotechnical Characterization 3

 Surface Geology 3

 Subsurface Conditions 4

Seismic Site Class..... 5

Geotechnical Overview 5

Earthwork 7

 Demolition 7

 Site Preparation..... 7

 Subgrade Preparation 8

 Fill Material Types 8

 Fill Placement and Compaction Requirements 9

 Utility Trench Backfill.....10

 Grading and Drainage.....11

 Earthwork Construction Considerations 11

 Construction Observation and Testing 12

Shallow Foundations 13

 Design Parameters – Compressive Loads 13

 Design Parameters – Overturning and Uplift Loads 14

 Foundation Construction Considerations 15

Deep Foundations..... 16

 Drilled Concrete Shafts 16

Floor Slabs 21

 Floor Slab Design Parameters 22

 Floor Slab Construction Considerations 22

General Comments 23

Figures

GeoModel

Attachments

- Exploration and Testing Procedures
- Site Location and Exploration Plans
- Exploration and Laboratory Results
- Supporting Information

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed building to be located on the southeast side of the existing campus at 1401 Moeling Street in Lake Charles, Louisiana. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Demolition considerations
- Foundation design and construction
- Floor slab design and construction

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the [Site Location](#) and [Exploration Plan](#), respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs in the [Exploration Results](#) section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	An email request for proposal was provided by Mr. Jack Clark on September 25, 2024. The request included a proposed site plan, denoting the location of the proposed building.
Project Description	The entire site is approximately 3.60 acres and includes several pre-existing buildings. Our proposed project scope includes the construction of an approximately 23,000 square foot building on the southeast side of the property. Mr. Clark also mentioned that construction associated with the existing buildings or new/renovated pavements is not included as a portion of our scope of work.
Proposed Structure	The structure associated with the project includes an approximately 23,000 square foot sanctuary building. Covered walking paths and an awning are also included on the west side of the proposed building.
Building Construction	Not provided; we anticipate that addition will be constructed utilizing a shallow foundation system in conjunction with slab-on-grade construction techniques.
Finished Floor Elevation	Not provided; boring depths have assumed that finished floor is not more than 2 feet from existing grade.
Maximum Loads	In the absence of information provided by the design team, we will use the following loads in estimating settlement based on our experience with similar projects. ■ Columns: 40 kips ■ Walls: 3 kips per linear foot (klf) Slabs: 150 pounds per square foot (psf)
Grading/Slopes	Not expected

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information See Site Location	The project is located at 1401 Moeling Street in Lake Charles, Louisiana. Latitude/Longitude (approximate): 30.2506° N, 93.2008° W (See Exhibit D)
Existing Improvements	Currently, there are pre-existing buildings on site with their associated parking and utilities.
Current Ground Cover	Currently, most of the site is covered in concrete pavement with some areas of grass spread about the site.
Existing Topography	Existing topography is relatively flat with an average elevation of +15 feet MSL.

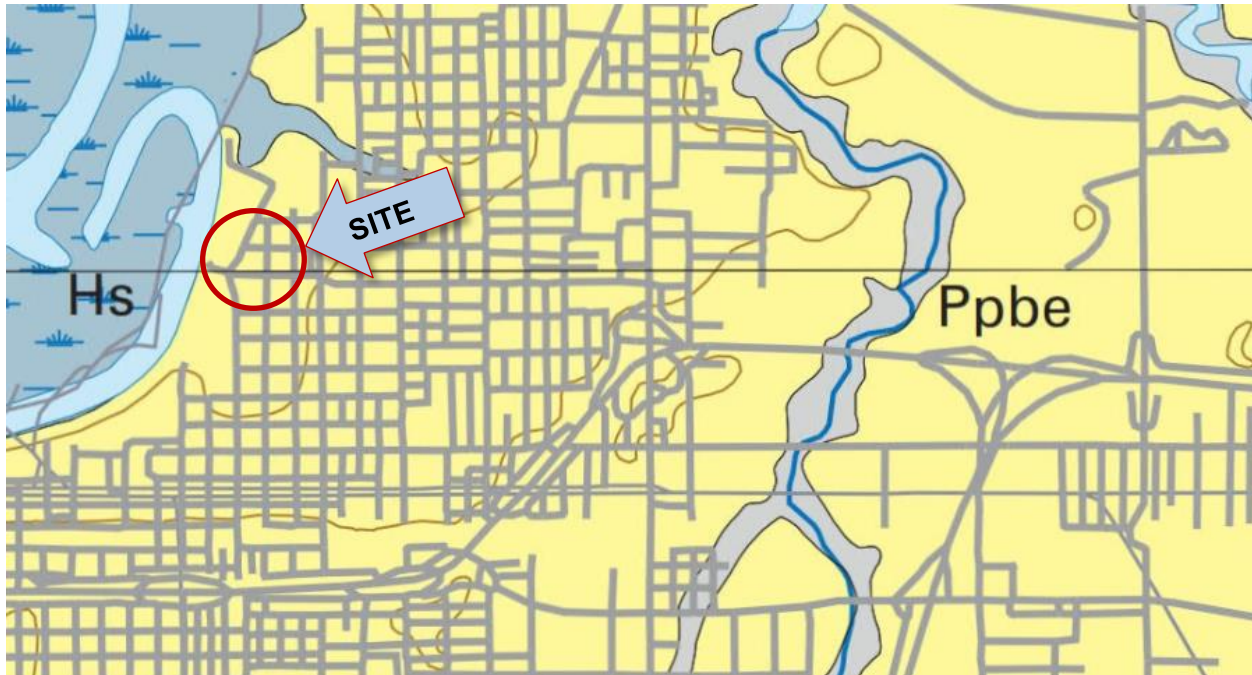
We also collected photographs at the time of our field exploration program. Representative photos are provided in our [Photography Log](#).

Geotechnical Characterization

Surface Geology

The project is mapped within an area of Beaumont Alloformation (**Ppbe**) of Prairie Terrace deposits of Pleistocene Age. Beaumont Alloformation consists of plain deposits of late to middle Pleistocene streams: the oldest alloformation and topographically highest surface or the Prairie Allogroup units of southwestern Louisiana. It exhibits the relict channels of the Red and Calcasieu Rivers and includes deposits of the Ingleside barrier trend within the Lake Charles quadrangle. These Pleistocene Age deposits typically consist of medium stiff to very stiff, tan and light gray clays with silt and sand layering.

The soils within the Prairie Terrace deposits typically provide good foundation support for relatively light to moderately loaded structures, are overconsolidated, and normally only marginally compressible. In some areas that are very dry and desiccated, the potential for expansive properties exists, but these conditions are not typical of the Prairie Terrace deposits.



Subsurface Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the [Exploration Results](#) and the GeoModel can be found in the [Figures](#) attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
01	Concrete	Concrete pavement with thicknesses ranging from 12 inches to 15 inches
02	Upper Sandy Lean/Fat Clay	Brown, gray, and tan, medium stiff to very stiff, lean clay, lean clay with sand, and sandy fat clay
03	Middle Fat/Lean Clay	Brown, gray, tan, and red, stiff to very stiff, lean clay, lean clay with sand, and fat clay
04	Lower Fat Clay	Gray and tan, stiff to very stiff, fat clay

The borings were advanced using a flight auger drilling technique that allow short term groundwater observations to be made while drilling. Groundwater was initially encountered in boring B-01 during drilling at a depth of approximately 20 feet below the existing ground surface. After 15 minutes, the water was measured at about 6 feet below existing grade. Groundwater seepage was not encountered within borings B-02 and B-03 during drilling at the time of our field exploration. Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, river levels and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties observed at the site and as described on the exploration logs and results, our professional opinion is for that a **Seismic Site Classification of D** be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 40 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Although not considered essential, additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations presented in this report are implemented in the design and construction phases of this project.

Within the undeveloped area of the proposed building footprint (boring B-01 area), topsoil and silt-laden soils were encountered to a depth of about 1 to 1.5 feet and underlain by very stiff lean clay. In the areas of the proposed building footprint within the existing concrete pavement (borings B-02 and B-03), concrete paving ranging in thickness from 12 to 15 inches was underlain by sandy fat clay fill materials to a depth of about 2 feet below existing grade. Beneath the fill materials, medium stiff to very stiff lean clay was encountered. As stated previously, groundwater was encountered during

drilling at a depth of 20 feet below existing grade within boring B-01 and rose to a depth of about 6 feet below existing grade after a period of about 15 minutes.

The surface soils appeared relatively stable at the time of the exploration. However, the clays could become unstable with typical earthwork and construction traffic, especially after precipitation events. Effective drainage should be completed early in the construction sequence and maintained after construction to reduce potential issues. At project sites with minimal grade change and with developments, existing paving, and roads surrounding the construction area, it can be difficult to maintain positive drainage throughout the construction phase. The construction phase drainage should be considered in the development of the project overall grading and drainage plan. The possible poor drainage conditions can lead to instability in the areas around the site and hamper construction progress. A temporary dewatering system of sumps and pumps could be necessary to remove ponding water where positive drainage is not feasible.

If possible, the grading should be performed during the warmer and drier times of the year. If grading is performed during the winter months, an increased risk for possible undercutting and replacement of unstable subgrade will persist. Initial processing and drying of the upper native soils is anticipated in some areas to achieve suitable stability for subsequent fill placement. It can be prudent to consider specifying chemical treatment of critical project access roads and construction laydown areas as part of the construction package to reduce potential weather related delays. Additional site preparation recommendations, including proofrolling and fill placement, are provided in the **Earthwork** section.

Based on the conditions encountered and estimated load-settlement relationships, the proposed structures can be supported on a shallow foundation system consisting of conventional continuous or spread footings, provided the footings do not exceed allowable bearing capacities and estimated settlements presented in the **Shallow Foundations** section are within tolerable limits. The soils which form the bearing stratum for shallow foundations are low and medium plasticity lean clays underlain by moderate to high plasticity fat clays. In general, lean clays are considered to exhibit low to moderate potential while fat clays are considered to exhibit a moderate to high potential for shrink-swell movements with changes in moisture. Maintaining a minimum dead load pressure on footings should reduce the anticipated swell movements to tolerable levels. The **Shallow Foundations** section addresses support of the building directly bearing on native medium stiff to very stiff lean/fat clay or structural fill. The **Floor Slabs** section addresses slab-on-grade support of the building.

If the building is heavily loaded or settlements beyond those reported in the **Shallow Foundations** section are beyond tolerable limits, it may be efficient with this type of construction to support the building on drilled shaft foundations. The **Deep Foundations** section addresses support of the building on drilled shafts.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the [Exploration Results](#)), engineering analyses, and our current understanding of the proposed project. The [General Comments](#) section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include demolition of existing pavements, clearing and grubbing, excavations, and structural fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and floor slabs.

Demolition

The proposed building will be constructed within the footprint of the existing paving which will need to be demolished prior to construction of the new building. We recommend existing foundations, paving, slabs, and utilities be removed from within the proposed building footprint and at least 5 feet beyond the outer edge of foundations.

Site Preparation

Prior to placing new fill, existing vegetation, existing fill, topsoil, root mats and loose, soft or otherwise unsuitable material should be removed. Complete stripping of the topsoil should be performed in the proposed building area. Topsoil (or existing paving thickness) measurements were made at the boring locations; however, stripping/removal depths between our boring locations and across the site could vary considerably. As such we recommend actual stripping/removal depths be evaluated by a representative of Terracon during construction to aid in preventing removal of excess material. For estimation purposes, we anticipate removal depths of approximately 24 inches below existing grade will likely be required.

Although no evidence of debris, buried foundations, or underground facilities (such as septic tanks and utilities) was observed during the exploration and site reconnaissance, such features could be encountered during construction clearing and should be further investigated. Such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and construction.

Subgrade Preparation

After stripping the site, the subgrade should be proofrolled with an adequately loaded rubber tire vehicle such as a partially loaded tandem-axle dump truck or loaded scraper. The vehicle should weigh between 15 and 20 Tons (total vehicle weight). The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. It is not unusual to find soft and wet soils immediately beneath existing pavements and slabs. Unstable, isolated areas could either be removed or modified by treating with lime or cement as specified by the Geotechnical Engineer at the time of construction. Excessively wet or dry material should either be removed or moisture conditioned and recompacted.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 10 feet of structures or constructed slopes and other structural areas. General fill is material used to achieve grade outside of these areas, such as landscaped areas.

Reuse of On-Site Soil: Excavated on-site lean clay soil may be selectively reused as structural fill if it meets the structural fill requirements stated below. Excavated on-site fat clay soil is not suitable for reuse as Structural Fill without lime treatment due to difficult compaction characteristics, stability issues at higher moistures and shrink/swell potential. It can be used as backfill in the landscape areas without lime treatment.

Silt soils are typically not considered ideal for use as structural fill due to difficult compaction characteristics and narrow range of moisture contents with stability when compacted.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris.

Soil Type ¹	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL	Liquid Limit less than 45, Plasticity index greater than 10 and less than 25
Imported Sand	SP, SP-SM	Less than 10% Passing No. 200 sieve
Aggregate Base	GP, GM	LADOTD No. 610 Crushed Limestone or similarly graded crushed recycled concrete.

1. Structural and general fill should consist of approved materials free of organic matter and debris. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used in confined areas.	Same as structural fill
Minimum Compaction Requirements ^{1,2,3}	95% of maximum dry density of standard Proctor (ASTM D698) below foundations, floor slabs, and finished pavement subgrade. 95% of maximum dry density of modified Proctor (ASTM D1557) for aggregate base beneath pavement.	92% of maximum dry density of standard Proctor (ASTM D698)
Water Content Range ¹	Low plasticity cohesive: -2% to +3% of optimum Granular: -3% to +3% of optimum Aggregate Base: -2% to +2% of optimum	As required to achieve min. compaction requirements.

Item	Structural Fill	General Fill
	1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698) for soil fill materials and the modified Proctor test (ASTM D1557) for aggregate base materials. 2. High plasticity cohesive fill should not be compacted to more than 100% of standard Proctor maximum dry density. 3. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254). Materials not amenable to density testing should be placed, compacted and conditioned at workable moisture levels to a stable condition observed without pumping when proofrolling by the Geotechnical Engineer or representative.	

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with LADOTD or local public works specifications for the utility to be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

On-site materials are generally considered suitable for backfill cover of utility and pipe trenches, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of structural fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

For low permeability subgrades, utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench should provide an effective trench plug that extends at least 5 feet from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for structural fill stated previously in this report.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

At project sites with minimal grade change and with developments and roads surrounding the construction area, it can be difficult to maintain positive drainage throughout the construction phase. The construction phase drainage should be considered in the development of the project overall grading and drainage plan. The possible poor drainage conditions can lead to instability in the areas around the building and hamper construction progress. The site grading and general contractor should consider their means and methods to maintain drainage during the construction phase. It is sometimes prudent to consider specifying chemical treatment of critical project access roads and construction laydown areas as part of the construction package to reduce potential weather-related delays as described above.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Trees or other vegetation whose root systems can remove excessive moisture from the subgrade and foundation soils should not be planted next to the structure. Trees and shrubbery should be kept away from the exterior edges of the foundation element a distance at least equal to 1.5 times their expected mature height.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment, after removal of pavements. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water

collecting over or adjacent to construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

The groundwater table could affect overexcavation efforts, especially for overexcavation and replacement of lower strength soils. A temporary dewatering system consisting of sumps with pumps may be necessary to achieve the recommended depth of overexcavation depending on groundwater conditions at the time of construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for possible effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, silt-laden soils, and pavements), evaluation and remediation of existing debris materials (if encountered), as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench

backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

If the site has been prepared in accordance with the requirements noted in [Earthwork](#), the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure ^{1, 2}	1,700 psf - (Isolated columns and continuous footings) - foundations bearing upon undisturbed natural soil or structural fill
Required Bearing Stratum ³	GeoModel Layer 2, undisturbed native soils or structural fill
Minimum Foundation Dimensions	Per IBC 1809.7
Ultimate Passive Resistance ⁴ (equivalent fluid pressures)	250 pcf (cohesive backfill) 350 pcf (granular backfill)
Sliding Resistance ⁵	250 psf allowable cohesion (native/structural fill clay) 0.25 allowable coefficient of friction (granular material)
Minimum Embedment below Finished Grade ⁶	Exterior footings: 18 inches Interior footings: 12 inches
Estimated Total Settlement from Structural Loads ²	Less than about 1 inch
Estimated Differential Settlement ^{2, 7}	About 1/2 of total settlement

Item	Description
1.	The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2.	Values provided are for maximum loads noted in Project Description . Settlement is for structural loads and up to 2 feet of engineering fill. Additional settlement of about 1/3 of an inch per foot of fill above 2 feet can be expected. Additional geotechnical consultation will be necessary if higher loads or fill heights are anticipated.
3.	Unsuitable or soft soils should be overexcavated and replaced per the recommendations presented in Earthwork .
4.	Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5.	Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations. A factor of safety of 1.5 was applied to this value. For fine-grained materials, lateral resistance using cohesion should not exceed ½ the dead load.
6.	Embedment necessary to minimize the effects of seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7.	Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Design Parameters – Overturning and Uplift Loads

Shallow foundations subjected to overturning loads should be proportioned such that the resultant eccentricity is maintained in the center-third of the foundation (e.g., $e < b/6$, where b is the foundation width). This requirement is intended to keep the entire foundation area in compression during the extreme lateral/overturning load event. Foundation oversizing may be required to satisfy this condition.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils with consideration to the IBC basic load combinations.

Item	Description
Soil Moist Unit Weight	115 pcf
Soil Effective Unit Weight ¹	53 pcf
Soil weight included in uplift resistance	Soil included within the prism extending up from the top perimeter of the footing at an angle of 20 degrees from vertical to ground surface

1. Effective (or buoyant) unit weight should be used for soil above the foundation level and below a water level. The high groundwater level should be used in uplift design as applicable.

Foundation Construction Considerations

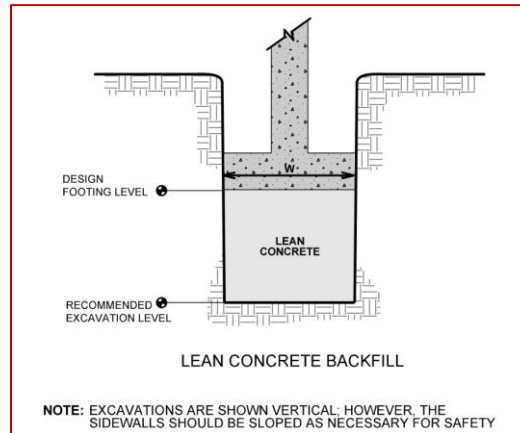
As noted in [Earthwork](#), the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Sensitive soils exposed at the surface of footing excavations may require surficial compaction with hand-held dynamic compaction equipment prior to placing structural fill, steel, and/or concrete. Should surficial compaction not be adequate, construction of a working surface consisting of either crushed stone or a lean concrete mud mat may be required prior to the placement of reinforcing steel and construction of foundations.

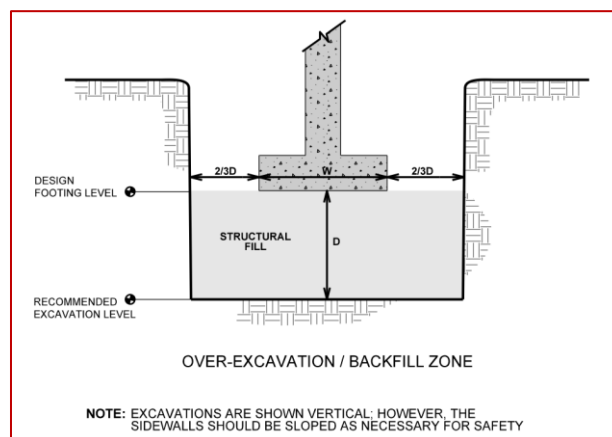
If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated on the sketch below.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Overexcavation for structural fill placement below footings should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation, with structural soil fill or crushed stone wrapped in non-woven geotextile fabric placed, as recommended in the [Earthwork](#) section.



Deep Foundations

Drilled Concrete Shafts

Drilled concrete shafts are a common foundation system for the planned construction, and when suitably reinforced, are particularly efficient in resisting uplift and horizontal forces. The following paragraphs provide design recommendations and construction considerations for a drilled concrete shaft supported foundation system.

Axial Resistance

We have predicted the nominal (ultimate) compression and tension geotechnical resistance for various drilled concrete shaft diameters and depths for static load conditions using contributions from skin friction and end bearing. The nominal side friction resistance of the drilled concrete shafts was predicted for uncased conditions using published design approaches for calculation of skin friction including the alpha (α) method for cohesive soils and the β -method for cohesionless soils, assuming uncased construction. The skin friction resistance of the pile was neglected to a depth of about 4 feet below the existing ground surface. The nominal end bearing resistance for the drilled concrete shaft was estimated using classic bearing capacity theory for cohesive soils and empirical correlations between corrected Standard Penetration Test (SPT) N_{60} values and the mobilized base resistance for cohesionless soils. If casing is used, the nominal compression and tension resistance in the tables below should be reduced by 10%.

The following table provides our recommendations for the nominal (ultimate) geotechnical resistance in kips for individual drilled shafts.

Drilled Shaft Axial Resistance Summary ¹

Drilled Shaft Depth (feet) ²	Nominal (Ultimate) Compression Resistance (kips)				Nominal (Ultimate) Tension Resistance ³ (kips)			
	Shaft Diameter (inches)				Shaft Diameter (inches)			
	18	24	30	36	18	24	30	36
20	80	115	155	200	45	60	75	90
22	85	125	170	215	50	65	85	105
24	95	135	180	230	55	75	95	115
26	--	145	195	245	--	80	105	125
28	--	155	205	260	--	90	115	140
30	--	165	220	275	--	95	125	150
32	--	175	230	295	--	105	135	165
34	--	185	245	310	--	110	145	175
36	--	195	260	--	--	120	155	--
38	--	210	--	--	--	130	--	--

- Design capacities are dependent upon the method of installation, and quality control during installation. The values provided are estimates and should be verified when installation protocols have been finalized.

Drilled Shaft Depth (feet) ²	Nominal (Ultimate) Compression Resistance (kips)				Nominal (Ultimate) Tension Resistance ³ (kips)			
	Shaft Diameter (inches)				Shaft Diameter (inches)			
	18	24	30	36	18	24	30	36

2. Measured from assumed ground surface elevation of 14 Feet, NAVD.

3. Buoyant weight of shaft is not included in nominal tension resistance.

The shaft resistances presented in the table above are the nominal (ultimate) geotechnical resistances and appropriate ASD factors of safety for the design should be established considering control methods specified to verify field capacity at the time of construction. Provided below are the recommended factors of safety that can be considered for this project:

Field Capacity Verification Method	ASD Factor of Safety
Static Load Test on minimum 1 test shaft per structure (after verification that concrete is at design strength). Full-time observation of production shaft installation	2
No static load test, but full-time observation of production shaft installation.	2.5

The allowable tension capacity should be determined using a factor of safety of 3 unless a static tension load test is performed. Design capacities can be increased by 33% for highly transient loads such as wind loads unless the transient loads have already been included in the factored design load (subject to verification of allowable structural capacity).

The structural capacity of the shafts should be evaluated by the structural engineer to assure that they can safely accommodate the combined stresses that may be induced by axial and lateral loads, drag loads, and overturning moments. The shaft should be adequately reinforced full depth to develop the full tension resistance.

Shaft top spacing is normally set to allow for typical construction tolerances in placement and vertical alignment. Drilled shafts should have a minimum (center-to-center) spacing of three diameters. For large shaft groups, the final design should be checked to evaluate potential for group settlement.

Drilled Shaft Lateral Loading

The following table lists input values for use in LPILE analyses. Such analysis should be considered if lateral loads exceed 10 kips. Modern versions of LPILE provide estimated default values of k_h and E_{50} based on strength and are recommended for the project. Since deflection or a service limit criterion will most likely control lateral capacity design, no safety/resistance factor is included with the parameters.

Stratigraphy ¹		L-Pile Soil Model	S_u (psf) ²	ϕ ²	γ' (pcf) ²	E_{50}	K (pci)	
Depth	Material						Static	Cyclic
0-2 ³	Assumed Structural Fill	Stiff Clay w/o Free Water	850	---	115	Use Default Value		
2-10	Fat Clay/Lean Clay	Stiff Clay w/o Free Water	1,500	---	64	Use Default Value		
10-20	Fat Clay/Lean Clay	Stiff Clay w/o Free Water	1,450	---	62	Use Default Value		
20-40	Fat Clay/Lean Clay	Stiff Clay w/o Free Water	1,500	---	57	Use Default Value		

1. See Subsurface Profile in [Geotechnical Characterization](#) for more details on Stratigraphy.
2. Definition of Terms:
 S_u : Undrained shear strength
 ϕ : Internal friction angle
 γ' : Effective unit weight
3. We recommend neglecting lateral capacity in the upper 2 feet of soil due to construction disturbance during foundation installation.

Group action for lateral resistance of shafts should be considered when spacing is less than six diameters (center to center). Group effects can be roughly estimated with the design parameters for allowable passive resistance in the direction of the load reduced in accordance with the table below; p-y multipliers can also be used in LPILE as a rough estimate for group load behavior. We can provide guidance for p-y multipliers if detailed analyses using LPILE are planned.

Pile/Shaft Spacing ¹	Reduction Factors
6D	1.0
4D	0.85
3D	0.65

1. Where D is the diameter of the shaft

The shafts/piles should be spaced at least three shaft diameters apart (center-to-center) if they will be used to resist lateral loads.

The load capacities provided herein are based on the stresses induced in the supporting soil strata. The structural capacity of the shafts should be checked to assure they can safely accommodate the combined stresses induced by axial and lateral forces. Lateral deflections of shafts should be evaluated using an appropriate analysis method, and will depend upon the pile's diameter, length, configuration, stiffness and "fixed head" or "free head" condition. We can provide additional analyses and estimates of lateral deflections for specific loading conditions upon request. The load-carrying capacity of shafts may be improved by increasing the diameter and possibly the length.

Load Testing

If a factor of safety of 2 is used to establish the allowable shaft resistance, a static load test should be performed to validate the predicted axial resistance. The cost of the load test should be considered in the selection of the factor of safety/resistance factor for shaft design.

If a load test is planned, at least one shaft representing the predominant diameter and depth should be tested. However, if more than one depth will be used, additional load tests should be added. Alternatively, the shaft can be instrumented with strain gages to provide load distribution information during the testing of a single shaft to allow for estimating allowable loads for shorter shafts. The test shaft(s) should be installed using the installation methods planned for production foundation elements.

For a static load test, the shafts should be loaded to a minimum of 250% of its design capacity after confirming the concrete strength, but typically not sooner than 7 days after installation. Ideally the shafts should be loaded to produce top of shaft movement as provided below to allow for an accurate interpretation of the ultimate resistance.

Shaft Diameter (inches)	Minimum Top of Shaft Movement For Load Test Interpretation (inches)
18	1-1/4
24	1-1/2
30	1-3/4
36	2

The load test including design of the reaction beam and shafts should be provided by the foundation contractor. However, we should oversee the load testing program and validate our capacity predictions based upon the test results.

Drilled Shaft Construction Considerations

The drilling contractor should be experienced in the subsurface conditions observed at the site, and the excavations should be performed with equipment capable of providing a clean bearing surface. The drilled straight-shaft foundation system should be installed in general accordance with the procedures presented in "Standard Specification for the Construction of Drilled Piers", ACI Publication No. 336.1-01.

The use of temporary steel casing and/or slurry drilling procedures should be anticipated at this site during drilled shaft construction to reduce the potential for collapse of the sidewalls within sand and silt seams and layers and control groundwater seepage. If casing is removed during concrete placement, care should be exercised to maintain concrete inside the casing at a sufficient level to resist earth and hydrostatic pressures present on a casing exterior. Water or loose soil should be removed from the bottom of the drilled shafts prior to placement of the concrete.

The drilled shaft installation process should be performed under the observation of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed shaft.

Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support¹	A leveling course of 4-6 inches of free-draining (less than 10% passing the U.S. No. 200 sieve) sand compacted to at least 95% of ASTM D 698 ² over compacted structural fill and/or stable subgrade.
Estimated Modulus of Subgrade Reaction ²	100 pounds per square inch per inch (psi/in) for point loads

1. Free-draining granular material should have less than 10 percent fines (material passing the No. 200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in [Earthwork](#), and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or

desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)

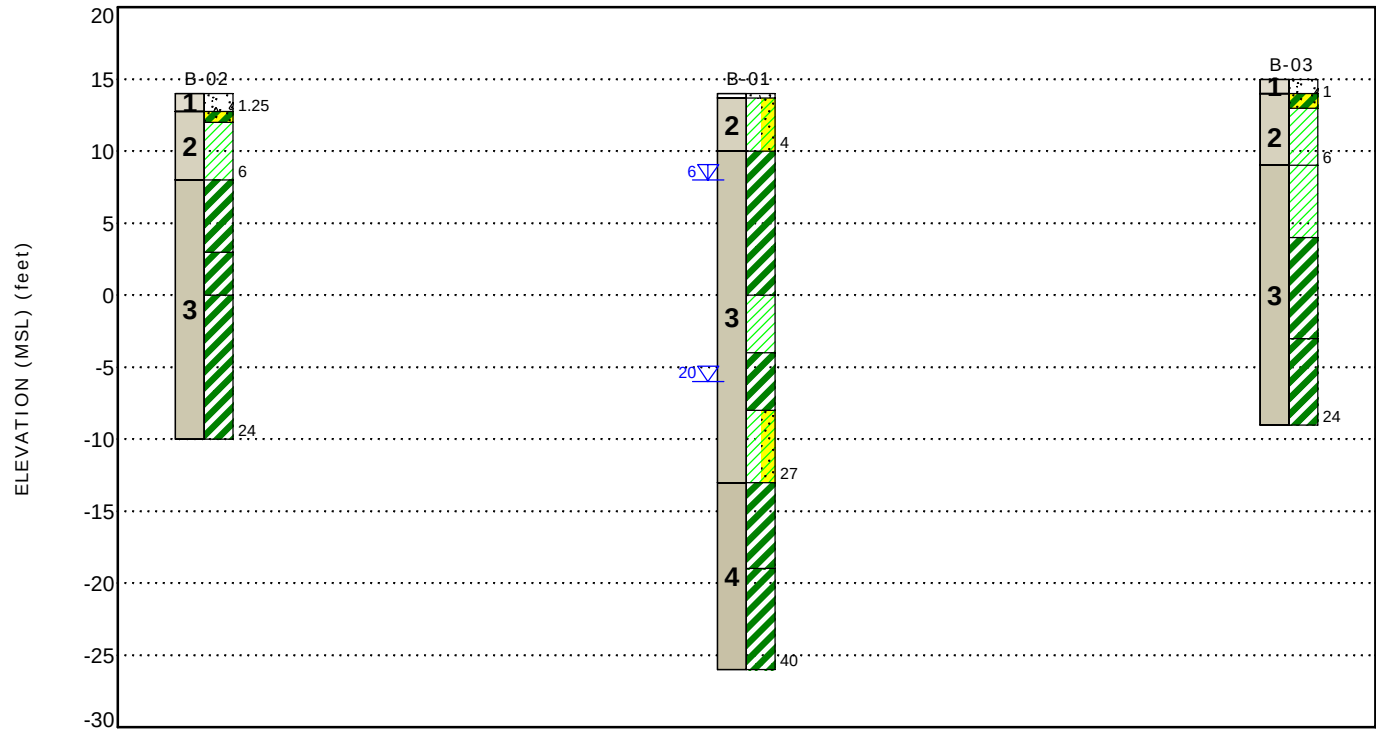


Figures

Contents:

GeoModel

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend	
1	Concrete	Concrete pavement with thicknesses ranging from 12 inches to 15 inches	Topsoil	Lean Clay with Sand
2	Upper Sandy Lean/Fat Clay	Brown, gray, and tan, medium stiff to very stiff, lean clay, lean clay with sand, and sandy fat clay	Fat Clay	Lean Clay
3	Middle Fat / Lean Clay	Brown, gray, tan, and red, stiff to very stiff, lean clay, lean clay with sand, and fat clay	Concrete	Sandy Fat Clay
4	Lower Fat Clay	Gray and tan, stiff to very stiff, fat clay		

- First Water Observation
- Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Type of Exploration	Boring Depth (feet)	Planned Location
1	Soil Boring	40	Building area
2	Soil Borings	24	Building area

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. Approximate ground surface elevations were estimated using Google Earth imagery. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted, rotary drill rig. Boring B-01 was advanced using continuous flight augers (solid stem) to a depth of around 20 feet followed by rotary wash techniques. Borings B-02 and B-03 were advanced using continuous flight augers (solid stem) to their completion depths. Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings or cement-bentonite grout after their completion, consistent with state regulations. Pavements were patched with pre-mixed concrete.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Atterberg Limits
- Dry Unit Weight
- Unconfined Compression
- Grain size analysis
- Triaxial compression

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Geotechnical Engineering Report

Greater Saint Mary Baptist Church – New Building | Lake Charles, Louisiana
November 26, 2024 | Terracon Project No. EU245067 (Rev. 1)



Site Location

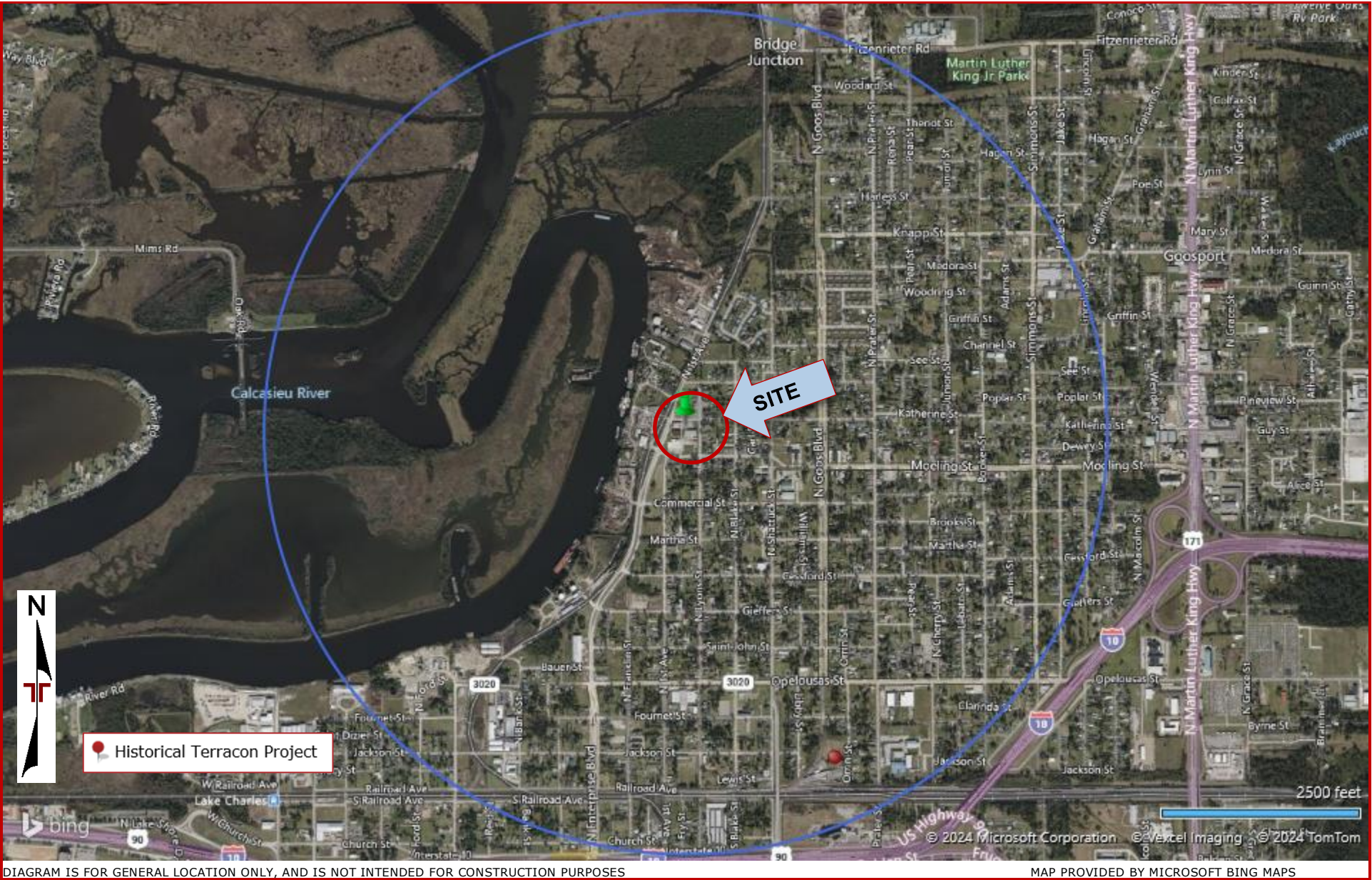
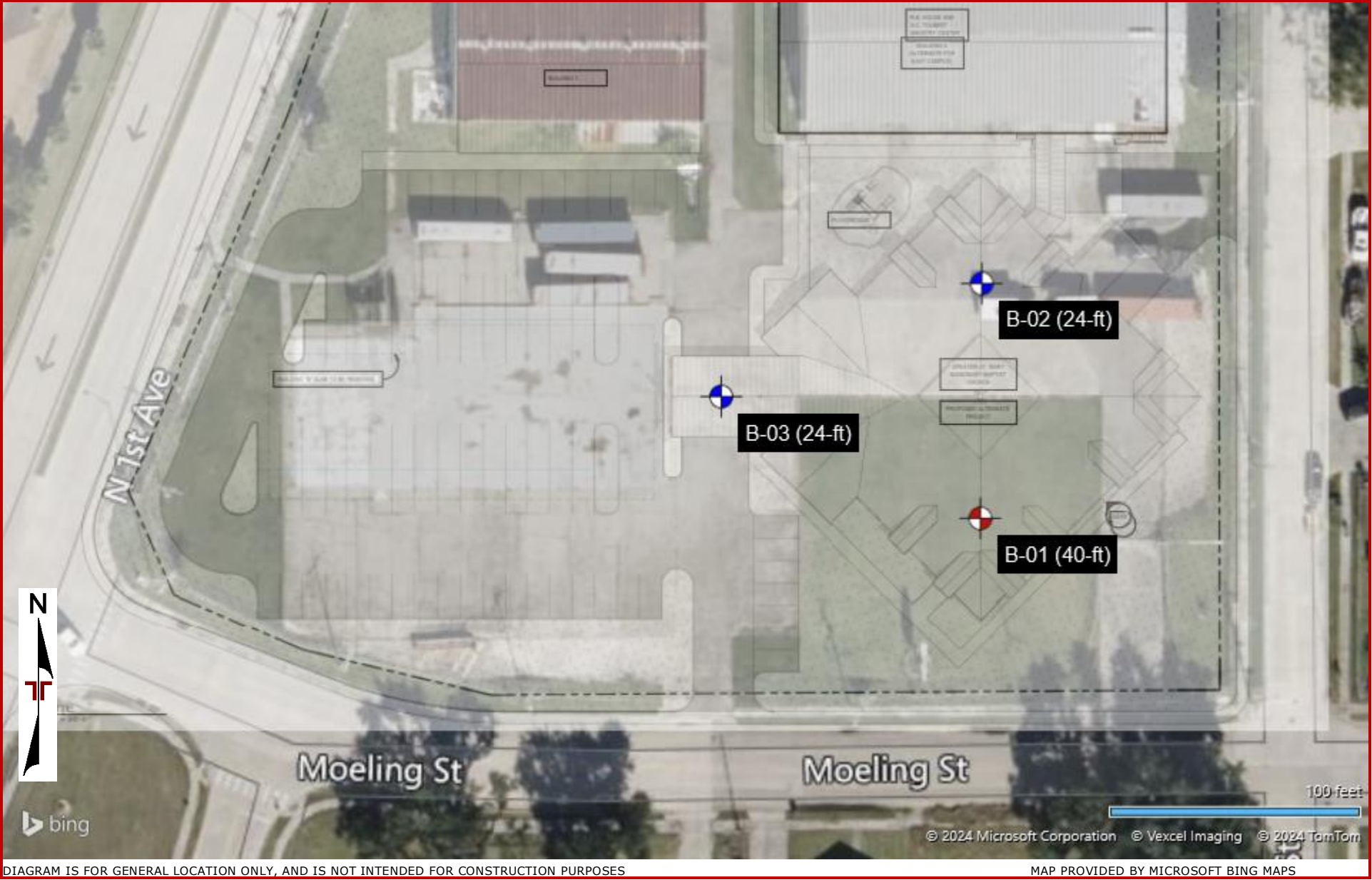


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan



Exploration and Laboratory Results

Contents:

Boring Logs (3 pages)

Note: All attachments are one page unless noted above.

Boring Log No. B-01

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 30.2502° Longitude: -93.2005° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test				Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
							Test Type	Compressive Strength (tsf)	Strain (%)	Confining Pressure (psf)				
2		0.3 TOPSOIL 4 inches				4.00 (HP)					5.4			
		LEAN CLAY WITH SAND (CL), brown and tan, very stiff - with silt seams to 1 foot - with ferrous nodules from 2 to 13 feet				3.50 (HP)					15.9			76
3		4.0 FAT CLAY (CH), brown and gray, very stiff				4.50 (HP)	UC	2.66	15		15.7		37-16-21	
			5	▽		2.50 (HP)	UC	2.70	9.6		20.3	108	53-18-35	
						4.50 (HP)								
			10			4.50 (HP)	UC	2.42	8.5		18.2	105	58-18-40	
		- with sand below 11 feet				4.00 (HP)					24.0			
3		14.0 LEAN CLAY (CL), brown and gray, stiff	15			3.50 (HP)	UU	1.35	7.3	15	22.4	103	45-14-31	
		18.0 FAT CLAY (CH), brown and gray, very stiff	20	▽		4.50 (HP)								
3		22.0 LEAN CLAY WITH SAND (CL), brown and tan, stiff to very stiff	25			3.50 (HP)								
4		27.0 FAT CLAY (CH), gray and tan, stiff, - with calcareous nodules to 30 feet feet - with ferrous nodules below 28 feet - low strain failure at 28 feet	30			4.00 (HP)	UU	1.35	1.5	14	32.1	90	83-22-61	
		33.0 FAT CLAY (CH), gray and tan, stiff to very stiff	35			4.50 (HP)								
		40.0 Boring Terminated at 40 Feet	40			3.50 (HP)								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevation based on Google Earth data	Water Level Observations ▽ First Encountered ▽ After 15 minutes	Drill Rig Truck Hammer Type Automatic Driller J.Thompson
Notes	Advancement Method 0' - 20' - Continuous Flight Auger 20' - 40' - Rotary Wash Abandonment Method Boring backfilled with auger cuttings and cement-	Logged by A.Grant Boring Started 10-21-2024 Boring Completed 10-21-2024

Boring Log No. B-02

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 30.2504° Longitude: -93.2009° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits	Percent Fines
							Test Type	Compressive Strength (tsf)	Strain (%)			LL-PL-PI	
1		1.3 CONCRETE 15 inches				3.00 (HP)	UC			18.5			
2		2.0 FILL - SANDY FAT CLAY (CH), gray and brown, LEAN CLAY (CL), gray and brown, very stiff - with ferrous nodules below 2 feet				1.50 (HP)	UC	1.20	15	16.6	109	50-16-34	54
						3.50 (HP)	UC	2.91	5.2	17.2	113	45-17-28	
						4.00 (HP)							
						4.50 (HP)	UC	2.94	6.3	22.3	105	55-18-37	
3		6.0 FAT CLAY (CH), gray and brown, very stiff	5			4.00 (HP)							
						4.00 (HP)							
		11.0 FAT CLAY (CH), brown and gray, stiff, - low strain failure at 11 feet	10			4.00 (HP)	UC	1.87	4.6	30.4	93		
		14.0 FAT CLAY (CH), brown and gray, very stiff - with calcareous nodules at 14 feet	15			3.50 (HP)							
			20			3.50 (HP)							
						4.50 (HP)							
		Boring Terminated at 24 Feet											

Notes	See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevation based on Google Earth data	Water Level Observations Groundwater not encountered	Drill Rig Truck Hammer Type Automatic Driller J.Thompson
		Advancement Method 0' - 24' - Continuous Flight Auger Abandonment Method Boring backfilled with auger cuttings upon completion.	Logged by A.Grant Boring Started 10-21-2024 Boring Completed 10-21-2024

Boring Log No. B-03

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 30.2505° Longitude: -93.2005° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Strength Test			Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits	Percent Fines
							Test Type	Compressive Strength (tsf)	Strain (%)			LL-PL-PI	
1		1.0 CONCRETE 12 inches								13.3			
2		2.0 FILL - SANDY FAT CLAY (CH), gray and brown, very stiff			X	12-10-10 N=20						50-16-34	67
		LEAN CLAY (CL), gray and brown, medium stiff to stiff, - with sand layers and ferrous nodules to 4 feet	5			4.00 (HP)	UC	0.63	12.8	21.3	105	45-15-30	
						4.00 (HP)							
3		6.0 LEAN CLAY (CL), gray and red, stiff				4.50 (HP)	UC	1.33	6.3	19.9	107	47-17-30	
		- with ferrous nodules from 8 to 13 feet				4.50 (HP)							
		11.0 FAT CLAY (CH), gray and orange, stiff	10			3.50 (HP)	UC	1.43	7.3	28.1	97	53-19-34	
						4.00 (HP)							
		18.0 FAT CLAY (CH), gray and orange, very stiff, trace sand	15			4.50 (HP)	UU	2.33	10.3	20.1	105	57-14-43	
			20			4.00 (HP)							
		24.0 Boring Terminated at 24 Feet											

Notes	See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any). See Supporting Information for explanation of symbols and abbreviations. Elevation Reference: Elevation based on Google Earth data	Water Level Observations Groundwater not encountered	Drill Rig Truck Hammer Type Automatic Driller J.Thompson
		Advancement Method 0' - 24' - Continuous Flight Auger Abandonment Method Boring backfilled with auger cuttings upon completion.	Logged by A.Grant Boring Started 10-21-2024 Boring Completed 10-21-2024

Supporting Information

Contents:

General Notes

Unified Soil Classification System

Note: All attachments are one page unless noted above.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	Cu≥4 and 1≤Cc≤3 ^E	GW	Well-graded gravel ^F
			Cu<4 and/or [Cc<1 or Cc>3.0] ^E	GP	Poorly graded gravel ^F
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	Cu≥6 and 1≤Cc≤3 ^E	SW	Well-graded sand ^I
			Cu<6 and/or [Cc<1 or Cc>3.0] ^E	SP	Poorly graded sand ^I
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	PI > 7 and plots above “A” line ^J	CL	Lean clay ^{K, L, M}
			PI < 4 or plots below “A” line ^J	ML	Silt ^{K, L, M}
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay ^{K, L, M, N} Organic silt ^{K, L, M, O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above “A” line	CH	Fat clay ^{K, L, M}
			PI plots below “A” line	MH	Elastic silt ^{K, L, M}
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay ^{K, L, M, P} Organic silt ^{K, L, M, Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

- ^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains ≥ 15% sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
- ^H If fines are organic, add "with organic fines" to group name.

^I If soil contains ≥ 15% gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

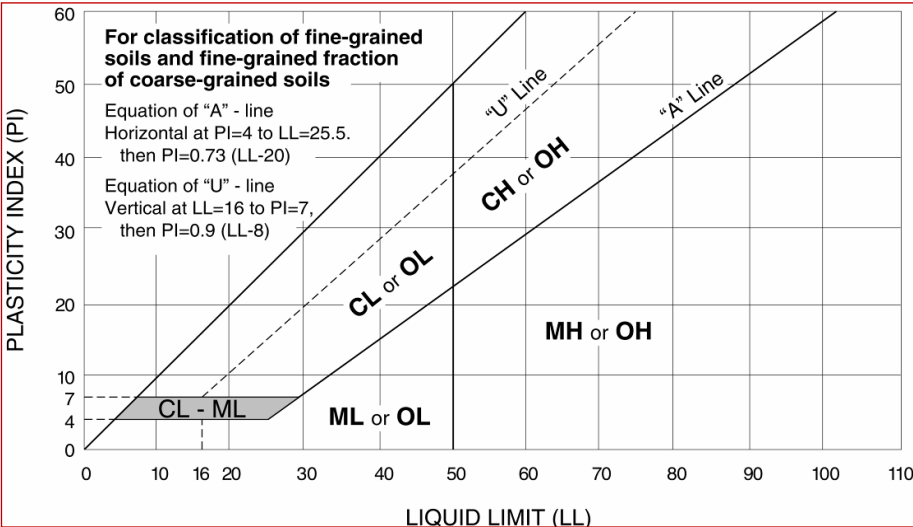
^M If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI ≥ 4 and plots on or above "A" line.

^O PI < 4 or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: _____

(Owner to provide name and address of owner)

BID FOR: Greater St Mary Missionary Baptist Church
Complex
1401 Moeling Street
Lake Charles, Louisiana 70601
(Owner to provide name of project and other identifying information)

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: _____
King Architects, Inc and dated: _____
(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____.

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:
_____ Dollars (\$ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
_____ Dollars (\$ _____)

Alternate No. 2 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
_____ Dollars (\$ _____)

Alternate No. 3 (Owner to provide description of alternate and state whether add or deduct) for the lump sum of:
_____ Dollars (\$ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** **A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: _____

(Owner to provide name and address of owner)

BID FOR: Greater St Mary Missionary Baptist Church Complex
1401 Moeling Street
Lake Charles, Louisiana 70601

(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

Wording for "DESCRIPTION" is to be provided by the Owner.

All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.

KING ARCHITECTS, INC

SECTION 00 43 13

BID BOND

KNOW ALL MEN BY THESE PRESENTS, That we _____

as Principal, hereinafter called the Principal, and _____

a corporation duly organized under the laws of the State of _____
as Surety, herinafter called the Surety, are held and firmly bound unto _____

as Obligee, hereinafter called the Obligee, in the sum of _____

_____ Dollars (\$ _____),
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our
heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for _____

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the
terms of such bid, and give such bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance
of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter
such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount
specified in said bid and such larger amount of which the Obligee may in good faith contract with another party to perform the Work covered by said bid,
then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 20____.

WITNESS

SIGNATURE

PRINTED NAME AND TITLE

WITNESS

SIGNATURE

PRINTED NAME AND TITLE

SUBSTITUTION REQUEST FORM (During Procurement)

IDENTIFICATION:

Owner: GREATER ST MARY MISSIONARY BAPTIST CHURCH

Architect: KING ARCHITECTS, INC

Contractor:

Project Name: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

Project Number: 2316

Date: _____

REFERENCE:

Specification Title: _____

Specification No.: _____ Page: _____ Article/Paragraph: _____

DESCRIPTION:

Manufacturer's Name: _____ Model No.: _____

Trade Name: _____

Proposed Substitution General Description: _____

CERTIFICATION:

The Undersigned certifies:

- Proposed substitution has been investigated and determined that it meets or exceeds the quality level of the specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing and construction costs caused by the substitution.

Submitted and Signed by:

Name _____ Title _____

Firm: _____

Address: _____

Telephone: _____

ATTACHED SUPPORTING DATA:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

ARCHITECT'S REVIEW AND ACTION:

- ☐ Substitution approved - Make submittals in accordance with Specification Section
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed By: _____

Name

Title

Date

KING ARCHITECTS, INC

SECTION 00 45 19.13

AFFIDAVIT

LA RS §38:2224 2190 2290-2296

STATE OF LOUISIANA

PARISH OF CALCASIEU

PROJECT NAME AND ADDRESS:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

PROJECT NO:

2316

Before me, the undersigned authority, duly commissioned and qualified within and for the state and parish aforesaid, personally came and appeared _____ representing _____ who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all

Appearer does hereby attest that:

- (1) Bidder is _____ of _____, the Bidder that has submitted the above referenced Bid:
- (2) Bidder is fully informed respecting the preparations and contents of the attached Bid and all pertinent circumstances respecting such Bid:
- (3) Such Bid is genuine and is not a collusive or sham Bid:
- (4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder or to fix any overhead, profit or cost element of the bid price or the Bid price of any other Bidder, or to secure through the collusion, conspiracy, connivance or unlawful agreement any advantage against the Owner, or any person interested in the proposed Contract; and

- (5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties in interest, including this affiant.

NAME OF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

SWORN TO AND SUBSCRIBE before me this _____ day of _____, 20____,

in _____, _____
CITY STATE

NOTARY PUBLIC

My Commission Expires _____

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) CALENDAR DAYS AFTER THE BID HAS BEEN OPENED.**

KING ARCHITECTS, INC.

SECTION 00 45 19.13

STATE OF LOUISIANA

PARISH OF CALCASIEU

PROJECT NAME: **GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX**PROJECT NO: **2316**LOCATION: **LAKE CHARLES, LOUISIANA**

Before me, the undersigned authority, duly commissioned and qualified within and for the state and parish aforesaid,

personally came and appeared _____

representing _____

who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath

to comply with all provisions herein as follows:

PART I

Section 2224 of Part I of Chapter 10 of Title 38 of the La. Revised Statutes of 1950 as Amended.

- (1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and
- (2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction of the public building or project were in the regular course of their duties for affiant.

PART II

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 as amended.

That affiant, if he be an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public building or project when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public building or project for which the materials are being supplied.

For the purposes of this section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange of the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

KING ARCHITECTS, INC.

SECTION 00 45 19.13

PART III

That affiant does hereby state that he has read and agrees to comply with and be subject to the provisions of Part V of Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950, being Sections 2290 through 2296 of Title 38 as amended.

NAME

COMPANY

Sworn to and Subscribed Before Me This _____ day of _____, 20____.

NOTARY PUBLIC

THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.

KING ARCHITECTS, INC

SECTION 00 45 19.16

ATTESTATION - PAST CRIMINAL CONVICTIONS OF BIDDERS

PROJECT NAME AND ADDRESS:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

PROJECT NO:

2316

Appearer, as a Bidder on the above-entitled Project, does hereby attest that: In accordance with the requirements of **Louisiana Revised Statute 38:2227**:

- (A) No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who ha a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:
- | | |
|---------------------------------------|-----------------------------------|
| (a) Public bribery (R.S. 14:118) | (c) Extortion (R.S. 14:66) |
| (b) Corrupt influencing (R.S. 14:120) | (d) Money laundering (R.S. 14:23) |
- (B) Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or hasentered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or excution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statues:
- | | |
|--|---|
| (a) Theft (R.S. 14:67) | (f) Bank fraud (R.S. 14:71.1) |
| (b) Identity Theft (R.S. 14:67.16) | (g) Forgery (R.S. 14:72) |
| (c) Theft of a business record (R.S. 14:67.20) | (h) Contractors; misapplication of payments (R.S. 14:202) |
| (d) False accounting (R.S. 14:70) | (i) Malfeasance in office (R.S. 14:134) |
| (e) Issuing worthless checks (R.S. 14:71) | |

NAME IF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

SWORN TO AND SUBSCRIBE before me this _____ day of _____, 20____,

in _____, _____
CITY STATE

NOTARY PUBLIC

My Commission Expires _____

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) CALENDAR DAYS AFTER THE BID HAS BEEN OPENED.**

KING ARCHITECTS, INC

SECTION 00 45 19.19

VERIFICATION OF EMPLOYEES AFFIDAVIT

PROJECT NAME AND ADDRESS:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

PROJECT NO:

2316

Appearer, as a Bidder on the above-entitled Project, does hereby attest that: In accordance with the requirements of **Louisiana Revised Statute 38:2212.10**:

- (A) Appearer is registered and participates in a status verification system (E-Verify) to verify that all new employees in the State of Louisiana are legal citizens of the United States or are legal aliens.
- (B) If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system (E-Verify) to verify the legal status of all new employees in the state of Louisiana.
- (C) If awarded the contract, Appearer shall require all subcontractor to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

NAME IF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

SWORN TO AND SUBSCRIBE before me this _____ day of _____, 20____,

in _____, _____
CITY STATE

NOTARY PUBLIC

My Commission Expires _____

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) CALENDAR DAYS AFTER THE BID HAS BEEN OPENED.**

KING ARCHITECTS, INC

SECTION 00 45 26

CERTIFICATION REGARDING UNPAID WORKERS' COMPENSATION INSURANCE

PROJECT NAME AND ADDRESS:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

PROJECT NO:

2316

Appearer, as a Bidder on the above-entitled Project, does hereby attest that: In accordance with the requirements of **Louisiana Revised Statute 23:1726(B)**:

- (A) L.R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.
- (B) By signing below, Affiant certifies that no such assessment is in effect against the bidding / proposing entity.

NAME OF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

SWORN TO AND SUBSCRIBE before me this _____ day of _____, 20____,

in _____, _____
CITY STATE

NOTARY PUBLIC

My Commission Expires _____

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) CALENDAR DAYS AFTER THE BID HAS BEEN OPENED.**

KING ARCHITECTS, INC

SECTION 00 45 43

RESOLUTION

BE IT RESOLVED that _____
NAME

Officer/Owner of _____
COMPANY

is hereby authorized to sign any contract or document on behalf of _____
COMPANY

COMPANY ADDRESS

OFFICER/OWNER

SIGNATURE OF OFFICER/OWNER

SWORN TO AND SUBSCRIBED before me this _____ day of _____
2022, in _____, Louisiana.

NOTARY PUBLIC

ROOFING MANUFACTURER'S WARRANTY AND INSPECTION LETTER

PROJECT NAME AND ADDRESS:
GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

PROJECT NO:
2316

The undersigned Roofing System Manufacturer acknowledges that they have inspected the job site for the above referenced project; read the specifications in their entirety; that they approve the installation of their roofing system as specified over the existing substrate conditions; and will provide a _____ warranty as specified in Section _____ of the Specifications/Project Manual.

The undersigned also agrees that the Manufacturer will provide ay no charge to the Owner, daily job site inspections during construction; and provide, at the annual request of the Owner, annual inspections for the duration of the warranty period as specified in Section _____ of the Specifications/Project Manual. These inspections shall be by only full-time employees of the Manufacturer.

I, _____, certify that I am the _____
NAME TITLE
of the below named Corporation.

NAME OF ROOFING SYSTEM MANUFACTURER

SIGNATURE

DATE

(AFFIX CORPORATE SEAL)

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.**

KING ARCHITECTS, INC

SECTION 00 45 63.13

APPROVED APPLICATOR LETTER

PROJECT NAME AND ADDRESS:

GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 MOELING STREET
LAKE CHARLES, LOUISIANA 70601

PROJECT NO:

2316

This letter of approval is to certify that _____ Roofing Contractor,
is currently an approved applicator of _____ Roofing Systems,
and is authorized to install our Roofing System on the above referenced project.

NAME OF ROOFING SYSTEM MANUFACTURER

BY

SIGNATURE

TITLE

DATE

**THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT
WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.**

DATE OF ISSUANCE: _____ PROJECT NO: _____ 2316

PROJECT NAME: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601OWNER:
Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, LouisianaARCHITECT:
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

TO CONTRACTOR:

You are hereby notified that your Bid dated _____ for the above referenced Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for your Bid totaling:

DOLLARS (\$) _____

One (1) digital copy of **executable contract documents** accompany this Notice of Award.

You must comply with the following conditions precedent **within ten (10) days** of the date you receive this Notice of Award.

1. Deliver to Architect _____ counterparts of the Document 00 52 00 (Contract Agreement), fully executed by Bidder.
2. Deliver with the executed Agreements the Contract security (e.g., performance and payment bonds) and insurance documentation as specified in the Instructions to Bidders and General Conditions.
2. Deliver with the executed Contract Agreements one original set of insurance certificates with endorsements required under Section 00 72 13 (General Conditions) and Section 00 73 00 (Supplementary Conditions).
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle the Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, the Architect will return to you two fully executed counterparts of the Agreement. One copy is for your records and one is for you to file with the Calcasieu parish Clerk of Court.

Authorized By: (Architect) _____ Barry King, AIA for King Architects, Inc

Authorized Signature: _____

Title: _____ President

ACCTANCE OF AWARD

Receipt of the above Notice of Award is hereby acknowledged this _____ day of _____, 2022.

Accepted By: (Contractor) _____

Authorized Signature: _____

Title: _____

AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement.

AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

The Owner and Contractor agree as follows.

Init.

AIA Document A101™ – 2017. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. To report copyright violations of AIA Contract Documents, e-mail The American Institute of Architects' legal counsel, copyright@aia.org.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- ☐ The date of this Agreement.
- ☐ A date set forth in a notice to proceed issued by the Owner.
- ☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

- ☐ Not later than () calendar days from the date of commencement of the Work.

Init.

☐ By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item

Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than () days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

_____ %

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- ☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- ☐ Litigation in a court of competent jurisdiction
- ☐ Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

- ☐ AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

Init.

☐ The Sustainability Plan:

Title	Date	Pages

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

CONTRACTOR (Signature)

(Printed name and title)

(Printed name and title)



AIA[®] Document A101[™] – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201[™]–2017, General Conditions of the Contract for Construction. Article 11 of A201[™]–2017 contains additional insurance provisions.

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201[™]–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's

property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Cause of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- ☐ **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.
- ☐ **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.
- ☐ **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.
- ☐ **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.
- ☐ **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.
- ☐ **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.
- ☐ **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

- ☐ **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

☐ **§ A.2.5.2 Other Insurance**

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than _____ (\$ _) each occurrence, _____ (\$ _) general aggregate, and _____ (\$ _) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to, or destruction of, tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the work involves such hazards.
- .11 Claims related to explosion, collapse, and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than _____ (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than _____ (\$) each accident, _____ (\$) each employee, and _____ (\$) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- ☐ § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below.

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

- ☐ § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than _____ (\$___) per claim and _____ (\$___) in the aggregate, for Work within fifty (50) feet of railroad property.
- ☐ § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than _____ (\$___) per claim and _____ (\$___) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- ☐ § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- ☐ § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- ☐ § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

Init.

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

KING

ARCHITECTS, INC

NOTICE TO PROCEED

PROJECT NO: 2316

PROJECT NAME: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

CONTRACT INFORMATION:

Contract For: General Construction

Contract Date:

OTHER INFORMATION:

Date:

Project Number: 2316

OWNER:

Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, Louisiana

ARCHITECT:

King Architects, Inc
1312 Sampson Street
Westlake, LA 70669

TO CONTRACTOR:

You are hereby notified that the Contract Times stated for the Project will commence on

On that date, start performing the obligations required by the Contract Documents. You are to fully complete the work within
consecutive calendar days in accordance with your Contract Completion Date of

Before commencing Work at the Project Site, deliver the certificates of insurance to the Architect as required by the Contract Documents.

Also before commencing Work at the Project Site, perform:

Authorized By: (Architect) Barry D King, AIA

Authorized Signature:

Title: Architect

Date:

Accepted By: (Contractor)

Authorized Signature:

Title:

Date:

KING

ARCHITECTS, INC

NOTICE TO PROCEED

PROJECT NO: 2316

PROJECT NAME: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

CONTRACT INFORMATION:

Contract For: General Construction

Contract Date:

OTHER INFORMATION:

Date:

Project Number: 2316

OWNER:

Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, Louisiana

ARCHITECT:

King Architects, Inc
1312 Sampson Street
Westlake, LA 70669

TO CONTRACTOR:

You are hereby notified that the Contract Times stated for the Project will commence on

On that date, start performing the obligations required by the Contract Documents. You are to fully complete the work within
consecutive calendar days in accordance with your Contract Completion Date of

Before commencing Work at the Project Site, deliver the certificates of insurance to the Architect as required by the Contract Documents.

Also before commencing Work at the Project Site, perform:

Authorized By: (Architect) Barry D King, AIA

Authorized Signature:

Title: Architect

Date:

Accepted By: (Contractor)

Authorized Signature:

Title:

Date:

SUBMITTAL TRANSMITTAL FORM

DATE: _____

SUBMITTAL NO: _____

☐ original submittal ☐ resubmittal

PROJECT NO: 2316

PROJECT NAME: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX

1401 Moeling Street

Lake Charles, Louisiana 70601

TO (Architect):

FROM (General Contractor):

King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

Per the Contract Documents, contractor shall use this transmittal form for submittal of submittals, shop drawings, testing reports, and product information. The procedure for submitting these items is located in the Contract Documents.

Contractor shall follow all specifications. Failure to follow requirements included in the Contract Documents and Specifications will constitute as reason for the return of the submittal for an additional re-submittal. Contractor is to number each submittal.

Submittal Name/Description: _____

Specification Section No: _____

Contractor: _____

Subcontractor/Supplier: _____

Submittal Type: ☐ Shop Drawing ☐ Sample(s) ☐ Product Data ☐ Other: _____

Notes/Comments: _____

Contractor hereby certifies that (i) CONTRACTOR has complied with the requirements of the Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

CONTRACTOR

SIGNATURE

PRINT

DATE



_____, an agency of the United States government, or an agency, board, commission, or instrumentality of the State of Louisiana or its political subdivisions, including parishes, municipalities and school boards, does hereby designate the following contractor as its agent for the purpose of making sales tax exempt purchases on behalf of the governmental body:

Name of Contractor		
Address		
City	State	ZIP

This designation of agency shall be effective for purchases of component construction materials, taxable services and leases and rentals of tangible personal property for the following named construction project:

Construction Project	Contract Number

This designation and acceptance of agency is effective for the period

Beginning Date (mm/dd/yyyy)	End Date (mm/dd/yyyy)

Purchases for the named project during this period by the designated contractor shall be considered as the legal equivalent of purchases directly by the governmental body. Any materials purchased by this agent shall immediately, upon the vendor’s delivery to the agent, become the property of this government entity. This government entity, as principal, assumes direct liability to the vendor for the payment of any property, services, leases, or rentals made by this designated agent. This agreement does not void or supersede the obligations of any party created under any construction contract related to this project, including specifically any contractual obligation of the construction contractor to submit payment to the vendors of materials or services for the project.

This contractor-agent is not authorized to delegate this purchasing agency to others; separate designations of agency by this governmental entity are required for each contractor or sub-contractor who is to purchase on behalf of this governmental entity. The undersigned hereby certify that this designation is the entirety of the agency designation agreement between them. In order for a purchase for an eligible governmental entity through a designated agent to be eligible for sales tax exemption, the designation of agency must be made, accepted, and disclosed to the vendor before or at the time of the purchase transaction.

Designation of Agency			Acceptance of Agency		
Signature of Authorized Designator		Date (mm/dd/yyyy)	Signature of Contractor or Subcontractor Authorized Acceptor		Date (mm/dd/yyyy)
Name of Authorized Designator			Name of Contractor's or Subcontractor's Acceptor		
Name of Governmental Entity			Name of Contractor		
Address			Address		
City	State	ZIP	City	State	ZIP

This designation of agency form, when properly executed by both the contractor and the governmental entity, shall serve as evidence of the sales tax exempt status that has been conferred onto the contractor. No other exemption certificate form is necessary to claim exemption from sales taxes. The agency agreement evidenced by this sales tax exemption certificate must be implemented at the time of contract execution with the governmental entity. The contract between the governmental entity and his agent must contain provisions to authenticate the conferment of agency.

KING

ARCHITECTS, INC

REQUEST FOR INFORMATION (RFI)

PROJECT NO: 2316

PROJECT NAME AND ADDRESS: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

RFI No: _____ Issue Date: _____

CONTRACTOR:

RFI DESCRIPTION:

REFERENCES/ATTACHMENTS:

Specifications

Drawings

Other

CONTRACTOR'S RECOMMENDATION:

ARCHITECT'S RESPONSE:

Architect's Name and Title: _____ Date: _____



Note: Some of the items in this response may result in credits or additions which may become part of a future Request for Change Order.

EQUIPMENT COSTS:

3rd Party Rentals	Vendor	Rate/ Day	Days	Total	Delivery Cost	15.00% Mark-Up	Total Cost
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00	\$0.00
Sub-Total							\$0.00

Change Order Subtotal Amount

\$0.00

Total Change Order Costs

\$0.00

Insurance Cost

	Rate / \$1,000	Cost
Builder Risk	\$0.00	\$0.00
Bond Premium	\$0.00	\$0.00
Sub-Total		\$0.00
Mark-Up	15.00%	\$0.00
Total Insurance Cost		\$0.00

AMOUNT OF CALENDAR DAYS REQUESTED TO BE ADDED TO CONTRACT TIME FOR THIS CHANGE

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY:

SIGNED

PRINTED NAME AND TITLE

COMPANY

CHANGE ORDER**00**

PROJECT NAME AND ADDRESS: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

PROJECT NO: 2316

CONTRACT INFORMATION:

Contract For: General Construction
Contract Date: _____

CHANGE ORDER INFORMATION:

Change Order Date: _____
Change Order Number: _____
CO Request Number: _____

OWNER:

Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, Louisiana 70601

ARCHITECT:

King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

CONTRACTOR:**THE CONTRACT IS CHANGED AS FOLLOWS:**

(Insert a detailed description of the change(s) and attach the itemized breakdown.)

ORIGINAL CONTRACT SUM \$ _____

NET CHANGES BY PREVIOUS CHANGE ORDERS \$ _____

CONTRACT SUM PRIOR TO THIS CHANGE ORDER \$ _____

CONTRACT SUM WILL BE INCREASED/
DECREASED
BY THIS CHANGE ORDER - DETAILS ATTACHED \$ _____

NEW CONTRACT SUM INCLUDING THIS CHANGE ORDER \$ _____

CONTRACT TIME WILL BE INCREASED BY _____ DAYS.

REVISED CONTRACT COMPLETION DATE: _____

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

RECOMMENDED:**ACCEPTED:****APPROVED:**

ARCHITECT

Barry King, AIA
King Architects, Inc.

CONTRACTOR

OWNER

Dr. Samuel C Tolbert Jr - Pastor
Greater St Mary Missionary Baptist Church

By: _____

By: _____

By: _____

Dated: _____

Dated: _____

Dated: _____

KING ARCHITECTS, INC

SECTION 00 65 19

DATE:
PROJECT NO: 2316
PROJECT NAME ADDRESS: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

ARCHITECT: KING ARCHITECTS, INC
1312 Sampson Street
Westlake, Louisiana 70669

CONTRACTOR:

OWNER: GREATER ST MARY MISSIONARY BAPTIST CHURCH
1401 Moeling Street
Lake Charles, Louisiana 70601

I certify that, to the best of my knowledge and belief, this project is complete or substantially complete in accordance with the Drawings and Project Manual to the point where it can be used for the purpose in which was intended. It is recommendaed that it be accepted.

DATE OF ACCEPTANCE: _____

CONTRACT DATE OF COMPLETION: _____

NUMBER OF DAYS (Overrun) (Underrun) _____
(As of Acceptance Date): _____

LIQUIDATED DAMAGES PER DAY (STIMPULATED IN CONTRACT): \$ _____

VALUE OF PUNCH LIST: \$ _____
(Attach Itemized List)

Was part of the Project occupied prior to Acceptance: _____

PORTION OCCUPIED: _____
(Attach Beneficial Occupancy forms)

Barry King, AIA for King Architects, Inc

For Use of Owner:
I concur in the Acceptance of this Project: _____

KING ARCHITECTS, INC

SECTION 00 65 83

NOT FOR RECORDATION

DATE:

PROJECT NO: 2316
PROJECT NAME AND ADDRESS: GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX
1401 Moeling Street
Lake Charles, Louisiana 70601

The below described portion of subject project is, to the best of my knowledge and belief, complete to a point where the User desires to use in according with the Contract Documents.

DATE OCCUPIED: _____
WARRANTY items covered by Occupancy.
(See Attached List.)

ARCHITECT: KING ARCHITECTS, INC 1312 SAMPSON ST. WESTLAKE, LA 70669	CONTRACTOR:	OWNER: GREATER ST MARY MISSIONARY BC 1401 Moeling Street Lake Charles, Louisiana 70601

BY _____	BY _____	BY _____
PRINT NAME _____	PRINT NAME _____	PRINT NAME _____
DATE _____	DATE _____	DATE _____

PUNCH LIST
Attached ☐
None ☐
Other ☐ _____

NOT FOR RECORDATION PURPOSES

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Greater St Mary Missionary Baptist Church Complex
1401 Moeling Street
Lake Charles, Louisiana 70601

THE OWNER:

(Name, legal status and address)

Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, Louisiana
337-433-0122

THE ARCHITECT:

(Name, legal status and address)

King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669
337-494-0806

TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	OWNER
3	CONTRACTOR
4	ARCHITECT
5	SUBCONTRACTORS
6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7	CHANGES IN THE WORK
8	TIME
9	PAYMENTS AND COMPLETION
10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS

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The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



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INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

Access to Work

3.16, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,

10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.4**

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8

Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,

3.12.10.1, 4.2.7, 9.3.2, 13.4.1

Arbitration

8.3.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,
9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,
13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3,
4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2,
9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,
7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,
13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,
3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,
3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,
9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,
15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

Building Information Models Use and Reliance

1.8

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval
13.4.4

Certificates of Insurance
9.10.2

Change Orders

1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2

Change Orders, Definition of

7.2.1

CHANGES IN THE WORK

2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5

Claims, Definition of

15.1.1

Claims, Notice of
1.6.2, 15.1.3

CLAIMS AND DISPUTES

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4

Claims and Timely Assertion of Claims
15.4.1

Claims for Additional Cost

3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**

Claims for Additional Time

3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**

Concealed or Unknown Conditions, Claims for

3.7.4

Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7

Claims Subject to Arbitration
15.4.1

Cleaning Up

3.15, 6.3

Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**

Commencement of the Work, Definition of

8.1.2

Communications

3.9.1, **4.2.4**

Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2

COMPLETION, PAYMENTS AND

9

Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

Compliance with Laws

2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3

Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract

1.1.1, 6.1.1, 6.1.4

Consent, Written

3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2

Consolidation or Joinder

15.4.4

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

1.1.4, **6**

Construction Change Directive, Definition of

7.3.1

Construction Change Directives

1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1

Construction Schedules, Contractor's

3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Contingent Assignment of Subcontracts

5.4, 14.2.2.2

Continuing Contract Performance

15.1.4

Contract, Definition of

1.1.2

CONTRACT, TERMINATION OR SUSPENSION OF THE

5.4.1.1, 5.4.2, 11.5, **14**

Contract Administration

3.1.3, 4, 9.4, 9.5

Contract Award and Execution, Conditions Relating to

3.7.1, 3.10, 5.2, 6.1

Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3

Contract Documents, Definition of

1.1.1

Contract Sum

2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**

Contract Sum, Definition of

9.1

Contract Time

1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5

Contract Time, Definition of

8.1.1

CONTRACTOR

3

CONTRACTOR

3

Contractor, Definition of

3.1, **6.1.2**

Contractor's Construction and Submittal Schedules

3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

Contractor's Employees
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1

Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5

Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, **15.1.5**
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**

Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work
(See Defective or Nonconforming Work)

Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4

GENERAL PROVISIONS

1

Governing Law

13.1
Guarantees (See Warranty)

Hazardous Materials and Substances
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1

Indemnification
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

Information and Services Required of the Owner
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

Instruments of Service, Definition of
1.1.7
Insurance
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
Insurance, Notice of Cancellation or Expiration
11.1.4, 11.2.3

Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 14.4.2

Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.2, 11.4, 11.5

Insurance, Stored Materials
9.3.2

INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Insured loss, Adjustment and Settlement of
11.5
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13

Interest
13.5
Interpretation
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12
Judgment on Final Award
15.4.2

Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 15.1.2, 15.4.1.1
Limitations of Liability
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1
Limitations of Time
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5

Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Mediation
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1

Minor Changes in the Work
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

MISCELLANEOUS PROVISIONS

13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

Mutual Responsibility

6.2

Nonconforming Work, Acceptance of

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2

Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance

11.1.4, 11.2.3

Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections

13.4.1, 13.4.2

Observations, Contractor's

3.2, 3.7.4

Occupancy

2.3.1, 9.6.6, 9.8

Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1

OWNER

2

Owner, Definition of

2.1.1

Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

Owner, Information and Services Required of the

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

Owner's Insurance

11.2

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

Owner's Right to Carry Out the Work

2.5, 14.2.2

Owner's Right to Clean Up

6.3

Owner's Right to Perform Construction and to Award Separate Contracts

6.1

Owner's Right to Stop the Work

2.4

Owner's Right to Suspend the Work

14.3

Owner's Right to Terminate the Contract

14.2, 14.4

Ownership and Use of Drawings, Specifications and Other Instruments of Service

1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

Partial Occupancy or Use

9.6.6, **9.9**

Patching, Cutting and

3.14, 6.2.5

Patents

3.17

Payment, Applications for

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3

Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4

Payment, Failure of

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Payment, Final

4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3

Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Payments, Progress

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

PAYMENTS AND COMPLETION

9

Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB

10.3.1

Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Permits, Fees, Notices and Compliance with Laws

2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2

PERSONS AND PROPERTY, PROTECTION OF

10

Polychlorinated Biphenyl

10.3.1

Product Data, Definition of

3.12.2

Product Data and Samples, Shop Drawings

3.11, **3.12**, 4.2.7

Progress and Completion

4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4

Progress Payments

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

Project, Definition of
1.1.4

Project Representatives
4.2.10

Property Insurance
10.2.5, 11.2

Proposal Requirements
1.1.1

PROTECTION OF PERSONS AND PROPERTY **10**

Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,
10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Rejection of Work
4.2.6, 12.2.1

Releases and Waivers of Liens
9.3.1, 9.10.2

Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1

Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

Review of Contract Documents and Field
Conditions by Contractor

3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and
Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples
by Contractor
3.12

Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,
6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,
12.2.4, **13.3**, 14, 15.4

Royalties, Patents and Copyrights
3.17

Rules and Notices for Arbitration
15.4.1

Safety of Persons and Property
10.2, 10.4

Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4

Samples, Definition of
3.12.3

Samples, Shop Drawings, Product Data and
3.11, 3.12, 4.2.7

Samples at the Site, Documents and
3.11

Schedule of Values
9.2, 9.3.1

Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2

Separate Contractors, Definition of
6.1.1

Shop Drawings, Definition of
3.12.1

Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7

Site, Use of
3.13, 6.1.1, 6.2.1

Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4

Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Special Inspections and Testing
4.2.6, 12.2.1, 13.4

Specifications, Definition of
1.1.6

Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14

Statute of Limitations
15.1.2, 15.4.1.1

Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1

Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4

Subcontractor, Definition of
5.1.1

SUBCONTRACTORS **5**

Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2,
9.6.7

Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1

Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8,
9.9.1, 9.10.2, 9.10.3

Submittal Schedule
3.10.2, 3.12.5, 4.2.7

Subrogation, Waivers of
6.1.1, **11.3**

Substances, Hazardous
10.3

Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2,
15.1.2

Substantial Completion, Definition of
9.8.1

Substitution of Subcontractors
5.2.3, 5.2.4

Substitution of Architect
2.3.3

Substitutions of Materials
3.4.2, 3.5, 7.3.8

Sub-subcontractor, Definition of
5.1.2

Subsurface Conditions

3.7.4

Successors and Assigns

13.2

Superintendent

3.9, 10.2.6

Supervision and Construction Procedures

1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

Surety

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

Surety, Consent of

9.8.5, 9.10.2, 9.10.3

Surveys

1.1.7, 2.3.4

Suspension by the Owner for Convenience

14.3

Suspension of the Work

3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract

5.4.1.1, 14

Taxes

3.6, 3.8.2.1, 7.3.4.4

Termination by the Contractor

14.1, 15.1.7

Termination by the Owner for Cause

5.4.1.1, **14.2**, 15.1.7

Termination by the Owner for Convenience

14.4

Termination of the Architect

2.3.3

Termination of the Contractor Employment

14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT

14

Tests and Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**

TIME

8

Time, Delays and Extensions of

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

Time Limits on Claims

3.7.4, 10.2.8, 15.1.2, 15.1.3

Title to Work

9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK

12

Uncovering of Work

12.1

Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

Unit Prices

7.3.3.2, 9.1.2

Use of Documents

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

Use of Site

3.13, 6.1.1, 6.2.1

Values, Schedule of

9.2, 9.3.1

Waiver of Claims by the Architect

13.3.2

Waiver of Claims by the Contractor

9.10.5, 13.3.2, **15.1.7**

Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**

Waiver of Consequential Damages

14.2.4, 15.1.7

Waiver of Liens

9.3, 9.10.2, 9.10.4

Waivers of Subrogation

6.1.1, **11.3**

Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

Weather Delays

8.3, 15.1.6.2

Work, Definition of

1.1.3

Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These

obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional,

whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work,

provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;

- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

Additions and Deletions Report for

AIA® Document A201® – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 10:40:29 ET on 08/22/2025.

PAGE 1

Greater St Mary Missionary Baptist Church Complex
1401 Moeling Street
Lake Charles, Louisiana 70601

...

(Name, legal status and address)

Greater St Mary Missionary Baptist Church
1401 Moeling Street
Lake Charles, Louisiana
337-433-0122

...

King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669
337-494-0806

PAGE 10

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. ~~The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.~~

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Barry D. King, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:40:29 ET on 08/22/2025 under Order No. 2114754863 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

These supplementary conditions modify, change, delete from or add to the General Conditions of the Contract for Construction AIA Document A201-2017. When any article of the General Conditions is modified, or any paragraph, subparagraph or clause thereof is modified or deleted by this supplement, the unaltered provisions of that article, paragraph, subparagraph, or clause shall remain in effect.

Article, paragraphs, subparagraphs or clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 The Contract Documents

(In Subsection 1.1.1 delete the third sentence and add the following sentence:)

"The Contract Documents shall include the bidding documents as listed in the Instruction to Bidders and any modifications made thereto by Addenda."

1.8 BUILDING INFORMATION MODELS USE AND RELIANCE

(Delete Section 1.8 in its entirety.)

ARTICLE 2 OWNER

2.2 EVIDENCE OF THE OWNER'S FINANCIAL ARRANGEMENTS

(Add the following sentence to the end of Subsection 2.2.4:)

2.2.4 "The Owner shall not be responsible for any explanation or interpretation of the Contract Documents."

(Add the following new Subsection 2.2.5:)

2.2.5 Unless otherwise provided in the Contract documents, The Architect will furnish to the Contractor, free of charge, up to one (1) copy of Contract Documents. Additional copies may be purchased by the Contractor by paying actual printing and mailing costs."

2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

(Delete the entire paragraph of Subsection 2.3.2 and substitute the following:)

2.3.2 The term Architect, when used in the Contract Documents, shall mean the prime designer (Architect, Professional Engineer or Landscape Architect), or his authorized representative, lawfully licensed to practice architecture, engineering or landscape architecture in the state of Louisiana, identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender.

(Add the following new Section and Subsection:)

2.6 OWNER'S RIGHT OF PARTIAL OCCUPANCY

2.6.1 The Owner shall have the right to use any and all portions of the building that have reached such a stage of completion as to permit occupancy or use provided that such occupancy or use does not hamper the Contractor or prevent his efficient completion of the Contract. Use form provided in the Contract Documents entitled "Beneficial Occupancy"

ARTICLE 3 CONTRACTOR

3.9 SUPERINTENDENT

(Add the following Subsection 3.9.2:)

3.9.2 If, in the opinion of the Owner and the Architect, such superintendent or any of his assistants are either negligent or unqualified to perform their duties, they shall be replaced promptly."

3.10 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULES

- 3.10.1 Add the following: For projects with a contract sum greater than \$1,000,000.00, the Contractor shall include with the schedule, for the Owner's and Architect's information, a network analysis to identify those tasks which are on the critical path, i.e., where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken. A revised schedule shall be submitted with each Application and Certificate for Payment. No payment shall be made until this schedule is received.

ARTICLE 5 SUBCONTRACTORS

- 5.2.3 (Delete Subsection 5.2.3)

ARTICLE 7 CHANGES IN THE WORK

7.2 CHANGE ORDERS

(Add the following Subsections 7.2.2, 7.2.3, 7.2.4, 7.2.5, 7.2.6, 7.2.7, 7.2.8:)

- 7.2.2 "The cost to the Owner resulting from the change in the work shall be the sum of:

1. Contractor's material and labor cost.
2. Subcontractor's (as defined in Article 5.1.1) material and labor cost.
3. Overhead and Profit.

The credit to the Owner resulting from a change in the work shall be the sum of:

1. Contractor's material and labor cost.
2. Subcontractor's material and labor cost.
3. Credit will not be required for overhead and profit.

- 7.2.3 Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect the following information, not subject to waiver, within ten (10) days after being notified to prepare said Change Order:

1. An itemized list of material and labor cost for each subcontractor's work including quantities and unit costs for each item of labor and each item of material.
2. An itemized list of material and labor costs for Contractor's work including quantities and unit costs for each item of labor and each item of material.
3. Overhead and profit shall be computed by one of the following methods: (not to exceed 15% on any portion of work).
 - a. When all of the work is Contractor's work; 10% of the cost of the work as defined hereafter.
 - b. When the work is all Subcontract work; 10% of the cost of the work for Subcontractor's overhead and profit plus 5% of the cost of the work for Contractor's overhead and profit.
 - c. When the work is a combination of Contractor's work and Subcontractor's work; 7.5% of the cost of the work for Subcontractor's overhead and profit plus 7.5% of the cost of the work for Contractor's overhead and profit.

- 7.2.4 The Contractor shall include extensions of time if any with the Change Order Request and shall submit substantiation for such extension of time.

- 7.2.5 Cost of the work for the purpose of change orders shall be costs necessarily incurred in performance of the work and paid by the contractor which shall consist of:

1. Wages paid
2. Cost of all materials and supplies.
3. Cost of necessary machinery and equipment.
4. Cost of applicable taxes, insurance, fringe benefits, unemployment compensation, social security, old age and bond premiums.
5. Any other documents costs.

- 7.2.6 Subcontractor's cost shall consist of items in 7.2.5 above plus overhead and profit as defined in 7.2.3.

- 7.2.7 Cost of the work whether Contractor's Cost or Subcontractor's cost shall not apply the following:

1. Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.

2. Expenses of the Contractor's principal offices, branch offices and the field office.
3. Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the work.
4. Overhead and general expenses of any kind or the cost of any items not specifically and expressly included above in Cost of the Work.
5. Costs due to the negligence of the Contractor, any Subcontractor, anyone directly employed by any of them, or for whose acts any of them may be liable, including but not limited to the correction of defective or nonconforming work, disposal of material and equipment wrongly supplied, or making good any damage to property.

7.2.8 When applicable, as provided by the Agreement, the Cost to the Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of material, labor, equipment, overhead and profit.

7.3 CONSTRUCTION CHANGE DIRECTIVES

- 7.3.1 (Delete the second sentence of paragraph 7.3.1.)
- (Delete 7.3.2, 7.3.3, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.8 and 7.3.9)

7.4 MINOR CHANGES IN THE WORK

(Add the following after the last sentence of Subsection 7.4.1)

- 7.4.1 "However, any changes which effects a reduction in quantity or quality of materials or equipment shall not be made without the written approval of the Owner."

ARTICLE 8 TIME

8.1 DEFINITIONS

- 8.1.2 (In Subsection 8.1.2 change the words "in the agreement" to read "by the written Notice to Proceed").
- (Add new Subsection 8.1.5:)
- 8.1.5 "The date of Beneficial Occupancy shall be the date when a certain portion or portions of a project are complete to a point where they can be occupied by the Owner."

8.2 PROGRESS AND COMPLETION

(Delete Subsection 8.2.1 and substitute the following:)

- 8.2.1 "Time is of the essence and completion of the work must be within the time stated in the Agreement, subject to such extensions as may be granted under Section 8.3 The Contractor agrees to commence work not later than fourteen days after the transmittal date of written Notice to Proceed from the Owner and to substantially complete the project within the time stated in the Agreement. The Owner will suffer financial loss if the project is not substantially complete in the time set forth in the Contract Documents. The Contractor and his surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, for each consecutive calendar day (Saturday, Sunday and holidays included) of delay until the Work is substantially complete."

8.3 DELAYS AND EXTENSIONS OF TIME

- 8.3.1 Change the words "by Change Order for such reasonable time as the Architect may determine" to read "as recommended by the Architect, subject to Owner's approval of the Change Order".
- (Delete Subsection 8.3.3.)

ARTICLE 9 PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

(Delete Subsection 9.2.1 and substitute the following)

- 9.2.1 "At the preconstruction conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:
1. The Schedule of Values form as submittal shall be on continuation sheet of Application of Certificate for Payment, AIA Documents G702-G703A.
 2. Use the index (table of contents, Section 00 01 00) of the specifications as a basis for format for listing costs of work for sections under Division 1 through 32. Use each section number under each division for subtitles. Each section shall be subdivided into separate line items for the total cost (with overhead and profit) of separate items in sections.
 3. The total of all items shall equal the total Contract Sum."

9.3 APPLICATIONS FOR PAYMENT

(Delete Subsection 9.3.1 and substitute the following).

- 9.3.1 "Monthly, the Contractor shall submit to the Architect an itemized Application of Certificate for Payment, notarized if required, supported by such data substantiating the right to payment as the Owner or the Architect may require. Application for Payment shall be submitted on or about the first of each month for the value of labor and materials incorporated in the work and of material suitable stored at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows, per LA R.S. 38:2248:
- 9.3.1.1 Project with Contract Sum of less than \$500,000.00 - 10% of the Contract Sum.
 - 9.3.1.2 Project with Contract Sum of more than \$500,000.00 - 5% of the Contract Sum.
 - 9.3.1.3 No payment shall be made until the revised schedule required by Section 3.10.1 is received.
 - 9.3.1.4 The normal retainage shall not be due the Contractor until after Substantial Completion and expiration of the forty-five day lien period and submission to the Architect of a clear lien certificate, consent of surety, and invoice for retainage.

(Delete Subsection 9.3.1.1.)

9.6 PROGRESS PAYMENTS

(Delete Subsection 9.6.1 and substitute the following).

- 9.6.1 "After the Architect has issued a Certificate for Payment, the Owner shall make payment within twenty days."

9.8 SUBSTANTIAL COMPLETION

- 9.8.2 Delete the words "or a portion thereof which the Owner agrees to accept separately" where they appear in 9.8.2.

(Delete the second and third sentences of paragraph 9.8.5 and substitute the following)

- 9.8.5 "The normal retainage shall not be due to the Contractor until expiration of the **forty-five day** lien period and submission to the Architect of a clear lien certificate and invoice for same".

(Add the following Subsections 9.8.6, 9.8.7, and 9.8.8).

- 9.8.6 Delete the words "or designated portion thereof" wherever they appear in Subsections 9.8.1, 9.8.2, and 9.8.3 above.
- 9.8.7 "Upon the recommendation and issuance of the Architect, the Contractor will record with the Clerk of Courts a Notice of Acceptance of Building Contract Certificate of Substantial Completion."
- 9.8.8 A "Punch List" of "exceptions" and the dollar value related thereto will be prepared. A monetary value will be assigned to each item so that a "special" retainage can be withheld for exceptions to acceptance in addition to the "normal" retainage. This monetary value shall be based on the estimated actual value of each item multiplied by Two."

9.9 PARTIAL OCCUPANCY OR USE

(Delete Section 9.9)

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.2 (Delete part (6) of the paragraph and substitute the following:)

"The Owner shall record the acceptance for the Work that has been performed and the Contractor shall furnish a clear lien certificate from the Clerk of Courts not less than forty-five (45) days after the recordation of acceptance. The cost of recordation shall be the responsibility of the Contractor.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.4 EMERGENCIES

(Add the following Subsection 10.4.1:)

10.4.1 "All Contractors should use the least hazardous materials on all jobs. Material safety data sheets (MSDS shall be given to the Owner on all materials used).

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

(Delete Subsection 11.1.2 and substitute the following)

11.1.2 "The Contractor shall, before commencing any work to be conducted under this Agreement, procure Workmen's Compensation and Employer's Liability Insurance with an insurance company authorized to write such policies of insurance in the state of Louisiana. It shall be the further responsibility of the Contractor to require that all Subcontractors have in full force and effect a policy of Workmen's Compensation and Employer's Liability Insurance before proceeding with any of the Work required under this Agreement. The Contractor shall procure and maintain, during the life of this agreement, such public liability and property damage insurance, including the operation of motor vehicles, with limits as hereinafter provided which will cover the Contractor's legal liability arising out of the Work performed by the Contractor any Subcontractor, and by anyone directly or indirectly employed by either of them for claims for damages for bodily injury, including accidental death, as well as claims for property damages, which may arise from operations under this contract.

Insurance coverage specified in the General Conditions (AIA Document A201) to be provided by the Contractor, and any other insurance described below shall be furnished with the following minimum limits:

11.1.2.1 Workmen's Compensation (Clause 11.1.1.1):

1.	Applicable State	Standard Louisiana
2.	Employer's Liability	\$500,000.00

11.1.2.1.1 Contractor's Liability Insurance (Clause 11.1.1.2, 11.1.1.3, 11.1.1.4) including contractual liability (Subparagraph 11.1.3): Form of insurance shall be Comprehensive General Liability including Broad Form CGL and the Contractor shall furnish a certificate naming the as an additional insured:

Coverage required for Projects:	<\$1,000,000	>\$1,000,000

1.	Bodily injury and Property damage Combined Single Limit (CSL)-Includes products and completed operations and contractual liability

Each Occurrence	500,000 (CSL)	1,000,000 (CSL)
Aggregate	500,000 (CSL)	1,000,000 (CSL)

2.	Personal Injury

Combined Single Limit (CSL) (Aggregate Limits) - Including products and completed Operations and contractual liability

Each Person Aggregate	500,000(CSL)	1,000,000 (CSL)
General Aggregate	500,000(CSL)	1,000,000 (CSL)

3. Automobile Liability
Combined Single Limit (CSL)-Owner, Non-owned and hired car bodily injury and property damage 300,000 (CSL) 500,000 (CSL)
4. XCU Coverage
5. Umbrella Policy - The Contractor shall procure and maintain during the life of this agreement an Umbrella Policy in the amount of \$1,000,000 in excess of all other insurance requirements.

- 11.1.3 The Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" (except earthquake and flood insurance coverage) completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Contractor's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this agreement.

11.2 OWNER'S LIABILITY INSURANCE

(Delete Subsection 11.2.1 and substitute the following)

- 11.2.1 Owner's and Contractor's Protective Liability Insurance shall be furnished by the Contractor naming the as an additional insured.

Coverage required for Projects:	<\$1,000,000	>\$1,000,000

1. Bodily injury and Property damage
Combined Single Limit (CSL) - Includes products and completed operations and contractual liability

Each Occurrence 500,000 (CSL) 1,000,000 (CSL)
Aggregate 500,000 (CSL) 1,000,000 (CSL)

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.2 SUCCESSORS AND ASSIGNS

- 13.2.1 (Eliminate the second sentence of Subsection 13.2.1 and substitute the following):

"There shall be no assignment of the Contract."

(Delete Subsection 13.2.2 in its entirety.)

(Add the following Section 13.8).

13.8 Recordation of Contract and Bond

- 13.8.1 "The Owner shall record the Agreement between the Owner and Contractor and Performance and Payment Bond with the Clerk of Court in the parish in which the work is to be performed. The cost of recordation shall be the responsibility of the Contractor.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.2 Termination by the Owner for Cause

(Add the following Subsection 14.2.1.5:)

(Add the following Subsection 14.2.5:)

- 14.2.5 "If an agreed sum of stipulated/liquidated damages has been established, termination by the Owner under this Article will not relieve the Contractor of his obligations under the stipulated/liquidated damages provisions and the Contractor shall be liable the Owner for per diem stipulated/liquidated damages."

ARTICLE 15 CLAIMS AND DISPUTE

15.1.6 Claims for Additional Time

(Add the following Subsection 15.1.6.1:)

- 15.1.6.1 "The following days are considered reasonable anticipated days of adverse weather on a monthly basis:

January	11 days	July	6 days
February	10 days	August	5 days
March	8 days	September	4 days
April	7 days	October	3 days
May	5 days	November	5 days
June	6 days	December	8 days

The Contractor shall ask for total adverse weather days. The Contractor's request shall be considered only for days over the allowable number of days stated above.

Note: Agreement is on a calendar day basis.

15.2 INITIAL DECISION

(Add the following sentence to the end of Subsection 15.2.2:)

- 15.2.2 The Architect is the Initial Decision Maker.

15.4 ARBITRATION

(Delete Subsections 15.4.4, 15.4.4.1, 15.4.4.2 and 15.4.4.3 and add the following:)

- 15.4.4 All claims, disputes and other matters in question between the parties to this Agreement under Ten Thousand Dollars and no cents (\$10,000.00) arising out of, or relating to this agreement or the breach thereof, shall be decided by arbitration under the following rules of arbitration. All claims, disputes and other matters over Ten Thousand dollars and no cents (\$10,000.00) may be decided by mutual of the parties to this agreement. Notice of the demand for arbitration shall be filed in writing with the other party of the agreement. The demand for arbitration shall be made within the time limits specified in paragraph 15.1.2 of AIA Document A201, 2017 edition. Any such arbitration proceeding shall, at the option of the Owner, be consolidated with or joined to other arbitration proceedings between the Owner and other persons or entities under contract with the Owner for the construction, repair or alterations of the project in question.
- 15.4.5 All claims by the Contractor shall first be submitted to the Architect in accordance with paragraph 15.2.1 of the General Conditions. In the event that the Contractor does not receive a decision from the Architect in accordance with the provisions of 15.2.1, the Contractor shall demand arbitration not later than forty (40) days from the date of submission to the Architect or else the Contractor expressly agrees that the claim is waived.
- 15.4.6 The parties hereby agree that the locale of the arbitration proceedings shall be in Louisiana and that all legal issues shall be governed by Louisiana Law. The Louisiana state courts shall have sole jurisdiction in any court proceedings.

- 15.4.7 There shall be full right of discovery in arbitration to the extent permitted by the Louisiana Code of Civil Procedure for court suits.
- 15.4.8 The right of AAA to make administrative appointments or appoint arbitrators is revoked. The Contractor and the Owner shall select arbitrators as follows:
1. After demand has been made to arbitrate, each party shall within (15) days name their respective arbitrator.
 2. The two arbitrators named by each party shall meet and jointly name the third arbitrator within the next fifteen (15) days.
 3. Arbitration proceedings must be commenced no later than forty (40) days after the initial demand to arbitrate has been made.
 4. Arbitrators must reach a decision within fifteen (15) days after the arbitration hearings are complete.
 5. No more than one item shall be arbitrated at one time unless agreed upon by both parties. In the event it is agreed by both parties that more than one item is to be arbitrated by one panel of arbitrators, each item must be arbitrated separately and only after a decision has been reached by the panel on the proceeding item can the second item be arbitrated.
 6. The decision of the arbitrators shall be in writing and shall be final.
- 15.4.9 This agreement to arbitrate shall be specifically enforceable under provisions of R.S. 9:4201 et seq.
- 15.4.10 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain progress during any arbitration proceeding, and the Owner shall continue to make payments in accordance with the Agreement.

(Add the following Articles 16, 17, 18, 19, 20, 21, 22, and 23:)

ARTICLE 16 SHOP DRAWINGS

- 16.1 Follow all provisions of General Conditions regarding shop drawings and samples.
- 16.2 Shop drawings must be submitted in quadruplicate.
- 16.3 No shop drawings will be allowed at the construction site which do not bear the Architect's stamp "Reviewed for field use."
- 16.4 The Contractor shall furnish the Owner with two sets of complete shop and working drawings of all apparatus, equipment, controls, etc. to be provided in the said project. These drawings shall give dimensions, weights, mounting data, locations, ratings and other pertinent information. No separate items will be accepted.

ARTICLE 17 COMPLIANCE WITH LOUISIANA LICENSING LAW

- 17.1 The Contractor must be fully qualified under state or local licensing law for "General Contractors" in effect and at the location of the Work before submitting his bid. For projects in the state of Louisiana, Contractors and Subcontractors must be licensed under Louisiana Revised Statutes 37:2151, et. seq. For projects requiring licensing in accordance with law. The Contractor shall state his license number with his bid and be responsible for determining that all Subcontractors and prospective Subcontractors are duly licensed.

ARTICLE 18 CONSTRUCTION SIGN

- 18.1 The Contractor shall erect a sign at the project site in accordance with the sample drawing included in the specifications. Sign shall be erected as soon as practical after commencement of the Work. Location of sign shall be as directed. Sign shall be maintained in good condition until completion of project.

ARTICLE 19 COORDINATION OF TRADES

- 19.1 The contract documents are intended to produce a piece of work complete in every respect and the Contractor shall furnish all things necessary to complete the Work within the meaning and intent of said documents. It shall be the responsibility of the Contractor to provide everything necessary to complete the Work.
- 19.2 If installation of conduits, piping and ductwork become a problem, it will be expected that the various Subcontractors with the General Contractor will coordinate their work to complete the installation at no additional cost to the Owner. Attention is called to the priority list for as enumerated here:
1. Sanitary drain and waste.
 2. Storm drain and sewer.
 3. Acids waste.

4. Steam supply.
5. Heating hot water.
6. Chilled water.
7. Clinical gases.
8. Air conditioning supply duct.
9. Sprinkler system.
10. Natural gas.
11. Domestic hot water.
12. Domestic cold water.
13. Electric conduit.

Items not required will be deleted, but adjusted sequence will remain.

- 19.3 It will be the responsibility of the Contractor and all Subcontractors to review all architectural, structural, mechanical and electrical plans and call discrepancies in coordination to the attention of the Architect for addendum items. After the contract is signed, it will be the responsibility of the Contractor and all Subcontractors to provide necessary rough-in and connection, mechanical and electrical, to all items and equipment necessary to place this unit or equipment in complete operating condition. If item is shown on any one segment (architectural, structural, mechanical or electrical), it shall be considered as being required by all and will be provided with all utility hook-up at no additional cost to the Owner, unless specifically noted otherwise.
- 19.4 Electrical panel locations shall be reviewed and locations adjusted for reasonable access by conduits within walls. If structure interferes with access to panels, the panel will be relocated at no cost to the Owner. Further, if the electrical panels cannot be flush mounted two options remain:
1. If the space is 1/2" or less from the wall, provide a finished wood trim filler at the perimeter of panel 2-1/2" wide with mitered corners.
 2. Subcontractor shall arrange with the General Contractor to provide an increase in wall thickness so that the panel may be flush mounted with no additional cost the Owner.
- 19.5 Plans will generally be complete with regard to pipe chases and furred areas. If additional furring is required, this should be called to the attention of the Architect for an addendum. After the contract is signed it will be the responsibility of the Contractor to provide all pipe chases, increases in wall dimension and other furring necessary to complete the project with required finishes at no additional cost to the Owner. No exposed piping or conduit will be permitted.

ARTICLE 20 DOCUMENT INTENT

- 20.1 The Contract Documents are intended to produce a piece of work complete in every respect and the Contractor shall furnish all things necessary to complete the work within the meaning and intent of the said documents. It shall be the responsibility of the Contractor to provide everything necessary to complete the Work as enumerated in these Supplementary Conditions.

ARTICLE 21 PRODUCT AND COLOR SELECTIONS

- 21.1 Although one carpet, vinyl wall covering, paint and/or other similar items are specified and scheduled, it is not the intent of the documents to use a single selection for all such scheduled areas.

ARTICLE 22 AS-BUILT DOCUMENTS (OWNER'S OPTION)

- 22.1 The Contractor will be furnished one (1) complete set of contract documents at the end of the contract period. On these documents will be entered any changes from the original documents for "As-Built" documents submitted to the Architect for the use of the Owner. Final acceptance shall not be issued until the Architect receives these "As-Built" documents for submittal to the Owner. If required, the cost will be negotiated between Owner and Architect.

ARTICLE 23 OPEN WALL AND CEILING INSPECTION

- 23.1 No finish material or construction will be issued on walls, partitions and ceilings until a representative of the Architect in the presence of the General Contractor and his Subcontractors make an open wall inspection of all plumbing piping, fixtures, supports, electrical conduit wall bracing, duct work and support, etc. Contractor will notify Architect forty-eight (48) hours prior to requested inspection.

END OF SUPPLEMENTARY CONDITIONS 00 73 00

SECTION 00 73 16 – INSURANCE REQUIREMENTS FOR CONSTRUCTION

PART 1 – GENERAL

1.01 Section Includes:

- A. Commercial General Liability
- B. Commercial Automobile Liability
- C. Workers' Compensation
- D. Employers Liability
- E. Contractor's Pollution Liability
- F. Builder's Risk Policy

1.02 Related Requirements:

- A. Property Insurance / Builder's Risk
- B. Umbrella / Excess Liability

PART 2 – PRODUCTS *(not applicable)*

PART 3 – EXECUTION

3.01 Contractor's Insurance; Indemnity

- A. Contractor shall procure and keep in effect, and cause its subcontractors to procure and keep in effect, during the period in which it performs and Work on or for the Project, the below outlined insurance coverages from insurers lawfully authorized to do business in the jurisdiction where any part of the Work shall be performed, such insurance will protect Contractor from all claims for which Contractor may be liable, including Contractor's own negligence, whether such actions or omissions be by the Contractor, or any Subcontractor or by anyone directly or indirectly engaged by them, or by anyone for whose acts they may be liable.
- B. The required insurance must be written for not less than the limits of liability specified herein, in each applicable Work Authorization of Contract or required by law, whichever coverages is greater. Contractor shall provide and maintain in full force and effect during the performance of the Work the following insurance coverages written by a carrier or carriers with an A.M. Best rating of A- or better and a financial size classification of VII or higher: (a) commercial general liability insurance, (b) automobile liability insurance, (c) worker's compensation insurance and employer's liability insurance, (d) Contractor's Pollution Liability Insurance.
 - 1. Commercial General Liability including coverage for Operations (extending for at least thirty-six (36) months after completion of operations) Blanket or Broad Form Contractual, Personal Injury Liability, Broad form Property Damage and Blanket XCU (property damage coverage that results

from blasting or explosion (X), structural damage or collapse©, and damage caused during excavation by mechanical equipment (U)).

- C. \$2,000,000.00 General Aggregate Per Location
- D. \$1,000,000.00 Products / Completed-Operations Aggregate
- E. \$1,000,000.00 Personal and Advertising Injury
- F. \$1,000,000.00 Each Occurrence
 - 1. Commercial Automobile Liability Insurance, covering all liability arising out of any vehicle operations, covering all owned, non-owned, leased or rented equipment used in connection with the Work, in amounts not less than:
- G. \$1,000,000.00 Combined Single Limit
 - 1. Workers' Compensation & Employer's Liability insurance and any insurance required by any employee benefits acts or other statutes applicable where the Work is to be performed. All such insurance limits shall be State and Federal Acts statutory. The Employer's Liability limits shall not be less than and include an all states endorsement:
- H. \$500,000.00 Each Accident
- I. \$500,000.00 Disease – Policy Limits
- J. \$500,000.00 Disease – Each Employee
 - 1. Contractor's Pollution insurance with the exclusion for professional errors and omissions deleted or a combined pollution and professional errors and omissions policy where there are both exposures for the Project.
- K. \$2,000,000.00 General Aggregate
- L.
- M. \$1,000,000.00 Each Occurrence

3.02 Owner's Health Additional Insurance Requirements

- A. Contractor shall include the Owner as an additional insured on the commercial general liability and automobile liability insurance policies with respect to the Project, and Contractor's use and occupancy thereof; the additional insured endorsement shall provide coverage for the additional insureds that is as broad as coverage as possible for an additional insured under the named insured's policy, including coverage for the additional insured's own negligence. On the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance (at least as broad as ISO Form CG 20 10, CG 11 85 or both CG 20 10, CG 20 26, CG 20 33, or CG 20 38; and CG 20 37 forms if later revisions used).
- B. The Commercial General Liability and Automobile Liability shall be written or endorsed to be primary and non-contributory to any insurance maintained by the Owner, and any insurance maintained by the Owner shall be considered excess, contingent and non-contributory. The amount of Contractor's insurer's liability

- under its respective insurance policy shall not be reduced by the existence of such other insurance carried by the Owner.
- C. With respect to Contractor's Commercial General Liability and Automobile Liability policies, the policies shall be written or endorsed to provide for cross-liability or severability of interest clause. Contractor's policies should not contain any cross-liability exclusions.
- D. Except as otherwise provided in the Work Authorization of Contract, Contractor shall ensure that any and all Subcontractors procure and maintain insurance coverage of the type and in amounts as is commercially reasonable.
- E. Prior to the commencement of any Work, Contractor must provide to the Owner certificates of insurance with endorsements and the applicable declaration pages, if such declaration pages are available, acceptable to the Owner that (a) evidence the insurance coverages listed in this Subsection and as required by each Work Authorization of Contract (including and self-insured retentions, for all of which Contractor shall at all times be responsible); (b) incorporate all other provisions required above; (c) show the Owner as the certificate holder; (d) are signed by an authorized representative; and (e) include project name and location. With respect to any self-insured retention over \$250,000 noted on the certificates, Contractor must provide a letter on Contractor letterhead, signed by a principal of Contractor authorized to bind Contractor on such matters, stating that the Contractor will provide the same terms and conditions to the certificate holder with respect to the self-insured retentions, including additional insured status, as are provided by the overriding policy.
- F. If Contractor fails to obtain or maintain an insurance required by this Agreement or the applicable Work Authorization Contract, the Owner, at its option, may obtain the same for Contractor and deduct the cost thereof from any payments to be made by the Owner under this Agreement.
- G. Contractor shall indemnify, defend (using counsel reasonably approved by the Owner), and hold the Owner and its employees and agents harmless from any and all claims, damages and liabilities for injury to any person or damage to any property (other than the completed Work), including real, personal and tangible property (including reasonable attorney's fees) arising from or relating to the negligent acts or omissions of Contractor or Contractor's Agents, in the performance or non-performance of its duties under this Agreement or breach of this Agreement. If any party asserts a lien against the Property as a result of services procured by, through, or at the direction of Contractor's Agents, Contractor shall defend, indemnify, and hold the Owner harmless from all damages, liability, losses, and costs, including actual attorney fees.
- H. The Owner shall indemnify, defend and hold the Contractor and its employees and agents harmless from any and all claims, damages, liabilities for injury to any person or damage to any property (including reasonable attorney's fees) arising from or relating to the negligent acts or omissions of the Owner or the Owner's agents, in the performance or non-performance of its duties under this Agreement or breach of this Agreement where such claims, damages and liabilities are not covered by any insurance required by this Agreement.
- I. The Owner reserves the right to require the Contractor to obtain additional insurance coverage and endorsement at the Owner's sole discretion and expense, according to the nature and location of Work to be performed by the Contractor.

3.03 Related Insurance Requirements

- A. Property Insurance / Builder's Risk

1. Unless otherwise provided, the Owner shall procure Builder's Risk insurance or similar property insurance policy at its sole cost and expense in amounts sufficient to cover the replacement cost of the Work in progress, "(not including Contractor's tools and equipment)". The Builder's Risk insurance or similar property insurance must be written or endorsed to provide a waiver of subrogation in favor of Contractor. The Owner shall name Contractor as loss payee on the Builder's Risk insurance or similar property policy with respect to the Project.
- B. Umbrella / Excess Liability
1. Excess/Umbrella Liability coverage shall be excess over and be no less broad than all coverages described for the base Commercial General Liability and base Auto policies and shall include a duty to defend any insured. Policy limits for the primary and excess/umbrella coverage must be the same as the underlying base Commercial General Liability policy. Drop-down coverage shall be provided for reduction and/or exhaustion of underlying aggregate limits of the base Commercial General Liability policy, and the excess/umbrella coverage shall be "following form" to underlying policies.
 2. \$2,000,000.00 General Aggregate
 3. \$1,000,000.00 Each Occurrence

END OF SECTION 00 73 16

ATTACHMENT: FEDERAL CONTRACT CLAUSES

Since the parties anticipate that federal funding will be applied to this Agreement, the following federal contract clauses must be complied with, where applicable, in addition to the clauses already mentioned.

REMEDIES

No suggested language- Insert your own language applicable to your entity.

TERMINATION FOR CAUSE

If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner his obligations under this contract, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this contract, the Owner shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In such event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the Contractor under this contract shall, at the option of the Owner, become the Owner's property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder. Notwithstanding the above, the Contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the Contractor, and the Owner may withhold any payments to the Contractor for the purpose of set-off until such time as the exact amount of damages due the Owner from the Contractor is determined.

TERMINATION FOR CONVENIENCE

The Greater St Mary Missionary Baptist Church may terminate the agreement for convenience completely or partially after providing a minimum of 30 days' written notice to Contractor notifying it of its intent to terminate for convenience.

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency,

the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon

contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

COMPLIANCE WITH THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia

or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

CLEAN AIR ACT

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 *et seq.*

(2) The Contractor agrees to report each violation to (***Greater St Mary Missionary Baptist Church***) and understands and agrees that (***Greater St Mary Missionary Baptist Church***) will, in turn, report each violation as required to assure notification to FEMA, and the appropriate Environmental Protection Agency Regional Office.

(3) The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.

FEDERAL WATER POLLUTION CONTROL ACT

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 7401 *et seq.*

(2) The Contractor agrees to report each violation to (***Greater St Mary Missionary Baptist Church***) and understands and agrees that (***Greater St Mary Missionary Baptist Church***) will, in turn, report each violation as required to assure notification to the FEMA, and the appropriate Environmental Protection Agency Regional Office.

(3) The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.

SUSPENSION AND DEBARMENT

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by (***Greater St Mary Missionary Baptist Church***). If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (***Greater St Mary Missionary Baptist Church***), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

BYRD ANTI-LOBBYING ACT

The Contractor will be expected to comply with Federal statutes required in the Anti-Lobbying Act.

Contractors who apply or bid for an award of more than \$100,000 shall file the required certification. Each tier certifies to the tier above that it will not and has not used federally appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the federal awarding agency.

PROCUREMENT OF RECOVERED MATERIALS

In the performance of this Contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired—

- i. Competitively within a timeframe providing for compliance with the Contract performance schedule;
- ii. Meeting Contract performance requirements; or
- iii. At a reasonable price.

Information about this requirement, along with the list of EPA-designate items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.

PROHIBITION ON CONTRACTING FOR COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES. (REQUIRED FOR CONTRACTS AFTER 11/12/20)

(a) *Definitions.* As used in this clause, the terms backhaul; covered foreign country; covered telecommunications equipment or services; interconnection arrangements; roaming; substantial or essential component; and telecommunications equipment or services have the meaning as defined in FEMA Policy 405-143-1, Prohibitions on Expending FEMA Award Funds for Covered Telecommunications Equipment or Services (Interim), as used in this clause—

(b) *Prohibitions.*

- (1) Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after Aug.13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.
- (2) Unless an exception in paragraph (c) of this clause applies, the contractor and its subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds from the Federal Emergency Management Agency to:
 - (i) Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
 - (ii) Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
 - (iii) Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system; or
 - (iv) Provide, as part of its performance of this contract, subcontract, or other contractual instrument, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

(c) *Exceptions.*

- (1) This clause does not prohibit contractors from providing—
 - (i) A service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or
 - (ii) Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.
- (2) By necessary implication and regulation, the prohibitions also do not apply to:
 - (i) Covered telecommunications equipment or services that:
 - i. Are *not used* as a substantial or essential component of any system; *and*
 - ii. Are *not used* as critical technology of any system.
 - (ii) Other telecommunications equipment or services that are not considered covered telecommunications equipment or services.

(d) *Reporting requirement.*

- (1) In the event the contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the contractor is notified of such by a subcontractor at any tier or by any other source, the contractor shall report the information in paragraph (d)(2) of this clause to the recipient or subrecipient, unless elsewhere in this contract are established procedures for reporting the information.
- (2) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause:
 - (i) Within one business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.
 - (ii) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: Any further available information about mitigation actions undertaken or recommended. In addition, the contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.

(e) *Subcontracts.* The Contractor shall insert the substance of this clause, including this paragraph (e), in all subcontracts and other contractual instruments.

DOMESTIC PREFERENCES FOR PROCUREMENTS. (REQUIRED FOR CONTRACTS AFTER 11/12/20)

As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or

materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

ACCESS TO RECORDS

The following access to records requirements apply to this contract:

(1) The Contractor agrees to provide GOHSEP, (*Greater St Mary Missionary Baptist Church*), the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

DHS SEAL, LOGO, AND FLAGS

The contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.

COMPLIANCE WITH FEDERAL EXECUTIVE ORDERS

This is an acknowledgement that FEMA financial assistance will be used to fund the Contract only. The Contractor will comply with all applicable federal law, regulations, executive orders, FEMA policies, procedures, and directives.

NO OBLIGATION BY THE FEDERAL GOVERNMENT

The Federal Government is not a party to this Contract and is not subject to any obligations or liabilities to the non-Federal entity, Contractor, or any other party pertaining to any matter resulting from the Contract.

PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

CONTRACTING WITH SMALL AND MINORITY BUSINESSES, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS.

(a) Any party to this contract must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. These steps are also required for the hiring of any subcontractors under this contract.

(b) Affirmative steps must include:

- (1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- (3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
- (4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises; and
- (5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

COPYRIGHT AND DATA RIGHTS

The Contractor grants to the (***Greater St Mary Missionary Baptist Church***), a paid-up, royalty-free, nonexclusive, irrevocable, worldwide license in data first produced in the performance of this contract to reproduce, publish, or otherwise use, including prepare derivative works, distribute copies to the public, and perform publicly and display publicly such data. For data required by the contract but not first produced in the performance of this contract, the Contractor will identify such data and grant to the (***Greater St Mary Missionary Baptist Church***) or acquires on its behalf a license of the same scope as for data first produced in the performance of this contract. Data, as used herein, shall include any work subject to copyright under 17 U.S.C. § 102, for example, any written reports or literary works, software and/or source code, music, choreography, pictures or images, graphics, sculptures, videos, motion pictures or other audiovisual works, sound and/or video recordings, and architectural works. Upon or before the completion of this contract, the Contractor will deliver to the (***Greater St Mary Missionary Baptist Church***) data first produced in the performance of this contract and data required by the contract but not first produced in the performance of this contract in formats acceptable by the (***Greater St Mary Missionary Baptist Church***).

BONDING REQUIREMENTS

The following bonds shall be provided in favor of Owner:

- (a) A bid guarantee from each bidder equivalent to five percent of the bid price. The “bid guarantee” must consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of the bid, execute such contractual documents as may be required within the time specified.
- (b) A performance bond on the part of the contractor for 100 percent of the contract price. A “performance bond” is one executed in connection with a contract to secure fulfillment of all the contractor’s obligations under such contract.
- (c) A payment bond on the part of the contractor for 100 percent of the contract price. A “payment bond” is one executed in connection with a contract.

Where bonds are required in the situations described herein, the bonds shall be obtained from companies holding certificates of authority as acceptable sureties pursuant to 31 CFR part 223, “Surety Companies Doing Business with the United States.”

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Project information.
 2. Work covered by Contract Documents.
 3. Phased construction.
 4. Work by Owner.
 5. Work under separate contracts.
 6. Future work.
 7. Purchase contracts
 8. Salvage requirements.
 9. Owner-furnished products.
 10. Contractor-furnished, Owner-installed products.
 11. Access to site.
 12. Coordination with occupants.
 13. Work restrictions.
 14. Specification and drawing conventions.
 15. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: **GREATER ST MARY MISSIONARY BAPTIST CHURCH COMPLEX**
- Project number: **2316**
1. Project Location: 1401 Moeling Street
Lake Charles, Louisiana 70601
- B. Owner: **GREATER ST MARY MISSIONARY BAPTIST CHURCH**
1. Owner's Representative: Dr Samuel C Tolbert Jr - Pastor
Greater St Mary Missionary Baptist Church
Lake Charles, Louisiana 70601
337.433.0122
- C. Architect: **KING ARCHITECTS, INC.**
1. Project Architect: Barry King, AIA
1312 Sampson Street
Westlake, Louisiana 70669
337.494.0806
office@kingarchitects.net
www.kingarchitects.net
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
1. CIVIL ENGINEER: Jason Duhon, PE
Duhon & Pleasant Consulting Engineering, LLC
5393 Big Lake Road
Lake Charles, Louisiana 70605

337.504.7755

jason@dandpengineers.comwww.dandpengineers.com

2. STRUCTURAL ENGINEER:

Jason Duhon, PE
 Duhon & Pleasant Consulting Engineers, LLC
 5393 Big Lake Road
 Lake Charles, Louisiana 70605
 337.564.5918

jason@dandpengineers.comwww.dandpengineers.com

3. MECHANICAL ENGINEER:

R Craig Campbell, II, PE, Engineer
 ADG Engineering
 3939 W Congress Street, Suite 201
 Lafayette, Louisiana 70506
 337.234.5710

ccampbell@agdginc.orgwww.adginc.org

4. ELECTRICAL ENGINEER:

R Craig Campbell, II, PE, Engineer
 ADG Engineering
 3939 W Congress Street, Suite 201
 Lafayette, Louisiana 70506
 337.234.5710

ccampbell@agdginc.org

5.

www.adginc.org

- E. Contractor: Unknown at the time of execution of this Project Manual. The Procurement Phase will occur in order for the Owner to decide the General Contractor for this Project.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

< To furnish labor, materials, tools and equipment necessary to construct the Sanctuary, Remodel Multi-Purpose Building, and New Veneer on Garage and Mercy Center as per bid documents.

1.

- B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

- B. Concurrent Work: Owner **[will award] [and will assign to Contractor]** separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. **<Insert name of the Contract>**: To **<Insert name of separate Contractor>** **[to] [for]** Sound, and Security Systems.

<Insert a brief description of work performed under separate contract>.

1.6 SALVAGE REQUIREMENT

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
 - 1. Mercy Center will remain fully operational during construction. Any work done to Mercy Center will be coordinated with owner prior to starting work.
- B. Site Utilization Plan: Prepare and submit a site utilization plan demonstrating the requirements provided by the Owner's Project representative. Do not commence mobilization on the Project site prior to written approval of the site utilization plan.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than [14] <Fourteen> days' notice to Owner of activities that will affect Owner's operations.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify [Architect] not less than [14] <Fourteen> days in advance of proposed utility interruptions.
 - 2. Obtain [Architect's] written permission before proceeding with utility interruptions.
- C. Controlled Substances: Use of controlled substances is similarly prohibited.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations [**published as part of the U.S. National CAD Standard**].
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers and titles found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

KING ARCHITECTS, INC

SECTION 01 21 00

SECTION 01 23 00 - ALLOWANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Unit-cost allowances.
- C. Related Sections:
 - 1. Divisions 32 Sections for items of Work covered by allowances.

1.03 SUBMITTALS

- A. Submit reports from the Owner's Independent Testing Agency to document actual quantities of materials delivered to or removed from the site for use in fulfillment of each allowance.

1.04 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.05 UNIT-COST ALLOWANCES

- A. Allowance shall include all costs to Contractor of specific products, materials and work under allowance and shall include taxes, freight, and delivery to Project Site.

PART 2 - PRODUCTS *(not applicable)*

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

- A. **Allowance No. One (1):** Door Hardware
1. Allowance: \$1,500.00 per door for ALL door hardware.
 2. The above allowance shall be included in the Base Bid and Alternates.
- B. **Allowance No. Two (2):** Brick Masonry
1. Allowance: \$750.00 per thousand
 2. The above allowance shall be included in the Base Bid and Alternates.

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 00 63 11 "Request for Information Form" for clarification and/or Project information.
 - 2. Section 01 21 00 "Allowances" for products selected under an allowance.
 - 3. Section 01 23 00 "Alternates" for products selected under an alternate.
 - 4. Section 01 31 00 "Project Management & Coordination" for Requests for Information.
 - 5. Section 01 33 00 "Submittal Procedures" for requirements for submitting comparable product submittals for products.
 - 6. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.03 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms, change in performance data, product dimensions or other design criteria.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner. --No substitutions for convenience are allowed.
- B. "Or Equal": When a product, material or equipment specified by brand or trade name is followed by the words "or equal," a substitution may be permitted if the substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance, and if the substitution complies with all other requirements of the plans and specifications.
- C. Procurement (Bidding) Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- D. During Construction Substitution Requests: Not allowed.

1.04 ACTION SUBMITTALS

- A. Substitution Requests: Submit to Architect. Substitution Request shall be made in writing and in compliance with the following requirements. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use **form provided in Division 00 – Bidding & Contract Requirements, Sections 00 43 25 –Substitution Request Form.**
 - 2. Requests for substitution of materials and equipment will be considered if received no later than **10 days** prior to date of bid opening.
 - 3. Required Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. **Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.**
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
4. Architect's Action During Bidding Phase: If necessary, Architect will request additional information or documentation for evaluation within **three (3)** days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within **seven (7)** days of receipt of request.
- a. Forms of Acceptance: Addenda. Architect will notify all bidders of accepted substitution.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
- B. Architect's approval of substitute does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.
- C. Architect's approval of a particular manufacturer does not suggest or imply any deviation from the Contract Documents. All products shall comply with the drawings and specifications. The Contractor shall note that prior approval will be by manufacturer's name only. The Contractor shall ensure that the products used in preparation of proposal and proposed to be used on this project, is equivalent to that specified in all aspects. Any material, product, or component found to not be equivalent to that specified will be rejected. Approval of one manufacturer does not automatically approve any subsidiary, parent, and/or sister company, and their associated products.

1.05 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.07 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than **fifteen (15)** days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is **fully** documented and **properly** submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION

3.01 REQUESTING A SUBSTITUTION DURING BIDDING

- A. In the event that a substitution is requested during the Bidding Phase, in order to be considered, the Contractor or Supplier shall submit it to the Architect no later than **ten (10)** days prior to bid opening. In general, this procedure shall be as follows:
- 1. Submit a Substitution Request form for each individual product.
 - 2. Support your request with required documentation as previously addressed.
- B. Requests for Substitutions submitted and approved during Bidding Phase shall be announced by the Architect by Addenda prior to the bid due date.

3.02 UNAUTHORIZED SUBSTITUTIONS

- A. Any Contractor who substitutes products without proper authorization by the Architect will be required to immediately remove and replace the product and all costs required to conform to the Contract Documents shall be borne by the General Prime Contractor.

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications. Construction Manager shall develop and implement a system acceptable to Owner for the preparation, review and processing of Change Order Requests, contingency and allowance expenditure authorizations, Change Orders, and requests for information.
- B. Related Requirements:
 - 1. Section 01 25 13 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 14 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect on a Change Order Request Form.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 01 25 13 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Change Order Request Form: Use form provided by Architect. Sample copy is included in Division 00 – Bidding & Contract Requirements section of the Specifications.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Contract Change Order for signatures of Owner and Contractor on Owner's standard form.

PART 2 - PRODUCTS *(Not Applicable)*

PART 3 - EXECUTION *(Not Applicable)*

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than at the Pre-Construction Meeting
 - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
 - 4. Sub-schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one-line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 - 6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
 - a. Include each Change Order as a new line item.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement or on a monthly period basis.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use form AIA Document G702 for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders completely executed before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit **four (4)** signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.

6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Punch List
 5. AIA Document G704, "Certificate of Substantial Completion."
 6. Clear Lien Certificate
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in temporary field office or in life safety binder and by each temporary telephone. Always keep list current.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations shall not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.

2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Contractor shall execute a data licensing agreement in the form of the Architect's In-house Digital Data Licensing Agreement.

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form that can be found in Section 00 63 13 – Request for Information Form.
 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 3. Submit RFI electronically via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Found in Section 00 63 13 – Request for Information form.
 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
 - 1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 7 days before commencement of construction.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Attendance is mandatory for authorized representatives of the Owner, Architect, and their appropriate consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Quality control plan.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents.
 - l. Submittal procedures.
 - m. Sustainable design requirements.
 - n. Preparation of record documents.
 - o. Site logistics plan.
 - p. Use of the premises.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. Site-specific safety plan.
 - bb. First aid.
 - cc. Security.
 - dd. Progress cleaning.
 - 4. Minutes: Entity responsible for conducting meeting shall record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Submit proposed dates of preinstallation conferences for Owner's approval.
 2. Submit a list of planned preinstallation conferences and list Work to be discussed by relevant specification section(s) to Owner and Architect.
 3. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting.
 4. Advise Owner and Architect of scheduled meeting dates at least 7 days in advance.
 5. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Schedules
 - c. Options.
 - d. Related RFIs.
 - e. Related Change Orders.
 - f. Purchases.
 - g. Deliveries.
 - h. Submittals.
 - i. Sustainable design requirements.
 - j. Review of mockups.
 - k. Coordination with other work
 - l. Possible conflicts.
 - m. Compatibility requirements.
 - n. Weather limitations.
 - o. Manufacturer's written instructions.
 - p. Warranty requirements.
 - q. Compatibility of materials.
 - r. Acceptability of substrates.
 - s. Temporary facilities and controls.
 - t. Space and access limitations.
 - u. Regulations of authorities having jurisdiction.
 - v. Testing and inspecting requirements.
 - w. Installation procedures.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 6. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 7. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 8. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Owner, Architect, Contractor Meetings: Conduct Owner, Architect, Contractor meetings at regular intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous Owner, Architect, Contractor meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.

- 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Status of sustainable design documentation.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of proposal requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting shall record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each Owner, Architect, Contractor meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 16 – CONSTRUCTION SCHEDULING

PART 1 – GENERAL

1.01 OVERVIEW

It is expressly understood and agreed by the Contractor that the rate of progress and the time of completion of the Work is of the essence for this Contract. The contractor shall execute the Work with such progress as required to prevent delay to Contract and to other contractors working on other contracts at Site.

The section includes preparation and submittal of Baseline Schedule, maintenance schedule during the execution of the Work, preparation and submittal of monthly schedule updates, and preparation and submittal of final As Delivered Schedule.

Baseline Schedule shall conform to time provisions specified in Contract Documents and to requirements of other specified work sequence constraints set forth in the Contract Documents. The contractor shall demonstrate its intent to safely execute the Work by preparing and submitting the Baseline Schedule and monthly schedule updates.

Develop Baseline Schedule to a reasonable level of detail and follow work breakdown structure and execution strategy correlating to the Schedule of Values (SOV). Maintain schedule according to instructions and requirements set forth in this Specification. Upon completion of the Work, the Contractor shall prepare and submit a final As Delivered Schedule.

1.02 PURPOSE

This Specification sets forth requirements and procedures for Baseline Schedule and related reports:

- A. Purpose of Baseline Schedule is to allow Contractor to prepare an orderly plan of execution with logically sequenced activities to successfully accomplish timely completion of Project and to identify, via Critical Path Method, which chain of activities drives completion date of Project.
- B. Purpose of schedule and related reports is to:
 - 1. Ensure adequate planning and timely execution of the Work.
 - 2. Establish a Baseline Schedule to which subsequent monthly schedule updates shall be compared to determine overall progress and performance towards satisfactory completion of the Contract.
 - 3. Identify interdependencies and facilitate coordination of Contractor's work with others as needed.
 - 4. Assist the Architect and Owner Representative in monitoring progress.
 - 5. Evaluate proposed changes to the Contract and subsequent impacts to the schedule.
 - 6. Effectively determine impacts of time extensions and Change Order costs to overall Project completion.
 - 7. Identify and mitigate risks early in the Project's lifecycle and during each period of progress.

1.03 DEFINITIONS

The following definitions apply to this Specification:

- A. Baseline Schedule: Accepted schedule for Contract, demonstrating planned activities, activity sequencing, and activity durations.
- B. Project Critical Path: One or more continuous sequences of activities (Critical path shall not pass solely through any lag relationships) with zero total float, spanning a portion of, or entire remaining duration of Project, which ends at Project completion milestone and delineates remaining duration of Project.
- C. Critical Path Method (CPM): Schedule development technique that starts with a network of work activities logically sequenced from beginning to end according to their interdependencies, followed by time-driven forward and backward pass calculation to establish Critical Path and Total Float.

- D. Early Finish: Earliest a schedule activity is planned to finish based on its logical relationship to other activities in Project.
- E. Early Start: Earliest a schedule activity is planned to start based on its logical relationship to other activities in Project.
- F. Fragnet (Methodology): A template building utility that can be used to model work outside of a project and then plugged into the Project's logic network.
- G. Free Float: Amount of time an activity can be delayed before it affects other activities in the schedule.
- H. Late Finish: Latest a schedule activity can finish based on its logical relationship to other activities on Project and still permits the Project to be completed on time.
- I. Late Start: Latest a schedule activity can start based on its logical relationship to other activities on Project and still permits the Project to be completed on time.
- J. Milestone: A significant event that is important for timely completion of the Project. Milestones occur at a particular point in time. Milestones have no duration and do not contain work, cost loading, or resource loading.
- K. Original Duration: Amount of time an activity was expected to take to complete at beginning of Project as shown on Baseline Schedule in calendar days or workdays depending upon software calendar assigned to a given task.
- L. Recovery Schedule: When the Project is not meeting its planned goals and becomes necessary to re-arrange the remaining work to represent the Work more accurately and how the work will be performed. The method indicates how the Project will either get back on track to finish on time, or to depict a new project finish date.
- M. Task: Element of the Work Breakdown Structure (WBS) that may represent a work package, assembly, sub-assembly, component, phase, or deliverable.
- N. Time Impact Analysis: Analytical process of adding a Fragnet or similar method of adding activities within a Project's existing set of activities in a CPM schedule network with corresponding appropriate logical relationship ties to be used as an analytical tool to effectively assess the impact that a given event, series of events, or delay has had on a Project's critical path.
- O. Total Float: Amount of time a given activity or path of activities may be delayed before it will affect the Project's completion date. Total Float is calculated as the difference between early and late dates.
- P. Work Activity: Activity that requires time and resources to complete and shall be performed before the Contract is considered complete. Activities are the detailed steps necessary to complete or deliver a Task.
- Q. Work Breakdown Structure (WBS): Hierarchical structure that decomposes and subdivides, into smaller and more manageable pieces, the Work required to deliver the scope of a Contract. Each descending level of the WBS represents an increasing level of detail of Project work. Typically, the lowest level WBS groups the Work activities of the Contract into tasks and subtasks, which may represent work packages, assemblies, subassemblies, components, phases, and deliverables. Work activities are assigned to WBS elements. Guidance on development can be obtained from Project Management Institute Practice Standard for Work Breakdown Structures if needed.

1.04 PROJECT SCHEDULER QUALIFICATIONS

Employ or retain services of a qualified Scheduler.

- A. Project Scheduler shall meet the following minimum requirements:

1. Understanding of construction process to the extent that a logical CPM schedule can be developed, maintained, and progressed which accurately represents the scope of work to be performed.
 2. Must possess knowledge of the Critical Path Method of scheduling and the ability to analyze schedules for determining reasonable durations and logical relationships.
- B. Project Scheduler shall attend meetings, including monthly progress and special meetings pertaining to scheduling of the Work. The project scheduler and the Contractor's management team are expected to collaborate closely with the Architect and Owner Representative to deliver acceptable products outlined in this section.

1.05 SOFTWARE

Prepare and maintain Project's schedule according to the following requirements:

- A. Use Primavera Project Management version 19.1 (P6) or Microsoft Project version 2016 or the latest version of either software at the time of award of the Contract.
- B. The Architect shall approve the contractor's use of alternative software.

1.06 SUBMITTALS

- A. Submit electronic schedule files in PDF format and the native file format (Primavera Project Management or Microsoft Project file Format [.xer or .mpp]) for the chosen software platform in accordance with submittal specifications as specified herein. The Architect shall approve the contractor's use of alternative software.

1.07 BASIS OF PAYMENT

The schedule shall be utilized as the relative basis for progress payments:

- A. The Contractor's first payment application will be processed when the initial Baseline Schedule has been submitted and accepted by the Architect.
- B. If the Baseline Schedule has been submitted but has not been accepted at the time of the first payment application, only mobilization costs will be paid by the Owner, as established in the Contract Document, and to an extent otherwise supported by the Contractor.
- C. The contractor's monthly progress payment applications shall not be accepted for payment without monthly schedule updates submitted in time and manner required by this specification and is accepted by the Architect.
- D. Failure to maintain the schedule in an accepted status may result in the Owner withholding payment until the schedule is accepted.

PART 2 – PRODUCTS *not used*

PART 3 – EXECUTION

3.01 BASELINE SCHEDULE

- A. Upon receipt of the Notice to Proceed, prepare and submit the Baseline Schedule for the Work included under the scope of Contract. Submittal of Baseline Schedule shall comply with the following requirements:

3.02 CRITICAL PATH METHOD

- A. Use the Critical Path Method (CPM) scheduling technique as the basis for preparing schedules and for monitoring job progress.
- B. Provide information concerning sequencing, logic, and duration of activities as well as providing the CPM logic network diagram and tabular schedule data.

3.03 INITIAL BASELINE SCHEDULE

- A. Submit Initial Baseline Schedule in accordance with requirements of this section and Section 01 33 00, Submittals, ten (10) days before Preconstruction Conference.
- B. Architect will schedule and conduct a Preconstruction Scheduling Meeting to initiate the development of the required Baseline Schedule. At the meeting, requirements will be reviewed with the Contractor. The Contractor shall present the proposed methodology utilized for the development of the Baseline Schedule, including the proposed methodology for sequencing, or segregating the work. Baseline Schedule shall comply with requirements set forth in these Specifications and in the rest of the Contract Documents.
- C. Within ten (10) days after Notice to Proceed, submit Final Baseline Schedule. Submittal shall be accompanied by a narrative report describing general project execution strategy, perceived risks, and identification of coordination efforts with the Architect or third parties required to effectively deliver the Project on time.
- D. Architect will accept or reject the Baseline Schedule within ten (10) days after receipt of the required information. If the Baseline Schedule is not accepted, Architect will provide comments to the Contractor stating reasons why the submission was not accepted.
- E. Following receipt of the Architect's review comments, the Contractor shall correct the Baseline schedule to identify missing activities and relationships relevant to the scope of work; resubmit the Baseline Schedule within seven (7) days. Time extensions will not be granted to complete this process.
- F. Comments made by Architect during review shall not relieve Contractor from compliance with requirements of the Contract Documents.
- G. To the extent that there are any conflicts between the accepted Baseline Schedule and requirements of the Contract Documents, the Contract Documents shall prevail.
- H. Once Baseline Schedule is accepted it becomes the schedule of record and basis for future schedule updates and performance metrics calculations. After acceptance of the Baseline Schedule, no changes shall be made therein without the approval of the Architect.

3.04 BASELINE SCHEDULE REQUIREMENTS

- A. General Requirements:
 - 1. Use software as prescribed within Section 1.05.
 - 2. Do not use mandatory constraints in development and avoid, or minimize, use of other types of constraints within the schedule.
 - 3. Demonstrate the final level of detail for each activity; include required relationships and durations of each activity based on work quantities and planned resources to accomplish the Work.
 - 4. Contain no changes or delays which may have been incurred during the Initial Baseline Schedule development period. At first schedule update after Baseline Schedule has been accepted, include changes which have been approved via Change Order.
 - 5. Data date shall be Notice to Proceed date.
 - 6. Indicate the longest critical path of activities from Notice to Proceed to the Contract completion date. The contractor shall provide a narrative defining the critical path and potential schedule risks to activity along the critical path.

- B. Subcontractor Work:
1. Collect information from Subcontractors, suppliers, and equipment manufacturers for incorporation into the Baseline Schedule, including the estimated durations for each separable work activity and material lead times.
 2. Coordinate with major lower-tier Subcontractors and with the Architect representative to comply with scheduling requirements.
 3. Major lower-tier Subcontractors shall provide schedule requirements specified herein to Contractor so that Contractor can prepare a fully coordinated Baseline Schedule.
 4. Submit certification that accepted Baseline Schedule has been reviewed and discussed with Subcontractors, Suppliers, and vendors as it relates to their work prior to commencement of their work.
- C. Work Breakdown Structure:
1. Develop the Baseline Schedule within a single project in Primavera P6 or Microsoft Project. The Project schedule shall only contain WBS elements that correspond to the scope of this Contract.
 2. The first level WBS node shall represent the appropriate lifecycle phase of the Project, such as Design, Procurement, or Construction.
 3. Other levels of the WBS below the first level may be used to group the Work in a logical way that represents lower-level phases, locations, deliverables, work packages, components, assemblies, or other scope elements.
- D. Milestones:
1. Milestone dates are defined in calendar days following the date set forth in Notice to Proceed or listed in the Contract Documents.
 2. Include as a minimum the following:
 - a. Notice to Proceed
 - b. Critical Submittals / Procurement
 - c. Construction Start
 - d. Substantial Completion
 - e. Final Completion
 - f. Specified Contract Milestones as identified in Contract Documents
- E. Project Duration and Scheduled Project Completion
1. Show sequence and interdependence of activities required for the complete performance of the Work, beginning with the date specified in Notice to Proceed and concluding with the date of Final Completion of the Contract:
 - a. The schedule duration from the early start to late finish for a subphase, phase, or entire Project shall not exceed the Contract times specified.
 - b. Lag durations shall not have a negative value unless specifically approved by the Architect.
 - c. Project float, total float, slack time, or time contingency within schedule (i.e., the difference in time between projected early completion date and required Contract completion date), and free float or critical path float within the overall schedule is not for the exclusive use of Owner or Contractor but is jointly owned and is an expiring resource available to and shared by both as needed to meet Contract milestones and the Contract completion date.
 2. Comply with limits imposed by the scope of Work, with contractually specified intermediate milestones and completion dates, and with constraints, restraints, or sequences included in Contract Documents.
- F. Project Calendar:
1. Defined within schedule and accurately reflect the work plan.
 2. Each activity within the schedule shall possess an assigned calendar.
 3. Weather conditions shall be anticipated and planned.
 4. If work crews are to work a schedule different from the rest of the Project, then a separate calendar shall be defined for that work crew and the Work shall be scheduled utilizing that specific calendar.

5. Use of, or requirement for, special work schedules or calendars shall be communicated to Architect in Narrative Report as part of Baseline Schedule submission.
- G. Activity Duration and Level of Detail:
1. Schedule shall include an appropriate level of detail. Failure to develop or update the Schedule shall result in nonacceptance of the Schedule.
 2. The Work activities shall be of sufficient detail to ensure adequate planning and execution of the Work and provide a basis for forecasting, monitoring, and evaluating the progress of the Work.
 3. Work activities shall conform to the following requirements:
 - a. Describe Work activities using consistent terminology such that the Work is readily identifiable for assessment of completion. Activity descriptions shall be stand-alone and not rely on WBS or activity codes for identification.
 - b. One day shall be the smallest time unit shown unless otherwise directed by Architect.
 - c. Subdivide the Work into activities of duration no longer than twenty (20) working days, except as to non-construction activities (such as procurement of materials, delivery of materials, and delivery of equipment) and any other activities for which Architect may approve a longer duration.
 - d. Activity descriptions shall be written in English, start with a verb, clearly describe the Work to be performed, and be used in a consistent manner throughout the Schedule.
 4. Activity durations shall be appropriate for the Work to be performed by crew size and major equipment assigned to the tasks.
- H. Procurement Activities and Submittals:
1. Prepare in chronological order of submittals. Show Specification section of submittal and submittal name. Include activities to cover the procurement process such as submittal preparation, review, approval, procurement, fabrication, delivery, permits, and similar preconstruction work. Submittal timeframes shall not be on the critical path, and sufficient time shall be included in the Schedule to allow for resubmittal if necessary.
 2. Activity ID numbers for submittals shall be coded to clearly identify each submittal number. Submittals shall be appropriately tied in the logic of the Schedule. Resubmittals shall be coded with the same Activity ID number as originally submitted submittal with the addition of one additional alpha character starting with the letter "A" and progressing subsequent letters for each resubmittal of the same submittal until approved to make each Activity ID unique.
 3. Resubmitted submittals shall be logically tied to appropriate Activities in the network logic model.
- I. Work Areas:
1. Code activities to show each major area of construction.
 2. Activities shall not be allowed to span more than one work area.
- J. Other Baseline Schedule Requirements:
1. Include the following items as appropriate to this Contract:
 - a. Purchases, submittals, submittal reviews, fabrication, deliveries, manufacturer factory tests, field tests, readiness tests, and installation activities for materials and equipment for which Contractor intends to seek payment, including stored materials.
 - b. Delivery, installation, check out/testing, and startup of Owner furnished equipment and materials in accordance with Schedule dates set forth in the Specifications or furnished by the Architect.
 - c. Approvals required by regulatory agencies or other third parties.
 - d. Connection to existing systems and equipment.
 - e. Temporary utilities and construction.
 - f. Interruption and shut down requests of facilities or utilities to allow for new connections.
 - g. Start up, testing, training, and assistance required under Contract Documents.
 - h. Contractor activities that will be coordinated with the Owner or Architect through ongoing activities.
 - i. Contractor obtained permits.

- j. Preparation of coordination and layout drawings.
- k. Punchlists.
- l. Final cleanup.
- m. Monthly updating of Record Drawings and final submittal of as-built drawings at project completion, or as directed by Architect.
- n. Required inspections by Architect.
- o. Other specific information required by Architect.

3.05 BASELINE SCHEDULE SUBMITTAL

Submit Baseline Schedule according to the following requirements:

- A. Baseline Schedule Narrative Report:
 - 1. Include the following information:
 - a. Transmittal letter.
 - b. Description of critical path as well as near critical paths with a total float of less than ten (10) days.
 - c. Listing of each Contract milestone showing its planned completion date.
 - d. Proposed number of working days per week for each calendar assigned within the Baseline Schedule.
 - e. Planned holidays to be observed during the life of the Contract (by day, month, and year).
 - f. Planned number of shifts per day.
 - g. Number of hours per shift.
 - h. Planned versus actual equipment productivity where applicable.
 - 2. Failure to include this information will delay review of the Schedule until Architect is in receipt of sufficient detail to validate the intent.
- B. Baseline Schedule Network Diagram:
 - 1. Depict schedule network diagram in Gantt chart format, showing schedule activities grouped according to the WBS and sorted by start date. The diagram shall show activity relationships and be formatted for tabloid-size paper (11" x 17").
- C. Baseline Schedule
 - 1. In accordance with Baseline Schedule Requirements.
 - 2. Submit in XER or MPP format as well as PDF format; include transmittal letter, Baseline Schedule Narrative Report, and Baseline Schedule Network Diagram.
- D. Accepted Baseline Schedule
 - 1. Basis for progress and performance measurement. No changes shall be allowed to the accepted Baseline Schedule.

3.06 MONTHLY SCHEDULE UPDATES

Once the Baseline Schedule is accepted, prepare, and submit a Monthly Schedule Update in compliance with the following requirements:

- A. Process for submittal of monthly schedule update:
 - 1. Prepare and submit with accurate information on logic, status, physical percent complete, percent complete, actual start and finish dates, remaining duration changes, and related reports, diagrams, and schedules based on periodic progress payment cycle.
 - 2. On date provided by Architect, meet with Architect to review monthly schedule update. The contractor and Architect will review the updated schedule and discuss the content of the Narrative Report.
 - 3. Allow Architect seven (7) days after meeting to review and accept or reject schedule updates.

4. Rejected schedule updates shall be resubmitted to Architect within seven (7) days. Requested changes shall be included in resubmittal. Submittal of Monthly Schedule Update to Architect shall be a condition precedent to making of payments, which are due or may become due under terms of the Contract.
 5. Subsequent Monthly Schedule Updates shall be compared to the accepted Baseline Schedule. In addition, each current monthly update shall be compared to last month's update. Each update shall be labeled by a period with a data date.
- B. Monthly schedule update requirements:
Update schedule every month with accurate progress and status information. Update according to the following requirements:
1. Updated Schedule Data Date
 - a. Accurately portray the Work performed as of the last day of the month, which will be considered the monthly schedule update cutoff date unless otherwise specified by the Architect.
 - b. Change Project's data date to correspond to Monthly Schedule Update cutoff date.
 2. Updating Progress and Status Information
 - a. Cutoff date to accurately reflect the Work performed during the month.
 - b. Actual start and finish dates for activities that started or finished during the month.
 - c. Activity remaining duration shall accurately reflect the time required to complete each activity.
 3. Default Progress Data and Retroactive Changes Disallowed
 - a. Default progress data provided from the scheduling system shall not be allowed.
 - b. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in scheduling software.
 - c. Ensure software settings prevent percent complete and remaining duration from being related so that Contractor evaluates activity remaining duration at each Monthly Schedule Update without affecting progress measurement.
 - d. Do not retroactively change progress data provided on previous Monthly Schedule Updates including, but not limited to, actual start and finish dates, and percent complete.
 4. Conditions Relating to Float
 - a. Extensions of time for the performance required under Contract Documents pertaining to equitable time adjustment will be granted only to extent that equitable time adjustment exceeds total float in the activity or path of activities affected at time approval was issued for the change.
 - b. Pursuant to float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates shall be cause for rejection of schedule and revisions or updates.
 - c. Owner initiated changes that extend or shorten Contract Times shall be the sole basis to adjust the Contract completion date. Delays in the critical path not associated with proper requests for time extensions in accordance with General Conditions and General Requirements shall be deemed to be the responsibility of the Contractor.
 - d. Delays to early completion date shall be non-compensable and considered Project Float.
 5. Out of Sequence Progress
 - a. Defined as activities that have reported progress without predecessor activities being completed. Or in the case of Start-to-Start relationships, where predecessor activities have not begun.
 - b. A written explanation of each out-of-sequence activity shall be described in the monthly Narrative Report update. The architect may direct changes in schedule logic be made to correct significant out-of-sequence Work.
 6. Approval of Changes
 - a. Execute the Work in accordance with the accepted Baseline Schedule.
 - b. Only schedule changes that have been previously accepted by Architect through a Change Order shall be included in the Monthly Schedule Update. Narrative Report shall specifically reference on activity-by-activity basis changes made since previous period and relate each change to accepted Change Order.

- c. Upon approval of change order request or issuance of a unilateral change order by Architect the agreed upon Change Order activities, activity duration, logic, and impacts shall be reflected in the next Monthly Schedule Update and in subsequent schedule updates.
 - d. No change to accepted activities, original activity durations, logic, interdependencies, resource loading of the Baseline Schedule shall be made without prior notification to and acceptance from the Architect.
 - e. If Contractor desires to make a change to accepted Baseline Schedule, request permission from Architect in writing stating reasons for change as well as specifics, such as the proposed changes in activities, original activity durations, logic, interdependencies, milestones, the planned sequence of operations of Baseline Schedule.
 - f. Architect will respond within seven (7) days after receipt of the request.
 - g. If Architect considers Baseline Schedule change requested to be a major change, Contractor may be required to submit a revised Baseline Schedule for acceptance, without additional cost to Owner, including reports deemed necessary by Architect to show the probable effect of change on Project.
 - h. Submit proposed schedule revision and required reports within seven (7) days after Architect notifies Contractor that requested revision is a major change.
 - i. Change shall be considered of a major nature if time estimated for activity or sequence of activities is varied from the original plan to the degree there is reasonable doubt that Contract milestones will be met, or if the change impacts the Work of other lower-tier Subcontractors at Site.
 - j. Only upon acceptance of the requested change by the Architect shall it be reflected in the next scheduled update.
 - k. Changes to activities having adequate float shall be considered as minor changes, except that an accumulation of minor changes may be considered a major change when such changes affect the Contract Completion date or milestones.
 - l. Activity that is added or modified by Change Order shall be identified by Change Order code that changed the activity. Activities shall not belong to more than one Change Order. Scope introduced through change orders shall remain independent from the base contract scope.
 - m. Change order requests and Requests for Information shall reference which schedule activity they potentially impact to properly assess time impacts. A time impact analysis shall be required if requested by Architect.
7. Delays and Recovery
- a. If the Architect determines the Contractor is not maintaining anticipated planned progress, the Architect may require a Recovery Schedule from the Contractor.
 - b. Failure to deliver an acceptable Recovery Schedule to the Architect within seven (7) days of written notification may result in Owner withholding progress payments until an acceptable Recovery Schedule is delivered.
 - c. Recovery Schedule is defined as a revised plan of execution supported by a revised schedule, workforce/staffing plan, project calendar, workweek requirements, and graphic analysis that are required to recover from current deficient progress or schedule deficit.
 - d. Whenever it becomes apparent from the Monthly Schedule Update that milestones will not be met, take any or all the following actions:
 - 1) Increase construction workforce in such quantities and crafts as shall eliminate the backlog of the Work.
 - 2) Increase number of working hours per shift, shifts per day, workdays per week, or amount of construction equipment, or combination of foregoing sufficiently to eliminate Work backlog.
 - 3) Reschedule work activities that were scheduled sequentially so that they occur in parallel.
 - e. Under no circumstances shall addition of equipment or construction forces, increasing working hours, or other methods, manner, or procedures shall be considered cause for Contract Modification or treated as acceleration.

- f. Requests for contract timeline extensions due to adverse conditions, delays, events outside the control of Contractor, or for other reason shall be submitted within same pay period in which purported impact was incurred unless otherwise directed by Architect.

3.07 MONTHLY SCHEDULE UPDATE SUBMITTAL

According to the following requirements:

- A. Schedule Update Narrative Report:
 - 1. Include the following:
 - a. Transmittal letter.
 - b. Listing of each activity on the schedule that was completed or in progress during the reporting period, as well as a list of activities scheduled for next reporting period.
 - c. Analysis, by critical path, of each negative path describing nature of critical path, its impact on other activities, milestones, and completion dates; and recommendations for recovery of delay.
 - d. Current and anticipated delays, including cause of delay, corrective action and schedule adjustments to correct delay, and impact of delay on other activities, milestones, and completion dates.
 - e. Description of significant changes in construction sequence, logic changes, relationship changes, or duration changes, and rationale associated with each change.
 - f. List of pending issues and their status including, but not limited to, permits, contract modifications, time extension requests, and long lead procurement items.
 - g. Listing of each Contract milestone showing its planned completion date according to the Baseline Schedule, its current planned completion date, and its status.
- B. Updated Schedule Network Diagram
 - 1. Depict the entire schedule network diagram in Gantt chart format, showing schedule activities grouped according to the WBS and sorted by start date. The diagram shall show activity relationships formatted for tabloid-size paper (11" x 17").
- C. Monthly Updated Schedule
 - 1. In accordance with the section, Monthly Schedule Update Requirements.
 - 2. Submit in XER or MPP format as well as PDF format; include transmittal letter, Monthly Update Schedule Narrative Report, Baseline Schedule Network.

3.08 SUBMITTAL OF FINAL AS DELIVERED SCHEDULE

- A. As a condition precedent to release of retainage, the last update to schedule submitted shall be identified as the As-Delivered Schedule.
- B. Reflect the manner in which Project was actually delivered, including start and finish dates.
- C. Architect will have fourteen (14) days to accept or reject the As-Delivered Schedule. Schedule rejection will be accompanied by instructions on corrective action required for resubmittal.

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART ONE – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.03 GENERAL

- A. General Provisions:
 - 1. Provisions in this section are mandatory procedures for review, approval and submitting samples, shop drawings and product data in accordance with the General Conditions.
 - 2. **Submittals which are received directly from sources other than through the General Contractor's office will be returned to the General Contractor "without action".**
 - 3. Job delays occasioned by requirement of re-submission of samples, shop drawings and product data not in accord with Contract Documents and/or submittals sequenced contrary to the agreed schedule are Contractor's responsibility and will not be considered valid justification for extension of contract time or increase in the contract sum.
 - 4. **All submittals shall be electronic where possible.**

1.04 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Submittals: General term including samples, shop drawings and product data, as applicable and as defined by the General Conditions.
- D. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- E. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.05 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled date of fabrication.

1.06 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings via email for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in .DWG format.
 - c. Contractor shall execute a data licensing agreement in the form of the Architect's In-house Digital Data Licensing Agreement.
 - d. The following digital data files will be furnished for each appropriate discipline:
 - 1) Floor plans.
 - 2) Reflected ceiling plans.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow **15** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow **15** days for review of each resubmittal.
 4. Consultant Review: Where the Contract Documents indicate that submittals may be transmitted to Architect's consultants via the Architect **ONLY (All submittals must be sent to the Architect; the Architect will in turn distribute to the consultant)**, allow **15** days for review of each submittal. Submittal will be returned to Architect before being returned to the Contractor.
- D. Paper Submittals: NOT ALLOWED.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into **one single** indexed PDF file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. **File name shall use KAI project identifier and three-digit sequential number followed by a decimal point and then the Specification number (e.g., 2012-001.061000).**
 - 1) **Resubmittals shall include the letter "R" followed by the resubmittal number after another decimal point (e.g., 2012-001.061000.R1).**
 - 2) **Color samples of a given section shall include the letter "C" followed by the submittal number after another decimal point (e.g., 2012-001.061000.C1).**
 3. Provide means for insertion to permanently record Contractor's review and approval markings.
 4. Transmittal Form for Electronic Submittals: **Transmit each submittal using a PDF version of the transmittal form located in these specifications (Section 00 62 11),** containing the following filled in information.
 - a. Project name.
 - b. Date.
 - c. Submittal Number, as described above.
 - d. Name and address of Architect.
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Names of subcontractor.
 - h. Category and type of submittal.
 - i. Submittal purpose and description.
 - j. Specification Section number and title.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Submittal and transmittal distribution record.
 - p. Other necessary identification.
 - q. Remarks
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 – PROCEDURES

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post/submit electronic submittals as PDF electronic files via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Action Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will return one copy.
 3. Informational Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will not return copies.
 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer, if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches (215 by 280 mm)**, but no larger than **24 by 36 inches (610 by 915 mm)**.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.

- 1) If it is impracticable to submit a Shop Drawing in PDF format, paper format may be allowed. Submit three opaque copies of each submittal. Architect will retain one copy; remainder will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. Provide corresponding electronic submittal of Sample transmittal via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit **three (3)** sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."
- F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
- G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."

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- H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- Q. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

- U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.02 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 – EXECUTION

3.01 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, or the action may be recorded in a separate transmittal.
- B. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals or submittals not following these guidelines are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

KING ARCHITECTS, INC

SECTION 01 41 26

SECTION 01 41 26 – PERMIT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Each project has varying requirements for permits, inspections, and fees based on scope, size, and location of the project.
- B. The Owner is subject to all permits, inspections and associated fees for construction, demolition, utility connection, storm water management, and other similar requirements that may be required to complete the scope of work associated with these Contract Documents.
- C. The General Contractor (GC) shall be responsible for obtaining all permits, inspections and paying for all associated fees unless specifically identified within this specification.

1.02 REFERENCES

- A. The following references are not intended to be inclusive. It shall be the GC's responsibility to determine all requirements based on the scope of work in the Contract Documents.
- B. Review all ordinances that may require a permit or fee that may related to a required permit. Contact the following agencies to determine that exact requirements during bidding:
 - 1. Building Inspection
 - 2. Zoning
 - 3. Engineering
 - 4. Water Utility
 - 5. Traffic Engineering
 - 6. Others as may be specified by the Contract Documents.
- C. State Statues
- D. Other Regulatory Regulations
- E. Other agencies or companies that may have related requirements:
 - 1. Sewage company
 - 2. Local gas and electric utility companies
 - 3. Other utility companies

1.03 GENERAL CONTRACTOR'S REQUIREMENTS

- A. The GC shall be responsible for all the following:
 - 1. Execute application for all required permits as may be required by the scope of work described within the Contract Documents.
 - 2. Paying all fees associated with the application of any required permits. Exception: fees required for all permits issued by Owner agencies will be paid by internal payment by the Owner, if applicable.
 - 3. Scheduling all required inspections that may be conditions of any required permits.

PART 2 – PRODUCTS *(not applicable)*PART 3 – EXECUTION *(not applicable)*

END OF SECTION 01 41 26

SECTION 01 42 00 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "accepted," "approved," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar subsequent operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities, either exclusively or to be shared with separate Contractors, for performance of work. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- J. "Installer": Entity (*firm or person*) engaged to install work by Contractor, Subcontractor, or Sub-subcontractor. Installers are required to be skilled and experienced in work they are engaged to install.
- K. "Specification Text Format": Underscoring facilitates scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.
- L. "Overlapping/Conflicting Requirements": Most stringent (generally most costly) applies and will be enforced, unless more detailed language written directly into contract documents clearly indicates that a less stringent requirement is acceptable. Refer uncertainties to Architect/Engineer for decision before proceeding.

Where optional requirements are specified in a parallel manner, option is intended to be Contractor's unless otherwise indicated.
- M. "Minimum Requirements": Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply within specified tolerance or may exceed minimums within reasonable limits. Refer uncertainties within reasonable limits. Refer uncertainties to Architect/ Engineer before proceeding.
- N. "Abbreviations, Plural Words": Abbreviations, where not defined in contract documents, will be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Architect/Engineer. Plural words will be interpreted as plural where applicable for context of contract documents.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents.
1. IBC 2018 / ASCE 7-16
 2. IEBC 2018
 3. IFC 2018
 4. IPC 2021
 5. IMC 2021
 6. IFGC 2021
 7. NFPA 101 2021
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220

EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science http://www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772
USPS	Postal Service www.usps.com	(202) 268-2000
FEMA	Federal Emergency Management Agency www.fema.gov	(800) 745-0243

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/ Available from Defense Standardization Program www.dsp.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.wbdg.org/ccb	(215) 697-2664 (202) 619-8925 (202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
ASCE	American Society of Civil Engineers www.asce.org	(800)548-2723
IBC	International Building Code www.codes.iccsafe.org	
IECC	International Energy Conservation Code	

www.codes.iccsafe.org

NEC National Electrical Code
www.nfpa.org

NFPA National Fire Protection Association (NFPA 101 Life Safety Code)) (800) 344-3555
www.nfpa.org

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

OSFM Office of State Fire Marshal
www.sfm.dps.louisiana.gov

LDH Louisiana Department of Health
www.ldh.la.gov

DEQ Louisiana Department of Environmental Quality
www.deq.louisiana.gov

LDI Louisiana Department of Insurance
www.lidi.state.la.gov

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 42 16 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

- 1.01 INDICATED: Shown on drawings by notes, graphics, or schedules, or written into other portions of contract documents. Terms such as "*shown*," "*noted*," "*scheduled*," and "*specified*" have same meaning as "indicated" and are used to assist the reader in locating particular information.
- 1.02 DIRECTED, REQUESTED, APPROVED, ACCEPTED, ETC.: These terms imply "*by the Architect/Engineer*", unless otherwise indicated.
- 1.03 APPROVED BY ARCHITECT/ENGINEER: In no case releases Contractor from responsibility to fulfill requirements of contract documents.
- 1.04 PROJECT SITE: Space available to Contractor at location of project, either exclusively or to be shared with separate Contractors, for performance of the work.
- 1.05 FURNISH: Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.
- 1.06 INSTALL: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning, and similar requirements.
- 1.07 PROVIDE: Furnish and install, complete and ready for intended use.
- 1.08 INSTALLER: Entity (*firm or person*) engaged to install work by Contractor, Subcontractor, or Sub-subcontractor. Installers are required to be skilled and experienced in work they are engaged to install.
- 1.09 SPECIFICATION TEXT FORMAT: Underscoring facilitates scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.
- 1.10 OVERLAPPING/CONFLICTING REQUIREMENTS: Most stringent (*generally most costly*) applies and will be enforced, unless more detailed language written directly into contract documents clearly indicates that a less stringent requirement is acceptable. Refer uncertainties to Architect/Engineer for decision before proceeding.

Where optional requirements are specified in a parallel manner, option is intended to be Contractor's unless otherwise indicated.

1.11 MINIMUM REQUIREMENTS: Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply within specified tolerance, or may exceed minimums within reasonable limits. Refer uncertainties within reasonable limits. Refer uncertainties to Architect/Engineer before proceeding.

1.12 ABBREVIATIONS, PLURAL WORDS: Abbreviations, where not defined in contract documents, will be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Architect/Engineer. Plural words will be interpreted as plural where applicable for context of contract documents.

PART 2 - PRODUCTS (*not applicable*)PART 3 - EXECUTION (*not applicable*)

END OF SECTION 01 42 16

SECTION 01 45 00 – QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED:

- A. General Quality Control
- B. Mock-ups
- C. Manufacturer's Field Services
- D. Testing Laboratory

1.02 RELATED WORK

- A. Requirements, abbreviations and acronyms for reference standard are defined in Division 01.
- B. ASTM C945 - Test for Compressive Strength of Lightweight Insulating Concrete.
- C. ASTM 329 - Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as used in construction.

1.03 QUALITY CONTROL, GENERAL

- A. Maintain quality control over supplies, manufacturers, products, services, site conditions and workmanship to produce work of specified quality.

1.04 MOCK-UP

- A. Erect field samples and mock-ups at project site in accordance with requirements of the applicable specification section.

1.05 MANUFACTURER'S FIELD SERVICES

- A. When specified in respective specification sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable and to make appropriate recommendations.

PART 2 - TESTING LABORATORY

2.01 GENERAL REQUIREMENTS

- A. An independent testing laboratory will be employed by Owner. Owner shall pay for laboratory services to perform specified testing.
 - 1. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
 - 2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the work of the Contract.

2.02 QUALIFICATIONS OF LABORATORY

- A. Laboratory shall meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Laboratory shall be authorized to operate in the State of Louisiana.

2.03 LABORATORY DUTIES

- A. Cooperate with Architect and Contractor. Provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified reference standards.
 - 2. Ascertain compliance of materials with requirements of contract documents.
- C. Promptly notify Architect of observed irregularities or deficiencies of work.
- D. Promptly submit four copies of written report of each test and inspection to Architect. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing lab name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Welder's identification number.
 - 6. Date and time of sampling or inspection.
 - 7. Record of temperature and weather conditions.
 - 8. Date of test.
 - 9. Identification of specification section.
 - 10. Location of sample or test in the project.
 - 11. Member tested for structural steel testing.
 - 12. Type of inspection or test
 - 13. Results of tests and compliance with contract documents.
 - 14. Interpretation of test results, when requested by Architect.
 - 15. Perform additional tests as required by Architect.

2.04 LIMITATION OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of contract documents.
- B. Laboratory is not authorized to approve or accept any portion of the work.
- C. Laboratory is not authorized to perform any duties of the Contractor.

2.05 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to the work.
- B. Secure and deliver to the lab adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the lab the design mix proposed to be used for concrete and other material mixes which require control by the testing laboratory.
- D. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested.
 - 2. To obtain and handle samples at the project site.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- E. Notify laboratory 24 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When test or inspections cannot be performed after such notice, Contractor shall notify the laboratory.
 - 2. If Contractor does not notify laboratory before laboratory personnel are scheduled for this work, Contractor shall reimburse Owner for laboratory personnel and travel expenses.

END OF SECTION 01 45 00

SECTION 01 45 13 - PROCEDURES AND CONTROLS

PART 1 - GENERAL

- 1.01 SUPERINTENDENT: Provide competent qualified supervision to expedite, coordinate and ensure quality in the work.
- 1.02 REPORTING ACCIDENTS: Prepare and submit reports of significant accidents at site and anywhere else where work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained or property loss of substance is or where the event posed a significant threat of loss or personal injury.
- 1.03 TRADE PERSON AND WORKMANSHIP STANDARDS: Instigate and maintain procedure to ensure that persons performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deterioration by faulty workmanship or its replacement.
- 1.04 INSPECTION, TEST, AND REPORTS: Required inspection and testing services are intended to assist in determination of probable compliance of work with requirements, but do not relieve Contractor of responsibility for those compliance, or for general fulfillment or requirements of contract documents. Specified inspection and test are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspection.
- The Owner has as his option to retain qualified testing laboratory to perform sampling and testing during or after the placement of materials in order to determine the quality of the work. All tests to herein will be paid for by the Owner. All costs of testing, removal and replacement of materials which fail to meet or exceed the limits and a standard specified or referred to herein will be paid for by the Contractor.
- The testing laboratory shall provide the Owner, Contractor, and Architect a copy of all test results as expediently as possible.
- 1.05 INSTALLER'S INSPECTION OF CONDITIONS: Require installer of each major unit of work to inspect substrate to receive work, and conditions under which work will be performed, and to report (*in writing to Contractor*) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- 1.06 MANUFACTURER'S INSTRUCTION: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to extent these are more explicit or more stringent than requirements indicated in contract documents.
- 1.07 INSPECT EACH ITEM of materials or equipment immediately prior to installation and reject damaged and defective items.
- 1.08 PROVIDE ATTACHMENT and connect devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.
- 1.09 RECHECK MEASUREMENTS and dimensions of the work as in integral step of starting each installation.
- 1.10 INSTALL WORK DURING CONDITIONS of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work. Isolate each unit of work from non-compatible work as required to prevent deterioration.
- 1.12 COORDINATE ENCLOSURE (*closing-in*) of work with required inspection and tests, so as to minimize necessity of uncovering work for that purpose.
- 1.13 MOUNTING HEIGHTS: Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting height choices to Architect/Engineer for final decision.

PART 2 - PRODUCTS (*not applicable*)

PART 3 - EXECUTION

- 3.01 STRUCTURAL WORK: Do not cut and patch structural work in a manner resulting in a reduction of load deflection ratio. Submit proposal and request and obtain Architect's/Engineer's approval before proceeding with cut and patch of structural.
- 3.02 OPERATION/SAFETY LIMITATIONS: Do not cut and patch operational elements and safety components in a manner resulting in a decreased performance, shortened useful or increased maintenance. Submit proposals and request and obtain Architect's approval before proceeding with cut and patch.
- 3.03 VISUAL/QUALITY LIMITATIONS: Do not cut and patch work exposed to view (*exterior and interior*) in a manner resulting in noticeable reduction of visual qualities and similar qualities as judged by Architect.
- 3.04 LIMITATIONS ON APPROVALS: Architect's/Engineer's approval to proceed with cutting and patching does not waive right to later require removal replacement of work found to be cut and patched in an unsatisfactory manner, as judged by Architect.
- 3.05 TEMPORARY SUPPORT AND PROTECTION: Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting and patching to prevent damage; and provide protection of the work from adverse weather exposure.
- 3.06 TREE AND PLANT PROTECTION: Install temporary fencing to protect vegetation from damage from construction operations. Protect tree root systems from damage.
- 3.07 CLEANING AND PROTECTION: During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonable required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on new installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operation without damaging effects. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure to include (*where applicable, but not by way of limitation*) static loading, dynamic loading, internal pressures, external pressures, high or low temperature, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling.

END OF SECTION 01 45 13

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the General Conditions cost unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction. Per 3.3.I.1, Hoisting equipment and permanent elevators are exempted from this provision.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the ADA.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, lockable entrances, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
 - 3. Keep in office at all times complete sets of Contract Documents and Architect reviewed submittals.
 - 4. Drinking water and private toilet.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.
 - 2. Provide weatherproof coverage for outdoor storage of materials and equipment needing only limited protection.
 - 3. Shed may be open shelters or fully enclosed spaces.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".

- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.
- D. First Aid Supplies: Comply with governing regulations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Use of building toilet, wash facilities and drinking water fixtures will not be permitted. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

- I. Water Service:
 1. Contractor shall provide piping, hoses, backflow preventers, valves, and other items necessary to conduct water from connection point to the construction location.
 2. Contractor shall supervise use of water to prevent waste and prevent damage due to leaking and uncontrolled discharge.
 3. Contractor shall provide sanitary drinking supply and paper cups for workers.
- J. Lighting: Whenever natural light is inadequate and existing or new overhead lighting is not in operation, provide temporary lighting and local switching as necessary for operations under way.
 1. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
 2. Provide sufficient temporary lighting to ensure proper workmanship. Finishing work will not be permitted in areas which are not adequately lighted.
 3. Provide and maintain lights and signs to prevent damage or injury. Keep safety lights burning from dusk to dawn.
 4. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 5. Install lighting for Project identification sign.
- K. Telephone Numbers:
 1. Post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 1. Identification Signs: Provide Project identification signs as indicated in Specification Section 01 58 13.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touchup signs so they are legible at all times.

- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- I. Temporary Use of Permanent Stairs: Use of stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of 2003 EPA Construction General Permit, or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
 - 1. Install a 6' tall temporary construction fence prior to beginning any work, encompassing the entire area of work from adjacent school facilities where students may be present. The fence shall be chain link (orange plastic fencing is not acceptable), free of openings or breaks, with fence posts at 8' O/C maximum. Gates are to be avoided if possible; if not they must be capable of being padlocked from school side. The fence shall be secured to withstand prevailing wind loads. The fence shall be maintained in place throughout the construction phase of the project.
 - a. If physical isolation from students of Work Area(s) by fencing is not attainable, Calcasieu Parish School Board badges must be obtained by Contractor prior to commencing work. For such projects, Contractor and subcontractors will be required to submit list of personnel along with a digital photo of each to Calcasieu Parish School Board (Owner) in order to create badges.
- I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 2. Protect air-handling equipment.
 - 3. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.

- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 56 26 – TEMPORARY FENCING

1.01 TEMPORARY FENCING

Install a 6' tall temporary construction fence prior to beginning any work., encompassing the entire area of work from adjacent school facilities where students may be present. The fence shall be chain link (orange plastic fencing is not acceptable), free of openings or breaks, with fence posts at 8' O/C maximum. Gates are to be avoided if possible; if not they must be capable of being padlocked from school side. The fence shall be secured to withstand prevailing wind loads. The fence shall be maintained in place throughout the construction phase of the project.

If physical isolation from students of Work Area(s) by fencing is not attainable, Calcasieu Parish School Board badges must be obtained by Contractor prior to commencing work. For such projects, Contractor and subcontractors will be required to submit list of personnel along with a digital photo of each to Calcasieu Parish School Board (Owner) in order to create badges.

SECTION 01 57 19 – TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor shall provide environmental controls consistent with regulatory requirements throughout the duration of the Project.
- B. Full compensation for required compliance and cooperation is considered subsidiary to other items of Work, and no additional compensation will be allowed.

1.02 SUBMITTALS

- A. Dust control agents other than water must be approved by Architect prior to use.
- B. Plan for water control, if requested, prior to beginning any Work.
- C. Stormwater quality management measures, Stormwater Management Plan (SWMP) and methods proposed by Contractor must be in conformance with all applicable permits and approved by Architect prior to installation and prior to moving onto the construction site.
 - 1. Submit the initial phase SWMP at the preconstruction conference. Submit plans for future phases of construction a minimum of 28 days before start of that construction phase to allow review and resubmittal, if necessary.
- D. Prepare schedules to implement stormwater management features, including but not limited to erosion and sediment control work, and submit for acceptance at preconstruction conference.
 - 1. Schedules shall incorporate construction activities, haul roads, borrow pits, storage and plant sites, and the plan for disposal of waste material.
 - 2. Work shall not start until the Architect has approved these schedules.

1.03 RELATED SECTIONS

- A. The following is a list of Specifications, which may be related to this section:
 - 1. Section 00 73 00, Supplementary Conditions
 - 2. Section 00 73 00, Supplementary Conditions, Article 90, Permits.

PART 2 PRODUCTS – *(Not Applicable)*

PART 3 EXECUTION

3.01 DUST CONTROL

- A. Contractor shall minimize dust from construction operations.
- B. During the performance of the Work, whether on right-of-way provided by Owner or elsewhere, Contractor shall furnish labor, equipment, and materials to control dust at all times, including evenings, holidays, and weekends.
- C. Contractor shall be liable for any damage resulting from dust originating from Contractor's operations.

3.02 HOUSEKEEPING

- A. Contractor shall keep the Project neat, orderly, and in a safe condition at all times, and shall store and use equipment, tools, and materials in a manner that does not present a hazard.

- B. Contractor shall provide on-site containers for collection of rubbish and construction waste and dispose of it at frequent intervals during the progress of Work, and whenever directed by Architect.
- C. Contractor shall be responsible for conforming will all elements of the SWMP and other Louisiana DEQ permits, including any requirements addressing storage and disposal of potential stormwater pollutants.

3.03 DISPOSAL

- A. Contractor shall legally dispose of waste materials and materials determined by Architect to be waste in an approved disposal site in a manner meeting all federal, state, local, and Project regulations.
- B. Contractor shall not bury waste unless authorized by the Owner and the Architect.
- C. All costs related to disposal, including but not limited to dump fees, permits, etc., will be the responsibility of Contractor.
- D. Excess excavation shall become the property of Contractor (unless otherwise specified) and be legally disposed of by Contractor outside the limits of construction in an approved disposal site.
- E. Excess excavated material suitable for backfill shall not be disposed of until all backfill operations are complete.
- F. Contractor shall immediately inform Architect of any hazardous materials encountered during construction and legally dispose of such hazardous materials at an approved disposal site.
- G. All debris shall be removed from site and/or burned in accordance with Louisiana DEQ guidelines and procedures.

3.04 WATER CONTROL

- A. Periodic Flooding:
 - 1. The Project may be subject to periodic flooding as a result of rainfall and snowmelt, reservoir or pond releases, flows from adjacent developed areas and stormwater pipes, and groundwater flows from saturated soils or other groundwater sources.
- B. Until final acceptance of the Project by Owner, Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof from any cause, including surface and subsurface water, whether arising from the execution or from non-execution of the Work.
- C. Contractor shall rebuild, repair, restore, and make good injuries or damages to any portion of the Work because of causes beyond the control of and without the fault of negligence of Contractor, including but not restricted to high water, floods, or acts of God, of the public enemy, or of governmental authorities.
- D. Contractor shall be responsible for the Project and shall take such precautions as may be necessary to construct the Project in a dry condition and provide for drainage, dewatering, and control of surface and subsurface water and shall erect any necessary temporary structures or other facilities at Contractor's expense.
- E. Contractor is advised that the Work may occur in a river or drainage channel subject to intermittent and extensive runoff conditions such that, unless the construction area is properly protected, localized flooding and extensive soil erosion may occur.
- F. Owner, at Owner's option, may require Contractor to update the water control plan.
- G. Contractor, at Contractor's expense, shall furnish necessary equipment and materials required to control surface and subsurface water in all areas from start of Work through the completion of the Project. Applicable permits related to specific controls shall be obtained by Contractor and all associated fees shall be borne by the Contractor.
- H. Contractor is responsible for furnishing; transporting; and installing all materials and equipment, well points, pumping, channelization, diversion, damming, or other means of controlling surface water, groundwater, runoff from other drainage tributaries, and pipe effluent as necessary to complete all of the Work in accordance with the Contract

Documents.

3.05 WATER QUALITY CONTROL

- A. Contractor shall comply with the "Louisiana Water Quality Control Regulations", promulgated, certifications issued, and the construction requirements listed below.
 - 1. In the event of conflicts between Federal and State water quality control laws, rules, or regulations, the more restrictive laws, rules, or regulations shall apply.
- B. This Work shall consist of measures needed for the purpose of minimizing water pollution, erosion, and sedimentation during the length of the construction activity.
- C. This Specification shall be followed to minimize the pollution of any watercourse, wetland, or water impoundment area.
- D. Stormwater Management Plan (SWMP):
 - 1. If a SWMP is provided in the Drawings and Specifications, it shall be used by Contractor as a guideline only. The Contractor shall be responsible for the development and implementation of the SWMP.
 - 2. Contractor shall submit SWMP for review by Owner in accordance with the submittal requirements defined in these Specifications. Adjustments to the approved plan may be required by Owner based on actual construction operations. Changes to the plan shall only be made with the written approval of the Owner.
 - 3. The SWMP may include measures for the control of erosion and sedimentation, and measures for stormwater quality management.
 - 4. Contractor shall take the necessary steps to comply with the intent of Owner's SWMP guidance, if it is provided in the Drawings and Specifications, and other applicable standards, permit conditions, and regulations of appropriate agencies.
- E. Contractor shall construct, operate, maintain, and remove in a safe manner temporary erosion and sediment control features described in Owner's SWMP guidance, if it is provided in the Drawings and Specifications.
- F. Contractor shall conduct the Work in such a manner to prevent contamination of adjacent watercourses, wetlands, or water impoundment areas.
- G. Diversion or Bypass around Erosion Control Facilities:
 - 1. Any diversion from, or bypass of water around facilities necessary to maintain compliance with the terms and conditions contained in SWMP is prohibited except:
 - a. Where unavoidable to prevent loss of life or severe property damage.
 - b. Where excessive storm drainage or runoff would damage the facilities.
 - 2. If diversion or bypass of water around the facilities occurs, Contractor shall immediately notify Owner of the occurrence.
 - 3. Contractor, at Contractor's expense, shall repair the breached or bypassed facilities and shall be responsible for the restoration of site drainage to conform to the requirements of the approved SWMP.
- H. Contractor shall provide design and implementation methods for overall site stormwater quality management to prevent contaminated surface runoff from entering the waters of the State and of erosion and sediment control measures for the purpose of correcting conditions unforeseen during the design of the Project, or for emergency situations that develop during construction.
- I. Contractor shall include temporary erosion and sediment control features for construction work outside the right-of-way that is necessary for borrow pits, haul roads, and equipment and material storage sites.
 - 1. Should the inclusion of these additional work areas cause the Project to be subject to Stormwater Discharge Permit(s), it shall be Contractor's responsibility to obtain the necessary permit(s).
- J. Contractor shall continuously maintain stormwater management features from start of Work through the completion of the Project, ensuring proper functionality.
- K. Contractor is responsible for the removal and storage and/or disposal of accumulated sediment.

- L. Any construction waste or salvageable material, excavation excess material, fill material, construction equipment, toxins, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within fifty (50) feet of the ordinary high water line of any watercourse, wetland, or water impoundment area or other sensitive areas as identified by the Architect.
- M. Equipment servicing shall occur within Architect approved designated areas.
- N. Spill prevention and containment measures as proposed by Contractor and approved by Architect shall be used at all storage sites.

3.06 NOISE CONTROL

- A. Mechanical equipment shall be equipped with the best available mufflers to reduce noise.
- B. Contractor shall be responsible for obtaining any necessary permits and shall limit noise to the levels established in the permit and in local jurisdiction noise control ordinances, if applicable.
- C. Contractor shall perform noise level monitoring as necessary, or as requested by the Owner, to show that permitted noise levels are not exceeded.
- D. During the performance of the Work, whether on right-of-way provided by Owner or elsewhere, Contractor shall furnish all the labor, equipment, and materials required to reduce the noise nuisance.

END OF SECTION 01 57 19

SECTION 01 58 13 – TEMPORARY PROJECT SIGNAGE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Official Project Identification Sign.
- B. Project informational signs.

1.3 SUMARRY

- A. The Contractor shall install an official Project Identification Sign at a location, constructed and with the graphic content as directed by the Architect.
- B. The Project Identification Sign shall show the name of the Project, the names of the Owner, Architect, Engineers and General Contractor.
- C. Project informational signs maybe required in order to direct traffic.
- D. Excepting for required signage, no additional Contractor, Subcontractor, or supplier signs may be installed on the site without prior authorization. It is the intent of the Owner to not allow signs that advertise for the Architect, Contractor, Subcontractors or Suppliers.

1.4 QUALITY ASSURANCE

- A. Sign Manufacturer to have experience in manufacturing signage with references on similar projects.
- B. Finishes, (Vinyl): Adequate to withstand weathering, fading, and chipping for duration of construction project.
- C. Excepting for required signage, no additional Contractor, Subcontractor, or supplier signs may be installed on the site without prior authorization. It is the intent of the Owner to not allow signs that advertise for the Architect, Contractor, Subcontractors or Suppliers.

1.5 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittal Procedures.
- B. Shop Drawing: Show content, layout, lettering styles, color choices, foundation, structure, sizes, and grades of members.

PART 2 – PRODUCTS

2.1 SIGN MATERIALS

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum ¾" thick, standard large sixes to minimum joints.
- C. Rough Hardware: Galvanized.
- D. Material: As selected by Architect.

E. Background: As selected by Architect.

F. Lettering: As selected by Architect.

2.2 PROJECT IDENTIFICATION SIGN

A. One graphic sign, 4' x 8', in the location, constructed and with the graphic content as directed by the Architect.

B. Graphic Design, Colors, Style of Lettering: Designated by Architect.

2.3 PROJECT INFORMATIONAL SIGNS

A. Vinyl informational signs with size lettering to provide legibility at 100-foot distance.

B. Provide at field office, and directional signs to direct traffic into and within the site. Relocate as Work progress requires.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install project identifications sign within 14 days after date fixed by Notice to Proceed.

B. Erect at designated location, as directed by Architect.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level. Anchor securely.

E. Exposed surfaces of sign, supports and, framing to be treated lumber.

3.2 MAINTENANCE

A. Maintain sign and supports clean, repair deterioration and damage.

3.3 REMOVAL

A. Remove sign, framing, supports, and foundations at completion of Project and restore area.

END OF SECTION 01 58 13

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 01 21 00 "Allowances" for products selected under an allowance.
 - 2. Section 01 23 00 "Alternates" for products selected under an alternate.
 - 3. Section 01 25 00 "Product Substitution Procedures" for requests for substitutions.
 - 4. Section 01 42 00 "References Standards" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. Note that no substitutions for convenience are allowed per Section 01 25 00.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 01 33 00 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 6. Protect stored products from damage and liquids from freezing.
 - 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers and/or products, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Product Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. Note that substitutions for convenience are not allowed per Section 01 25 00. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (*Not Applicable*)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for limits on use of Project site.
 - 2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
 - 3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Section 02 41 19 "Selective Structure Demolition" for demolition and removal of selected portions of the building.
 - 5. Section 07 84 13 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

- A. Requirements for Structural work: Do not cut and patch structural work in a manner that would result in a reduction of load carrying capacity or load deflection ratio.
- B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in manner that would result in a reduction in their capacity to perform in the manner intended.
- C. Visual Requirements: Do not cut and patch work exposed on building's exterior or in its occupied spaces in a manner that would, in the architect's opinion, result in lessening the building's aesthetic qualities.

1.02 SUBMITTALS

- A. Procedural Proposal for Cutting and Patching: For prior approval where cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed from the Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

General: Except as otherwise indicated or as directed by the Architect. Use materials for cutting and patching that are identical to existing materials.

PART 3 - EXECUTION

3.01 CLEANING

- A. Thoroughly clean areas and spaces where work is performed or used as access to work.

END OF SECTION 01 73 29

SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 02 41 19 "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
 - 2. Section 04 20 00 "Unit Masonry" for disposal requirements for masonry waste.
 - 3. Section 04 43 13.13 "Stone Masonry" for disposal requirements for excess stone and stone waste.
 - 4. Section 31 11 00 "Site Clearing and Grubbing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.03 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
 - 1. Demolition Waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Brick.
 - e. Concrete masonry units.
 - f. Wood studs.

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- g. Wood joists.
 - h. Plywood and oriented strand board.
 - i. Wood paneling.
 - j. Wood trim.
 - k. Structural and miscellaneous steel.
 - l. Rough hardware.
 - m. Roofing.
 - n. Insulation.
 - o. Doors and frames.
 - p. Door hardware.
 - q. Windows.
 - r. Glazing.
 - s. Metal studs.
 - t. Gypsum board.
 - u. Acoustical tile and panels.
 - v. Carpet.
 - w. Carpet pad.
 - x. Demountable partitions.
 - y. Equipment.
 - z. Cabinets.
 - aa. Plumbing fixtures.
 - bb. Piping.
 - cc. Supports and hangers.
 - dd. Valves.
 - ee. Sprinklers.
 - ff. Mechanical equipment.
 - gg. Refrigerants.
 - hh. Electrical conduit.
 - ii. Copper wiring.
 - jj. Lighting fixtures.
 - kk. Lamps.
 - ll. Ballasts.
 - mm. Electrical devices.
 - nn. Switchgear and panelboards.
 - oo. Transformers
 - 2. Construction Waste:
 - a. Masonry and CMU.
 - b. Lumber.
 - c. Wood sheet materials.
 - d. Wood trim.
 - e. Metals.
 - f. Roofing.
 - g. Insulation.
 - h. Carpet and pad.
 - i. Gypsum board.
 - j. Piping.
 - k. Electrical conduit.
 - l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.06 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons (tonnes).
 - 4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
 - 5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.08 WASTE MANAGEMENT PLAN

Retain option in "General" Paragraph below if Project requires selective demolition or building demolition.

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. [**Distinguish between demolition and construction waste.**] Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

Select option "site-clearing" below if there is work in the Project.

- B. Waste Identification: Indicate anticipated types and quantities of demolition **[site-clearing]** and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in hauling and tipping fees by donating materials.
 7. Savings in hauling and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

PART 2 – PRODUCTS *(not applicable)*

PART 3 – EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.”
1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls.”
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. **[Coordinator shall be present at Project site full time for duration of Project.]**
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- E. Plumbing Fixtures: Separate by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 1. Pulverize concrete to maximum 4-inch (100-mm) size.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 1. Pulverize masonry to maximum 4-inch (100-mm) size.
 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- G. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- J. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- K. Carpet Tile: Remove debris, trash, and adhesive.
 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.06 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Recommendation of Acceptance (Substantial Completion) procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Division 01 Specification Sections

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Recommendation of Acceptance (Substantial Completion).
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS (ATTIC STOCK)

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections. Schedule shall include part/product number, manufacturer, contact info, and current cost.

1.6 RECOMMENDATION OF ACCEPTANCE (SUBSTANTIAL COMPLETION) PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Recommendation of Acceptance (Substantial Completion): Complete the following a minimum of 10 days prior to requesting inspection for determining date of Recommendation of Acceptance (Substantial Completion). List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Recommendation of Acceptance (Substantial Completion): Complete the following a minimum of 10 days prior to requesting inspection for determining date of Recommendation of Acceptance (Substantial Completion). List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Recommendation of Acceptance (Substantial Completion).
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Recommendation of Acceptance (Substantial Completion) a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Recommendation of Acceptance (Substantial Completion) form after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
 2. Punch List: Submit Recommendation of Acceptance (Substantial Completion) and inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Recommendation of Acceptance (Substantial Completion) is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. **Must provide a scanned or digitally generated copy of the binder in PDF format on medium acceptable to the Owner.**
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Recommendation of Acceptance (Substantial Completion) for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - p. Leave Project clean and ready for occupancy.

- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Recommendation of Acceptance (Substantial Completion).
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

KING ARCHITECTS, INC

SECTION 01 78 39

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site for the Owner one record copy of **(ALL of which are to be in both physical and locked .pdf formats)**:
 - 1. Drawings (one complete set of stamped prints).
 - 2. Specifications.
 - 3. Addenda, Change Orders and other modifications to the contract.
 - 4. Architect's written instructions.
 - 5. Approved shop drawings, product data and samples.
 - 6. Field test reports.
 - 7. Construction photographs, if applicable.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
 - 1. Provide locked cabinet or secure storage space for storage of samples.
 - 2. File samples in accordance with the numbering system used for specifications.
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available at all times for inspection by Architect and Building Official.

1.03 MARKING DEVICES

- A. Label each document "Project Record" in neat large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until the required information is recorded.
 - 2. Project record documents shall be jointly inspected for accuracy and completeness by Architect and Contractor prior to submission of each monthly request for partial payment.
- C. Drawings: Legibly mark the drawings to record actual construction.
 - 1. Indicate depths of various elements of foundation in relation to finish first floor datum.
 - 2. Indicate horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Indicate location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - 4. Indicate field changes of dimension and detail.
 - 5. Indicate changes made by Change Order.
 - 6. Indicate details not on original contract drawings.
- D. Specifications and Addenda: Legibly mark each section to record.
 - 1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Field Order or by Change Order.

1.04 REVIEWS AND SUBMITTALS

- A. Architect and Contractor shall jointly review Project Record Documents for accuracy and completeness prior to

submission of each monthly partial payment request.

1. Before final application for payment is submitted, deliver the completed project record documents to Architect upon completion and acceptance of the work and deliver one copy of the project record documents to the Owner.

B. Accompany the submittal with transmittal letter in duplicate containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Title and number of each Record Document
5. Signature of Contractor or his authorized representative

1.06 ORIGINAL DOCUMENTS

A. There are to be four originals (for the Architect, the Owner (2), and the General Contractor) of the following:

1. Applications for Payment

B. There are to be six originals of the following;

1. 10-day Forms
2. Change Orders
3. Recommendation of Acceptance (and Punch List)

END OF SECTION 01 78 39

SECTION 02 41 00 – DEMOLITION WORK

PART 1 - GENERAL

1.01 SCOPE

- A. This section together with the contract documents and applicable design drawings covers all architectural, electrical, mechanical, and structural demolition.
- B. Contractor will be responsible for obtaining and abiding by any and all City, Parish, and other applicable permits, and requirements for demolition. All work shall comply with OSHA and all other applicable Federal, State and Local codes.

1.02 OPERATIONS

- A. This work shall be planned, scheduled, organized, and coordinated in such a manner that owner's operations will not be restricted, disrupted, or hindered in any manner. Refer to Project Manual Section 01 10 00 – Summary of Work for more details.
- B. Do not interfere with use of adjacent spaces. Maintain free and safe passage to and from the adjacent spaces.

1.03 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

1.04 TRAFFIC

- A. Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.05 PROTECTIONS

- A. Ensure safe passage of persons around area of demolition. Conduct operation to prevent injury to adjacent buildings, structures, other facilities, and persons. Erect temporary covered passageways as required by authorities having jurisdiction. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.06 DAMAGES

- A. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.
- B. Prevent movement or settlement of structure (s). Provide and place bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury.
- C. Cease operations and notify the Architect immediately if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.
- D. Be responsible for initiating, maintaining, and supervising all safety precautions and programs as required by applicable regulatory advisory to protect occupants of building and workers.

1.07 EXISTING UTILITY SERVICES

- A. Before starting excavation, establish location and extent of underground utilities occurring in work area.
- B. Notify utility companies having jurisdiction to remove and relocate lines which are in the way of excavation.

- C. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- D. Maintain, reroute, or extend as required, existing utility lines to remain which pass through work area.
- E. Protect active utility services uncovered by excavation.
- F. Remove abandoned utility service lines from areas of excavation. Cap, plug, or seal such lines and identify at grade.
- G. Accurately locate and record abandoned, and active utility lines re-routed or extended, on project record documents.

1.08 MATERIALS

- A. Except where noted otherwise, maintain possession of materials being demolished. Immediately remove from site and store as directed by Owner.
- B. Items Required for Reinstallation:
 - 1. Carefully remove, store, and protect materials and equipment scheduled for reinstallation.
- C. The User Agency shall have priority for the selection of salvaged equipment and materials.
- D. Items to be retained by User Agency:
 - 1. Carefully remove materials and equipment to be retained by the User Agency. Deliver and store where directed by User Agency. All items not retained by the User Agency shall be legally disposed of by the Contractor.
 - 2. User Agency shall maintain possession of all existing materials, equipment, etc. at the site; unless the Contractor is directed by the User Agency or Architect to legally dispose of such items or materials.

1.09 ASBESTOS

- A. Should the Contractor discover what appears to be asbestos or asbestos-containing material on the Project, he shall cease work immediately in the area where this material is found and notify the Architect as soon as possible, after which the following steps will be taken.
 - 1. The Owner will employ a testing company to determine if the suspect material contains asbestos.
 - 2. If the testing company determines that the material is asbestos and must be removed, the Owner will select an asbestos abatement company to remove the material.
 - 3. The abatement company will be paid by the Contractor, and a Change Order will be issued to add the cost of the abatement to the Contract, or
 - 4. The Owner will directly contract with the abatement company.
- NOTE: At its option, the Owner, may declare the material as asbestos without testing and proceed as noted in parts 1.05.A.2.a. and b. above.

1.10 DEMOLITION WORK

- A. Architectural and Structural Demolition must be closely coordinated with Electrical and mechanical demolition to ensure that power and all other services are de-energized and locked out and that all items requiring removal or relocation including, but not limited to, wall switches, outlets, panels, control devices, security, and alarm devices, lighting, grounding fixtures, HVAC components, thermostats, plumbing fixtures, vents and the like, are removed, relocated, tied in, tested and placed back in service as required, all in a timely manner and appropriate sequence.
- B. Carry out demolition work to cause as little inconvenience to adjacent occupied building areas as possible.

- C. Demolish in an orderly and careful manner as required to accommodate new work including that required for connection to the existing building. Protect existing foundations and supporting structural members.
- D. Burning of materials on site is not permitted.
- E. Remove from site, without delay, all contaminated, vermin infested, and dangerous materials encountered and dispose of by safe means so as not to endanger health of workers and public.
- F. Remove demolished materials, tools, and equipment from site on a regular basis. Do not allow them to accumulate. Upon completion of work leave building and site in a condition acceptable to the Architect.
- G. Contractor is to remove any debris, organic matter, frozen material that would not be considered good subsurface material. This determination would be made by the Architect.
- H. Contractor is to refer to the proposed finish grade contours on plans. When excavation extends into the limits of the proposed finish grade, Contractor shall place and compact fills to rough grade elevations.

1.11 RESTORATION

- A. Repair all demolition performed in excess of that required or where limits of demolition will be exposed at no cost to the Owner. Leave in as good condition as existing before commencement of work.
 - 1. Materials and workmanship used in restoring work shall conform in type and quality to that of original existing construction except as otherwise shown or specified.

1.12 TEMPORARY PARTITIONS

- A. Erect weatherproof closures for exterior openings. Maintain exit requirements.
- B. Erect and maintain noise abatement and dustproof partitions as required in order to suppress noise and spread of dust, fumes, and smoke to other parts of the building. Upon completion, remove partitions and repair damaged surfaces to match adjacent surfaces.
 - 1. Minimum construction of dust partitions: 4 mil polyethylene film full height on one side of 2 x 4 wood studs full height of space being closed off. Studs to be 48" o.c. with 2 x 4 horizontal block-in at third points between every stud. Secure polyethylene film to top and bottom plates with 1 x 2 wood strips nailed 16" o. c. Back partition with fiberglass batt insulation for noise abatement as required.
 - 2. Dust partitions shall be maintained "puncture-free" for duration of construction.

1.13 TERMITE DAMAGE

- A. If Contractor finds evidence of existing termite infestation or damage, he shall notify Architect as soon as possible.

END OF SECTION 02 41 00

SECTION 02 41 19 – SELECTIVE DEMOLITION

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in blue.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.03 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

1.04 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.05 PRE-INSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualifications Data: For refrigerant recovery technician.
-

- B. Proposed Protection Measures: Submit report, including drawings, that indicate the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevators and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: Submit a list of items to be removed, salvaged, and delivered to Owner prior to start of demolition.
- E. Pre-demolition Photographs or Video: Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Submit documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.07 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.08 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.09 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 – PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. If available, review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate, and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
 - 2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, pre-construction photographs, pre-construction videotapes and templates.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.02 UTILITY SERVICES AND MECHANICAL / ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary of Work."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.03 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.

3.04 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated on Drawings. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering, and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain [[fire watch and](#)] portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of such materials off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.05 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section <Insert Section number> "<Insert Section title>" for new roofing requirements.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

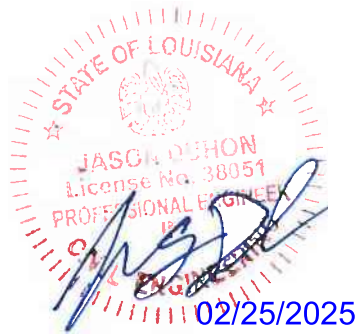
3.07 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL



1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcement bars.
 - 2. Welded-wire reinforcement.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete"
 - 2. Section 321313 "Concrete Paving"

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
- B. Shop Drawings: Comply with ACI 315-18 (Manual of Standard Practice for Detailing Reinforced Concrete Structures) and CRSI MSP-1 (Manual of Standard Practice), 29th Edition:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
 - 1. Location of construction joints is subject to approval of Engineer.
 - a. Include locations of contraction joints; spacing not to exceed 15' c./c u.n.o. on drawings.
 - b. Coordinate with sensitive architectural features as required.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Statements: For testing and inspection agency.
- B. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Steel Tie Wire: ASTM A1064, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain.

2.4 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 48 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117 (latest edition).

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
 1. Steel-reinforcement placement.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete standards.
2. Concrete materials.
3. Admixtures.
4. Vapor retarders.
5. Curing materials.
6. Accessories.
7. Repair materials.
8. Concrete mixture materials.
9. Concrete mixture class types.
10. Concrete mixing.

B. Related Requirements:

1. Section 032000 "Concrete Reinforcing"
2. Section 072600 "Vapor Retarder"
3. Section 312000 "Earth Moving"
4. Section 321313 "Concrete Paving"
5. Section 316329 "Drilled Concrete Piers and Shafts"

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.

3. Aggregates.
4. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
5. Vapor retarders.
6. Curing materials.
7. Joint Fillers
8. Repair Materials

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Placement location
3. Minimum 28-day compressive strength.
4. Maximum w/cm.
5. Slump limit or slump flow limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Intended placement method.
9. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. As specified in Section 032000 "Concrete Reinforcing".
2. Construction Joint Layout: If not shown on Drawings, indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Engineer.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.

4. Floor and slab treatments
5. Bonding agents.
6. Adhesives
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures.

D. Preconstruction Test Reports: For each mix design.

E. Field quality-control reports.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Special concrete finish Subcontractor.
2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.
 - h. Curing procedures.
 - i. Forms and form-removal limitations.
 - j. Shoring and reshoring procedures.
 - k. Methods for achieving specified floor and slab flatness and levelness.
 - l. Floor and slab flatness and levelness measurements.
 - m. Concrete repair procedures.
 - n. Concrete protection.

- o. Initial curing of standard-cured and field curing of field test cylinders (ASTM C31.)
- p. Protection of field cured field test cylinders.
- q. Distribution of test reports.

1.7 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.
- B. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94 and ACI 301.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. Concrete is not to be placed if temperature is below or expected to fall below 40 deg F. Place concrete only when temperature is 40 deg F or higher and rising.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150, Type I/II, IL gray.
2. Fly Ash: ASTM C618, Class C.

C. Normal-Weight Aggregates: ASTM C33, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494, Type A.
2. Retarding Admixture: ASTM C494, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

F. Water and Water Used to Make Ice: ASTM C94, potable.

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape. Comply with requirements of Section 072600 "Vapor Retarder."

2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to, the following:
 - a. BASF Corporation.
 - b. Dayton Superior.
 - c. Euclid Chemical Company (The); an RPM company.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable or complying with ASTM C1602.
- E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
 1. Basis of Design: W.R. Meadows, 1100
 2. Alternatives that are shown to meet or exceed specifications of the basis of design product will be acceptable.

2.5 RELATED MATERIALS

- A. Metal Keyed Joint System: 24 gauge, hot dipped galvanized with removable cap for formation of sealant reservoir.
 1. Basis of Design: QuicKey by BoMetals, Inc.
- B. Expansion- and Isolation-Joint-Filler: Nomaflex polypropylene joint filler. Locations, width and details as indicated on drawings.
- C. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
 1. Basis of Design: MM-80 by Metzger McGuire
- D. Bonding Agent: ASTM C1059, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- E. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 1. Types I and II, non-load bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. To be used at slab areas to receive floor coverings.
 - 1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations. To be used at exposed slab surfaces.
 - 1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 15 percent by mass. The use of fly ash is an option, not a requirement.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.8 CONCRETE MIXTURES

A. Normal-weight concrete.

1. Exposure Class: ACI 318; F0, S0, W0, C0.
2. Minimum Compressive Strength: 3000 psi except 4000 psi at grade beams, elevated beams, and columns unless otherwise indicated at 28 days.
3. Maximum w/cm:
 - a. 0.57 (non-air entrained 4000 psi concrete)
 - b. 0.48 (air-entrained 4000 psi concrete)
 - c. 0.68 (non-air entrained 3000 psi concrete)
 - d. 0.59 (air-entrained 3000 psi concrete)
4. Slump Limit: 4 inches, plus or minus 1 inch; 8 inches, plus or minus 1 inch for concrete with verified slump of 3 inches, plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
5. Air Content:
 - a. No entrained air for interior steel trowel finished slabs
 - b. 5.0 percent, plus or minus 1.5 percent at point of delivery for all other locations
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
7. "Performance" type mixes with variances in the (above) parameters of 3 and 4 (only) submitted with satisfactory testing and performance documentation will be considered.

2.9 CONCRETE MIXING

- ### A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 (90 minutes), and furnish batch ticket information.
1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

- A. Comply with ACI 117.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.5 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions. Comply with requirements of Section 072600 "Vapor Retarder."

3.6 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints in Slab-on-Grade: Coordinate with floor slab pattern and concrete placement sequence.
 - 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Engineer. Submit layout plan for review if not indicated on drawings.
 - 2. Form doweled and keyed joints with sealant reservoir using metal keyed joint system as indicated on drawings. Embed keys at least 1-1/2 inches into concrete or otherwise to depth indicated on drawings.
 - a. Install dowel bars as indicated on Drawings.

- b. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Contraction joints to be a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks. Timing of cutting shall be performed so as to not damage concrete but also prior to cracking of concrete. Any damage to the concrete resulting from cutting (or not cutting) of joints at appropriate times shall be repaired by the Contractor with no modifications to the contract amount or duration.
 - 2. Construction joints, as specified above, may be used as contraction joints at Contractor's option.
- D. Isolation Joints in Slabs-on-Ground: Install joint-filler at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings. Use manufacturer's cutter to score material to depth required for installation of joint material.
 - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
 - 3. Remove scored section of joint-filler after placement of concrete and provide joint sealant as specified.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view.
2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.

- e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces:

- 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
- 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

A. Verify all finishes with architectural drawings prior to placement of concrete.

B. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

C. Scratch Finish:

- 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
- 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
- 3. Apply scratch finish to surfaces to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.

D. Float Finish:

- 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
- 2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
- 3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

E. Trowel Finish:

- 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
- 2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
- 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
- 4. Do not add water to concrete surface.
- 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.

6. Apply a hard trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

a. Slabs on Ground:

- 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch and 1/16 inch in 2 feet.

F. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

G. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.10 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.11 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12-inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

- a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Polished Finish: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- d. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.12 TOLERANCES

- A. Conform to ACI 117.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month.

2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and as indicated on drawings at formed or keyed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.
- E. Joint filler installation to comply with manufacturer's printed directions; consult manufacturer as required for specific technical questions and additional required instruction.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 1. Repair and patch defective areas when approved by Engineer.
 2. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces:
 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

- a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31.
 - 2. Testing agency shall immediately report to Architect, Engineer, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports shall include reporting requirements of ASTM C31, ASTM C39, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- C. Inspections:
 - 1. Notify Architect a minimum of twenty-four (24) hours prior to scheduling concrete pours to allow for a pre-pour inspection. Defective work will be rejected.

- D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172 shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231 pressure method, for normal-weight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C1064:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C31:
 - a. Cast and laboratory cure three sets of two standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C39.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days. Retain one set of two specimens in reserve for later testing if required.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi .

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:
 - a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by Engineer.
 - 1) Acceptance criteria for concrete strength shall be in accordance with ACI 301, section 1.6.6.3.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 03 39 35 – CONCRETE DENSIFIER/SEALER/HARDENER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete sealer/densifier/hardener.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete: Cast-in-Place Concrete.

1.3 REFERENCES

- A. Corps of Engineers Spec: CEGS 03300 4-79.
- B. USDA approved.
- C. Department of Navy, GSA, VA approved.

1.4 SYSTEM

- A. Description: A sealer/densifier/hardener that will react with concrete surfaces to produce a dense, hydrophobic, insoluble, moisture barrier to seal out contaminants, while hardening and densifying surface.
- B. Design Criteria:
 - 1. ACI 302 Class 1 through 4 concrete floors.
 - 2. May be used on Class 5 and 6 floors when used with mineral or metallic aggregate hardeners and toppings, and Class 9, Super-flat floors.
 - 3. Complies with all Federal and State VOC requirements.
 - 4. Independent Test Data, ASTM C 779, Procedure A, reduction of surface abrasion by 50% or more at the 30-minute time interval.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Samples: Furnish representative samples if requested by the Architect.
- D. Project Specific Information:
 - 1. Test reports.
 - 2. Certificate of rate of application.
 - 3. Signed warranty.
- E. Application Rate: From Installer, based on project requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.
- B. Installer Qualifications: Minimum 2-year experience installing similar products.
 - 1. Approved in writing by manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship is approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.
- B. At the Architect's request, technical personnel shall be available for a pre-job conference to review installation procedures.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver to jobsite in sealed, labeled containers.
- B. Store and handle to prevent damage to product and environment.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Environmental requirements: Comply with applicable VOC and EPA requirements.

1.10 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 WARRANTY

- A. Warranty: Provide written warranty signed jointly by applicator, manufacturer and contractor. Warrant installation for a period of 10 years from date of substantial completion against dusting from abrasion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: L&M™ Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email: [request info \(info@lmcc.com\)](mailto:info@lmcc.com); Web: www.laticrete.com/lmcc
- B. Requests for substitutions will be considered in accordance with provisions of Division 01.

2.2 CONCRETE SEALER/DENSIFIER/HARDENER

- A. Product: SEAL HARD by L&M Construction Chemicals; a solution of 100% active ingredient chemicals which penetrate concrete to seal, densify, dustproof and harden to resist water and oil penetration, and contamination.
 1. Active ingredients: 100 percent.
 2. Type: Alkali Siliconate.
 3. Flash Point: None.
 4. Specific Gravity: 1.155.
 5. VOC: gm/L: 0.
 6. Solids minimum: 30 percent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Assure surfaces are clean and free of all contaminants, and any film forming curing compounds or sealers.

- D. Existing conditions, prior to installation:
 - 1. Assure concrete has been cured a minimum of 3 days.
 - 2. Assure concrete is clean and free of membrane forming curing compounds and/or other sealers.
 - 3. Concrete is free of laitance, grease, oil and contaminants.
- E. Protect concrete from construction activity staining.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Protection: Protect adjacent surfaces/areas from damage due to over spray; especially glass and painted surfaces.

3.3 INSTALLATION

- A. Apply in accord with manufacturer's instructions:
 - 1. Apply directly from sealer container onto prepared surfaces, undiluted.
 - 2. Application equipment: Mechanical "walk-behind" or riding scrubber.
 - 3. Apply at minimum rate of 1 gallon per 150-200 sq. ft.
 - 4. Allow surfaces to remain wet with sealer for 30-60 minutes.
 - 5. Remove excess sealer at end of application procedure by water flushing and then squeegee dry.
 - 6. Apply in 1 coat typical.
 - 7. Apply 2 coats to porous or rough concrete surfaces.
 - 8. Apply 2 coats to floor areas that will be exposed to frequent oil spills.
- B. Leave area broom clean.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 03 39 35

SECTION 03 48 16 – PRECAST CONCRETE SPLASH BLOCKS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General provisions of Contract including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SCOPE OF WORK

- A. Provide precast splash pads where required and shown on drawings to ensure positive drainage away from building at downspout or drain outlet locations.

1.03 DRAINAGE STANDARD

- A. Install splash pads to guarantee a minimum slope of 3% away from building without settlement for a minimum distance of 3 meters.

1.04 PROTECTION

- A. Protect benchmarks and existing structures, lawns, roads, sidewalks, paving and curbs against damage from vehicular or foot traffic.

1.05 WASTE MANAGEMENT AND DISPOSAL

- A. Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.
- B. Place materials defined as hazardous or toxic waste in designated containers.
- C. Ensure emptied containers are sealed and stored safely for disposal away for public.
- D. Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.
- E. Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.
- F. Dispose of waste from stripping of floors in a manner that will not have unfavorable effects on the environment.

1.06 WARRANTY

- A. Make good any settlement of splash/pads fill and topsoil for a period of one year from Substantial Completion of the project. Pay all costs in making good paving, lawns, etc., damaged by such settlement, at no cost to The City or Contract Administrator.

PART 2 – PRODUCTS

2.01 PRECAST CONCRETE SPLASH PADS

- A. Precast Concrete Splash Pads: to be Barkman Concrete Ltd. 12" mm (305 mm) wide x 30" (762 mm) long, Natural, model No: 105604. Locate at all rainwater leader locations.
 - 1. Provide mounting brackets at all splashpad locations and install as per manufacturer instructions.
- B. Levelling course: shall be 6 mm dia. crushed limestone down.
- C. Contact for Splash Pads and Mounting Brackets:

Barkman Concrete

909 Gateway Road
Winnipeg, MB R2K 3L1
Telephone No. (204) 667-3310

2.02 SUBSTITUTIONS

- A. In accordance with Section 01 25 00 – Substitution Procedures.

2.03 FILL MATERIALS

- A. Sub-surface gravel: Pit-run, crushed natural stone, free from shale, clay, friable materials, and debris.
- B. Surface Gravel (exposed): Clean natural stone, free from clay, shale, and organic matter, 19mm to 38mm (5/8" to 1 1/2") size.
- C. Sand: Clean natural river or bank sand, free from silt, clay, loam friable or soluble materials, and organic matter.
- D. Crushed Stone: Angular crushed natural limestone, free from shale, organic matter and debris, maximum stone size 12mm (1/2") (75% passing).
- E. Sub-soil: Free from roots, rock larger than 76mm (3") in size and building debris.

2.04 TOPSOIL

- A. In accordance with Section 32 91 19 – Topsoil Placement and Grading.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Determine extent of modification required to existing surface conditions to accommodate new splash pads.
- B. Locate splash pads to ensure best drainage away from building and the least interference with landscape or building elements such as shrubs, walkways, windows etc.
- C. Perform minor excavations as required to sub-surface for final grades.
- D. Carefully remove existing sod and retain for replacement as required.
- E. Firmly compact sub-soil to receive any required fill.

3.02 BACKFILLING AND TOPSOIL

- A. In accordance with Sections 31 23 10 – Excavation, Trenching and Backfilling and 32 91 19 – Topsoil Placement and Grading.
- B. Backfill areas to grades, levels and elevations as required with appropriate fill and topsoil materials to ensure positive drainage away from the building.
- C. Perform backfilling and topsoil operations systematically and as early as possible to allow maximum time for natural settlement and required compaction.
- D. Firmly compact fill to receive finished surface material.

3.03 GRAVEL BED

- A. In accordance with Section 32 11 23 – Aggregate Base Courses.

- B. Provide a compacted gravel bed of minimum 100 mm (4") depth beneath new splash pads.
- C. Gravel levelling base to extend min. 75 mm (3") past splash pads.

3.04 SPLASH PADS PLACEMENT

- A. Place splash pads on compacted material to fully support concrete with no hollows or bows below.
- B. Ensure required 3% slope.
- C. Install Barkman Concrete Natural Splash Pads as per manufacturer's specifications.
- D. Install Barkman Concrete Mounting Brackets as per manufacturer's specifications.

3.05 CLEAN-UP

- A. Remove all excess materials and leave the Site finished and in clean condition in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION 03 48 16

SECTION 04 05 13 – MASONRY MORTARING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Mortar for masonry work specified in Section 04 21 13.

1.02 REFERENCES

- A. Industry Standards: The Industry Standards listed below refer to the latest date of issue or edition, unless otherwise indicated.
- B. Requirements, abbreviations and acronyms for reference standards are defined in Section 01 42 19.
- C. ASTM C91 - Masonry Cement
- D. ASTM C144 - Aggregate for Masonry Mortar
- E. ASTM C150 - Portland Cement
- F. ASTM C207 - Hydrated Lime for Masonry Purposes
- G. ASTM C270 - Mortar for Unit Masonry
- H. ASTM C387 - Packaged, Dry, Combined Materials for Mortar and Concrete
- I. ASTM C476 - Grout for Reinforced and Non-Reinforced Masonry

1.03 SUBMITTALS

- A. Submit product data in accordance with Section 01 33 23.
- B. Include design mix, environmental conditions, and admixture limitations.
- C. Submit manufacturer's installation instructions in accordance with general conditions.

PART 2 – PRODUCTS

- A. MATERIALS:
 - 1. Portland Cement: ASTM C150, Type I. (Type III may be used for cold weather laying.)
 - 2. Masonry Cement: ASTM C91, Type II.
 - 3. Sand: ASTM C144, standard masonry type; clean natural sand; dry; protected against dampness, freezing, and foreign matter; well graded from coarse to fine; containing 5 to 15% of fines
 - 4. Portland Cement Grout Aggregate:
 - a. ASTM C33
 - b. Coarse Aggregate: Pea gravel uniformly graded from 3/8 inch to 1/2 inch.
 - 5. Lime: ASTM C207, Type S, Hydrated or quick lime, slaked to form lime putty conforming to ASTM C5.
 - 6. Water: Clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.
 - 7. Calcium Chloride: Not permitted
- B. MIXES
 - 1. Mortar for exterior work: ASTM C270, Type S.
 - 2. Mortar for interior work: ASTM C270, Type N.
 - 3. Pointing Mortar: ASTM C270, Type N, 750 PSI at 28 days with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
 - 4. Mortar for masonry below grade and/or in contact with earth: ASTM C270, Type M.

5. Mortar shall be pre-mixed by manufacturer and shall be complete except for sand and water. Job mixing of mortar shall not be allowed.
 6. Mortar color: Standard gray.
- C. GROUT FILL
1. For Lintels: Transit or job mixed, to produce minimum 2,500 PSI strength at 28 days, 7-8 inches slump.

PART 3 – EXECUTION

- A. MORTAR MIXING
1. Thoroughly mix mortar ingredients in quantities needed for immediate use. Use approved measuring box method.
 - a. Measure and batch materials either by volume or weight such that the required proportions for mortar can be accurately controlled and maintained. Measurement of materials exclusively by shovel will not be permitted.
 - b. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer.
 - c. Place two-thirds of the required mixing water and one-half of the sand in the mixer. Next, add the masonry cement. Then add the remaining sand. Allow to mix for two minutes to permit the fluidizing effect of the air-entraining agent to become effective. Then add remaining water to obtain the desired flow.
 - d. At no time should the amount of material in the mixer cover the top two inches of the mixer blades when they are at the apex of their travel.
 - e. Mix mortars with the minimum amount of water, consistent with workability to provide maximum tensile strength within the capacity of the mortar.
 2. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.
- B. RETEMPERING
1. To minimize re-tempering, do not mix mortar more than 15 minutes prior to use.
 2. If water is lost by evaporation, retemper within one hour of mixing. Do not use or retemper mortar more than one hour after mixing. Do not use mortar which has begun to set.
- C. INSTALLATION
1. Refer to Section 04 21 13, Brick Masonry

END OF SECTION 04 05 13

SECTION 04 21 13 – BRICK MASONRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Modular face brick.
 - 2. Standard concrete masonry units.
 - 3. Reinforcement, anchorage, and accessories.
 - 4. Thru-wall flashings.
- B. Products installed but not supplied under this section:
 - 1. Section 04 05 13 - Mortar and Grout: Testing Requirements
 - 2. Section 05 50 00 - Metal Fabrications: Loose steel lintels
- C. Related sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Reinforcing bars
 - 2. Section 05 12 00 - Structural Steel: Steel Shelf Angles
 - 3. Section 05 31 33 - Cold-Formed Metal Framing: Metal Stud Back-Up for Brick Veneer
 - 4. Section 07 19 00 - Water Repellents: Water Repellents Applied to Face Brick and Exterior Split Face CMU Surfaces.
 - 5. Section 07 92 00 - Joint Sealers: Backer Rod and Sealant at Control Joints
 - 6. Section 08 41 13 - Aluminum Entrances and Storefronts: Storefront System.

1.02 REFERENCES

- A. Industry Standards: The Industry Standards listed below refer to the latest date of issue or edition, unless otherwise indicated.
 - 1. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.
 - 2. ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).
 - 3. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
 - 4. ASTM A615 - Deformed and Plain Billet Steel bars for Concrete Reinforcement.
 - 5. ASTM C90 - Hollow Load Bearing Concrete Masonry Units.
 - 6. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.03 QUALITY ASSURANCE

- A. Single-Source Responsibility: Each type of unit masonry shall be obtained from one manufacturer.
- B. Qualifications of Workmen: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- C. Supervision: At least one skilled journeyman mason shall be present at all times during masonry work to personally supervise all work of this Section.

1.04 SUBMITTALS

- A. Product Data: Submit product data for all masonry units and fabricated wire reinforcements and accessories.
- B. Samples: Submit four samples of each type of masonry unit to illustrate color, texture and extremes of color range.
 - 1. Color shall match Architect's control sample.
- C. Shop Drawings: Submit drawings showing locations of all masonry control and expansion joints.
- D. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

1.05 MOCK-UP

- A. Mock-Up: Provide a 4' x 6' Mock-up of a typical masonry veneer wall system.
 - 1. Mock-up shall illustrate veneer wall system showing typical control joints, insulation, damp proofing, masonry ties, column ties, shelf-angles, thru-wall flashings, sealants, weep holes and accessories.
 - 2. Verify actual configuration and components with Architect prior to construction of mock-up.
 - 3. When accepted, mock-up will demonstrate minimum standard for the Work Mock-up may NOT remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store and protect mortar materials in accordance with manufacturer's recommendations.
 - 1. Maintain temperature and humidity within ranges required by manufacturer's instructions.
 - 2. Maintain cementitious materials and aggregates clean, dry and protected against dampness, freezing and foreign matter.

1.07 PROTECTION

- A. Protection During Erection: Maintain protective boards at exposed external corners which may be damaged by construction activities. Provide such protection without damaging completed work.
 - 1. At end of each day's work, cover top of walls with heavy waterproof sheets. Extend sheets 24 inches on each side of walls. Secure in place.
 - 2. Cover partially completed structures when work is not in place.
- B. Cold Weather Protection for Work in Progress:
 - 1. When air temperature is from 40°F to 32°F, heat sand and mixing water to produce mortar temperature between 40°F and 120°F.
 - 2. When air temperature is from 32°F to 20°F, heat sand and mixing water to produce mortar temperature between 40°F and 120°F. Maintain temperature of mortar on boards above freezing.
- C. Cold Weather Protection for Completed Work: Provide protection as required to maintain minimum 32°F for a minimum of 24 hours.
- D. Frozen Units: Remove all masonry units determined to be frozen or damaged by freezing conditions.
- E. Hot Weather Construction: When air temperature exceeds 100°F (or 90°F with wind over 8 mph), do not spread mortar more than 4 feet ahead of masonry, and set units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.01 BRICK UNITS

- A. Modular Face Brick: ASTM C216, Type FBS, Grade SW modular velour brick.
 - 1. Description: Standard modular, 3-5/8" x 7-5/8" x 2-1/4"
 - 2. Color: Match existing buildings. Final determination of match by Architect.

2.02 STANDARD CONCRETE MASONRY UNITS

- A. Concrete Masonry Units: ASTM C90, Grade N, Type I for hollow load bearing.
 - 1. Size: Nominal 8" x 16" x thicknesses as indicated; center scored.
 - 2. Weight: Lightweight classification
 - 3. U.L. Rated C.M.U.: 2 or 4 hour as required, see Drawings for locations.
- B. Solid Load-Bearing Concrete Masonry Units: ASTM C145, Grade N.
- C. Concrete Building Brick: ASTM C55
- D. Provide special units for bond beams, lintels, corners, jambs, control joints, headers, bonding, and other special conditions.

2.03 HORIZONTAL JOINT REINFORCEMENT

- A. General: Horizontal joint reinforcement specified below shall be prefabricated for embedment in horizontal mortar joints of masonry, manufactured and welded in 10 foot lengths from cold-drawn steel wire conforming with ASTM A82 requirements.
 - 1. Prefabricated Corners and Tees: Required for each type of wall reinforcing.
- B. Single-Wythe CMU Walls:
 - 1. Reinforcement Type: 2-wire system, truss design; "D/A 310, Truss" as manufactured by DUR-O-WAL, INC. or approved equal.
 - 2. Wire Gage/Size: Standard 9 gage side rods, 9 gage cross rods, width 2" less than wall thickness.
 - 3. Finish at Exterior Walls: Hot-dipped galvanized after fabrication, ASTM A153 Class B2.
 - 4. Finish at Interior Walls: Mill-galvanized, ASTM A641 Class 3.
- C. Face Brick/CMU Cavity Walls:
 - 1. Reinforcement Type: 2-wire system, truss design, with adjustable tab ties at 16" o.c.; "D/A 370, Dur-O-Eye" as manufactured by DUR-O-WAL, INC. or approved equal.
 - 2. Wire Gage/Size: Standard 9 gage side rods, 9 gage cross rods, width 2" less than concrete block thickness.
 - 3. Finish: Hot-dipped galvanized after fabrication, ASTM A153 Class B2
- D. Substitutions: (Upon compliance with all requirements)
 - 1. AA Wire Products, Co.
 - 2. Heckman Building Products, Inc.
 - 3. Hohmann & Barnard, Inc.
 - 4. Masonry Reinforcing Corp. of America
 - 5. National Wire Products Corp.

2.04 COLUMN TIES

- A. Column Ties: 3/16" diameter, hot-dipped galvanized triangular ties with 5/16" x 5" long hot-dipped galvanized column anchors welded to steel columns for anchorage of C.M.U. walls. Provide sizes to fit field conditions. Refer to Drawings.
 - 1. Heckman, Inc. - #316
 - 2. Hohmann & Barnard, Inc. - #VWT.
 - 3. Dur-O-Wal - #D/A 701

2.05 COLUMN ANCHORS

- A. Column Anchors: 1 1/4" wide x 12 gauge thick, hot-dipped galvanized column anchors for anchoring masonry to structural column when masonry is perpendicular to column flange. Provide flange widths and lengths to fit field conditions. Refer to Drawings.
 - 1. Heckman, Inc. - #197
 - 2. Hohmann & Barnard, Inc. - #353
 - 3. Dur-O-Wal - #D/A 606

2.06 NOTCHED COLUMN ANCHORS

- A. Notched Column Anchors (Corrugated Type): 1 1/2" wide x 12 gauge thick, hot-dipped galvanized column anchors for anchoring masonry to structural column when masonry is parallel to column flange. Provide flange widths and lengths to fit field conditions. Refer to Drawings.
 - 1. Heckman, Inc. - #189 L-type.
 - 2. Hohmann & Barnard, Inc. - #354
 - 3. Dur-O-Wal - #D/A 601

2.07 JOINT STABILIZATION ANCHORS

- A. Joint Stabilization Anchors: Used for bridging vertical control joints; Dur-O-Wal - #D/A 2200 or approved equal. Space at 16" o.c. maximum.

2.08 THRU-WALL FLASHINGS

- A. Copper-Fabric Laminate Flashing: 5 ounce copper sheet bonded with asphalt between two layers of glass-fiber cloth.
 - 1. Manufacturers/Products:
 - a. Cop-A-Cote; AFCO Products, Inc.
 - b. Type ACC-Asphalt Bituminous Coated; Phoenix Building Products.
 - c. Coated Copper Flashing; Sandell Manufacturing Co., Inc.
 - d. Copperseal; York Manufacturing, Inc.

2.09 RIGID ANCHORS (As Required)

- A. Fabricate from steel bars as follows:
 - 1. 1½" (38 mm) wide by 1/4" (6.4 mm) thick by length required with ends turned up 2" (50 mm) or with cross pins. Refer to drawings for locations and sizes.

2.10 ACCESSORIES

- A. Preformed Control Joints (where applicable): Extruded rubber conforming to ASTM D-2000 2AA-805 with 80 durometer conforming to ASTM D2240, designed for use in control joints in solid or cavity wall construction to provide resilient resistance to cracking under stress of expansion and contraction.
 - 1. Size and Configuration: As required for compliance with drawings.
- B. Horizontal (Soft Joint) Expansion Joint: 1/4" x 2 3/4" adhesive on one side with compression up to 35%, closed cell neoprene per ASTM D-1056, Class RE41.
- C. Vertical Expansion Joint: 3/8" x 3", no adhesive with compression up to 35%, closed cell neoprene conforming to ASTM D-1056, Class RE41.
- D. Mortar/Grout Screen: 1/4 square monofilament screen fabricated from high-strength, non-corrosive polypropylene polymers; 4", 6", or 10 widths, as required.
- E. Sealant and Backer Rods: Exterior quality in accordance with Section 07900.
 - 1. Color: To be selected by Architect.
- F. Sealant: Sonneborn Hydrocide Black Damp Proofing No. C.S. 2-5 applied to cover total wall surface without voids in accordance with manufacturer's recommendations.
- G. Weep Holes: 3/8" braided cotton sash cord; run up 16" high over flashing membrane.
- H. Cleaning Solutions: As recommended by manufacturer of masonry units.

2.11 LINTELS

- A. Steel Lintels:
 - 1. Type: Loose type steel angles as specified in Section 05500.
 - 2. Size: As indicated on Drawings.

PART 3 - EXECUTION:

3.01 EXAMINATION

- A. Field Conditions: Verify that field conditions are acceptable and are ready to receive work.
- B. Other Work: Verify items provided by other Sections of work are properly sized and located.
- C. Built-in Items: Verify that built-in items are in proper location, and ready to roughing into masonry work.

1. Confirm that steel shelf angles are NOT continuous masonry control and expansion joints.

3.02 PREPARATION

- A. Metal Anchors: Direct and coordinate placement of metal anchors supplied to other Sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Bond, CMU: Lay concrete masonry units in running bond. Course one unit and one mortar joint to equal 8 inches.
 1. Typically, form concave mortar joints in all areas.
- D. Bond, Brick Units: Lay brick units in running bond. Course three brick units and three mortar joints to equal 8 inches.
 1. Form concave mortar joints.

3.04 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Job site cutting: Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with a compressible joint filler.

3.05 WEEPS

- A. Install weep holes in veneer at 24" on center horizontally above through-wall flashing, and at bottom of walls.

3.06 CAVITY WALLS

- A. Mortar Droppings: Do not permit mortar on drop or accumulate into cavity air space or to plug weep holes.

3.07 REINFORCEMENT AND ANCHORAGES - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16" o.c.
- B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16" each side of opening.

- C. Place joint reinforcement continuous in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6". Extend minimum 16" each side of openings.
- E. Embed anchors attached to structural steel members in every second block joint.
- F. Prefabricated Corners: Reinforce joint corners and intersections with prefabricated corners and ties.

3.08 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

- A. Install horizontal joint reinforcement 16" o.c.
- B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16" each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls. Lap joint reinforcement ends minimum 6". Extend minimum 16" each side of openings.
- D. Embed anchors attached to structural steel members in every second block joint.
- E. Strap Anchors: Reinforce joint corners and intersections with strap anchors 16" o.c.

3.09 MASONRY FLASHINGS

- A. Extend flashings through veneer, turn up minimum 8" and bed into mortar joint of masonry or seal to sheathing over steel stud back-up.
- B. Lap end joints minimum 6" and seal watertight.
- C. Flashing Adhesive: Use flashing manufacturer's recommended adhesive and sealer.

3.10 LINTELS

- A. Install loose steel lintels over window and door openings.
- B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
- C. Openings up to 78" Wide: Place two, No. 4 reinforcing bars 1" from bottom web, unless otherwise indicated.
- D. Openings over 78": Reinforce openings as detailed.
- E. Reinforcing: Use single piece reinforcing bars only.
- F. Support and secure reinforcing bars from displacement. Maintain position with 1/2" of dimensioned position.
- G. Grout Fill: Place and consolidate grout fill without displacing reinforcing.
 - 1. Allow masonry lintels to attain specified strength before removing temporary supports.
- H. Maintain minimum 8" bearing on each side of opening.

3.11 GROUTED COMPONENTS

- A. Bond Beam Reinforcement: Reinforce bond beam with 2, No. 5 bars.
- B. Bar Splices: Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position with 1/2" of dimensioned position.

- D. Place and consolidate grout fill without displacing reinforcing.
 - 1. Place grout fill in maximum 4 foot lifts.
- E. Openings: At bearing locations, fill masonry cores with grout for a minimum 12" either side of opening.
 - 1. Provide one, No. 5 bar full height in first cell unless noted otherwise.

3.12 CONTROL AND EXPANSION JOINTS

- A. Control/Expansion Joints: Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Form control joints with a preformed control joint material as specified in Part 2 using sash block. Rake joint at exposed unit faces for placement of backer ord and sealant.
- C. Control Joints: Size control joint in accordance with Section 07900 for sealant performance.
- D. Form expansion joints as detailed.

3.13 BUILT-IN WORK

- A. Built-In Items: As work progresses, build in metal door frames, fabricated metal frames, window frames, anchor bolts, plates and other items furnished by other Sections.
- B. Build in items plumb and level.
- C. Door Jambs: Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12" from framed openings.
- D. Do not build in organic materials subject to deterioration.

3.14 PARTITION IDENTIFICATION

- A. Stenciling: Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2" high and labeled at 20-foot centers.
 - 1. Label as "FIRE", "SMOKE", and "NO. OF HOURS"
 - 2. Non-rated walls which extend to deck shall be labeled "NO WALL RATING REQUIRED".

3.15 TOLERANCES

- A. Maximum Variation From Alignment of Columns: 1/4"
- B. Maximum Variation From Unit to Adjacent Unit: 1/32"
- C. Maximum Variation From Plane of Wall: 1/4" in 10 feet and 1/2" in 20 feet or more.
- D. Maximum Variation From Plumb: 1/4" per story non-cumulative; 1/2" in two stories or more.
- E. Maximum Variation From Level Coursing: 1/8" in 3 feet and 1/4" in 10 feet and 1/2" in 30 feet.
- F. Maximum Variation of Joint Thickness: 1/8" in 3 feet.
- G. Maximum Variation From Cross Sectional Thickness of Walls: 1/4"

3.16 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of work to provide correct size, shape and location.
- B. Obtain Architect's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of

masonry work may be impaired.

3.17 CLEANING

- A. Remove excess mortar and mortar smears.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

3.19 PROTECTION OF FINISHED WORK

- A. Protection: Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION 04 21 13

SECTION 05 05 00 – COMMON WORK RESULTS FOR METALS

PART 1 - GENERAL

The extend of this work is as shown on the drawings, specified, and required by the general construction.

1.01 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, standards, and specifications, except as otherwise shown and specified:
 - 1. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including "Commentary of the AISC Specification."
 - 2. AISC "Specifications for the Design of Cold-Formed Steel Structural Members."
 - 3. AWS "Structural Welding Code."
- B. Qualification For Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualifications Procedure."
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to insure proper fittings of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.
- D. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of unit at the project site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.02 SUBMITTALS

- A. Manufacturer's Data; Miscellaneous Metal, General: For information only, submit *two (2) copies* of manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in miscellaneous metal work, including paint products. Indicate by transmittal that copy of instructions has been distributed to the installer.
- B. Shop Drawing; Miscellaneous Metal, General: Submit shop drawings for the fabrications and erection of all assemblies of miscellaneous metal work, which are not completely shown by the manufacturer's data sheets. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items. Include setting drawings and templates for location and installation of miscellaneous metal items and anchorage devices.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Metal Surfaces: For the fabrication of miscellaneous metal work items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes including zinc coatings:
- B. General Metal Materials:
 - 1. Rolled Steel Plates, Shapes, and Bars: *ASTM A 36.*
 - 2. Cold-Formed Steel Tubing: *ASTM A 500, Grade B.*
 - 3. Hot-Formed Steel Tubing: *ASTM A 501.*
 - 4. Steel Pipe: *ASTM A 53, Type E or S, Grade B.*
 - 5. Steel Castings: *ASTM A 27, Grade 65-35, medium strength carbon steel.*
 - 6. Unfinished Bolts and Nuts: *ASTM A 307, Grade A.*
 - 7. High-Strength Bolts and Nuts: *ASTM A 325 or A 490.*
 - 8. Electrodes for Welding: *Comply with AWS Code.*

C. Anchors:

1. Threaded-Type Concrete Inserts: Galvanized ferrous castings, internally threaded to receive 3/4" diameter machine bolts, either malleable iron complying with *ASTM A 47* or cast steel complying with *ASTM A 27*; hot-dip galvanized.
2. Wedge-Typed Concrete Inserts: Galvanized box-type ferrous casting, designed to accept 3/4" diameter bolts having special wedge-shaped heads; either malleable iron complying with *ASTM A 47* or cast steel complying with *ASTM A 27*; hot-dip galvanized.
3. Provide carbon steel bolts having special wedge shaped head, nuts, washers and shims; all galvanized in compliance with *ASTM A 153*.
4. Slotted-Typed Concrete Inserts: Galvanized 1/8" thick pressed steel plate complying with *ASTM A 283*; box-type welded construction with slot designed to receive 3/4" diameter square head bolt and with knockout cover; hot-dip galvanized.

D. Fasteners: Provide zinc-coated fasteners, with galvanizing complying with *ASTM A 153*, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.

1. Standard Bolts and Nuts: *ASTM A 307, Grade A, regular hexagon head.*
2. Lag Bolts: *FS FF-B-561, square head type.*
3. Wood Screws: *FS FF-S-111, Flat head carbon steel.*
4. Machine Screws: *FS FF-S-92, Cadmium plate steel.*
5. Plain Washers: *FS FF-W-92, round, general assembly grade carbon steel.*
6. Lock Washers: *FS FF-W-84, helical spring type carbon steel.*
7. Masonry Anchorage Devices: Expansion shields: *FS FF-S-325.*
8. Toggle Bolts: Tumble-wing type: *FS FF-B-588, type, class, and style as required.*

E. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, none-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with *CRD-C621*.

2.02 FABRICATION, GENERAL

A. Workmanship: Use materials of the size and thicknesses shown, or if not shown, of the required size and thickness to produce adequate strength and durability in the finished product for the intended use. Work to the dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use the type of materials shown or specified for the various components of work. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

1. Weld corners and seams continuously and in accordance with the recommendations of *AWS*. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
2. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type shown or, if not shown, use Phillips flathead (*countersunk*) screws or bolts. Provide for anchorage of the type shown, coordinated with the supporting structure and the progress schedule. Fabricate and space anchoring devices to provide adequate support for the intended use of the work. Cut, reinforce, drill and tap miscellaneous metal work indicated to receive finish hardware and similar items of work.
3. Galvanizing: Provide a zinc coating for those items shown on the drawings or specified to be galvanized, using the hot-dip process after fabrication.

ASTM A 153 for galvanizing of iron and steel hardware.

ASTM A 123 for galvanizing of rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.

ASTM A 386 for galvanizing of assembled steel products.

- B. Fabrication: Fabricate items of steel in accordance with *AISC Specifications* and as indicated on the final shop drawings. Properly mark and match-mark all materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling.
1. Connections: Combinations of bolts and welds in the same connections are not permitted, unless otherwise detailed. Weld or bolt shop connections, unless otherwise shown. Bolt field connections, except where welded connections or other connections are indicated. Provide high-strength bolts and nuts if required.
 2. Welded Constructions: Comply with *AWS Code* for procedures, appearance, and quality of welds, and for methods used in correcting welding work.
 3. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" o.c., unless otherwise shown.
 4. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for the passage of other work through steel framing members as indicated. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 PAINT:

- A. Metal Primer Paint: Zinc yellow iron oxide primer complying with *SF TT-P-57, Type II*. Primer paint selected must be compatible with the required finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in *Division 9* of these specifications.
- B. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with *Military Specifications MIL-P-21035 (Ships)*.
- C. Shop Painting: Shop paint all structural steel work, except members or portions of members to be embedded in concrete or mortar. Paint embedded steel on exposed portions and initials 2" of embedded areas only. Do not paint contact surfaces which are to be welded or high strength bolted. Do not paint surfaces which are scheduled to receive sprayed-on fireproofing. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
1. Surface Preparation: After inspection and before shipping, clean steelwork to be painted complying with *Steel Structures Painting Council (SSPC) SP-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush Off Cleaning."* Remove oil, grease and similar contaminants, complying with *SSPC SP-1 "Solvent Cleaning."*
 2. Application: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of 2.0 mils.

END OF SECTION 05 05 00

KING ARCHITECTS, INC

SECTION 05 12 00

SECTION 05 12 00 – STRUCTURAL STEEL

PART 1 -GENERAL:

1.01 SCOPE

- A. Provide, fabricate, and erect all structural steel including lintels, angles, anchor bolts, plates, hangers, etc., as indicated on the plans as hereinafter specified.
- B. Frames for all roof openings shall be provided under this section. Refer to Architectural, Mechanical, and Electrical plans for size and locations. All openings over 12" square shall be framed unless otherwise noted on the plans.

1.02 APPLICABLE STANDARDS

- A. Applicable portions of the current edition of the following standards are a part of these specifications:
 - 1. American Institute of Steel Construction (AISC):
AISC Manual of Steel Construction Latest Edition
 - 2. American Society for Testing & Materials (ASTM):
 - a. A 36, A572 Structural Steel
 - b. A 325 Structural Bolts
 - c. F1558 Anchor Bolts
 - d. A500 Structural Tubing
 - 3. American Welding Society (AWS):
 - a. D1.1 Structural Welding Code
 - 4. Corps of Engineers:
 - a. CRD C588 Pre-mixed grout

1.03 SHOP DRAWINGS

- A. Submit for review detailed shop drawings showing the layout, sizes, connections, arrangements, etc., for all structural steel in accordance with requirements of the Supplementary Conditions.

1.04 STORAGE OF MATERIALS

- A. Store above ground of suitable supports and keep free of foreign material and corrosion as far as practicable.

1.05 QUALITY CONTROL

- A. The Owner reserves the right to employ an independent testing laboratory to gamma ray or magna-flux all welds.
- B. The Owner shall employ independent testing laboratory to perform an inspection of all bolted connections. Testing laboratory shall visually inspect to insure all bolts are in place. Testing laboratory shall do random tests on 20 bolts for required tightness. If 2 or more of 20 tested fails test, Contractor shall re-tighten all bolts on project and testing laboratory shall be employed to test a different 20 random bolts. This procedure shall continue until test is passed. The testing laboratory shall send report to Architect after each test and inspection.
- C. All field welding shall be accomplished by certified welders.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural Steel: 36,000 psi yield steel as per ASTM A 36
- B. Structural Tubing: 46,000 psi yield steel as per ASTM A 500.

- C. Bolts for Structural Steel Connections: ASTM A 325-N high strength bolts. All bolts to be 3/4" diameter unless noted otherwise on the plans.
- D. Anchor Bolts: ASTM A 36 bolts. All bolts to be 1" in diameter unless otherwise noted on the plans.
- E. Welding Electrodes: E 70 series electrodes in accordance with AWS A1.1
- F. Grout: Premixed grout in accordance with Corps of Engineers CRD C 588
- G. Paint: Zinc chromate, alkyd type paint standard with the fabricator. Thickness shall be at least 1 mil dry film.

PART 3 - EXECUTION

3.01 FABRICATION

- A. The plans show general details of connections including the bolting and/or welding required for such connections. Special connections shall be worked out with the contracting officer's office.
- B. For connections not detailed, the contractor shall detail the beam connection for the reaction shown on the plans. Where no reaction is shown, the connection shall be detailed or $\frac{1}{2}$ the total allowable uniform load (W_c/L) given in the tables of uniform load constants in the AISC Manual for the given shape.
- C. Unless otherwise detailed on the plans, the fabricator shall design the frames for floor openings for the appropriate live and dead load within the allowable stress and deflection limits.
- D. Erection marks shall be painted on all structural members.
- E. Provide all necessary erection clips, angles, seats, etc., to properly erect structural steel.
- F. Welding shall be in accordance with the requirements of the American Welding Society with all possible welding performed in the shop.
- G. Provide one shop coat of paint to all structural members, connectors, angles, etc. Thickness shall be at least 1 mil dry film. All steel shall have been power wire-brushed so as to remove all loose mill scale, rust, weld-slag, etc., prior to painting.

3.02 ERECTION OF STRUCTURAL STEEL

- A. Provide falsework, temporary bracing, and all tools, machinery, and appliances, including drift pins and fitting up bolts, necessary for the expeditious handling of the work. Falsework and temporary bracing shall be properly designed and substantially constructed and maintained for the loads which will come upon it and shall remain in place until all permanent bracing is in place.
- B. The structure system and the individual structural members are designed to be self supporting only after all structural members are connected in place.
- C. Individual pieces of structural steel shall be positioned, plumbed and leveled so as not to have an error exceeding 1/4" and the overall structure shall be within the tolerance allowed by the AISC Specifications.
- D. Finished members shall be true to line and free from twists, bends and open joints.
- E. All full penetration welds shall be made using backup plates, after which the plates shall be removed.
- F. Base plates shall be set in accordance with the details shown on the plans and shall be grouted with pre-mixed grout. In no case shall wedges other than steel be used.
- G. Beams and lintels that are to be wall bearing shall be erected in normal sequence and shall extend over the wall a minimum of 8" unless shown otherwise on the plans.

3.03 FIELD PAINTING

- A. All field painting called for below is specifically excluded from this section of the specifications and is included under Division No. 9.
- B. After erection, all rust spots shall be removed and then, the clean surface, as well as damaged spots, bolts, etc., shall be touched up with one coat of the same material as the shop coat.

END OF SECTION 05 12 00

SECTION 05 21 19 – OPEN WEB STEEL JOIST FRAMING

PART 1 - GENERAL

1.01 SCOPE

Furnish and erect all open web steel joists including bridging, etc., as indicated on the plans as hereinafter specified.

Refer to Architectural and Mechanical plans for openings for skylights, hatches, ducts, fans, etc., and space joists as required for proper clearance. Joists supporting mechanical units shall be spaced to suit the dimensions of the units being furnished.

Any openings requiring spacing in excess of that indicated on the plans shall be brought to the attention of the Architect prior to installation of the joists.

1.02 APPLICABLE STANDARDS

A. Applicable portions of the current edition of the following Standards are a part of these specifications:

1. American Institute of Steel Construction (AISC):
AISC Manual of Steel Construction
2. Steel Joist Institute (SJI):
SJI Standard Specifications for Open Web Steel Joists - "K Series"
SJI Standard Specifications for Open Web Steel Joists - "LH Series"

1.03 SHOP DRAWINGS

Submit for review detailed shop drawings showing layout, sizes, arrangements, details, bridging, etc., for all open web steel joists in accordance with the requirements of the Supplementary Conditions. Submit one extra set of blue-line prints for the Structural Engineer with all submittals.

1.04 STORAGE OF MATERIALS

Store above ground on suitable supports and keep free of foreign materials and corrosion as far as practicable.

PART 2 - PRODUCTS

2.01 MATERIALS

1. Open Web Steel Joists: "K-Series" joists based on allowable stress of 30,000 psi. "LH Series joists based on allowable stress of 30,000 psi."
2. Paint: Zinc chromate, alkyl type paint standard with the manufacturer. Thickness shall be at least 1 mil. dry film.

PART 3 - ERECTION

3.01 FABRICATION

- A. Each joist shall be tagged to show its size. Strut joists, indicated on the plans by "S.J.", are joists having a bottom chord the same size as the top chord.
- B. Ceiling extensions shall be provided where required and extended ends shall be provided as noted on the plans.
- C. Camber shall be provided in accordance with the AISC and SJI Specifications or as otherwise noted on the plans.
- D. Bridging shall be in accordance with AISC and SJI Specifications or as noted on the plans.
- E. Joists bearing plates shall be sloped for even bearing at all supports where the slope is in excess of 1/4" per linear foot.

- F. Provide one shop coat of paint to all joists and bridging. Thickness shall be at least 1 mil.. dry film. Joist steel shall be power wire-brushed prior to fabrication. Clean all joists of weld slag after fabrication prior to painting. Joists shall be painted as soon as possible after fabrication to prevent rusting.

3.02 ERECTION

- A. All open web steel joists shall be erected in strict accordance with the specification requirements of the AISC and SJI.
- B. Space all joists equally between column lines or as noted otherwise on the plans. Coordinate spacing of joists under mechanical units, skylights, hatches, ducts, etc., with other trades.
- C. Where joists butt over a beam, the beam flange shall be wide enough so as to provide the minimum bearing required by the AISC and SJI Specifications, otherwise, the joist ends shall be welded across the tops as required by AISC and SJI Specifications.
- D. Where joists frame into a beam from one side only, the centroid of the end bearing plate shall fall over the centerline of the beam.
- E. Minimum bearing over masonry supports shall be provided in accordance with AISC and SJI Specifications.
- F. Special conditions shall be as noted on the plans.
- G. All joist ends shall be anchored as required by the AISC and SJI Specifications or as noted on the plans.
- H. As soon as joists are erected, all bridging shall be completely installed and the joists permanently fastened into place before the application of any loads.
- I. Where joists are to be exposed to view in the completed building, special care shall be taken so that all joists and rows of bridging are spaced uniformly and straight. Joints in bridging shall occur at the joists.
- J. During the construction period, care shall be exercised to avoid excessive concentrated loads. Loads shall be distributed so that the carrying capacity of any steel joist is not exceeded.

3.03 FIELD PAINTING

- A. All field painting called for below is specifically excluded from this section of the specifications and is included under the Architectural
- B. After erection, all rust spots shall be removed, and then, the clean surface, as well as all damaged spots, bolts, etc., shall be touched up with one coat of the same material as the shop coat.
- C. Refer to Architectural Specifications for PAINTING for finished coats on exposed surfaces.

END OF SECTION 05 21 19

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and *Division -1 Specification sections*, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
- B. Extent of metal fabrications is indicated on drawings and schedules.
- C. Types of work in this section include metal fabrications for:
 - 1. Miscellaneous framing and supports.
 - 2. Lavatory counter-top supports.
 - 3. Edge angles.
 - 4. Lintels.
 - 5. Pipe handrails and brackets.
 - 6. Metal Pan Stairs.

1.03 QUALITY ASSURANCE

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.

PART II - PRODUCTS

2.01 MATERIALS

- A. Ferrous Metals:
- B. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
- C. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washer and shims as required, hot-dip galvanized, ASTM A 153.

2.02 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately $1/32"$ unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- D. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

2.03 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate form structural steel shapes and shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

2.04 STEEL FRAMED STAIRS

- A. General: Provide stair units of sizes and arrangements shown. Design and construct entire assembly to support the specified loads. Provide metal framing, hangers, struts, clips, brackets, bearing plates, and other components as required for the support of stairs and platforms. Erect stair work to line, plumb, square and true with runs registering level with floor and platform levels. Fabricate units so that bolts and other fastenings do not appear on finish surfaces. Make joints true and tight and make connections between parts light-proof tight. Provide continuous welds ground smooth where exposed.
- B. Stair Framing: Fabricate stringers of structural steel channels or plates or a combination thereof. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members.
- C. Metal Plan Units: Form metal pans of $0.1045"$ thick (12 gage) minimum steel sheets complying with ASTM A 245, or ASTM A 570, Grade 30. Shape pans to conform to the configuration shown. Construct riser and sub-tread metal pans with steel angle supporting brackets welded to stringers. Weld metal pans to brackets. Weld sub-platform metal pans to platform frames.
- D. Steel Floor Plate Risers, Treads, and Platforms: Form risers, tread, and platforms from floor plate complying with FS QQ-F-461, Class 1, thickness as required to support specified loads. Shape floor plate to conform to the configuration shown. Construct riser and tread floor plate with steel angle supporting brackets welded to stringers. Weld floor plate to brackets. Weld platform floor plate to platform frames.

2.05 STAIR RAILINGS, HANDRAILS AND GUARDRAILS

- A. Pipe Railings:
 - 1. Provide steel pipe railings: consisting of top rail, intermediate rails, and posts, and handrails at walls. Unless otherwise shown, provide $1-1/4"$ nominal size.
- B. Join posts, rails and corners by the following methods as indicated: Provide flush-type steel wall return and railing fittings, welded and ground smooth.
- C. Provide railing splice locks secured with $3/8"$ hexagonal-recessed-head set screws.
- D. Miter and weld joints made by fitting post to top rail and intermediate rail to post, groove weld joints, and grind smooth.
- E. Bend railings at corners with constant radius, and bend railings at curved radius indicated with constant radius, and with cylindrical cross-section of pipe maintained throughout the entire bend.
- F. Adjust railings prior to securing in place to insure proper matching at butting joints and correct alignment throughout

- their length. Plumb posts in each direction. Secure posts and rail-ends to building construction as indicated.
- G. Secure handrails to walls by means of wall brackets as indicated.
 - H. Locate brackets not more than 60" o.c. Secure wall brackets to building construction as follow:
 - 1. For concrete and solid masonry anchorage, use bolt anchor expansion shields and lag bolts.
 - 2. For hollow masonry and stud partition anchorage, use toggle bolts having square heads.

PART III - EXECUTION

3.01 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorage, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

PART IV - INSTALLATION

4.01 GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in form-work for items which are to be built into concrete masonry or similar construction.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

END OF SECTION 05 50 00

SECTION 05 51 00 – PREFABRICATED METAL STAIRS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Prefabricated steel stair assemblies with treads and landings of steel-pan construction prepared for concrete fill, complete with welded handrails.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-In-Place-Concrete: Concrete fill in stair treads and landings.
 - 2. Section 09 91 00 Painting: Paint Finish

1.02 REFERENCES

- A. ADA Americans with Disabilities Act of 1990, Accessibility Guidelines for Buildings and Facilities.
- B. ANSI 117.1 American National Standard for Buildings and Facilities – Providing Accessibility and usability for physically handicapped people.
- C. AWS A2.0 Standard Welding Symbols
- D. AWS D1.1 Structural Welding Code
- E. SSPC Steel Structures Painting Council
- F. AISC American Institute of Steel Construction
- G. AISI American Iron and Steel Institute - Cold Form Steel Design Manual.
- H. ASTM A36 Structural Steel
- I. ASTM A500
ASTM A513 Steel Tubing
- J. ASTM A307 Bolts and Nuts
- K. ASTM A569 Steel Sheets
- L. Federal Specification TT-P-636 Shop Applied Prime Paint

1.03 SYSTEM DESCRIPTION

- A. Stair System: Stairs shall be prefabricated steel DROP-IN STAIR system complete with job poured concrete filled pans and landings, horizontal header and landing channels including vertical supports (steel angle struts, hanger rods and connectors, columns, or welded embedment plates), factory assembled stair railing for side mounted installation to plate stringers and/or top mount installation on channels stringers as indicated.
- B. Railings: Provide wall mounted railings as indicated including brackets and bolts, and all fasteners, for a complete and proper installation.

1.04 STRUCTURAL REQUIREMENTS

- A. Minimum Live Load: Fabricate metal stair assembly to support a minimum uniform live load of 100 PSF of projected plan area.
- B. Railings: Railing assembly shall comply with ADA Article 4.26.3 Structural Strength.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, accessories, and all required field measurements.
 - 1. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- B. Certificates: Furnish manufacturer's certification that materials meet specification requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products in exact accordance with the manufacturer's latest published requirements and specifications.
- B. Storage on Site: Store material in a location and in a manner to avoid damage. Stack in manner which prevents bending and damaging of products.

1.07 SEQUENCING / SCHEDULING

- A. Coordinate shop drawings, fabrication, delivery and installation.

1.08 FIELD MEASUREMENTS

- A. Verify that field measurements areas indicated on shop drawings.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Approved Manufacturers: Subject to compliance with requirements of this Section, provide products of one of the following:
 - 1. American Stair Co. - "Speedstair"
 - 2. Sharon Stair Systems, Ltd. - "Drop-In Stair"

2.02 MATERIALS - INTERIOR STAIRS

- A. General: Fabricate stairs and landings with closed risers and treads of metal pan construction, ready to receive 3,000 psi poured-in-place concrete by others.
- B. Structure:
 - 1. Stringer: Steel plates, tubing on channels for compliance with performance requirements, ASTM A36.
 - 2. Risers: Formed sheet steel risers minimum 14 gauge, ASTM A569
 - 3. Threaded and Hanger Rods: Minimum 5/8" diameter ASTM A36
 - 4. Plates and Angles: ASTM A36
- C. Treads: Minimum 14 gage sheet steel pan for concrete fill by others, complying with ASTM A569. Reinforce underside with angles to attain design load requirements.
 - 1. Contractor's Option: 5,000 psi Precast Concrete Treads with anti-skid, slip resistant surface may be used in lieu of job poured treads upon Architect's approval.
 - a. Precast treads shall comply with ASTM Method E303-74 (1978) with Results of friction less than 70 (transverse).
- D. Landings:
 - 1. Steel Decking: Minimum 14 gage sheet steel decking for concrete fill by others, complying with ASTM A569.

2. Steel Reinforcing Bar: #5 @ 14" o.c., grade 40. ASTM A615
 3. Steel Channel Support: Minimum C6 x 8.2, ASTM A36
- E. Railing: Round Multi-Strand Railing. Multi-Strand parallel 1½ " round tubular railing with continuous curved connections for top rail and terminations with end caps for lower rails.
- F. Wall Mounted Handrails: 1½ " tubular rail with wall returns.

2.03 MATERIALS - EXTERIOR STAIRS

- A. General: Fabricate stair and landing with closed rises and treads of slip-resistant fiber-reinforced cement.
- B. Structure:
1. Stringers: Steel plates, tubing or channels as required for compliance with performance requirements, ASTM36
 2. Risers: Formed sheet steel risers minimum 14-gauge, ASTM A 569
 3. Plates and Angels: ASTM A 36
- C. Precast Treads: Slip resistant surfaced concrete, factory-filled sheet steel tread bolted to stringer brackets.
- D. Landings: Provide 4" toe plates at open edges of landings. Type - Slip-Resistant Fiber-Reinforced Cement: Slip-Resistant safety grit surface permanently bonded to fiber-reinforced cement tread, with sheet steel backing; 2-shaped stiffeners and steel channel supports.
- E. Railing: Round Multi-Strand Railing. Multi-Strand parallel 1½ " round tubular railing with continuous curved connections for top rail and terminations with end caps for lower rails.
- F. Wall-Mounted Handrails: 1½ " tubular rail with wall returns where and if walls occur at this location.

20.4 FABRICATION

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Fabricate components with joints tightly fitted and secured.
- C. Continuously seal jointed pieces by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Anchorage: Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Accurately form components required for anchorage of stairs, landings and railings to each other and to building structure.
- H. Railings: Fabricate to profiles shown on drawings. Where not specifically detailed, manufacturer's standard railings may be used upon Architect's approval.

2.04 FINISHED

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.

KING ARCHITECTS, INC

SECTION 05 51 00

- C. Primer: Prime paint items with one coat per FS TT-P-636
- D. Paint Finish: As specified in Section 09 91 00 - Painting.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Field Conditions: Verify that field conditions are acceptable and are ready to receive work.
- B. Existing Conditions: Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Cast-In Items: Supply items required to be cast into concrete with setting templates, to appropriate sections.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Connections: Provide anchors, plates, angles and struts required for connecting stairs to structure.
- C. Erection and Installation: Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field weld components indicated on Drawings. Perform field welding in accordance with AWS D1.1.
- E. Field bolt and weld to match shop bolting and welding. Conceal bolts and screws whenever possible. Where not concealed, use flush counter sunk fastenings.
- F. Joints: Mechanically fasten joints butted tight, flush and hairline. Grind welds smooth and flush.
- G. Field Priming: After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.

3.04 CLEANING AND TOUCH-UP

- A. Cleaning: Clean the stairs and railing assembly thoroughly.
- B. Touch-up damaged shop coat with primer matching the shop coat.
- C. Remove debris, containers and excess material resulting from work specified herein.

END OF SECTION 05 51 00

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

Definition: Carpentry includes carpentry work, which is generally not exposed, except as otherwise indicated on the drawings.

1.02 REFERENCES

- A. Lumber Standards: Comply with *PS 20* and with applicable rules of the respective grading and inspecting agencies and products indicated.
- B. Plywood Products Standards: Comply with *PS 1* (ANSI A 199.1) or, for products not manufactured under *PS 1* provisions, with applicable *APA* Performance Standard for type of panel indicated.

1.03 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation with stacks.

1.04 JOB CONDITIONS

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate tight fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber, General: Factory mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual size as required by *PS 20* for moisture content specified for each use. Provide dressed lumber with 15% maximum moisture content at time of dressing.
- B. For structural framing, provide the following grade and species or approved equal by Architect in writing.
 - Select Structural Grade
 - No.2 grade or better
 - Southern Pine (SPIB)
 - Fb (minimum extreme fiber stress in bending): 1500 PSI
 - E (minimum modulus of elasticity); 1,500,000
- C. Miscellaneous Lumber: Provide wood for support or attachment or other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shape shown and as follows:
 - Moisture Content: 19% maximum for lumber items not specified to receive wood preservative treatment. Grade No. 2 S.Y.P. or better
- D. Plywood: Trademark: Identify each plywood panel with appropriate *APA* trademark. All plywood to be a face grade on exposed surface and have exterior glue rating.

2.02 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, materials, and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, and washer and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails. Where rough carpentry work is exposed to weather, in

ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

- B. Building Paper: Asphalt saturated felt, non-perforated, ASTM 226.

2.03 WOOD TREATMENT

- A. Preservative Treatment: Where lumber or plywood is indicated as "Treated" or is specified herein to be treated, comply with the applicable requirements of *AWPA Standard C2 (lumber) and C9 (plywood) and of AWPB Standards* listed below. Mark each treated item with *AWPB Quality Mark Requirements*.
1. Pressure-treat above-ground items with water-borne preservatives complying with *AWPB LP-2*. After treatment, kiln-dry to a maximum moisture content of 15%. Treat indicated items and the following:
 - a. Wood cants, nailers, curbs, blocking, stripping and similar concealed members in contact with masonry or concrete.
 - b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
 2. Pressure-treat the following with water-borne preservatives for ground contact use complying with *AWPB LP-22*.
 - a. Wood members in contact with ground.
 - b. Wood members in contact with fresh water.
 3. Complete fabrication of treated items prior to treatment where possible. If cut after treatment, coat cut surfaces with heavy brush coat of some chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- B. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 GENERAL

- A. Discard units of materials with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- B. Set carpentry work accurately to require levels and lines, with members plumb, and true and accurately cut and fitted.
- C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by required by recognized standards. Countersink nail heads and exposed carpentry work and fill holes. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners or size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood, pre-drill as required.

3.02 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level or work to be attached. Coordinate location with other work involved.
- B. Attach to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to form-work before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.03 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished

work.

- B. Furring: Unless otherwise shown, provide 1"x 4" furring at 16" o.c. maximum spacing.
- C. Suspended Furring: Provide size and spacing shown, including hangers and attachment devices. Level to a tolerance of 1/8" in 10'.

3.04 WOOD, FRAMING, GENERAL

- A. Provide framing members of sizes and on spacing shown, and frame openings as shown, or if not shown, comply with recommendations of "Manual for House Framing" of National Forest Products Association. Do not splice structural members between supports.
- B. Anchor and nail as shown, and to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and other recommendations of *NFPA*.
- C. Fire stop concealed spaces with wood blocking not less than 2" thick, if not blocked by other framing members. Provide blocking at third points of and at each building story level and at ends of joist spans.

3.05 JOIST FRAMING

GENERAL:

- A. Provide framing of sizes and spacing shown. Install with crown edge up and support ends of each member with not less than 1-1/2" of bearing members by toe nailing or metal, or 3" on masonry. Attach to wood bearing members by toe nailing or metal connectors; frame to wood supporting members with wood ledgers as shown, or if not shown, with metal connectors. Fire-cut members built into masonry (*if any*). Frame opening with headers and trimmers where span or headers exceeds 4". Do not notch in middle third of joist; limit notches to 1/6 *depth of joist*; 1/3 *at ends*. Do not bore holes larger than 1/3 *depth of joist* or located closer than 2" from top or bottom. Provide solid blocking (2" *thick by depth of joist*) at ends of joists unless nailed to header or brand member.
- B. Lap members framing from opposite sides of beams, girders or partitions not less than 4" or securely tie opposing members together. Provide solid blocking (2" *thick by depth of joist*) over supports.
- C. Under jamb studs at openings, provide solid blocking between joist.
- D. Under non-load bearing partitions, provide double joists separated by solid blocking equal to depth of studs above. Provide triple-joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures, unless otherwise shown.
- E. Provide bridging between joists where nominal depth-to-thickness ratio exceeds 4' at intervals of 8'. Use bevel cut 1"x 4" or 2"x 3" wood bracing, double-crossed and nailed both ends to joists or use solid wood bridging 2" thick by depth of joist, end nailed to joist.

3.06 SUB-FLOORING

- A. Install boards with end joints staggered over supports, and with each piece extending over at least *two (2) spaces* between supports. Nail with 8d common nails, space *two (2) per* support for board widths of 6" and less, *three (3) per* support for widths of 8" or more.
- B. Cover sheathing with building paper, lapped and nailed with roofing nails.

3.07 INSTALLATION OF PLYWOOD

GENERAL: Comply with applicable recommendations contained in *Form No. E 304*, "APA Design/Construction Guide-Residential and Commercial", for types of plywood products and applications indicated.

- A. Fastening Methods: Fasten panels as indicated below:

1. Subflooring: Staple or nail to framing
2. Plywood Backing Panels: Nail to supports

END OF SECTION 06 10 00

GUIDE SPECIFICATION

Manufacturer:
American Gypsum
3811 Turtle Creek Blvd., Suite 1200
Dallas, Texas 75219
(800) 545-6302
(214) 530-5634 fax
www.americangypsum.com

SECTION 06 16 40

GYPSUM SHEATHING

PART 1 - GENERAL

This guide specification has been prepared by American Gypsum, in printed and electronic media, as an aid to specifiers in preparing written construction documents for gypsum sheathing.

*Edit entire master to suit project requirements. Modify or add items as necessary. Delete items which are not applicable. Words and sentences within **bold brackets [_____]** reflect a choice to be made regarding inclusion or exclusion of a particular item or statement. Where a value, word, or phrase is followed by a bracket, the preferred value, word, or phrase occurs first, with the other choices following inside the brackets. This section may include performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements.*

This guide specification is written around the Construction Specifications Institute (CSI), Section Format standards references to section names and numbers are based on MasterFormat 2004.

For specification assistance on specific product applications, please contact our offices above or any of our local product representatives throughout the country.

American Gypsum reserves the right to modify these guide specifications at any time. Updates to this guide specification will be posted to the manufacturer's web site and/or in printed matter as they occur. American Gypsum makes no expressed or implied warranties regarding content, errors, or omissions in the information presented.

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Gypsum sheathing board.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology Standard: Refer to ASTM C 11 for definitions of terms for gypsum sheathing board construction not defined in this Section or in other referenced standards.

Include submittal requirements below which are consistent with the scope of the project and extent of work of this section. Only request submittals which are necessary for review of design intent.

Do not request submittals if drawings sufficiently describe the products of this section or if proprietary specifying techniques are used. The review of submittals increases the possibility of unintended variations to drawings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
 - 1. Product Data for Credit MR 4.1 and MR 4.2: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
 - a. Include statement indicating costs for each product having recycled content.
 - 2. Product Data for Credit EQ 4.1: For adhesives used to laminate gypsum board panels to substrates, including printed statement of VOC content.
 - 3. Product Data for Credit MR 5.1 and 5.2: Identify each regional material along with the location of its harvest, extraction, or manufacture. Include material cost for each item.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, or other causes. Stack sheathing flat on leveled supports off the ground, under cover, and fully protected from weather.

1.6 COORDINATION

- A. Gypsum Sheathing Board:
 - 1. Do not leave exposed to weather for more than 30 days.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

- A. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 1396/C 1396M / ASTM C 79/C 79M, exterior gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum.

Make selections below based on project requirements.

2. Type, Thickness, Size:
 - a. **[Regular, 1/2 inch (12.7 mm), 24 inches in width (610 mm) for horizontal application, tongue and groove edges].**
 - b. **[Regular, 1/2 inch (12.7 mm), 48 inches in width (1219 mm) for vertical application, square edges].**
 - c. **[Type X, 5/8 inch (16 mm), 48 inches in width (1219 mm) for vertical application, square edges].**
 - d. Acceptable Product: Exterior Gypsum Sheathing.

2.2 ACCESSORY MATERIALS

- A. Fasteners: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
 1. For steel framing from 0.033 to 0.112 inch(0.84 to 2.84 mm) thick, attach sheathing with drill screws complying with ASTM C 954.

PART 3 - EXECUTION

3.1 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and manufacturer's written instructions.
- B. Cut boards at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
 1. Install boards with a 3/8-inch (9-mm) setback where non-load-bearing construction abuts structural elements.
 2. Install boards with a 1/4-inch (6.4-mm) setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- C. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.
- D. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.
- E. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.
- F. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of stud flanges, and stagger end joints of adjacent boards not less than one stud spacing. Screw-attach boards at perimeter and within field of board to each steel stud.
 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch(9 mm) from edges and ends of boards.
 - a. Decrease spacing between fasteners where required to comply with design wind loads, and as indicated in shop drawings submitted under Section 05400.
- G. Vertical Installation: Install board vertical edges centered over flanges of steel studs. Abut ends and edges of each board with those of adjacent boards. Screw-attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9 mm) from edges and ends of boards.
 - a. Decrease spacing between fasteners where required to comply with design wind loads, and as indicated in shop drawings submitted under Section 05 40 00.
 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- 3.2 PROTECTION
- A. Paper-Surfaced Gypsum Sheathing: Protect sheathing that will be exposed to weather for more than 30 days by covering exposed exterior surface of sheathing with a securely fastened weather-resistant barrier. Apply covering immediately after sheathing is installed.

END OF SECTION

SECTION 06 20 00 – FINISH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Finish carpentry work.
- B. Millwork items, other than modular laminate casework specified in Division 12.
- C. Shelving other than for modular casework.
- D. Laminate Clad windowsills.

1.02 REFERENCE STANDARDS

- A. Requirements, abbreviations and acronyms for reference standards are defined in Section 01 42 16.
- B. AWI Quality Standards
- C. FS L-P-508 Plastic Sheet, Laminated, Decorative and Non-Decorative
- D. FS MMM-A-130A Adhesive, Contact
- E. PS1 Construction and Industrial Plywood
- F. PS 20 American Softwood Lumber Standard.
- G. NFPA National Forest Products Association National Design Specification for Stress Grade Lumber and Its Fastening.
- H. PS 51 Hardwood and Decorative Plywood
- I. PS 58 Basic Hardwood

1.03 QUALITY ASSURANCE

- A. Millwork to be in accordance with AWI Quality Standards - Section 400, custom grade, except as modified herein.

1.04 SHOP DRAWINGS

- A. Submit shop drawings in accordance with Section 01 33 23.
- B. For millwork: Indicate materials and wood species, thicknesses of materials, component profiles, fastening, jointing details, finishes and accessories to a minimum scale of 3/4 inch to one foot.
- C. For finish carpentry items: Indicate materials, component profiles, fastening methods, joining details, finishes and accessories, to a minimum scale of 1½ inch to one foot.
- D. Submit manufacturer's instructions for use of adhesive and hardware.

1.06 DELIVERY AND STORAGE

- A. Deliver materials in accordance with Section 01 60 00.
- B. Store indoors, in ventilated areas with constant but minimum temperature of 16°C and maximum relative humidity of 25 to 55%.

1.07 GUARANTEE / WARRANTY

- A. Provide a written guarantee in accordance with Section 01 33 00.
- B. Guarantee shall provide for making good or replacing, at no cost to the Owner, millwork and finish carpentry items specified herein which exhibit defects in material and workmanship within a minimum period of 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MILLWORK

- A. Quality of Fabrication: AWI's Custom Grade construction - Section 400
 - 1. Provide plastic laminate clad shelving units where indicated on drawings.
- B. Framing: C and better #2 Southern or Parana Pine, S4S.
- C. Shelving Units: B-D interior DFPA covered with 1/16" thick plastic laminate of type specified. Splash and edges to be covered with same material as top.
 - 1. Provide heavy duty shelving supports.
 - 2. Provide 3mm plastic molded edge banding at all edges for shelving.

2.02 WINDOW SILLS

- A. Provide 3/4" thick plastic laminate clad windowsills.
- B. Provide 3mm plastic molded edge banding at all edges of windowsills.
- C. Fabrications shall comply with AWI's custom grade construction Section 400

2.03 WOOD FOR HANDRAILS

- A. Solid stock select white oak handrail with matching plugs at fasteners where indicated.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with approved shop drawings.
- B. Set and secure materials and components in place rigid, plumb and square.
- C. Verify mechanical, electrical and building items affecting this Section are placed and ready to receive this work.
- D. Prime paint surfaces or items of assemblies in contact with cementuous materials.
- E. Fit exposed edges of plywood and particle board shelving and site-made millwork with 3/8" thick hardwood edging. Width is thickness of plywood or particle board.
- F. Apply plastic laminate finishes where indicated. Adhere with adhesive over entire surface. Make joints and corners hairline. Match pattern. Slightly bevel arises. Cap exposed edges with plastic trim. Apply laminate backing on reverse side of plastic laminate finished surfaces.
- G. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members cope at returns and miter at corners.

3.02 HANDRAIL INSTALLATION

- A. Drill holes for fasteners using forstner-type drill bit.
- B. Cut plugs from surplus handrail. Match grain and color of handrail.
- C. Install plugs flush with top of handrail. Align grain.
- D. Secure handrail to steel wall bracket at 4'0" o.c. max spacing.

3.03 HARDWARE INSTALLATION

- A. Install finish hardware in accordance with manufacturer's instructions. Adjust hardware to ensure smooth and correct operation.
- B. Finish hardware of all types shall be fitted and secured to prevent looseness and rattle but shall not be fitted so tightly as to result in binding.
- C. In fitting hinges, locks, etc. allow for thickness of finishes.
- D. Set all hinges, lock plates, and other similar elements exactly so as to be flush with surrounding surfaces.
- E. Drive pilot holes so as to avoid loosely set screws.

3.04 PREPARATION OF FINISHING

- A. Sand work smooth and set exposed rails and screws. Apply wood filler in exposed nail and screw indentations.

END OF SECTION 06 20 00

SECTION 06 61 19 – QUARTZ SURFACING COUNTERTOP

QUARTZ SURFACING COUNTERTOP

Note: *For Windows 2010, upon completion of section editing, you may turn-off "Specifier Notes as follows:
Click on "File" then "Options" then "Display" and remove check-mark for "Hidden text" in two locations as necessary.*

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Quartz surfacing fabrication.

1.02 RELATED REQUIREMENTS

- A. Section 06 40 00 – Architectural Woodwork: Shop-fabricated custom casework.
- B. Section 12 30 00 – Casework: Manufactured casework.

1.03 REFERENCE STANDARDS

- A. ANSI Z124.6 – Plastic sinks; 2007.
 - 1. Section 5.2: Stain Resistance.
 - 2. Section 5.3: Wear and Cleanability.
 - 3. Section 5.4: Cigarette Test.
 - 4. Section 5.5: Chemical Resistance.
- B. ASTM C 97 – Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone; 2009.
- C. ASTM C 501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser; 2009.
- D. ASTM C 650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances; 2009.
- E. ASTM C 880 – Standard Test Method for Flexural Strength of Dimension Stone; 2009.
- F. ASTM C 1026 - Standard Test Method for Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
- G. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method; 2007, Edition 1.
- H. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010
- I. ASTM E 228 – Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer; 2006.
- J. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2009.
- K. AWI (QCP) – Architectural Woodwork Standards (Quality Certification Program), www.awiqcp.org; current edition at www.awiqcp.org.
- L. AWMAC (GIS) – Architectural Woodwork Manufacturers Association of Canada (Guarantee and Inspection Services Program); current edition at www.awmac.com/gis.php.
- M. AWS (AWI/AWMAC/WI) - Architectural Woodwork Standards (Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute) (www.awinet.org - www.awmac.com - www.woodworkinstitute.com); Edition 1, 2009.
- N. MIA-DSDM – Marble Institute of America, Dimension Stone Design Manual; 2005.
- O. WI (CCP) – Woodwork Institute (Certified Compliance Program); current edition at www.woodworkinstitute.com/certification.
- P. WI (MCP) – Woodwork Institute (Monitored Compliance Program); current edition at www.woodworkinstitute.com/certification.

1.04 SUBMITTALS

- A. Comply with Section 01 30 00 – Administrative Requirements, for administrative and procedural requirements for processing of submittals during the construction phase.

- B. Product Data: Provide data on material characteristics, performance criteria and limitations, installation instructions, and cleaning and maintenance instructions.
- C. Shop Drawings: Provide complete detailed and dimensioned drawings combined with shop drawings of cabinets and casework specified in other sections showing fabrication details, edging, sink installation, coving, seams, fastener types and locations, use and type of sealant, and fabrication details for support brackets.
- D. Samples: Provide samples of colors as indicated on Drawings; submit [4 x 4 inch (102 x 102mm)] or [12 x 12 inch (300 x 300mm)] samples showing each color and finish.
 - 1. When colors are not indicated on Drawings, submit manufacturer's standard color book showing colors of actual material in greater than 1 1/2 inch (36mm) size.
 - 2. Upon selection of colors, submit samples as indicated above.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Certificates: Certify that products meet or exceed specified requirements.
 - 1. Low emitting VOC.
 - 2. Does not support growth of mold, mildew and bacteria on surface.
- G. Sustainable Design Submittals:
 - 1. Submit invoices and documentation from manufacturer of the amounts of pre-consumer and post-consumer recycled content for products specified.
 - 2. Submit invoices and documentation showing manufacturing locations and origins of materials for products manufactured and sourced within 500 miles of project location.
- H. LEED Submittal: Documentation of recycled content and location of manufacture.
 - 1. LEED, MR Credit 4 – Recycled Content: Provide documentation for cost of products having recycled content indicating percentages by weight of postconsumer plus 1/2 of the preconsumer content.
 - 2. LEED, MR Credit 5 – Regional Materials: Provide documentation for cost of materials or products that have been extracted, harvested, or recovered and also manufactured within 500 miles of project site.
 - a. If only a portion of the materials or products is extracted, harvested, or recovered and manufactured locally, then only provide percentage by weight for credit value.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: [Same fabricator as for cabinets that tops are to be installed.] or [Approved by the cabinet manufacturer.]
- B. Quality Certification: Provide [AWI (QCP)] [WI (CCP)] [WI (MCP)] or [AWMAC (GIS)] inspection report and quality certification of completed work.
 - 1. Provide labels or certificates indicating that the work complies with requirements of AWS Grade or Grades specified.
 - 2. This project has been registered as AWI (QCP) project number [_____].
 - 3. Prior to delivery to the site provide shop drawings with certification labels.
 - 4. Provide labels on each product when required by certification program.
 - 5. Upon completion of installation provide certificate certifying that the installation and products meet the specified requirements.
 - 6. Arrange and pay for inspections required for certification.
 - 7. Replace, repair, or rework all work for which certification is refused.
- C. Installer Qualifications: Fabricator.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store materials in clean, dry, interior area in accordance with manufacturer's instructions. Protect materials from damage during handling and installation.

1.07 AMBIENT CONDITIONS

- A. Maintain ambient temperature of 50 to 95 degrees F (10 to 35 degrees C) for 48 hours before, during and for minimum 7 days after installation.

KING ARCHITECTS, INC

SECTION 06 61 19

1.08 WARRANTY

- A. Manufacturer Warranty: Submit manufacturer's standard 10 year warranty.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. OKITE: 12227 FM 529, Suite K, Houston, TX 77041.
1. Phone: (713) 849-3800, Toll Free: (866) 654-8397.
 2. Fax: (713) 849-3835.
 3. Website: www.okite.us.
 4. Email: info@okite.us.

2.02 QUARTZ SURFACING COUNTERTOPS

- A. Quality Standard: See Section [06 40 00] or [12 30 00].
- B. Quality Standard: [Premium Grade] [Custom Grade] or [Economy Grade] in accordance with AWS.
- C. Natural Quartz and Resin Composite Countertops: Non-porous blend of natural quartz, 93 percent, and polyester resin, 7 percent, formed into flat slabs [over continuous substrate] or [self-supporting over structural members].
1. Overall Slab Size: 120 x 55 inches (3m x 1.4m).
 2. Flat Sheet Thickness: [13/16 inch (20mm)] [1/2 inch (13mm) Special Order] or [1 3/16 inch (30mm)].
 3. Slab Weight:
 - a. Slab – 1/2 Inch: 301 lbs (136.5 kg).
 - b. Slab – 13/16 Inch: 463 lbs (210 kg).
 - c. Slab – 1 3/16 Inch: 695 lbs (315 kg).
 4. Edge Detail: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [_____].
 - a. Surface Finish: [Polished (Standard)] or [Honed].
 - b. Color: [_____] [To be selected from manufacturer's standards] or [Custom color to be matched].
- D. Performance Criteria:
1. Flexural Strength: 5,567.6 psi; ASTM C 880.
 2. Coefficient of Linear Thermal Expansion (Cole): 5.9×10^{-6} in/in/degrees F (1.1×10^{-5} in/in/degrees C); ASTM E 228.
 3. Water Absorption and Bulk Density: In accordance with ASTM C 97.
 - a. Water Absorption: 0.005 percent by weight.
 - b. Bulk Density: 39.03 gr/in³ (2.38 gr/cm³)
 4. Abrasion Resistance: ASTM C 501.
 - a. Abrasive Wear: 187.2.
 - b. Weight Loss (1,000 Cycles, 1,000 gr. Load, H-22 wheels): 0.47 gr.
 5. Resistance to Fungal Growth: Rating 0 (No Effect); ASTM G 21.
 6. Static Coefficient of Friction (SCOF): ASTM C1028.
 - a. Dry: 0.63.
 - b. Wet 0.57.
 7. Chemical Resistance: ASTM C 650.
 - a. 10 Percent - Hydrochloric Acid (HCL): No effect.
 - b. 10 Percent – Potassium Hydroxide (KOH): No effect.
 8. Flame Spread Test: 25 or less, Class A; ASTM E 84.
 9. Freeze-Thaw Cycling Resistance: No damages, non-porous, temperature cycle resistant material (15 Cycles); ASTM C1026.
 10. Stain Resistance: 22 - Pass (64 = Passing); ANSI Z 124.6 Section 5.2.
 11. Wear and Cleanability: Pass; ANSI Z 124.6, Section 5.3.
 12. Cigarette Test: Pass; ANSI Z 124.6, Section 5.4.
 13. Chemical Resistance: Pass; ANSI Z 124.6, Section 5.5.

2.03 FABRICATION

- A. Fabricate components to greatest extent practical in sizes and shapes as indicated and in accordance with MIA-DSDM.
1. Inspect Quartz Surfacing prior to fabrication.

- B. Fabricate joints between components using manufacturer's recommended, color matched, joint adhesive, reinforce as required.
 - 1. Maximum Joint Width: 1/8 inch (3.2mm)
- C. Fabricate factory cutouts for plumbing fittings and bath accessories as indicated on the Drawings.
- D. Fabricate and finish routed edges of component with clean, sharp returns.
- E. Fabricate cutouts, radii and contours using template to ensure clean, sharp edges.
- F. Fabricate backsplash height and profile as indicated on the Drawings.
- G. Fabricate countertop components with finish as indicated.
- H. Cutouts for Sinks:
 - 1. Fabricate smooth and uniform without saw marks.
 - 2. Finish top and bottom of sink openings smooth.
 - 3. Provide at least 1/4 inch (6.4mm) radius at corners of sink cutouts.
 - a. Ease top and bottom of straight edge to avoid chipping.
- I. Provide insulation between countertop material and adjacent hot water pans and food warmers.
- J. Provide thermal isolation between hot and cold applications.
- K. Provide venting of cabinets as required.

2.04 FABRICATION TOLERANCE

- A. Panel Thickness Tolerance:
 - 1. Thickness of 3/8 to 1/2 Inch (9.5mm to 12.7mm): Plus or minus 1/32 inch (0.8mm).
 - 2. Thickness of 3/4 to 1 5/8 Inch (19mm to 41.3mm): Plus or minus 1/8 inch (3.2mm).
 - 3. Thickness Greater Than 1 5/8 Inch (41.3mm): Plus or minus 1/4 inch (6.4mm).
- B. Panel Face Dimension: Plus or minus 1/16 inch (1.6mm).
- C. Rectangular Face Variation (Maximum out of Square): Plus or minus 1/16 inch (1.6mm).
- D. Heads and Calibrated Edges: Plus or minus 1/16 inch (1.6mm).

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that field conditions are acceptable and are ready to receive this work.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for installation of this work. **INSTALLATION**
 - A. Install countertop materials in accordance with manufacturer's instructions.
 - B. Install components plumb and level and in accordance with approved shop drawings and installation details.
 - 1. Tops: Within 1/8 inch (3.2mm) of a flat surface over a 10 foot (0.3m) length.
 - a. Install with at least 1/16 inch (1.6mm) to at most 1/8 inch (3.2 mm) clearance between surface perimeter and wall.
 - 2. Sinks:
 - a. Install undermount sinks or bowls to countertops using appropriate adhesive, sealant and mounting hardware.
 - b. Install drop-in sinks or bowls to countertops using appropriate adhesive and color matched silicone sealant.
 - C. Install backsplashes and endsplashes as indicated on the Drawings.
 - 1. Adhere to countertops using appropriate adhesive and color matched silicone sealant.
 - D. Interface with Other Work: Provide proper installation of other materials and work as necessary for a complete and properly functioning system. **CLEANING**
 - A. Remove adhesives, sealants and other stains from surfaces in accordance with manufacturer's instructions.
 - B. Clean countertops prior to date of Substantial Completion.

KING ARCHITECTS, INC

SECTION 06 61 19

3.04 PROTECTION

- A. Protect surfaces from damage during construction until date of Substantial Completion, replace damaged work.

3.05 SCHEDULE

- A. Reception Areas: Type QRA – [____].
1. Location: Room [____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
- B. Nurse's Station: Type QNS – [____].
1. Location: Room [____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
- C. Countertops: Type QCT – [____].
1. Location: Room [____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
 - e. Sink: Model No. [____] as manufactured by [____].
 3. Backsplash and End Splashes: Surfaces adhesively joined, exposed seams.
 - a. Thickness: [13/16 inch] [1 3/16 inch].
 - b. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
- D. Bar Tops: Type QBT – [____].
1. Location: Room [____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
 - e. Sink: Model No. [____] as manufactured by [____].
 3. Backsplash and End Splashes: Surfaces adhesively joined, exposed seams.
 - a. Thickness: [13/16 inch] [1 3/16 inch].
 - b. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
- E. Cafeteria Surfaces:
1. Provide countertop expansion joints at locations and as detailed on the Drawings.
 2. Provide cut-outs to fit templates as furnished by the manufacturer.
 3. Comply with hot applications requirements as indicated under Fabrication article.
 4. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
 - e. Sink: Model No. [____] as manufactured by [____].
 5. Backsplash and End Splashes: Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Thickness: [13/16 inch] [1 3/16 inch].
 - c. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [____].
- F. Vanity Tops / Bathroom Tops: Type QVT – [____].

1. Location: Room [_____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [_____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [_____].
 - e. Sink: Model No. [_____] as manufactured by [_____].
 3. Backsplash and End Splashes: Surfaces adhesively joined, exposed seams.
 - a. Thickness: [13/16 inch] [1 3/16 inch].
 - b. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [_____].
- G. Windowsills: Type QWS – [_____].
1. Location: Room [_____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [_____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [_____].
- H. Interior Steps: Type QST – [_____].
1. Location: Room [_____].
 2. Surfaces adhesively joined, exposed seams.
 - a. Color: [Bianco Assoluto, No. 1665].
 - b. Finish: [_____].
 - c. Thickness: [13/16 inch] [1 3/16 inch] [Built up total thickness 1 1/2 inch].
 - d. Edge Details: [Flat] [Ogee] [Bullnose] [Demi-Bullnose] [Bevel] [Ogee-Bullnose] or [_____].

END OF SECTION 06 61 19

SECTION 07 19 23 – SILOXANE WATER REPELLENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This section covers the preparation, materials, services, and equipment required in conjunction with the application of a clear water repellent on all above grade, vertical, exterior exposed surfaces of masonry, concrete, brick, or stucco.

1.02 RELATED SECTIONS

- A. Section 03 01 30.91 - Concrete Restoration & Cleaning.
- B. Section 03 30 00 - Cast In Place Concrete.
- C. Section 03 40 00 - Precast Concrete.
- D. Section 04 01 20.91 - Masonry Restoration & Cleaning.
- E. Section 04 20 00 – Unit Masonry.
- F. Section 04 40 00 – Stone Assemblies.
- G. Section 07 18 00 - Traffic Coatings.
- H. Section 09 63 00 - Masonry Flooring.
- I. Section 09 91 00 - Painting.
- J. Section 09 93 0 – Stains and Transparent Finishing.
- K. Section 09 96 00 - High Performance Coatings.
- L. Section 09 97 23 –Concrete and Masonry Coatings.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 - Submittals.
- B. Product Specification Data: Submit manufacturer's technical literature, specifications, and application instructions for the specified clear water repellent material.
- C. Samples: Obtain liquid samples of the specified clear water repellent for sample application. Sample application is covered in section

1.04 QUALITY ASSURANCE

- A. Manufacturer: A firm with no less than ten (10) years experience in manufacturing the products specified in this section.
- B. Applicator Qualification: A firm with no less than three (3) years experience in the application of the products specified in this section. In addition, applicator must state the intended use of the proper application equipment and that it has been well maintained.
- C. Mock-Up:

1. Apply water repellent per manufacturer's application instructions as directed by the Architect to substrate material that matches actual job conditions. Determine the acceptability of appearance and optimum coverage rate required for application.
 2. After sample treatment has cured in accordance with manufacturers recommendations, water test to verify that substrate is coated with sufficient water repellent to effectively repel liquid water from the surface.
 3. Obtain Architect and/or Project Owner approval prior to full scale application of water repellents.
- D. Pre-Application Meeting: Convene a pre-application meeting prior to the start of application of the specified material. Attendance by a representative of each of the following organizations is requested; the application firm, the architectural firm, and the water repellent manufacturer. Notify each of the attendees at least three (3) days prior to the meeting time.

1.05 PRODUCT DELIVERY

- A. Material Delivery: Deliver materials to the job site in original sealed containers, clearly marked with manufacturer's name, brand name, and type of material. Verify the product matches that of the original sample applied on the mock-up wall.
- B. Record Keeping: Contractor / applicator shall record product batch number or lot number for warranty purposes.
- C. Storage & Protection: Store materials inside if possible, away from sparks and open flame. Store in a secure area to avoid tampering and contamination. Water based materials must be kept from freezing. Store and handle in accordance with manufactures written instructions.

1.06 PROJECT CONDITIONS

- A. Surface Preparation: Surface must be free of cracks, dirt, oils, paint or other contaminants which may affect the appearance or performance of the water repellent material.
- B. Environmental Requirements:
 1. Air and substrate temperature must be above 45° F (7° C) or below 95° F (35° C) unless otherwise specified by manufacturer.
 2. Do not proceed with application if the substrate is wet or contains frozen water.
 3. Do not apply material when rain is predicted within 48 hours; or earlier that five (5) days after the substrate became wet.
 4. Do not apply materials in high or gusty winds.
- C. Protection:
 1. Special precautions should be taken to avoid vapor transmission (fumes) from entering the building being treated. Ventilation systems and fresh air intakes should be turned off and closed.
 2. Protect shrubs, metal, wood trim, glass, asphalt and other building hardware during application from over-spray.
 3. Do not permit spray mist or liquid to drift onto surrounding properties.

1.07 SCHEDULING

- A. Architect shall be notified not less than 48 hours before each application of water repellent is scheduled.

1.09 PERFORMANCE REQUIREMENTS

- A. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.
 1. Water-Vapor Transmission: Maximum 8 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E-96.
 2. Water Penetration and Leakage through masonry: Minimum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E-514.

3. Durability Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G-53.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Chemprobe Coating Systems, L.P.
Masonry Division of Tnemec Company, Inc.
2805 Industrial Lane
Garland, TX 75041
PH: 800/760-6776
PH: 972/271-5551
FX: 972/271-5553
- B. Or approved equal.

2.02 WATER REPELLENT

- A. GENERAL: All products shall be carried in solvent and contain siloxane and hydrophobic fumed silica (defused quartz carbide). No fillers, sterates, or paraffins. Products shall be a minimum of seven (7) percent solids.
 1. PRIME A PELL 200: Solvent based 7% solids siloxane coupled with diffused quartz carbide.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify the following:
 1. The required joint sealants have been installed.
 2. New masonry and mortar have cured a minimum of twenty-eight (28) days.
 3. Surface to be treated is clean, dry and contains no frozen water.
 4. Environmental conditions are appropriate for application.

3.02 PREPARATION

- A. Protection:
 1. Special precautions should be taken to avoid vapor transmission (fumes) from entering the building being treated. Ventilation systems and fresh air intakes should be turned off and closed.
 2. Protect shrubs, metal, wood trim, glass, asphalt and other building hardware during application from over-spray.
 3. Do not permit spray mist or liquid to drift onto surrounding properties or parking lots.
- B. Other:
 1. Verify lawn sprinklers are turned off, where applicable, so as to avoid water contact prior to cure times required by the manufacturer.

3.03 APPLICATION

- A. Apply specified water repellent at a rate in accordance with manufacturer's written application instructions.
- B. Material must be applied using solvent resistant, low-pressure application equipment designed for water repellent application.
- C. Apply material as shipped by the manufacturer. Do not dilute or thin.
- D. Apply a saturating application of the product working from the bottom up. On porous substrates such as concrete masonry units, allow a slight rundown (less than three inches). On high density materials such as pre-cast concrete

panels or GFRC, do not allow any run-down. On all substrates allow the product to penetrate the substrate for approximately 5 - 7 minutes, then apply again in the same manner. This second pass will require less material.

3.04 FIELD QUALITY CONTROL

- A. The architect shall be contacted 48 hours prior to application so as to provide supervision as required. The architect or the architect's representative shall inspect the progress as the work proceeds. Do not apply any water repellent that is not specified by the architect.
- B. After water repellent has cured for six (6) days at low humidity and temperature between 70°-90° F or eight (8) days at high humidity and low temperature between 50°-69° F, all surfaces shall be tested with a light water spray. Recoat any area that indicates water absorption after the water test has completely dried.

3.05 CLEANING

- A. Remove protective coverings from adjacent surfaces and other protected areas.
- B. Immediately clean water repellent coating from adjoining surfaces and surfaces soiled by water-repellent application as work progresses.
- C. At completion, remove from the job site, all excess material, debris, and waste resulting from this work. Dispose of water repellent containers according to state and local environmental regulations.

END OF SECTION 07 19 23

KING ARCHITECTS, INC

SECTION 07 21 00

SECTION 07 21 00 – THERMAL INSULATION

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Interior liner system fabric of the color specified, support strapping of the appropriate color, fasteners of the appropriate type and color, sealants, thermal break materials and thermal insulation of the appropriate type to insulate the roof and wall areas to the full designed R-value of the building as specified.
- B. The installed liner system shall also provide the following OSHA required compliances to save and protect contractors, workers, inspectors, owners and other individuals (29 CFR-1926.751 "Controlling Contractors") from injury, penalty and liability, without added cost:
 - 1. "Through fall protection" (29 CFR-1926.501, 1926.760)
 - 2. "Protection from falling objects" (29 CFR-1926.759)
 - 3. "Protection from falls through roof openings" (29 CFR-1926.759)
 - 4. "Product-related project safety training" (29 CFR-1926.761)
 - 5. "Product-related project specific safety plan" (29 CFR-1926.752)

1.02 QUALITY ASSURANCE

- A. Provide the materials in original manufacturer's packages together with detailed instructions and project drawings of the installation.
- B. Materials shall be inspected for damage, proper sizes and quantities upon delivery and stored in a dry, secure manner.
- C. Post the detailed training instructions, project specific safety drawings, and plans for OSHA compliance using the product.
- D. Installation shall proceed with care to assure proper sealing of the liner system fabric.
- E. Insulation shall be placed on (roof) or behind (walls) the liner system fabric in the full-specified thickness without voids and with minimal compression of top layer (if applicable in roofs). Notify Thermal Design (800.255.0776) immediately of any damages, improper sizes, or shortages.
- F. Purlins, girts and insulation must be completely isolated from the inside conditioned air with an effective vapor retarder.
- G. Taping or stapling of vapor retarder lap joints is not acceptable.
- H. Sealing field joints with a permanent vapor retarder lap sealant is required.
- I. Field seams, if any, shall be made on a structural member and mechanically attached with a steel strap and fasteners along its full length.
- J. All exposed parts of the liner system shall be Class A material and have flame spread of 25 or less based on ASTM E84 standards.
- K. Vapor retarder fabric shall be white or colored woven coated fabric and triple extrusion-welded seams fabricated in one piece, to fit not less than the full bay length by the width of the building.
- L. Buildings more than 100' wide may have field seams on the bottom of a purlin but no less than 50' apart.
- M. Any field seams must be sealed with vapor retarder lap sealant.

KING ARCHITECTS, INC

SECTION 07 21 00

- N. Wall bay minimum fabric size shall be not less than one entire wall bay or end wall column space from the ceiling to the floor.
- O. Perimeter edges of the vapor retarder fabric shall be trimmed and sealed to the adjoining steel or fabric with vapor retarder lap sealant.
- P. All edges of liner system fabric, including field seams, shall be mechanically fastened with steel retaining straps the full perimeter.
- Q. In the event that the crew is not experienced in the installation procedures, videotaped or on-site installation training shall be requested by the installing contractor from Thermal Design to assure proper installation procedures.

1.03 SUBSTITUTIONS

- A. Substitutions must comply with specification Section 01 25 13 and be in compliance with Simple Saver System standards as set forth in this specification.
- B. Substitutions of systems that do not have a continuous vapor retarder on the inside plane of the purlins or girts will not be allowed.
- C. Substitutions of systems that do not have OSHA compliant through fall protection will not be allowed.

1.04 SUBMITTALS

- A. Submit product data in accordance with Section 01 33 00.
- B. Include manufacturer's product brochures; component specifications, samples of the painted support strapping, and samples of the Syseal® reinforced polyethylene vapor retarder fabric, including a sample of the triple extrusion welded seam; specific detailed drawings from Thermal Design for the project showing purlin spacings, support strap locations and spacings, fastening points, liner system fabric sizes and locations; insulation widths and thicknesses, sizes and locations and detailed installation instructions for quality assurance and OSHA compliance.

1.05 SAFETY COMPLIANCE CLAUSE

- A. Detailed installation instructions are provided to assure proper installation and function for OSHA safety compliance as an alternative form of through fall protection in metal building structures.
 - 1. Fall protection certificate available free of charge.

PART 2 – PRODUCTS

2.01 ROOF LINER SYSTEM

- A. Acceptable systems shall be the Simple Saver insulation system (with OSHA compliant through fall protection) manufactured by Thermal Design with an installed total roof insulation R-value of **25** and an average installed thickness of **8-inches**.
- B. Roof system shall be a (select one): single- or multi- layer system.
- C. A thermal break shall be applied where there is no existing thermal break between metal panel and metal structure.
 - 1. The thermal break shall be (select one): 3/16" x 3" Quik-Stop Trash Free™ foam tape, 3/8" Snap-R® thermal block, or 1" Snap-R® thermal block.

PART 3 – EXECUTION

3.01 SIMPLE SAVER ROOF SYSTEM

- A. Cut to length and install painted steel straps in the pattern and spacings as shown on the project shop drawings.
- B. The straps are installed in tension and span immediately below the bottom plane of the purlins.
- C. Position the pre-folded vapor retarder liner system fabric on the strap platform along one eave purlin.
- D. Clamp the two bottom corners squarely at the eave and centered on the bay.
- E. Pull the other end of the pleat-folded fabric across the building width on the strap platform but below the purlins, pausing only at the ridge to fasten the straps and fabric into position where the plane of the roof changes.
- F. Once positioned, the remaining fasteners are installed from the bottom side at each purlin/strap intersection and the edges are sealed and trimmed along the rafters.
- G. A similar method can be used starting at the ridge purlin space and pulling the fabric to each eave.
- H. Insulation is unpacked and placed on the vapor retarder liner system.
- I. Shake insulation to the specified thickness and install parallel, between purlins.
- J. In multi-layer systems, the upper most layer of insulation is placed over and perpendicular to the purlins as the roof sheeting is applied.
- K. It is important that the insulation cavity be filled, or the cavities be ventilated to minimize the probability of condensation (ventilated and/or dehumidified roof systems are possible with the Simple Saver System). Call Thermal Design 800.255.0776 for details.

3.02 SIMPLE SAVER WALL SYSTEM

- A. Sheet the building with just the thermal break (if specified) applied to the exterior of the girts.
- B. Insulation is cut to the required lengths to fit vertically between the girts and installed in the girt spaces and impaled on Fast-R insulation hangers.
- C. Fluff the insulation to the specified thickness, making sure there are no gaps or voids Insulate the complete wall section.
- D. Apply the wall vapor retarder fabric by clamping it into position over the eave strap.
- E. Once in position, the fasteners are installed through the wall straps, eave strap and into each roof strap, permanently clamping the wall fabric between them.
- F. Seal the wall fabric and to the roof fabric and to the base angle, or base cee channel as well as the column flanges.
- G. Additional straps are installed along the base angle and each column to retain the system permanently in place.
- H. Detailed installation instructions are to be sent along with the project drawings specific for the project and included with the materials in each shipment.
- I. Pertinent information is included on the drawings for each project.
- J. Review all information and instructions prior to commencement.
- K. If any questions arise, contact the manufacturer prior to installation. On-site installation training is available for actual expense. The manufacturer's toll-free hotline is 800.255.0776.

Note: The Simple Saver System with OSHA compliant through fall protection can be applied to pre-engineered metal buildings and installation execution varies slightly. Installations and specifications for existing buildings vary. Call or write for specific

details. A design manual is also available upon request. Shrink-wrap license terms are included on design manuals, installation instructions, and video training. For more information about the ten-year limited material warranty, see thermaldesign.com.

END OF SECTION 07 21 00

SECTIONS 07 21 00 – THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Batt and Roll Insulation.
- B. Blanket Insulation.
- C. Vapor Retarder.

1.02 RELATED SECTIONS

- A. Section 07 10 00 - Damp proofing and Waterproofing: Insulation installed with waterproofing systems.
- B. Section 07 26 00 - Vapor Retarders: Vapor retarder materials to adjacent insulation.
- C. Section 07 27 00 - Air Barriers: Air seal materials to adjacent insulation.
- D. Section 07 24 00 - Exterior Wall Assemblies: Exterior Insulated Finish Systems EIFS.
- E. Section 07 80 00 - Fire and Smoke Protection: Insulation installed in conjunction with firestopping or smoke containment systems.
- F. Section 09 20 00 - Plaster and Gypsum Board: Insulation installed in conjunction with interior wall and ceiling finish systems.
- G. Section 23 31 00 - Ducts: Insulation to surround HVAC ductwork.

1.03 REFERENCES

- A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- B. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM C 553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- D. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- E. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- F. ASTM C 764 - Standard. Specification for Mineral Fiber. Loose-Fill Thermal Insulation.
- G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- H. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- I. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- J. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.
- K. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- L. Federal Specification HH-I-521F: Insulation Blankets, Thermal (Mineral Fiber, For Ambient Temperatures).
- M. Federal Specification HH-I-558B: Insulation, Blocks, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe

fitting Covering, Thermal (Mineral Fiber, Industrial Type)

- N. National Fire Protection Association (NFPA) Life Safety Code
- O. Underwriters Laboratories (UL) - UL 2079 Standard test method for fire resistance of Building Joint Systems.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum of ten years experience manufacturing products in this section shall provide all products listed.
- B. Installer Qualifications: Products listed in this section shall be installed by a single organization with at least five years' experience successfully installing insulation on projects of similar type and scope as specified in this section.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Storage: Store materials in dry locations with adequate ventilation, free from water, and in such a manner to permit easy access for inspection and handling.
- C. Handling: Handle materials to avoid damage.

1.07 SEQUENCING

- A. Coordinate with the installation of vapor retarders and air seal materials specified in Section 07260 and Section 07270.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: CertainTeed Corp., Insulation Group, which is located at: 20 Moores Road, Malvern, PA 19355; Toll Free Tel: 800-233-8990; Email: [request info](mailto:requestinfo@certainteed.com); Web: certainteed.com/CertainTeed/Pro/Design+Professional/Insulation
- B. Substitutions: Submit in accordance with Section 01 33 00 Substitution Procedures.

2.02 APPLICATIONS

- A. Exterior Stud Walls: Batt type.
 - 1. Thickness: As indicated on the Drawings.
 - 2. Thickness: 5 1/4".
 - 3. R-Value: 19.
 - 4. Vapor Retarder: Separate.
- B. Interior Partitions Indicated with STC Rating: Batt type.
 - 1. Thickness: As indicated on the Drawings.
 - 2. Thickness: 3 1/2".

2.03 BATT AND ROLL INSULATION (SECTION 07 21 00)

- A. Thermal Batt Insulation: CertainTeed Fiber Glass Building Insulation and High Density Fiber Glass Building Insulation. Fiber glass building insulation for walls, ceilings, attics and floors. Complies with ASTM C 665; preformed glass fiber batt insulation:
 - 1. Facing: ASTM C 665 Type I Unfaced.
 - a. Fire Hazard Classification: ASTM E 84:
 - 1) Maximum Flame Spread Index; 25.
 - 2) Maximum Smoke Developed Index; 50.
 - b. Noncombustibility: ASTM E 136, passes.
 - c. Thermal Resistance: R of 11 (RSI 1.9).
 - 1) Thickness: 3-1/2 inches (89 mm).
 - 2) Width: 11-1/4 inches (286 mm).
 - 3) Width: 15 inches (381 mm).
 - 4) Width: 15-1/4 inches (387 mm).
 - 5) Width: 19-1/4 inches (489 mm).
 - 6) Width: 23 inches (584 mm).
 - 7) Width: 23-1/4 inches (591 mm).
 - 8) Width: 48 inches (1219 mm).
 - 9) Width: 84 inches (2134 mm).
 - d. Thermal Resistance: R of 19 (RSI 3.3).
 - 1) Thickness: 6-1/4 inches (159 mm).
 - 2) Width: 11-1/4 inches (286 mm).
 - 3) Width: 15 inches (381 mm).
 - 4) Width: 15-1/4 inches (387 mm).
 - 5) Width: 16 inches (406 mm).
 - 6) Width: 19-1/4 inches (489 mm).
 - 7) Width: 23 inches (584 mm).
 - 8) Width: 23-1/4 inches (591 mm).
 - 9) Width: 24 inches (610 mm).
 - 10) Width: 30 inches (762 mm).
 - 11) Width: 48 inches (1219 mm).
 - 12) Width: 60 inches (555 mm).
 - 13) Width: 72 inches (1829 mm).
 - e.
- B. Acoustical/Thermal Insulation, Unfaced: CertainTeed Sound Attenuation Noise Reducer Batts. Fiber glass building insulation for friction fit between steel studs. Complies with ASTM C 665; preformed glass fiber batt insulation. Fire Hazard Classification ASTM E84, Maximum Flame Spread Index of 25, Maximum Smoke Developed Index of 50, Noncombustible ASTM E 136, passes:
 - 1. Facing: ASTM C 665, Type 1, Unfaced.
 - a. Thermal Resistance: R of 8 (RSI 1.4).
 - 1) Thickness: 2-12 inches (64 mm).
 - 2) Width: 16 inches (406 mm).
 - b. Thermal Resistance: R of 8 (RSI 1.4).

- 1) Thickness: 2-12 inches (64 mm).
 - 2) Width: 24 inches (610 mm).
 - c. Thermal Resistance: R of 11 (RSI 1.9).
 - 1) Thickness: 3-12 inches (89 mm).
 - 2) Width: 16 inches (406 mm).
 - d. Thermal Resistance: R of 11 (RSI 1.9).
 - 1) Thickness: 3-12 inches (89 mm).
 - 2) Width: 24 inches (610 mm).
- C. Acoustical/Thermal Insulation: Certainteed Acoustical Ceiling NoiseReducer Batts. Fiber glass acoustical insulation for ceilings. Complies with ASTM C 665; preformed glass fiber batt insulation:
 1. Facing: ASTM C 665, Type 1, Unfaced.
 - a. Fire Hazard Classification: ASTM E 84:
 - 1) Maximum Flame Spread Index; 25.
 - 2) Maximum Smoke Developed Index; 50.
 - b. Noncombustibility: ASTM E 136, passes.
 - c. Thermal Resistance: R of 11 (RSI 1.9).
 - 1) Thickness: 3-12 inches (89 mm).
 - 2) Width: 24 inches (610 mm).
 - d. Thermal Resistance: R of 19 (RSI 3.3).
 - 1) Thickness: 6-14 inches (159 mm).
 - 2) Width: 24 inches (610 mm).
- D. Acoustical/Thermal Batt Insulation, Certainteed CertaPro Batts. Complies with ASTM C 665; preformed glass fiber batt insulation.
 1. Unfaced: ASTM C 665, Type 1,.
 - a. Fire Hazard Classification: ASTM E 84:
 - 1) Maximum Flame Spread Index; 5.
 - 2) Maximum Smoke Developed Index; 5.
 - b. Noncombustibility: ASTM E 136, passes.
 - c. Sizes:
 - 1) Thermal Resistance: R of 8 (RSI 1.41).
 - a) Thickness: 2-12 inches (64 mm).
 - b) Width: 16 inches (406 mm).
 - c) Width: 24 inches (610 mm).
 - 2) Thermal Resistance: R of 11 (RSI 1.94).
 - a) Thickness: 3-12 inches (89 mm).
 - b) Width: 16 inches (406 mm).
 - c) Width: 24 inches (610 mm).
 - 3) Thermal Resistance: R of 19 (RSI 3.35).
 - a) Thickness: 6-1/4 inches (159 mm).
 - b) Width: 16 inches (406 mm).
 - c) Width: 24 inches (610 mm).
 - 4) Thermal Resistance: R of 30 (RSI 5.28).
 - a) Thickness: 10 inches (254 mm).
 - b) Width: 24 inches (610 mm).
- E. Acoustical/Thermal Unfaced Batt Insulation, Certainteed CertaPro Partition Batts. Complies with ASTM C 665; preformed glass fiber batt insulation.
 1. Unfaced: ASTM C 665, Type 1,.
 - a. Fire Hazard Classification: ASTM E 84:
 - 1) Maximum Flame Spread Index; 5.
 - 2) Maximum Smoke Developed Index; 5.
 - b. Noncombustibility: ASTM E 136, passes.
 - c. Size:
 - 1) Thermal Resistance: R of 5.8 (RSI 1.02).
 - a) Thickness: 1-1/2 inches (38 mm).
 - b) Width: 24 inches (610 mm).

2.04 BLANKET INSULATION

- A. Metal Building Insulation, Certainteed Metal Building Insulation. Complies with ASTM C 553, Type I and ASTM 665, Type I Plain. Composed of inorganic glass fibers bonded with a thermoset resin.
1. Fire Hazard Classification: ASTM E 84:
 - a. Maximum Flame Spread Index; 25.
 - b. Maximum Smoke Developed Index; 50.
 2. Size:
 - a. Thickness: 3-3/4 inches (94 mm).
 - 1) Thermal Resistance: R of 11 (RSI 1.9).
 - b. Width:
 - 1) 36 inches (914 mm).
 - 2) 48 inches (1219 mm).
 - 3) 60 inches (1524 mm.).
 - 4) 72 inches (1829 mm.).

2.05 VAPOR RETARDER; SECTION 07 26 00

- A. Sheet Retarder: Certainteed MemBrain, The SMART Vapor Retarder. Polyimide film vapor retarder for use with unfaced, vapor permeable glass fiber and mineral wool insulation in wall and ceiling cavities. Material has a permeance of 1 perm or less when tested to ASTM E 86, dry cup method and increases to greater than 10 perms using the wet cup method.
1. Water Vapor Permeance:
 - a. ASTM E 86, dry cup method: 1.0 perms (57ng/Pa*s*m2).
 - b. ASTM E 86, wet cup method: 10.0 perms (1144ng/Pa*s*m2).
 2. Fire Hazard Classification: ASTM E 84:
 - a. Maximum Flame Spread Index; 20.
 - b. Maximum Smoke Developed Index; 55.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction has been completed to the point where the insulation may correctly be installed.
- C. Verify that mechanical and electrical services in ceilings, walls and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in exterior spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

E. Install insulation with vapor barrier installed facing the warm side. Seal or tape joints as required.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07 21 00

KING ARCHITECTS, INC

SECTION 07 25 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Commercial weather barrier assemblies.
 - 2. Flexible flashing.
 - 3. Weather barrier flashing.
 - 4. Fluid-applied flashing.
 - 5. Weather barrier accessories.
 - 6. Drainage material.
- B. Related Requirements:
 - 1. Section 072100 "Thermal Insulation" for installation of exterior insulation.
 - 2. Section 072413 "Polymer-Based Exterior Insulation and Finish System (EIFS)" for installation of exterior insulation and finish system.
 - 3. Section 072419 "Water-Drainage Exterior Insulation and Finish System (EIFS)" for installation of exterior insulation and finish system.
 - 4. Section 074646 "Fiber-Cement Siding" for installation of fiber-cement board siding.

1.3 DEFINITIONS

- A. Weather Barrier: A combination of materials and accessories that do the following:
 - 1. Prevent the accumulation of water as a water-resistive barrier.
 - 2. Minimize the air leakage into or out of the building envelope as a continuous air barrier.
 - 3. Provide sufficient water vapor transmission to enable drying as a vapor-permeable membrane.
- B. Water-Resistive Barrier: A combination of materials and accessories that prevent the accumulation of water within the wall assembly per International Building Code Section 1403.2.
- C. Continuous Air Barrier: The combination of interconnected materials, assemblies, and sealed joints and components of the building envelope that minimize air leakage into or out of the building envelope per ASHRAE 90.1 section 5.4.3.1.
- D. Vapor Diffusion: A slow movement of individual water vapor molecules from regions of higher to lower water vapor concentration (higher to lower vapor pressure).
- E. Vapor Permeable Membrane: The property of having a water-vapor permeance rating of 10 perms (575 ng/Pa x s x sq. m) or greater, when tested in accordance with the desiccant method using Procedure A of ASTM E96 per definition in International Building Code. Vapor permeable material permits the passage of moisture vapor through vapor diffusion.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For weather barrier, include data on air and water-vapor permeance based on testing in accordance with referenced standards.
- B. Sustainable Design Submittals:
 - 1. Test Reports: Envelope testing and verification of the following:
 - a. Water-Spray Test.
 - b. Air Infiltration Test.
 - c. Water Penetration Test.
 - 2. Product Data: Including the following information:

- a. Provide Environmental Product Declarations (EPDs)
- b. Provide SDS (formerly MSDS), third-party certifications, or product technical data confirming that systems meet or exceed emissions guidelines for volatile organic compounds (VOCs) and hazardous air pollutants (HAPs), as follows:
 - 1) Commercial weather barrier complies with California Department of Public Health (CDPH) Standard.
 - 2) Adhesives and sealants wet-applied on-site are to meet/exceed VOC content requirements for wet-applied products and comply with SCAQMD Rule 1168.
 - 3) Flashing systems comply with SCAQMD Rule 1168 on VOC limits.

C. Shop Drawings: Show details of weather barrier at terminations, openings, and penetrations. Show details of flexible flashing applications.

D. Preconstruction Laboratory Mockup Testing Submittals:

- 1. Owner will engage in a third-party testing program: Develop[ed] specifically for Project.
- 2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
- 3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For weather barrier, from ICC-ES.
- B. Manufacturer's Instructions: For installation of each product specified.
- C. Qualification Data: For Installer field testing agency.
- D. Sample Warranty: For manufacturer's warranty.
- E. Reports: Field test and inspection reports.
- F. Installer's weather barrier manufacturer-training certificate.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is certified by weather barrier system manufacturer to install manufacturer's product.
- B. Laboratory Mockup Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement in compliance with ISO/IEC 17025.
- C. Manufacturer's Field Service: Register Project with weather barrier manufacturer prior to installation of weather barrier and comply with weather barrier manufacturer's Project registration and observation process.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store near heat source or open flame.

1.8 WARRANTY

- A. Manufacturer's Product Warranty: To repair or replace weather barrier product that fails in materials within specified warranty period.
 - 1. Warranty Period: 10 years from date of purchase.
- B. Manufacturer's Product and Labor Warranty: Manufacturer agrees to repair or replace weather barrier that fails in materials within specified warranty period, including removal and replacement of affected construction up to manufacturer's limits.
 - 1. Warranty Period: 10 years from date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain weather barrier assembly components, including weather barrier flashing and foam insulation from same manufacturer as weather barrier.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed weather barrier and accessories shall withstand specified wind pressures, liquid water penetration, and water vapor pressures without failure due to defective manufacture of products.
- B. High-Performance Installations:
 - 1. For installation with one of the following building envelope performance or structural characteristics:
 - a. Exceeding 65 mph (100 km/h) equivalent structural load.
 - b. Exceeding 15 mph (24 km/h) equivalent wind-driven rainwater infiltration.
 - c. Buildings with 60 ft. (18 m) or more total height above grade plane, as defined in the International Building Code.
 - d. Construction with gypsum or cement-based exterior sheathing.
 - e. Non-wood based primary structure such as steel, light gage steel, masonry, or concrete.

2.3 WEATHER BARRIER

- A. Commercial Building Wrap: ASTM E2357 passed, ABAA (Air Barrier Association of America) evaluated air barrier assembly, and assembly water resistance per ASTM E331; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized for nine-month exposure; and acceptable to authorities having jurisdiction.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; **Tyvek CommercialWrap D** or comparable product by one of the following:
 - a. Or approved equal.
 - 2. System Description, Single-Layer Weather Barrier: Single-layer weather barrier, including flashing and sealing of penetrations and seams.
 - 3. System Description, Single-Layer Drainable: Single-layer weather barrier with integral drainage, including flashing and sealing of penetrations and seams.
 - 4. System Description, Double-Layer Drainable: Double-layer weather barrier, including flashing and sealing of penetrations and seams, arranged as follows:
 - a. Primary Layer: Commercial building wrap with integral drainage installed closest to building interior.
 - 5. Drainability: 98 percent or greater when tested in accordance with ASTM E2273.
 - 6. Air Permeance, Product: Not more than 0.004 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.02 L/s x sq. m at 75 Pa) when tested in accordance with ASTM E2178.
 - 7. Air Permeance, Assembly: Not more than 0.04 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.2 L/s x sq. m at 75 PA) when tested in accordance with ASTM E 2357 and evaluated by ABAA.
 - 8. Water Penetration Resistance, Product: Hydrostatic head resistance greater than 7.7 ft. (2.35 m) in accordance with AATTC 127.
 - 9. Water Penetration Resistance, Assembly: Assembly wall specimen described in ASTM E2357 to water resistance in accordance with ASTM E331 to [2.86 lbf/sq. ft. (137 Pa)] [6.24 lbf/sq. ft. (300 Pa)] [10.4 lbf/sq. ft. (500 Pa)] [12.5 lbf/sq. ft. (575 Pa)] [15 lbf/sq. ft. (718 Pa)].
 - 10. Water-Vapor Permeance: Not less than 23 perms (1300 ng/Pa x s x sq. m) per ASTM E96/E96M, Desiccant Method (Procedure A) or not less than 28 perms (1600 ng/Pa x s x sq. m) per ASTM E96/E96M, Water Method (Procedure B).
 - 11. Water-Vapor Permeance: Not less than 30 perms (1700 ng/Pa x s x sq. m) per ASTM E96/E96M, Desiccant Method (Procedure A) or not less than 46 perms (2600 ng/Pa x s x sq. m) per ASTM E96/E96M, Water Method (Procedure B).
 - 12. Allowable UV Exposure Time: Not less than nine months when tested in accordance with ASTM G155 (Accelerated Weathering).
 - 13. Flame Propagation Test: Materials and construction shall be as tested in accordance with NFPA 285.
 - 14. Heat and Visible Smoke Release Rates: Maximum rates in accordance with NFPA 285.
 - a. Peak Heat Release: 13,217 Btu/sq. ft. (150 kW/sq. m).
 - b. Total Heat Release: 1762 Btu/sq. ft. (20 MJ/sq. m)
 - c. Effective Heat of Combustion: 7744 Btu/lb (18 MJ/kg)
 - 15. Weather barrier system to have a VOC content of 30 g/L or less.

2.4 WEATHER BARRIER ACCESSORIES

- A. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by weather barrier manufacturer for sealing joints and penetrations in commercial building wrap.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek Tape or comparable product.
- B. Closed-Cell Polyurethane Foam Insulation: Low-pressure, low-expansion, single-component polyurethane foam, with maximum flame-spread and smoke-developed indexes of 15 and 25, respectively, per ASTM E84.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; GS Pro or comparable product.
- C. Fasteners with Self-Gasketing Washers: Commercial building wrap manufacturer's recommended pneumatically or hand-applied fasteners with **1-inch- (25-mm-)** diameter, high-density polyethylene cap washers with UV inhibitors.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek Wrap Caps or comparable product.
- D. Primer for Flashings: Synthetic rubber-based product; spray applied. Strengthen adhesive bond at low temperature applications between weather products such as self-adhered flashing products, commercial building wraps, and common building sheathing materials.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; DuPont Adhesive Primer or comparable product.
 - 2. Peel Adhesion Test: Passes in accordance with ASTM D3330, Test Method F, for the following.
 - a. Peel Angles: 0, 25, 72, and 180 degrees.
 - b. Substrates: Concrete masonry units (CMUs), exterior gypsum sheathing, oriented strand board (OSB), aluminum, and vinyl.
 - 3. Chemical Compatibility: Pass; AAMA 713.
 - 4. Flame Spread Index: 5; ASTM E84.
 - 5. Smoke Development Index: 0; ASTM E84.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements.
- B. Verify that substrate and surface conditions are in accordance with commercial weather barrier manufacturer recommendations prior to installation.
 - 1. Verify that rough sill framing for doors and windows is sloped downwards towards the exterior and is level across width of the opening.
- C. Verify that surfaces to receive weather barrier flashing are clean, dry, and free of frost.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Direct water onto an acceptable weather barrier drainage plane with an unobstructed path to exterior of wall.
 - 1. Provide a drainage path for water intrusion through window and door attachment system that collects at window and door sills and directs water to the exterior or weather barrier.

3.3 COMMERCIAL BUILDING WRAP INSTALLATION

- A. General: Comply with weather barrier manufacturer's written installation guidelines and warranty requirements.
- B. Cover exposed exterior surface of sheathing with weather barrier securely fastened to framing immediately after sheathing is installed.
 - 1. Maintain continuity of air and water barrier assemblies.

2. Start weather barrier installation at a building corner, leaving 12 inches (300 mm) of weather barrier extended beyond corner to overlap.
3. Install weather barrier horizontally starting at lower portion of wall surface.
4. Provide minimum 6 inches (150 mm) overlap at horizontal- and vertical-wrap seams in a shingle manner to maintain continuous downward drainage plane and air and water barrier.

C. Seams: Seal seams with building wrap tape per manufacturer's recommended installation instructions.

1. Shiplap horizontal seams in weather barrier to facilitate proper drainage.

D. Fasteners: Use weather barrier manufacturer's recommended fasteners to secure weather barrier and install fasteners according to weather barrier manufacturer's installation guidelines.

1. Do not use temporary fasteners to permanently attach weather barrier.
2. Do not place fasteners with gasketing washers where weather barrier flashing will be installed.
3. Install fasteners with gasketing washers through flashing where recommended by manufacturer.

E. Openings: Completely cover openings with weather barrier, then cut weather barrier membrane to openings in accordance with weather barrier manufacturer's installation guidelines.

1. Provide head and jamb flaps and seam overlaps to maintain continuous drainage.
2. Repair damage to weather barrier using method recommended by weather barrier manufacturer.
3. Install flashing in accordance with weather barrier manufacturer's installation guidelines.

3.4 DRAINAGE MATERIAL INSTALLATION

A. Install drainage material with grooves or channels running vertically in compliance with manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to train installers and observe subject test-wall areas and installations.

B. Testing Agency: Owner will engage a qualified third-party testing agency to perform tests and inspections.

C. Test Area: Perform tests on one bay at least 30 ft. (9.15 m), by one story.

D. Field Quality Control Testing: Perform the following test on representative areas of structural-sealant-glazed curtain walls:

1. Air Infiltration Whole Building: ASTM E779 at not more than 0.40 cfm/sf (2.00 L/s per sq. m).
2. Water Penetration: ASTM E1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa). No water penetration shall occur as defined in ASTM E1105.
 - a. Perform a minimum of two tests in areas as directed by Architect.
 - b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 30, and 70 percent completion.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Immediately remove release paper and scrap from work area and dispose of material in accordance with requirements of Section 017300 "Execution" and Section 017419 "Construction Waste Management and Disposal."

3.7 PROTECTION

A. Protect installed weather barrier from the following:

1. Damage from cladding, structure, or a component of the structure (for example, window, door, or wall system).
2. Contamination from building site chemicals, premature deterioration of building materials, or nonstandard use or application of products.
3. Foreign objects or agents, including the use of materials incompatible with weather barrier products.
4. UV exposure in excess of products' stated limits.

END OF SECTION 07 25 00

SECTION 07 41 13.13 – STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work described in this section includes preformed metal roofing system complete with insulation, temporary moisture protection, clips, perimeter and penetration flashing, and closures.

1.02 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 22 00 - Roof and Deck Insulation
- C. Section 07 52 00 - Modified Bitumen Roof Membrane
- D. Section 07 01 50.19 - Preparation for Re-Roofing
- E. Section 07 60 00 - Flashing and Sheet Metal

1.03 SUBMITTALS:

- A. Shop drawings: Show roofing system with flashings and accessories in plan and elevation; sections and details. Include metal thickness' and finishes, panel lengths, joining details, anchorage details, flashings and special fabrication provisions for termination and penetrations; purlin and girt locations, thermal expansion provisions and special supports. Indicate relationships with adjacent and interfacing work. Shop drawings must be completed by the metal panel manufacturer's engineering department. Any and/or all changes recommended by the successful bidder must be approved by the manufacturer in writing prior to submittal.
- B. Product Data: Include manufacturer's detailed material and system description, sealant and closure installation instructions, engineering performance data and finish specifications.
- C. Design test reports:
 - 1. Indicate fastener types and spacings; and provide fastener pullout values.
 - 2. Submit copy of manufacturer's minimum design load calculations according to ASCE 7-98.
 - 3. Submit copy of certification from manufacturer stating that specified system has been tested in accordance with ASTM-1592 requirements by an independent Engineering Firm. All test results must be submitted including Air (ASTM E 283 & E1680) and Water (ASTM E 331 & E 1646) Infiltration Tests. These test results must meet or exceed those listed in Section 1.8 (Design and Performance Criteria) and be stamped by an independent Engineering Firm.

1.04 INSTALLER QUALIFICATIONS:

- A. Engage an experienced metal roofing contractor (erector) to install standing seam system who has a minimum of five (5) years' experience specializing in the installation of structural standing seam metal roof systems.
- B. Contractor must be certified by manufacturer specified as supplier of structural standing seam system and obtain written certification from manufacturer that installer is approved for installation of specified system. If requested, contractor must supply owner with a copy of this certification.
- C. Successful contractor is required to maintain a full-time supervisor/foreman who is on the jobsite at all times during installation of new roof system. Foreman must have a minimum of five (5) years' experience with the installation of system similar to that specified.
- D. Successful contractor must obtain all components of roof system from a single manufacturer including any roll good materials if required. Any secondary products that are required which cannot be supplied by the specified manufacturer must be recommended and approved in writing by primary manufacturer prior to bidding.

- E. If required, fabricator/installer shall submit work experience and evidence of adequate financial responsibility. The owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.05 MANUFACTURERS QUALIFICATIONS / ALTERNATE MANUFACTURERS:

- A. The materials outlined in the Material and Method Specifications are the type of materials that should be used on this project. Bidder will not be allowed to supply panels formed at the jobsite on portable roll formers; metal panels must be pre-manufactured and engineered for this project. Bidder will not be allowed to change materials after the bid opening date. If the bidder wishes to propose an alternate manufacturer and/or material than that specified, the following manufacturer criteria must be submitted with the bid.
1. Submit certified test reports from a testing laboratory that bear the stamp of a registered P.E. to show compliance with specified performance criteria. Test reports must meet the specified negative uplift pressures as listed per this specification for the gauge, panel width and clip spacing specified as confirmed by manufacturers ASTM-E 1592 test results.
 2. Tests shall have been made for identical systems within the ranges of specified performance criteria.
 3. Empirical calculations for roof performance shall only be acceptable for positive loads.
 4. Indicate fastener types and spacing and provide fastener pullout values.
 5. Submit copy of manufacturer's Factory Mutual certification for specified system.
 6. Submit copy of UL 90 classification in accordance with UL 580 test procedure.
 7. Submit copy of certification from manufacturer stating that specified system has been tested in accordance with ASTM-1592 requirements by an independent Engineering Firm. All test results must be submitted including Air (ASTM E 283 & E1680) and Water (ASTM E 331 & E 1646) Infiltration Tests and meet or exceed those listed in Section 1.8 (Design and Performance Criteria)
 8. A list of a minimum of five (5) jobs where the proposed alternate material was used under similar conditions. The reference list shall include date of project, size of project, address and contact telephone number.
 9. A financial statement demonstrating a current ratio of 2:1 (current assets to current liabilities).
 10. A written statement from the manufacturer stating that they will provide the building owner with a daily site inspections by an experienced, full time employee of the company.
 11. A written statement from a corporate officer of the manufacturing company stating that he or she has reviewed the specifications and confirms that the proposed system meets or exceeds all performance requirements listed as well as meets the panel size, gauge, weight, clip design, sealant design, uplift pressures and height of the vertical seam.
 12. A copy of manufacturer's year warranty.
- B. The following samples must be submitted by alternate manufacturers:
1. Submit sample of panel section, at least 6" x 6" showing seam profile and also a sample of color selected.
 2. Submit sample of panel clip.
 3. Submit sample of bearing plate.
 4. Submit sample of purlin (Z) and/or bearing plate if required.
 5. Submit sample of base sheet, roll goods and/or mastics if required.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Manufacturer's responsibility:
1. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.
 2. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.
- B. Installer's responsibility:
1. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime or other corrosive substances.
 2. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.
 3. Protect panels from wind-related damages.
 4. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.

1.07 JOB CONDITIONS:

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for preformed metal roofing system.
- B. Protection:
 - 1. Provide protection or avoid traffic on completed roof surfaces.
 - 2. Do not overload roof with stored materials.
 - 3. Support no roof-mounted equipment directly on roofing system.
- C. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place and approved prior to installation of roofing.

1.08 QUALITY CRITERIA:

- A. Applicable standards:
 - 1. American Iron and Steel Institute (AISI):
 - a. 1986 Specification for the Design of Cold-Formed Steel Structural Members.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A792-96 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - b. B209-96 Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - c. A653-96 Specification for Steel Sheet Zinc-coated (galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip process.
 - d. D1056-91 Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
 - e. D3575-84 Test Methods for Flexible Cellular Materials made from Olefin Polymers.
 - f. E283-93 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - g. E1680-95 Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
 - h. E1592-95 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 - i. E331-86 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - j. E1646-95 Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 - 3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 1993 Architectural Sheet Metal Manual, 5th edition.
 - 4. Underwriters' Laboratories (UL):
 - a. Standard UL - 580 Tests for Wind-Uplift Resistance of Roof Assemblies.
 - b. Standard UL - 263 Tests for Fire Resistance
 - c. Standard UL - 790 Class A Fire Rating.
 - 5. Factory Mutual Research (FM):
 - a. Standard FM 4471 Tests for Wind-Uplift Resistance of Roof Assemblies.
- B. Applicable erection tolerances: Maximum variation from true planes or lines: 1/4" in 20'-0"; 3/8" in 40'-0" or more.

1.09 DESIGN AND PERFORMANCE CRITERIA:

- A. Thermal Movement:
 - 1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - 2. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.
 - 3. Location of metal roofing rigid connector shall be at roof ridge for gable and at center for arched unless otherwise approved and designed per job conditions by specified manufacturer.
- B. Uniform wind load capacity:

1. Installed roof system shall withstand positive and negative design wind loading pressures complying with:
 - a. ASCE 7-16
 - b. Safety Factor of 2.5 reduced for wind to 1.875
 - c. Category B Building with a Importance Factor of II.
 - d. Wind Speed of 131 mph
 - e. Ultimate Pullout Value is 685lbs/screw of the two fasteners holding the clip to the substrate or framing system
 - f. Exposure Category B.
 - g. Mean Roof Height 30.
 - h. Minimum Roof Width 12 feet.
 - i. Roof Slope 7: 12.
- C. Design Pressures: NEGATIVE
- | | |
|--------------------------------|--------|
| Roof Panel - Zone 1 (mid-roof) | 27 psf |
| Ridges & Eaves - Zone 2 | 63 psf |
| Corners - Zone 3 | 63 psf |
1. Capacity shall be determined using pleated airbag method in accordance with ASTM E 1592, testing of sheet metal roof panels as follows:
 - a. (7.1) Roof test specimens shall be either full length or representative of the main body of the roof, free from edge restraint or perimeter attachments, continuous over one or more supports, and containing at least five panel modules for standing seam roof.
 - b. (7.1.2) No attachments shall be permitted at sides or end perimeter other than those that occur uniformly throughout roof. Side and end seals shall be flexible and in no way restrain crosswise distortion of panels.
 - c. (7.2.1) Panels and accessories shall be production materials of same type and thickness proposed for use on project.
 2. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.
- D. Underwriters' Laboratories, Inc., (UL), wind uplift resistance classification: Roof assembly shall be classified as Class UL90, as defined by UL 580.
- E. Underwriters' Laboratories, Inc., (UL) fire resistance P ratings for roof assemblies. Underwriters' Laboratories, Inc., (UL) Class A fire rating per UL 790.
- F. ASTM E283: Static pressure air infiltration:
- | <u>Pressure</u> | <u>Leakage Rate</u> |
|-----------------|---------------------|
| 1.57 PSF | 0.0007 cfm/sq.ft. |
| 6.24 PSF | 0.0002 cfm/sq.ft. |
| 20.0 PSF | 0.0036 cfm/sq.ft. |
- G. ASTM E331: Static pressure water infiltration:
- | <u>Pressure</u> | <u>Result</u> |
|---|---------------|
| 5 Gal/Hr Per S.F. and Static
Pressure Of 20.0 Psf for 15 minutes | No Leakage |
- H. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.
- I. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range are not acceptable.

1.10 WARRANTIES:

- A. Owner shall receive ONE (1) WARRANTY from manufacturer of roof panels covering ALL of the following criteria. Multiple warranties are NOT acceptable.
1. Manufacturer's 15 year "NDL" no Dollar Limit watertight warranty for Metal Roof and Modified Roof System.
 2. 20 year coverage on finish including checking, crazing, peeling, chalking, fading and/or adhesion.
 3. 20 year material coverage.
 4. Warranty shall commence on date of substantial completion.
 5. Installer shall provide manufacturer with 2 year warranty covering roofing system installation and water tightness.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The Owner reserves the right to select and utilize products that will perform the best with the related construction materials and will afford the maximum protection for the facility.

2.02 METAL ROOFING SYSTEM

- A. Any proposed systems must meet or exceed the following listed characteristics and be submitted for approval 10 days prior to bid opening. Additionally, all performance requirements listed in "Design Criteria" (Section 1.8) and Warranty Criteria (Section 1.9) must be met and submitted as well as all items listed in the Manufacturer's Qualifications (Section 1.4).
1. Panel material: 24-gauge Galvalume steel, type AZ-55, grade 50 B, smooth as per ASTM A792-96.
 2. Flashing and flat stock material: Fabricate in profiles indicated on drawings of same material, thickness, and finish as roof system, unless indicated otherwise.
- B. Finish on surfaces:
1. Exposed surfaces for uncoated Galvalume shall be as shipped from the mill.
 2. Unexposed surfaces for coated Galvalume shall be baked-on polyester coating with .20 - .30 dry film thickness (TDF).
- C. Characteristics:
1. Configuration: Standing seams incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
 - a. Panel/Cap configuration must have a total of four (4) layers of steel surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.
 - b. Profile of panel shall have mesa's every ½" o.c. continuous throughout panel which are a minimum of 1.5" wide. These will absorb thermal stresses, reduce oil canning in panel and increase load carrying capacity.
 - c. Exposed fasteners, screws and/or roof mastic is unacceptable and will be rejected. System configuration only allows for exposed fasteners at panel overlap (if required) and trim details (as per manufacturer's guidelines)
 - d. Panels must be furnished in continuous lengths from ridge to eave with no overlaps unless approved by manufacturer to length of run.
 2. Seam must be 2-3/8" minimum height for added upward pressures and aesthetic appeal. Seam shall have continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are not acceptable.
 3. Concealed Anchor Clips: Clips must be 16 gauge, 40,000 p.s.i. (G-90 galvanized steel) ONE (1) piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
 - a. Two-piece (2) clips are NOT acceptable.
 - b. Clip design must isolate sealant in panel cap from clip to insure that no sealant damage occurs from the clip during expansion and contraction.
 - c. Clip must maintain a clearance of a minimum of 3/8" between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel

- fastener head to panel.
- 4. Bearing Plates: Bearing plates must be 16 gauge, pre-punched, 3" X 5" in size as provided by the Manufacturer of the panel.
- 5. Seam cap: Snap-on cap shall be a minimum of 1" wide "T" shaped of continuous length up to 45 feet according to job condition and field seamed by means of manufacturer's standard seaming machine.
 - a. Cap shall be designed to receive continuous double bead of hot applied, foamed in place gasketing sealant which will not come in contact with the anchor clip to allow unlimited thermal movement of panel without damage to cap sealant.
 - b. Sealant shall be non-fatigue, nitrogen injected water barrier.
- 6. Standing Seam Panel Width: 16".
- 7. Stiffening ribs: Located in flat of panel to minimize oil canning and telegraphing of structural members.
- 8. Panel length: Full length without joints, including bends.
- 9. Replaceability: Panels shall be of a symmetrical design with snap on cap configuration such that individual panels may be removable for replacement without removing adjacent panels.
- 10. Panel ends shall be panned at ridge, head-wall, and hip conditions where applicable.

E. Accessories:

- 1. Gable anchor clips: Standing Seam and Batten Seam styles Galvalume alloy; minimum 16 gauge.
- 2. Fasteners:
 - a. Concealed fasteners: Corrosion resistant steel screws designed to meet structural loading requirements. The normal minimum screw size shall be #14.
 - b. Exposed fasteners: Corrosion resistant steel screws (cadmium or zinc coatings are not acceptable) stainless steel with neoprene sealing washer, or 3/16" diameter waterproof rivets.
- 3. Closures: Factory pre-cut closed cell foam meeting ASTM D3575-93 a cross-linked closed cell polyolefin foam, enclosed in metal channel matching panels when used at hip and ridge.
- 4. Panel joint (endlap) sealant: Non-curing modified isobutylene tri-polymer tape of thickness to fully adhere to both surfaces being joined with indicated service life of 20 years.
- 5. Provide all miscellaneous accessories for complete installation.

2.03 ACCESSORY PRODUCTS:

A. Sealant:

- 1. Acceptable product:
 - a. Concealed Application : PT1-707 or Bostik Chem-Calk butyl sealant.
 - b. Exposed Application : General Electric Co., SILGLAZE II 2800.
- 2. Colors: As selected by architect from sealant manufacturer's standard selection.

2.04 FABRICATION:

- A. Shop fabricate metal roofing and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.
- B. Form flashing components from full single width sheet in minimum 10'-0" sections. Provide mitered corners, joined using closed end pop rivets and joint sealant.
- C. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves or buckles in the substrate before proceeding with installation of the preformed metal roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.
- B. Establish straight side and crosswise benchmarks.
- C. Use proper size and length fastener for strength requirements. Approximately 5/16" is allowable for maximum fastener

head size beneath the panel.

- D. Rectangular Roofs shall be checked for square and straightness. Gable ends may not be straight; set a true line for the gable clips and flashing with string line.
- E. Measure the roof lengthwise to confirm panel lengths, overhangs, coverage of flashings at eaves and ridges and verify clearances for thermal movement.
- F. Pre-roofing conference: Prior to beginning metal roofing work, a pre-roofing conference shall be held to review work to be accomplished.
 - 1. Contractor, metal roofing subcontractor, metal roofing system manufacturer's representative and all other subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.

3.02 ROOFING AND FLASHING INSTALLATION:

- A. All details will be shown on manufacturer's shop drawings to successful bidder; install roofing and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.
- B. Install insulation and temporary moisture protection as specified.
- C. Directly over the Fire Tite Ice & Water Shield, install the 16 gauge one piece panel clips (3 hole punched) into the deck based on the following spacing pattern.
 - 1. Clip spacing must be 2 ft. for Zone 1 (field)
 - 2. Clip spacing must be 2 for Zone 2 (eave, ridge etc.)
 - 3. Clip spacing must be 1.5 for Zone 3 (corners)
 - a. Clip spacing for Zones 2 & 3 must extend 8.0 ft. onto roof area.
 - b. This clip spacing must be followed to ensure integrity of the completed installation.
 - c. These have been determined based on the uplift calculations for the specified roof and the test results of ASTM-E-1592.
- D. Installation of Roof Panels: Roof panels can be installed by starting from either end and working towards the opposite end. Due to the symmetrical design of the specified panel system, it is also acceptable to start from the middle of the roof and work toward each end.
 - 1. A stainless-steel pop rivet shall be secured through the anchor reveal of the panel leg and extend into the arms of the panel clip located at the ridge of the system. This is done at each arm of the clip along the ridge. The panel is then anchored at both sides of the clip.
 - a. Be sure to capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.
 - 2. The seam caps are shipped with two rolls of factory applied hot melt sealant located inside the caps. To install the caps, hook one side of the cap over the panel edge and rotate over the opposite panel leg. For ease of installation, start at one end of the panel and work toward the opposite end.
 - 3. A hand crimping tool is used to crimp the cap around the top of two adjacent panels
 - 4. Caps shall then be permanently seamed with manufacturers mechanical seamer.
- E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.
- F. Limit exposed fasteners to extent indicated on shop drawings.
- G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.
- H. Seal laps and joints in accordance with roofing system manufacturer's product data.
- I. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Manual.

- J. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.
- K. Installed system shall be true to line and plane and free of dents, and physical defects with a minimum of oil canning.
- L. Form joints in linear sheet metal to allow for 1/4" minimum expansion at 20'-0" o.c. maximum and 8'-0" from corners.
- M. At joints in linear sheet metal items, set sheet metal items in two 1/4" beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- N. Remove damaged work and replace with new, undamaged components.
- O. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.
- P. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at date of substantial completion. Touch up minor abrasions and scratches in finish.

END OF SECTION 07 41 13.13

SECTION 07 60 00 – FLASHING AND SHEET METAL

PART 1- GENERAL

1.01 DESCRIPTION

- A. Related Work:
 - 1. Section 07 92 00: Joint Sealants
- B. American Society of Testing and Materials (ASTM):
 - 1. 176-77, Stainless and Heat Resistant Chromium Steel Plate, Sheet and Strip.
 - 2. A 526-71 (R1965), Steel Sheet, Zinc-Coated (Galvanized by the Hot-Dip Process).
 - 3. B 32-76
 - 4. D 412-75 Rubber Properties in Tension
 - 5. D 624-73 Rubber Property - Tear Resistant
 - 6. D 746-73, Brittleness Temperature of Plastics and Elastomers by Impact.
 - 7. D 2240-75, Rubber Property - Durometer Hardness
- C. Federal Specifications (FS):
 - 1. SS-C-00253A, Cement, Bituminous, Plastic.
 - 2. TT-P-645, Primer, Paint Zinc Chromate, Alkyd Type

1.02 SUBMITTALS

- A. Submit shop drawings for each shop or field fabricated item showing joints, types and locations of fasteners, and special shapes.
- B. Submit manufacturer's installation and welding instructions for manufactured items.
- C. Submit in accordance with Section 01 33 00 – Submittal Procedures.

1.03 GUARANTEE

- A. Unless other guarantee requirements are specified, furnish written guarantee for materials and workmanship for two (2) year period signed by installer and Contractor.

PART 2- PRODUCTS

2.01 SHEET METAL

- A. Galvanized Sheet Steel: ASTM A 526, commercial quality, paint grip type.
 - 1. Where flashing type and gauge is not indicated, use 24 gauge minimum (.0239") galvanized sheet steel.
- B. Stainless Steel: ASTM A 176, Type 302/304 soft temper.
- C. Lead:
 - 1. Antimony 4 to 6% remainder lead.
 - 2. Weight: 3 pounds / square feet

2.02 PRE-FINISHED GALVANIZED SHEET METAL

- A. 24 gauge hot-dipped galvanized steel (G90), commercial quality, primed and finished on finish side with fluoropolymer coating.
 - 1. Dry film thickness of coating 1 mil (+0.1 mil).
 - 2. Protect finished side with factory installed strippable film.
 - 3. Apply wash coat of .3 to 4 mil dry film thickness to the reverse side.
 - 4. Color to be selected from manufacturer's standards.
 - 5. Provide a written 20-year non-prorated warranty covering fade, chalking, and coating integrity. Warranty

shall include cost of labor and materials.

- B. Manufacturers / Products:
 - 1. Foremost Manufacturing Co., Livonia, MI, "Kynar 500 Sheet Stock"
 - 2. Petersen Aluminum Corporation, Elk Grove, IL, "PAC-CLAD Steel"
 - 3. Vincent Metals, Building Products Group, Minneapolis, MN, "ColorKlad".

2.03 PRE-FINISHED METAL COLUMN COVERS

- A. Exterior column covers in 1/8" aluminum 3003-H14 with a standard one color, two coats Kynar Painted finish.
- B. Interior column covers in .063" aluminum 3003-H14 with standard one color, two coats Kynar painted finish.
- C. Approved Manufacturer / Product:
 - 1. Baker Metal Products Inc./N gauge system 4000 or approved equal.

2.04 ACCESSORIES

- A. Solder: 50% tin and 50% lead, ASTM B32
- B. Flux: Rosin, cut muriatic acid, or commercial preparation for materials to be soldered.
- C. Neutralizer: 5% to 10% washing soda solution.
- D. Fasteners:
 - 1. Barbed roof nails, clips, or self-tapping sheet metal screws.
 - 2. Metal compatible with sheet metal or flashing material shall be stainless steel or hot dipped galvanized steel.
- E. Adhesive: As recommended by elastomeric manufacturer for bonding to substrate and for waterproof sealing of flashing seams.

2.05 SEALANTS

- A. Type: Acrylic Polymer Sealant
- B. Acceptable Manufacturers / Products:
 - 1. Pecora Corp., Harleysville, PA, "60+ Unicrylic"
 - 2. Tremco, Cleveland, OH, "Mono"
- C. Location: In contact with roofing or waterproof materials.

PART 3- EXECUTION

3.01 INSPECTION

- A. Inspect surfaces for conditions detrimental to work.
- B. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 FABRICATION

- A. Form sheet metal on bending brake.
- B. Do shaping, trimming, and hand seaming on bench as far as practicable.
- C. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.

- D. Fabricate supplemental parts necessary to complete each item of work.
- E. Form materials with straight lines, sharp angles, and smooth curves.

3.03 INSTALLATION

- A. General
 - 1. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for installation of work.
 - 2. Provide for thermal expansion of exposed sheet metal work exceeding 15 feet running length maximum.
 - 3. For flashing and trim, space expansion joints maximum of 10 ft. located 2 feet from corners and intersections.
 - 4. Conceal fasteners and expansion provisions wherever possible.
 - 5. Fold back edges of concealed side of exposed edge to form hem.
 - 6. Insert metal flashings into reglets, anchor with fasteners and wedges, and seal joints.
 - 7. Set sheet metal items level, true to line, and plumb.
 - 8. Secure to wood with screws or nails and washers.
 - 9. Set metal already partly formed in place and fasten by means of cleats.
 - 10. Where flashing type and gage is not indicated, use 24 ga. minimum galvanized sheet steel.
- B. Pre-finished galvanized sheet metal
 - 1. Exercise care during fabrication and erection to avoid damage to finish coat.
 - 2. Use color matched touch-up paint and rivets where exposed to view or otherwise required.
 - 3. Mechanically remove coating if soldering is necessary.
 - 4. Fabricate and install with strippable film in place. After installation is complete, immediately remove strippable film to avoid damage to paint coating underneath due to ultraviolet light.
- C. Curb Flashing
 - 1. Flash roof curbs with 26 ga. pre-finished metal.
 - 2. Seam and solder joints.
 - 3. Extend flashing down over curb 4" minimum over base flashing.
- D. Roof Counterflashing
 - 1. Overlap base flashing 4" minimum.
 - 2. Install bottom edge tight against base flashing.
 - 3. Lap seam vertical joints 3" minimum and apply sealant.
 - 4. Miter, lap seam, and close corner joints with solder or sealant.
- E. Gutters, Downspouts, and Leaderheads
 - 1. Fabricate with minimum amount of joints. Provide closure pieces at ends.
 - 2. Fabricate downspout in one piece, without seams.
 - 3. Fabricate gutters and downspouts out of 24 ga. pre-finished sheet metal. Gutter and downspout shall be "box-type". Downspout shall be 5" x 7" minimum.
- F. Column Covers
 - 1. Install pre-finished metal column covers as recommended by manufacturer.
 - 2. Provide reveal at top and bottom of column.

END OF SECTION 07 60 00

SECTION 07 71 23 – GUTTERS AND DOWNSPOUTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Gutters and Downspouts.
- B. Related Accessories.

1.2 RELATED SECTIONS

- A. Section 07 61 13 – Standing Seam Metal Roof.
- B. Section 07 21 00 – Insulation.
- C. Section 07 60 00 – Sheet Metal Flashing and Trim.
- D. Section 07 92 00 – Joint Sealers

1.3 REFERENCES

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. SMACNA - Architectural Sheet Metal Manual.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for size and method of rainwater discharge.
- B. American Architectural Manufacturers Association (AAMA) Specification 1405.1 "Specification for Aluminum Raincarrying Systems".
- C. FHA Minimum Property Standard 4900.1 for One- and Two-Family Dwellings.
- D. FHA Minimum Property Standard 4910.1 for Multi-Family Dwellings.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's catalog data, detail sheets, and specifications.
- C. Shop Drawings: Prepared specifically for this project; showing dimensions of metal gutters and accessories, fastening details and connections and interface with other products.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Manufacturer's warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
- B. Installer Qualifications: Certified and approved installer of the sheet metal roofing manufacturer Englert, Inc.
- C. Perform Work in accordance with SMACNA Manual or CDA Handbook.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products to prevent twisting, bending, and abrasion, and to provide ventilation. Slope stored materials to drain.
- C. During storage prevent contact with materials capable of causing discoloration, staining, or other damage.

1.8 PROJECT CONDITIONS

- A. Coordinate installation with installation of adjacent roofing, siding, and related materials.

1.9 WARRANTY

- A. Provide the Manufacturer's Limited 20-Year, pro-rated and non-transferable Warranty covering labor materials.

1.10 COORDINATION

- A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed underlayment and membrane materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Englert, Inc., which is located at: 1200 Amboy Ave. ; Perth Amboy, NJ 08861; Toll Free Tel: 800-364-5378; Tel: 732-826-8614; Fax: 732-826-8865; Email: request info; Web: www.englertinc.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

2.2 COMPONENTS

- A. Gutters: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent. Continuous and seamless sheet aluminum, roll formed.
 - 1. Thickness:
 - a. 0.027 inch (0.69 mm).
 - b. 0.032 inch (0.81 mm).
- B. Downspouts: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
 - 1. Thickness:
 - a. 0.019 inch (0.48 mm).
 - 2. Size:
 - a. 3 inches by 4 inches (76 mm by 102 mm).
 - b. 2 inches by 3 inches (51 mm by 76 mm).
- C. Endcaps: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch (0.69 mm).
- D. Inside and Outside Mitres: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch (0.69 mm).
- E. Gutter Hangers and Anchors: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.063 inch (1.60 mm). Provide types required to suit project requirements.
- F. Downspout Anchors: Aluminum. Provide types required to suit project requirements.
- G. Elbows: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
 - 1. Thickness:
 - a. 0.019 inch (0.48 mm).
 - 2. Size: To match downspouts.
- H. Gutter Guard:

1. Size:
 - a. Aluminum mesh, 5 inch (127 mm) by 3 foot (914 mm).
 - b. Aluminum mesh, white, 5 inch (127 mm) by 3 foot (914 mm).
 - c. Aluminum mesh, 6 inch (152 mm) by 3 foot (914 mm).
- I. Gutter Screen:
 1. Size:
 - a. Aluminum screen, brown, 5 inch (127 mm) by 3 foot (914 mm).
 - b. Aluminum screen, white, 5 inch (127 mm) by 3 foot (914 mm).
- J. Aluminum Finish: CastleClad, two-coat system applied in a continuous baked-on process in a single operation, comprising of an acid-based primer and baked-on high performance linear polyester topcoat on exposed surfaces. Concealed surfaces finished with a polyester gold backer or wash coat.
 1. Color: To be selected by Architect.
- K. Sealant: Provide as specified in Section 07 92 00 – Joint Sealers.
- L. Fasteners: Same material and finish as gutters and downspouts.

2.3 FABRICATION

- A. Continuously form seamless gutters to the profiles and sizes specified.
- B. Form downspouts of profiles and sizes specified.
- C. Hem exposed edges of metal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify governing dimensions at building.
- C. Verify surfaces are ready to receive gutters and downspouts.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Clean and repair if necessary, any adjoining work on which this work is in any way dependent for its proper installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install gutters using appropriate hangers to allow normal expansion and contraction.
- C. Install gutter hangers using two 1-1/4-inch (32 mm) screw shank nails and fastened into solid lumber.
- D. All gutters shall be in continuous length for each elevation (run). No end laps are allowed.
- E. Exercise care in placing aluminum in contact with other dissimilar metals or materials that are not compatible with aluminum.
- F. Providing adequate insulation/separation wherever necessary, such as by painting or otherwise protecting when they

are in contact with aluminum or when drainage from them passes over aluminum surfaces.

- G. Install sealants where indicated to clean dry surfaces only without skips or voids.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07 71 23

KING ARCHITECTS, INC

SECTION 07 84 13

SECTION 07 84 13 – PENETRATION FIRESTOPPING

PART – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 - Specification, apply to work specified in this section.

1.02 DEFINITIONS

- A. Firestopping: Systems (Material or combination of materials) used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations in fire-rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- A. U.L. rated firestop systems shall be used to seal penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical bus ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - 1. Slot gaps between edge of floor slabs and curtain walls.
 - 2. Openings between structurally separate sections of wall or floors.
 - 3. Gaps between the top of walls and ceilings or roof assemblies.
 - 4. Expansion joints in walls and floors.
 - 5. Openings around structural members which penetrate floors or walls.
 - 6. Other locations where specifically shown on the drawings.

1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections.

1.05 REFERENCES

- A. Test Requirements: ASTM E814, "Standard Method of Fire Tests of Through Penetration Fire Stops" (July 1983)
- B. Underwriters Laboratories (UL) or Northbrook, IL runs ASTM E814 under their designation of UL 1479 and publishes the results in their "FIRE RESISTANCE DIRECTORY" that is updated annually with a mid-year supplement. (Verify compliance with current U.L. rated system).
 - 1. UL Fire Resistance Directory: (Volume 1 and 2).
- C. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. All three major building codes: ICBO, SBCCI, and BOCA
- E. NFPA 101 - Life Safety Code
- F. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

- A. Firestop System installation must meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of the construction being penetrated.
- B. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

1. Submit system and material for Architect's review prior to installation.

- C. Firestop Systems do not re-establish the structural integrity of load bearing partitions / assemblies or support live loads and traffic. Installer shall consult the Architect prior to penetrating any load bearing assembly.

1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired material.

1.09 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetration item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather Conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contamination any adjacent surfaces.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Use only firestop products that have been UL 1479 or ASTM E814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with published "Through-Penetration Firestop Systems" in UL's Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
 1. Seal all holes or voids made by penetrations to ensure an air and water-resistant seal.
 2. Consult with Architect/Mechanical Engineer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 3. Protect materials from damage on surfaces subjected to traffic.

3.03 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities and Architect.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.04 ADJUSTING AND CLEANING

- A. Remove equipment, materials, and debris, leaving areas in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.05 PROTECTION AND SCHEDULE

- A. Protect finished work from damage by other trades and general construction for remainder of project.
- B. Submit schedule of all systems installed upon completion of project.

END OF SECTION 07 84 13

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The work of this section includes all exterior sealant work and all interior caulking work which is not specified as the work of a particular section.

1.02 RELATED WORK

- A. Flashing sealant is a part of Section 07 60 00, "Flashing and Sheet Metal".

1.03 REFERENCE STANDARDS

- A. Requirements for reference standards are defined in Sections 01 42 00.

1.04 PRODUCT DATA AND APPROVAL

- A. Before ordering any material, submit for Architect's approval complete manufacturer's specifications of all materials specified in this section, including surface preparation and installation requirements.

1.05 QUALITY ASSURANCE

- A. Applicator shall be experienced and trained in the techniques of caulking and sealant applications and shall be thoroughly familiar with recommendations of the manufacturer for the specified caulking and sealants.
 - 1. Selection of the proper sealant and caulking compound for particular joints shall be in accordance with current recommendations published by the manufacturer.

1.06 DELIVERY AND STORAGE

- A. Deliver materials to job in original, unopened containers with manufacturer's brand name clearly marked on all containers. Handle and store materials in original packages in accordance with manufacturer's recommendations.

1.07 GUARANTEE

- A. Upon completion and acceptance of the project, furnish the Owner through the Architect a written guarantee. Guarantee all items and work included in this section for a period of two (2) years from date of acceptance against defective workmanship and materials.
- B. Defects resulting from faulty materials and/or workmanship during the guarantee period shall be repaired or replaced by the Contractor at his expense.

PART 2 - PRODUCTS

2.01 CAULKING COMPOUND (FOR INTERIOR USE ONLY)

- A. Type: Oil-base, one part component non-hardening, gun grade, paintable.
- B. Acceptable Manufacturers / Products:
 - 1. Dow Corning, Midland, Mich., "790 Silicone Building Sealant, one-component silicone".
 - 2. General Electric Co., Waterford, NY, "Silpruf, one-component silicone".
 - 3. Pecora, "Synthacalk GC-9, one-component polysulfide base".

2.02 PREPARATORY MATERIALS

- A. Primer: Non-staining type recommended by sealant manufacturer to suit application.

- B. Joint Cleaner: Non-corrosive type recommended by sealant manufacturer; compatible with joint forming materials.
- C. Backer Rod for Exterior Sealant: Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by sealant manufacturer.
 - 1. Thickness before compression: twice thickness of joint.
 - 2. Manufacturers / Products:
 - a. Sandell Manufacturing Co., Inc., Cambridge, MA, "Poly-Tite Standard".
 - b. Williams Products, Inc., Troy, MI, "Everlastic".
- D. Backer Rod for Expansion Joints: Extruded foamed polyurethane strip saturated with polybutylene material.
 - 1. Manufacturers / Products:
 - a. Sandell "Poly-Tite Standard"
 - b. Williams "Everlastic"
- E. Bond Breaker: Pressure sensitive type recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 PREPARATION / INSTALLATION

- A. Perform all sealant work in accordance with caulking and sealant manufacturer's published instructions.
- B. Clean and prepare joints in accordance with caulking and sealant manufacturer's recommendations. Remove any loose materials and other foreign matter which might impair adhesion of sealant.
- C. Ensure that joint forming materials are compatible with sealant and caulking compound.
- D. Examine joint dimensions and size materials to achieve required width/depth ratios. Use approved joint backer rod to achieve required joint depths to allow sealants to perform properly.
 - 1. Use bond breaker where required.
- E. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.
- F. Form joints slightly concave and straight edges. Sealant must be free of air pockets, embedded matter, ridges and sags.

3.02 CLEANING

- A. As work progresses, remove excess materials adjacent to joints. Leave finished work in neat, clean condition with no evidence of spillovers onto adjacent surfaces.

END OF SECTION 07 92 00

KING ARCHITECTS, INC
SECTION 08 11 00 –STEEL DOORS AND FRAMES

SECTION 08 11 00

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel doors and frames.

1.02 RELATED SECTIONS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 81 00 - Glazing: Glazing materials to be installed in doors and frames.
- C. Section 09 90 00 - Painting: Painting of doors and frames.

1.03 REFERENCES

- A. ANSI A115.IG - Installation Guide for Doors and Hardware; 1994.
- B. ANSI A250.4 - American National Standard Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings; 1994.
- C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2001a.
- D. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2000.
- E. ASTM B 749 - Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products; 1997.
- F. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 1997.
- G. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 1998.
- H. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2001.
- I. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 1998.
- J. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2001.
- K. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 1999.
- L. ASTM E 413 - Classification for Rating Sound Insulation; 1987 (Reapproved 1999).
- M. CSDMA - Specifications for Commercial Steel Doors and Frames; Canadian Steel Door Manufacturers Association; 1990.
- N. CSDMA - Recommended Dimensional Standards for Commercial Steel Doors and Frames; Canadian Steel Door Manufacturers Association; 1990.
- O. NFPA 80 - Standard for Fire Doors and Fire Windows; 1999.
- P. NFPA 105 - Recommended Practice for Installation of Smoke-Control Door Assemblies; 1999.
- Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 1999.
- R. UBC 7-2 Part 2 - Test for Smoke and Draft Control Door Assemblies; 1997.

KING ARCHITECTS, INC

SECTION 08 11 00

- S. UBC 7-4 - Fire Tests of Window Assemblies Under Positive Pressure; 1997.
- T. ANSI/UL 9 - Standard for Fire Tests of Window Assemblies; 2000.
- U. ANSI/UL 10B - Standard for Fire Tests of Door Assemblies; 1997.
- V. ANSI/UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards.
- C. Shop Drawings:
 - 1. Indicate each type of door, frame, steel, core, material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of hardware.
 - 2. Include a schedule identifying each unit, with door marks or numbers referencing the numbering in the contract documents.
- D. Samples: Selection and verification samples for finishes, colors, and textures.
- E. Certificates: Product certificates signed by manufacturer certifying material compliance with specified requirements.
- F. Installation Instructions: Manufacturer's printed installation instructions.
- G. Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
- H. Warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in the design and production of standard and custom commercial steel door and frame assemblies and the integration of hardware and glazing materials, and assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
- B. Testing Agency Qualifications: Independent laboratory accredited for these specific test procedures under the National Voluntary Laboratory Accreditation Program.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- B. Store doors protected at corners to prevent damage or marring of finish. Store doors and frames in upright position under cover on building site on wood sills or on floors in a manner to prevent rust and damage.
- C. Do not use non-vented plastic or canvas shelters.

1.07 WARRANTY

- A. Provide manufacturer's warranty against defects in workmanship for a period of one (1) year from date of shipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Fleming Door Products Ltd; 20 Barr Road, Ajax, Ontario L1S 3X9. Tel: (800) 263-7515. Fax: (905) 427-1668. Email: postamaster@flemingdoor.com. www.flemingdoor.com.

KING ARCHITECTS, INC

SECTION 08 11 00

- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 13.

2.02 DOORS

- C. Steel Doors - General: Provide the types and sizes indicated on drawings and schedules.
1. Door Thickness: 1-3/4 inches (44.4 mm), unless otherwise indicated.
 2. Exterior Doors: Provide cores with thermal resistance rating as specified, when tested in accordance with ASTM C 177 or ASTM C 518.
 3. Non-Fire Labeled Exterior Doors: Polyisocyanurate core; rigid foam, closed cell, faced board, complying with ASTM C 128 9, with thermal resistance (R-value) of 12.3 (2.17).
 4. Fabricate door faces without visible seams, free of scale, pitting, coil brakes, buckles and waves.
 5. Fabricate formed edges true and straight with the minimum radius possible for the thickness of steel used.
 6. Lock and Hinge Edges: Beveled 1/8 inch in 2 inches (3 mm in 50 mm), unless bevel is not appropriate for hardware or door swing.
 7. Top and Bottom: Inverted, recessed, 16 gage, 0.060 inch (1.6 mm) steel end channels, welded to each face sheet at 6 inches (150 mm) on center maximum, unless otherwise indicated.
 - a. Non-Fire Rated Exterior Doors: Factory installed flush, extruded PVC top caps.
 - b. Fire Rated Exterior Doors: Factory installed flush steel top caps.
 8. Steel Sheet, Unless Otherwise Indicated: ASTM A 65 3/A 653M commercial grade tension leveled hot-dipped galvanized steel sheet, coating designation A40/ZF120.
 9. Laminating Adhesive: Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive UL/ULC/WH approved or equivalent.
 10. Edge Seam Adhesive: Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved or equivalent.
- D. Door Sizes: As indicated on drawings and:
1. Widths of Door Openings: Measured from inside of frame jamb rabbet with tolerance of plus 0.063 inch (plus 1.6 mm), minus 0.031 inch (minus 0.8 mm).
 2. Heights of Door Openings: Measured from finished floor (exclusive of floor coverings) to head rabbet of frame with tolerance of 0.047 inch (1.2 mm).
 3. Size doors to fit openings with 1/8 inch (3 mm) clearance at jambs and head, unless otherwise required by hardware.
 4. Provide clearance of 3/4 inch (19 mm) between bottom of door and finished floor surface (exclusive of floor coverings), unless otherwise indicated.
 5. Tolerances on Door Sizes: 0.047 inch (1.2 mm).
- E. Extra Heavy Duty Doors: Flush, with longitudinal edges continuously welded the full height of the door filled and ground smooth with no visible seams; Fleming H Series.
1. Quality: Provide doors complying with ANSI A250. 8, Level 3, and the more stringent requirements indicated.
 2. Durability: Achieve 1,000,000 cycles when tested in accordance with ANSI A250.4; provide independent testing agency report.
 3. Face Sheets: 14 gage, 0.075 inch (1.9 mm).
 4. Internally reinforced with 20 gage, 0.036 inch (0.9 mm) continuous interlocking steel stiffeners at 6 inches (150 mm) on center, securely welded to each face sheet at 6 inches (150 mm) on center maximum.
 5. Voids between stiffeners filled and sound deadened with 1.5 pcf (24kg/cu m) loose batt type fiberglass insulation, complying with ASTM C 665.

2.03 FRAMES

- A. Frames - General Requirements: Fabricated with integral door stops having minimum height of 0.625 inch (16 mm).
1. Frames for Fire-Rated Doors: Provide frames labeled for the same rating as the door.
 2. Fabricate jambs, heads, mullions, sills and center rails straight and uniform throughout their lengths; square and free of defects, warps or buckles.
 3. Knocked-Down Frames: Ship unassembled; provide 20 gage, 0.036 inch (0.9 mm) thick, steel reinforcing plates and/or jambs with integral tabs.; interlock jambs or corner reinforcing plates securely with factory prepared head.
 4. Set-Up and Welded Frames: Factory assemble; weld corner joints on the inside of returns and faces; provide 2 temporary steel jamb spreaders welded to base of jambs or mullions to maintain proper alignment during shipping and handling; remove spreaders prior to anchoring of frame to floor.

KING ARCHITECTS, INC

SECTION 08 11 00

5. Corner Joints: Accurately miter and tightly fit, with integral door stops mitered or butted when assembled.
 6. Joints at Mullions, Transom Bars, Sills and Center Rails: Coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 7. Glazing Stops: Formed 20 gage, 0.036 inch (0.9 mm) thick, steel, 0.625 inch (16mm) height channel, accurately fitted, butted at corners and fastened to frame sections with oval head scrulox (self-drilling) type screws at 12 inches (300 mm) on center maximum.
 8. Oversize Frames: Where required due to site access, indicated on the drawings, or when shipping limitations so dictate, fabricate frames in sections for splicing in the field.
 - a. Provide field spliced jambs, heads and sills with 16 gage, 0.060 inch (1.6 mm) steel splice plates securely welded into one section, extending 4 inches (100 mm), minimum, each side of splice joint.
 - b. At closed sections (mullions or center rails), provide 16 gage, 0.060 inch (1.6 mm) steel splice angles securely welded to the abutting member; extend face of splice angle 4 inches (100 mm) minimum into closed sections when assembled.
 - c. Field weld field splice joints, fill and grind to present a smooth uniform surface.
 9. Cut-Off Door Stops (Sanitary Bases): Provide where indicated on the drawings; cap at 30 degree angle, at the indicated height; weld and grind smooth the joints below the cut-off door stop with no visible seams.
 10. Silencers: Provide GJ-64 or equivalent, single stud rubber or neoprene door silencers, 3 for single door openings, two 2 for double door openings; ship silencers loose and install after finish painting.
 11. Steel Sheet, Unless Otherwise Indicated: ASTM A 653/A 653M commercial grade tension leveled hot-dipped galvanized steel sheet, coating designation A40/ZF120.
 12. Tolerances:
 - a. Face Widths, Door Stop Heights, and Jamb Depths: 0.031 inch (0.8 mm).
 - b. Throat Openings: 0.063 inch (1.6 mm).
 - c. Door Rabbets: 0.016 inch (0.4 mm).
- B. Standard Frames: Fleming F Series.
1. Metal Thickness: 16 gage, 0.060 inch (1.6 mm); knocked-down.

2.04 HARDWARE PREPARATION

- A. Prepare doors and frames for hardware specified elsewhere; comply with ANSI A115 series standards; adjust locations to allow for specified clearances and size tolerances, with maximum variation from template dimensions of plus 0.015 inch (plus 0.4 mm) and minus 0.
- B. Fully Templated Mortise Hardware: Factory blank, reinforce, drill and tap doors and frames in accordance with approved shop drawings and templates provided by hardware supplier.
 1. Factory prepare templated holes 0.5 inch (12.7 mm) diameter and larger, except mounting and through bolt holes.
 2. Factory prepare templated holes less than 0.5 inch (12.7 mm) diameter when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
- C. Mortised Hardware Not Fully Templated: Factory blank and reinforce doors and frames; drill and tap on site.
- D. Surface Mounted Hardware: Factory reinforce doors and frames with 16 gage, 0.060 inch (1.6 mm) steel, minimum; drill and tap on site.
- E. Hinge and Pivot Reinforcements: 10 gage, 0.13 inch (3.3 mm) thick, steel minimum high frequency type.
 1. Top of Upper Hinge Preparation for 4-1/2 inch (114 mm) Hinges: 7-1/2 inches (180 mm) down from head, transom mullion or panel as appropriate.
 2. Top of Bottom Hinge Preparation for 4-1/2 inch (114 mm) Hinges: 12.625 inches (310 mm) from top of finished floor, excluding carpet or resilient floor finishes.
 3. Intermediate Hinge Preparations: Spaced equally between top and bottom cutouts.
 4. Dutch Door Frames: Top and bottom hinge locations same as other doors; top of intermediate hinges at 36.5 inches (930 mm) and 55.938 inches (1403 mm) from finished floor.
- F. Lock, Strike and Flush Bolt Reinforcements: 16 gage, 0.060 inch (1.6 mm) steel minimum; provide mortised cutouts with 22 gage, 0.03 inch (0.7 mm) thick, steel, minimum, guard boxes, except for adjustable jamb depth frames, retrofit frames, and in drywall applications.
 1. Strikes for Unit, Integral, Cylindrical and Mortise Locks and Roller Latches: Center 40-5/16 inches (1033 mm) from finished floor.

KING ARCHITECTS, INC

SECTION 08 11 00

2. Strikes for Deadlocks: Center at 48 inches (1220 mm) from finished floor.
 3. Strikes for Exit Devices: Locate according to device manufacturer's templates.
- G. Reinforcements for Concealed Closers and Holders and Surface Mounted Hardware: 12 gage, 0.105 inch (2.7 mm) thick, steel minimum.
- H. Pushes and Pulls: Center 42 inches (1070 mm) from finished floor.
- I. Electrically or Electronically Operated Hardware: Provide hardware enclosures and junction boxes as indicated and interconnect with 1/2 inch (12.7 mm) diameter conduit and connectors complying with applicable local codes.

2.05 FRAME ANCHORAGE

- A. Frame Anchors: Provide anchors appropriate to floor, wall and frame construction.
1. Provide fasteners, anchor bolts, and expansion shell anchors as required.
- B. Standard Frames:
1. Locate wall anchors immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
 2. Unit Masonry Partitions: 0.156 inch (4.0 mm) diameter steel wire anchors, 18 gage, 0.048 inch (1.2 mm) thick, steel adjustable stirrup and strap or T-shaped anchors as required.
 3. Steel Stud and Drywall Partitions: 20 gage, 0.036 inch (0.9 mm) thick, steel snap-in or Z-shaped stud type anchors.
 4. Wood Stud and Drywall Partitions: 20 gage, 0.036 inch (0.9 mm) thick, steel snap-in or wood stud type anchors.
 5. Frames Installed Prior to Wall Construction: 16 gage, 0.060 inch (1.6 mm) steel floor anchors with 2 holes for mounting to the floor; securely welded to inside of jamb profile.
 - a. At thermally broken frames, design anchors to maintain thermal break.
 6. Frames in Openings in Existing Concrete, Masonry or Other Construction: Machine bolt anchors, 1/4 inch (6 mm) diameter, located not more than 6 inches (150 mm) from the top and bottom of each jamb, immediately above or below intermediate hinge reinforcements, and directly opposite on strike jamb.
 - a. Provide 16 gage, 0.060 inch (1.6 mm) anchor bolt guides and punch and dimple frame to countersink bolt head.
 - b. After tightening anchor bolts, weld the heads to provide a non-removable application., fill and grind welded bolt and dimple to present a smooth uniform surface, prior to finish painting.
- C. Frame Extensions: Where indicated on drawings provide channel extensions from top of frame to underside of structure above.
1. Material: Formed 12 gage, 0.105 inch (2.7 mm) thick, steel channels.
 2. Provide mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head.
 3. Install with mechanical fasteners.

2.06 FINISHING

- A. Steel:
1. Remove weld slag and splatter from exposed surfaces.
 2. Fill and sand all tool marks, abrasions and surface blemishes to present smooth uniform surfaces.
 3. On exposed surfaces where zinc coating has been removed during fabrication, factory apply rust inhibitive touch-up primer.
 4. Fully cure primer prior to shipment.

PART 2 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates and related construction are ready and suitable for installation of doors and frames.
- B. Start of work constitutes acceptance of existing conditions.

KING ARCHITECTS, INC
3.02 INSTALLATION

SECTION 08 11 00

- A. Install doors and frames in accordance with NAAMM HMMA 84 0, maintaining specified clearances.
- B. Install fire rated doors and frames in accordance with NFPA 80.
- C. Set frames plumb, square, aligned, without twist and at correct elevation, within the following tolerances:
 - 1. Plumbness: Not more than 0.063 inch (1.6 mm) out of plumb, measured using a line from the intersection of vertical members and the head to the floor.
 - 2. Squareness: Not more than 0.063 inch (1.6 mm) difference between diagonal measurements between corners.
 - 3. Alignment: Not more than 0.063 inch (1.6 mm), measured on jambs, through a horizontal line parallel to the plane of the wall.
 - 4. Twist: Not more than 0.063 inch (1.6 mm), measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall.
- D. Brace frames rigidly in position while partitions are being constructed.
 - 1. Remove temporary steel shipping jamb spreaders.
 - 2. Install wood spreaders at mid-point of frame rabbet height to maintain frame widths.
 - 3. Provide vertical support at center of head for openings exceeding 48 inches (1250 mm) in width.
 - 4. Remove wood spreaders after product has been built-in.
- E. Secure anchorages and connections to adjacent construction.
- F. In unit masonry, fill frame voids full with grout as wall is laid.
- G. Install hardware in accordance with ANSI A115.1G, manufacturers' templates and instructions.
- H. Keep steel surfaces free of grout, tar, other bonding materials, and sealers; clean surfaces immediately following installation.
- I. Install louvers, vents, glazing materials and door silencers; coordinate with field painting to avoid unnecessary masking or cleaning.
- J. Touch-up damaged surfaces and exposed field welds with rust inhibitive primer:
 - 1. Prepare galvanized steel to be finished with latex paints by cleaning with soap and water to remove foreign matter.
 - 2. Prepare galvanized steel to be finished with alkyd paints by cleaning with turpentine or paint thinner.
 - 3. Finish exposed field welds to present a smooth uniform surface.
 - 4. Follow recommendations of final paint finish manufacturer.

3.03 ADJUSTING

- A. Adjust operable parts for correct clearances and function.
- B. Adjust hinge sets, locksets, and other hardware. Lubricate using a suitable lubricant compatible with door and frame coatings.

3.04 CLEANING AND PROTECTION

- A. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions before owner's acceptance.
- B. Remove from project site and legally dispose of construction debris associated with this work.
- C. Protect installed products and finished surfaces from damage during construction.

END OF SECTION 08 11 00

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of standard doors and frames is shown and schedule on drawings.

1.02 QUALITY ASSURANCE

- A. Provide door and frames complying with Steel Door Institute specified. "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein.
- B. Manufacturer: Provide standard steel doors and frames by a single firm specializing in production of this type of work. Provide steel doors and frames by one of the following:
 - 1. Amweld Building Products Div.
 - 2. Ceco Corp.
 - 3. Republic Builders Prod. Corp.
- C. Fire-Rated Assemblies: Provide fire-rated doors and frames investigated and tested as fire door assemblies, complete with type of hardware to be used. Identify each fire door and frame with recognized UL testing laboratory labels, indicating applicable fire rating of steel doors and frames, construct and install assemblies to comply with NFPA Standard No 80, and as herein specified.
- D. Temperature Rise Rating: At stairwell enclosure provide door which have Temperature Rise Rating of 450 degrees F. (232 degrees C.) maximum in 30 minutes of fire exposure.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating those products comply with requirements.
- B. Shop Drawings: Submit for fabrications and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcement, and details of joints and connections. Show anchorage and accessory items.
- C. Provide schedule of doors and frames using some reference numbers for details and opening as those on contract drawings.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver hollow metal work packed in a carton or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
- B. Inspect hollow metal work upon delivery for damage. Minor damage may be repaired provided finish items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units wood sills at least 4" high, or otherwise store on floors in a manner that will prevent rust and damage. Avoid use of vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

- B. Cold Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366, and ASTM A 568.
- C. Galvanized Steel Sheets: (Exterior doors and frames) Zinc coated carbon steel sheets of commercial quality, complying ASTM A 536, with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphating.
- D. Supports and Anchors: Fabricate not less than 18 gage galvanized sheet steel.
- E. Inserts, bolts, and Fasteners: Manufacturer's standard units except hot-dip galvanized items to be built into exterior wall complying with ASTM A 153, Class C or D as applicable.
- F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.02 FABRICATION, GENERAL

- A. Fabricate steel door and frame units to be rigged, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).
- D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of inverted steel channels.
- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

2.03 FINISH HARDWARE PREPARATION

- A. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirement of ANSI A 115 series specifications for door and frame preparation for hardware.
- B. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- C. Locate finish hardware as shown on final shop drawings or, if not shown in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.04 SHOP PAINTING

- A. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- B. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
- C. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

2.05 STANDARD STEEL DOORS

- A. Heavy Duty 1 3/4" Thick (Type III) (Style 3):
- B. Stile and Panel Construction: Minimum 20-gauge stiles are butted against a full 16-gauge panel. Panels interlock with stiles or are joined to the stiles by internal welding. Stiles and panels closed at top and bottom of door with recessed end channels. Door face sheet are formed from one sheet of metal with no seams on door fascias or vertical edges. Doors to receive closures shall have 12-gauge reinforcement, 6-gauge hinge reinforcements and 14-gauge lock reinforcements.

- C. Provide metal doors indicated on drawings and/or schedules.

2.06 STANDARD STEEL FRAMES

- A. Provide 16-gauge metal frames for doors, transoms, sidelights, borrowed lights, and other openings of types and styles as shown on drawings and/or schedules. Conceal fastenings unless otherwise indicated.
 - 1. Fabricate frames for masonry construction with mitered and welded corners.
 - 2. Fabricate frames for dry wall construction with mitered corners knocked down for field assembly.
- B. Form exterior frames of hot dip galvanized steel.
- C. Door Silencers: Except on weather-stripped frames, drill stops to receive 2 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION

- A. Install standard steel doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as herein specified.

3.03 PLACING FRAMES

- A. Comply with provision of SDI-105 "Recommended Erection Instructions for Steel Frames" unless otherwise indicated. Except for frames located in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- B. In plaster or masonry walls constructed with antifreeze additives, protect inside (concealed) faces of door frames using fibered asphalt emulsion coating. Apply approximately 1/8" thick over shop primer and allow to thoroughly dry before handling.
- C. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels. Building-in of anchors and grouting of frames is required.
- D. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
- E. Install fire-rated frames in accordance with NFPA std. No. 80.
- F. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

3.04 DOOR INSTALLATION

- A. Fit hollow metal doors accurately in frames, within clearances specified in ADI-100.
- B. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.05 ADJUST AND CLEAN

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from pre-finished doors.
- C. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 11 13

SECTION 08 14 00 – WOOD DOORS

PART 1 - GENERAL

- 1.01 EXTENT AND LOCATION of each type of wood door is shown on drawing and in schedules.
- 1.02 FACTORY FITTING to frame (pre-fitting) and factory preparation for hardware (pre-matching) for wood doors is included in this section.
- 1.03 QUALITY ASSURANCE
- A. General: Comply with requirements of the following standard unless otherwise indicated.
 - B. Non-Fire-Rated Wood Doors: NWMA Industry Standard I.S.-1 "Wood Flush Doors" of the National Woodwork Manufacturer's Association. Stile and rail doors quality standards of A.W.A
 - C. Fire-Rate Wood Doors: Where fire-resistance classifications are shown or scheduled for wood door assemblies, provide doors which comply with requirements of NFPA NO.80 "Standard for Fire Doors and Windows" and which have been tested and rated with single point hardware by UL. Provide UL label on each door and panel.
- 1.04 SUBMITTALS
- A. Product Data: Submit door manufacturer's product data, specifications, and installation instructions for each type of wood door. Include details of core and edge construction, trim for openings and louvers (if any) and similar components. Include certifications as may be required to show compliance with specifications.
 - B. Shop Drawings: Submit shop drawings indicating locations and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
 - C. Specific Product Warranty: Submit written agreement indoor manufacturer's standard form signed by Manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup, or twist) or which show photographing of construction below in face veneers, or do not conform to tolerance limitations of NWMA. The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors. Warranty shall be in effect during following period of time after date of substantial completion.
 - 1. Solid Core Flush Interior Doors: Five years
 - 2. Solid Core Flush Exterior Doors: Five years
 - 3. Hollow, Core Flush Interior Doors: Two years
 - a. Solid Wood Stile and Rail Doors: One year
 - D. Submit in accordance with Section 01 33 00 – Submittal Procedures.
- 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

Product wood doors during transit, storage, and handling to prevent damage, soiling and deterioration. Comply with the "On-Site Care" recommendations of NWMA pamphlet. "Care and Finishing of Wood Doors" and with manufacturer's installations.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

General: Provide wood doors complying with applicable requirements of VWMA I.S.-1 for kinds and types of doors indicated and as specified.

- A. Face Panels: Manufacturer's standard 2 or 3 ply face panels, unless otherwise indicated.
- B. Exposed Surfaces: Provide kind shown or scheduled and as further specified. Provide same exposed surface material on both faces of each door, unless otherwise indicated.

- C. Fire-rated Doors: Provide exposed faces and edges to match none fire-rated doors in same area of building, unless otherwise indicated. Provide trim for openings (if any) which have been tested and listed for kind of door and rating indicated.
- D. Metal Louvers: Size, type, and profile shown and fabrication from 20 gauge, galvanized and factory primed for paint finish.

2.02 GENERAL FABRICATION REQUIREMENTS

- A. Transom and Slide Panels: Wherever transom panels or side panels of wood are shown in same framing systems as wood doors, provide panels which match quality and appearance of associated wood doors, unless otherwise indicated. Fabrication matching panels with same construction, exposed surfaces and finish as specified for associated doors.
- B. Openings: Cut and trim openings through doors and panels as shown. Comply with applicable requirements of referenced standard for kind(s) of doors required.
 - 1. Light openings: Factory cut openings. Trim openings for non-fire-rated doors with solid wood moldings.
 - 2. Metal Louvers: Factory cut openings. When standard service of door manufacturer, factory install metal louvers in prepared openings; otherwise install only flush wood beads in prepared openings.

2.03 EXTERIOR FLUSH WOOD DOORS

- A. Solid Core Wood Doors: Where shown or scheduled, provide exterior solid core wood doors complying with applicable requirements of referenced standards and as follows:
 - 1. Type 1 adhesive bond
 - 2. Core Type: At contractor's option, provide continuous wood block, stile and rail block, of particle board, as required by manufacturer to meet specified warranty period.
- B. Preservative Treatment: Dip-treat exposed wood for not less than 3 minutes in a 5% solution of pentachlorophenol with water repellent added.
- C. Flashing: Flash bottom of light openings (if any) and top of out-swinging doors (if any) with flexible non-corrosive metal set in white lead.
- D. Exposed Surfaces for Paint Finish: Where exterior flush wood doors are shown or scheduled for paint finish, provide standard thickness rotary cut birch complying with NWMA I.S.-1 good grade, or medium density overlay (MDO) applied over standard thickness hardwood face veneers, and any close-grain hardwood for exposed edges and other solid wood components, as required by manufacturer to meet specified warranty period.

2.04 INTERIOR FLUSH WOOD DOORS

- A. Solid Core Wood Doors:
 - 1. Type II water resistant bond.
 - 2. Core Construction: Solid wood block, wood particle board, or mineral with wood lock blocks, as required by door manufacturer to comply with specified warranty period.
 - 3. Face Panels Manufacturer's standard 2-or 3-ply face panels.
 - 4. Exposed Surfaces for Paint Finish where solid core interior wood doors are shown or scheduled to receive paint finish, provide either medium density overlay (MDO) complying with PS-1 applied over manufacturer's standard thickness hardwood face veneers; or standard thickness, rotary-cut birch face veneers complying with NWMA I.S.-1, good grade. Provide any close-grain hardwood for exposed edges and other exposed solid wood components. Standard thickness, rotary-cut birch complying with NWMA I.S.-1, sound grade for face veneers any species of wood for exposed edges and other exposed solid wood components.
 - 5. Exposed Surface for Transparent Finish: Where solid core interior wood doors are shown or scheduled to receive a transparent finish, provide manufacturer's standard thickness face veneers of NWMA I.S.-1, good grade face veneers of the species scheduled. #1 Sharp contrast not permitted at veneer joints. Provide exposed edges and other exposed solid wood components of any species of wood.
 - #1 If species is not scheduled, supply natural Birch, rotary cut.

- B. Hollow Core Wood Doors:
1. Core Construction: As required by manufacturer to meet warranty period.
 2. Core Construction: Any type of core complying with the requirements of NWMA I.S.-1 for hollow core flush doors.
 3. Face Panels: Manufacturer's standard 2-or 3-ply face panels.
 4. Exposed Surfaces for Paint Finish: Where hollow core interior wood doors are shown or scheduled to receive a paint finish, provide standard thickness, rotary-cut birch face veneer complying with NWMA I.S.-1 good grade face veneers and any species of wood for exposed edges and other exposed solid wood components.
 5. Exposed Surface for Transparent Finish: Where hollow core interior wood doors are shown or scheduled to receive a transparent finish, provide manufacturer's standard thickness face veneers of NWMA I.S.-1 good grade face veneers of species scheduled. #1 Sharp contrast not permitted at veneer joints. Provide exposed edges and other solid wood components of any species of wood.

2.05 PRE-FITTING AND PREPARATION FOR HARDWARE

- A. Pre-fit and pre-machine wood doors at factory.
- B. Comply with tolerance requirements of NWMA for prefitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules and door frame shop drawings and with hardware templates and other essential information required to ensure proper fit of doors and hardware. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in factory.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors and notify Contractor in writing of conditions detrimental to proper and timely installation of wood doors. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

3.02 INSTALLATION

- A. Condition doors to average prevailing humidity in installation area prior to hanging.
- B. Hardware: For installation see Division 8 "Builders Hardware" section of these specifications.
- C. Manufacturer's Instructions: Install wood doors in accordance with manufacturer's instructions and as shown.
- D. Job Fit Doors: (Only if approved in writing by Architect) Align doors to frames for proper fit and uniform clearance at each edge and matching for hardware. Seal cut surfaces after fitting and machining.
1. Bevel non-fire rated doors 1/8" in 2" at lock and hinge edges.
 2. Bevel fire-rated doors 1/16" in 2" at lock edge.
- E. Pre-fit Doors: Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each.
- F. Clearance: For non-fire doors provide clearances of 1/8" at jambs and head; 1/8" at meeting stiles for pairs of doors; and 1/2" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
1. For fire-rated doors, provide clearances complying with the limitations of the authority having jurisdiction.
- G. Job Site Finished Doors: See painting sections in Division 9 of these specifications for requirements for finishing wood doors.

3.03 ADJUST AND CLEAN

- A. Operation Rehang or replace doors which do not swing or operate freely, as directed by Architect.
- B. Finished Doors: Refinish or replace doors damages during installation, as directed by Architect.
- C. Protection and Completed Work: Advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance work.

END OF SECTION 08 14 00

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rolling service doors.

1.2 RELATED SECTIONS

- A. Section 05 55 00 - Metal Fabrications: Support framing and framed opening.
- B. Section 06 20 00 - Finish Carpentry: Wood jamb and head trim.
- C. Section 08 33 14 - Security Grilles.
- D. Section 08 71 00 - Door Hardware: Product Requirements for cylinder core and keys.
- E. Section 09 90 00 - Painting: Field applied finish.
- F. Section 2605 33 - Raceway and Boxes: Conduit from electric circuit to door operator and from door operator to control station.
- G. Section 26 05 83 - Wiring Connections: Power to disconnect.

1.3 REFERENCES

- A. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors And Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.
- B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
- C. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.
- D. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- E. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- F. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- G. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- H. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

I. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

J. NEMA MG 1 - Motors and Generators.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Details of construction and fabrication.
4. Installation instructions.

C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years' experience in the fabrication and installation of security closures.

B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.10 WARRANTY

- A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
- B. Warranty: Manufacturer's limited door system warranty for 2 years for all parts and components.
- C. PowderGuard Finish
 - 1. PowderGuard Premium Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Premium Finish warranty for 2 years.
 - 2. PowderGuard Zinc Base Coat applied to guides, bottom bar, headplates plus PowderGuard Premium applied to curtain and topcoat for guides, bottom bar, headplates: Manufacturer's limited Zinc Finish warranty for 4 years.
 - 3. PowderGuard Textured: Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Textured Finish warranty for 3 years.
 - 4. PowderGuard Zinc Base Coat applied to guides, bottom bar, headplates plus PowderGuard Textured applied to curtain and topcoat for guides, bottom bar, headplates: Manufacturer's limited Zinc Finish warranty for 4 years.
 - 5. PowderGuard Max: Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Max Finish warranty for 5 years.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: Overhead Door Corporation, 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

2.2 ROLLING SERVICE DOORS

- A. Industrial Doors: Overhead Door Corporation, Model 610 Rolling Service Doors.
1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
 - a. Curved profile type C-187 for doors up to 15 feet 4 inches (4.67 m) wide, fabricated of:
 - 1) 24-gauge galvanized steel.
 - 2) 22-gauge galvanized steel.
 - 3) 20-gauge galvanized steel.
 - 4) 18-gauge galvanized steel.
 - 5) 22-gauge stainless steel.
 - 6) 20-gauge stainless steel.
 - 7) .040-inch (1 mm) aluminum.
 - b. Curved profile type C-275 for doors up to and between 15 feet 4 inches (4.67 m) and 18 feet 4 inches (5.59 m) wide, fabricated of:
 - 1) 22-gauge galvanized steel.
 - 2) 20-gauge galvanized steel.
 - 3) 18-gauge galvanized steel.
 - 4) 16-gauge galvanized steel.
 - 5) 22-gauge stainless steel.
 - 6) 20-gauge stainless steel.
 - 7) .050-inch (1.29 mm) aluminum.
 - c. Curved profile type C-275 for doors between 18 feet 4 inches (5.59 m) and 25 feet 4 inches (7.72 m) wide, fabricated of:
 - 1) 20-gauge galvanized steel.
 - 2) 18-gauge galvanized steel.
 - 3) 16-gauge galvanized steel.
 - 4) 20-gauge stainless steel.
 - 5) .064-inch (1.63 mm) aluminum.
 - d. Curved profile type C-275 for doors between 25 feet 4 inches (7.72 m) and 40 feet (12.19 m) wide, fabricated of:
 - 1) 18-gauge galvanized steel.
 - 2) 16-gauge galvanized steel.
 - 3) .064-inch (1.63 mm) aluminum. Maximum width is 27 feet.
 - e. Flat profile type F-265 for doors up to 18 feet 4 inches (5.59 m) wide, fabricated of:
 - 1) 22-gauge galvanized steel.
 - 2) 20-gauge galvanized steel.
 - 3) 18-gauge galvanized steel.
 - 4) 16-gauge galvanized steel.
 - 5) 22-gauge stainless steel.
 - 6) 20-gauge stainless steel.
 - 7) .040-inch (1 mm) aluminum.
 - f. Flat profile type F-265 for doors between 18 feet 4 inches (5.59 m) and 25 feet 4 inches (7.72 m) wide, fabricated of:
 - 1) 20-gauge galvanized steel.
 - 2) 18-gauge galvanized steel.
 - 3) 16-gauge galvanized steel.
 - 4) 20-gauge stainless steel.
 - 5) .050-inch (1.29 mm) aluminum.

- g. Flat profile type F-265 for doors between 25 feet 4 inches (7.72 m) and 40 feet (12.19 m) wide, fabricated of:
 - 1) 18-gauge galvanized steel.
 - 2) 16-gauge galvanized steel.
 - 3) .050-inch (1.29 mm) aluminum. Maximum width is 27 feet.
- h. For fenestrated service doors, provide slats with 3 inches by 5/8 inch (76 mm by 16 mm) uniformly spaced openings.
- i. For ventilated service doors, provide slats with 1/16-inch (16 mm) diameter perforations 3/32 inch (2.4 mm) on center staggered rows.
2. Slats and Hood Finish:
 - a. Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester topcoat.
 - 1) Polyester Topcoat.
 - (a) Gray polyester.
 - (b) Tan polyester.
 - (c) White polyester.
 - (d) Brown polyester.
 - 2) Powder Coat:
 - (a) PowderGuard Premium powder coat, color as selected by the Architect.
 - (b) PowderGuard Textured powder coat, color as selected by the Architect.
 - (c) PowderGuard Max powder coat, color as selected by Architect.
 - 3) Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
 - b. Stainless Steel: Slats and hood shall be stainless steel finished as follows.
 - 1) Finish: 2B mill finish.
 - 2) Finish: No. 4 satin finish.
 - c. Aluminum: Slats and hood shall be aluminum finished as follows.
 - 1) Finish: Mill finish.
 - 2) Finish: Clear anodized finish.
 - 3) Finish: Bronze anodized finish.
 - 4) Finish: Powder Coat:
 - (a) PowderGuard Premium powder coat, color as selected by the Architect.
 - (b) PowderGuard Textured powder coat, color as selected by the Architect.
 - (c) PowderGuard Max powder coat, color as selected by Architect.
3. Weather seals:
 - a. Vinyl bottom seal.
 - b. Guide weather seal.
4. Bottom Bar:
 - a. Extruded aluminum for doors up to 15 feet 4 inches (4.67 m) wide.
 - b. Two primed steel angles for doors over 15 feet 4 inches (4.67 m) wide.
 - c. Two galvanized steel angles.
5. Guides: Three structural steel angles.
6. Brackets:
 - a. Hot rolled prime painted steel to support counterbalance, curtain and hood.
 - b. Galvanized steel to support counterbalance, curtain and hood.
7. Finish; Bottom Bar, Guides and Brackets:
 - a. PowderGuard Premium powder coat in black color.
 - b. PowderGuard Premium powder coat color as selected by the Architect.
 - c. PowderGuard Zinc base coat, gray.

- d. PowderGuard Zinc base coat with PowderGuard Premium powder coat color as selected by the Architect.
- e. PowderGuard Textured powder coat color as selected by the Architect.
- f. PowderGuard Max powder coat color as selected by the Architect.
- 8. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
- 9. Hood:
 - a. 24-gauge galvanized steel with intermediate supports as required.
 - b. Stainless steel, 24-gauge hood with intermediate supports as required.
 - c. Aluminum hood with intermediate supports as required.
- 10. Manual Operation:
 - a. Manual push up for doors up to 96 SF.
 - b. Chain hoist for doors up to 96 SF.
 - c. Chain hoist for doors over 96 SF.
 - d. Crank operation.
- 11. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
 - a. Sensing Edge Protection:
 - 1) Pneumatic sensing edge.
 - 2) Electric sensing edge.
 - b. Operator Controls:
 - 1) Push-button operated control stations with open, close, and stop buttons.
 - 2) Key operation with open, close, and stop controls.
 - 3) Push-button and key operated control stations with open, close, and stop buttons.
 - 4) Controls for interior location.
 - 5) Controls for exterior location.
 - 6) Controls for both interior and exterior location.
 - 7) Controls surface mounted.
 - 8) Controls flush mounted.
 - c. Special Operation:
 - 1) Vehicle detector operation.
 - 2) Radio control operation.
 - 3) Card reader control.
 - 4) Photocell operation.
 - 5) Door timer operation.
 - 6) Commercial light package.
 - 7) Explosion and dust ignition proof control wiring.
 - d. Motor Voltage: 115/230 single phase, 60 Hz.
- 12. Wind Load Design:
 - a. Standard wind load shall be 20 PSF.
 - b. Miami-Dade County NOA ____.
 - c. FBC certification FL# ____.
 - d. TDI approval # ____.
- 13. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.
- 14. Locking:
 - a. Two interior bottom bar slide bolts for manually operated doors.
 - b. Chain keeper locks for chain hoist operation.
 - c. Interior slide bolt lock for electric operation with interlock switch.
 - d. Cylinder lock.

15. Wall Mounting Condition:
 - a. Face-of-wall mounting.
 - b. Between jambs mounting.
16. Vision Lites: Provide with 3 inches by 5/8 inch (76 mm by 16 mm) uniformly spaced openings.
 - a. Provide open with no cover.
 - b. Provide with Plexiglas covers over openings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.
- B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.
- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
- G. Install perimeter trim and closures.
- H. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

3.4 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION 08 33 23

SECTION 08 41 13 – ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Extent of aluminum entrances and storefronts as indicated on drawings and schedules.
- B. Manually operated aluminum/glass doors, complete with glass, glazing and finish hardware.
- C. Aluminum framing for exterior windows.
- D. Aluminum casement windows with all related hardware.
- E. Aluminum framing for interior openings as indicated on drawings and schedules.
- F. Sealant work required for watertight installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 08 80 00, "Glass and Glazing"
- B. Section 08 70 00, "Finish Hardware"

1.03 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including the General and Supplementary Conditions and Division No. 1 Specifications, apply to work of this section.

1.04 REFERENCE STANDARDS

- A. Requirements for reference standards are defined in Sections 01 42 00 and 01 42 16.

1.05 DESIGN / PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
 - 1. Doors shall meet a minimum of 140 mph rating.
 - 2. Impact Resistance shall be in compliance with IBC 2021, ASCE 7-16, Risk Category III.

1.05 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 01 33 00. Indicated complete elevations of doors, framing, assemblies, installation and assembly conditions, details of construction; finishes, location, and installation of hardware; size, shape and thickness of materials, joints and connections, and details of joining with other work. Indicate hardware types, styles, finish, and shape.
- B. Submit manufacturer's product data for doors and framing system with shop drawings indicating complete instruction for installations.
- C. Provide certified test results showing that entrance and storefront systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.
- D. Must be stamped/sealed by an independent Engineering firm.

1.06 QUALITY ASSURANCE

- A. Provide entrances doors and storefront framing system by a single manufacturer capable of showing prior production

of units similar to those required.

- B. Provide doors and framing systems produced by a single manufacturer with not less than 5 years successful experience in the fabrication of assemblies of the type and quality required.
- C. Entrances and storefront shall be installed by a firm that has not less than 5 years successful experience in the installation of systems similar to those required.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aluminum Members: Provide alloy and temper recommended for strength, corrosion resistance, and applications of required finish; comply with ASTM B221 for extrusions and ASTM B209 for sheet or plate.
- B. Fasteners: Provide fasteners of aluminum, non-magnetic stainless steel, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum components, hardware, anchors, and other components.
- C. Reinforcement: Where fasteners screw anchor into aluminum less than 0.125" thick reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splinted grommet nuts.
- D. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of member or hardware being fastened.
 - 1. Provide Phillips flat-head screw for the exposed fasteners.
- E. Concealed Flashing: Provide 26 gauge minimum dead-soft stainless-steel or 0.026" minimum extruded aluminum alloy and type selected by manufacturer for compatibility with other components.
- F. Brackets and Reinforcement: Provide high-strength aluminum brackets and reinforcements; otherwise provide non-magnetic steel or hot dip galvanized steel complying with ASTM A386.
- G. Concrete/Masonry Inserts: Provide concrete and masonry inserts fabricated from cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A386.
- H. Compression Weather Stripping: Provide the manufacturer's standard replaceable compressible weather stripping gaskets of molded neoprene complying with ASTM D2000 or molded PVC complying with ASTM D2287.
- I. Sliding Weatherstripping: Provide the manufacturer's standard replaceable weatherstripping of wool, poly propylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.
- J. Sill Flashing: Provide .040 aluminum brake metal sill flashing.

2.02 FABRICATION

- A. General: Sizes of doors, windows, framing systems, etc. are indicated on drawings. All dimensions shall be field verified.
- B. Prefabrication: Before shipment to the project site, complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible.
 - 1. Do not drill and tap for surface mounted hardware until time of installation at project site.
- C. Welding: Comply with AWS recommendations; grind exposed welds smooth and restore mechanical finish.
- D. Reinforcing: Install reinforcing as required for hardware and necessary for performance requirements, sag resistance and rigidity.

- E. Dissimilar Metals: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.
- F. Fasteners: Conceal fasteners wherever possible.
- G. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops, at other edges, provide sliding weatherstripping retained in adjustable strip mortises into door edge.
 - 1. Provide EPDM in vinyl blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.
- H. Aluminum pocket filler: for exterior frames with no glass.

2.03 FINISHES

- A. Clear Anodized Finish: Provide NAAMM AA-M12 C22 A31, Class I (Non-specular as fabricated mechanical finish; chemical etch, medium matte, min. thickness 0.7 mil) clear anodized finish.

2.04 ALUMINUM STOREFRONT SYSTEM

- A. Storefront Framing System: Provide inside outside matched resilient flush-glazed storefront framing systems with provisions for glass replacement. Shop fabricate and preassemble frame components where possible.
- B. Glazing: Provide 1" thick insulated unit in accordance with Section 08800.
- C. Manufacturers
 - 1. United State Aluminum Corporation; 450 Flush Glazing System
 - 2. Kawneer Company, Inc. Niles, MI, "Tri-FAB" 450 for 1" Glazing.

2.05 ALUMINUM ENTRANCE DOORS

- A. Type: Medium STILE, manually operated, finish to match aluminum glass wall system.
- B. Provide manufacturer's standard threshold at exterior doors and where so noted on drawings.
- C. Manufacturer (must be same as for storefront system)
 - 1. United States Aluminum Corp.
 - 2. Kawneer Company, Inc.

2.06 ALUMINUM CASEMENT WINDOWS

- A. Type: Aluminum commercial grade casement windows as indicated on drawings. Aluminum finish to match storefront framing.
- B. Windows shall be provided with a full egress arms to open 90 degrees.
- C. Window units shall be provided with necessary accessories to provide a complete and weatherproof installation.
- D. Qualifications: Window manufacturer shall have been regularly engaged in fabrication of windows of this type for not less than 10 years. Windows shall conform to AAMA P-C50 specs.

2.07 HARDWARE

- A. General: Refer to hardware (Section 08700) for requirements for hardware items other than those indicated to be provided by aluminum entrance manufacturer.
- B. Provide manufacturer's heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number and type recommended by manufacturer for service required; finish and color to match door.

- C. Offset Pivot Sets: Provide offset pivot assemblies complying with ANSI A456.4, Grade 1; provide exposed parts of cast aluminum alloy; provide intermediate pivot for doors over 7'-6" high.
- D. Surface Mounted Overhead Closers: Provide surface-mounted overhead closure, modern type with cover, for hinge side installation; comply with ANSI A156.4, Grade 1. Comply with manufacturer's recommendations for size closer, depending on door size, exposure to weather and anticipated frequency of use. Comply with ADA requirements. Include the following:
 - 1. Hold-Open arm
 - 2. Delayed-Action closing
- E. Deadlocks: Provide max. security type deadlocks with min. 1" pivoted bolt and stainless steel, strike boss; Comply with ANSI A156.5, Grade 1 with thumb turn latch. Rim cylinder by others.
- F. Panic Hardware: Provide heavy-duty concealed rod type flush bolts complying with UL 305. Von DuPrin 3547. Exit Device shall match style used on all other doors.
- G. Flush bolts: Provide standard edge mortised lever extension type flush bolts complying with ANSI A156.16 for inactive leaves of pairs of doors. Provide flush bolts at both the top and bottom of doors.
- H. Pull handles: Provide 1" diameter, 3-1/4" projection extruded aluminum pull handle with stanchions spaced 18" apart.
- I. Thresholds: Provide extruded aluminum threshold in mill finish, complete with anchors and clips, coordinated with pivots.

2.08 SEALANT

- A. Type: Of exterior quality specified in Section 07 92 00.

PART 3 - EXECUTION

3.01 PROJECT CONDITIONS

- A. Field Measurements: Check openings by field measurements before fabrication to ensure proper fitting of work: show measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in the work. Where necessary, proceed with fabrication without field measurements, coordinate fabrication tolerances to ensure proper fit.

3.02 INSTALLATION

- A. Install aluminum framing, windows, and doors in accordance with manufacturer's recommendations and approved shop drawings. Ensure assemblies are plumb, level and free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- B. Use sufficient anchorage devices to securely and rigidly fasten door and frame assemblies to building.
- C. Coordinate glass and glazing work with Section 08800.
- D. Install hardware in accordance with manufacturer's recommendations using proper templates. Coordinate this work with Section 08 70 00 - Finish Hardware.
- E. Install about insulation in slim spaces around perimeter of door and frame assemblies to maintain continuity of thermal barrier.
- F. Install perimeter sealant and related backing materials in accordance with workmanship and installation requirements indicated in Section 07 92 00.
- G. Install aluminum pocket filler in exterior frames with no glass.

3.03 PROTECTION

- A. Protect aluminum surfaces that will abut masonry, concrete, wood, or steel from contact by neoprene gaskets or bituminous paint to prevent galvanic or corrosive action. Protect as recommended by door manufacturer. Comply with requirements specified under "Dissimilar Materials" in the Appendix of AAMA 101-85.

3.04 TOUCH UP PAINT

- A. Upon completion of the work, deliver to the Owner a minimum of one pint of paint of type and quality especially formulated to touch up the specified metal and finish.

END OF SECTION 08 41 13

SECTION 08 70 00 – BUILDING HARDWARE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Definition: "Builders Hardware" includes items known commercially as builder's hardware which are required for swing, sliding and folding doors.

1.02 QUALITY ASSURANCE

- A. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.
- B. Supplier: A recognized builders hardware supplier who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or has in employment, an experienced hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
- C. Fire - Rated Openings: Provide hardware for fire-rated openings in compliance with *NFPA Standard No. 80*. Provide only hardware which has been tested and listed by *UL* for types and sizes of doors required and complies with requirements of door and door frame label. Where emergency exit devices indicating "Fire Exit Hardware".

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information for each item of hardware. Include whatever information may be necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts and finish. Transmit copy of applicable data to Installer.
- B. Hardware Schedule: Submit final hardware schedule in the manner and format specified complying with the actual construction progress schedule of requirements. Hardware Schedules are intended for coordination of work.
- C. Final Hardware Schedule: Based on builder hardware indicated, organize hardware schedule into "hardware sets" indicated, complete designations of every item required for each door or opening. Include the following information:
 - 1. Type, style, function, size, and finish of each hardware item.
 - 2. Name and manufacturer of each item.
 - 3. Fastenings and other pertinent information.
 - 4. Location of hardware set cross - referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - 5. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
- D. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (*e.g., hollow metal frames*) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by builder's hardware, and other information essential to the coordinated review of hardware schedule.
- E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owners of builders' hardware, submit one sample of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
- F. Submit in accordance with Section 01 33 00 – Submittal Procedures.

1.04 PRODUCT HANDLING

- A. Packaging of hardware, on a set by set basis, is the responsibility of the supplier. As material is received by the hardware supplier from the various manufacturers, sort and repackage in containers marked with the hardware set number. Two or more identical sets may be packed in the same container.

- B. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.
- C. Provide secure lock-up for hardware delivered to the project but not yet installed. Control and handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.

1.05 JOB CONDITIONS

- A. Coordination: Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security, and similar requirements indicated, as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper locations (*shop or project site*) for installation.
- B. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware.

PART 2 - PRODUCTS

2.01 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders' hardware is indicated in the Builders Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.
- B. Manufacturer's product designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated, or where more than one manufacturer is listed, the comparable product of one of the other manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

2.02 MATERIALS AND FABRICATION

- A. Hand of door: The drawings show the direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.
- B. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (*omit removable nameplates*), except in concoction with required *UL* labels and as otherwise acceptable to the Architect. Manufacturer's identification will be permitted on rim of lock cylinders only.
- C. Base Metals: Product hardware units of the basic metal and forming method indicated, using the manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (*commercially recognized*) quality than specified for the applicable hardware units by *FS FF-H-106*, *FS FF-G111*, *GS GG-H-116* and *FS F-H-121*.

Do not provide furnish "optional" materials of forming methods for those indicated, except as otherwise specified.
- D. Fastener: Manufacture hardware to conform to published templates, generally prepared for machine screw published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- E. Furnish screws for installation, with each hardware item. Provide Phillips flathead screws except as otherwise indicated. Finish exposed (*exposed under any condition*) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
- F. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where the bolt head of the nut on the opposite face is exposed in other work, except where it is not feasible to

adequately reinforce the work.

- G. Tools for Maintenance: Furnish a complete set of specialized tools as needed of Owner's continued adjustment, maintenance, and removal and replacement of builder's hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by the Architect.
- B. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as otherwise directed by Architect.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever surfaces which are later to be painted or finished in another way. Coordinated removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.02 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating ventilating equipment.
- C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

END OF SECTION 08 70 00

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for doors indicated.
 - 2. Keyed cylinders as indicated.
- B. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. Florida Building Codes for Hurricane (NOA) for exterior openings.
- C. Intent of Hardware Groups
 - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.
- D. Allowances
 - 1. Refer to Division 1 for allowance amount and procedures.
- E. Alternates
 - 1. Refer to Division 1 for Alternates and procedures.

1.02 SUBSTITUTIONS:

- A. Comply with Division 1.

1.03 SUBMITTALS:

- A. Comply with Division 1.
- B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit 6 copies of catalog cuts with hardware schedule.
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.

1. List groups and suffixes in proper sequence.
 2. Completely describe door and list architectural door number.
 3. Manufacturer, product name, and catalog number.
 4. Function, type, and style.
 5. Size and finish of each item.
 6. Mounting heights.
 7. Explanation of abbreviations and symbols used within schedule.
 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Architect)
1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 2. 3 samples of metal finishes
- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 2. Copy of final hardware schedule, edited to reflect, "As installed".
 3. Copy of final keying schedule
 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.04 QUALITY ASSURANCE

- A. Comply with Division 1.
1. Exterior Openings Severe Windstorm Components testing: Listed and labeled by a testing and inspecting agency acceptable to authority having jurisdiction, based on testing according to ANSI A250.13. Further compliance with Florida Building Codes for Hurricane (NOA) for Exterior Openings.
 2. Statement of qualification for distributor and installers.
 3. Statement of compliance with regulatory requirements and single source responsibility.
 4. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
 5. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
 6. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.

- b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
- 7. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Comply with Division 1.
 - 1. Deliver products in original unopened packaging with legible manufacturer's identification.
 - 2. Package hardware to prevent damage during transit and storage.
 - 3. Mark hardware to correspond with "reviewed hardware schedule".
 - 4. Deliver hardware to door and frame manufacturer upon request.
- B. Storage and Protection: Comply with manufacturer's recommendations.

1.06 PROJECT CONDITIONS:

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.07 WARRANTY:

- A. Refer to Conditions of the Contract
- B. Manufacturer's Warranty:
 - 1. Closers: Ten years
 - 2. Exit Devices: Three Years
 - 3. Locksets & Cylinders: Three years
 - 4. All other Hardware: Two years.

1.08 OWNER'S INSTRUCTION:

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.09 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
 - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
 - 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.

- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Hinges	Stanley	Bommer, McKinney
Continuous Hinges	Stanley	
Locksets	Best	Sargent 10 Line, Schlage D
Cylinders	Best	No Substitution
Closers	Stanley D-4550	Sargent 350, LCN 4040
Push/Pull Plates	Trimco	Rockwood, CR Laurence
Protection Plates	Trimco	Rockwood, CR Laurence
Overhead Stops	ABH	Rockwood
Door Stops	Trimco	Rockwood, CR Laurence
Track & Hardware	Henerson	K N Crowder
Threshold & Gasketing	National Guard	Zero, Reese, Pemko

2.02 MATERIALS:

- A. Hinges:
1. Template screw hole locations
 2. Minimum of 2 permanently lubricated non-detachable bearings
 3. Equip with easily seated, non-rising pins
 4. Sufficient size to allow 180-degree swing of door
 5. Furnish hinges with five knuckles and flush concealed bearings
 6. Provide hinge type as listed in schedule.
 7. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
 8. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
 9. UL10C listed for Fire
- B. Geared Continuous Hinges:
1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
 2. Anti-spinning through fastener
 3. UL10C listed for 3 hour Fire rating
 4. Non-handed
 5. Lifetime warranty
 6. Provide Fire Pins for 3-hour fire ratings
 7. Sufficient size to permit door to swing 180 degrees
- C. Cylindrical Type Locks and Latchsets:
1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed
 2. Fit modified ANSI A115.2 door preparation
 3. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
 4. Locksets to have anti-rotational studs that are thru-bolted
 5. Keyed lever shall not have exposed "keeper" hole
 6. Each lever to have independent spring mechanism controlling it

7. 2-3/4 inch (70 mm) backset
 8. 9/16 inch (14 mm) throw latchbolt
 9. Provide sufficient curved strike lip to protect door trim
 10. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
 11. Keyed lever to be removable only after core is removed, by authorized control key
 12. Provide locksets with 7-pin removable and interchangeable core cylinders
 13. Hub, side plate, shrouded rose locking pin to be a one-piece casting with a shrouded locking lug.
 14. Locksets outside locked lever must withstand a minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset
 15. Core face must be the same finish as the lockset
 16. Functions and design as indicated in the hardware groups
- D. Cylindrical Deadbolt:
1. Tested and approved by BHMA for ANSI A156.5, Operational Grade 1,
 2. Fit modified ANSI A115.3 door preparation
 3. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
 4. 2-3/4 inch (70mm) backset, or 2 3/8 inch backset as needed
 5. 1 inch throw deadbolt
 6. Provide locksets with 7-pin core.
- E. Cylinders:
1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
 2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
 3. Coordinate and provide as required for related sections.
- F. Door Closers shall:
1. Tested and approved by BHMA for ANSI 156.4, Grade 1
 2. UL10C certified
 3. Closer shall have extra-duty arms and knuckles
 4. Conform to ANSI 117.1
 5. Maximum 2 7/16 inch case projection with non-ferrous cover
 6. Separate adjusting valves for closing and latching speed, and backcheck
 7. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 8. Full rack and pinion type closer with 1½" minimum bore
 9. Mount closers on non-public side of door, unless otherwise noted in specification
 10. Closers shall be non-handed, non-sized and multi-sized.
- G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered.
- H. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
 2. Surface overhead stops shall be heavy duty bronze or stainless steel.
- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.

- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
- K. Kickplates: Provide with four beveled edges ANSI J102, 8 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- L. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- N. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
 2. UL10C Positive Pressure rated seal set when required.
- O. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½" for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
- P. Key Control: Provide one wall mounted key cabinet complete with hooks, index and tags. Hook quantity 50% over lock quantity

2.03 FINISH:

- Q. Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- R. Powder coat door closers to match other hardware, unless otherwise noted.
- S. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.04 KEYS AND KEYING:

- T. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- U. Cylinders, removable and interchangeable core system: Best Cormax Patented 7-pin.
- V. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- W. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- X. Furnish keys in the following quantities:
1. 2 each Grand Masterkeys
 2. 2 each Control keys
 3. 6 each Masterkeys

4. 3 each Change keys each keyed core
 5. 12 each Construction masterkeys
 6. 2 each Construction Control keys
- Y. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- Z. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.03 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.04 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers to ensure proper operation.
 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.

3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.05 SCHEDULE OF FINISH HARDWARE:

Manufacturer List

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
AD	Adams Rite
BE	Best Access Systems
BO	Bommer
HE	Heerson
NA	National Guard
PR	Precision
ST	Stanley
TR	Trimco

Option List

<u>Code</u>	<u>Description</u>
M5	GALVANIZED STEEL CHAIN
WC	PADLOCK WEATHER COVERS
B4E	BEVELED 4 EDGES
XSPL	21B CUT RESISTANT
P45-110	Spacer Block PA Brkt on Rabbet
P45-180	Drop Plate
CSK	COUNTER SINKING OF SCREWS

Finish List

<u>Code</u>	<u>Description</u>
313	Duronodic - Medium
613	Oxidized Satin Bronze, Oil Rubbed
628	Aluminum
626	Satin Chromium Plated
630	Satin Stainless Steel
652	Chromium Plated, Dull
689	Aluminum Painted
695	Dark Bronze Painted
RC121	RiteCoat Painted - Dark Bronze
DB	Dull Bronze

Hardware Sets

SET #1 – Aluminum Entrances / Storefronts

2	Continuous Hinge	662HD	DB	ST
1	Deadlock	MS1850S	313	AD
1	Threshold Bolt	4015		AD
1	Header Bolt	4016		AD
1	Header Bolt	4085		AD
1	Exit Indicator	4089-00	RC121	AD
1	Cylinder Guard	MS4043-02	RC121	AD

1 Strike	4001-032	313	AD
2 Mortise Cylinder	1E-74 PATD	613	BE
2 Door Closer	D-4550 CS P45-180	695	ST
1 Push Pull Bar Set	1738	613	TR
1 Lock Guard	1807	630	AB
1 Threshold	896 SDKB		NA
2 Door Bottom	95WH		NA
1 Decal	771		TR
NOTE: Weatherseals by door manufacturer.			
SET #2 – Insulated Steel Doors			
4 Hinges	CB191 4 1/2 X 4 1/2 NRP	630	ST
1 Lockset	93K-7D14DS3 PATD	626	BE
1 Lock Guard	1806	630	AB
1 Door Closer	D-4550 CS	689	ST
1 Threshold	896 SDKB	628	NA
1 Gasket	704 VA (Head)		NA
2 Gasket	704 EV (Jambs)		NA
1 Door Bottom	95WH		NA
SET #3 – Exterior Wood Doors			
1 Continuous Hinge	662HD	DB	ST
1 Deadlock	MS1850S	313	AD
1 Exit Indicator	4089-00	RC121	AD
1 Cylinder Guard	MS4043-02	RC121	AD
1 Strike	4001-032	313	AD
1 Mortise Cylinder	1E-74 PATD	613	BE
1 Thumb Turn	1E7A4 X C181	613	BE
1 Push Pull Bar Set	1738	613	TR
1 Wall Bumper	1270CV	613	TR
SET #4 – Interior Wood Doors			
1 Continuous Hinge	662HD	DB	ST
1 Deadlock	MS1850S	313	AD
1 Exit Indicator	4089-00	RC121	AD
1 Cylinder Guard	MS4043-02	RC121	AD
1 Strike	4001-032	313	AD
1 Mortise Cylinder	1E-74 PATD	613	BE
1 Thumb Turn	1E7A4 X C181	613	BE
1 Push Pull Bar Set	1738	613	TR
1 Wall Bumper	1270CV	613	TR
SET #5 – Interior Wood Doors (Passage)			
4 Hinges	CB179 4 1/2 X 4 1/2	652	ST
1 Lockset	93K-7R14DS3 PATD	626	BE
1 Wall Bumper	1270CV	626	TR
3 Silencers	1229A		TR
SET #6 – Interior Wood Doors (Restroom)			
4 Hinges	CB179 4 1/2 X 4 1/2	652	ST
1 Deadlock	83T-7SSTK PATD	626	BE
1 Push Plate	1001-3	630	TR
1 Pull Plate	1013-3B	630	TR
1 Door Closer	D-4551 REG.	689	ST

KING ARCHITECTS, INC.**DOOR HARDWARE
SECTION 08 71 00**

1	Mop Plate	KM050 4" x 1" LDW B4E CSK	630	TR
1	Wall Bumper	1270CV	626	TR
3	Silencers	1229A		TR
SET #7 – Interior Wood Doors (Mech. / Storage / Janitor)				
4	Hinges	CB179 4 1/2 X 4 1/2	652	ST
1	Lockset	93K-7D14DS3 PATD	626	BE
1	Door Closer	D-4550 CS	689	ST
3	Silencers	1229A		TR

END OF SECTION 08710

SECTION 08 80 00 – GLASS AND GLAZING

PART 1 - GENERAL

- 1.01 EXTENT of glass and glazing work is indicated on drawings and schedules. All exterior classroom windows shall be operable per the current NFPA 101 Life Safety Code 14.2.11.
- 1.02 SYSTEM PERFORMANCES
- A. Provides glass and glazing that has been produced, fabricated, and installed to withstand normal temperature changes, wind loading, impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.
- 1.03 QUALITY ASSURANCE
- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section of other referenced standards.
- 1.04 SUBMITTALS
- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.
- B. Certificate: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
- C. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designation type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
- 1.05 DELIVERY, STORAGE, AND HANDLING
- A. Protect glass and glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects to moisture including condensation, of temperature changes, or direct exposure to sun, and from other causes.
- 1.06 PROJECT CONDITIONS
- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but at not limited to, the following:
1. AFG Industries, Inc.
 2. Libbey-Owens-Ford Co.
 3. PPG Industries, Inc.
 4. Or approved equal.
- 2.02 GLASS PRODUCTS, GENERAL

- A. Primary Glass Standard: Provide primary glass which complies with FS DD-G-451 requirements, including those indicated by reference to type, class, quality, and form.
- B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with FS DD-G-1403 requirements, including those indicated by reference to grade, style, type, quality, and class.
- C. Sizes: Fabricated glass to sizes required for glazing openings indicated, with edges clearances and tolerances complying with recommendations of glass manufacturer. Provide thickness indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.03 PRIMARY GLASS PRODUCTS

- A. Clear Float Glass: Class 1 (transparent), quality q3 (glazing select).
- B. Tinted Float Glass: Type I, Class 2 (heat absorbing and light reducing), Quality q3 (glazing select).

2.04 PRIMARY GLASS PRODUCTS

- A. General: Refer to primary and heat-treated glass requirements relating to properties of un-coated glasses make up laminated glass products.
- B. Plastic Interlayer: Provide glass fabricator's standard polyvinyl butyral interlayer for laminating panels of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in clear or colors and of thickness indicated.
 - 1. Product: Subject to compliance with requirements, provide "Saflex" by Monsanto Co.
- C. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.
- D. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with a 0.030" thick plastic interlayer and complying with requirements indicated below:
 - 1. Glass Characteristics: Float glass, complying with requirements for class, tint, grade, and thickness of each pane (ply) indicated on drawings.
- E. Mirror Glass: 1/4" thick, Type I, Class 1, Quality q2, conforming to FS DD-G-451, with silvering, copper coating, and protective organic coating complying with FS DD-M-411.

2.05 GLAZING SEALANTS

- A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicated and conditions at time of installation.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.
- C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- D. Silicone Glazing Sealant: Single components elastomeric silicone sealant complying with FS TT-S-001543, Class A, nonsag; and with ASTM C 920, Type S, Grade NS, Class 25, Use G and, as applicable to use indicated.

2.06 GLAZING GASKETS

- A. Lock-Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.
- B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded neoprene or EPDM gaskets of profile and hardness required to maintain watertight seal; complying with ASTM C 864, Option 1.

2.07 MISCELLANEOUS GLAZING MATERIALS

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primer, and Sealers: Type recommended by sealant or gaskets manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required or compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- D. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearance, and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING-GENERAL

- A. Comply with combined printed recommendations of glass manufacturers, of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Glazing channel dimensions as indicated in details are intended to provide or necessary bite on glass, minimum edge and face clearances, and adequate sealant thickness', with reasonable tolerances. Adjust as required by job conditions to time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block on rotating glass units to prevent damage to glass corners. Do not impact glass units to framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top to opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass, and impairs performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by pro-construction sealants, as determined by pro-construction sealant-substrate testing.

3.04 GLAZING

- A. Install setting blocks of proper size in sill rabbit, located one quarter of glass width from each corner, but no closer than 6", unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up materials, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

3.05 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contamination substance resolution from construction operations. If, despite such protection, contamination substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
- D. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- E. Wash glass on both faces not more than four (4) days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION 08 80 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Exterior gypsum board for ceilings and soffits.
 - 3. Texture finishes.
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
 - 2. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
 - 3. Section 09 30 00 "Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
 - 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.03 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.05 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

1.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.02 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- C. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site.
- D. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

1.03 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
 - 1. [Georgia-Pacific Gypsum LLC.](#)
 - 2. [National Gypsum Company.](#)
 - 3. [USG Corporation.](#)
 - 4. Substitutions: see Section 01 25 00 – Substitution Procedures.
- B. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 3.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch, regular type or 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

1.04 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet .
 - 2. Shapes:
 - a. Cornerbead.
 - b. Expansion (control) joint.

1.05 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: 10-by-10 self-adhesive glass mesh.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound .

1.06 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

PART 3 - EXECUTION

1.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

1.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

1.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Wallboard Type: As indicated on Drawings .
 2. Type X: As indicated on Drawings .
 3. Ceiling Type: As indicated on Drawings .
 4. Abuse-Resistant Type: As indicated on Drawings .
 5. Moisture- and Mold-Resistant Type: As indicated on Drawings .
- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

1.04 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings .
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.

1.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile or where indicated on Drawings .
 3. Level 3: Where indicated on Drawings .
 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated .
 - a. Primer and its application to surfaces are specified in other Section 09 91 23 "Interior Painting." Level 5 is suitable for surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting. It is considered a high-quality gypsum board finish.
 5. Level 5: Where indicated on Drawings .
 - a. Primer and its application to surfaces are specified in other Section 09 91 23 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

1.06 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

KING ARCHITECTS, INC

SECTION 09 50 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Sections

1. Section 09 51 00 - Acoustical Ceilings
2. Section 09 51 13 - Acoustical Fabric-Faced Panel Ceilings
3. Section 09 53 00 - Acoustical Ceiling Suspension Assemblies
4. Section 09 20 00 - Plaster and Gypsum Board
5. Section 01 81 13 - Sustainable Design Requirements
6. Section 01 81 19 - Indoor Air Quality Requirements
7. Section 02 42 00 - Removal and Salvage of Construction Materials
8. Divisions 23 - HVAC Air Distribution
9. Division 26 - Electrical

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.
2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

KING ARCHITECTS, INC

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
 7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
 8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
 9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material-A. Armstrong Fire Guard Products
 10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
 11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
 12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 13. ASTM E 1264 Classification for Acoustical Ceiling Products
- B. International Building Code
 - C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality
 - D. NFPA 70 National Electrical Code
 - E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
 - F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
 - G. International Code Council-Evaluation Services Report - Seismic Engineer Report
 1. ESR 1308 - Armstrong Suspension Systems
 - H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report
 1. 0244 - Armstrong Single Span Suspension System
 - I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010
 - J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings
 - K. International Well Building Standard
 - L. Mindful Materials
 - M. Living Building Challenge
 - N. U.S. Department of Agriculture BioPreferred program (USDA BioPreferred).

1.4 SYSTEM DESCRIPTION

- A. Continuous/Wall-to-Wall

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

- C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with or supported by the ceilings.
- D. Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
 - 1. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 SUSTAINABLE MATERIALS

- A. Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.
 - 1. Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration Open Standard.
 - 2. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).
 - 3. Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).
 - 4. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.
 - 5. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.
 - 6. Products meeting LEED V4 requirements including:
 - a. Storage & Collection of Recyclables
 - b. Construction and Demolition Waste Management Planning
 - c. Building Life-Cycle Impact Reduction
 - d. Building Product Disclosure and Optimization Environmental Product Declarations
 - e. Building Product Disclosure and Optimization Sourcing of Raw Materials
 - f. Building Product Disclosure and Optimization Material Ingredients
 - g. Construction and Demolition Waste Management

1.7 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
 - 1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.
 - 3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory
- B. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

KING ARCHITECTS, INC

SECTION 09 50 00

- C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 PROJECT CONDITIONS

- A. Space Enclosure:
 - 1. Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.
 - 2. HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.
 - 3. HumiGuard Max Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Ceilings with HumiGuard Max performance can be installed in conditions up to 120°F (49°C) and maximum humidity exposure including outdoor applications, and other standing water applications, so long as they are installed with either SS Prelude Plus, AL Prelude Plus, or Prelude Plus Fire Guard XL suspension systems. Products with Humiguard Max performance can be installed in exterior applications, where standing water is present, or where moisture will come in direct contact with the ceiling. Only Ceramaguard with AL Prelude Plus suspension system can be installed over swimming pools.

1.11 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
 - 1. Acoustical Panels: Sagging and warping
 - 2. Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
 - 1. Acoustical panels: Ten (10) years from date of substantial completion
 - 2. Suspension: Ten (10) years from date of substantial completion
 - 3. Ceiling System: Thirty (30) years from date of substantial completion
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.12 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

B. Suspension Systems:

1. Armstrong World Industries, Inc.

C. Perimeter Systems

1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP

1. Surface Texture: Medium
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24 in x 24 in
5. Edge Profile: Angled Tegal 15/16 in for interface with PRELUDE XL 15/16" Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.70
7. Ceiling Attenuation Class (CAC) : ASTM C 1414; Classified with UL label on product carton 40
8. Sabin:N/A
9. Articulation Class (AC):
10. Flame Spread: ASTM E 1264; Class A (UL)
11. Light Reflectance (LR) White Panel: ASTM E 1477; 0.82
12. Dimensional Stability: HumiGuard Plus
13. Recycle Content: Post-Consumer - 1% Pre-Consumer - 55%
14. Acceptable Product: FINE FISSURED, 1717 as manufactured by Armstrong World Industries

2.3 METAL SUSPENSION SYSTEMS

A. Components:

1. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
 - a. Structural Classification: ASTM C 635 Intermediate Duty duty
 - b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
 - c. Sustainability: Environmental Product Declaration (EPD), Health Product Declaration (HPD)
 - d. Acceptable Product: PRELUDE XL 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three design load, but not less than 12 gauge.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

- A. Follow manufacturer installation instructions.
- B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
- C. Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.
- D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
- E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

END OF SECTION 09 50 00

SECTION 09 65 13.13 – RESILIENT BASE

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Resilient wall base and accessories.
 - 2. Substrate preparation.
- B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
 - 1. Section 03 30 00 CAST-IN-PLACE CONCRETE for concrete substrate; slab surface tolerances;
 - 2. Section 06 10 00 ROUGH CARPENTRY for plywood substrate and surface tolerances.
 - 3. Section 09 69 00 ACCESS FLOORING for resilient floor covering for access panels.
- C. References (Industry Standards):
 - 1. ASTM International (ASTM):
 - a. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
 - b. ASTM E648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 - c. ASTM E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - d. ASTM F710 Standard Practice for Preparing Concrete to Receive Resilient Flooring
 - e. ASTM F1861 Standard Specification for Resilient Wall Base
 - f. ASTM F386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
 - 2. Canadian ULC Standards (CAN/ULC):
 - a. CAN/ULC-S102.2 Surface Burning Characteristics
 - 3. National Fire Protection Association (NFPA):
 - a. NFPA 253 Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
 - b. NFPA 258 Test Method for Specific Density of Smoke Generated by Solid Materials
 - c. NFPA 255 Test Method of Test of Surface Burning Characteristics of Building Materials

1.3 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures.
- B. Product Data: Submit manufacturer's technical data sheet, care & maintenance document, submittal and/or warranty for each material and accessory proposed for use (available at www.roppe.com).
- C. Samples: Submit representative samples of each product specified for verification.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide resilient flooring materials manufactured in the United States of America by a firm with a minimum of 10 years' experience with resilient flooring materials of type equivalent to those specified.
 - 1. Manufacturer's quality management system must have ISO 9001:2000 approval.
 - 2. Provide resilient flooring products, including wall base, accessories and subfloor preparation products from one manufacturer to ensure color matching and compatibility.
 - 3. Manufacturer shall be capable of providing technical training and technical field service representation.
- B. Installer Qualifications: Installer must be professional, licensed, insured and acceptable to manufacturer of resilient flooring materials. Project Managers or Field Supervisors must be INSTALL (International Standards & Training Alliance) certified, CFI (Certified Floorcovering Installers) Certified and/or an FCICA (The Flooring Contractors Association) CIM (Certified Installation Manager) for the requirements of the project.
- C. Sustainable Design Requirements:
 - 1. Construction waste take back program for the purpose of reducing jobsite waste by taking back uninstalled waste flooring. Information is available at <https://roppe.com/impact/>.
 - 2. Wall base and accessories that are easily cleaned and do not require coatings and stripping, or use chemicals that may be hazardous to human health.
 - 3. Supply all required products that are CA 01350 compliant.
 - 4. Wall base and accessories that are free of materials known to be teratogenic, mutagenic or carcinogenic.
 - 5. Wall base and accessories that contain no polyvinyl chloride or plasticizers.
 - 6. Wall base and accessories that contain no halogens.
 - 7. Wall base and accessories that contain no asbestos.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.
- B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

1.6 PROJECT CONDITIONS

- A. Maintain temperature and humidity at service levels or the ambient temperature must remain steady ($\pm 10^{\circ}$ F) and be between 65° F and 85° F for at least 48-hours prior to, during and after installation. The ambient relative humidity is recommended to be between 40% and 65% RH; avoid dew point conditions.

1.7 WARRANTY

- A. Provide manufacturer's standard limited commercial warranty to cover manufacturing defects.

PART 2 - PRODUCTS

2.0 ACCEPTABLE MANUFACTURER

- A. Basis-of-Design: Roppe Corporation, 1602 N Union St., Fostoria, OH 44830. P: (800) 537 – 9527
- B. Substitutions: No substitutions permitted.

2.1 RESILIENT WALL BASE

A. Thermoplastic Wall Base:

1. Product Name:	700 Series Base
2. Material Specification: ASTM F1861	Type TP – rubber, thermoplastic Group 2 – layered (multiple layers) Style B – Cove
3. Material Height:	6" (152.1 mm)
4. Material Thickness: ASTM F386	1/8" (3.2 mm)
5. Material Length:	48" sections (1.22 m), 120' (36.58 m)
6. Limited Warranty:	1 year, Manufacturing Only
7. Material & Composition:	Unique blend of a thermoplastic and rubber backing covered with a durable colored top layer.
8. Color:	70 standard colors
9. Surface Burning ASTM E84/NFPA 255	Class A
10. Flammability/Critical Radiant Flux: ASTM E648 / NFPA 253	Class 1
11. Smoke Density: ASTM E662/NFPA 258	Passes <450
12. Surface Burning: CAN/ULC-S102.2	FSR 10, SDS 60
13. Substrate Preparation:	Per ASTM F710 and Roppe Technical Data Sheet

2.2 INSTALLATION PRODUCTS:

A. Acrylic Adhesives

1. Product Name:	WB-600
Product Description:	Acrylic Wall Base Adhesive
Product Usage:	For standard, interior wall base installations over porous substrates only.
2. Product Name:	AW-510
Product Description:	Acrylic Wet-Set Adhesive
Product Usage:	For interior wall base installations that require a more aggressive bond over porous substrates only
3. Product Name:	C-630
Product Description:	Water-Based Contact Adhesive
Product Usage:	For interior wall base installations that require a more aggressive bond over porous or non-porous substrates.

2.3 MAINTENANCE PRODUCTS:

A. Cleaners

1.	Product Name:	NC-900
	Product Description:	All-Purpose pH Neutral Cleaner
	Product Usage:	For initial, daily or routine maintenance and spot cleaning.
2.	Product Name:	PR-930
	Product Description:	Performance Finish Remover
	Product Usage:	For removal of finish that has been accidentally or erroneously applied to material.

PART 3 - EXECUTION

3.0 GENERAL

A. General Contractor Responsibilities:

1. Supply a safe, climate controlled building and subfloor as detailed in Roppe Technical Data Sheets.
2. Ensure substrate meets the requirements of ASTM F710, Roppe Technical Data Sheets and Excelsior Technical Data Sheets.
3. Confirm the porosity of all substrates to ensure proper adhesive usage.
4. Provide a secure storage area that is maintained permanently or temporarily at normal operating temperature and humidity conditions (except walk in freezers or similar) between 65° F and 85° F and between 40% and 65% relative humidity, for at least 48-hours prior to and during the application of the flooring, so the flooring contractor can acclimate the flooring materials per manufacturer's instructions.
5. Provide an installation area that is weather tight and maintained either permanently or temporarily at ambient service temperature and humidity (except walk in freezers or similar), normal operating temperature and humidity conditions (except walk in freezers or similar) between 65° F and 85° F and between 40% and 65% relative humidity, for at least 48-hours prior to and during the application of the flooring per the manufacturer's instructions.
6. Ensure areas with direct prolonged exposure to sunlight are protected with protective UVA/UVB restrictive coatings or films.
7. Areas where the base are installed that are subject to direct sunlight through doors or windows should have them covered using blinds, curtains, cardboard or similar for the time of the installation and 72-hours after the installation to allow the adhesive to cure. Note: These areas should be installed using wet adhesives only.
8. Conduct initial maintenance prior to final usage per the Roppe Care & Maintenance Documents. Do not conduct initial maintenance until adhesive has cured per the adhesive technical data.

B. Flooring Contractor Responsibilities:

1. Provide trained installers that are professional, licensed, insured and acceptable to manufacturer of resilient flooring materials.
2. Ensure installers or installation teams meet one of the following requirements:
 - a. Have completed INSTALL (International Standards & Training Alliance) or CFI (Certified Floorcovering Installers) training programs and/or are certified by INSTALL or CFI.
 - b. Are being supervised by Project Managers or Field Supervisors that are INSTALL (International Standards & Training Alliance) certified, CFI (Certified Floorcovering Installers) Certified and/or an FCICA (The Flooring Contractors Association) CIM (Certified Installation Manager).
3. Follow all requirements in the appropriate Roppe and/or Excelsior Technical Data Sheets, Care & Maintenance Documents, Warranties and other technical documents or instructions.

3.2 EXAMINATION

- A. General: Follow guidelines laid out in Division 01, Section 017100 – Examination and Preparation, as well as Section 014300 – Quality Assurance.
- B. Verification of Conditions: Inspect all substrates to ensure they are clean, smooth, permanently dry, flat, and structurally sound.

3.3 SUBSTRATE PREPARATION

- A. General: Follow guidelines laid out in Division 01, Section 017100 – Examination and preparation. All work required to ensure substrate or subfloor meets manufacturers guidelines are the responsibility of the general contractor.
- B. Preparation: Ensure substrate meets the requirements of ASTM F710, Roppe Technical Data Sheets and Excelsior Technical Data Sheets. Substrates must be free of visible water or moisture, dust, sealers, paint, sweeping compounds, curing compounds, residual adhesives and adhesive removers, concrete hardeners or densifiers, solvents, wax, oil, grease, asphalt, visible alkaline salts or excessive efflorescence, mold, mildew and any other extraneous coating, film, material or foreign matter.

3.4 INSTALLATION

- A. General: Follow all relevant guidelines detailed in Division 01, as well as flooring and adhesive manufacturer's technical data sheets.
- B. Interface With Other Work: If caulking or sealing is required after installation, please contact the manufacturer for a suitable, matching caulk.

3.5 CLEANING & MAINTENANCE

- A. General: Clean up installation area and sweep, dust or wipe material to remove any dirt, dust or debris.
- B. Initial Maintenance: Conduct initial maintenance per the manufacturer's Care & Maintenance documents (www.roppe.com).

3.6 CLOSEOUT ACTIVITIES

- A. General: Follow all federal, state and local requirements and Division 01 Section 017600 – Protecting Installed Construction and Section 017800 – Closeout Submittal requirements for these activities.
- B. Protection: Protect newly installed material with construction grade paper or protective boards, such as Masonite or Ram Board, to protect material from damage by other trades. Limit usage and foot traffic according to the adhesive's requirements. When moving appliances or heavy furniture, protect wall base from scuffing and tearing using temporary floor protection.

END OF SECTION 09 65 13.13

SECTION 09 65 19.23 – VINYL TILE FLOORING

PART 1 – GENERAL

1.01 SUMMARY

- A. This section deals with resilient flooring found in the drawings and schedules of the contract that meet the requirements of this section.

1.02 RELATED SECTIONS

- A. Division 3 – Cement: not covered in this section.
- B. Division 6 – Wood and plastic: not covered in this section.
- C. Division 7 – Thermal and humidity protection: not covered in this section.
- D. Division 9 – Other sections containing information related to floor finishes: not covered in this section.

1.03 REFERENCES

- A. ASTM F 710: Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- B. ASTM E 648: Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- C. ASTM E 662: Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- D. ASTM F 1869: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F 2170: Determining Relative Humidity in Concrete Floor Slabs Using in Situ Probes.

1.04 ITEMS TO DELIVER

- A. Provide the product's Technical Specifications data sheet as well as all installation and maintenance instructions.
- B. When required, supply floor drawings and installation plans.
- C. Supply a set of samples measuring at least 3 in. (7.5 cm) by 6 in. (15 cm) of the complete range of colors and finishes chosen for the project.
- D. When required, provide Mohawk Group's attestation, certified by an independent laboratory, confirming that the flooring complies with the fire standards of the following tests:
 - 1. ASTM E 648; Critical Radiant Flux: 0.45 watts/cm² or more
 - 2. ASTM E 662; Smoke Density: 450 or less
- E. Provide Mohawk Group's Warranty Certificate.

1.05 QUALITY ASSURANCE

- A. Mohawk Group flooring shall be installed by an installer qualified in the installation of resilient flooring.
- B. In accordance with the technical instructions in the installation instructions, use all accessories recommended by Mohawk Group when installing its flooring.

- C. Follow the instructions specified in the most recent version of Mohawk Group's installation instructions.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver the flooring to the installation site in Mohawk Group's original packaging. Indicate the project name and handling instructions on the outside of the boxes.
- B. Advise the carrier of any damaged material and indicate it on the packing slip.
- C. Store the flooring inside, sheltered from extreme hot or cold temperatures. Place the material on a smooth level floor or where there is uniform solid support in a clean, dry well-ventilated area. Unstack the pallets. The long-term storage temperature must be maintained between 65°F (18°C) and 85°F (29°C). Protect adhesive and flooring material from freezing, extreme heat, and direct sun exposure.
- D. Acclimatize the subfloor, all flooring material and adhesive for 48 hours before, during and after the installation by maintaining the room temperature between 65°F (18°C) and 85°F (29°C). The pallets should be unstacked 24 hours prior to use.
- E. Afterwards, maintain the room temperature between 65°F (18°C) and 85°F (29°C). Protect the material from direct sources of heat such as air vents and other types of heaters.
- F. Install the flooring after all other finishing work, including painting, have been completed.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Mohawk Group, 160 S. Industrial Blvd, Calhoun GA 30701 Telephone 800.241.4494. Web Site: www.mohawkgroup.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 13 – Substitution Procedures.

2.02 MATERIALS

- A. Detailed product construction specifications:

1.	Style Name:	Living Local Wood C2039
2.	Overall Thickness:	2.5 mm (.1")
3.	Wear Layer:	20 mil (0.5 mm)
4.	Finish:	M-Force
5.	Actual Size:	152.4mm x 1219.2mm
6.	Nominal Size:	6" W x 48" L
7.	Square Feet Per Carton:	36 sf/ctn (3.34 m ² /ctn)
8.	Pieces Per Carton:	60 cartons/pallet
9.	Pounds Per Carton:	29.7 lbs/ctn
10.	Installation Method:	Glue Down
11.	Underlayment:	Mohawk AccuSound™ (Optional)
12.	Color:	To be selected by Architect from manufacturer's full line.
- B. Complies with ASTM F1700, Class III, Type A - Smooth, Type B – Embossed.
- C. Living Local Wood is not recommended for environments where it could be exposed to oils and greases, whether mineral, animal, or vegetable.

- D. Refer to the product's Technical Specifications data sheet for detailed specifications.
- E. Living Local Wood has FloorScore certification.
- F. This product was manufactured in a factory that has ISO 9001 and ISO 14001 certifications.
- G. Made in United States.

2.03 ADHESIVE

- A. Mohawk Group requires the use of the following adhesives to maintain the product warranty:
 - 1. M99 Adhesive (up to 99% in-situ RH and a pH of 12.0).
 - 2. M95.0 Adhesive (up to 95% in-situ RH and a pH of 8 - 10.0)
 - 3. M700 Adhesive (up to 90% in-situ RH and a pH of 7 – 9).
 - 4. MS160 Spray Adhesive (up to 95% in-situ RH and a pH of 11.0)

2.04 OTHER MATERIAL

- A. Subfloor repairs: use a good-quality Portland cement-based compound modified with latex that has a minimal resistance to compression of 3500 lbs/sq. in. (246 kg/cm²). to fill, smooth or level subfloor imperfections.
- B. Self-levelling underlayment: use a Portland cement-based self-levelling underlayment modified with a polymer that has a minimal resistance to compression of 3500 lbs/sq. in. (246 kg/cm²).

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the subfloor before installation to ensure that the surface is clean, dry, smooth, structurally sound, and free from foreign substances that may adversely affect adhesion or cause discoloration. Furthermore, ensure that the subfloor is free of paint, varnish, adhesive, oil, grease, solvent, and other foreign substances, including treatment compounds, sealers and curing compounds that may adversely affect adhesion or alter the appearance or durability of the rubber flooring.
- B. Verify the surface to ensure there is no powder, scaling, or mold. If there is, remove it with a mechanical sander and level with a good-quality cement-based Portland primer.
- C. Slabs that have been either using a curing agent or a sealer will have to be treated to ensure that the adhesion has not been impaired.
- D. Do not install on cement slabs that have been subjected to adhesive chemical abatement unless an approved remediation system was used afterwards.
- E. Report and rectify all unsatisfactory conditions. Do not start flooring installation until all rectifications have been completed.

3.02 SUBFLOOR PREPARATION

- A. Level all rough surfaces and fill cracks and marks with a Portland cement-based patching compound modified with latex.
- B. Mechanically remove all surface contaminants such as paint, oil, grease, varnish, adhesive as well as various other products such as treatment compounds.

- C. Measure the humidity and pH levels in the cement in compliance with the following standards before installation:
 - 1. ASTM F 2170, Relative Humidity (RH) test using in situ probes.
 - 2. ASTM F 710, pH levels (test procedure 5.3.1).
 - 3. The ASTM test frequency recommendation is three (3) measures for the first 1,000 sq ft (92.9 sq m) and one (1) measure for each additional 1,000 sq ft (92.9 sq m).
- D. Ensure Moisture, Relative Humidity and pH tests have all been conducted and measurements meet manufacturer's recommendations.
- E. In case of doubt, test the adhesion on the cement subfloor or other surface that will be covered by the flooring. Do the test using the specified flooring and recommended adhesive.

3.03 RESILIENT FLOORING STALLATION

- A. Install the flooring according to the latest version of Mohawk Group's installation instructions. Use the tools, adhesives, trowel types and procedures recommended in the instructions.
- B. Acclimatize the subfloor, all flooring material and adhesive for 48 hours before, during and after the installation by maintaining the room temperature between 65°F (18°C) and 85°F (29°C). Afterwards, maintain the temperature between 65°F (18°C) and 85°F (29°C).

3.04 CLEANING AND PROTECTION

- A. Remove all excess adhesive immediately after installation as recommended in Mohawk Group's installation instructions.
- B. Before allowing traffic after installation, consult and follow the recommendations in Mohawk Group's installation instructions.
- C. Following installation and cleanup, if the work of all other trades has not yet been completed, protect the flooring by laying sheets of non-staining brown Kraft paper, and then a layer of plywood sheets (rolls of non-staining heavy cardboard material could also be used for protection).
- D. Follow the instructions in Mohawk Group's Maintenance Instructions when performing initial and regular maintenance procedures.

Please note that technical web site documents prevail.

END OF SECTION 09 65 19.23

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide and install all modular carpet and installation work as required by contract documents and their specifications.

1.2 QUALITY ASSURANCE

- A. Manufacturer –
1. The carpet manufacturer shall have no less than fifteen years of production experience with modular carpet similar to type specified.
 2. Commitment to quality - Carpet manufacturer shall provide verification of registration to the ISO 9001/9002 Quality Management System.
 3. Carpet manufacturer shall provide verification of registration in the ISO 14001 Environmental Management System.
 4. Commitment to sustainability - carpet manufacturer shall demonstrate through programs of source reduction, recycling, reuse, water conservation and conservation of raw material usage its commitment to sustainability
 5. Response to RFQ shall be accompanied by a letter confirming compliance with listed performance specifications signed off by an Officer of the Company.
 6. Manufacturer shall make available a list of qualified minority, disabled, women and veteran owned carpet dealers capable of installation per manufacturer's installation instructions and provide contact information for each name supplied.
 7. All products offered by the manufacturer shall be "standard running line" products and shall be available with no minimum order (single box availability).
 8. Manufacturer shall guarantee availability of recycled content product.
 9. The product warranty required herein shall be provided directly by the carpet manufacturer.

1.3 INSTALLATION PROVIDER –

- A. The installation provider shall be directly responsible for the quality of the completed floorcovering installation, including the quality of both the materials and labor used in the installation.
- B. The installation provider shall directly warrant to the end use all products, materials and services related to the floorcovering installation (including any floorcovering(s), or other products or materials used in the installation) meeting specifications set forth herein.
- C. The installation provider shall have successful carpet installation experience on work similar to the work of this Section.

1.4 SUBMITTALS – Please submit each of the following with your proposal (unless otherwise noted):

- A. Manufacturer's Data - Two (2) copies of carpet manufacturer's construction specifications, performance specification and installation instructions for carpet and related items specified.
- B. Fiber Verification – Certification from the fiber producer verifying use of premium, type 6,6 fiber or type 6. (Premium fibers are identified as Invista, Universal and Aquafil).
- C. Fibers extruded by carpet mills will be considered "non-premium" for purposes of this specification.
- D. All applicable product warranties provided by manufacturer.
- E. Installation provider's proof of insurance, copy of contractor's license, and worker's compensation certificate.
- F. Five (5) current project references for installation provider, with scope, date, and customer contact with phone number in compliance letter.
- G. Samples – Customary (standard) size carpet samples of each type of carpet, in each specified pattern, color, and construction.

H. Any alternatives to specified product(s) or approved manufacturers, to be considered, shall be submitted for approval at least ten (10) working days prior to bid or proposal to be considered.

I. Maintenance Instructions - Two (2) copies of the manufacturer's carpet maintenance instructions.

1.5 WARRANTY

A. Provide the following written warranties by carpet manufacturer for a period of not less than 15 years (non-prorated):

B. Wear - Surface fiber wear shall not be more than 10% by weight in 15 years. (Note: Wear warranty shall not require use of chair pads)

C. Static - Static generation shall be less than 3.0 kV at 70° F, and 20% R.H.

D. No delamination

E. No edge ravel

F. No dimensional instability (i.e., shrinkage, curling and doming) which adversely affect the ability of the tile to lie flat

G. Submit manufacturer's National Voluntary Laboratory Accreditation Program (NVLAP) certified test results to show that carpet meets or exceeds product performance specification criteria for carpet testing requirements under Section 2.1 hereof.

H. Installation provider shall warrant all installation services will be free from defects in workmanship for a period of at least one (1) year following their completion, and that in the event of defective services, the installation provider will re-perform the effected services and, as necessary, supply new products of the same or similar grade sufficient to repair or replace products adversely affected.

PART 2 PRODUCTS

Interface, The Standard – Granite color selection.

2.1 MODULAR CARPET TILE PERFORMANCE STANDARDS. Modular carpet tile shall meet the following performance standards:

0.1	Carpet Flammability	
	.1 Pill Test (ASTM D2859 or CPSC FF-1-70)	Passes
	.2 Radiant Panel Test (ASTM E648)	≥ 0.45 watts/cm ² , Class 1
0.2	Smoke Density (ASTM E662)	≤ 450 Flaming Mode
0.3	Dimensional Stability (Aachen Method Din 54318)	≤ 0.1% change
0.4	Static Generation at 70° F (AATCC 134 w/ neolite)	≤ 3.0 kV at 20% R.H.
0.5	Lightfastness (AATCC 16E)	≥ 4.0 after 60 hours
0.6	Gas Fade (AATCC 23)	4
0.7	Ozone Fade (AATCC 109)	4
0.8.1	Antimicrobial (ASTM E2471-05)	The carpet primary backing should display a minimum performance rating of "CI" (complete inhibition) or "PI" high (partial inhibition high < 10% coverage) against the three challenge microorganisms
or 0.8.2	Antimicrobial (AATCC 174, Part II)	≥ 90.0% reduction
0.9	Fungicidal (AATCC 174, Part III)	No growth
0.10	Soil/Stain Protection (AATCC 175-1991)	≥ 8.0 on the Red 40 Stain Scale
0.11	Sustainable Carpet Assessment Standard – NSF/ANSI 140	Gold minimum, as certified by 3 rd party

-
- 0.12 Carpet & Rug Institute Green Label Plus Any and all products shall pass Carpet & Rug Institute Green Label Plus. Certification number of the specified product category shall accompany submittal.
- 0.13 Carbon Neutral 3rd party verified
- 2.2 PRODUCT CONSTRUCTION SPECIFICATION. Modular carpet tile shall meet the following construction specifications:
- A. Yarn System: Universal Type 6,6 Nylon
 - B. Dye Method: 100% Solution Dyed
 - C. Construction: Tufted
 - D. Patterning: Integrated (topical application or wet printed patterning not allowed)
 - E. Texture: Textured Loop
 - F. Gauge: 1/12
 - G. Pile Height: 0.12 inch
 - H. Tufted Yarn Weight: 15 oz per sq. yard \
 - I. Primary Backing: Non-woven polyester. Woven primary backings not allowed.
 - J. Secondary Backing: Fiberglass Reinforced Thermoplastic Composite (polyolefin-free). Secondary backing shall be 100% recyclable at the end of its useful life and shall contain recycled content. Claims of 'recyclable' shall meet the Federal Trade Commission Part 260 -- Guides for the Use of Environmental Marketing Claims 260.7(d).
 - K. Soil/Stain Resistance: Application by fiber producer and manufacturer required. Use of polyfluorinated chemical (PFC) coatings is prohibited.
 - L. Antimicrobial: Antifungal and Antibacterial ASTM E 2471-05 Standard Test Method for Use of Seeded Agar for Screening Assessment of Antimicrobial Activity in Carpet. Minimum allowable growth ratings on washed and unwashed carpet samples after 72 hours incubation are complete to partial inhibition (<10% sample coverage) on shaven primary and unshaven fiber layers. Or, if AATCC 174 Parts II & III (AATCC 171 Washed) is used, shall pass both Part II and Part III of AATCC 174 with a minimum of 90% reduction both gram negative and gram positive bacteria and no visible growth against the fungi.
 - M. Size: 50cm x 50cm
 - N. Installation Method: All product shall be designed for Non-Directional installation.
- 2.3 PRODUCT SUBSTITUTION
- A. Substitutions: Substitutions not permitted.
- 2.4 ENVIRONMENTAL SPECIFICATIONS
- A. Recycled Content by total product weight: minimum of 59% total recycled content with recycled content in both the yarn and backing; a minimum of 57% post-industrial and a minimum of 2% post-consumer content is required.
 - B. Recycled versus Recyclable – Primary consideration will be given to carpet products in the following order of priority: (A) use of post consumer recycled content in both fiber and backing, (B) post consumer recycled content in the backing, (C) 100% recyclable product. Claims shall meet the Federal Trade Commission Part 260 -- Guides for the Use of Environmental Marketing Claims.

- C. Product platform shall have a 3rd party verified Environmental Product Declaration following ISO 14025 guidelines and a 3rd party verified Life Cycle Assessment following ISO 14040 guidelines.
- D. Carbon footprint of the Product – Proposal shall state the average quantity of greenhouse gas emissions associated with the entire life cycle of the product from raw material extraction through end-of-life, a description of any emission reduction credits used to offset the global warming footprint. If credits are claimed the proposal must identify, quantity claimed and the name of the 3rd party verifying this claim.

2.5 MINIMUM ANTIMICROBIAL CONSTRUCTION STANDARDS

- A. Antimicrobial preservative, registered by the EPA for use in carpeting, with broad spectrum efficacy against the growth of bacteria and fungi for a minimum of 15 years, assuming proper maintenance. The antimicrobial ingredient shall meet standards set by the U.S. General Services Administration (GSA) for Antimicrobial Carpet as supported by independent lab testing less than six months old.
- B. Manufacturer shall provide a stamped EPA technical data sheet for carpet. Antimicrobial preservative shall contain no arsenic, formaldehyde or heavy metals (tin, lead, mercury, silver, copper or zinc), be non-halogenated (no fluorine, chlorine, bromine or iodine) and non-phenolic. Blends of amine neutralized phosphated esters are preferable. Antimicrobial shall have low water solubility (30ppm), a vapor pressure of 12mm Hg at 27° C, and an oral LD₅₀ toxicity rate less than 2.4 grams/kg.
- C. The Antimicrobial preservative shall be incorporated into the primary backing of the product during the manufacturing process, not topically applied to the carpet fibers.
- D. The antimicrobial treated carpet when new shall pass GSA parameters for treated carpets via AATCC method 174 parts II and III. Initial performance shall be 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) and no fungal growth on either the primary backing or fibers both on washed (AATCC method 174) and non-washed samples. The Standard Test Method for Use of Seeded Agar for Screening Assessment of Antimicrobial Activity in Carpet (ASTM E 2471-05) may be used in lieu of AATCC method 174 parts II and III.
- E. The antimicrobial treated carpet shall maintain, for the warranted life of the carpet, a minimum of 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) listed in AATCC method 174 part II, provided the carpet is maintained as specified. Additionally, the antimicrobial treated carpet shall maintain a "no macroscopic growth" rating against Aspergillus niger 6275 at the primary backing in accordance with AATCC 174 part III.
- F. The preservative shall be biodegradable and not toxic to non-target species as found acceptable by the US EPA.
- G. Efficacy of the preservative should be documented in professional peer reviewed scientific publications.

2.6 RELATED MATERIALS

- A. Leveling compound - Latex type as recommended by carpet manufacturer. Shall be compatible with carpet and curing/sealing compound on concrete.
- B. Glue - Installation shall be free of the application of any wet adhesive.
- C. Installation connectors - Compounded acrylic adhesive, applied to PET polyester backing with PET polyester release liner (clear 3" x 3" polyester squares with small quantity of a pressure sensitive adhesive applied on one side of the polyester film). The squares connect the carpet modules together to form a stable surface over almost any hard surface. The connectors shall contain no liquid components and shall have "zero" calculated VOC's.
- D. Carpet edge guard, non-metallic - Extruded or molded heavy duty vinyl or rubber carpet edge guard of size and profile indicated, and with minimum two-inch-wide anchorage flange; colors selected by architect/designer from among standard colors available within the industry.

PART 3 EXECUTION

3.1 PRE-INSTALLATION REQUIREMENTS

- A. Scope of Work: All existing carpet and existing carpet waste shall be reused or recycled at no added cost to the end use customer. A reclamation plan shall be submitted in the proposal that will provide directions for the "environmentally friendly" reclamation of all carpet at the job site. "Environmentally friendly" methods consist of:
1. Repurposing - reusing the product in another application such as facilitating the donation of used carpeting to charities and other nonprofit organizations.
 2. Closed Loop Recycling - turning waste materials into new materials of the same value, such as vinyl backing into vinyl backing and nylon yarn into nylon carpet yarn.
 3. Open Loop Recycling - creating other product types from reclaimed carpet. For example, turning nylon face fiber into automotive parts or carpet padding, including nylon face fiber in recycled backings.
 4. Waste-to-Energy - using carpet for waste-to-energy. Method of generating power through the disposal of used carpet - usually accomplished through burning.
 5. Landfill or incineration - are not approved disposal methods.
- B. Description of Reclamation Services - Carpet shall be removed by the successful contractor from any existing site and prepared for pickup based on the type of material and reclamation option selected. Documentation such as chain of custody must be provided for each and every job conducted under this contract during the term of the contract. Specifications for removal from the jobsite include:
1. Removal of vinyl backed carpet tile for recycling. All vinyl backed carpet tile must be closed loop recycled (13.1.1.2) through Hank's Specialties, or a qualified comparable contractor. Carpet must be tested to assess acceptability for vinyl closed loop recycling. Non-vinyl modular carpet must be managed in one of the other methods described above.
 - a. Carpet tile shall be palletized and secured for shipping, (i.e., shrink wrap, banding, strapping).
 - b. Carpet tile shall be kept dry and free of any moisture damage.
 - c. Carpet tile shall be clean of any non-carpet debris.
 2. Removal of non-vinyl backed carpet tile for open loop recycling or waste-to-energy shall be managed as follows:
 - a. Carpet tile shall be palletized and secured for shipping, (i.e., shrink wrap, banding, strapping).
 - b. Carpet tile shall be kept dry and free of any moisture damage.
 - c. Carpet tile shall be clean of any non-carpet debris.
 3. Removal of performance broadloom for recycling.
 - a. Performance broadloom shall be rolled, palletized and secured for shipping. Cut pieces of performance broadloom shall also be acceptable, provided they are secured for shipping.
 - b. Performance broadloom shall be kept dry and free from moisture damage.
 - c. Rolls shall be clean of any non-carpet debris, front and back, other than ordinary soiling in normal use.
 4. Removal of broadloom carpet for recycling.
 - a. Rolled carpet shall not exceed six (6) feet in length x one (1) foot diameter. Width may vary from 2 feet to 12 feet.
 - b. Carpet shall be accumulated and kept dry for shipping and processing.
 - c. Rolls shall be clean of any non-carpet debris, front and back, other than ordinary soiling in normal use.
 5. Repurposing of carpet material.
 - a. Approval of old carpet for possible donation shall be determined at the jobsite.
 6. All possible recycling options shall be clearly presented and submitted in writing to owner and specifier prior to job start. A written description of the used carpet disposal process is required.
 - a. Description shall contain information as to complete process of diversion from landfill.
 - b. A certificate shall be furnished upon request verifying the reclamation of the carpet and the pounds of material diverted from the landfill.

3.2 INSTALLATION

- A. General
- Comply with manufacturer's instructions and recommendations and in accordance with the Carpet and Rug Institute's Installation Standard. All products shall be installed as a random installation, meaning that each and every tile can be installed in any of the four possible directions without regard to pile direction, pattern or orientation of any adjacent tiles

while still creating a finished carpet tile assembly that appears to be a visually continuous carpeted surface with no tile appearing out of place or improperly positioned.

1. A "no-glue" waterless method of installation is preferred using materials described in 2.5.3 above. In the event a releasable glue method of installation is required, the following adhesive description applies. Adhesive shall be water-based and allow for removal of carpet tile at any time without damage to carpet or substrate. Adhesive shall contain antimicrobial preservative and have "zero" calculated VOC's.
2. Comply with manufacturer's instructions for subfloor evaluation for moisture and alkalinity. In the event the concrete subfloor does not meet moisture and alkalinity requirements as defined in manufacturer's installation instructions and the moisture vapor emission rates are less than 15 pounds and the alkalinity pH is less than 12.0, a moisture barrier such as MoistureGard 2.0 must be installed. Installation must comply with manufacturer's installation instructions. In the event the moisture vapor emission rate is higher than 15 pounds and the alkalinity is higher than a pH of 12.0, additional remediation of the slab is required.
3. Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
4. Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
5. Run carpet under open bottom items such as heating convectors, and install tight against walls, columns and cabinets so the entire floor area is covered with carpet. Cover over all floor type door closures.
6. Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise.
7. Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed.
8. Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4'0" of feather.
9. Expansion joints - Do not bridge building expansion joints with continuous carpeting.
10. Chair Pads shall not be recommended or required within installation instructions.

3.3 CLEANING AND PROTECTION

- A. On completion of the installation in each area, all dirt, carpet scraps, etc. shall be removed from the surface of the carpet.
- B. Remove debris, and sort pieces to be saved from scraps to be repurposed or recycled.
- C. Construction manager shall protect carpeting against damage during construction.
- D. At the completion of the work and when directed by the construction manager, vacuum carpet using commercial dual motor vacuum of type recommended by carpet manufacturer. Remove spots and replace carpet where spots cannot be removed. Remove rejected carpeting and replace with new carpeting. Remove any protruding yarns with shears or sharp scissors.

3.4 INSPECTION

- A. Upon completion of the installation, manufacturer and installer shall verify and certify by means of an affidavit of compliance that work is complete, properly installed and meets all specification herein.
- B. Preliminary Acceptance - Upon completion of the carpet installation of each floor, such installation shall be inspected by owner, the construction manager and installation provider.

*Mergeability: Note that mergeability as defined here is applicable to select products and may not be applicable to all carpet tile styles.

END OF SECTION 09 68 13

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SECTION 099113 - EXTERIOR PAINTING

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on **[exterior substrates.] [the following exterior substrates:]**
 - 1. Concrete.
 - 2. Steel.
 - 3. Galvanized metal.
 - 4. Aluminum (not anodized or otherwise coated).
 - 5. Exterior portland cement plaster (stucco).
 - 6. Exterior gypsum board.
- B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this section.
2. Section 099123 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.
3. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.
4. Section 099600 "High-Performance Coatings" for tile-like coatings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 2. Label each coat of each Sample.
 3. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. Indicate VOC content.

1.4 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials[, **from the same product run,**] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint: [**1 gal. (3.8 L)**] <Insert value> of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:
 1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.
 7. Application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
- D. Hazardous Materials: Hazardous materials including lead paint **[are]** **[may be]** present in buildings and structures to be painted. A report on the presence of known hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified.
 2. Perform preparation for painting of substrates known to include lead paint in accordance with EPA Renovation, Repair and Painting Rule and additional requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide [Sherwin-Williams Company \(The\)](#); products indicated or comparable product from one of the following:
 1. **<Insert manufacturer's name>**.
- B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:
 1. Products are approved by manufacturer in writing for application specified.
 2. Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.
- C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
 1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: For field applications, provide paints and coatings that complies with VOC content limits of authorities having jurisdiction.

- C. Colors: [As selected by Architect from manufacturer's full range] [Match Architect's samples] [As indicated in a color schedule] <Insert requirements>.

1. [10] [20] [30] <Insert number> percent of surface area will be painted with deep tones.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

- B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Fiber-Cement Board: 12 percent.
 - c. Masonry (Clay and CMU): 12 percent.
 - d. Wood: 15 percent.
 - e. Portland Cement Plaster: 12 percent.
 - f. Gypsum Board: 12 percent.
2. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
3. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer[.] [**but not less than the following:**]
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
 - 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 2. Sand surfaces that will be exposed to view, and dust off.
 3. Prime edges, ends, faces, undersides, and backsides of wood.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Paint entire exposed surface of window frames and sashes.
 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards[**and switch gear**].
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

h. <Insert mechanical items to be painted>.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. **[Concrete] [Clay Masonry] [Portland Cement Plaster (Stucco)] [Cementitious Siding]**, Nontraffic Surfaces:
1. Concrete Stain System (Water-based):
 - a. First Coat: Low-luster opaque finish matching topcoat.
 - b. Topcoat: Low-luster opaque finish:
 - 1) S-W H&C Colortop Water-Based Solid Color Concrete Stain, at **50 to 250 sq. ft. per gal.** (**1.23 to 6.14 sq. m per liter**).
- B. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:
1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, water based.
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, **5.0 to 10.0 mils** (**0.127 to 0.254 mm**) wet, **2.0 to 4.0 mils** (**0.051 to 0.102 mm**) dry.

- b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
- c. Topcoat: Light industrial coating, exterior, water based eggshell.
 - 1) S-W Pro Industrial Eg-Shel Acrylic B66-660 Series, at 2.5 to 4.0 mils (0.064 to 0.102 mm) dry, per coat.
- d. Topcoat: Latex, exterior, semi-gloss:
 - 1) S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.
- e. Topcoat: Latex, exterior, gloss:
 - 1) S-W A-100 Exterior Latex Gloss, A8 Series, at 4.0 mils (0.102 mm) wet, 1.3 mils (0.033 mm) dry, per coat.

END OF SECTION 099113

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For more information, contact The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115; Phone: (800) 321-8194; Fax: (216) 566-1392; Website: www.sherwin-williams.com; Email: specifications@sherwin.com.

For information about MasterSpec contact ARCOM at (800) 424-5080 or visit www.MasterSpec.com.

SECTION 099123 - INTERIOR PAINTING

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on [**interior substrates.**] [**the following interior substrates:**]
 - 1. Steel.
 - 2. Wood.
 - 3. Gypsum board.
- B. Related Requirements:
 - 1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this section.

2. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
3. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.
4. Section 099600 "High-Performance Coatings" for tile-like coatings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 1. Indicate VOC content.
- B. Sustainable Design Submittals:
 1. Product Data for LEED 2009 Credit EQ 4.2: For paints and coatings, showing printed statement of VOC content.
 2. Laboratory Test Reports: For paints and coatings, indicating compliance with LEED 2009 Credit EQ 4.2 requirements for low-emitting materials.
- C. Samples for Initial Selection: For each type of topcoat product.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 2. Label each coat of each Sample.
 3. Label each Sample for location and application area.
- E. Product List: For each product indicated, include the following:
 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. Indicate VOC content.

1.4 CLOSEOUT SUBMITTALS

1. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials[, **from the same product run,**] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint: [1 gal. (3.8 L)] <Insert value> of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.
 7. Application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
 - 1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.
- D. Lead Paint: Lead paint [is] [may be] present in buildings and structures to be painted. A report on the presence of lead paint is on file for review and use. Examine report to become aware of locations where lead paint is present.
 - 1. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
 - 2. Perform preparation for painting of substrates known to include lead paint in accordance with EPA Renovation, Repair and Painting Rule and additional requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide [Sherwin-Williams Company \(The\)](#); products indicated or comparable product from one of the following:
 - 1. <Insert manufacturer's name>.
- B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:
 - 1. Products are approved by manufacturer in writing for application specified.
 - 2. Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.
- C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
 - 1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall provide materials that comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Primers, Sealers, and Undercoaters: 200 g/L.
 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
 5. Floor Coatings: 100 g/L.
 6. Shellacs, Clear: 730 g/L.
 7. Shellacs, Pigmented: 550 g/L.
- C. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental Chambers."
- D. Colors: **[As selected by Architect from manufacturer's full range] [Match Architect's samples] [As indicated in a color schedule] <Insert requirements>.**
1. **[10] [20] [30] <Insert number>** percent of surface area will be painted with deep tones.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and

primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Gypsum Board: 12 percent.
 - e. Plaster: 12 percent.
2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
3. Plaster Substrates: Verify that plaster is fully cured.
4. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
1. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.

- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer[.] [**but not less than the following:**]
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
 - 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards[**and switch gear**].
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - i. **<Insert mechanical items to be painted>**.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - i. **<Insert mechanical items to be painted>**.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Metal Substrates (Aluminum, Steel, Galvanized Steel):
 1. Water-Based Dry-Fall System:
 - a. Top Coat: Dry-fall latex, flat:
 - 1) S-W Pro Industrial Waterborne Acrylic Dryfall Flat, B42-181 Series, at **6.0 mils (0.152 mm)** wet, **1.5 mils (0.038 mm)** dry.
 - b. Top Coat: Dry-fall latex, eggshell:
 - 1) S-W Pro Industrial Waterborne Acrylic DryFall Eg-Shel, B42-82, at **6.0 mils (0.152 mm)** wet, **1.9 mils (0.048 mm)** dry.
 - c. Top Coat: Dry-fall latex, semi-gloss:
 - 1) S-W Pro Industrial Waterborne Acrylic DryFall Semi-Gloss, B42-83, at **5.8 mils (0.147 mm)** wet, **2.3 mils (0.058 mm)** dry.
 2. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, rust-inhibitive, water based:
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at **5.0 to 10 mils (0.127 to 0.254 mm)** wet, **2.0 to 4.0 mils (0.051 to 0.102 mm)** dry.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, eggshell:

- 1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-151 Series, at **4.0 mils (0.102 mm)** wet, **1.5 mils (0.038 mm)** dry, per coat.
- d. Topcoat: Light industrial coating, interior, water based, semi-gloss:
 - 1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at **4.0 mils (0.102 mm)** wet, **1.5 mils (0.038 mm)** dry, per coat.
- B. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.
 1. Latex System:
 - a. Prime Coat: Primer sealer, latex, interior:
 - 1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at **4.0 mils (0.102 mm)** wet, **1.4 mils (0.036 mm)** dry.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, eggshell:
 - 1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at **4.0 mils (0.102 mm)** wet, **1.7 mils (0.043 mm)** dry, per coat.
 - d. Topcoat: Latex, interior, semi-gloss:
 - 1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at **4.0 mils (0.102 mm)** wet, **1.6 mils (0.041 mm)** dry, per coat.
 - e. Topcoat: Latex, interior, gloss:
 - 1) S-W ProMar 200 Zero VOC Gloss, B21-12650 Series, at **4.0 mils (0.102 mm)** wet, **1.5 mils (0.038 mm)** dry, per coat.
- C. **[Gypsum Board] [Plaster] [and] [Spray-Texture Ceiling]** Substrates:
 1. Latex System:
 - a. Prime Coat: Primer, latex, interior:
 - 1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at **4.0 mils (0.102 mm)** wet, **1.0 mils (0.025 mm)** dry.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat:
 - 1) S-W ProMar 200 Zero VOC Latex Flat, B30-2600 Series, at **4.0 mils (0.102 mm)** wet, **1.6 mils (0.041 mm)** dry, per coat.
 - d. Topcoat: Latex, interior, low sheen:
 - 1) S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series, at **4.0 mils (0.102 mm)** wet, **1.6 mils (0.041 mm)** dry, per coat.

- e. Topcoat: Latex, interior, eggshell:
 - 1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry, per coat.
- f. Topcoat: Latex, interior, semi-gloss:
 - 1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.
- g. Topcoat: Latex, interior, gloss:
 - 1) S-W ProMar 200 Zero VOC Gloss, B21-12650 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

END OF SECTION 099123

SECTION 10 14 16 – PLAQUE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install building plaque.

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with *Section 01 33 23*. Indicate materials, thickness, overall dimensions, fasteners, and installation method.
- B. Furnish full-size layout of plaque.
- C. Contractor shall not proceed with fabrication of any signage without Architect's written approval of layouts.

PART 2 - PRODUCTS

2.01 PLAQUE

- A. Material: Bronze.
- B. Plaque shall be cast from virgin ingots (*85-5-5-5 standard U.S. Bronze alloy*). Casting shall be free of pits and gas holes.
 - 1. All letters and symbols shall be sharp and hand tooled.
 - 2. Border and faces of raised letters are to be satin finish.
- C. Background: Stipple finish.
- D. Finish:
 - 1. Background shall be oxidized.
 - 2. Plaque shall be chemically cleaned and sprayed with two coats of clear acrylic lacquer.
- E. Layout: Size and layout per sketch at end of this Section.
 - 1. Plaque thickness: *1/2"*.
 - 2. Letters and Symbols: *Raised*.
 - 3. Plaque size: *18"x30"*.
- F. Manufacturers/Products:
 - 1. *A.R.K. Ramos, Oklahoma City, OK., "Bronze Plaque"*.
 - 2. *Southwell, San Antonio, TX., "Bronze Plaque"*.

PART 3 - EXECUTION

3.01 PLAQUE MOUNTING

- A. Location: Verify location with Architect prior to mounting.
- B. Anchor plaque using flat-head fasteners, countersunk, with rosette trim.
- C. Mount plaque plumb and level. Anchor securely to partition per manufacturer's recommendations.

3.02 PROTECTION

- A. Do not install signage until all painting work in the immediate area has been completed. Do not install signage over painted surface which has not adequately dried.

- B. Protect signage from damage by other trades.

END OF SECTION 10 14 16

SECTION 10 14 23 – PANEL SIGNAGE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Forms of specialty signs required include the following:

1. Panel Signs.

1.02 QUALITY ASSURANCE

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.

PART 2 - PRODUCTS:

2.01 ACCEPTABLE MANUFACTURERS

- A. Available manufacturers: Subject to compliance with requirements manufacturer offering products which may be incorporated in the work includes, but are not limited to, the following:
1. Architectural Graphics Inc.
 2. Best Manufacturing Co.
 3. A. C. Davenport & Son Co.

2.02 MATERIALS, GENERAL

- A. Plastic Laminate: High pressure plastic laminate engraving stock with face and core plies in contrasting color, in finish and color combinations indicated or, if not indicated as selected from manufacturer's standard.
- B. Fasteners: Use concealed fasteners, unless otherwise indicated which are fabricated from metals which are non-corrosive to either sign materials or mounting surface.
- C. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.03 FABRICATION OF PANEL SIGNS

- A. Fabricate panel signs to comply with requirements indicated for materials, thickness', finishes, colors, design, shapes, sizes and details of construction.
- B. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16" measured diagonally from corner to corner.
- C. Unframed Panel Signs: Fabricated unframed panel signs with edges mechanically and smoothly finished to conform with following requirements:
1. Edge Condition: Beveled.

2. Edge Color for Plastic Laminate: Same as copy.

2.04 GRAPHIC IMAGE PROCESS

- A. Graphic Content and Style: Provide sign copy to comply with requirements indicated for sizes, styles, spacings, content, position, materials, finishes and colors of letter, numbers, symbols, and other devices.
- B. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into sign panel on face indicated to produce precisely formed copy, incised to a uniform depth. Use high speed cutters mechanically linked to master templates in a pantographic system or equivalent process capable of producing characters of style indicated with sharply formed edges.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Located Sign Units and accessories where shown or scheduled using mounting methods of type described and in compliance with manufacturer's instruction, unless otherwise indicated.
- B. Install sign units level, plumb and at height indicated, with sign surfaces free from distortion of other defects of appearance.

3.02 PANEL SIGNS

- A. Wall Mounted Units: Attach panel signs to wall surfaces using methods indicated below:
 1. Vinyl-Tape Mounting (VTM): Use double sided foam tape, of thickness indicated to mount signs to smooth non-porous surfaces.

3.03 CLEANING AND PROTECTION

- A. At completion of installation, clean soiled sign surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by owner.

3.04 GENERAL

- A. One (1) inch high letter on Two (2) inch high plastic, length to average 12".
- B. Provide signage quantity based on total number of rooms shown on Finish Schedule.
- C. All signage to comply with ADAAG. With Braille etc.
- D. Provide universal symbol signage at all restroom locations. ADA Comply.
- E. Provide low level exit signage that meets a previous criteria. Exit signage to be provided at all exit egress locations.

END OF SECTION 10 14 23

SECTION 10 21 13.19 – SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Floor mounted plastic partitions for toilet compartments, complete with plastic urinal screens.
- B. Vanity lavatory top, edge and splash.

1.02 REFERENCE STANDARDS

Requirements for reference standards are defined in Section 01 42 16.

1.03 PRODUCT DATA

- A. Submit product data in accordance with Section 01 33 00.
- B. Submit manufacturer's product data and installation instructions for toilet partitions and urinal screens.

PART 2 - PRODUCTS

2.01 PLASTIC TOILET PARTITIONS

- A. Type: Floor mounted, handrail braced.
- B. Acceptable Products and Manufacturer's:
 - 1. Scranton Products, P.O. Box 2021, Scranton, PA 18501.
 - 2. American Sanitary Partition Corp., P.O. Box 99, Ocoee, FL 34761.
 - 3. Or approved equal.
- C. Color: To be selected by Architect from manufacturer's **<standard>** colors.

2.02 URINAL SCREENS

Type and Manufacturer: Wall mounted, floor braced of same construction and manufacturer as toilet partitions, complete with accessories required for secure installations.

2.03 VANITY TOPS

- A. Vanities shall be constructed per "Accessible Sink at Restroom" detail.
- B. Color to match toilet partitions.

PART 3 - MATERIALS

- A. Braced, with non-corrosive panels, doors, pilasters, shoes and wall brackets similar and equal to Poly-mar HD partitions as manufactured by Santana Products Company, Inc. Scranton, PA or comparable products with hardware as specified herein.
- B. Panels, doors, pilasters, shoes and wall bracket shall be fabricated from Polymer resins under high pressure forming a single component section which is waterproof, nonabsorbent and has self-lubricating surface that resists marking with pens, pencils, or other writing utensils. All panels, doors, and pilasters to arrive at job site with special protective plastic covering.

3.01 CONSTRUCTION

- A. Single component construction of solid Poly-Mar HD in colors that extend from the surface throughout the entire thickness of the panels, doors and pilasters.

- B. Doors, panels and pilasters shall be 1" thick and all edges machined to a radius of .250" and all exposed edges to be free of saw marks.
- C. Dividing panels shall be 55" high and mounted at 14" above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all panels full length. (If desired, panel at end of layout shall extend up and fasten into handrail. Only available on standard depth stalls 57" or less).
- D. Doors shall be 55" high and mounted at 14" above finished floor. Aluminum edging strips shall be fastened to the bottom edge of all doors full width.
- E. Pilasters shall be 82" high and fastened to 3" high non-corrosive polymer resin shoes with theft proof sex bolts.
- F. Finish of doors, panels, and pilasters shall be similar and equal to Santana Products Co., Inc., "Plastic-Glaze 280".

3.02 HARDWARE

- A. Door hardware shall be as follows:
 - 1. Hinges shall be fabricated from heavy aluminum extrusion (6463-T5 Alloy) with clear anodized finish with wrap around flanges, surfaces mounted and thru-bolted to door and pilasters with one-way sex bolts. Hinges will be factory set to a full close position unless otherwise noted, 8" heavy duty hinges shall be used throughout.
 - 2. Each door shall be furnished with (1) coat hook/bumper of heavy chrome plated Zamack with rubber bumper (Handicapped doors also include: (1) door pull and (1) wall stop).
 - 3. Door strike and keeper shall be fabricated from heavy aluminum extrusion (6463 T5 Alloy) with clear anodized finish with wrap around flange surface, mounted and thru-bolted to pilaster with one-way sex bolts. Strike shall be heavy duty 6" strike plates.
 - 4. Door latch housing shall be fabricated from heavy aluminum extrusion (6463 T5 Alloy) with clear anodized finish, surface mounted and thru-bolted to door with one-way sex bolts. Slide bolt and button shall be heavy aluminum with "Tough-Coat Black" finish.
- B. Pilaster shoes shall be made from Polymer resin formed under high pressure and be made of single construction with color throughout. Pilaster shoes shall be anchored to finish floor with No. 5 Plastic Anchors and No. 14 stainless steel Phillips head screws.
- C. Full length continuous wall brackets (shall be Poly-Mar HD) weighing not less than .822 lbs. per linear foot, as manufactured by Santana Products Co. Brackets shall be used for all panels to pilaster, pilasters to wall and panel to wall connections. Wall brackets shall be pre-drilled by manufacturer with holes spaced every 6" along full length of brackets. Wall bracket shall be thru-bolted to panels and pilasters with one-way sex bolts. Attachment of bracket to adjacent wall construction shall be accomplished by (1) theft proof Zamack mushroom nail in head anchor directly behind the vertical edge panels and pilasters at every 12" along the full length of bracket and (2) No. 5 plastic anchors and No. 14 x 1/4" stainless steel Phillips head screws at each 12" interval alternately spaced between anchor connections.
- D. Handrail shall be heavy aluminum extrusion (6463 T5 Alloy) with mill finish in anti-grip configuration weighing not less than 1.188 lbs. per linear foot similar and equal to Santana Products Co., Inc. section #58993. Handrail shall be fastened to tops of pilasters and handrail brackets by thru-bolting with one-way sex bolts.
- E. Handrail brackets shall be 16 gauge stainless steel.

3.03 INSTALLATION

Erection of partitions, etc. shall be in accordance with the manufacturer's standard recommendations and the following:

- A. All parts shall be erected in a substantial manner, straight, level and plumb.
- B. No evidence of drilling, cutting, or patching shall be visible in the finished work.

- C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/16".
- D. Finished surfaces shall be cleaned after installation and left free of imperfections.

END OF SECTION 10 21 13.19

KING ARCHITECTS, INC

SECTION 10 22 23

SECTION 10 22 23 – OPERABLE WALLS

PART 1 - GENERAL

(See PANEL SECTIONS and WALL JAMB SECTIONS)

PART 2 - PRODUCTS

- 2.01 OPERABLE WALLS shall be manufactured by *Panelfold, Inc. Miami, Florida, U.S.A.* and installed by an authorized representative of the manufacturer in openings prepared by others *Moduflex Series 600* requirements.
- 2.02 OPERATION shall consist of a series of manually operated flat panels, top supported. Top and bottom seals shall be specified in paragraph 2.8.
- 2.03 PANEL CONFIGURATION shall be as follows:
 - A. MODEL 610 shall be comprised of a series of individual panels, remote stacking (*Located in room(s):*
- 2.04 PANELS shall be not less than 4" thick and not more than 49" wide Panel faces shall be laminated to metal frames. Panels shall have appropriate internal insulation to achieve specified *STC*. The tops of the panels shall be reinforced to support suspension components. The vertical edges of the panels shall not require trim thus minimizing the appearance of the vertical joining of the panels.
- 2.05 PANELS shall be factory surfaced with Manufacturer's standard vinyl. *Class A* flame spread. *Startex* solid color, *Type I*.
- 2.06 HANGING WEIGHT of panels shall be no more than *10 pound* per square foot.
- 2.07 ACOUSTICAL RATINGS as tested by an independent acoustical laboratory in accordance with *ASTM E 90-81* test procedures in a full scale *14'-0"x 9'-3"* opening shall be.
- 2.08 SOUND SEALS shall be as follows:
 - A. Vertical seals between panels shall consist of deep nesting, universal interlocking ESP bronze steel astragals incorporating continuous, vinyl-acoustical seals. Vertical astragal vinyl seals shall be installed on the outboard edges of the panel skins in a double row with an acoustical labyrinth.
 - B. Horizontal *TOP* seals shall be continuous contact extruded vinyl shapes.
 - C. Horizontal *BOTTOM* seals shall be *1 1/2"* clearance-type automatically actuated by the movement of one panel against the other.
- 2.09 SUSPENSION SYSTEM shall be heavy duty aluminum *Type 7/8* track. Track shall be supported by adjustable steel hanger rods. Panels shall be supported by trolley assemblies of radial type nylon tired or carbon fiber fill tired, steel ball-bearing wheels. Trolleys shall be attached to panels with adjustable steel pendant bolts.
- 2.10 PANELS that are hinges together shall be hinged with manufacturer's standard butt-type hinges.
- 2.11 OPTIONS shall be as follows:
 - A. Pass-doors where indicated on the plans shall be nominally *3'-0"* wide by *7'-0"* high and manufactured of the same materials and thickness as the panels. Hinges shall be standard butt-type. No threshold shall be required. Door shall be equipped with latch, drop cup and ring pull. Optional recessed (*specify: self-illuminated or non-illuminated*) exit signs shall be installed over pass door.

END OF SECTION 10 22 23

SECTION 10 28 13.13 – COMMERCIAL TOILET ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED

Toilet and related accessories of types scheduled in this section, complete with attachment hardware.

1.02 SAMPLES AND PRODUCT DATA

Submit the following in accordance with Section 01 33 00:

- A. Manufacturer's product data describing materials, construction, and finish for each type of accessory.
- B. Manufacturer's installations recommendations for each accessory.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- B. Pack accessories individually in a manner to protect accessory and its finish.

1.04 PROTECTION

Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stainless Steel Sheet: Commercial grade, 22-gauge.
- B. Stainless Steel Tubing: Commercial grade, seamless welded.
- C. Adhesive: Epoxy type contact cement.
- D. Fasteners, Screws and Bolts: Rust - resistant.

2.02 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from one sheet of stock, free of joints.
- C. Provide steel anchor plates and anchor components for installation on building finishes.
- D. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.
- F. Provide stainless steel anchors and fastening devices.
- G. Shop assemble the components and packages complete with anchors and fittings.
- H. All edges of removable stainless-steel waste containers shall be hemmed for safe handling.
- I. All bends on grab bars shall be made by the mandrel process to ensure uniform diameter bends, and to provide full 90

degree return to the mounting flange.

J. Grind smooth and polish weld marks at intermediate supports of all grab bars.

K. See Part 4 for Toilet Accessories Schedule.

PART 3 - EXECUTION

3.01 PREPARATION

A. Deliver inserts and rough-in frames to job site at appropriate time for installation. Provide templates and rough-in measurements as required.

B. Before starting work, notify Architect in writing of any conflicts detrimental to installation or operation of units.

C. Verify with Architect exact location of accessories.

3.02 INSTALLATION

A. Install accessories and items in accordance with approved manufacturer's printed instructions.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

C. See drawings for mounting height and location.

PART 4 - TOILET ACCESSORIES SCHEDULE

4.01 TOILET TISSUE DISPENSER

A. Double roll (open).

1. Partition mounted.

2. Manufacturers:

a. Bobrick Washroom Equipment, Inc., No. B-265.

b. Or approved equal.

4.02 GRAB BAR

A. Straight grab bar, 1-1/2" diameter, 1-1/2" inside wall clearance.

B. Length: As Noted

C. Manufacturers / Products:

1. Bobrick No. B -6806 x "length as noted on drawings".

2. Or approved equal.

4.03 PAPER TOWEL DISPENSER AND DISPOSAL

A. Combination unit handicapped accessible.

B. Semi-recessed mounting.

C. Manufacturers / Products:

1. Bobrick No. B-3942.

2. Or approved equal.

4.05 DIAPER CHANGING UNIT

- A. Horizontal surface mounted.
- B. Color to be selected by Architect.
- C. Manufacturers / Products:
 - 1. Bobrick No. KB200 (Koala Kare).
 - 2. Or approved equal.

4.07 SOAP DISPENSER

- A. Surface mounted.
- B. Manufacturers / Products:
 - 1. Bobrick No. B-2111.
 - 2. Or approved equal.

4.08 ROBE HOOK

- A. Surface mounted.
- B. Location: Refer to Hardware Schedule in Section 08 70 00 (Finish Hardware) and Door Schedule for location of doors to receive robe hooks.

Robe hooks to be furnished and installed as a part of this Section.
- C. Stainless steel satin finish.
- D. Products / Manufacturers:
 - 1. B-6717 for satin-finish stainless steel.
 - 2. Or approved equal.

4.09 UTILITY SHELF WITH MOP/BROOM HOLDERS & RAG HOOK

- A. Surface Mounted
- B. Shelf 8" deep, 24" or 36" long, with 3 mop holders and 2 rag hooks.
- C. Location: One per Janitor Closet as indicated on drawings. Install unit with shelf 60" above floor.
- D. Manufacturers / Products:
 - 1. Bobrick No. B-224 x 24 or 36.
 - 2. Or approved equal.

4.10 SHOWER CURTAIN RODS

- A. Heavy-duty. Concealed mounting with aluminum brackets.
- B. Size: As indicated on drawings.
- C. Location: Showers.
- D. Manufacturers / Products:
 - 1. Bobrick No. B-207 x "size indicated on drawings".
 - 2. Or approved equal.

4.14 VINYL SHOWER CURTAINS

- A. Opaque, matte white vinyl, containing antibacterial and flame-retardant agents.
- B. Size: As indicated on drawings.
- C. Location: As indicated on drawings.
- D. Manufacturers / Products:
 - 1. Bobrick No. B-204-2 42" x 72" B-204-3 70" x 72"
 - 2. Or approved equal..

4.12 MIRROR UNIT

- A. Stainless steel framed 1/4" float/plate glass mirror electrolytically copper plated.
Guarantee mirror against silver spoilage for 15 years.
- B. Frame: Type 304 stainless steel with a one-piece roll-formed angle, mitred, and welded corners, polished satin finish.
- C. Size: As shown on drawings.
- D. Manufacturers / Products:
 - 1. Bobrick No. B-290 x "size indicated on drawings".
 - 2. Or approved equal.

END OF SECTION 10 28 13.13

SECTION 10 44 16.13 – PORTABLE FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Definition: *"Portable Fire Extinguishers"* include units which can be hand carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems, unless otherwise indicated.

1.02 QUALITY ASSURANCE

- A. Provide portable fire extinguisher and accessories by one manufacturer, unless otherwise acceptable to Architect.
1. Manufacturers offering products to comply with the requirements include the following:

LARSEN'S UL Rated 3-A: 40-B: C 6# ABC Dry Chemical in semi-recessed rolled edge cabinets (mount top of cabinet at 5'-0" A.F.F.)

- B. Portable Fire Extinguisher Standard: Provide new portable fire extinguishers which comply with applicable *UL* standard and are labeled by *UL*.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style, and materials. Where color selections by Architect are required include color charts showing full range of manufacturer's standard colors and designs available.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS

- A. General: Provide fire extinguisher for each location whether or not indicated as required by the Architect, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities. Provide a minimum of (1) one fire extinguisher for each 2,500 sq. ft. of floor space; also provide one in each mechanical room and cooking space. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.

1. Abbreviations indicated below to identify extinguisher types relate to UL classification and ratings system and not necessarily, to type and amount of extinguishing material contained in extinguisher.

- B. Multi-Purpose Dry Chemical Type (4A-60BC-FE): *UL* rated 4-A; 60-BC, 10 lb. nominal capacity, in enameled steel container for *Class A, Class B, and Class C* fires.

2.02 MOUNTING BRACKETS

Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, or proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

PART 3 - EXECUTION

3.01 INSTALLATION

Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

3.02 IDENTIFICATION

Identify bracket-mounted extinguishers with red letter decals spelling "*FIRE EXTINGUISHER*" applied to wall surface. Letters size, style, and location as selected by Architect.

END OF SECTION 10 44 16.13

SECTION 10 73 16.13 – METAL CANOPIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Steel canopies.

1.02 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete.
- B. Section 05100 - Structural Metal Framing.
- C. Section 07600 - Flashing and Sheet Metal.
- D. Section 07920 - Joint Sealants.
- E. Section 09910 - Paints.

1.03 REFERENCES

- A. ASTM A-500 – Structural tubing for Construction of Bridges and Buildings.
- B. ASTM A-653 – Steel Sheet, Zinc Coated by the Hot-Dip Process. Structural Quality.
- C. ASTM a-924 – Steel Sheet, Metallic Coated by the Hot-Dip Process.
- D. AISI – Design of Cold-Formed Steel Structural Members.

1.04 SYSTEM DESCRIPTION

- A. Design of canopy shall be in accordance with applicable local building Codes and certified by a registered Professional Engineer.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: For each product to be used, including:
 - 1. Manufacturer's product data including performance data.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Shop Drawings:
 - 1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.
- D. Construction Samples: Submit two 2" x 3" color samples for selection of roof deck and trim.
- E. Finish Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Finish Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications:

1. The manufacturer shall have a minimum of 10 years experience in the manufacture and supplying of steel canopies.
- B. Installer Qualifications:
 1. The installer shall have a minimum of 5 years experience installing pre-engineered steel canopies. Installation shall be in accordance with manufacturers shop drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
- B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finishes during handling and installation to prevent damage.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

- A. Manufacturer shall provide standard limited warranty for louver systems for a period of 1 year from date of installation, no more than 18 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner. Warranty shall include coverage of materials and workmanship.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Ruskin Company, which is located at: 3900 Dr. Greaves Rd. ; Grandview, MO 64030; Tel: 816-761-7476; Email: [request info \(ruskin@ruskin.com\)](mailto:request info (ruskin@ruskin.com)); Web: www.ruskin.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01630.

2.02 COVERED CANOPIES

- A. Roof deck and trim shall be prepainted, hot-dip galvanized steel meeting ASTM Specification A-653. Grade 50. 50,000 psi yield. Galvanizing shall meet ASTM Specification A-924, G-90 Class. Paint shall be factory applied baked polyester with a full coat on color side and a uniform wash coat on reverse.
- B. Roof beams shall meet ASTM Specification A-653. Grade 50. 50,000 psi yield. Galvanizing shall meet ASTM Specification A-924. G-90 Class.
- C. Columns shall be square tubes meeting ASTM Specification A-500. Grade B. Columns shall be hot-dip galvanized after fabrication with a minimum zinc coating of 2 ounces per square foot.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Verify that canopies are installed straight and true.

3.02 INSTALLATION

KING ARCHITECTS, INC

SECTION 10 73 16.13

- A. Install canopies in accordance with manufacturer's drawings and specifications.

3.03 TOLERANCES

- A. Maximum Variation From Plan or Location Indicated on Drawings: None.
- B. Maximum Offset From True Alignment between Adjacent Members Butting or In Line: None.

1.02 CLEANING

- A. Clean up site and remove excess material.

END OF SECTION 10 73 16.13

SECTION 13 34 19 – METAL BUILDING SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Metal Framing Components
- B. Metal Wall Panels and Trim
- C. Metal Roof Panels and Trim
- D. Metal Building Accessories

1.2 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC):
 - 1. AISC Specification for Structural Steel Buildings.
 - 2. AISC Serviceability Design Considerations for Low-Rise Buildings
- B. American Iron and Steel Institute (AISI):
 - 1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members
- C. American Welding Society (AWS):
 - 1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
 - 2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel
- D. Association for Iron & Steel Technology (AISE):
 - 1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
- E. ASTM International (ASTM):
 - 1. ASTM A 36 – Standard Specification for Carbon Structural Steel
 - 2. ASTM A 48 – Specification for Gray Iron Castings
 - 3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 4. ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
 - 5. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - 6. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
 - 7. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
 - 8. ASTM A 490 – Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
 - 9. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - 10. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - 11. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts
 - 12. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - 13. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 14. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
 - 15. ASTM A 992 – Standard Specification for Structural Steel Shapes.
 - 16. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - 17. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
 - 18. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
 - 19. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.

20. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 21. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 22. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
 23. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
 24. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
 25. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
 26. ASTM F 436 – Specification for Hardened Steel Washers
- F. IAS – International Accreditation Service
- G. SJI – Steel Joist Institute
- H. Metal Building Manufacturers Association (MBMA):
1. MBMA Metal Building Systems Manual
- I. Underwriters Laboratories (UL):
1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies

1.3 DEFINITIONS

- A. Gable Symmetrical: A continuous frame building with the ridge in the center of the building, consisting of tapered or straight columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (inset in the column line). The rafters may or may not have interior columns.
- B. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. The eave height and roof slope may differ on each side of the ridge. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
- C. Single-Slope: A continuous frame building which does not contain a ridge but consists of one continuous slope from side to side. The building consists of straight or tapered columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
- D. Lean-To (LT): A building extension, which does not contain a ridge, but consists of one continuous slope from side to side. These units usually have the same roof slope and girt design as the building to which they are attached and supported by.
- E. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.
- F. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).
- G. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.
- H. Building Length: Measured from outside to outside of end wall secondary structural member.
- I. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.
- J. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.

- K. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.
- L. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.
- M. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
- N. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.
- O. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.

1.4 DESIGN REQUIREMENTS

- A. General
 - 1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
 - 2. Design structural mill sections and built-up plate sections in accordance with:
 - a. (US) code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.
 - 3. Cold-Formed steel structural members and panels will generally be designed in accordance with "Specifications for the Design of Cold-Formed Steel Structural Members", 2007 Edition, ANSI/AISI S-100-07.
 - 4. Design weldments per the following:
 - a. Structural Welding
 - 1) (US) Design per AWS D1.1, "Structural Welding Code – Steel", Latest Edition.
 - b. Cold-Formed Welding
 - 1) (US) Design per AWS D1.3, "Structural Welding Code – Sheet Steel", Latest Edition.
- B. Design Code:
 - 1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:
 - a. Governing Building Code: International Building Code - IBC.
 - b. Year/Version: 2015.
 - c. Occupancy Category: Assembly, Group A-3.
- C. Design Loads:
 - 1. Dead Load – Weight of the building system as determined by manufacturer.
 - 2. Roof Live Load: 20 psf
 - 3. Roof Collateral Load: 7 psf
 - 4. Floor Live Load: 100 psf
 - 5. Wind Load:
 - a. Wind Speed: 141 mph
 - b. Wind Exposure: B
 - c. Risk Category: 2
 - 6. Seismic Design Category: A.
 - 7. The design load combinations for all buildings shall be as specified by the Architect of Record. In no case shall the load combinations be less severe than specified in the current version of MBMA Metal Building Systems Manual
- D. General Serviceability Limits:
 - 1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.

2. Vertical Deflections:
 - a. Roof Secondary (Purlins) – L/150.
 - b. Main Frame roof beams – L/180.
3. Horizontal Deflections:
 - a. Wall Secondary (Girts) – L/90.
 - b. Main Frames – H/60.
4. Vertical deflection limits apply for snow load (50-year mean-recurrence interval) plus collateral load, or the code required live load. The horizontal drift and deflections limits apply for the loads induced by a basic wind speed corresponding to a 10-year mean-recurrence interval.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Shop Drawings: Provide complete erection drawings for the proper identification and assembly of all building components. Drawings will show anchor bolt settings, transverse cross-sections, sidewall, end wall and roof framing, flashing and sheeting, and accessory installation details.
- D. Selection Samples: For each finish product specified, two complete sets of color charts representing manufacturer's full range of available colors.
- E. Certifications: Shop drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by manufacturer upon request.
- F. Bill of Materials: Bills of material shall be furnished and shall include item weights.
- G. Preventative Maintenance Manual.
- H. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.
- I. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.

1.6 QUALITY ASSURANCE

- A. Manufacturer / Fabricator Qualifications:
 1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years' experience.
- B. Weldments/Welder/Weld Inspection Qualifications:
 1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, "Structural Welding Code – Steel", latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, "Structural Welding Code – Sheet Steel", latest edition.
- C. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
- D. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by manufacturer upon request.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Do not store materials directly on ground.
 - 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
 - 5. Protect materials and finish during storage, handling, and installation to prevent damage.
- C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.8 WARRANTY

- A. Building System Warranty
 - 1. The manufacturer shall warrant the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment.
 - 2. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
- B. Standing Seam Roof Weathertightness Warranty (Optional)
 - 1. Furnish manufacturer's standard limited-NDL(No-Dollar-Limit) weathertightness warranty for a maximum of 5-10-15-20 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
- C. Roof and Wall Paint Finish Warranty
 - 1. Paint Systems
 - a. Furnish manufacturer's standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units as set forth in ASTM-D-2244, and chalking in excess of 8 units as set forth in ASTM-D-4214.
 - b. The warranty shall be for a period of 30 years from the date of shipment for PVDF paint systems.
 - c. The warranty shall be for a period of 20 years from the date of shipment for silicone-polyester paint systems.
 - 2. Galvalume® systems
 - a. Furnish manufacturer's standard warranty for the Galvalume panels against rupture, structural failure, or perforation due to normal atmospheric conditions.
 - b. The warranty shall be for a period of 20 years from the date of shipment for Galvalume systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MBCI
- B. Substitutions: Allowed in accordance with Section 01 25 00 – Substitution Procedures.

2.2 MATERIALS

- A. Primary Framing Steel:
1. Steel for hot rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
 2. Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
 3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
 4. Square and Rectangular Tube must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 ksi.
 5. Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.
 6. X-bracing will conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.
- B. Secondary Framing Steel:
1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A-1011 or ASTM A-1039 Grade 55 for primed material or ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
 2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.
- C. Panels:
1. Roll-formed Galvalume®, pre-painted Galvalume®.
 2. Standing Seam Panels must have:
 - a. UL-90 rated, roll-formed, 24 gauge with a minimum yield of 50 ksi and conform to ASTM 792-99a.
 3. Through-fastened panels must have:
 - a. Extended purlin bearing leg, whether PBR, PBR, RPBR, RPBU or PBA (PBA is considered an architectural panel).
 4. Panel Finish:
 - a. SP Finish: Modified Siliconized Polyester paint system with a 20-year finish warranty.
 - b. PVDF Finish: 70% PVDF paint system with a 30-year finish warranty.
- D. Panel Fasteners:
1. For Galvalume® and Painted finished roof panels: Long Life.
 2. For wall panels: Long Life.
 3. Color of exposed fastener heads to match the wall and roof panel finish.
 4. Concealed Fasteners: Self-drilling type, of size required.
- E. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.
- F. Roof Clips:
1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
 2. Low or Tall Fixed clips; shall be either 3 3/8" or 4 3/8" in height.
 3. Low or Tall Sliding clips: shall be either 3 3/8" or 4 3/8" in height and provide a minimum of 2" of travel to allow for expansion and contraction.
- G. Sealant And Closures:
1. Sidelaps: Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic – Q41A.
 2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant and pre-cut to length.
 3. Outside Closures: Shall be manufactured from the same materials as the roof panels.
 4. Inside Closures: 22-gauge Galvalume or galvanized coated metal.

2.3 PRIMARY FRAMING

- A. Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.
 - 1. Frame Design: Lean-To.
 - 2. Frame Type: Clear-Span.
- B. Rigid Frame Columns:
 - 1. Straight/Uniform depth
- C. Rigid Frame Rafters:
 - 1. Straight/Uniform depth
- D. Endwall Frames / Roof Beams: Fabricated as mill-rolled sections or built-up "I" sections depending on design requirements. Fabricate endwall columns of cold-formed "C" sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
- E. Finish: Red-Oxide.
- F. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM A-325 or ASTM A-307 as required by design.

2.4 SECONDARY FRAMING

- A. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI and LGSI. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will install through the purlin/girt webs, not purlin/girt flanges. Purlin/girt flanges shall be unequal in width to allow for easier nesting during erection.
- B. Purlins:
 - 1. Depth: To be determined by design.
 - 2. Maximum Length: To be determined by design.
 - 3. Finish: Red Oxide Primer.
- C. Girts: Horizontal structural members that support vertical panels.
 - 1. Depth: To be determined by design.
 - 2. Maximum Length: To be determined by design.
 - 3. Finish: Red Oxide Primer.
- D. Eave Struts: Unequal flange, cold-formed "C" sections or "Z" purlins.
 - 1. Depth: To be determined by design.
 - 2. Maximum Length: To be determined by design.
 - 3. Finish: Red Oxide Primer.
- E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
 - 1. Base girt.
 - a. With flashing.
 - b. Without flashing.
 - 2. Finish: Red Oxide Primer.

2.5 ROOF PANELS

- A. VS216 Roof Panel: A mechanically seamed pan-type standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
 - 1. Gauge: 24 (Std.)

2. Dimensions: 16" wide by 2" high

2.6 WALL PANELS

- A. PBR Wall Panel: A through-fastened sidewall panel with 1 ¼" ribs at 12" on center. The area between the ribs is reinforced to minimize oil-canning.
 1. Gauge: 24
 2. Dimensions: 36 inches wide by 1 1/4 inch high

2.7 ACCESSORIES

- A. Canopies: Overhanging or projecting roof structures off the sidewall or endwall with the extreme end usually unsupported. For aesthetic application or to cover entrance or walkway.
- B. Roof Line Trim:
 1. To be determined by design.
 2. Trim Type: Simple Eave/Rake Trim
 3. Trim Type: Sculptured Eave/Rake Trim
 4. Trim Type: Low-Eave Gutter / Sculptured Rake Trim
- C. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.
- D. Walk Doors: Personnel entry doors.
 1. Size: As noted on the Contract Drawings.
 2. Accessories: As noted on the Contract Drawings
- E. Liner Panels: PBR Liner Panel: A through-fastened sidewall panel with 1 ¼" ribs at 12" on center. The area between the ribs is reinforced to minimize oil-canning.
 1. Gauge: As noted on the Contract Drawings.
 2. Dimensions: 36" wide by 1 ¼" high
- F. Soffit Panels: As noted on the Contract Drawings.
 1. PBR-PBU Wall Panel: A through-fastened sidewall panel with 1 ¼" ribs at 12" – ¾" ribs at 6" on center. The area between the ribs is reinforced to minimize oil-canning.
 - a. Gauge: 26 (std.)
 - b. Gauge: 24
 - c. Dimensions: 36" wide by 1 ¼" high
 2. SL12-SL11: Flat panel with a 1" depth with concealed fasteners.
 - a. Gauge: 24 (std.)
 - b. Dimensions: SL12 12" depth by 1" high; SL11 11" wide by 1" depth
 - c. Finish: As specified in Article 2.8 PANEL FINISHES
 3. Gravity Ridge Vents: Can be used as single unit or continuous.
 - a. Size: 9" by 10'-0" with Damper.

2.8 PANEL FINISHES

- A. Roof Panel:
 1. Schulte PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
- B. Wall Panel:
 1. Schulte PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
- C. Soffit Panel:
 1. Schulte (SL11) PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
 - a. Color: Standard Fluoropolymer

2.9 FABRICATION

-
- A. General:
1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
 2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
 3. All framing members must carry an identifying mark.
- B. Primary Framing:
1. Plates, Stiffeners and Related Members: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
 2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
 3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
 4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation Certification.
- C. Zee Purlins:
1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges. Purlin flanges shall be unequal in width to allow for easier nesting during erection.
- D. Girts
1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges. Girt flanges shall be unequal in width to allow for easier nesting during erection.
- E. Bracing:
1. Diagonal Bracing:
 - a. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.
 - b. Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.
 2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column will be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
 3. Flange Braces: The inside compression flange of all primary framing must be braced laterally with angles connecting to the bottoms chords of joists or to the webs of purlins/girts so that the flange compressive stress is within allowable limits for any combination of loading.
- F. Standing Seam Panels - General:
1. One side of the panel is configured as female, having factory applied hot-melt mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.
 2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
 3. Maximum panel length is 45 feet unless otherwise noted in the Contract Documents.
 4. Endlaps:
 - a. Endlaps must have a 16-gauge backup plate and have the (4) endlap joint fasteners installed in pre-punched hole locations in the flat.
 - b. Apply mastic between the panels and secured with #12-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.
 - c. "Through-the-Roof" fasteners may only be used at endlaps and eaves.

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment's to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.3 INSTALLATION

- A. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
- B. Erection practices shall conform to "Common Industry Practices", Section 6, MBMA (LR)-Building Systems Manual.
- C. There shall be no field modifications to primary structural members except as authorized and specified by the manufacturer.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 13 34 19



SECTION 21 00 00 – FIRE PROTECTION GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SYSTEM DESCRIPTION

- A. Fire protection system shall be a system employing automatic sprinkler heads attached to a piping system containing water and connected to an adequate water supply so that water discharges immediately from the sprinklers opened by fire.
- B. The fire protection system shall be the following:
 - 1. Standard-Pressure Sprinkler Piping: Automatic Wet-Pipe and Dry-Pipe sprinkler system piping designed to operate at a working pressure of 175-psig maximum.
- C. The fire protection system shall be monitored by a fire alarm system.

1.3 DEFINITIONS

- A. Working Plans as used in this Section means those documents (including drawings and calculations) prepared pursuant to the requirements contained in NFPA 13 for obtaining approval of the authority having jurisdiction (AHJ).
- B. Pipe sizes used in this Specification are Nominal Pipe Size (NPS).
- C. Refer to NFPA Standard 13 for additional definitions for fire protection systems.

1.4 SCOPE OF WORK

- A. Furnish all materials, labor, tools, equipment and working plans necessary to install and place into operation the complete fire protection portion of this Contract as called for on the accompanying drawings and as specified herein.
- B. Interlock the fire protection system with the fire alarm system monitoring. If there is no fire alarm being provided under work of Division 26 – Electrical, this contractor shall provide a fire alarm communicator panel in the vicinity of the sprinkler entry riser. Contractor shall interlock the supervised valves (Post indicator valve, OS&Y valves, tamper switch(es), flow switch(es), etc.) with the communicator panel. The contractor shall provide a phone line to the communicator panel. Contractor shall provide one year of monitoring. Contractor shall coordinate turn-over of the monitoring service with the owner. Contractor shall provide a complete and operable system as per specifications.
- C. Prior to start of the working plans of the fire protection system, the contractor shall coordinate and complete the "Owner's Information Certificate" form required by the State Fire Marshal. The form can be found at the State Fire Marshal's website <http://sfm.dps.louisiana.gov>. The form shall identify special occupancies and commodity classifications and shall be given to the fire protection system designer before the start of design.

- D. Contractor shall refer to the Architectural and Structural drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.
- E. It is the intention of these specifications that all fire protection systems shall be furnished complete with all necessary valves, controls, insulation, piping devices, equipment, etc. necessary to provide a satisfactory installation that is complete and in good working order.
- F. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.
- G. This Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Architect to reject any piece of equipment.
- H. Contractor shall include in the bid all offsets required in order to avoid conflict with ductwork, lights, grilles, structure, water lines, cable trays, conduits, etc. Offsets shall be made above intersecting ducts or pipes in order to minimize trapping of water.
- I. Coordinate installation of piping with other trades to assure that the piping can fit in the space provided. In general, the sprinkler piping shall be run at maximum height above the finished floor or between joists in order to minimize conflict with other trades. Obtain latest plan of Architectural, Mechanical, Plumbing, Structural and Electrical before preparing finished drawings.
- J. Contractor shall obtain the latest flow data from the local utility water company and assure prior to bid that adequate water pressures and flow are available for the system intended to be provided.

1.5 DEMOLITION

- A. The contractor shall visit the site prior to bid to determine the extent of work required to complete the project.
- B. Contractor shall coordinate demolition with owner. All equipment shall be salvaged for owner. Locate equipment as directed by owner. All equipment and materials not salvaged by the owner shall be removed from the site and discarded at the contractor's expense in a lawful manner.
- C. Contractor shall coordinate all work with general contractor and phase work as required by project.
- D. All equipment piping, etc. required to be removed to accommodate the modifications shall be removed.
- E. Contractor shall maintain services to existing facilities which shall remain during and after construction is complete.
- F. Contractor shall coordinate any shutdown of services with the owner. It is intended that the building will remain occupied during construction. Contractor shall schedule shut down of services with the owner in order to prevent disruption of building occupancy.

- G. Contractor shall be responsible for draining down of existing systems to complete demolition. All work shall be scheduled with the owner. Contractor shall also be responsible for refilling system and removing all air in order to return the systems to proper operating conditions.

1.6 BIDDING REQUIREMENTS AND RESPONSIBILITIES

- A. Each bidder shall be licensed to perform sprinkler work in the State of Louisiana and shall be recognized by the Property Insurance Association of Louisiana as a reliable sprinkler contractor.
- B. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.
- C. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation require provisions of services by another sub-contractor or trade.
- D. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, etc. to coordinate requirements and responsibilities with and through prime bidder.
- E. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with Division 00 & 01 requirements, prior to bidding.
- F. All timely, pertinent, questions provided in writing prior to bids, in accordance with Division 00 & 01 requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance in Division 00 & 01 requirements.
- G. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.
- H. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with Division 00 & 01 requirements.
- I. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all Division 00 & 01 requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade.

- J. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:
1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor (whose proposal is also being accepted).
 2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
 3. The work has been accepted as the responsibility of the prime contractor directly.

1.7 MATERIAL AND EQUIPMENT

- A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the Work.
- B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified.
- C. Coordinate and properly relate all Work of this Division to building structure and work of all other trades.
- D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with Division 00.
- E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information from physically examining the existing equipment, receiving specific cut sheet information from the Owner's representative, other trades and/or Architect. Rough-in services for "NIC" equipment as required, as the work progresses.
- F. Provide storage and protection for all equipment and materials in accordance with requirements of Division 00 & 01. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to Owner.
- G. Keep premises clean in accordance with requirements of Division 00 & 01.

1.8 EXTRA MATERIALS

- A. Sprinkler heads and cabinets: Provide spare sprinkler heads of each style included in the project. Furnish each style with its own special wrenches and in quantities as specified by NFPA 13. Minimum of six (6) spare heads required.
- B. Identify the storage cabinet and each spare sprinkler head with labels describing contents.

1.9 SUBSTITUTIONS

- A. Substitutions are only allowed by approval of the Architect prior to Bid Date as stipulated in Division 00 & 01.

- B. Design of systems is based on specific equipment. If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by Contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, their equipment with different model numbers shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from Contract Document requirements. Furnish all options specified or reasonably implied from the contract documents. Specifically identify any variance in regard to submittal versus specified performance on the cover sheet of each submittal.

1.10 POST-BID VALUE ENGINEERING (V/E):

- A. While it may be in the project Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, Division 21 contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.
- B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, Division 21 contractor shall provide duly licensed professional engineering consultants working on behalf of the Division 21 contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The Division 21 contractor's licensed professional engineering consultants and the Division 21 contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as Division 21 contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.
- C. Division 21 contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design.
- D. Further, the Division 21 contractor's (V/E Items) professional of record (either employees, or independent consultants to the Division 21 contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the Division 21 systems altered, affected or modified, in whole or in part.
- E. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.11 DRAWINGS AND SPECIFICATIONS

- A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated functional condition.

- B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items should any major interference develop, immediately notify the Architect.
- C. In laying out Work, refer to mechanical, electrical, structural, and architectural drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.12 CODES AND REGULATIONS

- A. Work shall be in full accord with the most stringent interpretation of the local AHJ, local ordinances, building codes, and other applicable national, local, and state regulations.
- B. Equipment shall conform to requirements and recommendations of the National bureau of Fire Underwriters and National Fire Protection Association (NFPA).
- C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1
- D. In the possible event of conflict between codes or regulations and Contract Documents, the most stringent interpretation of either shall govern (provided it exceeds the requirements of other codes). In the event of an irreconcilable difference between codes or regulations notify the Architect/Engineer immediately.
- E. In addition to the codes heretofore mentioned, all work and equipment shall conform to the applicable portions of the following promulgated specifications, codes and/or regulations:
 - 1. NFPA 13
 - 2. NFPA 101
 - 3. National Electrical Code (NEC)
 - 4. International Building Code (2021 IBC)
 - 5. Underwriters Laboratories (UL)
 - 6. LA State Fire Marshal Regulations
- F. All materials, equipment and accessories installed under this Contract shall conform to all rules, codes, etc. as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. All materials shall be new and of the best quality and first class in every respect. Whenever directed by the Architect, the Contractor shall submit a sample for approval before proceeding.
- G. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories, whether or not called for in these Specifications.
- H. All unfired and fired pressure vessels shall be built in accordance with the A.S.M.E. Code and so stamped. Furnish shop certificates for each vessel. Contractor shall provide and pay for first operating certificate as per State Fire Marshal Regulations.

1.13 FEES, PERMITS, AND TAXES

- A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.
- B. All permits, fees, certificates, etc. for the installation, inspections, plan review, service

connections locations, and/or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the Contractor.

- C. The Contractor shall make all tests required by the Architect, Engineer or other governing authorities at no additional cost to the Owner.

1.14 REQUEST FOR APPEAL

- A. The Contractor shall be required to complete any appeal to the State of Louisiana Fire Marshal's Office required to address review comments associated with the fire protection system shop drawings. The Contractor shall be responsible for completing the appeal forms and submitting to the AHJ. The Contractor shall be responsible for the associated cost of the appeals associated with this project.

1.15 SUBMITTALS

- A. Product Data: Include each manufacturer's data sheet for each type sprinkler head, valve, pipe, piping specialty, fire protection specialty, specified.
- B. Plans and Diagrams: Working plans (drawings) shall be prepared by the contractor and found acceptable by all Authorities Having Jurisdiction before commencing fire protection installation.
- C. Contractor shall pay all applicable fees required, by all Authorities Having Jurisdiction, for the project thru completion of project.
- D. All drawings shall be made at minimum 1/8" scale and arranged same as contract drawings.
- E. Shop Drawings: Submit working drawings which have been prepared in accordance with the requirements contained herein and identified as "Working Drawings," including hydraulic calculations and manufacturers data sheets.
 - 1. Submit one (1) copy of the working drawings printed to scale, manufacturers' product data sheets, and hydraulic calculations to the Architect/Engineer for review.
 - 2. If the submittal is found acceptable the shop drawing review stamp will be applied to the shop drawing submittal. The submittal will then be scanned and a pdf copy will be transmitted to the contractor for electronic submittal to the State Fire Marshal's Office and all other Authorities Having Jurisdiction for review.
- F. Quality Control Submittals:
 - 1. Welders' qualification certificates.
 - 2. Test Reports and Certificates: Include "Contractor's Material & Test Certificate for Aboveground Piping" and "Contractor's Material & Test Certificate for Underground Piping" as described in NFPA 13.

1.16 QUALITY ASSURANCE

- A. Installer's Qualifications: Installation and alterations of fire protection piping, equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified means experienced in such work (experienced shall mean having a minimum of five (5) previous projects similar in size and scope to this project), familiar with all precautions required, and has complied with all the requirements of the Authority Having Jurisdiction. Upon request, submit evidence of such qualifications to

the Engineer. Refer to Division-01 Section: "Definitions and Standards" for definitions for

"Installers."

1.17 QUALIFICATIONS OF CONTRACTOR:

- A. The contractor shall be a qualified fire protection contractor, licensed by the State of Louisiana and directly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment.
- B. Qualifications for Welding Processes and Operators: Comply with the requirements of AWS D10.9, Specifications for Qualifications of Welding Procedures and Welders for Piping and Tubing, Level AR-3."
- C. Regulatory Requirements: Comply with the requirements of the following codes (Latest Edition):
 - 1. NFPA 13 - Standard for the Installation of Sprinkler Systems.
 - 2. UL and FM Compliance: Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled, and Factory Mutual approved for the application anticipated.

1.18 MANUFACTURER'S DIRECTIONS

- A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.19 GROUNDS AND CHASES

- A. This Contractor shall see that all required chases, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise, he shall bear the cost of providing them.

1.20 CUTTING AND PATCHING

- A. Initial cutting and patching shall be the responsibility of the General Contractor, with the various trades being responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimble without first receiving the approval of the Architect. After initial surfacing has been done, any further cutting, patching and painting shall be done at this Contractor's expense.

1.21 PROTECTION OF EQUIPMENT AND MATERIALS

- A. During the project the Contractor shall safe guard and take the necessary precautions to protect the equipment and materials from damage. Failure on the part of the Contractor to comply with the above to the entire satisfaction of the Professional of Record shall be a sufficient cause for rejection of the damaged piece of equipment, material and/or assembly. In this case the Contractor shall be responsible for replacing the damaged piece of equipment, material and/or assembly to the satisfaction of the Professional of Record.

1.22 CLEANING AND ADJUSTING:

- A. Upon completion of his work, the Contractor shall clean and adjust all equipment, controls, valves, etc.; clean all piping, ductwork, etc.; and leave the entire installation in good working order.

1.23 LOCAL CONDITIONS

- A. The location and elevation of all utility services is based on available surveys and utility maps and are believed to be reasonably accurate; however, these shall serve as a general guide only, and the Contractor shall visit the site and verify the location and elevation of all services to his satisfaction in order to determine the amount of work required for the execution of the Contract.
- B. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven (7) days before the date of bidding. Failure to comply with this requirement will make the Contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

1.24 MINOR DEVIATIONS

- A. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes, etc. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and shall be made as required. However, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift ducts or pipes, or to change the shape of ducts, and these changes shall be made as required. All such changes shall be referred to the Architect for approval before proceeding. Extra charges shall not be allowed for these changes.
- B. Only typical details are shown on the Plans. In cases where the Contractor is not certain about the installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.
- C. In general, the drawings are diagrammatic and the Contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect is to state which item was first installed.
- D. Contractor shall make note that the sprinkler head locations and piping layout are diagrammatic and the spaces shall have proper number of heads and proper pipe size in the contractor's bid.

1.25 PROJECT RECORD DOCUMENTS

- A. Keep Project Record Documents in accordance with requirements of Division 00 & 01.
- B. During construction period, keep accurate records of installations made under this Division, paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.
- C. The Contractor shall obtain at his cost, two sets of prints of the original bid documents by the Architect. One print set shall be kept on the site with all information as referenced below, and shall update same as the work progresses. The other print set will be utilized to record all field changes to a permanent record copy for the Owner.
- D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Architect for any phase of the work, he shall record in a neat and readable manner, all such variances on the print set in red. The original print set shall be returned to the Architect for documentation.
- E. Provide electronic (PDF) copies of all documentation included in Final Report.
- F. All deviations from sizes, locations, and from all other features of the installations shown in

the Contract Documents shall be recorded.

- G. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions and the like, as well as other features of the work which will be concealed underground and/or in the finished building.
- H. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.
- I. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The Architect's/Engineer's decision in this matter will be final.
- J. The following requirements apply to all "As-Built" drawings:
 - 1. They shall be maintained at the Contractor's expense.
 - 2. All such drawings shall be done carefully and neatly, and in a form approved by the Architect/Engineer.
 - 3. Additional drawings shall be provided as necessary for clarifications.
 - 4. These drawings shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Architect/Engineer; and when necessary, to establish clearances for other parts of the work.
 - 5. "As-built" drawings shall be returned to the Architect upon completion of the work and are subject to approval of the Architect/Engineer.

1.26 USE OF ELECTRONIC (CAD) MEDIA

- A. Electronic media (cadfiles) can be made available to the Contractor by filling in the information on the next page, agreeing to the single use waiver and submitting to the Architect/Engineer.

- A. Provide the owner a copy of NFPA 25 "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems" to be kept on site.
- B. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

1.28 GUARANTEE

- A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.
- B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 21 00 00



SECTION 21 11 00 – SPRINKLER PIPING

PART 1- GENERAL

1.1 SECTION INCLUDES

- A. Pipe, fittings, valves, covers, and connections for combination sprinkler and standpipe systems including exterior piping systems.

1.2 RELATED SECTIONS

- A. Division 21, Section 21 00 00- “Fire Protection General Provisions”
- B. Division 21, Section 21 13 19 - “Sprinkler Systems”

1.3 REFERENCES

- A. ASME Boiler and Pressure Vessel Code Section IX - Welding and Brazing Qualifications.
- B. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 250.
- C. ASME B16.3 - Malleable Iron Threaded Fittings, Class 300.
- D. ASME B16.4 - Cast Iron Threaded Fittings, Class 250.
- E. ASME B16.5 - Pipe Flanges and Flanged Fittings.
- F. ASME B16.9 - Factory-made Wrought Steel Buttwelding Fittings.
- G. ASME B16.11 - Forged Steel Fittings, Socket-welding and Threaded.
- H. ASME B16.25 - Buttwelding Ends.
- I. ASME B36.10 - Welded and Seamless Wrought Steel Pipe.
- J. ASTM A135 - Electric-Resistance-Welded Steel Pipe.
- K. ASTM A47 - Malleable Iron Castings.
- L. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.
- M. ASTM A795 - Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- N. AWWA C110 - Ductile Iron and Gray Iron Fittings.
- O. AWWA C151 - Ductile Iron Pipe, Centrifugally Cast.
- P. NFPA 13 - Installation of Sprinkler Systems.
- Q. NFPA 24 - Installation of Private Fire Service Mains and Their Appurtenances.
- R. UL - Fire Resistance Directory.
- S. UL 262 - Gate Valves for Fire-Protection Service.

T. UL 312 - Check Valves for Fire-Protection Service.

U. UL 405 - Fire Department Connections.

1.4 SUBMITTALS FOR REVIEW

A. Section - "Submittal Procedures": Procedures for submittals.

B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

1. Grooved joint couplings and fittings shall be referred to on drawings and product submittals, and be identified by the manufacturer's listed model or series designation.

C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1. Sprinklers shall be referred to on drawings, submittals and other documentation, by the sprinkler identification number or Series designation as specifically published in the appropriate agency listing or approval.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Section - "Closeout Submittals": Record actual locations of components and tag numbering.

B. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
2. All castings used for couplings housings, fittings, or valve and specialty bodies shall be date stamped for quality assurance and traceability.

B. Installer Qualifications: Company specializing in performing the work of this section and shall be licensed to perform sprinkler work in the State of Louisiana.

1.7 REGULATORY REQUIREMENTS

A. Conform as a minimum to UL and FM.

B. Sprinkler Systems: As a minimum, conform work to NFPA 13.

C. Welding Materials and Procedures: Conform to ASME Code and AWS D10.9.

D. Valves: Bear UL and/or FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

- E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Refer to Architectural Specification Section - "Temporary Facilities & Controls": Transport, handle, store, and protect products.
- B. Deliver and store valves in shipping containers, with labeling in place.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Store all materials a minimum of 12" above grade when stored in exterior environment, 6" when stored on slab. Do not allow materials to contact ground. Provide end caps on all piping to prevent dirt or other construction debris from entering piping while stored.

1.9 EXTRA MATERIALS

- A. Provide two sets of valve stem packings for each size and type of valve installed.

PART 2 - PRODUCTS

2.1 BACKFLOW PREVENTOR ASSEMBLY

- A. Backflow Preventors:
 - 1. Provide Reduced Pressure Principal or Double Check Assembly as required by local governing authority and at a location approved by the Authority Having Jurisdiction.
 - 2. Enclose backflow assembly in a heated enclosure.
- B. Heated Valve Assembly Enclosure
 - 1. Provide factory assembled, heated, backflow preventor assembly enclosure. Enclosure shall be constructed and approved to ASSE Standard 1060 as a "Class I Freeze Protection Enclosure".
 - a. Acceptable Manufacturers
 - i. Hot Box
 - ii. Safe - T - Cover
 - 2. Provide insulated valve enclosure on all above ground exposed fire protection piping. Insulate fire protection piping which is NOT located in heated valve box assembly.
 - 3. Insulation shall be polyisocyanurate foam sprayed in place with a minimum of 1-inch thickness average coverage.
 - a. Dimensional stability shall be less than 2% linear shrinkage.
 - b. Compressive strength shall be 20 psi or greater.
 - c. Flame spread rating shall not exceed 25.
 - 4. Enclosure shall be of aluminum.
 - 5. Structural components shall be of aluminum.
 - 6. Multi-sectional enclosures shall be fitted together with overlapping "tongue & groove" joints.
 - 7. The enclosure shall be securely attached to a concrete base with anchor

- brackets installed on the interior of the enclosure, through the flange base of the enclosure itself or through a stainless steel anchor hinge.
- 8. Access panels shall be provided to allow access for operations and inspections without the removal of the entire enclosure.
- 9. Heating equipment shall be furnished by the enclosure manufacturer to maintain a temperature of 40 deg F with an outside temperature of (-) 10 deg. F.
 - a. Factory assemble heater shall be ETL, UL, or CSA certified.
 - b. Heating equipment shall be installed above the level of the backflow equipment.
 - c. Electrical power source shall be GFI protected, with a minimum of 18" clearance from the receptacle base to the top of slab.
- 10. Enclosure shall have the following text/lettering posted on all four exterior walls of the enclosure.
 - a. "FIRE DEPARTMENT USE, SPRINKLER CONTROL VAVLES"
 - b. Lettering shall be RED in color and shall be no smaller than three (3) inches in height.

2.2 BURIED PIPING

- A. Ductile Iron Pipe: AWWA C151.
 - 1. Fittings: AWWA C110, standard thickness.
 - 2. Joints: AWWA C111, rubber gasket.
 - 3. Mechanical Couplings: Shaped composition sealing gasket, stainless steel bolts, nuts, and washers.
 - 4. Listed and internally lined with cement or epoxy coated.
- B. PVC Pipe (On exterior of building) - ASTM - D2241; AWWA - C-900, Class 150-DR-18.
 - 1. Fittings - AWWA C110.
 - 2. Joints - ASTM F-477'; AWWA C-111.
 - 3. Mechanical Couplings - Shaped composition sealing gasket, stainless steel bolts, nuts and washers.
- C. Refer to Architectural Specification - "Excavation, Filling and Grading" for further specific trenching and backfilling requirements.

2.3 ABOVE GROUND PIPING

- A. General: Refer to PART 3 - Article 3.2 "PIPE APPLICATIONS" or on individual plan sheets for identification and type of piping where the below materials are used.
 - 1. All above ground fire protection piping located within non-heated enclosures shall be insulated.
- B. Steel Pipe (Galvanized steel pipe manufactured in Korea shall not be accepted): ASTM A53; ASTM A135; ASTM A795; Schedule 10 and 40, black and galvanized.
 - 1. Steel Fittings: ASME B16.9, wrought steel, buttwelded; ASME B16.25, buttweld ends; ASME B16.5, steel flanges and fittings; ASME B16.11, forged steel socket welded and threaded.
 - 2. Ductile Iron Fittings: ASME B16.1, flanges and flanged fittings; ASME B16.4, threaded fittings; or ASTM A536 Grade 65-45-12 grooved end fittings.
 - a. Grooved - In applicable sizes, fittings shall be short-pattern, with flow equal to standard pattern fittings. Basis of Design: Victaulic FireLock.
 - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings

4. Mechanical Roll Grooved Couplings (Cut grooves not acceptable): Two (2) ductile iron housing clamps to engage and lock, "C" shaped or center-leg elastomeric sealing gasket with pipe stop to ensure proper groove engagement, alignment, and pipe insertion depth, ASTM A449 compliant steel bolts, nuts, and washers; galvanized for galvanized pipe. Anvil and Victaulic:
 - a. Rigid: Victaulic Style 009-EZ and 107N
 - b. Flexible: Victaulic Style 177 Installation Ready and Style 77
 - c. Listed for dry or wet pipe use.
 - d. Grooves shall be rolled (cut grooves not allowed).
 - e. Couplings shall be Installation-Ready in applicable sizes, for direct stab installation without field disassembly.
5. Installation-Ready™ fittings for Schedule 40 grooved end steel piping in fire protection applications sizes NPS 1-¼ thru 2½ (DN 32 thru DN 65). Fittings shall consist of a ductile iron housing with Installation-Ready™ ends, prelubricated Grade "E" EPDM Type 'A' gasket, and ASTM A449 electroplated steel bolts and nuts. UL listed for a working pressure of 300 psi (2065 kPa) and FM approved for working pressure 365 psi (2517kPa).
6. In lieu of threaded steel piping systems, the Victaulic FireLock IGS System with "Installation-Ready™ fittings and couplings may be used for NPS 1 (DN 25) Schedule 40 carbon steel pipe in fire protection applications. System rated for a working pressure to 365 psi (2517 kPa).
 - a. Groove: IGS "Innovative Groove System" groove with shortened "A" dimension and tapered groove backside for ease of installation.
 - b. Grooving Tool: Victaulic RG2100, with IGS Confirmation Gauge.
 - c. Fittings: Ductile iron housing conforming to ASTM A-536, Grade 65-45-12. Orange enamel coated or galvanized.
 - d. Victaulic Style 101 (90-degree elbow), Style 102 (tee), and Style 108 (coupling) with Installation-Ready™ ends.
 - e. Style 108 single-bolt coupling provided with EPDM Type A pressure responsive gasket with Vic-Plus lubricant, and ASTM A449 compliant electroplated steel bolt and nut. CrMo alloy steel coupling linkage.

2.4 PIPE HANGERS AND SUPPORTS

- A. Conform to the General Requirements of NFPA 13 and the additional design and installation requirements as listed below:
 1. Provide hangers and vertical piping restraints within 12 inches on all sprinkler drops at end of branch where system pressure exceeds 100 psig in accordance with NFPA 13.
 2. Provide hangers within 12 inches of each turn of direction (horizontal elbow) in sprinkler piping.
 3. Powder- driven Studs are not acceptable.
 4. Prime coat all sprinkler pipe hangers where indicated in Part 3 - "Execution"
 5. Hangers for Pipe Sizes 1 through 6 Inch: Provide Carbon steel, adjustable swivel, split ring hangers.
 6. Multiple or Trapeze Hangers: Steel pipe or steel angles with welded spacers and hanger rods.
 7. Vertical Support: Steel riser clamps.
 8. Floor Support: Cast iron adjustable pipe saddles, lock nut, nipple, floor flange, and concrete pier or steel support.

2.5 FIRE PROTECTION GATE VALVES

- A. Up to and including 2 Inches:

1. Manufacturers:
 - a. Nibco Model T-104-O.
 - b. Kennedy Model KS-FW
2. Bronze body, bronze trim, rising stem, handwheel, solid wedge or disc, threaded ends.

B. Over 2 Inches:

1. Manufacturers:
 - a. Nibco Model F-697-0., F-609
 - b. Kennedy Model KS-FW
 - c. Victaulic Series 771
2. Iron body, bronze trim, rising stem, pre-grooved for mounting tamper switch, handwheel, OS&Y, solid bronze or cast iron wedge, flanged, or grooved ends. 250 psi pressure rated

2.6 BALL VALVES

A. Up to and including 2 Inches (Ball valves are not to be used over 2 inches):

1. Manufacturers:
 - a. NIBCO KG-505-W-8
 - b. Victaulic Series 728
2. Brass two piece body, chrome-plated brass, full port, chrome plated bronze, or stainless steel ball, teflon seats and stuffing box ring, weatherproof actuator housing with supervisory switches and handwheel or lever handle and balancing stops, threaded or grooved ends. 300 psi pressure rated.

2.7 AUTOMATIC AIR VENT VALVES

A. Automatic Air Vent:

1. Manufacturers:
 - a. Potter Model "PAV" with ball valve and Potter Model RBVS tamper witch
2. Manufacturers:
 - a. Engineered Corrosion Solutions Model "PAV-W" Automatic Air Vent with ball valve and Potter Model RBVS tamper switch

2.8 BUTTERFLY VALVES

A. Cast or Ductile Iron Body:

1. Manufacturers:
 - a. Kennedy Fig. G300 or 01G
 - b. Victaulic Series 705
2. Cast or ductile iron, chrome or electroless-nickel plated ductile iron or aluminum bronze disc, pressure responsive resilient replaceable EPDM seat, stainless steel stem (offset from the disc centerline to provide complete 360-degree circumferential seating), wafer, lug, or grooved ends, extended neck, with weatherproof actuator housing and handwheel with gear drive and integral indicating device, and internal tamper switches rated 10 amp at 125 volt AC. 300 psi pressure rated.

2.9 CHECK VALVES

A. Up to and including 2 Inches:

1. Manufacturers:
 - a. Nibco Model KT403W
 - b. Victaulic Series 717
2. Bronze body and swing disc, rubber seat, threaded ends.
3. Ductile iron body with stainless steel spring for vertical or horizontal installation, grooved ends. 250 psi rated.

B. Over 2 Inches:

1. Manufacturers:
 - a. Nibco Model G917-W
 - b. Victaulic Series 717
2. Ductile iron body, bronze trim, spring-assisted swing check for vertical or horizontal installation with stainless steel or rubber / elastomer encapsulated disc, renewable disc and seat, grooved or flanged ends with automatic ball check. 250 psi pressure rated.

2.10 BACKFLOW PREVENTER VALVE ASSEMBLY

A. Manufacturer

1. Wilkins
 - a. Model 350 ASTDA with by-pass meter, bypass double check valve assembly OS&Y Valves and tamper switches
2. Apollo Valves
 - a. Model DCDALF 4A with by-pass meter, bypass double check valve assembly, OS&Y Valves and tamper switches

2.11 FIRE HYDRANTS

- A. The fire hydrants to be supplied under this contract shall conform to AWWA Standards C 50 - 73 or updated revisions thereof for improved type three-way hydrants, suitable for a working pressure of 150 pounds per square inch, and shall contain the following features:
- B. Two (2), 2 1/2" hose nozzles and one (1), 4 1/2" pumper nozzle.
- C. Compression type main valve. Valve opens against pressure and closes with pressure.
- D. Main valve and valve seat replaceable without digging up fire hydrant
- E. Bronze upper valve plate, bronze main valve seat, and non-corrodible double drain valves with treated leathers, rubber main valve.
- F. "O" ring seals between dry top and main body.
- G. All hydrants shall contain a breakaway feature at ground level consisting of breakaway bolts or flange and breakable coupling on the rod.
- H. The size of valve opening shall be 5 1/4".
- I. The inlet size shall be mechanical joint 6" and inlet.
- J. All hydrants shall have a National Standard 1 1/2" pentagon operating nut and shall open counterclockwise.
- K. The hose nozzle thread shall conform to National Standard Fire Hose Coupling Thread.

- L. The pumper nozzle thread shall conform to the National Standard Thread.
- M. The hydrant shall be lubricated according to manufacturer's recommendations when installed.
- N. The exterior of the hydrant shall be painted with enamel and shall be repainted after installation. Color shall be yellow #54-302 PPG or equal.
- O. Hydrant bury shall be three, four, five, and six feet.
- P. Hydrant extension sections shall be furnished by the same manufacturer as for the hydrant to which section is to be added.
- Q. One hydrant wrench shall be furnished with each ten (10) hydrants, of fraction thereof.
- R. All nozzle caps shall have extra long, heavy (no smaller than five gauge) link chains that will not kink. The chain loop at the cap end shall permit free turning of the caps.
- S. The hydrants to be supplied under this contract shall be Mueller "Centurion", Dresser "Reliant", American "B -84-B " and Kennedy "K-8 I -A Guardian".

PART 3- EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends.
 - 1. Remove burrs.
 - 2. Bevel or groove plain end ferrous pipe.
 - 3. Remove scale and foreign material, from inside and outside, before assembly.
 - 4. Prepare piping connections to equipment with flanges or unions.
 - 5. Unions and flanges for servicing or disconnect are not required in installations using grooved mechanical joint couplings.

3.2 PIPE APPLICATIONS

- A. Underground Pipe: Listed, lined, ductile iron pipe and fittings, 250 lb working pressure. Refer to Architectural Specification - "Excavation, Filling and Grading" for further specific trenching and backfilling requirements.
 - 1. Depth of Bury:
 - a. Minimum 36 inches depth of bury from top of pipe to finished grade in accordance with NFPA 24.
 - i. Provide pipe tape markers and # 12 copper trace wire over entire length of pipe.
 - b. Minimum 42 inches depth of bury under driveways, slabs, parking lots, etc., in accordance with NFPA 24.
 - i. Provide pipe tape markers and # 12 copper trace wire over entire length of pipe.
- B. Underground Pipe: Listed C900 DR 18 PVC pipe and ductile iron fittings, 150 lb working pressure. Refer to Architectural Specification - "Excavation, Filling and Grading" for further specific trenching and backfilling requirements.
 - 1. Depth of Bury:

- a. Minimum 36 inches depth of bury from top of pipe to finished grade in accordance with NFPA 24.
 - i. Provide pipe tape markers and # 12 copper trace wire over entire length of pipe.
 - b. Minimum 42 inches depth of bury under driveways, slabs, parking lots, etc., in accordance with NFPA 24.
 - i. Provide pipe tape markers and # 12 copper trace wire over entire length of pipe.
- C. Above Ground Pipe: Provide piping in accordance with the following schedule of systems:
 - 1. Sprinkler pipe (wet pipe - 1 1/4 inches & below): Schedule 40 steel pipe - screwed fittings or with rolled grooves and roll grooved fittings where the fittings are designed to prevent the pipe from rotating.
 - 2. Sprinkler pipe (wet pipe - 1 1/2 thru 5 inches): Schedule 40 steel pipe with rolled grooves and roll grooved fittings.
 - 3. Sprinkler pipe (wet pipe - 6 inches and larger): Schedule 10 steel pipe with rolled grooves and roll grooved fittings.
 - 4. Standpipe hose system (wet or dry pipe system): Schedule 40 steel pipe - screwed fittings.
 - 5. Air compressor lines: Schedule 40 steel pipe - screwed fittings.
 - 6. Drain lines: Schedule 40 galvanized steel pipe - screwed or grooved fittings.

*all exposed sprinkler pipe where indicated to be painted shall be properly prepared for painting

3.3 INSTALLATION OF FIRE HYDRANTS:

- A. General: Install fire hydrants when called for in accordance with AWWA M17 "Installation, Operation, and Maintenance of Fire Hydrants".
- B. Hydrants shall be placed with pumper nozzles facing the street and shall be located as indicated on the contract drawings. Each hydrant shall be placed on a concrete base and shall be secured against dislocation, as indicated on the typical detail drawings. A minimum of seven (7) cubic feet of clean washed gravel shall be placed around each hydrant base. Backfill above gravel shall be thoroughly tamped.
- C. Hydrants of the required bury shall be used at each location, and each shall be buried to the point indicated on the barrel. Cutting or filling around the hydrant will be required as may be necessary to meet existing grades. Where necessary, and where required by the Engineer, hydrant extension sections shall be installed to adjust the hydrant to grade.
- D. Hydrants shall be placed plumb and with back side at the utility easement line, unless otherwise directed by the Engineer. Hydrants shall be properly lubricated and shall be in good working order before acceptance. Touch-up painting will be required prior to acceptance.
- E. Location: Install fire hydrants minimum of 40'-0" from building outside wall, or as indicated.
- F. Shutoff Valves: Install shutoff valve ahead of each hydrant.
- G. The fire hydrant bury shall be three and one-half feet (3 1/2) except where conditions are not favorable in which case the Contractor shall select the correct hydrant bury to fit the existing ground elevations subject to approval of the Engineer.

3.4 INSTALLATION

- A. Heated Backflow Prevention Device enclosure shall be assembled and mounted on concrete pad in accordance with the manufacturer's published installation instructions.
 - 1. Enclosure shall be installed plumb, level, and square.
- B. Install piping in accordance with NFPA 13 for Sprinkler Systems, NFPA 14 for Standpipe and Hose systems, and NFPA 24 for service mains. Refer to Architectural Specification "Excavation, Filling and Grading" for further specific trenching and backfilling requirements.
- C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- D. Install piping to conserve building space, to not interfere with use of space and other work.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipes passing through partitions, walls, and floors.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- H. Pipe Hangers and Supports:
 - 1. Install in accordance with NFPA 13 and NFPA 14 except where specifically indicated in order to raise the minimum standards set by NFPA.
 - 2. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches of each horizontal elbow.
 - 4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
 - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 7. Prime coat exposed steel hangers and supports or provide factory primed hangers and supports. Refer to Section - "Painting". Hangers and supports located in areas not generally in view of the general public including crawl spaces, pipe shafts, and above suspended ceiling spaces are not considered exposed.
- I. Electrical Service to Fire Protection Systems:
 - 1. Except for high voltage electrical service to fire pumps, jockey pumps, and pump controllers, if electrical circuits or services are required for the operation of the fire protection system(s) at a location selected by sprinkler designer, the sprinkler contractor shall coordinate the location and placement of required electrical circuit(s) with the electrical sub-contractor. It is the responsibility of the sprinkler contractor to coordinate the number, size, type, and location of electrical circuits in the field with other trades. The fire protection contractor shall be responsible for providing and/or paying for all costs associated with providing electrical service for his equipment prior to bidding.

J. Drains:

1. Where sanitary sewer drains, storm drains, hub drains, floor drains, etc., are required for the draining of fire protection systems at a location indicated or selected by the sprinkler designer, the sprinkler contractor shall coordinate the location and placement of required drains with the plumbing sub-contractor. It is the responsibility of the sprinkler contractor to coordinate the number, type, and location of drains in field with other trades. Contractor shall be responsible for covering all costs associated with providing for and/or paying for drainage piping for his equipment prior to bidding.

K. Slope piping and arrange systems to drain at low points.

1. Use eccentric reducers to maintain top of pipe level.

L. Do not penetrate building structural members unless indicated.

M. Provide sleeves when penetrating building footings, floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance rating equivalent to fire separation required.

N. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

O. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

P. Grooved Joints: Install in accordance with the manufacturers latest published installation instructions. Pipe ends shall be clean and free from indentations, projections, and roll marks in the area from the pipe end to (and including) the groove. Gasket shall be verified as suitable for the intended service. Contractor shall remove and replace any improperly installed products. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products. Factory trained representative shall periodically visit the jobsite to ensure best practices in grooved product installation are being followed. Contractor shall remove and replace any improperly installed products.

Q. Install valves with stems upright or horizontal, not inverted. Remove protective coatings after installation.

1. Provide gate or butterfly valves for shut-off or isolating service.
2. Provide drain valves at main shut-off valves, low points of piping and apparatus.

3.5 TRAINING & DEMONSTRATION

A. Demonstration Services: Arrange and pay for a factory-authorized service representative to train Owner's maintenance personnel on the following:

1. Procedures and schedules related to start-up and shut down, troubleshooting, servicing, preventative maintenance, and how to obtain replacement parts.
2. Familiarization with contents of Operating and Maintenance Manuals specified in Architectural Specification - "Closeout Submittals" and Division 15, Section - "Basic Mechanical Materials & Methods."
3. Provide Service Manuals for each sprinkler system specified.

- B. Provide three (3) hours of factory authorized training and demonstration.
 - 1. Refer to Section - "Mechanical General Provisions" for video taping requirements.
 - 2. Schedule training with a minimum of seven (7) days notice to Owner's Representative.

END OF SECTION 21 11 00



SECTION 21 13 19 - SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 REQUIRED PRE-BID FLOW TESTS

- A. Prior to submitting a bid, the Sprinkler Contractor shall perform a flow test utilizing the nearest municipal fire hydrant(s) at the Project site in order to substantiate the basis of the Contractor's design. The flow test shall be performed using gauges which have been calibrated within twelve (12) months of the flow test. The flow test shall be performed in accordance with the recommendations included in NFPA 291.
 - 1. The Contractor shall utilize a five (5) psig reduction/safety factor in the field flow test data (static & residual) and a ten (10) percent reduction/safety factor in the flow in GPM obtained during the flow test for the basis of design in order to calculate and/or perform a hydraulic analysis of the proposed system.
- B. All flow test data shall be performed by the Contractor at no cost to Owner.
 - 1. Contractor shall notify the Owner's Representative a minimum of seven (7) days prior to flow tests being performed.
 - 2. Owner's Representative shall witness all flow tests.
 - 3. Provide a report to Owner's Representative stating location, time and duration of test.

1.2 SECTION INCLUDES

- A. Wet-pipe and dry-pipe sprinkler systems. Note!: Unless specifically so noted on plan sheets, the utilization of glycol anti-freeze wet-pipe sprinkler systems for freeze protection is not allowed!
- B. Sprinkler system design, installation, and certification including site work and insurances.
- C. Fire department connections.

1.3 RELATED SECTIONS

- A. Division 21, Section 21 00 00 - "Fire Protection General Provisions"
- B. Division 21, Section 21 11 00 - "Sprinkler Piping"

1.4 REFERENCES

- A. NFPA 13 - Installation of Sprinkler Systems.
- B. FM - Factory Mutual Approval Guide.
- C. NFPA 70 - National Electrical Code.
- D. UL - Fire Resistance Directory.
- E. UL 199 - Automatic Sprinklers.
- F. Warnock Hersey - Certification Listings.

1.5 SYSTEM DESCRIPTION

- A. The sprinkler system is to provide coverage for the entire building.
 - 1. Note: It is not the intent of this specification to design or to construct the sprinkler system in accordance with the "minimum" design criteria allowed by the applicable codes. Where indicated, certain areas, specific equipment or methods may exceed the "minimum" criteria required by applicable codes. Refer to Section - "Mechanical General Provisions", Article 1.3 - "Compliance with National & Local Code Requirements."
 - 2. The contractor shall refer to both plans and specifications in order to accomplish the design intent.
- B. Provide a system designed in accordance with NFPA 13 for Light hazard, Ordinary hazard, Group 1, Ordinary hazard, Group 2, or other hazard classification as indicated on the various plan sheet.
- C. Interface the sprinkler system with the building Fire and Smoke Alarm Systems and Smoke Evacuation systems. Coordinate electrical power requirements or control interfaces with the various sub-contractors.
- D. Provide fire department connections where indicated. Coordinate thread patterns with the local fire department serving the site.

1.6 ELECTRICAL REQUIREMENTS

- A. Note: It is the intent of this section that prior to bidding, the fire protection contractor shall coordinate and either provide, or pay to provide, all of the minor electrical power and control services, circuits, wiring and conduit required for the fire protection equipment.
- B. It is not the intent of this section that the fire protection contractor provide or pay for the necessary electrical service to the emergency fire pump, jockey pump, controllers or associated wiring and conduit required to connect fire protection devices (such as limit switches, flow switches, tamper switches, etc.) to the fire alarm system. Other coordination issues and requirements between sub-contractors however, remain.

1.7 PLUMBING REQUIREMENTS

- A. Sprinkler Drains: "Note" - Where sewer or storm drains are required for any component of the sprinkler system such as pre-action cabinets, standpipes, risers, etc., the sprinkler contractor shall provide such drains as required to prevent spillage of water onto or within the building. Contractor shall coordinate with other trades and pay for and/or provide at the point of discharge, all floor drains, hub drains, catch basins, etc., needed for the maintenance and draining of the sprinkler system.

1.8 SUBMITTALS FOR REVIEW

- A. Refer to Architectural Specification - "Submittal Procedures": for full submittal requirements.
- B. Product Data: Provide data on all system components including fire pumps (if applicable), pipes, sprinklers, valves, flow switches, pressure reducing devices, meters, and other specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections. Contractor shall submit a minimum of one (1) printed set of shop drawings, hydraulic calculations, and equipment cut sheets to the Architect/Engineer for review.

Architect/Engineer will review the submittal, and if it is found to be acceptable for submittal to the State Fire Marshals office for review, the Architect/Engineer will stamp it with their shop drawing review stamp. This stamped submittal will be scanned and a "PDF" copy will be E-mailed to the contractor for electronic submittal to the State Fire Marshall for review. Contractor shall be responsible for all fees and costs as may be required for final acceptance of system(s) by all Authorities Having Jurisdiction.

1. Sprinklers shall be referred to on drawings, submittals and other documentation, by the sprinkler identification number or Model/Series designations as specifically published in the appropriate agency listing or approval.
- C. Shop Drawings: Submittal to the State Fire Marshal shall occur after Contractor has obtained a "No Exception Taken", or "Appears to Comply" comment on the System Shop Drawings from the Architect/Engineer. No payment will be made to the contractor for any automatic sprinkler system work until submittal is forwarded to the AHJ for approval.
1. Provide project name, project address, occupancy and owner on application. Drawings shall include "Preparer of Shop Drawings" indicated on each sheet.
 2. Drawing shall be legible and drawn to a scale suitable for proper definition and clarity. In no case shall the scale be less than $1/8" = 1' - 0"$. Indicate partitions or small enclosures in which no sprinklers are to be installed. Provide graphic representation of the scale used on all plans.
 3. Submittal shall include a master list of all materials and equipment which is to be utilized for the project. Include manufacturers model number, size, color, and quantity of each.
 4. Provide the number of sprinklers on each riser per floor.
 5. Provide the total number of sprinklers on each dry pipe system, pre-action system, combined dry pipe pre-action system, or deluge system.
 6. Provide the approximate capacity in gallons of each dry pipe system.
 7. Provide the location and electrical characteristics of all air compressors, pre-action cabinets, and any and all other components which require electrical services.
 8. Provide type of fittings and joints and location of all welds and bends. The contractor shall specify on the drawing any sections to be shop welded and the type of fittings or formations to be used.
 9. Indicate piping provisions for flushing.
 10. Provide kind, type and location of alarm bells.
 11. Provide size, location, of hose outlets, hand hose, and related equipment if used. The hydraulic reference point shown on plans shall correspond with comparable reference points on the hydraulic calculation sheets.
 12. Provide full height cross section of building or schematic diagram.
 13. Provide the occupancy class or each area or room identified.
 14. All sprinklers shall be identified by make, type, orifice size, temperature rating, thermal sensitivity including if applicable, all existing heads affecting the submitted scope of work.
 15. For large storage areas, provide the storage height, method of storage, description of commodities, etc. If the project is a specialized storage design, provide a complete design statement denoting the methodology for arriving at the project area/densities.
 16. All piping shall be identified by size, type, inside diameter, and schedule.
 17. Submit layout of finished ceiling areas indicating sprinkler head locations and type, fully coordinated with ceiling installation. Provide ceiling information such as heights, architectural profiles, (vaults, coffers, furrings, etc.), construction assembly, (combustible ceiling or framing, significant combustibles in ceiling cavity, etc.).
 18. Provide sprinkler obstructions denoted (suspended light fixtures, duct work, fire

- alarm strobes, fire alarm horns, speakers, motion detectors, or other architectural items.)
19. Show all HVAC openings and all ductwork over 48" in width/height.
 20. Indicate the method of maintaining the sprinkler system at or above 40 deg F. Describe all unheated applicable areas and explain the methodology of all sizes, types, locations, etc. of freeze protection devices.
 21. Graphically highlight each hydraulic area (perimeter dashed lines, etc.) title each area on the plans with matching title on each calculation sheet.
 22. Provide the locations and ratings of fire walls, unprotected vertical openings, and other assemblies affecting sprinkler design.
 23. Provide a site plan showing location and size of city mains at street, denoting dead end or circulating or denote private supply system.
 24. Provide the total area protected by each system on each floor.
 25. Provide and indicate the location, type, and listing of each pipe hanger.
 26. Provide the underground pipe size, length, location, type, point of connection to city main, bury depth, thrust blocks, and all appurtenances (valve types, water meters, backflow preventors, valve pits, etc.) with appropriate back-up data sheets denoting manufacturer's fire protection equipment listing and friction/pressure loss for each device.
 27. Provide all hydraulic nameplate information.
 28. Hydraulic reference points shall coordinate between the drawings and calculations.
 29. Provide the setting for pressure reducing devices denoted.
 30. Submit hydraulic calculations, building sections, site plan indicating piping layout, detailed building piping layouts, hangers and supports locations, sprinklers, components and accessories. Indicate system controls.

D. Hydraulic Calculations:

1. Verify that the water supply, test location, date (must be 4 months current) of peak demand time (or calculated adjustment) and account for test elevations at calculations. Reduce the static and residual pressures by 5 psig and calculate on this basis.
2. Verify the hazard classification (light, ordinary, special occupancy, etc.).
3. Verify the design criteria (density/sq. ft. over the hydraulic design area).
4. Verify the location of the design area calculated (most hydraulically demanding not always the most physically remote).
5. Verify the physical dimensions of the area calculated (design area shall not extend beyond the designated area served by each sprinkler). Sufficient length parallel to the branch lines or cross mains, as required.
6. Verify the densities (sprinklers flowing at or above minimum required flow rate).
7. Verify the pipe sizes, lengths, equivalent lengths of fittings, and flow paths (account for all pressure losses).
8. Verify the hose demand and provide the total quantity of water and the pressure required for hose streams both inside and outside.
9. Confirm that the system demand is at or less than the available water supply (include demand versus supply graph).
10. Sprinkler Drains: "Note" - Where drains are required for any component of the sprinkler system such as pre-action cabinets, standpipes, etc. the sprinkler contractor shall provide such drains as required to prevent spillage of water onto or within the building. Contractor shall coordinate with other trades and pay for and/or provide floor drains, hub drains, catch basins, etc. needed for the maintenance and draining of the sprinkler system.
11. Samples: Submit two samples of each style of sprinkler head specified.

1.9 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section - Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- B. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds code requirements.
- C. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- E. Provide a copy of NFPA 25 - "Standard for Inspection, Testing, and Maintenance of Water Based Fire Protection Systems."

1.10 QUALITY ASSURANCE

- A. Perform Work in accordance with NFPA 13. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.
- D. Design system under direct supervision of a NICET III Certified Technician experienced in design of this work and licensed in the State of Louisiana. The Fire Protection contractor shall be licensed for fire protection work in the State of Louisiana.

1.11 REGULATORY REQUIREMENTS

- A. Conform to UL, FM.
- B. Perform Work in accordance with NFPA 13.
- C. Equipment and Components: Bear UL, FM, label or marking.
- D. Products Requiring Electrical Connection: Provide products that are listed and classified by Underwriters Laboratories Inc., or other testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- E. Fire Protection Contractor shall be licensed to perform fire protection systems design and installation in the State of Louisiana.

1.12 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.
 - 1. Provide seven (7) days advanced notice to Owner's Representative.

1.13 DELIVERY, STORAGE, AND PROTECTION

- A. Section - Product Requirements: Transport, handle, store, and protect products.

- B. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.14 EXTRA MATERIALS

- A. Provide extra sprinklers under provisions of NFPA 13.
- B. Provide suitable wrenches for each sprinkler type.
- C. Provide metal storage cabinet in location designated.

PART 2 - PRODUCTS

2.1 SPRINKLERS

- A. Sprinklers shall be glass bulb type, with hex shaped wrench boss integrally cast into the sprinkler body to reduce the risk of damage during installation.
 - 1. Wrenches shall be provided by the sprinkler manufacturer that directly engage the hex-shaped wrench boss integrally cast in the sprinkler body.
- B. Both threaded and grooved sprinklers are accepted.
 - 1. UL listed and FM approved rigid coupling to join sprinklers with IGS profile grooved ends to matching 1" IGS outlets; Coupling consists of two cast copper-alloy housing segments for connection of 1/2", 3/4", and 1" sprinklers. Coupling includes an EPDM Type A gasket, with zinc-plated cap screws conforming to ASTM F835, and nylon insert locknut. Installation-ready, for direct push installation without field disassembly. Rated for a working pressure to 175 psi.
- C. Suspended/Finished Ceilings
 - 1. Manufacturers:
 - a. Victaulic Series FL-QR/C
 - b. Viking Microfast -Quick Response Concealed Sin No. VK 462
 - c. Reliable SIN RA3415
 - 2. Type: Concealed Quick Response pendant type with push on thread off cover plate.
 - 3. Finish: Color by Architect.
 - 4. Cover Plate Finish: Color by Architect.
 - 5. Fusible Link: Glass bulb type temperature rated for specific area hazard.
 - 6. Location: In center of modular ceiling tile
- D. Exposed Area Type:
 - 1. Manufacturers:
 - a. Victaulic Series FL-QR
 - b. Viking Microfast. Model M Sin No. VK 302
 - c. Reliable SIN RA 1414
 - 2. Type: Standard coverage Quick Response Pendant type.
 - 3. Finish: Brass.
 - 4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- E. Exposed Area Type:

1. Manufacturers:
 - a. Victaulic Series FL-QR
 - b. Viking Microfast. Model M Sin No. VK 300
 - c. Reliable SIN RA 1425
2. Type: Standard coverage Quick Response Upright type.
3. Finish: Brass.
4. Fusible Link: Glass bulb type temperature rated for specific area hazard.

F. Exposed Area Type:

1. Manufacturers:
 - a. Victaulic Series FL-SR
 - b. Viking. Model M Sin No. VK 102
 - c. Reliable SIN RA1314
2. Type: Standard coverage Standard Response Pendant type.
3. Finish: Brass.
4. Fusible Link: Glass bulb type temperature rated for specific area hazard.

G. Exposed Area Type:

1. Manufacturers:
 - a. Victaulic Series FL-SR
 - b. Viking. Model M Sin No. VK 100
 - c. Reliable SIN RA 1325
2. Type: Standard coverage Standard Response Upright type.
3. Finish: Brass.
4. Fusible Link: Glass bulb type temperature rated for specific area hazard.

H. Sidewall Type - Standard Response:

1. Manufacturers:
 - a. Victaulic Series FL-SR/SW
 - b. Viking Model M SIN No. VK 104
 - c. Reliable SIN RA 1335
2. Type: Standard response 175 psi rated horizontal sidewall type with matching push on escutcheon plate.
3. Finish: Brass
4. Escutcheon Plate Finish: Brass
5. Fusible Link: Glass bulb type temperature rated for specific area hazard

2.2 PIPING SPECIALTIES

A. Wet Pipe Sprinkler Riser Check Alarm Valve:

1. Manufacturers
 - a. Victaulic Series 751 Series or UMC Riser Check Assembly
 - b. Viking Easy Riser Swing Check Valve Model E-1, F-1
 - c. Reliable Model G
2. Check type valve with divided seat ring, rubber faced clapper to automatically actuate electric alarm, with test and drain valve.

B. Wet Pipe Sprinkler Zone Control Riser Valve Assembly:

1. Manufacturers
 - a. Victaulic Zone Control Riser Module Series 747M or UMC Floor Universal Floor Control Assembly

- b. Viking Easy Pac
 - c. Reliable Model "CR"
 - 2. The module shall consist of a butterfly control valve, test and drain valve combination with appropriate orifice, a UL Listed and FM approved Flow Switch, and a UL Listed and FM approved pressure relief valve
- C. Electric Alarm Bell:
 - 1. Manufacturers
 - a. Potter Electric Model MBA-6-24
 - b. System Sensor Model SSM 24-6
 - 2. Electrically operated red enameled gong.
- D. Fire Department Connections:
 - 1. Manufacturers:
 - a. Potter Roemer Model 5761
 - b. Guardian Model 6224
 - 2. Type: Free standing type with chrome plated finish.
 - 3. Outlets: Two (2)-way with thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.
 - 4. Drain: 3/4 inch automatic drip, outside.
 - 5. Label: "Auto. Sprinkler - Fire Department Connection".
 - 6. At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for localized system drainage. Basis of Design: Victaulic #10-DR.
 - 7. Sign: Provide metal sign that reads "FDC"
 - a. Lettering shall be minimum three (3) inches in height and colored RED.
- E. Supervisory Switches:
 - 1. Manufacturers
 - a. Potter Electric Model OSYSU-2, PCVS
 - b. System Sensor. Model OSY-2, PIBV2
- F. Flow Switches:
 - 1. Manufacturers
 - a. Potter Electric Model VSR-F
 - b. System Sensor Model WFD Series
- G. Test and Drain Valve
 - 1. Manufacturers
 - a. Victaulic Series UTD (Universal Test and Drain)
 - b. AGF Model 1011A
 - c. Guardian Model 9210
 - d. Reliable Model "TD"
- H. Dry Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, aluminum-bronze clapper with EPDM clapper seal or rubber face clapper to automatically actuate electric alarm, with tank mounted air compressor, test and drain valve. Required air pressure shall be 13-psi (90-kPa). Valve internal components shall be replaceable without removal of valve from installed position. Valve shall be externally re-settable.
 - 1. Manufacturers
 - a. Viking Model F-1, G-4000

- b. Tyco Model No. DPV-1
 - c. Victaulic Series No. 768N
 - d. Reliable Model EX
- I. Alarm Pressure Switches:
 - 1. Manufacturers
 - a. Potter Electric Model PS10-2A
 - b. System Sensor Model EPS10-2
- J. High/Low Pressure Supervisory Switches:
 - 1. Manufacturers
 - a. Potter Electric Model PS40-2A
 - b. System Sensor Model EPS40-2
- K. Tank Mounted Air Compressors:
 - 1. Manufacturers
 - a. General Air Model
 - b. Jenny Model
 - c. C-aire Model
- L. Flexible Sprinkler Hose Fitting for Fire Protection Service:
 - 1. Manufacturer: FlexHead Industries, Inc. and Victaulic Vic-Flex AH2/AH2CC
 - a. Substitutions: Allowed if substitute product meets regulatory requirements, performance criteria and material specifications listed below.
 - 2. Description:
 - a. Regulatory Requirements: Provide flexible stainless steel hose fittings that comply with the following requirements:
 - i. In accordance with General Requirements contained in specification.
 - ii. In accordance with NFPA 13.
 - 3. Performance Criteria: Comply with the following to suit project requirements:
 - a. FM 1637 Approval Standard for Flexible Sprinkler Hose with Treaded End Fittings
 - b. UL 2443 Standard for Flexible Sprinkler Hose with Fitting for Fire Protection Service.
 - c. ICC-ES AC-156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and System
 - 4. Materials: Victaulic Vic-Flex Connection
 - a. Flexible Stainless Steel Sprinkler Drop System (with captured coupling style 108) may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel Male threaded nipple or Victaulic Firelock IGS Groove Style 108 coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to a sprinkler head.
 - b. The drop shall include a UL approved Series AH1 with 3" bend radius; AH2 or AH2-CC braided hose with a bend radius to 2" to allow for proper installation in confined spaces.
 - c. The hose shall be listed for [(4) bends at 31" length]
 - d. Union joints shall be provided for ease of installation.
 - e. The flexible drop shall attach to the ceiling grid using a one-piece open

- gate Series AB1 or AB2 bracket. The bracket shall allow installation before the ceiling tile is in place.
 - f. The braided drop system is UL listed for sprinkler services to 175 psi (1206 kPa) and FM Approved to 200 psi (1380 kPa)
- 5. Materials: FlexHead Superflex Commercial Sprinkler Connection
 - a. FlexHead Superflex flexible stainless steel hose assemblies:
 - i. Straight Hose Assembly Lengths (3 ft. length, Model #2036SF-50), (4 ft. length, Model #2048SF-50), (6 ft. length, Model #2072SF-50)
 - 1) ½ inch outlet
 - 2) 175 psi maximum rated pressure.
 - 3) Fully welded non-mechanical fittings, braided, leak-tested with minimum 1 inch true-bore internal corrugated hose diameter made of 100% 304 stainless steel including end fittings.
 - b. FlexHead Ceiling Bracket: Direct attachment type having integrated snap-on clip ends positively attached to the ceiling using tamper-resistant screws and removable attachment hub with set screw for attaching and adjusting flexible hose.
- 6. For Dry systems, in lieu of rigid connections to dry sprinkler heads, a Victaulic VicFlex™ dry sprinkler, Model VS1, may be used. The sprinkler shall provide a vertical or horizontal flexible connection with a bend radius to 2" and allow for up to 4 bends.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with NFPA 13
- B. Wrenches used to install the sprinkler heads shall be the wrench called for by the manufacturer of the sprinkler head. The use of any other wrench shall not be acceptable and contractor shall replace all heads which were improperly installed without the use of the correct sprinkler head wrench.
- C. Install equipment in accordance with manufacturers instructions.
- D. Install buried shut-off valves in valve box. Provide post indicator.
- E. Provide approved double detector check valve assembly at sprinkler system water source connection.
- F. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent siamese connections to allow full swing of fire department wrench handle.
- G. Locate outside alarm gong on building wall as indicated.
- H. Place pipe runs to minimize obstruction to other work.
- I. Do not install sprinkler heads that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs.
- J. Sprinkler bulb protector shall be removed by hand after installation. Do not use tools or any other device(s) that could damage the bulb in any way, to remove the protector.
- K. Place piping in concealed spaces above finished ceilings.

- L. Center sprinklers in two directions in ceiling tile and provide piping offsets as required, dependent upon spacing and coordination with ceiling elements.
- M. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- N. Flush entire piping system of foreign matter.
- O. Install guards on sprinklers where indicated.
- P. Hydrostatically test entire system.
- Q. Require test be witnessed by Fire Marshal and Architect.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Ensure required devices are installed and connected as required to fire alarm system.

3.3 PAINTING

- A. Refer to Section - "Mechanical General Provisions" for painting requirements and Architectural Specification - "Painting". Coordinate the painting requirements of this section with the Contractor. Painting is typically performed by the Division 9 Contractor. This Contractor, however, shall either perform specialized painting as called for below in the following conditions or he shall advise the Contractor prior to bidding of these painting requirements set forth as follows:
 - 1. All sprinkler risers in stairs/stairwells and riser closets shall be painted.
 - 2. All fire protection piping in Fire pump Room shall be painted.
 - 3. All exposed fire hose drops shall be painted.
 - 4. All fire protection piping in Exhibits Area shall be painted.
 - 5. All exposed fire protection piping in Central Plant shall be painted.
 - 6. Thoroughly clean all mechanical surfaces, requiring prime painting, of rust, loose scale, oil and grease.
 - 7. Dry all surfaces before painting.
 - 8. Paint only under proper ambient conditions.
 - 9. Do not paint over controls, or on equipment nameplates, factory labels or sprinkler heads.
 - 10. Prepare pipe, fittings, supports, and accessories for finish painting.
 - 11. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

3.4 TRAINING & DEMONSTRATION

- A. Demonstration Services: Arrange and pay for a factory-authorized service representative to train Owner's maintenance personnel on the following:
 - 1. Procedures and schedules related to start-up and shut down, troubleshooting, servicing, preventative maintenance, and how to obtain replacement parts.
 - 2. Familiarization with contents of Operating and Maintenance Manuals specified in Division 1, Section- "Closeout Submittals" and Division 22, Section - "Basic Mechanical Requirements."
 - 3. Provide Service Manuals for each sprinkler system specified.

- B. Provide three (3) hours of factory authorized training.
 - 1. Refer to Section - "Mechanical General Provisions" for video taping requirements.
 - 2. Provide seven (7) days advanced notice to Owner's Representative.

3.5 INSPECTIONS AND TESTS

- A. All fees, etc. for the installation, inspection, or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the contractor.
- B. All inspections, examination, and tests required shall be arranged and paid for by the contractor as necessary to obtain complete and final acceptance of the Fire Protection System. The contractor shall deliver certificates of all such inspections to the Architect/Engineer.
- C. Maintenance Instructions to the Owners: After installation of this system is completed and before it is accepted by the owner, the sprinkler contractor shall instruct the maintenance personnel on the care and maintenance of this system. Included in these instructions shall be the following:
 - 1. Two (2) original copies of NFPA 25 shall be furnished to the owner's maintenance personnel.
 - 2. Full sized copy of AS-BUILT sprinkler drawings, showing any modified locations of sprinkler heads/piping.
 - 3. Full sized print of Louisiana State Fire Marshal reviewed/stamped submittal including material data sheets, hydraulic calculations, and shop drawings.
 - 4. Normal conditions of the sprinkler system.
 - 5. Weekly test of alarm valve.
 - 6. Weekly test of waterflow indicator.
 - 7. Semi-Annual test of alarm valve and water flow indicator.
 - 8. Abnormal conditions and corrections.
 - 9. Maintenance.
- D. After the above instruction has been completed, this contractor shall notify the Architect/Engineer by letter of such. This letter should state the name(s) of the individuals receiving instructions.

3.6 INSPECTIONS

- A. For a period of one (1) year after acceptance, this contractor shall make two (2) inspections on the sprinkler system. One shall be six (6) months after acceptance and the other one (1) year after acceptance. This contractor shall furnish the owner with all inspection certificates after each inspection and furnish the architect with two copies of the inspection certificate. After one year, the owner shall be responsible for arranging for inspections by a qualified sprinkler contractor.

END OF SECTION 21 13 19



SECTION 22 00 00 – PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Furnish all labor and material necessary to provide and install the complete plumbing portion of this Contract as called for herein and on accompanying drawings. Parts of the plumbing division may be bid separately or in combination, at the Contractor's option; however, it shall be the responsibility of the General Contractor to assure himself that all items covered in the Plumbing Division have been included if he chooses to accept separate bids.
- B. It is the intent of this specification that all materials with temperatures below ambient conditions or conveying any fluid/gas at temperatures below 70 deg. F be insulated to completely eliminate the potential for condensation. Unless specified elsewhere in these specifications, for materials that do not require and requiring occasional access, use 2" thick closed cell rubberized insulation with re-sealable fabric joints (hook and loop type).
- C. Contractor shall refer to the Architectural and Structural drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.
- D. It is the intention of these specifications that all plumbing systems shall be furnished complete with all necessary valves, controls, insulation, piping devices, equipment, etc. necessary to provide a satisfactory installation that is complete and in good working order.
- E. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.
- F. This Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Architect to reject any piece of equipment.

1.3 DEMOLITION

- A. The contractor shall visit the site prior to bid to determine the extent of work required to complete the project.
- B. Contractor shall coordinate demolition with owner. All equipment shall be salvaged for owner. Locate equipment as directed by owner. All equipment and materials not salvaged by the owner shall be removed from the site and discarded at the contractor's expense.
- C. Contractor shall coordinate all work with general contractor and phase work as required by project.

- D. All equipment piping, etc. required to be removed to accommodate the modifications shall be removed.
- E. Contractor shall maintain services to existing facilities which shall remain during and after construction is complete.
- F. Contractor shall coordinate any shutdown of services with the owner. It is intended that the building will remain occupied during construction. Contractor shall schedule shut down of services with the owner in order to prevent disruption of building occupancy.
- G. Contractor shall be responsible for draining down of existing systems to complete demolition. All work shall be scheduled with the owner. Contractor shall also be responsible for refilling system and removing all air in order to return the systems to proper operating conditions.
- H. All shutdown of services shall be done at night during a time period approved by owner. The systems shall be required to be back up and running each morning unless otherwise approved by the owner.

1.4 GROUNDS AND CHASES

- A. This Contractor shall see that all required chases, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise, he shall bear the cost of providing them.

1.5 CUTTING AND PATCHING

- A. Initial cutting and patching shall be the responsibility of the General Contractor, with the various trades being responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimble without first receiving the approval of the Architect. After initial surfacing has been done, any further cutting, patching and painting shall be done at this Contractor's expense.

1.6 FILL AND CHARGES FOR EQUIPMENT

- A. Fill and charge with materials or chemicals all those devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.

1.7 BIDDING REQUIREMENTS AND RESPONSIBILITIES

- A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.
- B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation that require provision of services by another sub-contractor or trade.
- C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, etc. to coordinate requirements and responsibilities with and through prime bidder.

- D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with Division 00 & 01 requirements, prior to bidding.
- E. All timely, pertinent, questions provided in writing prior to bids, in accordance with Division 00 & 01 requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance in Division 00 & 01 requirements.
- F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.
- G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with Division 00 & 01 requirements.
- H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all Division 00 & 01 requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:
 - 1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor (whose proposal is also being accepted).
 - 2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
 - 3. The work has been accepted as the responsibility of the prime contractor directly.

1.8 MATERIAL AND EQUIPMENT

- A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the Work.
- B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified.
- C. Coordinate and properly relate all Work of this Division to building structure and work of all other trades.
- D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with Division 00.

- E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information from physically examining the existing equipment, receiving specific cut sheet information from the Owner's representative, other trades and/or Architect. Rough-in services for "NIC" equipment as required, as the work progresses.
- F. Provide storage and protection for all equipment and materials in accordance with requirements of Division 00 & 01. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to Owner.
- G. Keep premises clean in accordance with requirements of Division 00 & 01.

1.9 SUBSTITUTIONS

- A. Substitutions are only allowed by approval of the Architect prior to Bid Date as stipulated in Division 00 & 01.
- B. Design of systems is based on specific equipment. If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by Contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, their equipment with different model numbers shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from Contract Document requirements. Furnish all options specified or reasonably implied from the contract documents. Specifically identify any variance in regard to submittal versus specified performance on the cover sheet of each submittal.

1.10 POST-BID VALUE ENGINEERING (V/E):

- A. While it may be in the project Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, Division 22 contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.
- B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, Division 22 contractor shall provide duly licensed professional engineering consultants working on behalf of the Division 22 contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The Division 22 contractor's licensed professional engineering consultants and the Division 22 contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as Division 22 contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.
- C. Division 22 contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the Division 22 contractor's (V/E Items) professional of record (either employees, or independent consultants to the Division 22 contractor) through the offer and acceptance of V/E items, agree to indemnify and hold

harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the Division 22 systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.11 DRAWINGS AND SPECIFICATIONS

- A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated functional condition.
- B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items should any major interference develop, immediately notify the Architect.
- C. In laying out Work, refer to mechanical, electrical, structural, and architectural drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.12 CODES AND REGULATIONS

- A. Work shall be in full accord with the most stringent interpretation of the State Sanitary Code, local ordinances, building codes, and other applicable national, local, and state regulations.
- B. Equipment shall conform to requirements and recommendations of the National bureau of Fire Underwriters and National Fire Protection Association (NFPA).
- C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1
- D. In the possible event of conflict between codes or regulations and Contract Documents, the most stringent interpretation of either shall govern (provided if exceeds the requirements of other codes). In the event of an irreconcilable difference between codes or regulations notify the Architect/Engineer immediately.
- E. In addition to the codes heretofore mentioned, all work and equipment shall conform to the applicable portions of the following specifications, codes and/or regulations:
 - 1. National Electrical Code (NEC)
 - 2. National Fire Protection Association (NFPA)
 - 3. American Society of Mechanical Engineers (ASME)
 - 4. American Gas Association (AGA)
 - 5. Underwriters Laboratories (UL)
 - 6. International Plumbing Code (IPC) with Louisiana Amendments
- F. All materials, equipment and accessories installed under this Contract shall conform to all rules, codes, etc. as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. All materials shall be new and of the best quality and first class in every respect. Whenever directed by the Architect, the Contractor shall submit a sample for approval before proceeding.

- G. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories, whether or not called for in these Specifications.
- H. All unfired and fired pressure vessels shall be built in accordance with the A.S.M.E. Code and so stamped. Furnish shop certificates for each vessel. Contractor shall provide and pay for first operating certificate as per State Fire Marshal Regulations.

1.13 FEES, PERMITS, AND TAXES

- A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.
- B. Pay any and taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.
- C. All permits, fees, certificates, etc. for the installation, inspections, plan review, service connections locations, and/or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the Contractor.
- D. The Contractor shall make all tests required by the Architect, Engineer or other governing authorities at no additional cost to the Owner.
- E. The Contractor shall notify the Architect and local governing authorities before any tests are made, and the tests are not to be drawn off a line covered or insulated until examined and approved by the authorities. In event defects are found, these shall be corrected and the work shall be retested.
- F. Prior to requesting final inspection by the Architect, the Contractor shall have a complete coordination and adjustment meeting of all of his sub-contractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Architect in writing ten (10) days prior to this meeting, instructing him of the time, date and whom you are requesting to be present.
- G. This project shall not be accepted until the above provisions are met to the satisfaction of the Architect.

1.14 MANUFACTURER'S DIRECTIONS

- A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.15 SUBMITTAL DATA

- A. Submit shop drawings, project data, and samples in accordance with requirements of Division 00 & 01.
- B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

- C. Where approved manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document requirements, specifically call such deviations to attention of Architect on submittals. Type deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted.
- D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.
- E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

1.16 REVIEW OF MATERIALS:

- A. Whenever manufacturers or trade names are mentioned in these Plans or Specifications, the words "or approved equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only, and should not be construed to infer a preference. Equivalent products which meet the Architect's approval will be accepted; however, these products must be submitted to the Architect a minimum of ten (10) days prior to the Bid Date.
- B. Submission shall include the manufacturer's name, model number, rating table and construction features.
- C. Upon receipt and checking of this submittal, the Architect will issue an addendum listing items which are approved as equivalent to those specified. The contractor shall base his bid solely on those items specified or included in the "prior approval addendum", as no other item will be acceptable.
- D. Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve the Contractor of the responsibility of assuring himself that this equipment is in complete accord with the Plans and Specifications and that it will fit into the space provided. Shop drawings must be submitted on all items of equipment for approval as hereinafter specified.
- E. Before proceeding with work and/or within thirty (30) days after the award of the General Contract for this work, the Contractor shall furnish to the Architect complete shop and working drawings of such apparatus, equipment, controls, insulation, etc. to be provided in this project. These drawings shall give dimensions, weights, mounting data, performance curves and other pertinent information.
- F. The Architect's approval of shop drawings shall not relieve the Contractor from the responsibility of incorrectly figured dimensions or any other errors which may be contained in these drawings. Any omission from the shop drawings or specifications, even through approved by the Architect, shall not relieve the Contractor from furnishing and erecting same.
- G. Shop drawings shall be submitted in accordance with Section 013300. These submittals shall be supplied as part of this Contractor's contract. Any drawings not approved shall be resubmitted until they are approved. Submit all shop drawings at the same time. No separate items will be accepted.

1.17 PROJECT RECORD DOCUMENTS

- A. Keep Project Record Documents in accordance with requirements of Division 00 & 01.

- B. During construction period, keep accurate records of installations made under this Division, paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.
- C. The Contractor shall obtain at his cost, two sets of blueline prints of the original bid documents by the Architect. One set shall be kept on the site with all information as referenced below, and shall update same as the work progresses. The other set will be utilized to record all field changes to a permanent record copy for the Owner.
- D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Architect for any phase of the work, he shall record in a neat and readable manner, all such variances on the blueline print in red. The original blueines shall be returned to the Architect for documentation.
- E. Provide electronic (PDF) copies of all documentation included in Final Report.
- F. All deviations from sizes, locations, and from all other features of the installations shown in the Contract Documents shall be recorded.
- G. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions and the like, as well as other features of the work which will be concealed underground and/or in the finished building.
- H. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.
- I. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The Architect's/Engineer's decision in this matter will be final.
- J. The following requirements apply to all "As-Built" drawings:
 - 1. They shall be maintained at the Contractor's expense.
 - 2. All such drawings shall be done carefully and neatly, and in a form approved by the Architect/Engineer.
 - 3. Additional drawings shall be provided as necessary for clarifications.
 - 4. These drawings shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Architect/Engineer; and when necessary, to establish clearances for other parts of the work.
 - 5. "As-built" drawings shall be returned to the Architect upon completion of the work and are subject to approval of the Architect/Engineer.

1.18 EXCAVATING AND BACKFILLING

- A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of Division 02, Site Work, if applicable.
- B. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner's Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative inspection and as subsequently found to be deficient, the trenches shall be uncovered, inspected, and then re-filled, if requested by Owner's Representative.

- C. Provide minimum 18 inches of cover or in compliance with local published frost line data (if greater than 18 inches) to finish grades or paving at water piping.
- D. For piping, provide bell holes at trench bottom to assure uniform bearing. Accurately grade trench bottoms by instrument before laying any pipe.
- E. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers.
- F. Compact fill to satisfaction of Architect and/or Owner's Representative.

1.19 CUTTING AND PATCHING

- A. Comply with requirements of Division 00 & 01 regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.
- B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.
- C. Repairing Roadways and Walks: Coordinate all roadway work with authorities having jurisdiction. Cut and/or bore under roadways for connection of utilities as required. Coordinate work through General Contractor. Where this contractor cuts or breaks roadways, or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.20 PAINTING

- A. Painting shall be provided by General Contractor's painting sub-contractor, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.
- B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additions cost to Owner.
- C. Coordinate all painting requirements with prime bidder prior to bids.
- D. Paint all exposed piping inside and outside of building. Label all piping after painting in accordance with Section 230553. Utilize industry standard paint colors for respective system unless directed otherwise by Architect. Review proposed color scheme with Architect/Engineer prior to ordering materials.

1.21 CLEANING AND ADJUSTING:

- A. Upon completion of his work, the Contractor shall clean and adjust all equipment, controls, valves, etc.; clean all piping, ductwork, etc.; and leave the entire installation in good working order.

1.22 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

- B. Copies of shop drawings will not be acceptable as operation and maintenance instructions.
- C. This information shall be bound in plastic hardbound notebooks with the job name, Architect and Engineer names permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Architect for approval.
- D. In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.
- E. The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, rpm, etc. The Contractor shall include this data on each piece of equipment furnished under this contract.
- F. Contractor shall provide electronic (PDF) format copies of all Operation and Maintenance Instruction on disk.

1.23 GUARANTEE

- A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.
- B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

1.24 LOCAL CONDITIONS

- A. The location and elevation of all utility services is based on available surveys and utility maps and are believed to be reasonably accurate; however, these shall serve as a general guide only, and the Contractor shall visit the site and verify the location and elevation of all services to his satisfaction in order to determine the amount of work required for the execution of the Contract.
- B. The Contractor shall contact the various utility companies, determine the extent of their requirements and he shall include in his bid all lawful fees and payments required by these companies for complete connection and services to the building, including meters, connection charges, street patching, extensions from meters to main, etc.
- C. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven (7) days before the date of bidding. Failure to comply with this requirement will make the Contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

1.25 MINOR DEVIATIONS

- A. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes, etc. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and

shall be made as required. However, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift ducts or pipes, or to change the shape of ducts, and these changes shall be made as required. All such changes shall be referred to the Architect for approval before proceeding. Extra charges shall not be allowed for these changes.

- B. Only typical details are shown on the Plans. In cases where the Contractor is not certain about the installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.
- C. In general, the drawings are diagrammatic and the Contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect is to state which item was first installed.

1.26 VALVE TAGS

- A. Secure metal tags to all valves. Labeling on all valve tags shall include type of system the valve controls and the area of building, zone, or equipment number affected by valve operation. Tag shall be 2" minimum diameter brass, engraved with code number, service and size. A framed list of the valves, giving manufacturer's name, model number, type and location shall be mounted in the main basement equipment room.

1.27 LABELING PLUMBING EQUIPMENT

- A. All equipment furnished under the contract documents shall be labeled with permanent laminated plate secured to equipment. Units shall be labeled as indicated on plans and schedules.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 22 00 00



SECTION 22 05 00 – COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes the furnishing and installation of common work results for plumbing which includes the following related components:
 - 1. Strainers;
 - 2. Water hammer arresters;
 - 3. Valves;
 - 4. Hydrants;
 - 5. Hose bibbs and sill faucets;
 - 6. Backflow preventers;
 - 7. Pressure regulating and reducing valves;
 - 8. Pressure-temperature relief valves.

1.3 SUMMARY

- A. This Section specifies the water distribution piping system, including potable cold, hot, and recirculated hot water piping, fittings, and specialties within the building.

1.4 DEFINITIONS

- A. Water Distribution Piping: A pipe within the building or on the premises which conveys water from the water service pipe or meter to the points of usage.
- B. Water Service Piping: The pipe from the water main or other source of potable water supply to the water distributing system of the building served.

1.5 SUBMITTALS

- A. Refer to Division 01 and Basic Mechanical Requirements for administrative and procedural requirements for submittals.
- B. Product Data: Submit manufacturer's product data for the following products that apply to this project scope:
 - 1. Strainers;
 - 2. Water hammer arresters;
 - 3. Valves;
 - 4. Hydrants;
 - 5. Hose bibbs and sill faucets;
 - 6. Backflow preventers;
 - 7. Pressure regulating and reducing valves;
 - 8. Pressure-temperature relief valves.

- C. Coordination Drawings: Prepare and submit coordination drawings for Water Distribution Piping in accordance with Division 23 - Basic Mechanical Requirements.
- D. Maintenance Data: Submit maintenance and operating data. Include this data in maintenance manual in accordance with requirements of Division 01 and Division 23 - Basic Mechanical Requirements for the following products that apply to this project scope:
 - 1. Strainers;
 - 2. Valves;
 - 3. Hose Bibbs and Sill Faucets;
 - 4. Backflow Preventers;
 - 5. Pressure Regulating and Reducing Valves;
 - 6. Pressure-temperature relief valves.
- E. Quality Control Submittals:
 - 1. Submit welders' certificates specified in Quality Assurance below.
 - 2. Submit certification of compliance with ASME and UL fabrication requirements specified in below.
 - 3. Submit reports specified in Part 3 of this Section.

1.6 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. Plumbing Code Compliance: Comply with applicable portions of Edition 2015 of the International Plumbing Code.
 - 2. ASME Compliance: Fabricate and stamp pressure-temperature relief valves to comply with ASME Boiler and Pressure Vessel Code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store pipe in a manner to prevent sagging and bending.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate the size and location of concrete equipment pads. Cast anchor bolt inserts into pad. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate the installation of pipe sleeves for foundation wall penetrations.

1.9 MAINTENANCE

- A. Spare Parts:
 - 1. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer uniformity: Conform with the requirements specified in Basic Mechanical Requirements, under "Product Options" for the following water distribution piping products.

2.2 VALVES

- A. Gate, ball, butterfly, check, and drain valves are specified in Section 230620 "Hydronic Specialties".
- B. Balance Cocks:
 - 1. Threaded Ends 2" and Smaller: Class 125, bronze body, bronze plug, screw driver operated, straight or angle pattern.
 - 2. Soldered Ends 2" and Smaller: Class 125, bronze body, bronze plug, screw driver operated, straight or angle pattern.

2.3 PIPING SPECIALTIES

- A. Water Hammer Arresters: Bellows type, with stainless steel casing and bellows, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201.
- B. Basket Strainers: Cast-iron body, 125 psi flanges, bolted type or yoke type cover; with removable non-corrosive perforated strainer basket having 1/8" perforations and lift-out handle.
- C. Flexible connectors: Stainless steel bellows with a woven flexible bronze wire reinforcing protective jacket; rated for 150 psig water working pressure, 250 deg F operating temperature and suitable for up to maximum 3/4" misalignment. Connectors shall be a minimum of 12" long and have threaded or flanged ends; sweat ends are not acceptable.
- D. Hose Bibbs: Bronze body, renewable composition disc, tee handle, 3/4" NPT inlet, 3/4" hose outlet.
- E. Backflow Preventers: Reduced pressure principle assembly consisting of shutoff valves on inlet and outlet, and strainer on inlet. Assemblies shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves, and comply with requirements of ASSE Standard 1013. Backflow preventer shall be with drain funnel.
- F. Pressure Regulating Valves: Single seated, direct operated type; having bronze body with integral strainer, and complying with requirements of ASSE Standard 1003.
- G. Relief Valves:
 - 1. Provide proper size for relief valve, in accordance with ASME Boiler and Pressure Vessel Codes, for indicated capacity of the appliance for which installed.
 - 2. Combined Pressure- Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 deg. F, and pressure relief at 150 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify all dimensions by field measurements. Verify that all water distribution piping may be installed in accordance with pertinent codes and regulations, the original design, and the referenced standards.
- B. Examine rough-in requirements for plumbing fixtures and other equipment having water connections to verify actual locations of piping connections prior to installation.

- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 JOINING PIPES AND FITTINGS

- A. Copper Tubing: Solder joints in accordance with the procedures specified in ANSI B9.1, using lead free piping, solder and flux. Lead free, when used with respect to solder and flux, refer to solder and flux containing not more than 0.2 percent lead. When used with respect to pipe and fittings, lead free refers to pipe and fittings containing not more than 6.0 percent lead.

3.3 PIPING INSTALLATION

- A. Refer to the separate Division 230020 section: "Basic Mechanical Requirements", for general piping installation instructions.
- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into consideration pipe sizing and friction loss, expansion, pump sizing, and other design considerations. So far as practical, install piping as indicated.
- C. Install gravity drainage piping with minimum 1/32" per foot (1/4 percent) downward slope towards drain point unless specified otherwise, herein.

3.4 INSTALLATION OF VALVES

- A. Installation requirements for general duty valves are specified in a separate Section of Division 23.
- B. Sectional Valves: Install sectional valves on each branch and riser, close to main. For sectional valves 2" and smaller, use ball valves; for sectional valves 2-1/2" and larger, use gate or butterfly valves.
- C. Shutoff Valves: Install shutoff valves on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated. For shutoff valves 2" and smaller, use ball valves; for shutoff valves 2-1/2" and larger, use butterfly valves.
- D. Drain Valves: Install drain valves on each plumbing equipment item, located to completely drain equipment for service or repair. Install drain valves at the base of each riser, at low points of horizontal runs, and elsewhere as required to completely drain distribution piping system. For drain valves 2" and smaller, use gate or ball valves; for drain valves 2-1/2" and larger, use gate or butterfly valves.
- E. Check Valves: Install swing check valves on discharge side of each pump, and elsewhere as indicated.
- F. Balance Cocks: Install in each hot water recirculating loop, discharge side of each pump, and elsewhere as indicated.

3.5 INSTALLATION OF PIPING SPECIALTIES

- A. Install pressure regulating valves with inlet and outlet shutoff valves, and balance cock bypass. Install pressure gage on valve outlet.

3.6 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide hot and cold-water piping runouts to fixtures of sizes indicated on plans. Connect cold water to hot and cold-water faucet connections where hot water is not provided.
- B. Mechanical Equipment Connections: Connect hot and cold-water piping system to mechanical equipment. Provide shutoff valve and union for each connection, provide drain valve on drain connection. For connections 2-1/2" and larger, use flanges instead of unions.

3.7 FIELD QUALITY CONTROL

- A. Inspections:
 - 1. Do not enclose, cover, or put into operation water distribution piping system until it has been inspected and approved by the Architect.
 - 2. During the progress of the installation, notify the Architect, at least 24 hours prior to the time such inspection must be made. Perform tests specified below in the presence of the Architect.
 - 3. Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in after system is roughed-in, and prior to setting fixtures.
 - 4. Final Inspection: Arrange for a final inspection by the Architect to observe the tests specified below and to ensure compliance with the requirements of the plumbing code.
 - 5. Reinspections: Whenever the Architect finds that the piping system will not pass the test or inspection, make the required corrections and arrange for reinspection by the Architect.
 - 6. Reports: Prepare inspection reports, signed by the Architect.
- B. Piping System Test:
 - 1. Test for leaks and defects all water distribution piping systems. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
 - 2. Leave uncovered and unconcealed all water distribution piping until it has been tested and approved. Expose all such work for testing, that has been covered or concealed before it has been tested and approved.
 - 3. Cap and subject the piping system to a static water pressure of 50 psi above the operating pressure without exceeding the pressure rating of the piping system materials. Isolate the test source and allow to stand for a period of 4 hours. Leaks and loss in test pressure constitute defects which must be repaired.
 - 4. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
 - 5. Prepare reports for all tests and required corrective action.

3.8 ADJUSTING AND CLEANING

- A. Cleaning and Disinfecting:
 - 1. Purge all new water distribution piping systems and parts of existing systems, which have been altered, extended, or repaired prior to use.
 - 2. Reports:
 - a. Prepare reports for all purging and disinfecting activities.

3.9 STERILIZATION

- A. Sterilize water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit to Architect.

END OF SECTION 22 05 00



SECTION 22 05 19 – PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes the following basic mechanical materials and methods to complement other Divisions and Sections.
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Pipe Specialties.
 - 3. Sleeves.
 - 4. Valves and Unions.
 - 5. Shock Absorbers.
 - 6. Escutcheons.
 - 7. Flashing.
 - 8. Access Panels.
 - 9. System Accessories.
- B. Pipe and pipe fitting materials are specified in individual piping system Sections.

1.3 ELECTRICAL WORK

- A. All electrical equipment shall have the U.L. Label and shall meet the standards of the National Electrical Code and NEMA.

PART 2 - PRODUCTS

2.1 PIPE:

- A. Sanitary Sewer Waste Lines Above Slab (PVC):
 - 1. Piping above slab, unless otherwise shown or specified, shall be constructed of solid wall Schedule 40 PVC "DWV" plastic pipe and fittings conforming to ASTM D265 and ASTM D1785 with solvent welded joints.
- B. Sanitary Sewer Waste Lines Below Slab (PVC):
 - 1. Piping below slab, unless otherwise shown or specified, shall be constructed of solid wall Schedule 40 PVC "DWV" plastic pipe and fittings conforming to ASTM D265 and ASTM D1785 with solvent welded joints.
- C. Sanitary Sewer Vent Lines Above Slab (PVC):
 - 1. These shall be constructed of solid wall Schedule 40 PVC "DWV" plastic pipe fittings conforming to ASTM D2665 and ASTM D1785 with solvent welded joints.

2. Sanitary sewer pipe penetrating concrete slabs shall be wrapped with Virginia Chemical K-501, Benjamin Manufacturing Model 6200, or equal foam insulation tape.

D. Domestic Cold and Hot Water Lines:

1. All such lines shall be Government Type "L", hard copper water tubing of standard weight and thickness as made by Mueller, Chase, Anaconda or equivalent, unless indicated otherwise. Use 95-5 lead-free solder on all piping above slab. Use Silfos 1000° lead-free solder on all piping beneath the slab.
2. In certain areas, type "L" soft copper without joints below slab shall be used only where indicated on the Plans. Piping shall be completely insulated per Section 220700.
3. Domestic cold-water lines penetrating concrete slabs shall be wrapped with "Protect-O-Sleeve" vinyl flexible tube as manufactured by Robert H. Harris Co., or equivalent. Sleeve shall have a minimum thickness of .025" (0.635 mm).
4. Domestic hot water lines shall be insulated at all penetrations through slab per insulation (see Section 220700).
5. Domestic cold-water piping within 5'-0" of building may be Schedule 40 PVC plastic pipe with solvent welded joints, or slip joint fittings with EPDM seals. Provide thrust blocks all at changes in direction. Installation shall be in accordance with manufacturer's recommendations.

E. Water Heater Relief Lines:

1. These shall be Government Type "L" hard copper.

F. Trap Primer Lines:

1. All such lines shall be Type "L" soft copper, without joints.

2.2 PIPE SPECIALTIES

- A. Dielectric unions shall be used between copper and iron pipe.

2.3 PIPE HANGERS AND SUPPORTS

- A. This Contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the Drawings.
- B. This Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.

2.4 PROVIDE SLEEVES FOR ALL PIPES PASSING THROUGH WALLS, FLOORS, BEAMS, ETC.

- A. Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26-gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed.
- B. Provide Grinnell, Fee & Mason, or equivalent malleable iron split ring hangers with rod supports throughout. Strap hangers or wire will not be accepted.
- C. Maximum spacing of hangers for cast iron pipes shall be 5 ft.; for other than soil, use 10 ft.

- D. Provide galvanized iron shields between hangers and pipe covering.
- E. Provide Grinnell, Fee & Mason, Crane or equivalent heavy steel riser clamps on vertical risers at floors to support pipes.
- F. Provide producer specialty, Jones Manufacturing or equal chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.
- G. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported fixtures or accessories will not be accepted.

2.5 VALVES AND UNIONS

- A. Furnish and install all valves, unions, stops, connections, etc. shown on plans and necessary to make a complete system in working order. Provide valves on inlet and outlet of all equipment and fixtures and on branch lines to fixtures or groups of fixtures.
- B. Ball Valves, 3" and smaller, rated for 150 PSI saturated steam pressure, 600 PSI WOG pressure; shall be 2-piece construction, bronze body conforming to ASTM B-62, conventional port, chrome-plated brass ball, replaceable TFE seats and seals, blow-out proof stem, and vinyl-covered steel handle. Provide solder ends for domestic hot and cold-water service of NIBCO Design S-580-70, Milwaukee BA-150-S or equal, threaded ends of heating hot water and low pressure steam of NIBCO Design T-580-70, Milwaukee BA-100-S or equal. At Contractor's option, Victaulic Style 722 or 721 ball valves may be used.
- C. All valves, unions, etc. where pipe is chrome plated shall have similar finish. All exposed supplies to plumbing fixtures shall be chrome plated.
- D. Domestic water valves (below grade): M & H AWWA Series C-509 resilient gate valve with low torque operation, positive shut-off, O- Ring seals, full epoxy coating and square valve stem end. Provide two (2) adjustable "TEE" handle valve wrenches to be turned over to the owner after construction is complete.
- E. Gate Valves, 2-Inch and Smaller: MSS SP-80; Class 125, body and bonnet of ASTM B 62 cast bronze; with threaded or solder ends, solid disc, copper-silicon alloy or bronze stem, brass packing gland, "Teflon" impregnated packing, and malleable iron handwheel. Provide Class 150 valves meeting the above where system pressure requires.
- F. Gate Valves, 2-1/2-Inch and Larger: MSS SP-70; Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A 126 Class B; with flanged ends "Teflon" impregnated packing, and two-piece backing bland assembly.
- G. Globe Valves, 2-Inch and Smaller: NSS SP-80; Class 125; body and screwed bonnet of ASTM B 62 cast bronze; with threaded or solder ends, brass or replaceable composition disc, copper-silicon alloy stem, brass packing gland, "Teflon" impregnated packing, and malleable iron handwheel. Provide Class 150 valves meeting the above where system pressure requires.
- H. Butterfly Valves, 2-1/2-Inch and Larger: MSS SP-67; rated at 200 psi; cast-iron body conforming to ASTM A 126, Class B. Provide valves with field replaceable EPDM sleeve, nickel-plated ductile iron disc (except aluminum bronze disc for valves installed in condenser water piping), stainless steel stem, and EPDM O-ring stem seals. Provide lever operators with locks for sizes 2 through 6 inches and gear operators with position indicator for sizes 8 through 24 inches. Provide "Non-Leakage" full threaded lug flange body type capable of being broken down at one side of the valve remaining closed. Drill and tap valves on dead-

end service or requiring additional body strength. At Contractor's option Victaulic 300 BFV for grooved piping systems may be used.

- I. Wafer Check Valves: Class 2500, cast-iron body; with replaceable bronze seat, and non-slam design lapped and balanced twin bronze flappers and stainless-steel trim and torsion spring. Provide valves designed to open and close at approximately one-foot differential pressure.
- J. Select Valves with the following ends or types of pipe/tube connections:
 - 1. Copper Tube Size 2 Inch and Smaller: Solder ends, except provide threaded ends for heating hot water.
 - 2. Steel Pipe Sizes, 2 Inch and Smaller: Threaded or grooved end.
 - 3. Steel Pipe Sizes, 2-1/2 Inch and Larger: Grooved end or flanged.

2.6 SHOCK ABSORBERS

- A. All water service to fixtures or groups of fixtures shall have concealed air chambers. Air chambers shall be of the same diameter as the supply or header pipes and 12 inches long on both hot and cold-water branches. Locate shock absorbers close to fixture or at end of header.
- B. Shock arrestors shall be installed for sterilizer water supplies.
- C. On lines 1-1/4" and above fixtures with quick closing valves (i.e.: Dishwashers, tempered valves, etc.) install "Shock Trol", "Precision Plumbing Products" or equal water hammer arrester properly sized for each unit.

2.7 ESCUTCHEONS

- A. Provide escutcheons for all exposed lines passing through floors, walls, and ceilings. They shall be chrome plated brass and shall be of such flange size as to cover necessary penetrating openings.

2.8 FLASHING

- A. Flash all vent penetrations through roof. Extend flashing approximately 10 inches in all directions at base and turn ends down into top of pipe. Off-set vents where necessary to provide 4 feet minimum clearance from other flashing such as outside walls, curbs, etc. Note: All vents shall be 25 feet from fresh air intakes.

2.9 ACCESS PANELS

- A. Furnish and install access panels where valves, dampers, control boxes, etc. are concealed in walls, ceilings, floors, or otherwise inaccessible or where specifically called for on plans. Panels shall be Milcor Style DW, or Bar-Co. Model 500, J-L Industries Model WB, or equal sized as required and furnished with prime coat finish.

2.10 SYSTEM ACCESSORIES

- A. Automatic Drain Valves for Compressed Air Piping shall be corrosion-resistant metal body and internal parts, rated for 200 psig minimum working pressure, capable of automatic discharge of collected condensate. Plug End shall be flow-sensor bleeder, check-valve type, with serrated outlet for hose.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING:

- A. All pipe shall be true and straight, without sags or traps.
- B. The Contractor shall exercise care in cleaning joints after making cuts on pipe to prevent pipe particles from entering the system.
- C. All pipe fittings shall be same as piping specified unless indicated otherwise.
- D. Arrange, install piping approximately as indicated, straight, plumb and as direct as possible; form right angles, or parallel lines with building walls. The most practical appearance of piping runs is required. Keep pipes close to walls, partitions, ceilings; off-set only where necessary to follow walls as directed.
- E. Before installing piping, check plumbing drawings with architectural, mechanical, structural, electrical drawings; make accurate layout of plumbing and HVAC piping. Where interferences may appear and departures from indicated arrangements are required, consult with other trades involved; come to agreement as to changed locations and elevations of piping; obtain approval of proposed changes. Note runs of other contractor's piping and large conduits and cooperate to achieve neat appearance.
- F. Unless otherwise indicated, conceal all piping in building construction in finished areas. Install such piping in time so as not to cause delay to work of other trades and to allow ample time for tests and approval; do not cover before approval is obtained.
- G. Locate groups of pipes parallel to each other and building lines; space them at distance to permit access for servicing, valves, and to create most practical appearance when racked with conduits, refrigerant, etc., provided by other contractors.
- H. Keep fixture branches concealed to points above floor close to fixtures; expose only as much as necessary for final connection. Rigidly support pipes projecting from walls, chases, etc. in wall or chase to make firm, well-braced installation. Loosely supported pipe or accessory is not acceptable.
- I. Install horizontal piping to coordinate with other trades and install without sags or humps.
- J. Grade inside sewer piping at uniform slope of 1/4 inch per foot, minimum; where this is impossible, maintain slope as directed but in no case less than 1/8 inch per foot. Waste lines 3 inches and smaller must grade at minimum 1/4 inch per foot. See Drawings for fall on exterior sewer lines.
- K. Grade other piping as specified under heading or service where used, or as directed.
- L. Keep piping free from scale and dirt, protect open pipe ends wherever work is suspended during construction. To prevent foreign bodies entering and lodging in pipe, use temporary plugs or other approved material.
- M. Where changes in pipe sizes occur, do not bush down; use only reducing fittings. For drainage piping changes in direction, use longsweep bends where possible; otherwise, short sweep 1/4 bends or combination Y and 1/8 bends; also, Y's in combination with other bends.
- N. Provide shut off valves at all supply connections to all equipment. Supplier of equipment shall provide rough-in drawings and this contractor shall fully connect all items, supply necessary piping and fittings as required, unless otherwise noted individually.

- O. Buried thermoplastic piping systems shall be installed in accordance with ASTM D2321.
- P. Do not locate valves with stems below horizontal.
- Q. Locate valves for easy access and operations. Where concealed, notify General Contractor of exact location in order that he may leave openings for access panels. Provide access panels.
- R. Provide unions, screwed or flanged, where indicated, and in following locations even if not indicated.
- S. In connection to equipment requiring disconnection for repairs or replacement. Locate between shut-off and equipment.
- T. Approved expansion joints or flexible couplings shall be provided as necessary.
- U. Care shall be taken in making up pipe and fittings such that the pipe does not extend into fitting sufficiently to reduce the waterway.
- V. Standard, one-piece reducing fittings of approved design shall be used wherever a change in size is made. Changes in pipe sizes shall not be made by means of reducing flanges.
- W. Bushings may be used only where standard, one-piece reducing fittings are not available and shall be subject to the following:
 - 1. Bushings shall be of the face or flush type.
 - 2. Bushings shall not be used in elbow fittings.
 - 3. Bushings shall not be used when the reduction in size of the outlet is less than ½".
 - 4. Bushings shall not be used in more than one outlet of any tee or two outlets of any cross fitting.

3.2 INSTALLATION OF VALVES

- A. Use ball and butterfly valves for shut-off duty.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install three-valve bypass around each pressure reducing valve using throttling-type valves.
- E. Install valves in horizontal piping with stem at or above the center of the pipe.
- F. Install valves in a position to allow full stem movement.
- G. All valves, unions, etc. where pipe is chrome plated shall have similar finish. All exposed supplies to plumbing fixtures shall be chrome plated.
- H. All valves, on insulated piping shall be complete with extended lever handle stem.

3.3 PIPE MARKERS

- A. Provide pipe markers and directional arrows on all piping in mechanical equipment rooms, or which is exposed in building, and on both sides of all valves located above ceiling. Markers shall be as manufactured by W.H. Bradley Co., or the equivalent. All letters shall be color-

coded and sized as recommended by OSHA. Samples of the type of letters to be used shall be submitted with shop drawings.

B. The following pipe and valves shall be identified:

		Piping	Valves
1.	Domestic Cold Water	X	X
2.	Domestic Hot Water Supply	X	X
3.	Domestic Hot Water Return	X	X
4.	Sanitary	X	

C. Pipe markers with arrows shall indicate lines content and shall be located 20 feet on center and at each change of direction of line. Identification bands shall be color coded to match pipe markers and shall be provided 10 feet on center. Pipe identification markers shall be taped at each end and shall be taped around the entire circumference of pipe.

3.4 TEST

- A. Make such tests of work as specified, or required by Architect or by State and Municipal Bureaus having jurisdiction, and under their supervision. Perform tests in presence of Architect's representative. Notify Architect two days prior to testing.
- B. Provide apparatus, temporary piping connections, or other requirements necessary for tests. Take precautions to prevent damage to building or contents by tests. Contractor is required to repair and make good at his expense damage so caused.
- C. For Drain, Waste, and Vent piping, use hydrostatic test to 10 feet of head. Do not use compressed air or gas.
- D. Correct leaks, defects, or deficiencies discovered as result of tests. Repeat tests until test requirements are fully complied with. Caulking of pipe joints to remedy leaks is not permitted, except on lead and oakum joints.

3.5 STERILIZATION

- A. Sterilization all water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit approval report to Architect.

END OF SECTION 22 05 19



SECTION 22 07 00 – PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Pipe insulation shall not begin until all work has been tested and found to be tight. All insulation adhesives, sealers, tapes and mastic shall meet the latest NFPA requirements and shall meet 25/50/50 flame spread and smoke developed ratings.
- B. All insulation shall be installed in strict accordance with the manufacturer's recommendations.
- C. All pipe insulation where recommended by the manufacturer shall be banded with aluminum bands, three to a section and with one band on each side of each fitting, valve, etc.
- D. Insulation shall be continuous through walls and ceilings.
- E. All valves, strainers, etc. shall be insulated to maintain the same thermal resistance rating as its adjacent piping and the covering shall extend all the way up to the equipment.
- F. Use high density insulation inserts at hangers on all piping 1-1/2" and above to prevent crushing of insulation.

PART 2 - PRODUCTS

2.1 THERMAL INSULATION

- A. After all work has been tested and approved, insulate as follows:
 - 1. Insulation shall be installed in accordance with the manufacturer's recommendations and instructions.

2.2 DOMESTIC WATER PIPING

- A. Cover all domestic cold and hot water lines and hot water return lines above slab with 1" thick, high density fiberglass insulation with Universal Fire-Retardant Jacket, Owens/Corning "25 ASJ/SSL", Knauf ASJ-SSL, or equal. All laps are to be sealed and stapled in place. Fittings are to be mitered segments of insulation held in place with white vapor barrier tape for concealed areas and Zeston 25/50 PVC, Knauf 25/50 rated PVC, pre-molded insulated fitting covers in exposed areas.
- B. Domestic cold and hot water lines 2 -1/2" and above shall be insulated with 1-1/2" thick fiberglass with jacket.
- C. All water lines exposed, including mechanical rooms, shall be covered with 0.030 PVC jacket with solvent welded seams and joints.

- D. All water lines on the outside of the building exposed to the weather shall be covered with 0.160 smooth aluminum jacket and elbows.
- E. Domestic cold and hot water lines run below slab within building shall be insulated with 3/4" thick closed cell tube insulation. Apply two (2) coats of mastic on insulation.

2.3 WASTE LINE P-TRAPS

- A. P-traps receiving HVAC condensate (exposed to weather or above ceilings) shall be insulated with 2.33" thick 3/4 # density fiberglass ductwrap insulation with aluminum foil vapor barrier. Insulation shall be sealed at all seams and joints.

2.4 LAVATORY P-TRAP & SUPPLY LINES

- A. Unless specified otherwise on drawings, insulate p-trap, tailpiece and water supplies on lavatories/sinks with white, Truebro Model 102 Handi Lav-Guard, Pro-Wrap A.D.A. lavatory insulation kit, or approved equivalent insulating system to meet A.D.A. Requirements. Provide accessories for offset tailpiece as required.

PART 3 - EXECUTION

3.1 INSULATION THROUGH HANGERS AND SLEEVES

The insulation shall be continuous through pipe hangers and pipe sleeves. At hangers where the pipe is supported by insulation, provide a galvanized iron protection shield. Provide pipes 2-inch i.p.s. and larger in insulation inserts at points of hanger supports. The inserts shall be of calcium silicate, cellular glass, prestressed molded glass fiber of minimum 13-pound density, or other approval material of the same thickness as adjacent insulation and not less than 13-pound density. The inserts shall have sufficient compression strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Inserts shall be 180 degrees and not less than the length of the protection shield. Vapor barrier facing of the insert shall be the same as the facing on the adjacent insulation. Where copper clad hangers are used on domestic copper pipe, insulation may cover pipe and hanger. Provide 18-gauge metal saddles between all hangers and insulation.

END OF SECTION 22 07 00



SECTION 22 11 23 – NATURAL GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Manual gas shutoff valves.
 - 5. Pressure regulators.
 - 6. Dielectric fittings.

1.3 SCOPE OF WORK

- A. Prior to bid, contact the local utility company to determine the extent of their requirements and include all costs associated with the complete installation of the gas service line, gas meter assembly, gas meter and gas service regulator. Contractor shall be responsible for fees and permits required for the gas service.
- B. Contract shall include routing gas main from the local utility main to the building and throughout project as indicated on Drawings.
- C. Provide gas pressure regulator downstream of the meter assembly to provide adequate gas pressure to equipment furnished in project. Coordinate gas supply pressure and equipment supply pressure requirements with the utility company and equipment manufacturer.
- D. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. International Fuel Gas Code.
 - 2. NFPA 54.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Gas Regulators shall be AGA rated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
 - 1. Notify Architect, Owner and Engineer no fewer than seven days in advance of proposed interruption of natural-gas service.
 - 2. Do not proceed with interruption of natural-gas service without Architect's permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 100 psig minimum unless otherwise indicated.
 - 3. Minimum Operating Pressure of Service Meter: 5 psig.
- B. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 0.5 psig but not more than 2 psig, and is reduced to secondary pressure of 0.5 psig or less.

2.2 PIPES, TUBES, AND FITTINGS

- A. See Part 3 – Piping Schedule articles to determine where pipes, tubes, fittings and joining materials are applied in various services.
- B. Steel Pipe: ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A234/A234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.

- d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum O-rings, and spiral-wound metal gaskets.
- e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless-steel underground.
- 5. Mechanical Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - i. Baker Hughes Company.
 - ii. Smith-Blair, Inc.
 - b. Stainless-steel flanges and tube with epoxy finish.
 - c. Buna-nitrile seals.
 - d. Stainless-steel bolts, washers, and nuts.
 - e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

2.3 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

- 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
- 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
- 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
- 4. Corrugated stainless-steel tubing with polymer coating.
- 5. Operating-Pressure Rating: 0.5 psig.
- 6. End Fittings: Zinc-coated steel.
- 7. Threaded Ends: Comply with ASME B1.20.1.
- 8. Maximum Length: 72 inches

B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

- 1. Copper-alloy convenience outlet and matching plug connector.
- 2. Nitrile seals.
- 3. Hand operated with automatic shutoff when disconnected.
- 4. For indoor or outdoor applications.
- 5. Adjustable, retractable restraining cable.

C. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.4 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.5 GAS VALVES

A. General Requirements for Metallic Valves, **(NPS 2 and Smaller)**: Comply with ASME B16.33.

- 1. CWP Rating: 125 psig.
- 2. Threaded Ends: Comply with ASME B1.20.1.

3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 4. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 5. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- B. General Requirements for Metallic Valves, **(NPS 2-1/2 and Larger)**: Comply with ASME B16.38.
1. CWP Rating: 125 psig.
 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
 3. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- C. Service / Main Line Valves: Cast-Iron, Lubricated Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Flowserve Corporation.
 - c. Homestead Valve.
 - d. Milliken Valve Company.
 - e. Mueller Co.
 - f. R & M Energy Systems; Robbins & Myers.
 - g. Nordstrom.
 - h. Resun.
 2. Body: Cast iron, complying with ASTM A126, Class B.
 3. Plug: Bronze or nickel-plated cast iron.
 4. Seat: Coated with thermoplastic.
 5. Stem Seal: Compatible with natural gas.
 6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 7. Operator: Square head or lug type with tamperproof feature where indicated.
 8. Pressure Class: 125 psig.
 9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- D. Equipment / Shut-off Valves: Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Nibco.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. Milwaukee.
 - d. BrassCraft Manufacturing Co.; a Masco company.
 - e. Lyall, R. W. & Company, Inc.
 - f. Perfection Corporation.
 - g. A.Y. McDonald Mfg. Co
 2. Body: Bronze, complying with ASTM B584.
 3. Ball: Chrome-plated bronze.
 4. Stem: Bronze; blowout proof.
 5. Seats: Reinforced TFE; blowout proof.
 6. Packing: Threaded-body packnut design with adjustable-stem packing.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
8. CWP Rating: 600 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Automatic Emergency Shut-off Valves.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASCO Red Hat Series 8044
 - b. Honeywell.
2. Listing: UL listed and Factory Mutual (FM) Approved for natural gas service.
3. Valve shall be 2-way electrically tripped solenoid type, fail safe closed; manual reset; Type 1 solenoid enclosure; NBR seals and disc; stainless steel core tube and springs; copper coil.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Meter Company.
 - b. Dormont; a WATTS brand.
 - c. Fisher Control Valves & Instruments; a brand of Emerson Process Management.
 - d. Maxitrol Company.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
11. Maximum Inlet Pressure: 2 psig.

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dormont; a WATTS brand.
 - b. Eaton.
 - c. Harper Wyman Co.
 - d. Maxitrol Company.
 - e. SCP, Inc.
2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 2 psig.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions (NPS 1/2 to NPS 2):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. HART Industrial Unions, LLC.
 - c. WATTS.
 - d. Wilkins.
 - e. Zurn Industries, LLC.
2. Description:
 - a. Standard: ASSE 1079.
 - b. Pressure Rating: 125 psig minimum at 180 deg F.
 - c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges (NPS 2-1/2 to NPS 4):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Matco-Norca.
 - c. WATTS.
 - d. Wilkins.
2. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 125 psig minimum at 180 deg F.
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
2. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

2.8 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.
- B. Install underground, natural-gas piping buried at least 36 inches below finished grade.
 1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.
- C. Install underground, PE, natural-gas piping according to ASTM D2774.
- D. Steel Piping with Protective Coating:
 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

- 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
- E. Install fittings for changes in direction and branch connections.
- F. Install pressure gage upstream and downstream from each service regulator.

3.4 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Verify final equipment locations for roughing-in.
- K. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- L. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- M. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- N. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

- O. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
 - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
 - 2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
 - 3. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
 - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
 - 4. Prohibited Locations:
 - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
 - b. Do not install natural-gas piping in solid walls or partitions.
- P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- Q. Connect branch piping from top or side of horizontal piping.
- R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- S. Do not use natural-gas piping as grounding electrode.
- T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- U. Install pressure gage upstream and downstream from each line regulator.
- V. Install sleeves for piping penetrations of walls, ceilings, and floors.
- W. Install sleeve seals for piping penetrations of concrete walls and slabs.
- X. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.5 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing connector.
- B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- C. Install cooking appliance shunt trip valve per valve manufacturer's instructions and in coordination with the kitchen equipment vendor and installer.

3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.
- F. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Install hangers for steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- B. Install hangers for corrugated stainless-steel tubing, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Support horizontal piping within 12 inches of each fitting.
- D. Support vertical runs of steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support vertical runs of corrugated stainless-steel tubing to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.8 CONNECTIONS

- A. Connect to utility's gas main after the gas meter and the gas regulator.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

- A. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 PAINTING

- A. Paint exposed, Exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (gloss).
Color (Service Gas Regulator and Upstream): Grey
 - d. Color (Downstream of Service Gas Regulator): Yellow.
- B. Paint exposed, Interior metal piping, fittings and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Latex Over Alkyd Primer System: MPI INT 5.1Q.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex (gloss).
 - d. Color: Yellow.
- C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports and submit to the Architect and Engineer for review.

3.12 OUTDOOR PIPING SCHEDULE

- A. Underground natural-gas piping shall be the following:
 - 1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
- B. Aboveground natural-gas piping, **(NPS 2 and Smaller)** shall be the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
- C. Aboveground natural-gas piping, **(NPS 2-1/2 and Larger)** shall be the following:
 - 1. Steel pipe with wrought-steel fittings and welded joints.

3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

- A. Aboveground, natural-gas piping **(NPS 2 and smaller)** shall be one of the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
 - 2. At Contractor's option, for branch piping **(NPS 1 or smaller)** Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
 - 3. Exceptions:
 - a. All exposed piping located within areas utilized as a return air plenum shall have welded joints with Schedule 40 socket welded forged steel fittings conforming ASME B16.11.
 - b. All exposed piping serving laboratories from main natural gas riser to each emergency shut-off valve shall have welded joints with Schedule 40 socket welded forged steel fittings conforming to ASME B16.11.
- B. Aboveground natural-gas piping, **(NPS 2-1/2 and Larger)** shall be the following:
 - 1. Steel pipe with wrought-steel fittings and welded joints.

3.14 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 5 PSIG

- A. Aboveground, Branch and Distribution Piping: Steel pipe with steel welding fittings and welded joints.

END OF SECTION 22 11 23



SECTION 22 13 19 – PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes plumbing specialties for water distribution systems; soil, waste, and vent systems; and storm drainage systems.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with following minimum working pressure ratings, except where otherwise indicated:
 - 1. Water Distribution Systems, Below Ground: 250 psig.
 - 2. Water Distribution Systems, Above Ground: 250 psig.
 - 3. Soil, Waste, and Vent Systems: 10-foot head of water.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections, and Utility Company requirements.
- B. Submit product data including rated capacities of selected models and weights (shipping, installation, and operation). Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following plumbing specialty products that apply to this project scope:
 - 1. Drain valves.
 - 2. Trap seal primer valves.
 - 3. Cleanouts, cover plates, and access panels.
 - 4. Floor drains, open receptors, trench drains, and roof drains.
 - 5. Sleeve penetration systems.
- C. Maintenance data for inclusion in Operating and Maintenance manuals as specified in Division 01.

1.5 QUALITY ASSURANCE

- A. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
- B. Electrical Component Standard: NFPA 70, "National Electrical Code."
- C. Listing and Labeling: Provide equipment that is listed and labeled.
- D. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.

- E. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.6 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below. Package them with protective covering for storage and identify with labels clearly describing contents.
- B. Operating Keys (Handles): Furnish 1 extra key for each key-operated hose bibb and hydrant installed.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS PIPING SPECIALTIES

- A. Piping specialties such as escutcheons, dielectric fittings, sleeves, and sleeve seals are specified in Division 23 Section "Basic Mechanical Materials and Methods."
- B. Stop-and-Waste Drain Valves: Ball valve or MSS SP-80 gate valve, rated for 200 psig WOG minimum, ASTM B 62 bronze body, with 1/8-inch side drain outlet and cap.
- C. Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:
 - 1. 30-75 psig minimum operating pressure.
 - 2. Bronze body with atmospheric-vented drain chamber.
 - 3. Inlet and Outlet Connections: 1/2 inch threaded, union, or solder joint.
 - 4. Gravity Drain Outlet Connection: 1/2 inch threaded or solder joint.
 - 5. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
- D. Stack Flashing Fittings: Counterflashing-type, cast-iron fitting, with bottom recess for termination of roofing membrane, and with threaded or hub top for extension of vent pipe.

2.2 CLEANOUTS

- A. General: Size cleanouts as indicated on drawings, or where not indicated, same size as connected drainage piping.
- B. Cleanouts larger than 4 inches are not required except where indicated.
- C. Cleanouts: ASME A112.36.2M, cast-iron body with straight threads and gasket seal or taper threads for plug, flashing flange and clamping ring, and a brass closure plug. Cleanouts for installation in floors not having membrane waterproofing may be furnished without clamping ring.
- D. Covers of clean-outs shall be extra-heavy duty, AASHTO H20-44 or greater due to high wheel/point loads.
- E. Cleanout top styles shall be coordinate with floor types.

2.3 SLEEVE PENETRATION SYSTEMS

- A. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.

1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on 1 end for installation in cast-in-place concrete slabs.
2. Stack Fitting: ASTM A 48, cast-iron, hubless-pattern, wye branch stack fitting with neoprene O ring at base and cast-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
 - a. Special Coating: Include corrosion-resistant interior coating on fittings for vent stacks.

2.4 FLASHING MATERIALS

- A. Elastic Membrane: Nonreinforced flexible, black elastic, sheet, 50 to 65 mils thick and complying with the following:
 1. Shore A Hardness: ASTM D 2240, 50 to 70.
 2. Tensile Strength: ASTM D 412, 1200 psi.
 3. Tear Resistance: ASTM D 624, Die C, 20 lb per linear inch.
 4. Ultimate Elongation: ASTM D 412, 250 percent.
 5. Low-Temperature Brittleness: ASTM D 746, minus 30 deg F.
 6. Resistance to Ozone Aging: ASTM D 1149, no cracks for 10 percent elongated sample for 100 hours in ozone at 104 deg F.
 7. Resistance to Heat Aging: ASTM D 573, maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212 deg F.
 8. Fasteners: Metal compatible with material and substrate being fastened.

PART 3 - EXECUTION

3.1 PIPING SPECIALTY INSTALLATION

- A. Install strainers on supply side of each control valve, pressure-regulating valve, and solenoid valve, and where indicated.
- B. Install trap seal primer valves with valve outlet piping pitched down toward drain trap a minimum of 1/8 inch per foot (1:100) (1 percent) and connect to floor drain body, trap, or inlet fitting. Adjust valve for proper flow.
- C. Install expansion joints on vertical risers, stacks, and conductors.
- D. Install cleanouts in above-ground piping and building drain piping where indicated, and where not indicated, according to the following:
 1. Size same as drainage piping up to 4 inches size. Use 4 inches size for larger drainage piping except where larger size cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping 3 inches and smaller and 80 feet for larger piping.
 4. Locate at base of each vertical soil or waste stack.
- E. Install cleanout deck plates (covers), of types indicated, with top flush with finished floor, for floor cleanouts for piping below floors.
- F. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.
- G. Install flashing flange and clamping device with each stack and cleanout passing through floors having waterproof membrane.

- H. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to the manufacturer's written instructions.
- I. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

3.2 CONNECTIONS

- A. Supply Runouts to Fixtures: Install hot- and cold-water supply piping runouts to fixtures of sizes indicated, but not smaller than required by equipment/fixture connection size and/or required by the plumbing code.
- B. Drainage Runouts to Fixtures: Provide drainage and vent piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, for equipment/fixture connection size and/or required by the but not smaller than required by plumbing code.
- C. Locate drainage piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

3.3 FLASHING INSTALLATION

- A. Provide flashing manufactured in a single piece except where large pans, sumps, or other drainage shapes are required.
- B. Install 4 psf lead flashing or 16 oz. per sq. ft. copper, except when another weight or material is specified.
- C. Install 6 psf lead flashing or heavier where burning (welding) of lead sheets is required.
- D. Solder joints of metal sheet flashing utilized sheets where required.
- E. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with membrane waterproofing.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum sleeve length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
- F. Set flashing on floors and roofs in solid coating of bituminous cement.
- G. Secure flashing into sleeve and specialty clamping ring or device.
- H. Install flashing for piping passing through roofs with counter flashing or commercially made flashing fittings, according to Division 07 Section "Sheetmetal Flashing and Trim."
- I. Extend flashing up vent pipe passing through roofs and turn down into pipe or secure flashing into cast-iron sleeve having calking recess.
- J. Fabricate and install metal sheet flashing and pans, sumps, and other drainage shapes consistent with Architectural details and materials identified. Install drain connection at all equipment requiring drain piping connection.

3.4 COMMISSIONING

A. Preparation: Perform the following checks before start-up:

1. Systems tests are complete.
2. Damaged and defective specialties and accessories have been replaced or repaired.
3. There is clear space for servicing of specialties.

B. Before operating systems, perform these steps:

1. Close drain valves, hydrants, and hose bibbs.
2. Open valves to full open position.
3. Remove and clean strainers.
4. Verify drainage and vent piping are clear of obstructions. Flush with water until clear.

C. Starting Procedures: Follow manufacturer's written procedures.

3.5 ADJUSTING

A. Adjust operation and correct deficiencies discovered during commissioning.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

B. Place plugs in ends of uncompleted piping at end of day or when work stops.

END OF SECTION 22 13 19



SECTION 22 14 00 – DRAINAGE AND VENT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section specifies building sanitary drainage and vent piping systems, building condensate drainage system, building grease waste drainage and vent system, and storm drainage and vent piping systems, including drains and drainage specialties.

1.3 DEFINITIONS

- A. Building Drain: That part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer.
- B. Building Sewer: That part of the drainage system which extends from the end of the building drain and conveys its discharge to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.
- C. Drainage System: Includes all the piping within a public or private premise which conveys sewage, rain water or other liquid wastes to a point of disposal. It does not include the mains of public sewer systems or a private or public sewage treatment or disposal plant.
- D. Vent System: A pipe or pipes installed to provide a flow of air to or from a drainage system, or to provide a circulation of air within such system to protect trap seals from siphonage and back pressure.

1.4 SUBMITTALS

- A. Refer to Division 01 and Division 23, Basic Mechanical Requirements for administrative and procedural requirements for submittals.
- B. Product Data: Submit product data for the following products that apply to this project scope:
 - 1. Drainage piping specialties
 - 2. Floor drains.
- C. Quality Control Submittals:
 - 1. Submit reports specified in Part 3 of this Section.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:

1. Plumbing Code Compliance: Comply with applicable portions of Edition 2015 of the International Plumbing Code.

1.6 SEQUENCING AND SCHEDULING

- A. Coordinate the installation of roof drains, flashing, and roof penetrations.
- B. Coordinate flashing materials installation of roofing, waterproofing, and adjoining substrate work.
- C. Coordinate the installation of drains in poured-in-place concrete slabs, to include proper drain elevations, installation of flashing, and slope of slab to drains.
- D. Coordinate with installation of sanitary and storm sewer systems as necessary to interface building drains with drainage piping systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer Uniformity: conform with the requirements specified in Division 23, Basic Mechanical Requirements, under "Product Options" for the following drainage and vent systems.

2.2 DRAINAGE PIPING SPECIALTIES

- A. Backwater Valves: Valve assembly shall be bronze fitted cast-iron, with bolted cover. Flapper shall provide a maximum 1/4" clearance between flapper and seat for air circulation. Valve ends shall suit piping material.
- B. Trap Primers: Bronze body valve with automatic vacuum breaker, with 1/2" connections matching piping system. Complying with ASSE 1018.
- C. Expansion Joints: Cast-iron body with adjustable bronze sleeve, bronze bolts with wing nuts.
- D. Cleanout Plugs: Cast-bronze or brass, threads complying with ANSI B2.1, countersunk head.
- E. Floor Cleanouts: Cast-iron body and frame, and adjustable round top as follows:
 1. Nickel-Bronze Top: Manufacturer's standard cast unit with the following patterns:
 2. Exposed flush type, standard non-slip scored or abrasive finish.
 3. Cast-iron Top: Manufacturer's extra-heavy duty cast unit with the following patterns:
 - a. Exposed flush type, standard non-slip scored or abrasive finish.
 4. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.
 5. Flashing Flanges: Cast-iron watertight stack or wall sleeve with membrane flashing ring. Provide underdeck clamp and sleeve length as required.
 6. Vent Flashing Sleeves: Cast-iron calking type roof coupling for cast-iron stacks, cast-iron threaded type roof coupling for steel stacks, and cast bronze stack flashing sleeve for copper tubing.
 7. Frost-Proof Vent Caps: Construct of galvanized iron, copper, or lead-coated copper, sized to provide 1" air space between outside of vent pipe and inside of flashing collar extension.
 8. Vandal-Proof Vent Caps: Cast-iron body full size of vent pipe, with calked base connection for cast-iron pipes, threaded base for steel pipes.

2.3 FLOOR DRAINS

- A. Floor drain type designations, descriptions, and sizes are indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify all dimensions by field measurements. Verify that all drainage and vent piping and specialties may be installed in accordance with pertinent codes and regulations, the original design, and the referenced standards.
- B. Verify all existing grades, inverts, utilities, obstacles, and topographical conditions prior to installations.
- C. Examine rough-in requirements for plumbing fixtures and other equipment having drain connections to verify actual locations of piping connections prior to installation.
- D. Examine walls, floors, roof, and plumbing chases for suitable conditions where piping and specialties are to be installed.
- E. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOUNDATION FOR UNDERGROUND BUILDING DRAINS

- A. Grade trench bottoms to provide a smooth, firm and stable foundation, free from rock, throughout the length of the pipe.
- B. Remove unstable, soft, and unsuitable materials the surface upon which pipes are to be laid and backfill with clean sand and pea gravel to indicate invert elevation.
- C. Shape bottom of trench to fit bottom of pipe for 90-degrees (bottom 1/4 of the circumference). Fill unevenness with tamped sand backfill. At each pipe joint dig bell holes to relieve the bell of the pipe of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.3 JOINING PIPES AND FITTINGS

- A. Copper Tubing: Solder joints in accordance with the procedures specified in ANSI B9.1.
- B. Cast-Iron Soil Pipe: Make lead and oakum calked joints, compression joints, and hubless joints in accordance with the recommendations in the CISPI Cast Iron Soil Pipe and Fittings Handbook, Chapter IV.

3.4 INSTALLATION

- A. Refer to the separate Division 23 section: Basic Piping Materials and Methods, for general piping installation instructions.
- B. Install supports and anchors in accordance with Division-23 Basic Mechanical Materials and Methods section "Supports and Anchors".
- C. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into account many design considerations. So far as practical, install piping as indicated.

- D. Make changes in direction for drainage and vent piping using appropriate 45-degree wyes, half-wyes, or long sweep quarter, sixth, eighth, or sixteenth bends. Sanitary tees or short quarter bends may be used on vertical stacks of drainage lines where the change in direction of flow is from horizontal to vertical, except use long-turn tees where two fixtures are installed back to back and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. No change in direction of flow greater than 90 degrees shall be made. Where different sizes of drainage pipes and fittings are connected, use proper size, standard increasers and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.
- E. Install underground building drains to conform with the plumbing code, and in accordance with the Cast Iron Soil Pipe Institute Engineering Manual. Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- F. Install building drain pitched down at minimum slope of 1/4" per foot (2 percent) for piping 3" and smaller, and 1/8" per foot (1 percent) for piping 4" and larger.
- G. Extend building drain to connect to sewer piping, of size and in location indicated for service entrance to building. Sewer piping is specified in a separate section of Division 02.
- H. Install sleeve and mechanical sleeve seal through foundation wall for watertight installation.
- I. Install 1" thick extruded polystyrene over underground building drain piping not under building. Width of insulation shall extend minimum of 12" beyond each side of pipe. Install directly over, and center on pipe center line.

3.5 INSTALLATION OF PIPING SPECIALTIES

- A. Install backwater valves in sanitary building drain piping as indicated, and as required by the plumbing code.
- B. Install expansion joints on vertical risers as indicated, and as required by the plumbing code.
- C. Above Ground Cleanouts: Install in above ground piping and building drain piping as indicated, and as required by plumbing code;
 - 1. At each change in direction of piping greater than 45 degrees;
 - 2. At minimum intervals of 50' for piping 3" and smaller and 80' for larger piping;
 - 3. At base of each vertical soil or waste stack.
- D. Clean-outs Covers (extra heavy duty): Install floor and wall cleanout covers for concealed piping, types as indicated at all cleanouts.
- E. Flashing Flanges: Install flashing flange and clamping device with each stack and clean-out passing through waterproof membranes.
- F. Vent Flashing Sleeves: Install on stacks passing through roof, secure over stack flashing in accordance with manufacturer's instructions.
- G. Frost-Proof Vent Caps: Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1" clearance between vent and pipe and roof substrate.

3.6 INSTALLATION OF FLOOR DRAINS

- A. Install floor drains in accordance with manufacturer's written instructions and in locations indicated.
- B. Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.
- C. Set drain elevation depressed below finished slab elevation as listed below to provide proper slope to drain:

DEPRESSION	RADIUS OF AREA DRAINED
1/2"	5'-0"
3/4"	10'-0"
1"	15'-0"
1-1/4"	20'-0"
1-1/2"	25'-0"

- D. Trap all drains connected to the sanitary sewer. Provide 6" deep seal p-traps, and trap primers.
- E. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.
- F. Position drains so that they are accessible and easy to maintain.

3.7 INSTALLATION OF TRAP PRIMERS

- A. Install trap primers with piping pitched towards drain trap, minimum of 1/8" per foot (1 percent). Adjust trap primer for proper flow.

3.8 CONNECTIONS

- A. Piping Runouts to Fixtures: Provide drainage and vent piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated.
- B. Locate piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

3.9 FIELD QUALITY CONTROL

- A. Inspections:
 - 1. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the Architect.
 - 2. During the progress of the installation, notify the Architect, at least 24 hours prior to the time such inspection must be made. Perform tests specified below in the presence of the Architect.
 - 3. Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in after system is roughed-in, and prior to setting fixtures.
 - 4. Final Inspection: Arrange for a final inspection by the Architect to observe the tests specified below and to ensure compliance with the requirements of the plumbing code.
 - 5. Re-inspections: Whenever the piping system fails to pass the test or inspection, make the required corrections, and arrange for reinspected by the Architect.
 - 6. Reports: Prepare inspection reports, signed by the Architect.

B. Piping System Test:

1. Test for leaks and defects all new drainage and vent piping systems and parts of existing systems, which have been altered, extended or repaired. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
2. Leave uncovered and unconcealed all new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose all such work for testing, that has been covered or concealed before it has been tested and approved.

C. Drainage and Venting System Testing Procedures:

1. Rough Plumbing: Except for outside leaders and perforated or open jointed drain tile, test the piping of plumbing drainage and venting systems upon completion of the rough piping installation. Tightly close all openings in the piping system, and fill with water to the point of overflow, but not less than 10 feet head of water. Water level shall not drop during the period from 15 minutes before the inspection starts, through completion of the inspection. Inspect all joints for leaks.
2. Finished Plumbing: After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and water-tight. Plug the stack openings on the roof and building drain where it leaves the building, and introduce air into the system equal to a pressure of 1" water column. Use a "U" tube or manometer inserted in the trap of a water closet to measure this pressure. Air pressure shall remain constant without the introduction of additional air throughout the period of inspection. Inspect all plumbing fixture connections for gas and water leaks.
3. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
4. Prepare reports for all tests and required corrective action.

3.10 ADJUSTING AND CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Clean drain strainers, domes, and traps. Remove dirt and debris.

3.11 PROTECTION

- A. Protect drains during remainder of construction period, to avoid clogging with dirt and debris, and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

END OF SECTION 22 14 00



SECTION 22 40 00 – PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes plumbing fixtures and trim, fittings, and accessories, appliances, appurtenances, equipment, and supports associated with plumbing fixtures.
- B. Products unloaded, uncreated, set in place, installed and final connections made but not furnished under this Section include:
 - 1. Plumbing Fixtures described in Plumbing Fixture Schedule.
 - 2. Accessories, appliances, appurtenances, and equipment specified in other sections, requiring plumbing services or fixture-related devices such as ice makers for refrigerators, as indicated.

1.3 DEFINITIONS

- A. Accessible: Describes a plumbing fixture, building, facility, or portion thereof that can be approached, entered, and used by physically handicapped people.
- B. Accessory: Device that adds effectiveness, convenience, or improved appearance to a fixture but is not essential to its operation.
- C. Appliance: Device or machine designed and intended to perform a specific function.
- D. Appurtenance: Device or assembly designed to perform some useful function when attached to or used with a fixture.
- E. Equipment: Device used with plumbing fixtures or plumbing systems to perform a certain function for plumbing fixtures but that is not part of the fixture.
- F. Fitting: Fitting installed on or attached to a fixture to control the flow of water into or out of the fixture.
- G. Fixture: Installed receptor connected to the water distribution system that receives and makes available potable water and discharges the used liquid or liquid-borne wastes directly or indirectly into the drainage system. The term "Fixture" means the actual receptor, except when used in a general application where terms "Fixture" and "Plumbing Fixture" include associated trim, fittings, accessories, appliances, appurtenances, support, and equipment.
- H. Roughing-In: Installation of piping and support for the fixture prior to the actual installation of the fixture.
- I. Support: Device normally concealed in building construction, for supporting and securing plumbing fixtures to walls and structural members. Supports for urinals, lavatories, and sinks

are made in types suitable for fixture construction and the mounting required. Categories of supports are:

1. Carrier: Floor-mounted support for wall-mounted water closet, and support fixed to wall construction for wall-hung fixture.
 2. Chair Carrier: Support for wall-hung fixture, having steel pipe uprights that transfer weight to the floor.
 3. Chair Carrier, Heavy Duty: Support for wall-hung fixture, having rectangular steel uprights that transfer weight to the floor.
 4. Reinforcement: Wood blocking or steel plate built into wall construction, for securing fixture to wall.
- J. Trim: Hardware and miscellaneous parts, specific to a fixture and normally supplied with it required to complete fixture assembly and installation.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Product data for each type of plumbing fixture specified, including fixture and trim, fittings, accessories, appliances, appurtenances, equipment, supports, construction details, dimensions of components, and finishes.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements of ANSI Standard A117.1, "Buildings and Facilities -- Providing Accessibility and Usability for Physically Handicapped People," and Public Law 90-480, "Architectural Barriers Act, 1968," with respect to plumbing fixtures for the physically handicapped.
- B. Regulatory Requirements: Comply with requirements of ATBCB (Architectural and Transportation Barriers Compliance Board) "Uniform Federal Accessibility Standards (UFAS) - 1985-494-187" with respect to plumbing fixtures for the physically handicapped.
- C. Listing and Labeling: Provide electrically (battery) operated fixtures specified in this Section that are listed and labeled.
 1. The terms "listed" and "labeled" shall be as defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- D. Design Concept: The drawings indicate types of plumbing fixtures and are based on the specific descriptions, manufacturers, models, and numbers indicated. Plumbing fixtures having equal performance characteristics by other manufacturers may be considered provided that deviations in dimensions, operation, color or finish, or other characteristics are minor and do not change the design concept or intended performance as judged by the Architect. Burden of proof for equality of plumbing fixtures is on the proposer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver plumbing fixtures in manufacturer's protective packing, crating, and covering.
- B. Store plumbing fixtures on elevated platforms in a dry location.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work as described in plumbing fixture schedule on drawings.

2.2 PLUMBING FIXTURES, GENERAL

- A. Contractor shall install all plumbing fixtures shown on accompanying Drawings. Refer to both Plumbing and Architectural, and install all fixtures shown on either.
- B. Provide plumbing fixtures and trim, fittings, other components, and supports as specified in "Plumbing Fixture Schedule" identified on plans.
- C. All brass must be of the best quality. Lightweight goods will not be accepted.
- D. All brass pipe shall be seamless brass tubing and nipples shall be extra heavy.
- E. All fittings and trim shall be chromium plated heavy brass unless otherwise specified.
- F. "P" traps on lavatories and sinks shall be cast brass with cleanouts.
- G. All exposed piping shall be chromium plated.
- H. Provide cut-off valves at each fixture in both hot and cold-water piping.
- I. For the purpose of establishing type and class of fixtures required, the following plate numbers have been taken from the Manufacturer's Catalog as indicated. Fixture manufacturer's and Model numbers with prior approval will be acceptable, however fixtures and accessories shall meet standards and features consistent with basis of design fixtures and accessories identified.
- J. Provide plumbing fixtures and trim, fittings, other components, and supports as specified in "Plumbing Fixture Schedule" identified on plans.

2.3 PLUMBING FIXTURE SUPPORTS

- A. Supports: ASME A112.6.1M, categories and types as required for wall-hanging fixtures specified, and wall reinforcement.
 - 1. Support categories are:
 - a. Carriers: Supports for wall-hanging fixtures supported from wall construction.
 - b. Reinforcement: 2 inches by 4 inches wood blocking between studs or 1/4 inch by 6 inches steel plates attached to studs, in wall construction, to secure floor-mounted and special fixtures to wall.
 - c. Support Types: Provide support of type having features required to match fixture.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for potable cold water and hot water supplies and soil, waste, and vent piping systems to verify actual locations of piping connections prior to installing fixtures.
- B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 APPLICATION

- A. Install plumbing fixtures and specified components, in accordance with designations and locations indicated on Drawings.
- B. Install supports for plumbing fixtures in accordance with categories indicated, and of type required:
 - 1. Carriers for following fixtures:
 - a. Wall-hanging fixtures supported from wall construction.
 - 2. Chair carriers for the following fixtures:
 - a. Wall-hanging urinals.
 - b. Wall-hanging lavatories and sinks.
 - c. Wall-hanging drinking fountains and electric water coolers.
 - 3. Heavy-duty chair carriers for the following fixtures:
 - a. Fixtures where specified.
 - 4. Reinforcement for the following fixtures:
 - a. Floor-mounted sinks required to be secured to wall.
 - b. Recessed, box-mounted electric water coolers.

3.3 INSTALLATION OF PLUMBING FIXTURES

- A. Install plumbing fixtures level and plumb, in accordance with fixture manufacturers' written installation instructions, roughing-in drawings, and referenced standards.
- B. Install water closets with closet flanges and gasket seals.
- C. Install wall-hanging, back-outlet urinals with gasket seals.
- D. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.
- E. Fasten wall-mounted fittings to reinforcement built into walls.
- F. Fasten counter-mounting-type plumbing fixtures to casework.
- G. Secure supplies behind wall or within wall pipe space, providing rigid installation.
- H. Install stop valve in an accessible location in each water supply to each fixture.
- I. Install trap on fixture outlet except for fixtures having integral trap.
- J. Install escutcheons at each wall, floor, and ceiling penetration in exposed finished locations and within cabinets and millwork. Use deep pattern escutcheons where required to conceal protruding pipe fittings.
- K. Seal fixtures to walls, floors, and counters using a sanitary-type, one-part, mildew-resistant, silicone sealant in accordance with sealing requirements specified in Division 07. Match sealant color to fixture color.

3.4 CONNECTIONS

- A. Piping installation requirements are specified in other sections of Division 22. The Drawings indicate general arrangement of piping, fittings, and specialties. The following are specific connection requirements:
 - 1. Install piping connections between plumbing fixtures and piping systems and plumbing equipment specified in other sections of Division 22.
 - 2. Install piping connections indicated between appliances and equipment specified in other sections, direct connected to plumbing piping systems.

3.5 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Test fixtures to demonstrate proper operation upon completion of installation and after units are water pressurized. Replace malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

3.6 ADJUSTING AND CLEANING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Operate and adjust disposers, hot water dispensers, and controls. Replace damaged and malfunctioning units and controls.
- C. Adjust water pressure at drinking fountains, electric water coolers, and faucets, shower valves, and flushometers having controls, to provide proper flow and stream.
- D. Replace washers of leaking and dripping faucets and stops.
- E. Clean fixtures, fittings, and spout and drain strainers with manufacturers' recommended cleaning methods and materials.
 - 1. Review the data in Operating and Maintenance Manuals. Refer to Division 01.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of fixtures for temporary facilities, except when approved in writing by the Owner.

END OF SECTION 22 40 00

SECTION 23 00 10 - MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Furnish all labor and material necessary to provide and install the complete mechanical portion of this Contract as called for herein and on accompanying drawings. Parts of the mechanical division may be bid separately or in combination, at the Contractor's option; however, it shall be the responsibility of the Contractor to assure himself that all items covered in the mechanical Division have been included if he chooses to accept separate bids.
- B. It is the intent of this specification that all materials with temperatures below ambient conditions or conveying any fluid/gas at temperatures below 70 deg. F be insulated to completely eliminate the potential for condensation. Unless specified elsewhere in these specifications, for materials that do not require and requiring occasional access, use 2" thick closed cell rubberized insulation with re-sealable fabric joints (hook and loop type).
- C. Contractor shall refer to the Architectural and Structural drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.
- D. It is the intention of these specifications that all mechanical systems shall be furnished complete with all necessary valves, controls, insulation, piping devices, equipment, etc. necessary to provide a satisfactory installation that is complete and in good working order.
- E. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.
- F. Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Architect to reject any piece of equipment.

1.3 BIDDING REQUIREMENTS AND RESPONSIBILITIES

- A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.
- B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid.

- C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, and Fire Alarm drawing section to coordinate requirements and responsibilities with and through prime bidder.
- D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with Division 01 requirements, prior to bidding.
- E. All timely, pertinent, questions provided in writing prior to bids, in accordance with Division 01 requirements, will be clarified, defined, or otherwise explained in written addendum and / or addendums prior to bids, in accordance with Division 01 requirements.
- F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.
- G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with Division 01 requirements.
- H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all Division 01 requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:
 - 1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor (whose proposal is also being accepted).
 - a. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
 - b. The work has been accepted as the responsibility of the Contractor directly.

1.4 POST-BID VALUE ENGINEERING (V/E):

- A. Value Engineering (V/E) defined: For purposes of Division 23 Specifications, in accordance with all Division 01 Requirements and all Terms and Conditions of proposed contract between Owner and Contractor, Value Engineering (V/E) shall be defined as a "post bid" process, whereby the apparent low bidder (having submitted a proposal in strict accordance with Project Contract Documents, that exceeds the Owner's available funds for construction [AFC] for this specified project offers proposed changes ("Value Engineering") to the work. This proposed value engineering may alter or adjust aforementioned contract document requirements in exchange for financial and/or other consideration (in response to a specific request by the Owner/Owner's Representative).

- B. Value Engineering may not be considered, prior to scheduled receipt and review of Bid Proposals by the Owner and an official written request from the Owner/Owner's Representative expressing the Owner's desire to consider value engineering items.
- C. While it may be in the project Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, Division 23 contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.
- D. Should Contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, Contractor shall provide duly licensed professional engineering consultants working on behalf of the Contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The Contractor's licensed professional engineering consultants and the Contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as Contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.
- E. Division 23 Contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the Contractor's (V/E Items) professional of record (either employees, or independent consultants to the Contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the Division 23 systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.5 MATERIAL AND EQUIPMENT

- A. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified.
- B. Coordinate and properly relate all Work of this Division to building structure and work of all other trades.
- C. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with Division 00.
- D. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information or determining rough-in requirements from

physically examining the existing equipment, receiving specific cut sheet information from the Owner's representative, other trades and/or Architect. Rough-in services for "NIC" equipment as required, as the work progresses.

- E. Provide storage and protection for all equipment and materials in accordance with requirements of Division 00 and Division 01. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to Owner.
- F. Keep premises clean in accordance with requirements of Division 00 and Division 01.

1.6 SUBSTITUTIONS

- A. Substitutions are allowed under La. R.S. 38:2291 and La R.S. 38:2292. Any requests for prior approval (as provided for under La. R.S. 38:2295) including any re-submitted data, shall be received by the Architect/Engineer a minimum of ten (10) working days prior to bid date. The Contractor shall recognize that it may be necessary to submit certain requests for prior approval sooner than the final date listed in the Instructions to Bidders, depending upon the complexity and completeness of the submittal. If, in the opinion of the Architect/Engineer, there is neither sufficient time available nor adequate descriptive data attached to the submittal, the submittal will not be considered. Except as otherwise specified, materials and equipment shall be new and bear the approval label of the Underwriters Laboratories, Inc. for the type of installation required.
- B. Basis of design of systems is based on specific equipment for performance, size, shape, color, construction material, etc... If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by the contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, his equipment shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from basis of design requirements.
- C. All requests for prior approval shall identify where proposed material matches or exceeds the performance of the equipment specified. In addition, such submittal shall also clearly identify all deficiencies compared to specified product. Submittal of general cut sheets will be returned rejected.

1.7 DRAWINGS AND SPECIFICATIONS

- A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated and functional condition.
- B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items. Should any major interference develop, immediately notify the Architect.
- C. In laying out Work, refer to Contract Documents at all times in order to avoid interference and undue delays in the progress of the Work.
- D. Furnish all plumbing fixtures (with required accessories) shown on either the plumbing drawings or the architectural drawings. Review Architectural casework elevations and identify fixtures indicated. Provide fixtures indicated. Rough-in for all fixtures as work

progress. Verify plumbing fixtures required from review of Mechanical and Architectural drawings, prior to fixture shop drawing submittal.

1.8 CODES AND REGULATIONS

- A. Work shall be in full accord with the most stringent interpretation of the State Sanitary Code, local ordinances, building codes, and other applicable national, local, and state regulations.
- B. Equipment shall conform to requirements and recommendations of the National Bureau of Fire Underwriters and National Fire Protection Association (NFPA).
- C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1
- D. In the possible event of conflict between codes or regulations and Contract Documents, notify the Architect immediately. Codes and Standards represent minimum requirements. These specifications may exceed requirements in various codes and standards.

1.9 FEES, PERMITS, AND TAXES

- A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.
- B. Pay any and all taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

1.10 MANUFACTURER'S DIRECTIONS

- A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.11 SUBMITTAL DATA

- A. Submit shop drawings, project data, and samples in accordance with requirements of Division 01.
- B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.
- C. Where approved manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document requirements, specifically call such deviations to attention of Architect on submittals. Type deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted.
- D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.
- E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

1.12 PROJECT RECORD DOCUMENTS

- A. Keep Project Record Documents in accordance with requirements of Division 00 and/or Division 01.
- B. During construction period, keep accurate records of installations made under this Division, paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.

1.13 EXCAVATING AND BACKFILLING

- A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of Division 31, Earth Work, if applicable.
- B. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner's Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative inspection and as subsequently found to be deficient, the trenches shall be uncovered.
- C. Inspected, and then re-filled, if requested by Owner's Representative.
- D. Provide minimum 18 inches of cover or in compliance with local published frost line data (if greater than 18 inches) to finish grades or paving at water piping.
- E. For piping, provide bell holes at trench bottom to assure uniform bearing. Accurately grade trench bottoms by instrument before laying any pipe.
- F. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers.
- G. Compact fill to satisfaction of Architect and/or Owner's Representative.

1.14 CUTTING AND PATCHING

- A. Comply with requirements of Division 00 and Division 01 regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.
- B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.
- C. Repairing Roadways and Walks: Coordinate all roadway work with authorities having jurisdiction. Cut and/or bore under roadways for connection of utilities as required. Coordinate work through Contractor. Where this Contract cuts or breaks roadways, or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.15 PAINTING

- A. Painting shall be provided under Division 09, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.

- B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additional cost to Owner.
- C. Coordinate all painting requirements with prime bidder prior to bids.
- D. Paint all exposed piping inside and outside of building. Label all piping after painting in accordance with Section 230553. Utilize industry standard paint colors for respective system unless directed otherwise by Architect. Review proposed color scheme with Division 23 Requirements prior to ordering materials.

1.16 GUARANTEE

- A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.
- B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

PART 2 - PRODUCTS

2.1 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Furnish manufacturers operating and maintenance instructions, parts lists and sources of supply for replacements in accordance with Division 01.
- B. Provide the following operations and maintenance data:
 - 1. Complete sets of final and correct shop drawings, maintenance and replacement parts manuals, and operating instructions, for equipment supplied.
 - 2. Bind each set within a common binder. Index and organize with a table of contents, to permit quick and convenient reference.
 - 3. Provide a minimum of five (5) days of instruction in operation and maintenance of equipment to Owner's Representative maintenance force. Design a 2-week period, convenient to Owner's Representative, during which qualified personnel, including manufacturers' technicians and authorized factory trainers shall be available for Architect/Owner's Representative instruction.

2.2 RECORD DRAWINGS

- A. Provide "Record Drawings" in accordance with the Division 01, General Requirements, indicating in a neat and accurate manner a complete record of all revisions of the original design of the work.
 - 1. Include all changes and provide for an accurate record, on reproductions of the Contract drawings or on appropriate shop drawings, all deviations between the work shown and work installed.
- B. Submit for approval bound sets of the required drawings, manuals and operating instructions.

2.3 IDENTIFICATION MARKINGS

- A. General: Apply identification tags, markers, etc. after insulation and field painting are completed.

PART 3 - EXECUTION

3.1 COORDINATION AND LAYOUT

- A. Study Drawings and Specifications to ensure completeness of work required.
 - 1. Include supplementary items normal to manufacturers' requirements or standard accepted trade practices as necessary to complete work, though not specifically indicated or specified.
- B. Verify measurements and conditions in field before starting work.
- C. Examine materials to which work is to be applied and notify the Architect/Owner's Representative, in writing, of any conditions existing which are detrimental to proper and expeditious installation of work.
 - 1. Starting of work shall be construed as acceptance of conditions.
- D. Confer with other trades, install work to avoid interference with other trades, and possible necessary adjustments to conform to structural conditions and work of other trades.
- E. Coordinate and set inserts and locate openings in floors and walls in new construction.
 - 1. Locate pipes and ducts to avoid interference with other work shown on the drawings and as directed by the Architect/Owner's Representative.
 - 2. Keep all concealed pipes and ducts within the enclosing construction provided.
 - 3. Arrange exposed work neatly in parallel runs and parallel with walls or structure, with uniformly spaced hangers and supports, and within the spaces assigned for each kind of work.
- F. Make coordinated layouts showing concrete work required for housekeeping pads, equipment bases and inertia masses which are cast in place, including the location of anchors and dowels.
 - 1. Coordinate the scheduling and placing of the concrete to suit the mechanical work schedules.
 - 2. Concrete housekeeping pads are to cover the full area of each piece of equipment. Concrete bases are to be of dimension and heights to suit the equipment. The forming and placing of concrete shall be provided under this specification section.

3.2 MAINTENANCE OF EQUIPMENT AND SYSTEM PRIOR TO FINAL ACCEPTANCE

- A. Maintain all installed equipment and systems in accordance with the manufacturer's published instructions, until final acceptance by the Architect/Owner's Representative, and take such measures as necessary to ensure adequate protection of all equipment and materials during delivery, storage, installation, operating and shut-down conditions.
 - 1. This responsibility shall include all provisions required to meet the conditions incidental to the delays pending final test of systems and equipment.
 - 2. Maintain and periodically clean all equipment until final acceptance.

- B. After installation of systems has been completed, operate the system to determine the capability of the equipment and controls to conform to the requirements of the drawings and specifications prior to performance testing.

3.3 DAMAGED EQUIPMENT

- A. Any and all equipment, parts, components, etc., provided under this division which is damaged by the Contract or which is received in damaged condition during shipping, transit, handling, or during installation shall be replaced. Dented, or damaged non-structural equipment jackets or surface casings such as but not limited to water heater jackets, boiler jackets, chiller insulation jackets, etc., shall either be repaired or replaced at the option of the Owner's Representative. If repaired, the finished product shall match original equipment exactly.
- B. Any equipment which develops surface rust, either through improper storage, handling or installation, shall be refinished by grinding the affected area down to bare (white) metal, then prepared with a rust preventive primer and finished with the original manufacturer's touch-up paint to match existing color.

3.4 EQUIPMENT INSTALLATION

- A. Locate and set equipment anchor bolts, dowels and aligning devices for all equipment requiring them. Coordinate requirements of concrete work with Contractor and other trades.
 - 1. Level the equipment and grout solid between the equipment and the surface below. Grout to be premixed grout mixed in accordance with manufacturer's specifications.
- B. The field assembly, installation and alignment of equipment is to be done under field supervision provided by the manufacturer or with inspections, adjustments and approval by the manufacturer.
- C. Equipment startup.
 - 1. Contractor shall provide qualified start-up personnel, certified by equipment manufacturer, to inspect and approve equipment and to supervise the operating tests of the equipment. System commissioning shall be performed in accordance with ASHRAE standards.
- D. Equipment and system test operation.
 - 1. Note: Equipment and system test operation is separate and apart from additional requirements of training and demonstration. Refer to individual sections for requirements regarding training and demonstration. Notify the Owner's Representative in advance of beginning the equipment and system test operation. All equipment testing/demonstration shall be performed in the presence of the Architect/Owner's Representative. A minimum of seven (7) days notice is required before equipment and system testing.
 - 2. Each piece of equipment shall be operated in its system as long as required to provide proper functioning.
 - 3. Perform an operating test of each complete system for twenty-four hours continuous operation as a minimum, or as long as required to provide coordination and proper functioning of all related systems and controls.
 - 4. The operating criteria for each test shall be determined in advance with the Owner's Representative approval whenever seasonal conditions shall not produce a full design load on any equipment or system.

5. Certify to the Owner's Representative that all equipment is functioning properly.
6. Should the apparatus fail to meet the Contract requirements, adjust, repair or replace all defective or inoperative parts and again conduct the complete performance tests.

3.5 CLEANING AND ADJUSTING OF SYSTEMS

- A. Blow out, clean and flush each system of piping, and equipment to thoroughly clean the systems.
 1. Clean all materials and equipment, and leave in condition ready to operate and receive succeeding finishes where required.
 2. Adjust and align all equipment interconnected with couplings or belts.
 - a. Adjust valves of all types and operating equipment of all types to provide proper operation.
 - b. Remove and clean elements in all steam trap bodies.
 - c. Clean all strainers. Replace temporary construction screens with new permanent screens.
- B. Permanent equipment operated during construction shall not be abused or be used in service different from its design application.
 1. Temporary disposable filters shall be used during temporary operation.
 2. All expendable media, including belts used for temporary operation and similar expendable materials shall be replaced just prior to acceptance.
 3. Packing boxes of equipment operated during construction must be replaced just prior to system acceptance, using materials and methods specified by the supplying manufacturer.
- C. Equipment furnished with factory finishes where damaged shall be retouched and repainted to present a new appearance.
- D. Furnish and maintain protection for all of the work whether completed or in progress.
 1. Furnish and install coverings and enclosures as required.
- E. New and existing operating equipment and systems shall be clean and dust free inside and out.
 1. Concealed and unoccupied areas such as plenums, pipe and duct spaces and Equipment Rooms shall be free of rubbish and swept, vacuumed or wiped clean at time of acceptance.

3.6 CONTRACTOR REQUESTED FIELD OBSERVATIONS

- A. During the course of, and at stages appropriate to the progress of construction, the Contractor may request field observations of the design professional. If the field observation is a request of and by the Contractor, the Contractor shall provide all necessary ladders, scaffolding, lifts, safety harnesses or other equipment in order for the Architect to safely and adequately perform the requested observations.
 1. Requests for observations shall be made a minimum of seven (7) days in advance of the requested date of observation.
 2. All equipment, ladders, lifts, safety nets, scaffolding, etc., shall be provided and in place for the use of the Architect.

3. All equipment panel covers, electrical panels, or other equipment shall be opened by the Contractor for viewing by the Architect.
4. The Contractor shall make available a mechanic or technician of that field in order to answer questions of the designer, make any and all adjustments and/or corrections and to assist the Architect.

3.7 TESTING AND BALANCING

- A. Refer to Specifications Section 230593.

3.8 PAINTING

- A. General painting is typically performed by the Division 09 Contractor. This Contract shall however, either perform specialized painting as called for below in the following conditions or he shall advise the Contractor of these requirements as follows:
 1. Thoroughly clean all surfaces, requiring prime painting, of rust, loose scale, oil and grease.
 2. Dry surfaces before painting.
 3. Do not paint controls, nameplates, labels or sprinklers.
- B. Paint all equipment unless otherwise specified not to be painted at the factory with one prime coat of rust prohibitive paint.
- C. Provide field painting as follows:
 1. All exposed iron work, including un-insulated ferrous piping and conduit system components, hangers, supports, equipment bases, and apparatus; prime coat with a red lead-free paint.
 2. Un-insulated duct work and casing exposed to view and exposed galvanized surfaces of conduit and piping and of equipment prime painted at the shop: Prime coat, zinc chromate for galvanized surfaces.
 3. Inside of all duct work where visible through registers and grilles: One coat of flat black paint.

3.9 CONNECTIONS TO EQUIPMENT

- A. Provide mechanical connections to equipment and fixtures requiring such connections which are supplied by Architect/Owner's Representative or under other divisions.
- B. Provide unions, nipples, adapters, valves, flexible connections, and other trim required for final connections for each such fixture or item of equipment, as required for complete operation, servicing, and maintenance.

3.10 WORKMANSHIP

- A. Perform all work in a practical, neat and workmanlike manner with mechanics skilled in work, and using the best practices of the trade involved.
- B. No work shall be concealed until it has been inspected and approved by the Architect/Owner's Representative.
- C. Workmanship or materials not meeting with requirements of the specifications and drawings and satisfaction of the Architect/Owner's Representative shall be rejected and immediately replaced in an acceptable manner, without additional cost to the Architect/Owner's Representative.

3.11 LUBRICATION

- A. All equipment furnished, installed or connected under this division, shall be inspected for proper lubrication when connected and before operation of the equipment is begun, as recommended by the Manufacturer.
- B. The Contractor for the work of this division shall be held responsible for any damage to equipment that is operated without having been properly lubricated.

3.12 USE OF PREMISES AND CLEANING

- A. Remove and dispose of all waste materials and rubbish due to all construction operations under the Contract, except as otherwise noted, and keep the building free from rubbish and dirt caused by his and/or his Sub-Contractors' employees.
 - 1. During the entire progress of the work, rubbish removal shall be made frequently so as to prevent any potential safety or health hazard.
- B. Upon completion of the work, remove all protection, paint, putty, and other stains from all fixtures and glass and leave the premises thoroughly broom cleaned.

3.13 CUTTING, ALTERING AND PATCHING

- A. Provide all cutting, chasing, drilling, altering and rough patching required for the work of this division.
- B. Do all shoring, bracing, cutting, patching, piecing out, filling in, repairing and refinishing of all present work as made necessary by the alteration and the installation of new work.
- C. All holes and openings occurring in the existing floors after equipment, partitions, floors, steel work, conduits and pipes are removed or installed shall be closed up with materials similar to the adjacent work.
- D. The size and location of items requiring an opening, chase or other provisions to receive it shall be given by the trade requiring same in ample time to avoid undue cutting of any new work to be installed. These provisions shall not relieve the Contractor from keeping other trades informed as to the required opening, chases, etc., nor from responsibility for the correctness thereof, nor for cutting and repairing after the new work is in place.
- E. Include all cutting, repairing and patching in connection with the work that may be required to make the several parts come together properly and fit it to receive or be received by the work of other trades, as shown on the drawings and/or specified, or reasonably implied by the drawings and specifications.
- F. All repairing, patching, piecing-out, filling-in, restoring and refinishing shall be neatly done by mechanics skilled in their trade to leave same in condition satisfactory to the Architect/Owner's Representative.
- G. Materials and their methods of application for patching shall comply with applicable requirements of the specifications.
 - 1. Materials and workmanship not covered by the specifications and items of work exposed to view adjoining existing work to remain shall conform to similar materials and workmanship existing in or adjacent to the spaces to be altered.

- H. Cutting, repairing and patching shall include all items shown on the drawings, specified in the specifications or required by the installation of new work or the removal of existing work.
- I. Remove partitions, walls, suspended ceilings, etc., as necessary to perform the required alterations or new construction work.
 - 1. Avoid damage to construction and finishes that are to remain.
- J. Protect and be responsible for the existing building, facilities and improvements if any.
 - 1. Any disturbance or damage to the work, the existing building, and improvements, or any impairments of facilities resulting from the construction operations, shall be promptly rectified, with the disturbed, damaged, or impaired work, restored, repaired or replaced at no extra cost.
- K. All alterations which are not indicated on the drawings nor specified herein but necessary to make good existing work disturbed by reason of the work shall be restored to a condition satisfactory to the Architect/Owner's Representative.
- L. All holes in masonry floors and walls are to be core drilled.
- M. Disturbed concrete and /or cement floor areas shall be patched with approved type latex mortar.
 - 1. When cement mortar is used for patching, the surfaces shall be depressed a minimum depth of one inch (1").
- N. Reinstall all weather protection work in waterproof manner.
- O. Openings in roofs:
 - 1. Openings in roofs shall be kept properly plugged and caulked at all times, except when being worked on, to preclude the possibility of flooding due to storms or other causes. After completion of work, openings shall be permanently sealed.
- P. Temporary openings.
 - 1. All temporary openings cut in walls, floors or ceilings for pipe or duct work shall be closed off with transite or an equally non-combustible material except when mechanics are actually working at the particular opening.

3.14 USE OF PERMANENT SYSTEMS:

- A. Heating System:
 - 1. The Contractor may, at his option, utilize the permanent heating systems provided under this Contract to provide space heating prior to Project completion date. The fuel for such space heating and for required tests of heating equipment shall be provided by Contractor.
 - 2. The heating system shall be operated only by qualified personnel, and shall be operated with all auxiliaries, and in accordance with manufacturer's instructions and good operating practice. If at any time the Owner's Representative determines that the equipment is being improperly operated or maintained, Contractor may be directed to disconnect its use.
 - 3. Heating systems shall be operated and controlled to prevent temperature in any room or space in any building from exceeding 90 deg. F.

4. Systems may be activated without diffusers and registers in place, but filters with same efficiency as those specified shall be provided both in air handling equipment and at return air grille locations. Filter return air entering duct work, to prevent return air duct work from accumulating dust or otherwise becoming dirty.
5. Contractor shall, prior to final acceptance of the Work, place heating systems and related equipment in a condition equal to new.

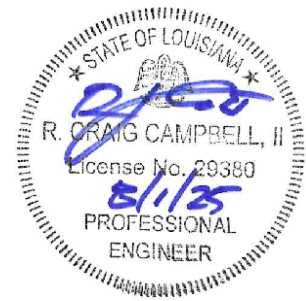
B. Air Conditioning System:

1. The Contractor may, at his option, utilize the permanent air conditioning systems provided under this Contract to provide space cooling prior to the Project completion date.
2. The fuel, electricity or other energy required for space cooling and for any subsequent operation or testing shall be provided for by the Contractor.
3. The cooling system shall be operated only by fully qualified personnel and shall be operated with all auxiliaries, and in accordance with manufacturer's instructions and good operating practice. Start up of equipment for use by the Contractor shall not commence any warranty period.
4. Cooling systems shall be operated and controlled to prevent temperature in any room or space in any building from falling below 70 deg. F.
5. Systems may be activated without diffusers and registers in place, but filters with same efficiency as those specified shall be provided both in air handling equipment and at return air grille locations. Filter all return air entering duct work, to prevent return air duct work from accumulating dust or otherwise becoming dirty.
6. Contractor shall, prior to final acceptance of the Work, place cooling systems and related equipment in a condition equal to new.

3.15 PENETRATIONS THROUGH FIRE SEPARATIONS

- A. Pack annular space between sleeve and pipe (insulation) and / or conduit in fire rated construction with fire retardant putty, sealant and / or caulk in accordance with listed assemblies utilized on the project. Material shall be non-asbestos based and installed in accordance with manufacturers instructions for fire rating required.
- B. Penetrations of multiple items and penetrations with annular space greater than 1/2" shall be provided with approved backing material in accordance with manufacturer's instructions.
- C. Fire retardant sealer and system shall meet ASTM E-84, ASTM E-814, and UL-1479.

END OF SECTION 23 00 10



SECTION 23 00 20 – BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section specifies the basic requirements for mechanical installations and includes requirements common to more than one section of Division 23. It expands and supplements the requirements specified in sections of Division 01.

1.3 ACCESSIBILITY

- A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing. Verify exact location and placement of all access panels with/through Architect prior to any equipment rough-in.
- B. Extend all grease fittings to an accessible location.
- C. Refer to the Division 08 Section: Access Doors.

1.4 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 23 for rough-in requirements.

1.5 MECHANICAL INSTALLATIONS

- A. Coordinate mechanical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for mechanical installations.
- D. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
- E. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.

- G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.
- H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- I. Coordinate the installation of mechanical materials and equipment above ceilings with suspension system, light fixtures, and other installations.
- J. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.6 MECHANICAL COORDINATION DRAWINGS

- A. Prepare and submit a set of coordination drawings showing major elements, components, and systems of mechanical equipment and materials in relationship with other building components. Prepare drawings to an accurate scale of 1/4"=1'-0" or larger. Indicate the locations of all equipment and materials, including clearances for installing and maintaining insulation, servicing and maintaining equipment, valve stem movement, and similar requirements. Indicate movement and positioning of large equipment into the building during construction.
- B. Prepare floor plans, reflected ceiling plans, elevations, sections, and details to conclusively coordinate and integrate all installations. Indicate locations where space is limited, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 - 1. Mechanical equipment room layouts;
 - 2. Specific equipment installations, including:
 - a. Ductwork and diffusers;
 - b. Pumps (new and existing) and piping connections
 - c. Air Handling equipment, fan coils and terminal units with accessories requirements.
 - 3. Work in pipe spaces, chases, trenches, and tunnels;
 - 4. Exterior wall penetrations;
 - 5. Ceiling plenums which contain piping, ductwork, or equipment in congested arrangement;
 - 6. Installations in mechanical riser shafts, at typical sections and crucial offsets and junctures;
 - 7. Division 23 Contractor shall furnish drawings, to Contractor, once approved by reviewing Architect, to fully coordinate with all trades and subcontractors required. Failure to fully coordinate via this process shall not relieve the contractor of his responsibility to coordinate structural supports, electrical service routing of mechanical systems and provisions for required access.

1.7 CUTTING PATCHING AND SEALING OF PENETRATIONS

- A. This Article specifies the cutting and patching of mechanical equipment, components, and materials to include removal and legal disposal of selected materials, components, and equipment.
- B. Refer to the Division 01 Section: CUTTING AND PATCHING for general requirements for cutting and patching.

- C. Refer to Division 26 Section for BASIC ELECTRICAL REQUIREMENTS for requirements for cutting and patching electrical equipment, components, and materials.
- D. Do not endanger or damage installed Work through procedures and processes of cutting and patching.
- E. Arrange for repairs required to restore other work, because of damage caused as a result of mechanical installations.
- F. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defective, or non-conforming installations.
- G. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - 1. uncover Work to provide for installation of ill-timed Work;
 - 2. remove and replace defective Work;
 - 3. remove and replace Work not conforming to requirements of the Contract Documents;
 - 4. remove samples of installed Work as specified for testing;
 - 5. install equipment and materials in existing structures;
 - 6. upon written instructions from the Architect, uncover and restore Work to provide for Architect observation of concealed Work.
- H. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including, but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work.
- I. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
- J. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
- K. Locate identify, and protect mechanical and electrical services passing through remodeling or demolition area and serving other areas required to be maintained operational. When transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.
- L. Seal all penetrations of building envelope air and water tight. For complete closure of openings, where necessary, provide 1/8" thick elastomeric barrier anchored to materials penetrating building envelope and adjacent envelope surfaces involved - seal connections with caulk and mechanical fasteners. Refer to Architectural Sections on joints and sealants. Seal all conduit systems communicating between conditioned and unconditioned spaces. Coordinate all work with and through prime bidder and other trades. Unless otherwise directed, caulk sealant shall be long lasting polyurethane based products, resistant to UV exposure, installed in accordance with manufactures instructions. Sealant joints shall withstand building pressures variance with respect to ambient of 0.25 inches water gauge, with no leakage in terms of air and or water vapor.

1.8 MECHANICAL SUBMITTALS

- A. Refer to the Conditions of the Contract (General and Supplementary) and Division 01 Section: Submittal Procedures for submittal definitions, requirements, and procedures.

- B. Submittal of bound shop drawings, product data, and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the Architect will not be processed.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Refer to the Instructions to Bidders for requirements in selecting products and requesting substitutions.

2.2 PRODUCT LISTING

- A. Prepare listing of major mechanical equipment and materials for the project. A sample schedule is included at the end of this Section to complete this requirement.
- B. Provide all information requested.
- C. Submit this listing as a part of the submittal requirement specified in the Division 01.
- D. When two or more items of same material or equipment are required (plumbing fixtures, pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in Work, except as otherwise indicated.
- E. Provide products which are compatible within systems and other connected items.

2.3 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliance, and similar essential data. Locate nameplates in an accessible location.

2.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
- B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- C. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

2.5 RECORD DOCUMENTS

- A. Refer to the Division 01 Section: Closeout Procedures for requirements. The following paragraphs supplement the requirements of Division 01.
- B. Mark Drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes,

and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.

- C. Mark Specifications to indicate approved substitutions, Change Orders, actual equipment and materials used.

2.6 OPERATION AND MAINTENANCE DATA

- A. Refer to the Division 01 Section for Project Closeout or Operation and Maintenance Data for procedures and requirements for preparation and submittal of maintenance manuals.
- B. In addition to the information required by Division 01 for Maintenance Data, include the following information:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.
- C. Submit in accordance with Section 017800.
- D. Use multiple binders if a single binder would exceed 2-1/2 inches in thickness; arrange the data in the same sequence as the specification sections; delete or mark through extraneous data.
- E. Provide tab pages with metal or plastic reinforced holes to separate each major item or closely related group of items with typed item names on the tabs. Supply a table of contents at the beginning of each volume listing at items, the manufacturers and the name, address and phone number of the nearest authorized service representative.
- F. A copy of the completed manual shall be submitted to the Contracting Officer one week before the user instruction for perusal. This copy will be returned to the Contractor with the user, comments. These comments shall be incorporated in the final copies of the manual. The Contractor shall obtain a signed receipt for the manual.
- G. The O & M Manual outline shall be prepared in two parts along the lines suggested in the 2011 HVAC Applications, Chapter 39.
- H. All contents shall be project specific, typewritten.

2.7 WARRANTIES

- A. Refer to individual equipment specifications for warranty requirements.
- B. Compile and assemble the warranties specified in Division 23, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

2.8 CLEANING

- A. Refer to the Division 01 Section for general requirements for final cleaning.
- B. Refer to Division 230593 Section: TESTING, ADJUSTING, AND BALANCING for requirements for cleaning filters, strainers, and mechanical systems prior to final acceptance.

PART 3 - EXECUTION

3.1 WARRANTIES

- A. Refer to the Division 01 Section for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
- B. Compile and assemble the warranties specified in Division 23, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

3.3 CLEANING

- A. Refer to the Division 01 Section for general requirements for final cleaning.
- B. Refer to Division 23 Section: TESTING, ADJUSTING, AND BALANCING for requirements for cleaning filters, strainers, and mechanical systems prior to final acceptance.

END OF SECTION 23 00 20

SECTION 23 05 10 - ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Compliance with National Electric Code Requirements
 - 1. Minimum Requirements:
 - a. The requirements of this Division supercede the "minimum" requirements of National Codes such as NEC in many areas. Where reference to this National Code is made, it is understood that the requirements of these codes are meant to indicate the "minimum" requirements required by these Contract Documents and are not to infer that these "minimum" requirements eliminate or in any way diminish the requirements of individual sections of these Contract Documents.
 - b. Wherever compliance with this National Code is required, it shall be taken as a minimum requirement and applicable whenever the Contract Documents are silent with respect to specific requirements or installation procedures. The Contractor shall as a minimum, comply with the more stringent of the requirements.
- B. Interlock Wiring for Mechanical Equipment
 - 1. Interlocks & Wiring of Mechanical Equipment: It is the intent of the contract documents to note or include most of the obvious physical wiring, conduit, relays, and necessary interlocks between various pieces of mechanical/electrical equipment. Plans, details, specifications and drawings however, do not typically indicate the exact extent and encompassment of all required mechanical/electrical interlocks, routing, control voltages, conduit, wiring diagrams, etc., between mechanical and electrical devices and equipment that may be required for the proper operation and sequencing of equipment. Also, typically not indicated on the drawings is the differentiation between field installed and factory provided wiring because of the significant differences in requirements between various equipment manufacturer's requirements and/or job site conditions. It is the responsibility of this contractor to first verify that all mechanical related items affecting other trades are properly coordinated, accounted for and included in pricing prior to bid date. Additional costs for interlocks after bids are received will not be allowed for failure to coordinate. Reference is made to coordination and responsibility of providing the required wiring diagrams and requirements between the various subs, etc. It remains however, the responsibility of this Contractor as further described in the following articles, to properly coordinate, be responsible for, and to allow for any and all costs associated with the requirements of the equipment manufacturer's recommendations in order to preserve guarantees and warranties. (Note: For informational purposes only) - Typical mechanical/electrical/control/wiring interlocks covered under this section include but are not limited to the following examples:

- a. Domestic water pump interlocks with aquastats & thermostats.
- b. Exhaust fans and supply fan general ventilation interlocks.
- c. Smoke detector interlocks with supply air fans.
- d. Hi-Limit Temperature (firestat) interlocks with supply air fans.
- e. Lo-Limit Temperature (freezestat) interlocks with supply air fans.
- f. Interlocks between automatic safety float switches in emergency drain pans and respective fan motors and/or condensing units.
- g. Interlocks between Air Handling Unit "Kill" switches and fan motor starters.
- h. Damper interlocks between required fire suppression systems.
- i. Fresh air damper interlocks with supply air fans.
- j. Two speed fan motors, number of conductors, and interlocks between motor starters and fan speed controllers.
- k. High limit temperature interlocks with unit heater thermostats.
- l. High and low water level limit interlocks with sump and ejector pumps.
- m. All other factory wired mechanical equipment requiring field installed connections and interfaces.

1.3 SUMMARY OF RESPONSIBILITY

- A. In order to ensure proper operation of mechanical equipment installed, it is the intent of this section of the specifications to ensure that the Division 23 Contractor is the ultimate party responsible for the proper electrical installation of the equipment provided under the technical specifications of this Division. Unless the Division 23 Contractor is fully licensed and qualified to provide a complete electrical installation, he shall obtain the services of a fully qualified electrical Contractor to perform those services required to provide a complete and operational system. If, however, the services of other Contractors or sub-contractors are required by the Division 23 Contractor in order that the equipment provided is to operate and perform as specified, the Division 23 Contractor shall obtain, pay for, and coordinate the services of such Contractor(s) in order to provide a complete a fully operational mechanical system. The Division 23 Contractor shall be fully responsible for the work of all sub-contractors and shall fully warrant their work in accordance with the requirements of Division 01 of these specifications.
- B. This section includes the basic requirements for field installed electrical conduits, power circuits, breakers, wiring, interlocks, and other electrical components which are to become an integral part of mechanical equipment provided under Division 23. All work performed under this section shall fully as a minimum, comply with Division 26 Specifications and National Electric Code - (latest edition) and shall be provided as listed below:
 - 1. All "field-installed" interlock and/or control/power wiring necessary to provide a complete and operating mechanical system shall be ultimately provided by, and be the responsibility of the Division 23 Contractor. These components shall include, but are not limited to the following examples:
 - a. Automatic Temperature Control panels
 - b. Installation and connection of factory installed motors.
 - c. Variable frequency drives
 - d. Motors (single & multi-speed)
 - e. Motor starters (single and multi-speed) for all Division 23 equipment
 - f. Fire protection control panels.
 - g. Supply, return, & exhaust fan interlocks
 - h. Plumbing fixture automatic flush valves
 - i. Interlocks between domestic water circulating pumps & aquastats.
 - j. Exhaust fan/supply fan interlocks.
 - k. Filters at AHU's
 - l. AHU, hi-limit temperature interlocks, lo-limit temperature interlocks, smoke detectors, and other interlocks related to Life Safety protection.

- m. Other various interlocks between items of mechanical equipment, safeties, and field wired interconnections.
- C. It is the responsibility of the Division 23 Contractor to fully coordinate the electrical requirements of his mechanical equipment with the Division 26 Contractor prior to bidding and to insure that other contractors and divisions are made aware of the requirements of his equipment that he intends to provide. The Division 23 Contractor shall provide wiring and control diagrams of all mechanical, air conditioning, ventilation, plumbing and /or fire protection equipment clearly delineating between factory wiring and field installed wiring. The mechanical contractor shall insure that all field installed wiring, interlocks, etc., required to provide a complete and operable system are inclusive with his bid.
- D. Specific electrical power requirements (i.e., horsepower and electrical characteristics) where known, for mechanical equipment are scheduled on the Drawings or within the body of the individual technical specifications.
- E. Low Voltage Wiring: Low voltage wiring is not typically shown on the contract documents or plans. It remains however, the responsibility of the Division 23 Contractor to fully coordinate the low voltage electrical requirements of his mechanical equipment with the Division 26 Contractor prior to bidding and to insure that other Contractors and Divisions are made aware of the requirements of his equipment that he intends to provide. The Division 23 Contractor shall also provide the low voltage wiring and control wiring diagrams of all mechanical, air conditioning, ventilation, plumbing and /or fire protection equipment clearly delineating between factory wiring and field installed wiring.
 - 1. The Division 23 Contractor shall coordinate with the Division 26 Contractor for all necessary power requirements.

1.4 REFERENCES

- A. NEMA Standards MG 1: Motors and Generators
- B. NEMA Standard ICS 2: Industrial Control Devices, Controllers, and Assemblies.
- C. NEMA Standard 250: Enclosures for Electrical Equipment.
- D. NEMA Standard KS 1: Enclosed Switches.
- E. As a minimum, comply with National Electrical Code (NFPA 70).

1.5 SUBMITTALS

- A. Motors, Starters, & VFD Drives: Provide manufacturer's product data. If starters are an integral part of packaged mechanical equipment, then a separate starter submittal is not required.
- B. Submit product data for motors, starters, variable frequency drives and other electrical components with submittal data required for the equipment for which it serves, as required by the individual equipment specification sections.

1.6 QUALITY ASSURANCE

- A. All electrical components and materials shall be UL labeled.

PART 2 - PRODUCTS

2.1 MOTORS

- A. The following are basic requirements for simple or common motors. For special duty motors, more detailed and specific requirements are specified in Section 230513 – “Electric Motors”.
1. Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads.
 2. Motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range.
 3. Temperature Rating: Rated for 50 deg. C environment with maximum 50 deg. C temperature rise for continuous duty at full load (Class A Insulation).
 4. Starting capability: Frequency of starts as indicated by automatic control system, and not less than 5 evenly time spaced starts per hour for manually controlled motors.
 5. Service Factor: 1.15 for poly-phase motors and 1.35 for single phase motors.
 6. Motor construction: NEMA Standard MG 1, general purpose, continuous duty, Design "B", except "C" where required for high starting torque.
 - a. Frames: NEMA Standard No. 48 or 54; use driven equipment manufacturer's standards to suit specific application.
 - b. Bearings: Ball or roller or pillow block bearings with inner and outer shaft seals; re-greaseable, except permanently sealed where motor is normally inaccessible for regular maintenance; designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor; for fractional horsepower, light duty motors, sleeve type bearings are permitted.
 7. Enclosure Type: Open drip-proof motors for indoor use where satisfactorily housed or remotely located during operation; totally enclosed, fan cooled for exterior applications or where specifically indicated on drawings.
 8. Overload protection: Built-in thermal overload protection.
 9. Noise rating: "Quiet"
 10. Efficiency: "Premium Energy Efficient" motors shall have a minimum efficiency as scheduled in accordance with IEEE Standard 112, test method B. If efficiency not specified, motors shall have a higher efficiency than "average standard industry motors", in accordance with IEEE Standard 112, test method B.
 11. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

2.2 STARTERS, ELECTRICAL DEVICES, AND WIRING

- A. Motor Starter Characteristics:
1. Enclosures: Unless otherwise specifically identified, provide NEMA 1, general purpose enclosures with padlock ears, except in wet or exterior locations, where enclosures shall be NEMA 3R with conduit hubs, or units in hazardous or dust laden atmospheres or other locations which shall have NEC rating for that particular proper class and division.
 2. Type and size of starter shall be as recommended by motor manufacturer and the driven equipment manufacturer for applicable protection and start-up condition.
- B. Magnetic Starters:
1. Refer to Section 230514 - “Motor Starters” for full requirements of motor starters.
 2. As a minimum, provide the following items on each motor starter:
 - a. Maintained contact push buttons and pilot lights, properly arranged for single speed or multi-speed operation as indicated.
 - b. Trip-free thermal overload relays, each phase.

- c. Interlocks, pneumatic switches and similar devices as required for coordination with control requirements of Division 23- "Building Automation System" controls sections.
- d. Built-in 120 volts control circuit transformer, fused from line side, where incoming electrical service exceeds 240 volts.
- e. Lockable "Off" position handle.
- f. H-O-A selector switch.
- g. Externally operated manual reset.
- h. Under-voltage release or protection.

C. Motor connections:

- 1. Flexible conduit, except where plug-in electrical cords are specifically indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify equipment physical size and clearances required.
- B. Verify electrical interlocks required.

3.2 THERMAL STOPS & BARRIERS

- A. Thermal Barriers: Where electrical equipment, conduit, wiring, etc., penetrates or comes into contact with cold or hot mechanical equipment, provide thermal barriers to prevent intrusion of unconditioned air into mechanical equipment or to prevent electrical devices from sweating or accumulating condensation.
 - 1. Examples: Examples of the above include but are not limited to:
 - a. Air handling conduit penetrations at or into AHU casings.
 - b. Smoke detectors attachment to hot or cold ductwork.

3.3 TRAINING & DEMONSTRATION

- A. Provide training as described in individual technical specifications.

END SECTION 23 05 10



SECTION 23 05 29 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes hangers and supports for mechanical systems piping and equipment.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product data for each type of hanger and support.
- C. Submit pipe hanger and support schedule showing manufacturer's Figure No., size, location, and features for each required pipe hanger and support.
- D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- E. Shop drawings for each type of hanger and support, indicating dimensions, weights, required clearances, and methods of component assembly.

1.4 QUALITY ASSURANCE

- A. Qualify welding processes and welding operators according to AWS D1.1 "Structural Welding Code--Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- B. Qualify welding processes and welding operators according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."
- C. Listing and Labeling: Provide hangers and supports that are listed for their intended use.
 - 1. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Hangers, Supports, and Components: Factory-fabricated according to MSS SP-58.
 - 1. Components include galvanized coatings where installed for piping and equipment that will not have a field-applied finish.

2. Pipe attachments include nonmetallic coating for electrolytic protection where attachments are in direct contact with copper tubing.
- B. Thermal-Hanger Shield Inserts: 100-psi average compressive strength, waterproofed calcium silicate, encased with sheet metal shield. Insert and shield cover entire circumference of pipe and are of length indicated by manufacturer for pipe size and thickness of insulation.
 - C. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Fasteners for fire protection systems include UL listing and FM approval.

2.2 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36, steel plates, shapes, and bars, black and galvanized.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Grout: ASTM C 1107, Grade B, nonshrink, nonmetallic.
 1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic-cement-type grout that is nonstaining, noncorrosive, nongaseous and is recommended for both interior and exterior applications.
 2. Design Mix: 5000-psi, 28-day compressive strength.
 3. Water: Potable.
 4. Packaging: Premixed and factory-packaged.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger requirements are specified in the Section specifying the equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping specification Sections.

3.2 HANGER AND SUPPORT INSTALLATION

- A. General: Comply with MSS SP-69 and SP-89. Install hangers, supports, clamps, and attachments to properly support piping from building structure.
- B. Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible.
- C. Install supports with maximum spacings complying with MSS SP-69.
- D. Where pipes of various sizes are supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
- E. Install building attachments within concrete or to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert to forms. Install reinforcing bars through openings at top of inserts.

- F. Install concrete inserts in new construction prior to placing concrete.
- G. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4 inches thick.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- I. Heavy-Duty Steel Trapezes: Field-fabricate from ASTM A 36 steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.
- J. Support fire protection systems piping independent of other piping.
- K. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so that maximum pipe deflections allowed by ASME B31.9 "Building Services Piping" is not exceeded.
- N. Insulated Piping: Comply with the following installation requirements.
 - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
 - 2. Saddles: Install protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments of insulation that match adjoining pipe insulation.
 - 3. Shields: Install MSS Type 40, protective shields on cold piping with vapor barrier. Shields span an arc of 180 degrees and have dimensions in inches not less than the following:

THICKNESS NPS (Inches)	LENGTH (Inches)
1/4 to 3-1/2	12 0.048
4	12 0.060
5 and 6	18 0.060
8 to 14	24 0.075
16 to 24	24 0.105
 - 4. Pipes 8 Inches and Larger: Include pressure treated wood inserts.
 - 5. Insert Material: Length at least as long as the protective shield.
 - 6. Thermal-Hanger Shields: Install with insulation of same thickness as piping.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.
- C. Provide housekeeping pads where indicated on plans.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal-arc welding, appearance and quality of welds, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so that no roughness shows after finishing, and so that contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 ESCUTCHEONS, SLEEVES AND RISER CLAMPS

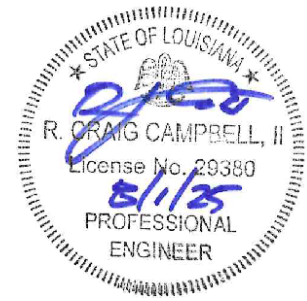
- A. Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.
- B. Contractor shall furnish and install all piping sleeves required. Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26-gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed. Sleeves of structural members shall be as detailed on structural plans.
- C. Provide malleable iron split ring hangers with rod supports as specified. Strap hangers or wire will not be accepted. Spacing of hangers shall be as required above by MSS Standards. Maximum spacing shall no case exceed the following: For cast iron pipes 5ft.; for other than soil pipes 10 ft.
- D. Provide galvanized iron shields between hangers and pipe covering.
- E. Provide heavy steel riser clamps on vertical risers at floors to support pipes.
- F. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.
- G. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping, fixtures or accessories will not be accepted.

3.7 PAINTING

- A. Touching Up: Clean field welds and abraded areas of shop paint and paint exposed areas immediately after erection of hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

- B. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal is specified in Division 09 Section "Paints and Coatings."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 05 29



SECTION 23 05 53 – MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Duct labels.
 - 4. Stencils.
 - 5. Warning tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 4. Fasteners: Stainless-steel rivets or self-tapping screws.
 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White.
 3. Background Color: Black.
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Black.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.

- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 DUCT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Black.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

2.4 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
 - 1. Stencil Material: Aluminum.
 - 2. Stencil Paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
 - 1. Size: 3 by 5-1/4 inches.
 - 2. Fasteners: Brass grommet and wire.

3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.
 1. Identification Paint: Use for contrasting background.
 2. Stencil Paint: Use for pipe marking.
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Pipe Label Color Schedule (Verify exact color prior to installation):
 1. Chilled-Water Piping:
 - a. Background Color: Blue.
 - b. Letter Color: White.
 2. Heating Water Piping:
 - a. Background Color: Yellow
 - b. Letter Color: White

3.4 DUCT LABEL INSTALLATION

- A. Install plastic-laminated self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
 2. Yellow: For hot-air supply ducts.
 3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
 4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
- B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53



SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section specifies the requirements and procedures total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.
- B. Test, adjust, and balance the following mechanical systems:
 - 1. Supply air systems, all pressure range;
 - 2. Fresh Air
 - 3. Return air systems
 - 4. AHUs
 - 5. Verify temperature control system operation;
- C. Provide assistance to Division 23 and Division 26 Contractor and project Architect in system commissioning process. Identify all system variances of greater than 10% and make required measurements, adjustments, etc. to bring systems into compliance to satisfaction of project Architect.
- D. THE TEST AND BALANCE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING OUT AND REPORTING EACH SEQUENCE OF HEATING, COOLING AND CONTROL INTERLOCK OPERATION FOR THE EQUIPMENT REFERENCED ABOVE.

1.3 DEFINITIONS

- A. Systems testing, adjusting, and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:
 - 1. The balance of air distribution;
 - 2. Adjustment of total system to provide design quantities;
 - 3. Electrical measurement;
 - 4. Verification of performance of all equipment and automatic controls;
- B. Test: To determine quantitative performance of equipment.
- C. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g., reduce fan speed, throttling).
- D. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.

- E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.
- F. Report forms: Test data sheets arranged for collecting test data in logical order for submission and review. These data should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.
- G. Terminal: The point where the controlled fluid enters or leaves the distribution system. These are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return inlets on air terminals such as registers, grilles, diffusers, louvers, and hoods.
- H. Main: Duct or pipe containing the system's major or entire fluid flow.
- I. Submain: Duct or pipe containing part of the systems' capacity and serving two or more branch mains.
- J. Branch main: Duct or pipe serving two or more terminals.
- K. Branch: Duct or pipe serving a single terminal.

1.4 SUBMITTALS

- A. Agency Data:
 - 1. Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below.
- B. Engineer and Technicians Data:
 - 1. Submit proof that the Test and Balance Engineer assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.
- C. Procedures and Agenda: Submit a synopsis of the testing, adjusting, and balancing procedures and agenda proposed to be used for this project.
- D. Maintenance Data: Submit maintenance and operating data that include how to test, adjust, and balance the building systems. Include this information in maintenance data specified in Division 01 and Section 230020.
- E. Sample Forms: Submit sample forms, if other than those standard forms prepared by the AABC or NEBB are proposed.
- F. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Follow the procedures and format specified below:
 - 1. Draft reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports

in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.

2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final reports.
 3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the below listed divisions, separated by divider tabs:
 4. General Information and Summary
 - a. Air Systems
 - b. Hydronic Systems
 - c. Temperature Control Systems
 - d. Special Systems
 5. Report Contents: Provide the following minimum information, forms and data:
 - a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency, Contractor, Owner, Architect, Engineer, and Project. Include addresses and contact names and telephone numbers. Also include a certification sheet containing the seal and name address, telephone number, and signature of the Certified Test and Balance Engineer. Include in this division a listing of the instrumentations used for the procedures along with the proof of calibration.
 - b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC and NEBB, for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form.
 6. Provide electronic (PDF) copies of all documentation included in the Final Report.
- G. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.
- H. At the front of the Report, the TAB Contractor shall provide a summary sheet identifying system operational variances problems, etc. recommended corrective measures that in the opinion of the TAB Contractor should be enacted by the Mechanical Contractor prior to retesting. Submit to project Architect as work progresses with resolution documented for inclusion in final report.

1.5 QUALITY ASSURANCE

- A. Test and Balance Engineer's Qualifications: A Professional Engineer (either on the installer's staff or an independent consultant), registered in the State in which the services are to be performed, and having testing, adjusting, and balancing experience on projects with testing and balancing requirements similar to those required for this project.
- B. Pre-Balancing Conference: Prior to beginning of the testing, adjusting, and balancing procedures, schedule and conduct a conference with the Architect and representatives of installers of the mechanical systems. The objective of the conference is final coordination and verification of system operation and readiness for testing, adjusting, and balancing.

1.6 PROJECT CONDITIONS

- A. Systems Operation: Systems shall be fully operational prior to beginning procedures.

1.7 SEQUENCING AND SCHEDULING

- A. Test, adjust and balance air conditioning systems during summer season and heating systems during winter season, including at least a period of operation at outside conditions within 5 deg F wet bulb temperature of maximum summer design condition, and within 10 deg F dry bulb temperature of minimum winter design condition. Take final temperature readings during seasonal operation.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING

- A. Before operating the system, perform these steps:
 - 1. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
 - 2. Obtain copies of approved shop drawings of all air handling equipment, outlets (supply, return, and exhaust) and temperature control diagrams.
 - 3. Compare design to installed equipment and field installations.
 - 4. Walk the system from the system air handling equipment to terminal units to determine variations of installation from design.
 - 5. Check filters for cleanliness.
 - 6. Check dampers (both volume and fire) for correct and locked position, and temperature control for completeness of installation before starting fans.
 - 7. Prepare report test sheets for both fans and outlets. Obtain manufacturer's outlet factors and recommended procedures for testing. Prepare a summation of required outlet volumes to permit a crosscheck with required fan volumes.
 - 8. Determine best locations in main and branch ductwork for most accurate duct traverses.
 - 9. Place outlet dampers in the full open position.
 - 10. Prepare schematic diagrams of system "as-built" ductwork and piping layouts to facilitate reporting.
 - 11. Lubricate all motors and bearings.
 - 12. Check fan belt tension.
 - 13. Check fan rotation.

3.2 MEASUREMENTS

- A. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerances specified in the referenced standards. Instruments shall be properly maintained and protected against damage.
- B. Provide instruments meeting the specifications of the referenced standards.
- C. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.
- D. Apply instrument as recommended by the manufacturer.
- E. Use instruments with minimum scale and maximum subdivisions and with scale ranges proper for the value being measured.
- F. When averaging values, take a sufficient quantity of readings which will result in a

repeatability error of less than 5 percent. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.

- G. Take all reading with the eye at the level of the indicated value to prevent parallax.
- H. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuation readings.
- I. Take measurements in the system where best suited to the task.

3.3 PERFORMING TESTING, ADJUSTING, AND BALANCING

- A. Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards.
- B. Cut insulation, ductwork, and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.
- C. Patch insulation, ductwork, and housings, using materials identical to those removed.
- D. Seal ducts and piping, and test for and repair leaks.
- E. Seal insulation to re-establish integrity of the vapor barrier.
- F. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.
- G. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

3.4 RECORD AND REPORT DATA

- A. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.
- B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.
- C. Prepare a summary sheet of noted variances in excess of $\pm 10\%$ of design value. Include all such variances, recommended resolutions and ultimate result in Appendix "A" to TAB Final Report.

3.5 DEMONSTRATION

- A. Training:
 - 1. Train the Owner's maintenance personnel on troubleshooting procedures and testing, adjusting, and balancing procedures. Review with the Owner's personnel, the information contained in the Operating and Maintenance Data specified in Division 01 and 230020.
 - 2. Schedule training with Owner through the Architect with at least 7 days prior notice.

END OF SECTION 23 05 93



SECTION 23 07 13 - INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Extent of mechanical insulation required by this section is indicated on drawings and schedules, and by requirements of this section.
- B. This Section includes:
 - 1. Piping insulation including fittings and valves.
 - 2. Duct insulation (internal lining and external wrapping)
 - 3. Mechanical equipment room walls and ceilings
 - 4. Mechanical equipment insulation.
- C. Cover and insulate all valves, fittings, and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run and piping system. Install factory molded, pre-cut or field cut and fabricated units (at installer's option) except where specifically noted otherwise.
- D. Maintain the integrity of vapor jackets on all pipe insulation, duct insulation, equipment insulation and protect during construction to prevent puncture or other damage.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:
 - 1. Product data for each type of mechanical insulation identifying k-value, thickness, and accessories.
 - 2. Manufacturer's installation recommendations.
 - 3. Material certificates, signed by the manufacturer, certifying that materials as a minimum, comply with specified requirements where laboratory test reports cannot be obtained.
 - 4. Material test reports prepared by a qualified independent testing laboratory. Certify insulation meets specified requirements.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 - 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.5 SEQUENCING AND SCHEDULING

- A. Schedule piping and duct insulation application only after the testing of piping and duct systems is complete and accepted.
- B. Schedule insulation application after installation and testing of heat trace tape is complete and accepted.
- C. Schedule insulation of walls and ceiling to correspond with installation of pipe hangers, supports and equipment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe insulation shall not begin until all work has been tested and found to be tight. All insulation adhesives, sealers, tapes and mastic shall meet the latest NFPA requirements and shall meet 25/50/50 flame spread and smoke developed ratings.
- B. All insulation shall be installed in strict accordance with the manufacturer's recommendations.
- C. All pipe insulation where recommended by the manufacturer shall be banded with aluminum bands, three to a section and with one band on each side of each fitting, valve, etc.
- D. Insulation shall be continuous through walls and ceilings.
- E. All valves, strainers, etc. shall be insulated the same as its adjacent piping and the covering shall extend all the way up to the equipment.
 1. USE HIGH DENSITY INSULATION INSERTS AT HANGERS ON ALL PIPING 1-1/2" AND ABOVE TO PREVENT CRUSHING OF INSULATION.

2.2 THERMAL INSULATION

- A. After all work has been tested and approved, insulate as follows:
 1. INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

2.3 CONDENSATE DRAIN PIPING

- A. Insulate with 1/2" Aerotube or Armaflex pipe insulation applied in accordance with manufacturer's recommendations and instructions.

2.4 REFRIGERANT LINES

- A. Insulate with 3/4" closed cell, tube insulation, Aerotube, Armaflex or equivalent. Apply two coats of weatherproof mastic on all piping below grade or exposed to weather. Contractor shall install refrigerant lines below grade in watertight PVC sleeve in accordance with manufacturer's recommendations.

- B. All copper refrigerant lines shall be separated from dissimilar metals at all support points..

2.5 AIR HANDLING ROOM WALLS

- A. Furnish and install over entire areas of walls of air handling rooms containing a/c units a 1" thick Manville Linacoustic or equal acoustical type duct insulation 3# density, applied over Slick-Klips 12" on center. Stick-Klips shall be applied to wall with Miracle Adhesive. Acoustical material shall be applied over Stick-Klips with duct liner adhesive tape EC-104 spotted between pins. Stick-Klips with factor applied adhesive will not be acceptable.

2.6 HVAC DUCTWORK INSULATION:

- A. Supply, return, transfer, fresh air and exhaust ductwork shall be wrapped on outside with 2.33" thick 3/4# density fiberglass insulation with aluminum foil vapor barrier (unless stated otherwise on mechanical drawings). Insulation shall be taped at all joints and installed per the manufacturer's recommendations.
- B. Refer to air distribution section of mechanical specifications for duct insulation supplied by the sheet metal sub-contractor.
- C. Transfer ductwork across walls shall be internally lined with 1" thick acoustical insulation.

2.7 HVAC FLEX-CONNECTIONS:

- A. Shall be wrapped on outside with 2.33" thick 3/4 # density fiberglass insulation with aluminum foil vapor barrier. Insulation shall be taped at all joints and installed per the manufacturer's recommendations.

2.8 INSULATION THROUGH HANGERS AND SLEEVES

- A. The insulation shall be continuous through pipe hangers and pipe sleeves. At hangers where the pipe is supported by insulation, provide a galvanized iron protection shield. Provide pipes 2-inch i.p.s. and larger in insulation inserts at points of hanger supports. The inserts shall be of calcium silicate, cellular glass, prestressed molded glass fiber of minimum 13-pound density, or other approval material of the same thickness as adjacent insulation and not less than 13-pound density. The inserts shall have sufficient compression strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Inserts shall be 180 degrees and not less than the length of the protection shield. Vapor barrier facing of the insert shall be the same as the facing on the adjacent insulation. Where copper clad hangers are used on domestic copper pipe, insulation may cover pipe and hanger. Provide 18 gauge metal saddles between all hangers and insulation.

END OF SECTION 23 07 13



SECTION 23 31 13 – METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Section Includes:

- 1. Single-wall rectangular ducts and fittings.
- 2. Single-wall round ducts and fittings.
- 3. Double-wall round and flat-oval ducts and fittings.
- 4. Sheet metal materials.
- 5. Duct liner.
- 6. Sealants and gaskets.
- 7. Hangers and supports.
- 8. Seismic-restraint devices.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical System.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

- 1. Liners and adhesives.
- 2. Sealants and gaskets.

B. Shop Drawings:

- 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
- 2. Factory- and shop-fabricated ducts and fittings.
- 3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
- 4. Elevation of top of ducts.

5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including but are not limited to the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.
 - g. F/A devices, wi-fi antennas, etc.

E. Welding certificates.

F. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow, LLC.
 - c. SEMCO Incorporated.
 - d. Sheet Metal Connectors, Inc.
 - e. Eastern Sheet Metal, Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and

Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 DOUBLE-WALL ROUND INSULATED DUCT & FITTINGS

- A. Unless otherwise specified, all interior and outer shell duct and fittings shall be a minimum G-90 galvanized sheet metal in accordance with ASTM A525 and A527 specifications.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
 - a. Eastern Sheet Metal, Inc.
 - b. Hamlin Sheetmetal, Inc.
 - c. United McGill, Inc.
 - d. Semco, Inc.
 2. General: "Basic Round Diameter" as used in this article is the diameter of the size of round duct that has a circumference equal to the perimeter of a given sized of flat oval duct. Except where interrupted by fittings, provide round and flat oval ducts in lengths not greater than 12 feet.
 3. Round Ducts: Fabricate round supply ducts with "spiral lock seam" construction, except where interior diameters exceed 72 inches. As a minimum, comply with SMACNA "HVAC Duct Construction Standards," Second Edition - 1995 with addendums, Table 3-2A and 3-2B for galvanized steel gages.
 - a. Round & Oval Ducts - Low Pressure: Solid welded (continuous welded), 1-inch insulation, perforated inner liner and with metal thickness listed below for pressure classes from minus 2 inches to plus 1 inch:
 - i. 3 to 26 inches: 24 gage.
 - ii. 27 to 36 inches: 22 gage.
 - iii. 37 to 50 inches: 20 gage.
 - iv. 52 to 60 inches: 18 gage.
 - b. Round & Oval Ducts - Medium Pressure: Solid welded (continuous welded), 1-inch insulation, perforated inner liner and with metal thickness listed below for pressure classes from 2 inches to plus 6 inches:
 - i. 3 to 14 inches: 24 gage.
 - ii. 15 to 26 inches: 26 gage.
 - iii. 28 to 36 inches: 20 gage.
 - iv. 38 to 50 inches: 18 gage.
 - v. 52 to 78 inches: 14 gage.
 4. Double-Wall (Insulated) Fittings: Fabricate double-wall insulated fittings with an outer shell, insulation, and an inner liner as specified below. Dimensions indicated on internally insulated ducts are nominal inside dimensions.
 - a. Thermal Conductivity: 0.27 Btu/sq.ft./deg. F/inch thickness at 75 deg. F mean temperature.

- b. Outer Shell: Base outer shell gage on actual outer shell dimensions. Gages for outer shell shall be same as for uninsulated fittings specified above.
 - c. Insulation: Unless otherwise indicated, provide 1-inch-thick fiber-glass insulation. Provide insulation ends where internally insulated duct connects to single-wall duct or non-insulated components. The insulation end shall terminate the insulation and reduce the outer shell diameter to the nominal single-wall size.
 - d. Perforated Inner Liner: Construct round and flat oval inner liners with perforated sheet metal of the gages listed below. Provide 3/32-inch-diameter perforations, with an overall open area of 23 percent. For flat oval ducts, the diameter indicated in the table below is the "basic round diameter."
 - i. 3 to 34 inches: 24 gage.
 - ii. 35 to 58 inches: 22 gage.
 - iii. 60 to 88 inches: 20 gage.
 - e. Connectors: Maintain concentricity of liner to outer shell by mechanical means. A second "inner" factory installed flange shall be provided to keep the inner liner concentric and to eliminate the need to make inner connections at the inner wall. Retain insulation from dislocation by mechanical means. Ductwork shall be provided with flanged connections (paint grip galvanized) at each fitting or coupling on all double wall ducts.
5. Exhibit Hall/General Assembly Exposed Ductwork: Drum louver taps are to be factory fabricated and installed double wall taps with factory installed air foil type extractors up to the first duct reducer. Extractors are to be field adjustable and provided with means of securing the extractor to the duct without the use of additional fasteners or attachments. The drum louver taps are to be of length suitable for the dimensions of the installed louver. Factory manifold taps shall be welded to the spiral duct. Tack or spot welds are not acceptable.

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized. (Paint Grip)
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product name or designation or comparable product by one of the following:
 - a. CertainTeed Corporation; Insulation Group.
 - b. Johns Manville.
 - c. Knauf Insulation.
 - d. Owens Corning.
3. Maximum Thermal Conductivity:
 - a. Type I, Flexible: 3 lbs. Density / 1 ½" thick.
 - b. Type II, Rigid: 3 lbs. Density / 1 ½" thick.
4. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
5. Solvent -Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 4 inches.
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 7. Service: Indoor and outdoor.
 8. Service Temperature: Minus 40 to plus 200 deg F.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
 1. Application Method: Brush on.
 2. Solids Content: Minimum 65 percent.
 3. Shore A Hardness: Minimum 20.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 8. Service: Indoor or outdoor.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Solvent-Based Joint and Seam Sealant:
 1. Application Method: Brush on.
 2. Base: Synthetic rubber resin.
 3. Solvent: Toluene and heptane.
 4. Solids Content: Minimum 60 percent.
 5. Shore A Hardness: Minimum 60.
 6. Water resistant.
 7. Mold and mildew resistant.

8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 9. VOC: Maximum 395 g/L.
 10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
 11. Service: Indoor or outdoor.
 12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- E. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
 2. Type: S.
 3. Grade: NS.
 4. Class: 25.
 5. Use: O.
 6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- G. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
 2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
 3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 3. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 - 4. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 5. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 6. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 7. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
 - 8. Conditioned Space, Exhaust Ducts: Seal Class B.
 - 9. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
 - 2. Test the following systems:

- a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, selected by Architect from sections installed, totaling no less than 25 percent of total installed duct area for each designated pressure class.
 - b. Supply Ducts with a Pressure Class of 3-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
 - c. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
 - d. Exhaust Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
 - e. Outdoor Air Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 4. Test for leaks before applying external insulation.
 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
 6. Give seven days' advance notice for testing.
- C. Duct System Cleanliness Tests:
1. Visually inspect duct system to ensure that no visible contaminants are present.
 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
 - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.8 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Duct Accessories" for access panels and doors.
 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within new duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.9 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing."

3.10 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected Downstream of Fan Coil Units, and Terminal Units:
 - a. Pressure Class: Positive 2-inch wg.

- b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12
 - 2. Ducts Connected to Variable-Air-Volume Air-Handling Units and Inlets of Terminal Units:
 - a. Pressure Class: Positive 4-inch wg
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3
 - 3. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: A
 - c. SMACNA Leakage Class for Rectangular: 3.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- B. Return Ducts:
 - 1. Ducts Connected to Air-Handling Units
 - a. Pressure Class: Positive or negative 4-inch wg.
 - b. Minimum SMACNA Seal Class: A
 - c. SMACNA Leakage Class for Rectangular: 6
 - d. SMACNA Leakage Class for Round and Flat Oval: 6
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg>.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- C. Exhaust Ducts:
 - 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 1-inch wg.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- D. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Velocity 700 fpm or Lower:
 - i. Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - ii. Mitered Type RE 4 without vanes.
 - b. Velocity 700 to 1500 fpm:
 - i. Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - ii. Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - iii. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - i. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - ii. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - iii. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - i. Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - ii. Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - iii. Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - iv. Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.

- b. Rectangular Main to Round Branch: Spin in.
- 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113



SECTION 23 33 00 – DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes the following:
 - 1. Backdraft dampers.
 - 2. Manual volume control dampers.
 - 3. Motorized Dampers.
 - 4. Spin Collars.
 - 5. Turning vanes.
 - 6. Duct-mounted access doors and panels.
 - 7. Flexible connectors.
 - 8. Flexible ducts.
 - 9. Accessories hardware.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Product data including details for materials, dimensions of individual components, profiles, and finishes for the following items:
 - 1. Backdraft dampers.
 - 2. Manual volume control dampers.
 - 3. Duct-mounted access panels and doors.
 - 4. Flexible ducts.
- C. Shop drawings from manufacturer detailing assemblies. Include dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Detail the following:
 - 1. Special fittings, volume control damper installation (both manual and automatic), and transformers details.
 - 2. Fire and smoke damper installations, including sleeves and duct-mounted access door and panel installations.
- D. Product Certification: Submit certified test data on dynamic insertion loss; self-noise power levels; and airflow performance data, static pressure loss, and dimensions and weights.

1.4 QUALITY ASSURANCE

- A. NFPA Compliance: Comply with the following NFPA Standards:

1. NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

- A. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 BACKDRAFT DAMPERS

- A. Description: Suitable for horizontal or vertical installation.
- B. Frame: 0.063-inch-thick 6063T extruded aluminum.
- C. Blades: 0.025-inch-thick roll-formed aluminum.
- D. Blades: 0.050-inch-thick 6063T extruded aluminum.
- E. Blade Seals: Vinyl.
- F. Blade Axles: Nonferrous.
- G. Tie Bars and Brackets: Aluminum.
- H. Return Spring: Adjustable tension.
- I. Wing-Nut Operator: Galvanized steel, with 1/4-inch galvanized-steel rod.
- J. Adjustable Pressure Controls.
- K. Dampers to be Greenheck EM-30, Ruskin BD6, Pottorff BD-150, or approved equal.

2.2 MANUAL VOLUME CONTROL DAMPERS

- A. General: Provide factory-fabricated volume-control dampers, complete with required hardware and accessories. Stiffen damper blades to provide stability under operating conditions. Provide locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class. Provide end bearings or other seals for ducts with pressure classifications of 3 inches or higher. Extend axles full length of damper blades. Provide bearings at both ends of operating shaft.
- B. Standard Volume Control Dampers: Multiple or single-blade, parallel or opposed-blade design as indicated, standard-leakage rating, with linkage outside of air stream, and suitable for horizontal or vertical applications. Greenheck MDB-15, Ruskin MD-15, Pottorff CD-10 & MD-41, or approved equal.

2.3 MOTORIZED DAMPERS

- A. Mechanical Contractor shall furnish and install motorized dampers as indicated on mechanical and architectural drawings. Damper shall be opposed blade motorized type equivalent to Greenheck Model VCD-23, Ruskin CD36/OB, Pottorff CD-41, or equal. Motorized dampers shall be operated by 120/1/60 electric actuator as indicated on plans. Damper shall be complete with outboard support bearing, blade and jamb seals. Dampers shall be low - leakage type. Dampers shall go to closed position when units are off unless otherwise noted.

2.4 SPIN COLLARS

- A. All round take-offs to round branch duct shall be made with 26-gauge spin-type collars with 26-gauge balancing dampers. These spin-collars shall be as manufactured by Flexmaster Model FLD, Dace MSD, or approved equivalent.
- B. The mounting groove shall be die-formed to assure constant fit control. Balancing dampers shall be factory-installed with spring loaded, retractable bearings and a positive locking wing-nut for easy adjustment.

2.5 TURNING VANES

- A. Fabricate turning vanes according to SMACNA HVAC Duct Construction Standards, Figures 2-2 through 2-7.
- B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch-wide, curved blades set at 3/4 inch) on center, support with bars perpendicular to blades set at 2 inches on center, and set into side strips suitable for mounting in ducts.
- C. Acoustic Turning Vanes: Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fiber glass fill.

2.6 DUCT-MOUNTED ACCESS DOORS AND PANELS

- A. General: Provide construction and airtightness suitable for duct pressure class.
- B. Frame: Galvanized sheet steel. Provide with bend-over tabs and foam gaskets.
- C. Door: Double-wall, galvanized sheet metal construction with insulation fill and thickness, number of hinges and locks as indicated for duct pressure class. Provide vision panel where indicated. Provide 1-inch by 1-inch butt hinge or piano hinge and cam latches.
- D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber seals.
- E. Insulation: 1-inch- thick fiber glass or polystyrene foam board.
- F. Access doors shall be Ruskin Model ADH-22, Kees ADH, Pottorff HAD, or approved equal.

2.7 FLEXIBLE CONNECTORS

- A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL Standard 181, Class 1.
- B. Standard Metal-Edged Connectors: Factory-fabricated with a strip of fabric 3-1/2 inches wide attached to 2 strips of 2-3/4-inch-wide, 24-gage, galvanized sheet steel or 0.032-inch

(0.8-mm) aluminum sheets. Select metal compatible with connected duct system. Fold and crimp metal edge strips onto fabric as illustrated in SMACNA HVAC Duct Standard, 1st Edition, Figure 2-19.

2.8 FLEXIBLE DUCTS

- A. General: Comply with UL 181, Class 1.
- B. Flexible Ducts – Insulated (2.33", R-6): Factory-fabricated, insulated, round duct, with an outer aluminum jacket, glass fiber insulation around a continuous inner liner.
 - 1. Reinforcement: Steel-wire helix encapsulated in the inner liner.
 - 2. Outer Jacket: Glass-reinforced, silver mylar with a continuous hanging tab, integral fiber glass tape, and nylon hanging cord.
 - 3. Outer Jacket: Polyethylene film.
 - 4. Inner Liner: Polyethylene film for low pressure, woven glass fiber for high pressure.
 - 5. Low pressure duct rated at 6" static pressure.
 - 6. Manufacturer: Thermaflex or approved equivalent.

2.9 ACCESSORIES HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket and a flat mounting gasket. Size to allow insertion of pilot tube and other testing instruments and provide in length to suit duct insulation thickness.
- B. Splitter Damper Accessories: Zinc-plated damper blade bracket, 1/4-inch, zinc-plated operating rod, and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.
- C. Flexible Duct Clamps: Stainless steel band with cadmium-plated hex screw to tighten band with a worm-gear action. Provide in sizes from 3 to 18 inches to suit duct size.
- D. Adhesives: High strength, quick setting, neoprene based, waterproof and resistant to gasoline and grease.
- E. Provide all necessary transformers, electrical components suitable for each system installation including duct damper controllers, fire dampers and smoke dampers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of duct accessories. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install duct accessories according to manufacturer's installation instructions and applicable portions of details of construction as shown in SMACNA standards.
- B. Install volume control dampers in lined duct with methods to avoid damage to liner and to avoid erosion of duct liner.
- C. Provide test holes at fan inlet and outlet and elsewhere as indicated.

- D. Install fire and smoke dampers according to the manufacturer's UL-approved printed instructions.
- E. Install fusible links in fire dampers.
- F. Label access doors according to Division 23 for "Mechanical Identification."

3.3 ADJUSTING

- A. Adjust duct accessories for proper settings.
- B. Adjust fire and smoke dampers for proper action.
- C. Final positioning of manual dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

END OF SECTION 23 33 00



SECTION 23 37 13 – DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. Section Includes:
 - 1. Adjustable bar, registers and grilles

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.
- C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.
- D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Duct access panels.
 - a. Source quality-control reports.

PART 2 - PRODUCTS

2.1 REGISTERS AND GRILLES

- A. Adjustable Bar Register:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

- i. Anemostat Products; a Mestek company.
 - ii. Krueger.
 - iii. METALAIRE, Inc.
 - iv. Nailor Industries Inc.
 - v. Price Industries.
 - vi. Titus.
- 2. Material: Aluminum.
- 3. Finish: Baked enamel, white.
- 4. Face Blade Arrangement: Horizontal spaced 3/4 inches apart.
- 5. Core Construction: Removable.
- 6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
- 7. Frame: 1 inch wide.
- 8. Mounting Frame: Filter
- 9. Mounting: Countersunk screw or Lay in.
- 10. Damper Type: Adjustable opposed blade.
- 11. Accessories:
 - a. Front-blade gang operator.

B. Adjustable Bar Grille:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - i. Anemostat Products; a Mestek company.
 - ii. Krueger.
 - iii. METALAIRE, Inc.
 - iv. Nailor Industries Inc.
 - v. Price Industries.
 - vi. Titus.
- 2. Material: Aluminum
- 3. Finish: White baked enamel, unless noted otherwise.
- 4. Face Blade Arrangement: Horizontal spaced 3/4 inches apart.
- 5. Core Construction: Integral
- 6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
- 7. Frame: 1 inch wide.
- 8. Mounting: Countersunk screw or Lay in.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13



SECTION 23 7412 - PACKAGED UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Package unit.
- B. Heat exchanger.
- C. Refrigeration components.
- D. Unit operating controls.
- E. Electrical power connections.
- F. Operation and maintenance service.

1.2 REFERENCES

- A. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems. (all)
- B. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration. (all)
- C. AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard. (g/e, c/e above 135,000 btuh)
- D. AHRI 340 - Commercial and Industrial Unitary Heat Pump Equipment. (hp above 135,000 btuh)
- E. ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment. (all)
- F. ANSI/ASHRAE/IESNA 90.1-1999 - Energy Standard for New Buildings Except Low-Rise Residential Buildings.
- G. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.
- H. California Energy Commission Administrative Code - Title 20/24 - Establishes the minimum efficiency requirements for HVAC equipment installed in new buildings in the State of California. (all)

- I. AHRI 210/240 - Unitary Air-Conditioning Equipment and Air- Source Heat Pump Equipment. (All under 135,000 btuh)
- J. AHRI 270 - Sound Rating of Outdoor Unitary Equipment. (all below 135,000)
- K. AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment. (All above 135,000 Btuh)
- L. ANSI/NFPA 70-1995 - National Electric Code. (all)

1.3 SUBMITTALS

- A. Submit unit performance data including: capacity, nominal and operating performance.
- B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
- C. Submit shop drawings indicating overall dimensions as well as installation, operation and services clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.
- E. Shop drawings submitted for approval shall be accompanied by a copy of the purchase agreement between the Contractor and an authorized service representative of the manufacturer for check, test and start up and first year service.

1.4 DELIVERY, STORAGE and HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Protect units from physical damage. Leave factory-shipping covers in place until installation.

1.5 WARRANTY

- A. Provide parts warranty (excluding refrigerant) for one year from substantial completion.
- B. Provide five-year extended warranty for compressors.
- C. Provide five-year heat exchanger limited warranty.

1.6 REGULATORY REQUIREMENTS

- A. Unit shall conform to ANSI Z21.47/UL1995 for construction of packaged air conditioner ANSI_Z21.47/UL_1995_REQUIREMENTS.
 - 1. In the event the unit is not UL approved, the manufacturer must, at his expense, provide for a field inspection by a UL representative to verify conformance to UL standards. If necessary, contractor shall perform modifications to the unit to comply with UL, as directed by the UL representative, at no additional expense to the Owner.

PART 2 - PRODUCTS

2.1 SUMMARY

- A. The contractor shall furnish and install package unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.
- B. APPROVED MANUFACTURERS
 - 1. Ruud, Rheem, Trane, Daikin, or approved equal.

2.2 GENERAL UNIT DESCRIPTION

- A. Unit(s) furnished and installed shall be packaged unit (s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on AHRI Standard. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls
- B. Unit(s) shall be 100% factory run tested and fully charged with R-410A
- C. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.
- D. Units shall be convertible airflow design as manufactured.
- E. Wiring internal to the unit shall be colored and numbered for identification.

2.3 UNIT CASING

- A. Cabinet: Galvanized steel, phosphatized, and finished with a pre-applied baked polyurethane enamel. Structural members with access doors and removable panels shall be a minimum 22 gauge.
- B. Unit's cabinet surface shall be tested 672 hours in salt spray test in compliance with ASTM B117.
- C. Cabinet construction shall allow for all service/ maintenance from one side of the unit.
- D. Cabinet top cover shall be one piece construction or where seams exists, it shall be double-hemmed and gasket-sealed.
- E. Access Panels: Water- and air-tight panels with handles shall provide access to filters, heating section, return air fan section, supply air fan section, evaporator coil section, and unit control section.
- F. Unit's base pan shall have a raised 1 1/8 inch high lip around the supply and return openings for water integrity.
- G. Provide ½ inch foil faced, fire retardant permanent, odorless glass fiber material. All edges must be captured so that there is no insulation exposed in the air stream.
- H. The base pan shall have no penetrations within the perimeter of the curb other than the

raised 1 1/8 inch high down flow supply/return openings to provide and added water integrity precaution.

- I. Provide openings either on side of unit or through the base for power, control, condensate, and gas connections.
- J. The base of the unit shall have 3 sides for forklift provisions. The base of the units shall have rigging/lifting holes for crane maneuvering.

2.4 AIR FILTERS

- A. Air Filters: Factory installed filters shall mount integral within the unit and shall be accessible through access panels. Two-inch thick MERV 13 filters shall be provided.

2.5 FANS AND MOTORS

- A. Provide evaporator fan section with forward curved, double width, double inlet, centrifugal type fan.
- B. Provide self-aligning, grease lubricated, ball or sleeve bearings with permanent lubrication fittings.
- C. Outdoor and Indoor Fan motors shall be permanently lubricated and have internal thermal overload protection.
- D. Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position.
- E. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

2.6 ELECTRIC HEATING SECTION

- 1. Finned tube heating elements or helical nickel-chrome resistance wire coil heating elements with refractory ceramic support bushings easily accessible with automatic reset thermal cut-out, built-in magnetic contactors, galvanized steel frame, control circuit transformer and fuse, manual reset thermal cut-out, airflow proving device, toggle switch (pilot duty), fused disconnect, unfused disconnect, load fuses.
- 2. Controls shall start supply fan before electric elements are energized and continue operating until air temperature reaches minimum setting, with switch for continuous fan operation.
- 3. Heating shall have 2 stages of control.

2.7 EVAPORATOR COIL

- A. Provide configured aluminum fin surface mechanically bonded to copper tubing coil.
- B. Provide an independent expansion device for each refrigeration circuit. Factory pressure tested at 450 psig and leak tested at 200 psig.
- C. Provide a removable, reversible, cleanable double sloped drain pan for base of evaporator coil constructed of PVC.

2.8 CONDENSER SECTION

- A. Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in

a weather tight casing.

2.9 REFRIGERATION SYSTEM

- A. Compressor: Provide direct-drive hermetic, reciprocating type compressor with centrifugal oil pump providing positive lubrication to moving parts and automotive type pistons, rings to prevent gas leakage, internal suction and discharge valves and crankcase heater. Motor shall be suction gas-cooled with internal temperature and current sensitive motor overloads. Internally isolate motors on springs.
- B. Provide each unit with refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, suction and liquid line pressure ports.

2.10 OPERATING CONTROLS

- A. Provide factory-wired packaged units with 24-volt microprocessor control circuit with control transformers, contactors pressure lugs or terminal block for power wiring. Contractor to provide DISCONNECT DEVICE. Units shall have single point power connection as standard. Field wiring of zone controls to be NEC Class II.

2.11 CONTROLS

- A. Contractor shall provide factory supplied, insulated curb, 16 gauge perimeter made of zinc coated steel with supply and return air gasketing and wood nailer strips. Ship knocked down and provided with instructions for easy assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall verify that proper power supply is available.

3.2 INSTALLATION

- A. Contractor shall install in accordance with manufacturer's instructions.

END OF SECTION 23 7412

SECTION 23 80 00 - AIR CONDITIONING, HEATING, AND VENTILATING

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. The air conditioning system, in general, shall be for the entire building, providing cooling and de-humidification in summer and heating in winter. A constant amount of fresh air shall be taken into the system and all air shall be filtered.

1.2 EMERGENCY DRAIN PAN:

- A. Provide an emergency drain pan below all interior air handling units. The pan shall be constructed of 18 gauge galvanized steel, extending 6" beyond unit all around and turning up a minimum of 4" around the perimeter. A 1-1/4" x 1-1/4" x 1/8" galvanized angle iron frame shall be welded around the top of the pan. Entire pan should be painted with black asphalt rust preventative paint. Extend a Type "L" hard copper drain line (minimum 1") to the floor drain in the mechanical room or as indicated on the drawings. Provide a float switch in drain pan and interlock with A/H unit motor to de-energize the unit motor on rise of water in drain pan.

1.3 HIGH EFFICIENCY CONDENSING UNIT - OUTDOOR SECTION (20 TON OR LESS):

- A. Furnish and install high-efficiency, air-cooled top discharge condensing unit where shown and with capacities scheduled. UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED, PRE-CHARGED AND TESTED, AND SHALL BE SUPPLIED FROM THE FACTORY WITH ALL FEATURES LISTED BELOW. Min. SEER 13.0 FOR UNITS OVER 5 TONS AND 14.0 SEER FOR UNITS 5 TONS AND BELOW. Unit electrical, parts, compressors, controls and labor shall have a 5 year warranty (entire unit).
- B. Condenser coil shall be constructed of aluminum fins mechanically bonded to an aluminum coil and shall be protected with stamped louvered panels on outside of unit.
- C. Condenser fan shall be propeller type, direct driven. Motor shall have inherent protection and be of the permanently lubricated type, resiliently mounted. Fans shall be complete with safety guards.
- D. Compressor shall be a single speed serviceable hermetic or sealed hermetic design complete with crankcase heater and external spring isolators and compressors, and shall have a 5-year warranty. Unit shall be equipped with time delay to prevent compressor from starting within five minutes of "off" time. Refrigerant shall be R-410A.
- E. All controls shall be factory wired and shall consist of condenser fan overload devices, hard start kit (single phase only), internal pressure relief valve, filter dryers, pressure taps for refrigerant check, quick connect refrigerant couplings and liquid and suction line service valves. Unit shall also be furnished with outdoor expansion valve or metering valve and check valve, switch-over valve and an evaporator defrost control kit to permit the cooling system to operate down to 30oF outdoor temperature. Provide hot gas re-heat as required for proper operation of humidity control system.
- F. Casing shall be fully weatherproof for outdoor installation and shall be bonderized steel with baked enamel finish. Panels shall be removable to provide access for servicing. Unit shall be set in place on rubber mounting pads.
- G. Contractor shall advise the Electrical Contractor of the manufacturer's recommended breaker size, fuse size, wire size, electrical service, etc. if different from that specified on

the Electrical Drawings. Mechanical Contractor shall pay any additional costs required to change breaker size, fuse sizes, wire sizes, electrical service of equipment, etc. for proper operation and installation.

- H. Unit shall be as manufactured by Trane, Lennox, Carrier, York, Daikin, or approved equivalent.

1.4 HIGH EFFICIENCY AIR CONDITIONING UNIT - INDOOR SECTION:

- A. Furnish and install vertical discharge/bottom or horizontal return air conditioning unit of size, type and capacities as scheduled. Units shall be Trane, Lennox, Carrier, York, Daikin, or approved equivalent. Unit shall have a full 5 year parts and labor warranty.
- B. Units shall be complete with fan, multi-speed direct drive blower, motor, direct expansion cooling coil, low voltage control transformer, grease fittings, insulated metal drain pan, etc. All units shall be factory insulated on the interior with not less than 3/4# density neoprene coated fiberglass cemented in place with waterproof adhesive.
- C. Each unit shall be mounted on a suitable base as indicated on plans or 18" high painted angle iron base approved by the Engineer to allow for proper return air duct connection. Unit shall also be designed for continuous operation at the maximum rated static pressure. Fan capacities shall be rated with the fans in the units, and the horse powers specified shall include all losses.
- D. Casings shall be suitable for operation at the pressures specified and constructed of bonderized steel.
- E. Cooling coils shall be of aluminum or copper and shall be tested at 400 psi air pressure. Cooling coil face velocity shall not exceed that guaranteed by manufacturer for no moisture carry-over.
- F. Electric strip heaters shall be as hereinafter specified and shall be mounted inside unit housing. Coordinate electric service to heaters and blower with Electrical Contractor. Heater and air unit shall be internally wired and fused to receive one electrical source of power. Coordinate fuse size, breaker size, HP size, KW size, etc. with Electrical Contractor. Mechanical Contractor shall pay for all changes required for proper installation and operation.
- G. Filter shall be 1" thick, pleated, throw-way mounted in an accessible factory filter rack at unit, or in R.A. ductwork as indicated on plans.
- H. Contractor shall provide two new sets of filters upon completion of project, to turn building over to Owner.
- I. If the manufacturer's equipment is not available internally wired to receive one source of power, necessary modifications to electric service shall be the responsibility of the equipment supplier. Any modifications required shall be submitted in writing ten (10) days prior to the bid date.

1.5 ELECTRIC STRIP HEATERS:

- A. Electric strip heaters shall consist of open coils made from Grade "A" resistant wire insulated by floating ceramic bushings and supported in an aluminum steel frame.
- B. All terminal studs, nuts and washers shall be stainless steel, insulated with phenolic terminal bushings. Terminals shall be machine crimped to coils and heater shall be tested at 2000 volts before shipment. All voltages and phases shall be as scheduled.

- C. Heater shall be provided with built-in contactors, with one terminal block furnished for each circuit and separate contactors for each stage of heating. Heaters with air units shall be internally wired with air unit to receive one electric source of power.
- D. An automatic reset thermal cut-off shall be provided to break the heater load directly on over-temperature. In addition, provide manual reset thermal cut-off to break the heater load manually.
- E. Control circuit transformer shall be built into heater terminal box and sized to carry full contactor holding coil load.
- F. Heaters shall be listed by UL and shall be as manufactured by Chromalox, Electric Heaters, Inc., Industrial Engineering and Equipment Co., or an approved equivalent.
- G. Heater shall be equipped with built-in pressure type air flow switch. Heater shall be mounted inside unit housing.
- H. Where indicated on drawings, heaters in ductwork shall be provided with duct flanges. Outside of heater shall be wrapped with 2" thick fiberglass ductwrap with aluminum foil vapor barrier.

1.6 TESTING REFRIGERANT PIPING SYSTEMS:

- A. Refrigerant lines shall be tested under 200 psi dry nitrogen pressure for 5 hours using soap suds at joints to test for leaks. Evacuate system and charge with refrigerant.

1.7 AHU FILTERS:

- A. All new air handling units (split systems units) shall be furnished and installed with permanent metal filter frames.
- B. Frame shall be constructed of 22 gauge perimeter frame enclosing a preformed 16 gauge wire air leaving grid. The front support shall be a 10 gauge wire grid.
- C. During construction, start-up and running units, units shall have 2" thick pleated disposable filters as manufactured by FARR or prior approved equivalent.
- D. Final size of metal frames for filters shall be coordinated with each A/C unit and owner.

1.8 LABELING A/C UNITS AND FANS

- A. All indoor and outdoor a/c units and fans shall be labeled with permanent laminated plate riveted to unit. Units shall be labeled as indicated in schedules. Plate shall be black with white unit numbers. Height of unit number shall be minimum of one (1) inch. Label shall also indicate area serviced by unit as noted in schedules. Height of letters shall be minimum of one-half (1/2) inch.

1.9 VENTILATING SYSTEM

- A. This Contractor shall furnish and install all exhaust fans shown and scheduled on Plans. Fans shall be of the type indicated and shall be Cook, Greenheck, Acme, Twin City, Penn Barry, or approved equivalent.
- B. All exhaust fans shall be equipped with bird screen, automatic back-draft dampers and integral disconnect switch unless noted otherwise. Fan motors shall be of the 40 deg C ambient temperature rise type and shall be suitable for continuous duty operation. Direct

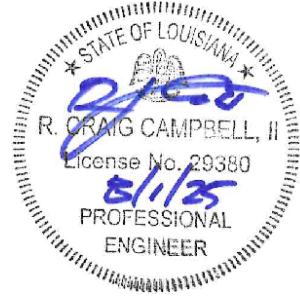
drive fans shall be complete with solid state speed control switch mounted on unit for balancing. Interlock with remote on/off switch.

- C. Roof mounted fans and equipment shall be complete with insulated factory roof curb. Coordinate installation requirements and height with roofing manufacturer's recommendation.
- D. In-line exhaust fans shall be mounted with spring isolation hangers and threaded rod supports anchored to structure.
- E. Ceiling mounted fans shall be complete with white ceiling mounted grille. Grille shall be removable to provide service access to fan, motor, etc.

END OF SECTION 23 80 00

SECTION 238025 – VRF EQUIPMENT

PART 1 - GENERAL



1.1 SYSTEM DESCRIPTION R2-SERIES (SIMULTANEOUS HEAT/COOL)

- A. Per the equipment schedule, the variable capacity, heat pump heat recovery air conditioning system basis of design is Mitsubishi Electric CITY MULTI VRF (Variable Refrigerant Flow) zoning system(s).
- B. Acceptable alternative manufacturers, assuming compliance with these equipment specifications, are Daikin, Panasonic, and Hitachi. Contractor bidding an alternate manufacturer does so with full knowledge that that manufactures product may not be acceptable or approved and that contractor is responsible for all specified items and intents of this document without further compensation.
- C. Simultaneous heating/cooling (heat recovery) systems shall consist of an outdoor unit, BC (Branch Circuit) Controller (or comparable branch devices), multiple indoor units, and an integral DDC (Direct Digital Controls) system. Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation. To ensure owner comfort, each indoor unit or group of indoor units shall be independently controlled and capable of changing mode automatically when zone temperature strays 1.8 degrees F from set point for ten minutes.
- D. No additional branch circuit controllers (or comparable branch devices) than shown on the drawings/schedule may be connected to any one outdoor unit. Contractors proposing alternate systems requiring more branch devices than those included as the basis of design are responsible for additional piping & electrical costs and are required to identify additional costs & installation time required of other trades with their bid.

1.2 QUALITY ASSURANCE

- A. The units shall be listed by Electrical Testing Laboratories (ETL) and bear the ETL label.
- B. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
- C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
- D. All units must meet or exceed the 2010 Federal minimum efficiency requirements and the ASHRAE 90.1 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1230.
- E. System start-up supervision shall be a required service to be completed by the manufacturer or a duly authorized, competent representative that has been factory trained in system configuration and operation. The representative shall provide proof of manufacturer certification indicating successful completion within no more than two (2) years prior to system installation. This certification shall be included as part of the equipment and/or controls submittals.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendation.

1.4 WARRANTY

- A. The CITY MULTI units shall be covered by the manufacturer's limited warranty for a period of one (1) year parts and seven (7) year compressor to the original owner from date of installation.
- B. Installing contractor shall meet manufacturer requirements to obtain extended manufacturer's limited parts and compressor warranty for a period of ten (10) years to the original owner from date of installation. This warranty shall not include labor.
- C. Manufacturer shall have a minimum of fifteen (15) years continuous experience providing VRF systems in the U.S. market.
- D. All manufacturer technical and service manuals must be readily available for download by any local contractor should emergency service be required. Registering and sign-in requirements which may delay emergency service reference are not allowed.
- E. The CITY MULTI VRF system shall be installed by a contractor with extensive CITY MULTI install and service training. The mandatory contractor service and install training should be performed by the manufacturer.

PART 2 - OUTDOOR UNITS

2.1 R2-SERIES STANDARD EFFICIENCY (HEAT RECOVERY), AIR COOLED OUTDOOR UNITS

- A. General:
 - 1. The outdoor unit modules shall be air-cooled, direct expansion (DX), multi-zone units used specifically with VRF components described in this section and Part 5 (Controls). The outdoor unit modules shall be equipped with a single compressor which is inverter-driven and multiple circuit boards—all of which must be manufactured by the branded VRF manufacturer. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
 - 2. Outdoor unit systems may be comprised of multiple modules with differing capacity if a brand other than basis of design is proposed. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s). If an alternate manufacturer is selected, any additional material, cost, and labor to install additional lines shall be incurred by the contractor. Contractor responsible for ensuring alternative brand compatibility in terms of availability, physical dimensions, weight, electrical requirements, etc.
 - 3. Outdoor unit shall have a sound rating no higher than 66.5 dB(A) individually or 69.5 dB(A) twinned. Units shall have a sound rating no higher than 52 dB(A) individually or 55 dB(A) twinned while in night mode operation. Units shall have 5 levels sound adjustment via dip switch selectable fan speed settings. If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.
 - 4. Refrigerant lines from the outdoor unit to the indoor units shall be insulated in accordance with the installation manual.

5. The outdoor unit shall have the capability of installing the main refrigerant piping through the bottom of the unit.
6. The outdoor unit shall have an accumulator with refrigerant level sensors and controls. Units shall actively control liquid level in the accumulator via Linear Expansion Valves (LEV) from the heat exchanger.
7. The outdoor unit shall have a high pressure safety switch, over-current protection, crankcase heater and DC bus protection.
8. VRF system shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.
9. The outdoor unit shall be capable of operating in heating mode down to -18°F ambient temperatures or cooling mode down to 23°F ambient temperatures, without additional low ambient controls. If an alternate manufacturer is selected, any additional material, cost, and labor to meet low ambient operating condition and performance shall be incurred by the contractor.
10. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained. Oil return sequences must be enabled only during extended periods of reduced refrigerant flow to ensure no disruption to correct refrigerant flow to individual zones during peak loads. Systems which might engage oil return sequence based on hours of operation risk oil return during inopportune periods are not allowed. Systems which rely on sensors (which may fail) to engage oil return sequence are not allowed.
11. Unit must defrost all circuits simultaneously in order to resume full heating more quickly during extreme low ambient temperatures (below 23°F). Partial defrost, also known as hot gas defrost which allows reduced heating output during defrost, is permissible only when ambient temperature is above 23°F.
12. While in hot gas defrost the system shall slow the indoor unit fan speed down to maintain a high discharge air temperature. Systems that keep fans running in same state shall not be allowed as they provide an uncomfortable draft to the indoor zone due to lower discharge air temperatures.
13. In reverse defrost all refrigerant shall be bypassed in the main branch controller and shall not be sent out to the indoor units, systems that flow refrigerant through indoor units during reverse defrost shall not be allowed.

B. Unit Cabinet:

1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished.
2. The outdoor unit shall be tested in compliance with ISO9277 such that no unusual rust shall develop after 960 hours of salt spray testing.
3. Panels on the outdoor unit shall be scratch free at system startup. If a scratch occurs the salt spray protection is compromised and the panel should be replaced immediately.

C. Fan:

1. Each outdoor unit module shall be furnished with direct drive, variable speed propeller type fan(s) only. Fans shall be factory set for operation at 0 in. WG. external static pressure, but capable of normal operation with a maximum of 0.32 in. WG. external static pressure via dipswitch.
2. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
3. All fans shall be provided with a raised guard to prevent contact with moving parts.

D. Refrigerant and Refrigerant Piping:

1. R410A refrigerant shall be required for systems.
2. Polyolester (POE) oil—widely available and used in conventional domestic systems—shall be required. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.
3. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the VRF equipment manufacturer and installed in accordance with manufacturer recommendations.
4. All refrigerant piping must be insulated with ½" closed cell, CFC-free foam insulation with flame-Spread Index of less than 25 and a smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102. R value of insulation must be at least 3.
5. Refrigerant line sizing shall be in accordance with manufacturer specifications. Future changes to indoor unit styles or sizes must be possible without resizing/replacing refrigerant piping to any other branch devices or indoor units.

E. Coil:

1. Outdoor Coil shall be constructed to provide equal airflow to all coil face surface are by means of a 4-sided coil.
2. Outdoor Coil shall be elevated at least 12" from the base on the unit to protect coil from freezing and snow build up in cold climates. Manufacturer's in which their coil extends to within a few inches from the bottom of their cabinet frame shall provide an additional 12" of height to their stand or support structure to provide equal protection from elements as Mitsubishi Electric basis of design. Any additional support costs, equipment fencing, and tie downs required to meet this additional height shall be responsibility of Mechanical Contractor to provide.
3. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
4. The coil fins shall have a factory applied corrosion resistant blue-fin finish. Uncoated aluminum coils/fins are not allowed.
5. The coil shall be protected with an integral metal guard.
6. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
7. Unit shall have prewired plugs for optional panel heaters in order to prevent any residual ice buildup from defrost. Panel heaters are recommended for operating environments where the ambient temperature is expected to stay below -1F for 72 hours.
8. Condenser coil shall have active hot gas circuit direct from compressor discharge on lowest coil face area to shed defrost condensate away from coil and protect from Ice formation after returning to standard heat pump operation. While in Heat Pump operation this lower section of the Outdoor Evaporator coil shall continually run hot gas from the compressor discharge to protect the coil from ice buildup and coil rupture. Manufacturers who do not have an active hot gas circuit in the lower section of the Outdoor coil to protect coil from freezing shall not be allowed in markets where the outdoor unit will see temperatures below freezing.
9. Each outdoor unit module shall be equipped with only inverter driven scroll hermetic compressors. Non inverter-driven compressors, which may cause inrush current (demand charges) and require larger generators for temporary power shall not be allowed.
10. Each compressor shall be equipped with a multi-port discharge mechanism to eliminate over compression at part load. Manufacturer's that rely on a single

- compressor discharge port and provide no means of eliminating over compression and energy waste at part load shall not be allowed.
11. Crankcase heat shall be provided via induction-type heater utilizing eddy currents from motor windings. Energy-wasting "belly-band" type crankcase heaters are not allowed. Manufacturer's that utilize belly-band crankcase heaters will be considered as alternate only.
 12. Compressor shall have an inverter to modulate capacity. The capacity for each compressor shall be variable with a minimum turndown not greater than 15%.
 13. The compressor shall be equipped with an internal thermal overload.
 14. Field-installed oil equalization lines between modules are not allowed. Prior to bidding, manufacturers requiring equalization must submit oil line sizing calculations specific to each system and module placement for this project.
 15. Manufacturers that utilize a compressor sump oil sensor to equalize compressor oil volume within a single module shall not be allowed unless they actively shut down the system to protect from compressor failure.

F. Controls:

1. The unit shall be an integral part of the system & control network described in Part 5 (Controls) and react to heating/cooling demand as communicated from connected indoor units over the control circuit. Required field-installed control voltage transformers and/or signal boosters shall be provided by the manufacturer.
2. Each outdoor unit module shall have the capability of 4 levels of demand control based on external input.

G. Electrical:

1. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz or 460 volts, 3-phase, 60 hertz per equipment schedule.
2. The outdoor unit shall be controlled by integral microprocessors.
3. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.2 BRANCH CIRCUIT (BC) CONTROLLERS AS REQUIRED FOR SIMULTANEOUS HEAT/COOL SYSTEMS

A. General

1. BC (Branch Circuit) Controllers (or comparable branch devices) shall include multiple branches to allow simultaneous heating and cooling by allowing either hot gas refrigerant to flow to indoor unit(s) for heating or subcooled liquid refrigerant to flow to indoor unit(s) for cooling. Refrigerant used for cooling must always be subcooled for optimal indoor unit LEV performance; alternate branch devices which do not include controlled refrigerant subcooling risk bubbles in liquid supplied to indoor unit LEVs and are not allowed.
2. BC Controllers (or comparable branch devices) shall be equipped with a circuit board that interfaces to the controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish and be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors, with access and service clearance provided for each controller. BC Controllers (or comparable branch devices) shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. BC Unit Cabinet:

1. The casing shall be fabricated of galvanized steel.
 2. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
 3. The unit shall house two tube-in-tube heat exchangers.
- C. Refrigerant Piping (specifications in addition to those for outdoor unit):
1. All refrigerant pipe connections shall be brazed.
 2. Future changes to indoor unit quantities or sizes served by BC Controller or comparable branch device must be possible with no piping changes except between the branch device and indoor unit(s) changing. Systems which might require future piping changes between branch device and outdoor unit—if changes to indoor unit quantities or sizes are made—are not considered equal and are not allowed.
- D. Refrigerant valves:
1. Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
 2. Service shut-off valves shall be pre-installed by the equipment vendor and leak tested to the applicable factory specifications for each branch to allow service to any indoor unit without field interruption to overall system operation.
- E. Condensate Management:
1. BC Controller (or comparable branch device) must have integral resin drain pan or insulate refrigeration components with removable insulation that allows easy access for future service needs. Cabinets filled with solid foam insulation do not allow for future service and are not allowed.
- F. Electrical:
1. The unit electrical power shall be 208/230 volts, 1 phase, 60 Hertz. The unit shall be capable of satisfactory operation within voltage limits of 187-228 (208V/60Hz) or 207-253 (230/60Hz).
 2. The BC Controller shall be controlled by integral microprocessors
 3. The control circuit between the indoor units and outdoor units shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

PART 3 - INDOOR UNITS

3.1 4-WAY CEILING-RECESSED CASSETTE WITH GRILLE INDOOR UNIT

- A. General:
1. The ceiling-recessed indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch, and the ability to adjust airflow patterns for different ceiling heights. Indoor unit and refrigerant pipes shall be

charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. Unit Cabinet:

1. The cabinet panel shall have provisions for a field installed filtered outside air intake.
2. Branch ducting shall be allowed from cabinet.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.
4. The grille vane angles shall be individually adjustable from a wired remote controller to customize the airflow pattern for the conditioned space

C. Fan:

1. The indoor fan shall be an assembly with a statically and dynamically balanced turbo fan direct driven by a single motor with permanently lubricated bearings.
2. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of five (5) speed settings, Low, Mid1, Mid2, High and Auto.
3. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
4. The indoor unit fan logic must include multiple setting that can be changed to provide optimum airflow based on ceiling height and number of outlets used.
5. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
6. The vanes shall have an Auto-Wave selectable option in the heating mode that shall randomly cycle the vanes up and down to evenly heat the space.
7. Grille shall include a factory-installed "3D i-see" sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39' detecting diameter (based on 8.8ft mounting height) with 1,856 or more measuring points.

D. Filter:

1. Return air shall be filtered by means of a long-life washable filter

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.
3. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 33 inches above the condensate pan.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls:

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
2. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.
3. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
4. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.
5. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.

3.2 4-WAY CEILING-RECESSED CASSETTE WITH GRILLE FOR 2X2 GRID INDOOR UNIT

A. General:

1. The indoor unit shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. Unit Cabinet:

1. The cabinet shall be a compact 22-7/16" wide x 22-7/16" deep so it will fit within a standard 24" square suspended ceiling grid.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

C. Fan:

1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall be capable of three (3) speed settings, Low, Mid, and High.
4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
5. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
6. Grille shall include an optional "3D i-see" sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in

unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39' detecting diameter (based on 8.8ft mounting height) with 1,856 or more measuring points.

D. Filter:

1. Return air shall be filtered by means of a long-life washable filter.

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.
3. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 19-3/4" inches above the condensate pan.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls:

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
2. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.
3. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
4. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.
5. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur, the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.

3.3 VERTICAL/HORIZONTAL DUCTED (MULTI-POSITION AIR HANDLER)

A. General:

1. The multi-position indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in air handling spaces in accordance with Section 18.2 of UL 1995 4th Edition, be tested in accordance with ANSI/ASHRAE 193 and have less than 2% air leakage at maximum airflow setting.

B. Unit Cabinet:

1. The cabinet shall include a fixed bottom return, a fixed vertical discharge supply and be pre-painted, pre-insulated, 22 gauge galvanized steel.

C. Fan:

1. The indoor unit fan shall be an assembly with a single, statically and dynamically balanced direct drive fan with a high efficiency DC motor with permanently lubricated bearings.
2. The fan shall have 3-speeds with the capability to operate between 0.3-0.8 In.WG selectable.

D. Filter:

1. The unit shall have a 1" filter rack with a reusable filter.

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Optional Electric Heat Kit:

1. The indoor unit shall have a manufacturer supplied electric heat kit accessory. The electric heat kit shall offer either one or two stages of back up heat for maximum efficiency. The heater shall be designed to work with the indoor unit without any modifications to the unit or to the control sequence.

H. Controls:

1. Control board shall include contacts for control of no less than two stages of external heat. The first stage of external heat may be energized when the space temperature is 2.7°F from set point for between 10-25 minutes (user adjustable). The second stage of external heat may be energized when the first stage has been active for no less than 5 minutes and the space temperature has not risen by more than 0.9°F.
2. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
3. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

PART 4 - CONTROLS

4.1 OVERVIEW

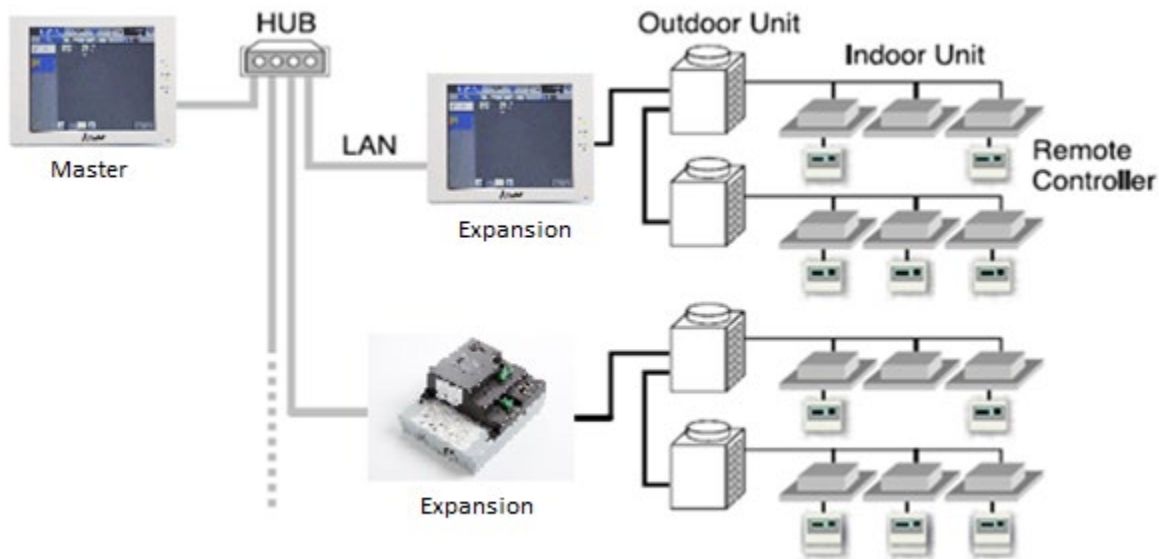
- A. The control system shall consist of a low voltage communication network and a web-based interface. The controls system shall gather data and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface.
- B. Furnish energy conservation features such as optimal start, request-based logic, and demand level adjustment of overall system capacity as specified in the sequence.
- C. System shall be capable of email generation for remote alarm annunciation.

4.2 ELECTRICAL CHARACTERISTICS

- A. General:
 - 1. Controller power and communications shall be via a common non-polar communications bus and shall operate at 30VDC.
- B. Wiring:
 - 1. Control wiring shall be installed in a daisy chain configuration from indoor unit to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.
 - 2. Control wiring for centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to the system controllers (centralized controllers and/or integrated web based interface), to the power supply.
- C. Wiring type:
 - 1. Wiring shall be 2-conductor (16 AWG), twisted, stranded, shielded wire as defined by the Diamond System Builder output.
 - 2. Network wiring shall be CAT-5 with RJ-45 connection.

4.3 CITY MULTI CONTROLS NETWORK

- A. The CITY MULTI Controls Network (CMCN) consists of remote controllers, centralized controllers, and/or integrated web based interface communicating over a high-speed communication bus. The CITY MULTI Controls Network shall support operation monitoring, scheduling, occupancy, error email distribution, personal web browsers, tenant billing, online maintenance support, and integration with Building Management Systems (BMS) using either LonWorks® or BACnet® interfaces. The below figure illustrates a sample CMCN System Configuration.



CMCN System Configuration

4.4 CMCN: REMOTE CONTROLLERS

A. Simple MA Remote Controller:

1. The Backlit Simple MA Remote Controller shall be capable of controlling up to 16 indoor units (defined as 1 group).
2. The Backlit Simple MA Remote Controller shall only be used in same group with Wireless MA Remote Controllers or with other Backlit Simple MA Remote Controllers, with up to two remote controllers per group.

Simple MA Remote Controller			
Item	Description	Operation	Display
ON/OFF	Run and stop operation for a single group	Each Group	Each Group
Operation Mode	Switches between Cool/Drying/Auto/Fan/Heat/Setback. Operation modes vary depending on the air conditioner unit. Auto and Setback mode are available for the R2/WR2-Series only.	Each Group	Each Group
Temperature Setting	Sets the temperature from 40°F – 95°F depending on operation mode and indoor unit. Separate COOL and HEAT mode set points available depending on central controller and connected mechanical equipment.	Each Group	Each Group
Fan Speed Setting	Available fan speed settings depending on indoor unit.	Each Group	Each Group
Air Flow Direction Setting	Air flow direction settings vary depending on the indoor unit model.	Each Group	Each Group
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter).	N/A	Each Group *1

Simple MA Remote Controller			
Item	Description	Operation	Display
	*1: Centrally Controlled is displayed on the remote controller for prohibited functions.		
Display Indoor Unit Intake Temp	Measures and displays the intake temperature of the indoor unit when the indoor unit is operating.	N/A	Each Group
Display Backlight	Pressing the button lights up a backlight. The light automatically turns off after a certain period of time. (The brightness settings can be selected from Bright, Dark, and Light off.)	N/A	Each Unit
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed	N/A	Each Unit
Test Run	Operates air conditioner units in test run mode. *2 The display for test run mode will be the same as for normal start/stop (does not display "test run").	Each Group	Each Group *2
Ventilation Equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY unit.	Each Group	N/A
Set Temperature Range Limit	Set temperature range limit for cooling, heating, or auto mode.	Each Group	Each Group

4.5 CENTRALIZED CONTROLLER (WEB-ENABLED)

A. Master Centralized Controller:

1. The Master Centralized Controller shall be capable of controlling a maximum of two hundred (200) indoor units across multiple CITY MULTI outdoor units with the use of three expansion controllers. The Master Centralized Controller shall be approximately 11-5/32" x 7-55/64" x 2-17/32" in size and shall be powered with an integrated 100-240 VAC power supply. The Master Centralized Controller shall support system configuration, daily/weekly scheduling, monitoring of operation status, night setback settings, free contact interlock configuration and malfunction monitoring. When being used alone without the expansion controllers, the Master Centralized Controller shall have five basic operation controls which can be applied to an individual indoor unit, a collection of indoor units (up to 50 indoor units), or all indoor units (collective batch operation). This basic set of operation controls for the Master Centralized Controller shall include on/off, operation mode selection (cool, heat, auto (R2/WR2-Series only), dry, setback (R2/WR2-Series only) and fan), temperature setting, fan speed setting, and airflow direction setting. Since the master provides centralized control it shall be able to enable or disable operation of local remote controllers. In terms of scheduling, the Master Centralized Controller shall allow the user to define both daily and weekly schedules (up to 24 scheduled events per day) with operations consisting of ON/OFF, mode selection, temperature setting, air flow (vane) direction, fan speed, and permit/prohibit of remote controllers.

Master Centralized Controller			
Item	Description	Operation	Display
ON/OFF	Run and stop operation.	Each Block, Group or Collective	Each Group or Collective

Master Centralized Controller			
Item	Description	Operation	Display
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. (Group of Lossnay unit: automatic ventilation/vent-heat/interchange/normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is available for the R2/WR2-Series only.	Each Block, Group or Collective	Each Group
Temperature Setting	Sets the temperature from 57°F – 87°F depending on operation mode and indoor unit.	Each Block, Group or Collective	Each Group
Fan Speed Setting	Available fan speed settings depending on indoor unit.	Each Block, Group or Collective	Each Group
Air Flow Direction Setting	Air flow direction settings vary depending on the indoor unit model. *1. Louver cannot be set.	*1 Each Block, Group or Collective	Each Group
Schedule Operation	Annual/weekly/today schedule can be set for each group of air conditioning units. Optimized start setting is also available. *1. The system follows either the current day, annual schedule, or weekly, which are in the descending order of overriding priority. Twenty-four events can be scheduled per day, including ON/OFF, Mode, Temperature Setting, Air Direction, Fan Speed and Operation Prohibition. Five types of weekly schedule (seasonal) can be set. Settable items depend on the functions that a given air conditioning unit supports.	*2 Each Block, Group or Collective	Each Group
Optimized Start	Unit starts 5 - 60 minutes before the scheduled time based on the operation data history in order to reach the scheduled temperature at the scheduled time.	Each Block, Group or Collective	Each Block, Group or Collective
Night Setback Setting	The function helps keep the indoor temperature in the temperature range while the units are stopped and during the time this function is effective.	Each Group	Each Group
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *3. Centrally Controlled is displayed on the remote controller for prohibited functions.	Each Block, Group or Collective	*3 Each Group
Room Temp	Displays the room temperature of the group. Space temperature displayed on the indoor unit icon on the touch screen interface.	N/A	Each Group
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed *4. When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the	N/A	*4 Each Unit or Collective

Master Centralized Controller			
Item	Description	Operation	Display
	abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection		
Outdoor Unit Status	Compressor capacity percentage and system pressure (high and low) pressure (excludes S-Series)	Each ODU	Each ODU
Connected Unit Information	MNET addresses of all connected systems	Each IDU, ODU and BC	Each IDU, ODU and BC
Ventilation Equipment	This interlocked system settings can be performed by the master system controller. When setting the interlocked system, use the ventilation switch the free plan LOSSNAY settings between “Hi”, “Low” and “Stop”. When setting a group of only free plan LOSSNAY units, you can switch between “Normal ventilation”, “Interchange ventilation” and “Automatic ventilation”.	Each Group	Each Group
Multiple Language	Other than English, the following languages can be selected: Spanish, French, Japanese, Dutch, Italian, Russian, Chinese, and Portuguese.	N/A	Collective
External Input / Output	By using accessory cables you can set and monitor the following. Input By level: “Batch start/stop”, “Batch emergency stop” By pulse: “batch start/stop”, “Enable/disable remote controller” Output: “start/stop”, “error/Normal” *5. Requires the external I/O cables (PAC-YG10HA-E) sold separately.	*5 Collective	*5 Collective

2. All Master Centralized Controllers shall be equipped with two RJ-45 Ethernet ports to support interconnection with a network PC via a closed/direct Local Area Network (LAN) or to a network switch for IP communication to up to three expansion controllers for display of up to two hundred (200) indoor units on the main master centralized controller interface.
3. The Master Centralized Controller shall be capable of performing initial settings via the high-resolution, backlit, color touch panel on the controller or via a PC browser using the initial settings.
4. Standard software functions shall be available so that the building manager can securely log into each master centralized controller via the PC's web browser to support operation monitoring, scheduling, error email, interlocking and online maintenance diagnostics. Additional optional software functions of personal browser for PCs and MACs and Energy shall be available but are not included. The Energy Apportionment function shall require a LIC-Charge software license

B. Expansion Controller:

1. The Expansion Controller shall serve as a standalone centralized controller or as an expansion module to the Master Centralized Controller for the purpose of adding up to 50 indoor units to either the main touch screen interface of the master centralized controller. Up to three (3) expansion controllers can be connected to the master via a local IP network (and their IP addresses assigned on the master)

to the master to allow for up to two hundred (200) indoor units to be monitored and controlled from the master interface.

2. The expansion controllers have all of the same capabilities to monitor and control their associated indoor units as the features specified above. Even when connected to the master and configured to display their units on the main controller, the individual indoor units connected to the expansion can still be monitored and controlled from the interface of the expansion. The last command entered will take precedence, whether at the wall controller, the expansion or the master Centralized Controller.

C. Non Touch Screen, Networked Centralized Controller:

1. The Non Touch Screen, Networked Centralized Controller shall be capable of controlling a maximum of 50 indoor units across multiple CITY MULTI outdoor units. The controller shall be approximately 8-1/2"x10" in size and shall be powered by its internal power supply. The controller shall support system configuration, daily/weekly scheduling, monitoring of operation status, free contact interlock configuration and malfunction monitoring. The controller shall have five basic operation controls which can be applied to an individual indoor unit, a group of indoor units (up to 50 indoor units), or all indoor units (collective batch operation). This basic set of operation controls for the controller shall include on/off, operation mode selection (cool, heat, auto (R2/WR2-Series only), dry, temperature setting, fan speed setting, and airflow direction setting. Since the controller provides centralized control it shall be able to enable or disable operation of local remote controllers. In terms of scheduling, the controller shall allow the user to define both daily and weekly schedules with operations consisting of ON/OFF, mode selection, temperature setting, air flow (vane) direction, fan speed, and permit/prohibit of remote controllers.

Non Touch Screen, Networked Centralized Controller			
Item	Description	Operation	Display
ON/OFF	Run and stop operation.	Each Block, Group or Collective	Each Group or Collective
Operation Mode	Indoor unit modes: COOL/DRY/FAN/AUTO/HEAT. Lossnay unit modes: HEAT RECOVERY/BYPASS/AUTO Air to water (PWFY) modes: HEATING/HEATING ECO/HOT WATER/ANTI-FREEZE/COOLING *Operation modes vary depending on the unit model connected. ** Auto mode is available for the R2/WR2-Series only.	Each Block, Group or Collective	Each Group
Temperature Setting	Sets the temperature from 40°F – 95°F depending on operation mode and indoor unit model. Separate COOL and HEAT mode set points available depending on remote controller and connected mechanical equipment.	Each Block, Group or Collective	Each Group
Set Temperature Range Limit	The range of room temperature setting can be limited by the initial setting depending on the indoor unit connected.	Each Group	Each Group

Non Touch Screen, Networked Centralized Controller			
Item	Description	Operation	Display
Fan Speed Setting	Available fan speed settings depend on indoor unit model.	Each Block, Group or Collective	Each Group
Air Flow Direction Setting	*Air flow direction settings vary depending on the indoor unit model. *1. Louver cannot be set.	*1 Each Block, Group or Collective	Each Group
Schedule Operation	Annual/weekly/today schedule can be set for each group of air conditioning units. Optimized start setting is also available. *2. The system follows either the current day, annual schedule, or weekly, which are in the descending order of overriding priority. Twenty-four events can be scheduled per day, including ON/OFF, Mode, Temperature Setting, Air Direction, Fan Speed and Operation Prohibition. Five types of weekly schedule (seasonal) can be set. Settable items depend on the functions that a given air conditioning unit supports.	*2 Each Block, Group or Collective	Each Group
Hold	Disables scheduled functions for indoor unit groups and their associated remote controller timers. *not available for general equipment	Each Block, Group or Collective	Each Group
Optimized Start	Unit starts 5 - 60 minutes before the scheduled time based on the operation data history in order to reach the scheduled temperature at the scheduled time.	Each Block, Group or Collective	Each Block, Group or Collective
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Fan Speed, Air Direction and Reset filter). *3. Centrally Controlled is displayed on the remote controller for prohibited functions.	Each Block, Group or Collective	*3 Each Group
Room Temp	Displays the room temperature of the group.	N/A	Each Group
Room Humidity	Displays the percent relative humidity in the space as sensed by the Smart ME Remote Controller	N/A	Each Group
Occupancy Sensor	Displays the occupancy icon on the group icon in the condition list page when the room is occupied (blue) or vacant (gray). *The Smart ME Remote Controller Occupancy sensor is required.	N/A	Each Group
Brightness Sensor	Displays the brightness icon on the group icon in the condition list when the space is determined to be bright (yellow) or dark (gray). *The Smart ME Remote Controller Brightness sensor is required.	N/A	Each Group

Non Touch Screen, Networked Centralized Controller			
Item	Description	Operation	Display
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed *4. When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection	N/A	*4 Each Unit or Collective
Ventilation Equipment	This interlocked system settings can be performed by the master system controller. When setting the interlocked system, use the ventilation switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	Each Group	Each Group
Multiple Language	Other than English, the following languages can be selected: Spanish, French, Japanese, German, Italian, Russian, Chinese, and Portuguese.	N/A	N/A
External Input / Output	By using accessory cables you can set and monitor the following. Input: By level: "Batch start/stop", "Batch emergency stop"; By pulse: "batch start/stop", "Enable/disable remote controller" Output: "start/stop", "error/Normal" *5. Requires the external I/O cables (PAC-YG10HA-E) sold separately.	*5 Collective	*5 Collective
M-Net	The "M-NET" LED lights, when AC power supply is turned ON. The LED blinks while M-NET is communicating.	N/A	Each Group (LED)
Collective ON/OFF	All the units can be operated / stopped with a DIP switch.	Collective	N/A
Measurement	Displays the Temperature and Humidity inputs of the AI Board. Supports graph display and data export.	N/A	Each Unit
AHC Status	Displays the status of the of the inputs and outputs of each Advanced HVAC Controller (DC-A2IO)	N/A	Each Unit
Free Contact Status	Displays the input/output status of the Free Contacts on the indoor units	N/A	Each Unit
Free Contact Interlock Control	Operation of indoor groups, general equipment or free contact outputs based on group(s) conditions or free contact(s) input states.	Each Group, Output or Collective	N/A
Data Back-up (PC)	Initial setting data can be exported to a PC.	Collective	N/A

2. All Non Touch Screen, Networked Centralized Controller shall be equipped with two RJ-45 Ethernet port to support interconnection with a network PC and BACnet/IP communication via a closed/direct Local Area Network (LAN). The

- controller shall be capable of performing initial settings online via a PC using the controller's initial setting browser or online/offline with the Initial Setting Tool.
3. Standard software functions shall be available so that the building manager can securely log into each controller via the PC's web browser to support operation monitoring, scheduling, error email, interlocking and online maintenance diagnostics. Standard software functions shall not expire. Additional optional software functions of personal browser for PCs and MACs and Energy Allocation shall be available. The Energy Allocation function shall require Master Centralized Controller Energy Allocation Integrated System in conjunction with Non Touch Screen, Networked Centralized Controller.

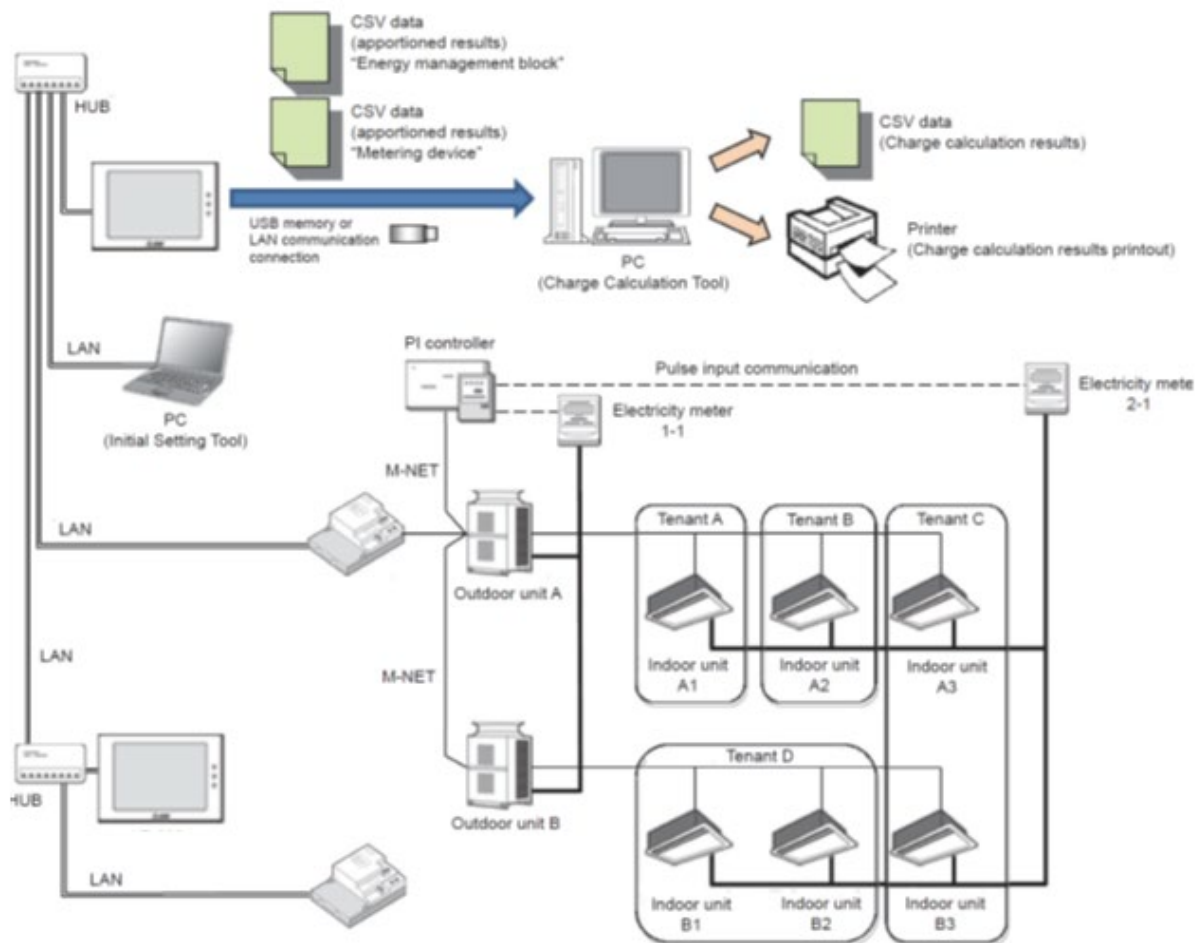
4.6 GRAPHICAL USER INTERFACE

- A. The Graphical User Interface (Integrated Centralized Control Web) shall require a field supplied PC or Tablet.
- B. ICCW
 1. The Integrated Centralized Control Web System (ICCW) interface shall enable the user to control multiple networked central controllers and shall provide additional functions such as energy apportionment from a single network PC configured with the Charge Calculation Tool. The ICCW shall be capable of controlling up to forty networked Centralized Controllers with a maximum of 2,000 indoor units across multiple CITY MULTI outdoor units. The ICCW shall be required if the user wants to simultaneously control more than 1 Centralized Controllers from a single PC or tablet using a single web browser session. Licensing per function, per Centralized Controller shall be required for the ICCW. Optional software features shall be available through the ICCW including energy apportionment and personalized web. These optional software features shall require the ICCW, advance purchase from the customer, and licensing from ICCW.

ICCW (Integrated System Software)	
Item	Details
ON/OFF	The units can turn ON and OFF for all floors or in a block, floor, or group of units.
Operation Modes	The operation mode can be switched between COOL, DRY, FAN, AUTO, and HEAT for all floors or in a block, floor, or group of units
Temperature Setting	Sets the temperature for a single group. Range of Temperature setting from 57°F – 87°F depending on operation mode and indoor unit model. Separate COOL and HEAT mode set points available depending on remote controller and connected mechanical equipment.
Fan Speed	The fan speed can be set to four stages for all floors or in a block, floor, or group of units
Air Direction	The air direction can be set in four vertical directions or to swing for all floors or in block, floor, or group of units. (The selectable air direction differs according to the model.)

ICCW (Integrated System Software)	
Item	Details
Interlocked Unit ON/OFF LOSSNAY	If there is an interlocked unit (LOSSNAY), then the unit can be turned ON (strong/weak) or OFF for all floors or in a block, floor, or group of units. (Note that the ventilation mode cannot be selected for interlocked units.)
Local Operation Prohibit	The items for which operation with the local remote controller are to be prohibited can be selected for all floors or in a block, floor, or group of units. (The items that can be prohibited are ON/OFF, operation mode, set temperature and filter sign reset.)
Annual / Weekly Schedule	The annual/weekly schedule function can be used by registering the license. Two settings, such as seasonal settings for summer and winter, can be saved.
Power Rate Apportionment Charging	A watt-hour meter (WHM) with kWH pulse output is connected to calculate the air conditioning charges based on the amount each tenant's air-conditioner has operated. Five charging rates can be applied per day. ***OPTIONAL ENERGY APPORTIONMENT SOFTWARE (LIC-CHARGE) and PI Controller (PAC-Y60MCA) REQUIRED
History	Up to 3,000 items for the error history and up to 10,000 items for operation history can be saved. Each history file can be output as a daily report or monthly report in CSV format. (The operation history consists only of the operations carried out with the ICCW and is limited to some limited operation items.)
Operation Time Monitor	The cumulative operation time of each indoor unit can be viewed or output as a CSV format file. (This function is valid only when the charging function license is registered.)
Filter Sign Display Mask	The filter sign display at the remote controllers can be disabled.
Set Temperature Limit	The set temperature lower limit can be set for cooling and the upper limit for heating. (ME remote controller required)

4.7 ENERGY APPOINTMENT METHOD FOR CITY MULTI CENTRALIZED CONTROLLERS



CMCN System Configuration

A. System Overview

1. For centralized systems serving multiple tenants for which one-to-one electricity metering is not possible, an apportioned electricity billing function that attributes just the electrical energy consumed by each individual tenant's air conditioner is required. The Energy Apportionment function takes the information on the electrical energy usage gathered from Watt Hour Meters (WHM) connected to dedicated breaker panels serving the system's outdoor units and synthesizes it with the information on the operating status of the indoor units that is collected by the CITY MULTI centralized controller(s).

B. Watt Hour Meters

1. Requirements:
 - a. The Watt Hour Meters (WHMs) to be used to read the electrical energy consumption of the outdoor units must be capable of a pulse output, which would be configured based on the current rating of the units. The associated current transformers/ transducers (CTs) must also be sized based on the current rating of either the individual outdoor units or the dedicated air conditioning electrical panels they are to be reading. The proper quantity of meters for a particular sized system must be selected in order to ensure sufficient resolution and hysteresis in the unit pulse output of the meters so as to ascribe an acceptable level of accuracy to the apportionment of energy usage for each tenant's system. The system is designed to work with any WHM capable of a pulse output that meets ANSI C12.20 class 0.2% or 0.5% accuracy standards.
2. Connection:
 - a. The WHMs are to be physically connected to the integrated pulse input module or an external Mitsubishi Electric PI Controller if such an input is not available or if there is a wiring length limitation or installation hardship. The cable type of the interconnecting wiring shall be according to the wiring specifications of the WHM manufacturer.

C. CITY MULTI Centralized Controller Requirements

1. Licensing:
 - a. Each centralized controller to which units are assigned that require the energy apportionment function must have the "LIC-Charge" software license purchased and properly unlocked in order to enable the operating status of the indoor units to be passed to the energy apportionment tool. The procedure for licensing the centralized controllers with this function and the necessary forms can be found on Mitsubishi Electric's technical documentation repository, mylinkdrive.com. Purchase Order information for the licenses will be required at the time of submission of the licensing request forms.
2. Dedicated master centralized controller for apportionment (no MNET connection)
 - a. A dedicated master centralized controller, for which the LIC-Charge license is purchased and the energy apportionment function enabled, must be provided in order to serve as the portal for exporting metering device

and energy management data to a USB drive or to a PC via LAN connection. This means that by virtue of selecting this master centralized controller to serve this function, the MNET capability of this particular centralized controller will be disabled. All indoor units must be physically wired via MNET to other expansion centralized controllers, which must be physically wired via LAN with Static IP addresses and a network hub or switch to the master apportionment controller.

D. PC for collecting charge calculation results

1. A networked PC, which does not necessarily have to be dedicated to the task of collecting energy apportionment data, can be provided and loaded with the Charge Calculation Tool software for exporting data necessary to generate billing documentation to be performed by a third party. The system requirements of the PC are as follows:

Item	Requirements
CPU	1 GHz or better (at least 2 GHz recommended)
Memory	2GB or more
Screen Resolution	1024 x 768 or better
OS	Windows 7, Windows 8.1 (32bit/64bit)
System requirements	The system should meet the minimum requirement for Windows 7 or Windows 8.1 • Net Framework 4.5 or later
Internal LAN port or LAN card	100 BASE-TX or better
Porting device	Mouse, etc.

2. Ventilation Options

END OF SECTION 238025



SECTION 26 00 01 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions as appropriate, apply to the Work specified in this Section.
- B. Refer to all Electrical Divisions of the Specifications as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 BIDDING REQUIREMENTS AND RESPONSIBILITIES

- A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.
- B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation, that require provision of services by another sub-contractor or trade.
- C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, etc. to coordinate requirements and responsibilities with and through prime bidder.
- D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with the general provisions of the Specifications requirements, prior to bidding.
- E. All timely, pertinent, questions provided in writing prior to bids, in accordance with the general provisions of the Specifications requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance with the general provisions of the Specifications requirements.
- F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.
- G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with contract document's General Provisions requirements.

- H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all contract document's General Provisions requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:
1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor whose proposal is also being accepted.
 2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question or seeking clarification.
 3. The work has been accepted as the responsibility of the prime contractor directly.

1.3 MATERIAL AND EQUIPMENT

- A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the work.
- B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgement of the Architect expressed in writing is equivalent to that specified.
- C. Coordinate and properly relate all work of this Division to building structure and work of all other trades.
- D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with contract document's General Provisions.
- E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information or determining rough-in requirements from other trades and/or Architect.
- F. Provide storage and protection for all equipment and materials in accordance with requirements of contract document's General Provisions. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to the Owner.
- G. Keep premises clean in accordance with requirements of contract document's General Provisions.

1.4 SUBSTITUTIONS

- A. Substitutions are allowed under La. R.S. 38:2291 and La R.S. 38:2292. Any requests for prior approval (as provided for under La. R.S. 38:2295) including any re-submitted data, shall be received by the Architect/Engineer a minimum of ten (10) working days prior to bid date. Submittals sent via facsimile and/or electronic mail will not be accepted. The Contractor shall recognize that it may be necessary to submit certain requests for prior approval sooner than the final date listed in the Instructions to Bidders, depending upon the complexity and completeness of the submittal. If, in the opinion of the

Architect/Engineer, there is neither sufficient time available nor adequate descriptive data attached to the submittal, the submittal will not be considered. Except as otherwise specified, materials and equipment shall be new and bear the approval label of the Underwriters Laboratories, Inc. for the type of installation required.

- B. Basis of design of systems is based on specific equipment for performance, size, shape, color, construction material, etc... If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by the contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, his equipment shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from basis of design requirements.
- C. All requests for prior approval shall identify where proposed material matches or exceeds the performance of the equipment specified. In addition, such submittal shall also clearly identify all deficiencies compared to specified product. Submittal of general cut sheets will be returned rejected.
- D. The following items shall be submitted for prior approval:
 - 1. Lighting Fixtures and Poles
 - 2. Electrical Gear (Panelboards, Switchboards, Safety Switches, Circuit Breakers,). This includes Short-Circuit Study, Coordination Study and Arc-Flash Study.
 - 3. Dimmer Switches
 - 4. Fire Detection and Alarm System
 - 5. Receptacles
 - 6. Toggle Switches
 - 7. Wiring Device Box Support Brackets
 - 8. Photocells
 - 9. Cover Plates
 - 10. Pull Boxes
 - 11. Wire
 - 12. Occupancy/Motion Sensors
 - 13. Dimming Systems/Lighting Control Systems
 - 14. Floor Boxes
 - 15. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
 - 16. Cable Tray
 - 17. Lightning Protection System
 - 18. Emergency Lighting Inverters
 - 19. Lighting Emergency Battery Packs/Inverters

1.5 DRAWINGS AND SPECIFICATIONS

- A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated and functional condition.
- B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items. Should any major interference develop, immediately notify the Architect.
- C. In laying out Work, refer to mechanical, electrical, structural, and architectural drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.6 CODES AND REGULATIONS

- A. Work shall be in full accord with the LA Sanitary Code, 2020 N.E.C. (NFPA 70), local ordinances, building codes, and other applicable national, state, and local regulations.
- B. Equipment shall conform to requirements and recommendations of the National Bureau of Fire Underwriters and National Fire Protection Association (NFPA).
- C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1, and the Americans with Disabilities Act (A.D.A.).
- D. Work called for in these Plans and Specifications shall be executed by competent workmen.
- E. In the possible event of conflict between codes or regulations and Contract Documents, notify the Architect/Engineer immediately.
- F. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.
- G. Because of the small scale of the drawings, it is not possible to indicate all of the offsets, fittings, and accessories required. The Contractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions at no additional costs to the Owner.

1.7 FEES, PERMITS, AND TAXES

- A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.
- B. Pay any and all taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

1.8 MANUFACTURER'S DIRECTIONS

- A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.9 SUBMITTAL DATA

- A. Submit shop drawings, project data, and samples in accordance with requirements of the General Provisions of the contract documents. Submittals shall be received no later than thirty (30) consecutive calendar days from effective date of "Notice to Proceed".
- B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

- C. Where manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document basis of design requirements, specifically call such deviations to attention of Architect/Engineer on submittals. Typed deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted. Submittals shall clearly indicate where material submitted meets and/or exceeds the performance criteria of the equipment used as the basis of design of the project. Failure to note compliance with the basis of design material/equipment shall result in rejection of submittals.
- D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.
- E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.
- F. Contractor shall submit Submittals/Shop Drawings on all equipment listed below. In addition, contractor shall refer to subsequent sections of the Electrical portion of the specifications for additional shop drawing submittal requirements.
 - 1. Lighting Fixtures and Poles
 - 2. Electrical Gear (Panelboards, Switchboards, Safety Switches, Circuit Breakers,). This includes Short-Circuit Study, Coordination Study and Arc-Flash Study.
 - 3. Dimmer Switches
 - 4. Fire Detection and Alarm System
 - 5. Receptacles
 - 6. Toggle Switches
 - 7. Wiring Device Box Support Brackets
 - 8. Photocells
 - 9. Cover Plates
 - 10. Pull Boxes
 - 11. Wire
 - 12. Occupancy/Motion Sensors
 - 13. Dimming Systems/Lighting Control Systems
 - 14. Floor Boxes
 - 15. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
 - 16. Cable Tray
 - 17. Lightning Protection System
 - 18. Emergency Lighting Inverters
 - 19. Lighting Emergency Battery Packs/Inverters
- G. Shop drawings may be submitted electronically as described below.
 - 1. Must be in a portable document format (PDF).
 - 2. Must be submitted to the prime designer and the prime designer will forward to ADG Engineering for distribution/processing.
 - 3. Do not submit directly to ADG Engineering's project manager.
- H. Shop Drawings/submittals shall be submitted as grouped together and stated below and shall be submitted simultaneously. Electrical gear shop drawings shall not be submitted until approval is obtained for all HVAC and plumbing equipment. Prior to submission of electrical gear shop drawings, contractor shall obtain a copy of the approved mechanical and plumbing submittals. Any modifications required to be made to the electrical gear due to changes in electrical requirements (increases and/or decreases) of the mechanical and plumbing equipment shall be clearly notated in the electrical gear submittals.

1. Light Fixtures, Occupancy/Motion Sensors, Poles, Photocells, Dimming Systems/Lighting Control systems, Emergency Lighting Inverters, Emergency Battery Packs
2. Electrical Gear, Overcurrent Protective Device Studies
3. Fire Detection and Alarm System
4. Dimmer Switches, Receptacles, Toggle Switches, Cover Plates, Device Box Support Brackets, Pull Boxes, Power Poles, Floor Boxes, and Wire
5. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
6. Lightning Protection System

1.10 PROJECT COORDINATION

- A. Refer to applicable Electrical Specification Sections for products work of this Division.
- B. Refer to all plumbing, mechanical and fire protections specifications sections for related products affecting work of these electrical sections.
- C. Coordinate handling of all products, materials, etc., through the Contractor. Coordinate space, access, clearances, etc., through the Contractor prior to preparation of shop drawing submittal.

1.11 SERVICE CONTINUITY

- A. At all times during the construction of the project, electric service shall be maintained to all portions of the site and existing facility, except with prior written approval from the Architect/Engineer of interruptions. It shall be the responsibility of the contractor to provide, install and maintain (fuel included) any required rental generators to accomplish said task. Any required interruptions of electric service due to work being performed under this Contract shall be scheduled in writing a minimum of forty-eight (48) hours in advance after consultation with the Architect/Engineer and the Owner and shall occur when permitted by the Architect/Engineer. The Contractor shall be responsible for any overtime pay required to meet these requirements, at no additional cost to the Owner.

1.12 VALUE ENGINEERING (V/E):

- A. While it may be in the Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.
- B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, the contractor shall provide duly licensed professional engineering consultants working on behalf of the contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The contractor's licensed professional engineering consultants and the contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.

- C. The contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the contractor's (V/E Items) professional of record (either employees, or independent consultants to the contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.
- D. Contractor shall refer to subsequent specification sections for additional requirements for submission and approval of VE items.

1.13 PROJECT RECORD DOCUMENTS

- A. Keep Project Record Documents in accordance with general provision requirements of the specifications.
- B. During construction period, keep accurate records of installations paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.
- C. The Contractor shall obtain a minimum of one (1) set of the contract documents including all addenda and change orders (including CAD/Revit files) as prepared by the Architect/Engineer.
- D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Architect/Engineer for any phase of the work, he shall record in a neat and readable manner all such variances on the contract documents in red ink. Prior to requesting substantial completion, the marked-up set of contract documents shall be returned to the Architect/Engineer for approval.
- E. All deviations from sizes, locations and from all other features of the installation shown in the Contract Documents shall be recorded.
- F. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions, and the like, as well as other features of work which will be concealed underground and/or in the finished building.
- G. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc. and by properly referenced centerline or invert elevations and rates of fall.
- H. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The decision of the Architect/Engineer in this matter will be final.
- I. The following requirements apply to all Record Drawings:
 - 1. They shall be maintained at the Contractor's expense.
 - 2. All such drawings shall be done carefully and neatly.
 - 3. Additional drawings shall be obtained at the Contractor's expense.

4. They shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Architect/ Engineer and when necessary, by other trades, to establish clearances for other parts of the work.
5. Record Drawings shall be returned to the Architect/Engineer upon completion of the work and are subject to approval of the Architect/ Engineer.
6. CAD/Revit files can be provided upon request (proper release forms must be completed). Contractor shall update CAD/Revit files to reflect As-Built conditions and shall submit revised file back to Architect/Engineer as part of the close-out documents.

1.14 OPERATION AND MAINTENANCE DATA

- A. Refer to the specification Sections related to PROJECT CLOSEOUT or OPERATION AND MAINTENANCE DATA for procedures and requirements for preparation and submittal of maintenance manuals.
- B. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.
- C. COPIES OF SHOP DRAWINGS WILL NOT BE ACCEPTABLE AS OPERATION AND MAINTENANCE INSTRUCTIONS.
- D. This information shall be bound in plastic hardbound notebooks with the job name, Architect and Engineer names permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Architect for approval.
- E. In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.
- F. As part of the O & M binders, contractor shall include copies of all studies and test reports performed as part of this project, including but not limited to, the following:
 1. Acceptance Testing Reports
 - a. Grounding Tests
 - b. Thermographic Tests
 - c. Torque Values
 - d. Rotation Tests
 2. Fire Alarm System 100% Test Report
 3. Short Circuit Study Report – Updated to Reflect Installed Conditions
 4. Coordination Study Report – Updated to Reflect Installed Conditions
 5. Arc Flash Study Report – Updated to Reflect Installed Conditions
 6. Lightning Protection System Certifications
 7. All specified photos of installations including open trenches, grounding terminations, pole foundation rough-ins, etc...
- G. The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, rpm, etc. The Contractor shall include this data on each piece of equipment furnished under this contract including but not limited to those items listed below.
 1. Lighting Fixtures and Poles

2. Electrical Gear (Panelboards, Switchboards, Safety Switches, Circuit Breakers,). This includes Short-Circuit Study, Coordination Study and Arc-Flash Study.
3. Dimmer Switches
4. Fire Detection and Alarm System
5. Receptacles
6. Toggle Switches
7. Wiring Device Box Support Brackets
8. Photocells
9. Cover Plates
10. Pull Boxes
11. Wire
12. Occupancy/Motion Sensors
13. Dimming Systems/Lighting Control Systems
14. Floor Boxes
15. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
16. Cable Tray
17. Lightning Protection System
18. Emergency Lighting Inverters
19. Lighting Emergency Battery Packs/Inverters

1.15 EXCAVATING AND BACKFILLING

- A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of specification section pertaining to Site Work, if applicable.
- B. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner's Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative and/or authority having jurisdiction inspection and as subsequently found to be deficient, the trenches shall be uncovered, inspected, and then re-filled, if requested by Owner's Representative. Prior to covering any and all underground facilities, including but not limited to conduit, ground rods, terminations, etc., Contractor shall take clear and concise digital photos and shall forward said photos to Engineer prior to covering said utilities.
- C. Provide minimum 24 inches of cover to finish grades or paving at raceways.
- D. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers. Repeat backfill and tamping 6 months after initial coverage has been accomplished to avoid swale development from sinking soils.
- E. Compact fill to satisfaction of Architect and/or Owner's Representative.
- F. Prior to any excavating, Contractor shall be responsible for having all utilities in the area of excavation located and marked by an approved company with a minimum of five (5) years' experience locating underground facilities. This includes all owner owned utilities on their site.
- G. Approximate locations shown on the drawings shall not be used. Any facility damaged by the Contractor's underground work shall be repaired and/or replaced at no additional cost to the Owner

1.16 CUTTING AND PATCHING

- A. Comply with requirements of the Specifications regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.

- B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.
- C. Repairing Roadways and Walks: Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.17 PAINTING

- A. Painting shall be provided under the Specification section regarding painting, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.
- B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additional cost to Owner.
- C. Coordinate all painting requirements with prime bidder prior to bids.
- D. All exposed conduit, materials, hangers, anchors, etc., are to be primed and painted. Color shall match adjacent surfaces where not specifically designated otherwise. All galvanized materials shall be suitably treated prior to painting to ensure adhesion.
- E. All exterior electrical gear (panels, meter cans, CT can, switchboards, safety switches, etc.) shall be painted to match adjacent wall surface(s). All interior panels (flush mount) shall have their covers painted to match adjacent wall surface(s).
- F. All exterior receptacles and junction boxes shall be painted to match adjacent wall surface(s).

1.18 EXISTING CONDITIONS

- A. The Electrical Contractor shall visit the building site to determine existing conditions and will be held responsible for allowing for these conditions in his bid.
- B. Note that this area of work will have storm drainage, mechanical and electrical utilities located underground and within and under the buildings. It is part of this work for the Contractor to determine the scope and location of all utilities to be installed with this project and arrange his work around others. There will be no extra consideration for work discovered as being hidden after the bid, and no change orders for extra cost that may be caused by unknown after bid conditions. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.

1.19 PROTECTION OF APPARATUS

- A. The Contractor shall take precautions necessary at all times to properly protect his apparatus from damage. Failure on the part of the Contractor to comply with the above to the Architect's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

1.20 MINOR DEVIATIONS

- A. The Contractor shall realize that the drawings cannot delve into every step, sequence, or operation necessary for the completion of the project without drawing on the Contractor's experience. Only typical details are shown on the plans. In cases where the Contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.

1.21 SALVAGED MATERIALS

- A. The Owner shall have priority for the selection of salvaged material and equipment. Any equipment, light fixtures, devices, ballasts, materials, etc. selected to remain property of the Owner shall be removed and delivered to a location on the site as designated by the Owner. Material and equipment not retained by the Owner shall become the property of this Contractor and shall be removed from the site by him.
- B. The Contractor shall obtain written approval of all material and equipment determined not to be salvaged by the Owner.

1.22 SAFETY PRECAUTIONS

- A. Work methods and project safety are the Contractor's sole responsibility.
- B. Contractor shall furnish and place proper guards for prevention of accidents. He should provide and maintain any other necessary construction required to secure safety of life or property, including maintenance of sufficient lights during all day and night hours as required to secure such protection.
- C. Temporary electrical services during construction should be maintained in perfect condition. Frayed, loose or opened connections should not be used for temporary services. The Contractor should use only equipment in first class working condition for construction services.

1.23 TEMPORARY CONSTRUCTION LIGHTING

- A. The Contractor should provide and install construction lighting as required by General Contractor and other trades. The installation shall conform to requirements of the National Electrical Code.

1.24 SUPERVISION

- A. Contractor shall personally, or through an authorized and competent representative, constantly supervise the work done from beginning to completion and final acceptance. To the best of his ability, he shall keep the same foreman and workmen throughout the project duration. Foreman shall be present at project site at all times while work under this section of the contract documents is being performed. Foreman shall be accessible by cellular phone at all times. Respective telephone numbers shall be forwarded to Architect/Engineer prior to commencement of work on this project.

1.25 CAD/REVIT FILES

- A. ADG will provide, upon request, CAD/Revit files to the contractors for use in preparing submittals and record drawings. Plans will be provided at a cost of \$10.00 per drawings sheet requested. By submitting request for CAD/Revit files, contractors automatically consent to the verbiage contained in the CAD/Revit release form contained in the plans. This includes any all limitations, restrictions, indemnifications, etc... contained therein.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Panelboards, safety switches, equipment cabinets, motor starters and other equipment shown on the drawings and furnished and/or installed under this section of the Specifications shall be labeled with laminated plastic nameplates inscribed to identify equipment with description shown on the drawings for panels, the name of the equipment controlled for motor starters, or the system or function involved for other equipment. Provide typewritten panelboard directories indicating the equipment served and its location using final approved room numbers, etc., as directed by the Architect. Refer to specification section – Electrical Distribution System and details(s) for additional requirements.

PART 3 - EXECUTION

3.1 COORDINATION OF TRADES

- A. Where work is in close proximity to the work of other contractors, the Contractor shall review plans of other contractors and coordinate his work with theirs. The Electrical Contractor shall verify the location of lighting fixtures, beams, structural members, conduit, ductwork, pipes or other obstructions before beginning his work in the area. Notify the Architect where proper clearances do not occur or where the work of others would interfere with the safe and/or proper operation of this work.

3.2 HARMONIC DISTORTION

- A. IEEE 519-1992 - Harmonic Control in Electrical Power Systems shall be a requirement of this project. Harmonic filters (passive or active), phase multiplication devices, or any other components required to mitigate harmonic voltage THD to 5% and current THD to 8% maximum levels shall be an integral part of the VFD system. Compliance measurement shall be based on THD added (during VFD full load operation compared to across-the-line operation) at the VFD circuit breaker terminals or actual THD measurement at the VFD circuit breaker terminals during full load VFD operation. Designs which employ shunt tuned filters must be designed to prevent the importation of outside harmonics which could cause system resonance or filter failure. Calculations supporting the design, including a system harmonic flow analysis, must be provided as part of the submittal process for shunt tuned filters. Any filter designs which cause voltage rise at the VFD terminals must include documentation in compliance with the total system voltage variation of plus or minus 10%. Documentation of Power Quality compliance shall be part of the commissioning required by the VFD supplier. Actual job site measurement testing shall be conducted at full load and documented in the operation and maintenance manuals. Harmonic measuring equipment utilized for certification shall carry a current NiTS calibration certificate. The final test report shall be reviewed, and compliance certification stamped by a licensed professional engineer (PE).

3.3 SUPPORTS AND FOUNDATIONS

- A. Support all items covered by this Specification directly from building structural members independent of any ceilings or any other installed item. Panelboards and switches may be attached to suitably reinforced walls. Ground or slab mounted equipment shall be mounted on a separate four-inch-high concrete slab. Extending 6" beyond equipment footprint on all sides.

- B. Do not attach items of this Specification to HVAC ductwork, ceiling grids and ceiling support members, piping or other equipment unless specifically shown otherwise. Where applicable, all equipment including conduit shall be supported from overhead wall, floor or roof structures using galvanized channel or angle members for a rigid support. Position supports and equipment such that access through lay-in ceilings or panels is not impaired and all Code required clearances are maintained.
- C. Where applicable, under no circumstances is the Contractor to attach to or support from any bar joist bridging. Any supports to the bar joists or any structural systems shall be approved by the Architect. All supplemental angle or channel iron required to support equipment of this Specification shall be furnished by the Electrical Contractor.

3.4 EQUIPMENT LAYOUT

- A. The physical location and arrangements of electrical equipment is shown on the Plans and is to be used by the Contractor as a guideline in construction. It is the responsibility of the Contractor to review the Plans with the proposed equipment and equipment of other contractors that are affected, and to ensure that all Code required clearances, wiring distances and maintenance accesses, including equipment heights, of all items are maintained. Alternate arrangements to accomplish the above due to field conditions or changes in physical size of the equipment proposed for the project are to be submitted to the Architect for review before any work is begun or equipment ordered.
- B. All electrical gear arrangements shall be presented in a 1/4-inch scaled drawing showing all equipment, including those of other contractors. This includes all electrical rooms, mechanical rooms, mechanical yards, electrical yards, service platforms, boiler rooms, etc... Include shop drawing cut sheets and applicable information. Indicate on the drawing by dimension all required Code clearances, wiring distances and maintenance access requirements. Where equipment heights are required to be coordinated with architectural or other items, indicate revised heights. Refer to "MOUNTING HEIGHTS."

3.5 GUARANTEE

- A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall include the replacement of lamps. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.
- B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect/Engineer for approval.

3.6 CLEANING

- A. Refer to the Specification Section relating to PROJECT CLOSEOUT or FINAL CLEANING for general requirements for final cleaning.
- B. Clean all light fixtures, and lenses prior to final acceptance and replace inoperable drivers or LED modules.

END OF SECTION 26 00 01



SECTION 26 05 00 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions; as appropriate, apply to the work specified in this section.
- B. Refer to all portions of the Contract Documents as well as the plans and specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

PART 2 - PRODUCTS

2.1 WIRE (600 VOLT AND BELOW)

- A. All conductors used in the work shall be soft drawn annealed copper having a composition of not less than 98% of pure copper. Conductors shall be standard code gauge in size, insulated, and shall have insulation rated for use at 600 volts. The contractor's bid shall reflect the use of all copper conductors unless specifically indicated otherwise. When aluminum conductors are used as part of the V.E. process, their use shall be limited to circuits, feeders and services rated 150 Amperes and larger and shall be of the high alloy, compact stranded type, Southwire SIM pull THHN, SIM pull THWN or equivalent. It shall be the contractor's responsibility for properly upsizing the conductors and associated conduit to achieve the equivalent ampere rating of the circuit/feeder/service as specified for copper conductors. As part of this VE item, Contractor shall provide an updated riser diagram (one-line diagram) indicating proposed conductor changes.
- B. Unless otherwise noted or specified, insulation shall be Type THWN. Wires shall be of the single conductor type and shall be stranded. Wire insulation shall not contain any asbestos materials.
- C. Wire #8 AWG and smaller may be type MC-cable where allowed by applicable codes and ordinances.
- D. Throughout the system, conductors shall be identified as to phase and voltage of system by color-coding. Color-coding shall be continuous the full length of wire for all wire sizes. Identification by permanent paint bands or tags at outlets will not be acceptable. Surface printing at regular intervals on all conductors shall indicate manufacturer, size, voltage, and insulation type. White and/or gray colored insulation shall be used for grounded conductors and only for grounded conductors.
- E. The color code assigned to each phase wire shall be consistently followed throughout the project. The following systems of color-coding shall be strictly adhered to:
 - 1. 208/120 Volt, 3-Phase, 4-wire Wye Systems
 - a. Grounding leads = green
 - b. Grounded neutral leads = white
 - c. Ungrounded phase wires = black, red and blue
- F. Where multiple neutral conductors are installed in a common raceway, the neutral conductor for each circuit shall be separately identified in accordance with the National Electric Code (NEC).

2.2 CONDUIT

- A. Unless otherwise specified or shown on the drawings, all conduit shall be rigid galvanized steel (RGS), electrical metallic tubing (EMT), or rigid nonmetallic conduit (PVC) as allowed in the paragraphs below.
- B. RGS may be used for conduit shown run underground (red concrete encasement required), may be used in concrete slabs, and shall be used for conduit run exposed to the weather (locations defined as damp locations and wet locations in Article 100 of the NEC) and shall be run in hazardous areas.
- C. EMT shall be used for conduit not encased in concrete, not exposed to the weather, not run underground, and not run in hazardous areas.
- D. PVC may be used for conduit run in concrete slabs or may be run underground (underground only where permitted by NEC and local ordinances). Concrete encasement will not be required on underground runs unless specifically noted or specified elsewhere. PVC shall not be run exposed nor concealed in walls nor above ceilings nor in hazardous areas. When rigid nonmetallic conduit (PVC) is installed underground, it shall be Schedule 80 at all underground road crossings, at all underground driveway crossings, and when required by the NEC or local ordinance or specified otherwise. PVC Schedule 40 may be used at all other underground locations. The only use of exposed above ground PVC conduit shall be for telephone service entrance use up utility poles (Schedule 80 required), for CATV service entrance use up utility pole (Schedule 80 required) or for power utility service entrance use up utility pole (Schedule 80 required).
- E. Where PVC is utilized for underground installations, RGS 90° elbows and conduit shall be utilized to turn conduit vertical and to rise up to above grade/slab. Red concrete encasement shall be required for all elbows and vertical conduits. Refer to detail on plans.
- F. All conduit shall be new and shall bear the inspection label of the Underwriters Laboratories, Inc. (U.L.).
- G. Where multiple conduits are installed underground in the same trench, carlon snap-n-stac spacers, or approved equivalent, shall be utilized and spaced a maximum of 5'-0" apart. Provide pre-cast, 4" thick, concrete bases at each spacer and where conduits are turned to be installed in a vertical orientation. Provide spacers immediately before and after all elbows and where conduit transitions from underground to above ground.
- H. Fittings for rigid steel conduit and EMT shall be hot-dipped galvanized and shall be of an approved type specially designed and manufactured for their purpose.
- I. All flexible conduit, where installed indoors and outdoors, shall be of the flexible liquid tight metallic type. Flexible weatherproof electrical conduit is prohibited from use on this project.
- J. Metallic conduit shall be metallized, sheradized, or hot-dipped galvanized.
- K. Where conduit is installed exposed in finished spaces and on the exterior of the building (excluding mechanical, equipment and electrical rooms), conduit shall be painted to match adjacent surfaces (color as selected by the Architect/Engineer). All other conduit installations shall be complete with factory applied paint finish as manufactured by Allied Tube and Conduit (True Color EMT) or Wheatland Tube Company (Color Check Conduit). All fittings, couplings, boxes, covers, etc. shall match color of conduit. Color of conduit shall comply with color code noted below.

Power and Lighting - Non-Emergency

Standard Conduit Finish

Power and Lighting - Emergency	Yellow with Black Lettering - Lettering to Denote branch of emergency power system (Critical, Life Safety or Equipment)
Fire Alarm	Red
Tele/Data/CATV	Green

2.3 METAL-CLAD CABLE (600 VOLTS AND BELOW)

- A. Where permitted by NEC and local codes and ordinances, metal-clad (MC) cables may be used in lieu of conduit and wiring specified elsewhere herein.
- B. Installation of MC cables shall be in compliance with the National Electric Code (NEC).
- C. Conductors shall be softdrawn annealed copper having a composition of not less than 98% of pure copper.
- D. Conductors shall be solid -type, standard Code gauge in size, insulated, and shall be rated for use at 600 volts or below. Minimum size shall be No. 12.
- E. Conductor insulation shall be of a type listed in the NEC and be rated for 75 deg. C (167 deg. F) as a minimum and shall be of a type approved for use in MC cable.

2.4 EXPANSION FITTINGS

- A. Each conduit that is buried in or rigidly secured to the building construction on opposite sides of a building expansion joint and each long run of exposed conduit that may be subject to excessive stresses shall be provided with an expansion fitting. Expansion fittings shall be made of hot-dipped galvanized malleable iron and shall have a factory-installed packing, which will prevent the entrance of water, a pressure ring, and a grounding ring.
- B. In addition to the grounding ring, a separate grounding conductor shall be provided. This grounding conductor shall be an external flexible copper ground securely bonded by approved grounding straps on each end of the fitting. Grounding conductor may be omitted when expansion fitting includes an approved integral grounding conductor or device.
- C. Where conduits are buried in concrete, they shall cross the building expansion joints at right angles. Ends of conduit shall be provided with insulated bushings.

2.5 OUTLET BOXES

- A. Outlet boxes in concealed conduit systems shall be flush mounted. Boxes shall be galvanized steel of sufficient size to accommodate devices shown and shall have raised covers. Requirements of the NEC shall be minimum.
- B. Boxes for lighting fixtures shall be four-inch (4") octagon, not less than 1-1/2" deep. Where boxes are installed in concrete, boxes designed for this application shall be used.
- C. Outlet boxes for switches and receptacles in concealed work shall be 4" square, and not less than 1-1/2" deep. Flush mounted outlet boxes shall be installed with plaster rings.
- D. Outlet boxes for switches and receptacles installed in exposed conduit system shall be cast iron or cast aluminum Type FD or approved equivalent.

- E. Where multiple outlet boxes are shown to be installed at the same location, they shall be installed using B-Line Series BB8 mounting bracket or approved equivalent. Where single boxes are shown to be installed, the B-Line Series BB2 mounting bracket or approved equivalent shall be used.
- F. Outlet boxes for adjacent rooms shall not be installed in the same stud space to minimize sound transmission.
- G. Outlet boxes used for lighting toggle switches shall have outlet box stabilizer(s) installed.
- H. Outlet boxes installed in rated walls shall receive appropriately rated putty pads as manufactured by 3M or STI.

2.6 PULL BOXES

- A. Furnish and install pull boxes. Boxes shall be code gauge galvanized steel with screw attached access panels unless noted otherwise in top, side or bottom as required.

2.7 OUTLET COVER PLATES

- A. Unless otherwise noted, all outlets including telephone outlets, television outlets, computer outlets, etc. shall be fitted with cover plates of the type indicated below.
- B. Cover plates shall be uniform in design and finish for switches, receptacles, and other outlets requiring cover plates. Plates shall be one (1) piece of the required number of gangs. Sectional plates shall not be used.
- C. Cover plates shall be smooth nylon with gray, white, black, brown or ivory finish. Color shall be selected by the Architect/Engineer to suit the wall finish.
- D. Provide blank coverplates for all un-used/empty device boxes including, but not limited to tele/data, CATV, access controls, etc....boxes.

2.8 WIRING DEVICES

- A. Wiring devices shall be as listed in the following table, except that color of device shall match color of outlet cover plate. The “*” in the model numbers indicate color selection to be made.
 1. Leviton / Hubbell (or equivalent by Pass and Seymour)
Single Pole-20A (5621-2* / DS120*)
Rocker or Paddle Switch
 2. Three Way-20A (5623-2* / DS320*)
Rocker or Paddle Switch
 3. Four Way-20A (5624-2* / DS420*)
Rocker or Paddle Switch
 4. 20A 125V 2P 3W Duplex (16342-* / DR20*)
Decora Style
Grounded Receptacle
 5. 20A 125V 2P 3W Duplex (G5362-00* / GFRST20SNAP*)
GFCI Receptacles (Indoor)

6. 20A 125V 2P 3W Duplex (G5362-WT*/ GFTWRST20*)
GFCI Receptacles (Outdoor)

2.9 WEATHERPROOF RECEPTACLES

- A. Weatherproof receptacles shall be duplex receptacles of the ground fault current interrupting type as specified under WIRING DEVICES, mounted in a cast iron or cast aluminum Type FD (or approved equivalent) conduit fitting with Leviton No. 5997-DGY, (or approved equivalent) clear, extra deep GFCI Style weather resistant cover. Weatherproof receptacles shall be flush mounted in exterior walls whenever possible.

2.10 PHOTOELECTRIC CONTROLS

- A. Unless otherwise noted on the drawings, photoelectric controls shall be electronic-stem/swivel with sensor on side: Intermatic EK4236S or equivalent by Voltage and power requirements of circuits controlled per drawings.

2.11 DIMMER SWITCHES

- A. Dimmer switches shall be Legrand Radiant series, Acuity Brands nLight nPODMA series, Acuity Brands sPODMA series or approved equivalent. Ratings shall be of appropriate wattage for the circuits to be controlled. Provide and install all required 0-10V. control interface units for all LED lighting circuits. Dimmer loading shall not exceed 80% of the dimmer rating. Dimmers shall be UL listed.

2.12 FLOOR OUTLETS/FLOOR BOXES

- A. Floor outlets shall consist of the assembly of wiring devices, floor boxes and fittings. Floor boxes shall be 16 gauge galvanized sheet metal complete with fusion-banded epoxy paint. Boxes shall be fully adjustable before concrete pour.
- B. Contractor shall adjust box such that coverplate is flush against floor surface. When multiple floor outlets are shown directly adjacent to each other, multiple gang type boxes with separating partitions between each gang shall be utilized. Provide separate conduit for each function.
- C. Floor boxes shall be round with threads for conduits or hubs as required and be of suitable height for concrete slab use. Box shall be capable of accepting duplex receptacles and/or other wiring devices or usage as indicated.
- D. Each floor box shall be Legrand Resource RFBA Series Round Activation floor boxes, (or equivalent) with round covers. Quantity of gangs/size of box shall be individually determined by each location's requirements. Provide equivalent fire-rated poke-thrus as required by floor assemblies.
- E. Where box is to be installed in an existing concrete slab above the ground level, caution must be taken to ensure that the structural integrity of the slab is not impaired by the box installation. Coordinate with the Architect. Use a core drill, poke through device, fire rated to at least the rating of the floor system, as per National Electrical Code (NEC). Depth of unit shall be as required. Hole by the Electrical Contractor. Color by Architect during shop drawing submittal. Color choices shall include satin brass, nickel, grey powder coated, brass, bronze, brushed aluminum, black power-coated, brass-plated, bronze-plated and/or satin nickel-plated.

PART 3 - EXECUTION

3.1 MOUNTING HEIGHTS

- A. Unless otherwise noted on the drawings or required by the Architect/Engineer, the mounting heights set forth below shall apply. Dimensions given are from finished floor to the top of the device unless noted otherwise noted.

1.	Toggle Switches	4'-0" to top of device
2.	Receptacles	1'-6" to bottom of receptacle
3.	Panelboards	6'-7" to top of can
4.	Tele/Data Outlets	1'-6" to bottom of outlet
5.	Fire Alarm Audio/Visual	6" from ceiling on wall and in between 80" and 96"*
6.	Fire Alarm Hand Stations	4'-0" to top of device
7.	Fire Alarm Visual Only	6" from ceiling on wall *

* Mounting height shall be 6" from ceiling or maximum 80" above finished floor, whichever is lowest.

- B. Where overcurrent or safety switch devices are shown to serve exterior equipment, the Contractor shall review in detail with the Architect/Engineer proposed exterior mounting locations, mounting heights, conduit routing, etc., and receive approval prior to rough-in.
- C. Where overcurrent or safety switch devices are shown to serve condensing units, the top of the overcurrent device shall be 3'- 0" AFG or level with the top of the condensing unit(s) whichever is lower. Refer to detail on plans for additional requirements.

3.2 WIRE (600 VOLT AND BELOW)

- A. Service entrance, feeders, and motor circuit conductors shall be run their entire length without joints or splices. Splices and joints in branch circuit wiring shall be only at outlets or in accessible junction boxes.
- B. Joints and splices in branch circuit wiring shall be made with compression type solderless connectors. Connectors of the nonmetallic screw on type are not acceptable.
- C. Terminations or splices for conductors # 6 AWG and larger shall utilize Burndy Unitap, Polaris Black or equivalent connectors.
- D. Unless otherwise specified, all wiring shall be installed in conduit.
- E. No wire shall be smaller than No. 12 for power or lighting service, fixture whips or for switch legs. Wire for each branch circuit shall be of a single size and type from the branch circuit protective device to the last outlet on the circuit unless noted otherwise.
- F. Not more than three (3) branch circuits shall be installed in a raceway for three-phase electrical systems. For single phase electrical systems, the number of circuits in any one raceway shall be limited to two (2).
- G. Branch circuit home run numbers shown on the drawings shall be used for connection of circuit wiring to similarly numbered protective devices in branch circuit panelboards.
- H. Where the length of a home run, from panel to the first outlet exceeds 75 feet (75') for 120-volt circuits, the conductor size shall be No. 10 AWG or that shown on the drawings, whichever is larger.

- I. For all 3-phase circuits, contractor shall provide and install a full-size neutral conductor and a grounding conductor for a complete 5-wire circuit. If the neutral conductor is not required by the equipment, contractor shall install wire nuts on each end of the neutral conductor for future use.

3.3 CONDUIT

- A. When conduits are shown to be installed in the floor slab, under the floor slab, or underground, whenever possible and approved by the Architect/Engineer, conduits one-inch (1") trade size and smaller shall be installed in the concrete floor slab. Conduits embedded in concrete slabs shall have lateral spacing not less than three diameters except where the slab has been specially designed to accommodate closer spacing.
- B. Conduits larger than one-inch (1") trade size shall not be installed in the floor slab and shall be installed a minimum of twelve inches (12") below the floor slab.
- C. Conduits shown underground but not in or under a floor slab shall be installed not less than twenty-four inches (24") below grade. Conduit locations shall be identified by means of 4" wide; detectable, red warning/ marker tape installed in trench in accordance with NEC requirements.
- D. Prior to backfilling of trenches and /or providing concrete encasement, contractor shall take photographs of conduit installation including spacers/supports and concrete support blocks. In addition, prior to backfilling trenches and after concrete encasement, take additional photographs of installation. Submit photographs to engineer upon request.
- E. Rigid conduit joints shall be made with threaded fittings made up tight with at least five threads fully engaged. Compression type threadless fittings and setscrew type fittings shall not be used for RGS unless specifically approved in writing by the Architect/Engineer.
- F. Couplings and connectors for EMT shall be compression type or cast-iron set screw type.
- G. Where conduits enter boxes or cabinets that do not have threaded hubs the conduit shall be secured in place with galvanized locknuts inside and outside and shall have bushings inside for interior locations. All exterior terminations shall be made with Meyers hubs or approved equivalent. Conduits larger than one inch (1") shall have galvanized insulating bushings.
- H. All conduits shall be installed as indicated or scheduled on the drawings and shall be of sufficient size to accommodate the required number of insulated conductors including equipment-grounding conductor. A grounding conductor shall be pulled in every raceway and properly terminated. The Contractor shall increase the conduit size from that shown on the drawings where necessary to accommodate the equipment-grounding conductor and/or where to comply with the NEC.
- I. Unless otherwise noted, conduit shall be run concealed. Conduit runs from wall mounted receptacles, toggle switches, etc. shall be run concealed in walls whenever possible.
- J. Conduit runs shall be straight; elbows and bends shall be uniform, symmetrical, and free from dents or flattening. All conduit shall be installed with runs parallel or perpendicular to walls, ceilings and structural members.
- K. Conduit shall not be run nearer than three inches (3") to hot water or steam pipes except where crossings are unavoidable. Conduit shall be kept at least one inch (1") from covering of pipe crossed and the conductor size shall be increased one (1) size

- L. Conduit shall be held securely in place by approved hangers and fasteners of appropriate design and dimensions for the particular application. Support shall be such that no strain will be transmitted to the outlet box and/or pull box supports. Conduit shall be secured only to the building structure.
- M. All conduit runs shall be installed in accordance with all applicable sections of the National Electrical Code and local codes or ordinances.
- N. Where empty conduits are shown, a #14 pull wire shall be installed and conduits shall be capped.
- O. Terminations to all mechanical equipment and to all dry-type transformers shall be made using a minimum of 12" to a maximum of 24" liquid-tight flexible metallic conduit.
- P. At each concealed junction box in the power and lighting system, identify the panel and circuit number(s) contained in the junction box by writing in permanent marker on the outside of the junction box cover.
- Q. Where conduits are run from condition spaces to/thru un-conditioned spaces, the ends of the conduits shall be sealed (after conductor installation) to prevent the transmission of air from non-conditioned spaces into the conditioned spaces. Expanding spray foam and EYS seals are approved methods of sealing conduits.
- R. For all surface mounted devices, including fire alarm, intercom and nurse call systems, device boxes shall be Wiremold No. R5752 and R5753 or approved equivalent style boxes sized such that device does not overhang edge(s) of back box. Color of box shall match device.

3.4 METAL-CLAD CABLE (600 VOLTS AND BELOW)

- A. The metallic sheath shall be galvanized steel or aluminum corrugated sheath type and shall be terminated at outlet boxes, cabinets, etc. with fittings specifically approved for such use, which shall properly ground the metallic sheath.
- B. Each metal-clad cable assembly shall have one (1) green insulated ground conductor sized as required by NEC for the application as a minimum size.
- C. Where run in walls, cable shall be fastened using B-Line Series BX4 or approved equivalent cable fasteners. Cable shall be fastened to wall stud not more than 8" from entry into device box.
- D. MC Cable shall be supported horizontally and vertically every 5' minimum or closer where required by NEC and applicable federal, state and local ordinances.

3.5 WIRING DEVICES

- A. All wiring devices installed shall be identified as to which panel serves it and which overcurrent protection device protects the wiring device. This shall be accomplished via panel name and circuit number being written using a permanent marker on the back side of the coverplate.

3.6 MANUFACTURER'S DIRECTION

- A. Contractor shall be responsible for coordinating all aspects of equipment electrical service installation for all electrical gear, devices, mechanical, plumbing, fire protection, architectural, and owner furnished equipment. Contractor shall obtain and review actual

manufacturer's installation instructions and shall install electrical facilities to said equipment in accordance with the instructions, NEC, NFPA and contract documents. Should a discrepancy exist between the manufacturer's installation directions and the contract documents, the engineer shall be notified in writing immediately.

3.7 COORDINATION WITH OTHER TRADES

- A. Prior to purchasing and installing any wire and/or conduit for all circuitry to mechanical equipment, owner furnished equipment, and other equipment requiring electrical power furnished by other trades as part of this project, contractor shall review equipment cut sheets and shall verify exact equipment electrical requirements. Any discrepancies between contract documents and equipment submittals shall be immediately brought to the architect/engineer's attention for clarification.

END OF SECTION 26 05 00



SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.
- B. Refer to all Electrical portions of the specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. Contractor shall provide grounding of service equipment, transformers, non-current carrying conductive surfaces of equipment, cable tray, metallic raceways, fencing, metal buildings, structures and other equipment as specified herein and as shown on the drawings.

1.3 SCOPE

- A. The equipment shall be grounded as shown on the plans and as specified herein. All metal structures and equipment, including fences, shall be connected to the systems ground grid. Ground conductors must be as short and straight as possible, protected from mechanical injury and, if practicable, without splice or joint.
- B. Provide and install 1" C with insulated 3/0 C.U. service grounding conductor from grounding electrode(s) to telephone service backboard and to each and every tele/data/CATV closet.
- C. Provide and install ERICO No. TMGBA24L33PT Tamper Resistant Copper Bus Bar Kit or approved equivalent, at each telephone service backboard, data backboard, CATV backboard in the MDF Room and IDF Rooms. Terminate 3/0 C.U. conductor to each bus bar. Refer to details.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Main grounding conductors shall be bare, soft drawn, stranded, single conductor copper wire, and generally sized as follows:
 - 1. Ground grid cable: #3/0 AWG
 - 2. Equipment and structures to grid conductor: #3/0 AWG
 - 3. Fence grid conductor: #3/0 AWG
 - 4. Fence-to-fence post conductor: #2 AWG (Stranded)
 - 5. Fence post to grid conductor: #2 AWG (Stranded)

2.2 CONNECTORS

- A. All connectors shall be of the exothermically welded type.

2.3 GROUND RODS

- A. Ground electrodes shall be copper-clad steel rods nominal 3/4 inch in diameter and ten feet (10') long.

2.4 EXOTHERMIC WELD PROCESS

- A. All wire-to-wire exothermic welds shall be the parallel type. Wire-to-wire rod connections shall be "T" type. To establish a basis of design for quality and type, the following is a partial list of approved Cadweld type connections. Approved equivalent connectors by other manufacturers may be utilized.

Connections	Cadweld Type
Parallel cable-to-cable	PG
Cable to ground rod	GR, FT, NT or NX
Cable to steel	VN
Cable to lug	LA
Cable to rebar	Consult factory (similar to RR)

PART 3 - EXECUTION

3.1 EXPOSED NON-CURRENT-CARRYING METAL PARTS

- A. Ground connections to equipment or devices shall be made as close to the current-carrying parts as possible; that is, to the main frame rather than supporting structures, bases or shields. Grounding connections shall be made only to surfaces that are clean and dry. Steel surfaces shall be ground or filed to remove all scale, rust, grease and dirt. Copper and galvanized steel shall be cleaned to remove oxide before making welds or connections. Code size ground conductors shall be run in all conduits containing circuits protected by overcurrent devices; then properly terminated.
- B. All raceways, cable racks, cable trays, conduits, armored or shielded cable or cables with ground and all exposed non-current carrying metal parts shall be grounded. Such items shall be bonded together and permanently grounded to the equipment ground bus. Conduits shall be connected by the grounding bushings or clamps to ground bus. Flexible "jumpers" shall be provided around all raceway expansion joints. Bonding straps for steel conduit shall be copper. Jumper connections shall be provided to effectively ground all sections of rigid conduit connected into plastic pipe. No metallic conduit shall be left ungrounded. In conduit systems interrupted by junction or switch boxes where locknuts and bushings are used to secure the conduit in the box, the sections of conduit and box must be bonded together using grounding bushings.
- C. Any conduits entering low voltage (600 volts or below) equipment through sheet metal enclosure and effectively grounded to enclosure by hub need not be otherwise bonded. Both ends of ground buses in switchboards, etc., shall be separately connected to the main ground bus to form two (2) separate paths to ground.
- D. All metal buildings shall be grounded by separate grounding conductor and ground rods. Fencing (existing and new) shall be grounded as specified herein and as shown on the drawings. Where exposed to physical damage, the ground wires shall be suitably protected with PVC conduit enclosures. Cables below grade shall be laid with a reasonable amount of slack to reduce the possibility of breakage.

3.2 EXOTHERMIC WELD PROCESS

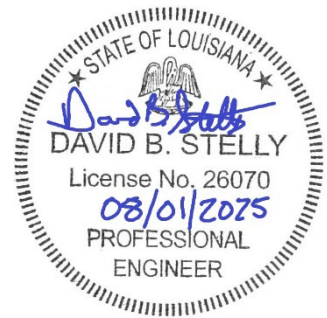
- A. The grounding grid shall be installed and connected as specified herein and as shown on the drawings using an exothermic weld process (Cadweld or other approved manufacturer). Where bolted connections are required, brass/bronze 2-hole pads exothermically welded to the grounding conductor shall be used.
- B. All exothermic weld grounding connections shall be made using exothermic welded Cadweld (or other approved manufacturer) connections, tools and materials.
- C. Unless noted otherwise, all copper-to-copper or copper-to-steel splices and terminating specified shall be made with exothermic welds.
- D. Steel surfaces shall be ground or filed to remove the galvanizing coating and the surface cleaned and dried thoroughly prior to making the welds. All welds shall be repainted with an approved galvanized paint after the welds are made.
- E. Copper surfaces shall be sanded to remove oxides and the surface cleaned and dried thoroughly prior to making the welds. All welds shall be painted with an approved anti-oxide manufactured by T&B or Burndy (or other approved manufacturer) to prevent corrosion.
- F. Brass/bronze split bolts shall be used to connect the fence grounding conductors where shown on the drawings.
- G. Where bolted connections are specified, brass/bronze 2-hole pads shall be utilized except for equipment manufactured neutral and ground busses. The equipment to be grounded shall be cleaned of all paint, dirt, and rust prior to making the bolted connection. All bolts, nuts, washers, and lock washers shall be stainless steel. All such connections shall be coated with an approved anti-oxide compound. Only one (1) 2-hole pad shall be terminated on one (1) set of bolts, nuts and washers.
- H. Where approved in writing by the Engineer, brass/bronze pipe ground clamps or 2 set screw 2-hole pads may be used for special conditions.
- I. Where grounding conductors or PVC conduits penetrate walls, floors, etc., these openings and conduits shall be sealed with Dow Corning No. 2001 Silicone RTV (or other prior approved manufacturer) after installation is complete.
- J. Provide gradual bends for all grounding grid cables wherever possible. Sharp bends will not be permitted. The minimum being radius should be 8 inches.
- K. The Contractor shall notify the Architect/Engineer when the buried grounding grid is completed for inspection by the Engineer prior to backfilling. Notification should be no less than 24 hours prior to scheduling the backfill of trenches.
- L. The Contractor shall test the grounding grid resistance and continuity. The testing shall be performed after all underground and above ground connections have been made. Refer to "Acceptance Testing" specification section for additional requirements.

3.3 ELECTRICAL SERVICE ENTRANCE

- A. Grounding conductor shall be installed from one (1) ground rod to the next and then looped back to the service equipment. Both ends of the grounding conductor loop shall be properly terminated on the service equipment's neutral bus. Provide all required lugs to accomplish this. Properly bond to ground bus per NEC requirements.

- B. Ground rods shall be spaced a minimum of 6'0" from each other.
- C. Extend grounding conductor to all metallic water piping, building steel, concrete reinforcing steel, all other building steel for adjacent buildings services from main electrical service and properly terminate. Refer to details for additional requirements.
- D. Grounding conductor shall be installed using 1" schedule 80 PVC conduit.
- E. Prior to pouring of slab(s) and prior to covering grounding grid, contractor shall take digital photographs of all ground rods, terminations, conductors and overall photo and shall submit to engineer prior to requesting substantial completion.
- F. Provide and install hand-hole (inspection well) with bolt-down removable cover at all ground rods to allow visual inspection of the terminations of the grounding conductors to the grounding electrode(s). Refer to details for additional requirements.

END OF SECTION 26 05 26



SECTION 26 05 71 - ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract apply to the Work specified in this Section.
- B. Refer to all Electrical Sections of the Specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 SUMMARY

- A. This section outlines the acceptance testing requirements and division of responsibility.

1.3 SCOPE

- A. Contractor shall engage the services of a recognized independent NETA Certified testing firm or professional electrical engineering firm for the purpose of performing inspections and tests as herein specified.
- B. The testing firm shall provide all materials, equipment, labor and technical supervision to perform such test and inspections.
- C. It is the intent of these tests to assure that all electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.
- D. The tests and inspections shall determine suitability for energization.

1.4 REFERENCES

- A. All inspections and tests shall be in accordance with the latest editions following applicable codes and standards except as provided otherwise herein.
 - 1. National Electrical Code – NEC
 - 2. National Electrical Manufacturer's Association - NEMA.
 - 3. American Society for Testing and Materials - ASTM
 - 4. Institute of Electrical and Electronic Engineers – IEEE
 - 5. National Electrical Testing Association – NETA
 - 6. American National Standards Institute – ANSI
 - 7. State Codes and Ordinances
 - 8. Insulation Cable Engineers Association – ICEA
 - 9. National Electrical Safety Code – NESC
- B. All inspections and tests shall utilize the following references:
 - 1. Project Design Specifications
 - 2. Project Design Drawings
 - 3. Manufacturer's Instruction Manuals applicable to each particular apparatus.

1.5 QUALIFICATIONS OF TESTING AGENCY

- A. The testing/engineering firm shall be a corporately independent testing organization that can function as an unbiased testing authority, professionally independent of the

manufacturers, suppliers and installers of equipment or systems evaluated by the testing firm.

- B. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations and systems.
- C. The testing firm shall have been engaged in such practices for a similar size project.
- D. The testing firm shall utilize only full-time technicians who are regularly employed by the firm. Electrically unskilled employees are not permitted to perform testing or assistance of any kind. Electricians and/or linemen may assist but may not perform testing and/or inspection services.
- E. The testing firm shall submit the "on site" foreman's qualifications and experience through the Contractor at the pre-construction conference for review and approval by the Engineer.
- F. Contractor shall submit statement of qualifications of proposed testing firm at the pre-construction conference for approval and acceptance by the Engineer.

1.6 DIVISION OF RESPONSIBILITY

- A. Testing firm shall perform the following tests as outlined in these specifications:
 - 1. Ground Resistance Tests
 - 2. Thermographic Survey
- B. Contractor shall perform the following tests as outlined in these specifications:
 - 1. Low Voltage Cable
 - 2. Phasing and Rotation Tests

1.7 TEST REPORT

- A. The test report shall include the following:
 - 1. Summary of project.
 - 2. Description of project.
 - 3. Description of test
 - 4. Test results.
 - 5. Conclusions and recommendations.
 - 6. Appendix, including appropriate test forms.
 - 7. Identification of test equipment used.
 - 8. Signature of responsible test organization authority.
- B. Furnish three printed (3) copies of the complete report to the Engineer prior to requesting substantial completion and no later than thirty (30) days after completion of testing procedures unless directed otherwise. After acceptance of the report, Contractor shall submit an electronic copy of the report in PDF format.
- C. All tests shall be performed with apparatus de-energized except where otherwise specifically required.
- D. The testing firm shall have a designated safety representative on the project to supervise operations with respect to safety.

- E. The testing firm shall have a calibration program that assures that all applicable test instrumentation is maintained within rated accuracy. The accuracy shall be directly traceable to the National Bureau of Standards. Instruments shall be calibrated in accordance with the following frequency schedule:
- F. Field Instruments: Analog - 6 months maximum
 Digital - 12 months maximum
- G. Laboratory Instruments: 12 months
- H. Leased specialty equipment: 12 months
- I. Dated calibration labels shall be visible on all test equipment.
- J. Records must be kept up to date which show date and results of instruments calibrated or tested.
- K. An up-to-date instrument calibration instruction and procedure will be maintained for each test instrument.
- L. Calibrating standard shall be of higher accuracy than that of the instrument tested.

1.8 GENERAL

- A. An outline of tests required is included in this section. Refer to applicable NETA, ANSI, NEMA, IEEE and other test standards for exact procedures, methods and requirements.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 TESTS

- A. Upon completion of the work, the entire electrical system shall be tested and shall be shown to be in perfect working condition, in accordance with the intent of the specifications.

3.2 EQUIPMENT TESTS

- A. The Contractor shall provide the service of equipment manufacturer's field staff for inspection and testing of equipment installed under this contract. The Contractor shall coordinate and schedule test with Owner, Engineer, User Agency and Equipment Manufacturer. Adequate field tests shall be conducted to ensure Engineer, Owner and User Agency that equipment will operate in accordance with these specifications. Specific equipment requiring manufacturer field-testing shall be as follows:
 - 1. Switchboard
- B. Testing Agency shall perform thermographic study of all terminations in the new electrical system prior to acceptance. Thermographic study shall be performed after load is placed on the system
- C. All 600 volt and below cables shall be tested as specified after being installed but prior to being terminated.
- D. Ground resistance tests shall be performed at the pad mounted transformer, at the Service Entrance and at each step-down/step-up transformer as specified.

- E. All terminations (lugs, split-bolts, etc.) shall have their "tightness" torque values measured and verified against NEC and manufacturer's requirements.

3.3 GROUND RESISTANCE TESTS

- A. Inspect ground system for compliance with plans and specifications.
- B. Perform 3-point fall-of-potential test per IEEE Standard No. 81, Section 9.04 on the main grounding electrode or system.
- C. The main ground electrode system resistance to ground shall be no greater than one (1) ohm at the pad mounted transformer at the Service Entrance and at all step-down/step-up transformers.

3.4 LOW VOLTAGE CABLE, 600 V MAXIMUM

- A. Compare cable data with drawings and specifications. Inspect exposed sections of cables for physical damage and correct connection in accordance with one-line diagram.
- B. Verify tightness of accessible bolted connection by calibrated torque wrench in accordance with manufacturer's published data. Perform thermographic survey.
- C. Inspect compression-applied connectors for correct cable match and indentation.
- D. Verify cable color-coding with applicable Engineer's specifications.
- E. For all service entrances, switchboards, MCC and all panelboard feeders, perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 1000 volts dc for one minute.
- F. Perform continuity test to insure correct cable connection.
- G. Bolt-torque levels shall be in accordance with manufacturer's requirements. Measure and record results.
- H. Minimum insulation-resistance values shall be not less than 50 mega-ohms.
- I. Investigate and report on all deviations between adjacent phases.

3.5 PHASING AND ROTATION:

- A. Perform phasing test on each circuit tie section energized by separate sources.
- B. Perform tests from permanent source.
- C. Damage caused due to omission of this test shall be corrected at Contractor's expense.

3.6 THERMOGRAPHIC SURVEY:

- A. Thermographic survey shall be performed with equipment utilizing long wave technology that provides photo record of deficient areas.
- B. Equipment to be inspected shall include all current-carrying devices installed under this contract, generally, all new high and low voltage cable terminations and splices. Specific equipment to be surveyed includes the following.

1. Medium Voltage Transformers
 2. Medium Voltage Terminations
 3. Medium Voltage Sectionalizers
 4. Medium Voltage Load Interrupters
 5. Switchboards
 6. Panelboards
 7. Paralleling Gear
 8. TVSS Units
 9. UPS Units (rotary and/or battery based)
 10. Loadcenters
 11. Transfer Switches
 12. Safety Switches (fused and non-fused)
 13. Motor Controllers
 - a. Starters
 - b. Variable Frequency Drives
 14. Chillers
 15. Pumps
 16. Generators and it's terminations
- C. Inspect physical, electrical and mechanical condition. Remove all necessary covers prior to thermographic inspection.
- D. Provide report including the following:
1. Discrepancies.
 2. Temperature difference between the area of concern and the reference area.
 3. Cause of temperature difference.
 4. Areas inspected. Identify inaccessible and/or unobservable areas and/or equipment.
 5. Identify load conditions at time of inspection.
 6. Provide photographic thermograms of all equipment (non-deficient and deficient areas). Provide corresponding digital photograph (non-thermal image) of electrical equipment scanned.
 7. Inspect distribution systems with imaging equipment capable of detecting a minimum temperature difference of 1 degree C at 30 degrees C.
 8. Equipment shall detect emitted radiation and convert detected radiation to visual signal.
 9. Thermographic surveys should be performed during periods of maximum possible loading but not less than 40 percent of rated load of the electrical equipment being inspected. Refer to NFPA 70B-1994, Section 18-16 (Infrared Inspection).
 10. Temperature differences for 1 degree C to 3 degrees C indicate possible deficiency and warrant investigation.
 11. Temperature differences of 4 degrees C to 15 degrees C indicated deficiency; repair as time permits.
 12. Temperature differences of 16 degrees C and above indicate major deficiency; repair immediately.

END OF SECTION 26 05 71

SECTION 26 05 72 - OVERCURRENT PROTECTIVE DEVICE
SHORT-CIRCUIT STUDY



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Short-circuit study input data, including completed computer program input data sheets.
 - 2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
 - b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.
- C. At the conclusion of the project, contractor shall have the specified studies updated to reflect "As-Installed" conditions and submit the revised studies as part of the O&M manuals. This includes the electronic software data files, PDF of the study and PDF's of the appropriate labels.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Short-Circuit Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Short-Circuit Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. SKM Systems Analysis, Inc.
 - 2. ETAP
- B. Comply with IEEE 399 and IEEE 551.
- C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

- A. Executive summary.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.

- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
- D. Comments and recommendations for system improvements, where needed.
- E. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to short-circuit ratings.
 - 2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
 - 3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 - 4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
 - 5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
- F. Short-Circuit Study Input Data: As described in "Power System Data" Article in the Evaluations.
- G. Short-Circuit Study Output:
 - 1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Equivalent impedance.
 - 2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Calculated asymmetrical fault currents:
 - i. Based on fault-point X/R ratio.
 - ii. Based on calculated symmetrical value multiplied by 1.6.
 - iii. Based on calculated symmetrical value multiplied by 2.7.
 - 3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Obtain all data necessary for the conduct of the study.
 - 1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Engineer.
 - 2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 - 3. For relocated equipment and that which is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E
- B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 - 1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Obtain electrical power utility impedance at the service.
 - 3. Power sources and ties.
 - 4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 - 5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
 - 6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
 - 7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 - 8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
 - 9. Motor horsepower and NEMA MG 1 code letter designation.
 - 10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.2 SHORT-CIRCUIT STUDY

- A. Perform study following the general study procedures contained in IEEE 399.
- B. Calculate short-circuit currents according to IEEE 551.
- C. Base study on the device characteristics supplied by device manufacturer.
- D. The extent of the electrical power system to be studied is indicated on Drawings.
- E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.

2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:
1. Electric utility's supply termination point.
 2. Incoming switchgear.
 3. Unit substation primary and secondary terminals.
 4. Low-voltage switchgear.
 5. Motor-control centers.
 6. Control panels.
 7. Standby generators and automatic transfer switches.
 8. Branch circuit panelboards.
 9. Disconnect switches.

3.3 ADJUSTING

- A. Make minor modifications to equipment as required to accomplish compliance with short-circuit study.

3.4 DEMONSTRATION

- A. Train Owner's operating and maintenance personnel in the use of study results.

END OF SECTION 26 05 72

SECTION 26 05 73 - OVERCURRENT PROTECTIVE DEVICE
COORDINATION STUDY



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Coordination-study input data, including completed computer program input data sheets.
 - 2. Study and equipment evaluation reports.
 - 3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
- C. At the conclusion of the project, contractor shall have the specified studies updated to reflect "As-Installed" conditions and submit the revised studies as part of the O&M manuals. This includes the electronic software data files, PDF of the study and PDFs of the appropriate labels.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Coordination Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. The following parts from the Protective Device Coordination Study Report:
 - i. One-line diagram.
 - ii. Protective device coordination study.
 - iii. Time-current coordination curves.
 - b. Power system data.

1.7 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Coordination Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Software Developers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. SKM Systems Analysis, Inc.
 - b. ETAP

- B. Comply with IEEE 242 and IEEE 399.
- C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.
 - 1. Optional Features:
 - a. Arcing faults.
 - b. Simultaneous faults.
 - c. Explicit negative sequence.
 - d. Mutual coupling in zero sequence.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

- A. Executive summary.
- B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
- D. Study Input Data: As described in "Power System Data" Article.
- E. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."
- F. Protective Device Coordination Study:
 - 1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.
 - a. Phase and Ground Relays:
 - i. Device tag.
 - ii. Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
 - iii. Recommendations on improved relaying systems, if applicable.
 - b. Circuit Breakers:
 - i. Adjustable pickups and time delays (long time, short time, ground).
 - ii. Adjustable time-current characteristic.
 - iii. Adjustable instantaneous pickup.
 - iv. Recommendations on improved trip systems, if applicable.
 - c. Fuses: Show current rating, voltage, and class.

- G. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
 2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
 3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
 4. Plot the following listed characteristic curves, as applicable:
 - a. Power utility's overcurrent protective device.
 - b. Medium-voltage equipment overcurrent relays.
 - c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
 - d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
 - e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
 - f. Cables and conductors damage curves.
 - g. Ground-fault protective devices.
 - h. Motor-starting characteristics and motor damage points.
 - i. Generator short-circuit decrement curve and generator damage point.
 - j. The largest feeder circuit breaker in each motor-control center and panelboard.
 5. Series rating on equipment allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels. Maintain selectivity for tripping currents caused by overloads.
 6. Provide adequate time margins between device characteristics such that selective operation is achieved.
 7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.
1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 PROTECTIVE DEVICE COORDINATION STUDY

- A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.
- B. Comply with IEEE 399 for general study procedures.
- C. The study shall be based on the device characteristics supplied by device manufacturer.

- D. The extent of the electrical power system to be studied is indicated on Drawings.
- E. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. Transformer Primary Overcurrent Protective Devices:
 - 1. Device shall not operate in response to the following:
 - a. Inrush current when first energized.
 - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
 - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
 - 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- H. Motor Protection:
 - 1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.
 - 2. Select protection for motors served at voltages more than 600 V according to IEEE 620.
- I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- J. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.
- K. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:
 - 1. Electric utility's supply termination point.
 - 2. Switchgear.
 - 3. Unit substation primary and secondary terminals.
 - 4. Low-voltage switchgear.
 - 5. Motor-control centers.

6. Standby generators and automatic transfer switches.
7. Branch circuit panelboards.

M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3.3 LOAD-FLOW AND VOLTAGE-DROP STUDY

- A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:
1. Determine load-flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
 2. Determine load-flow and voltage drop based on 80 percent of the design capacity of the load buses.
 3. Prepare the load-flow and voltage-drop analysis and report to show power system components that are overloaded or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.4 MOTOR-STARTING STUDY

- A. Perform a motor-starting study to analyze the transient effect of the system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of the motor starting on the power system stability.
- B. Prepare the motor-starting study report, noting light flicker for limits proposed by IEEE 141 and voltage sags so as not to affect the operation of other utilization equipment on the system supplying the motor.

3.5 POWER SYSTEM DATA

- A. Obtain all data necessary for the conduct of the overcurrent protective device study.
1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Engineer.
 2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 3. For existing equipment, whether or not relocated obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.
- B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams,

- overcurrent protective device submittals, input and output data, and recommended device settings.
2. Electrical power utility impedance at the service.
 3. Power sources and ties.
 4. Short-circuit current at each system bus, three phase and line-to-ground.
 5. Full-load current of all loads.
 6. Voltage level at each bus.
 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
 9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
 10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
 12. Maximum demands from service meters.
 13. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
 14. Motor horsepower and NEMA MG 1 code letter designation.
 15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
 16. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.
 17. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
 - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
 - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
 - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
 - d. Generator thermal-damage curve.
 - e. Ratings, types, and settings of utility company's overcurrent protective devices.
 - f. Special overcurrent protective device settings or types stipulated by utility company.
 - g. Time-current-characteristic curves of devices indicated to be coordinated.
 - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
 - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
 - j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.
 - k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.6 FIELD ADJUSTING

- A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.
- B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.
- C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.7 DEMONSTRATION

- A. Engage the Coordination Study Specialist to train Owner's maintenance personnel in the following:
 - 1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.
 - 2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.
 - 3. Adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 26 05 73

SECTION 26 05 74 - OVERCURRENT PROTECTIVE DEVICE
ARC-FLASH STUDY



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Arc-flash study input data, including completed computer program input data sheets.
 - 2. Arc-flash study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
- C. At the conclusion of the project, contractor shall have the specified studies updated to reflect "As-Installed" conditions and submit the revised studies as part of the O&M manuals. This includes the electronic software data files, PDF of the study and PDFs of the appropriate labels.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Arc-Flash Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance procedures according to requirements in NFPA 70E shall be provided in the equipment manuals.
- B. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Arc-Flash Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Arc-Flash Study Specialist Qualifications: Professional engineer in charge of performing the study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Software Developers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. SKM Systems Analysis, Inc.
 - b. ETAP
- B. Comply with IEEE 1584 and NFPA 70E.

- C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

- A. Executive summary.
- B. Study descriptions, purpose, basis and scope.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center and panelboard designations.
- D. Study Input Data: As described in "Power System Data" Article.
- E. Short-Circuit Study Output: As specified in "Short Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."
- F. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."
- G. Arc-Flash Study Output:
 - 1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis
- H. Incident Energy and Flash Protection Boundary Calculations:
 - 1. Arcing fault magnitude with and without required Arc Energy Reduction methods.
 - 2. Protective device clearing time.
 - 3. Duration of arc.
 - 4. Arc-flash boundary.
 - 5. Working distance.
 - 6. Incident energy.
 - 7. Hazard risk category.
 - 8. Recommendations for arc-flash energy reduction.
- I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of the computer printout.

2.3 ARC-FLASH WARNING LABELS

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems." Produce a 3.5-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis.
- B. The label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:
 - 1. Location designation.
 - 2. Nominal voltage.
 - 3. Flash protection boundary.
 - 4. Hazard risk category.
 - 5. Incident energy.
 - 6. Working distance.
 - 7. Engineering report number, revision number, and issue date.
- C. Labels shall be machine printed, with no field-applied markings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

- A. Comply with NFPA 70E and its Annex D for hazard analysis study.
- B. Preparatory Studies:
 - 1. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."
- C. Calculate maximum and minimum contributions of fault-current size.
 - 1. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume no motor load.
 - 2. The maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.
- D. Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.
- E. Include medium- and low-voltage equipment locations, except equipment rated 240-V ac or less fed from transformers less than 125 kVA.
- F. Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.

- G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:
1. Fault contribution from induction motors should not be considered beyond three to five cycles.
 2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).
- H. Arc-flash computation shall include both line and load side of a circuit breaker as follows:
1. When the circuit breaker is in a separate enclosure.
 2. When the line terminals of the circuit breaker are separate from the work location.
- I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

- A. Obtain all data necessary for the conduct of the arc-flash hazard analysis.
1. Verify completeness of data supplied on the one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to the attention of Engineer.
 2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers.
- B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 2. Obtain electrical power utility impedance at the service.
 3. Power sources and ties.
 4. Short-circuit current at each system bus, three phase and line-to-ground.
 5. Full-load current of all loads.
 6. Voltage level at each bus.
 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in per cent, and phase shift.
 8. For reactors, provide manufacturer and model designation, voltage rating and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
13. Motor horsepower and NEMA MG 1 code letter designation.
14. Low-voltage cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
15. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.

3.4 LABELING

- A. Apply one arc-flash label for 600-V ac, 480-V ac, and applicable 208-V ac panelboards and disconnects and for each of the following locations:
 1. Motor-control center.
 2. Low-voltage switchboard.
 3. Switchgear.
 4. Medium-voltage switch.
 5. Control panel.

3.5 APPLICATION OF WARNING LABELS

- A. Install the arc-fault warning labels under the direct supervision and control of the Arc-Flash Study Specialist.

3.6 DEMONSTRATION

- A. Engage the Arc-Flash Study Specialist to train Owner's maintenance personnel in the potential arc-flash hazards associated with working on energized equipment and the significance of the arc-flash warning labels.

END OF SECTION 26 05 74



SECTION 26 09 23 - OCCUPANCY SENSORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.
- B. Refer to all other Electrical specification sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. Contractor shall provide and install motion sensors in accordance with the plans and specifications herein. System shall be installed to provide detection system coverage of the entire space the sensors are located in. It is understood that due to some manufacturer's devices providing different coverage patterns, the plans represent a generic system. Contractors shall evaluate each space individually and shall at no additional costs to the owner, provide additional detection sensors where required to provide a complete coverage pattern and shall also adjust installation locations to retain the coverage while reducing false triggers of the sensors.

PART 2 - PRODUCTS

2.1 WALL MOUNTED SENSORS

- A. For single-pole/single switch applications wall mounted motion sensors shall be IR-TecLDS700S, Watt Stopper No.: DSW-100, Lutron MS-A102, Greengate ONW-D-1001-MV, Leviton ODS10, Acuity Controls (Sensor Switch) WSX-PDT.
- B. For two-pole/dual switch applications, wall mounted motion sensors shall be IR-TecLDT700S or Watt Stopper No.: DSW-200, Greengate ONW-D-1001-DMV, Leviton ODSOD, Acuity Controls (Sensor Switch) WSX-PDT-2P.
- C. Color of sensor shall be selected by Architect/Engineer during shop drawing submittal.

2.2 CEILING MOUNTED SENSORS

- A. Ceiling mounted motion sensors shall be IR-Tec-BDS-600S, Watt Stopper No. DT-305, Lutron LOS-CDT-2000-WH, Greengate OAC-DT-2000, Sensor Switch CM-PDT-9 (or 10 depending upon coverage required for space) or approved equivalent.
- B. All relays, contactors, and power packs required to provide a fully operational system shall be provided and installed at no additional cost to the owner.
- C. Install device using properly sized device box recessed in ceiling. Utilize MC-cable to run all conductors. Install power pack in properly rated junction box.
- D. Color of sensor shall be selected by Architect/Engineer during shop drawing submittal.

2.3 POWER/SWITCH PACKS

- A. Power packs shall employ zero crossing circuit to limit inrush current. Contacts shall be dry-type (Isolated) twenty-ampere (20A). Leads shall be Class 2 Teflon insulated for use in plenums. Power pack shall be rated for both 120 volt and 277-volt operation.
- B. Install device using properly sized device box recessed in ceiling. Utilize flexible conduit to run all control voltage conductors. Install power pack in properly rated junction box.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Should a particular manufacturer's product require that additional sensors and associated wiring and accessories be provided to allow full and complete coverage of the space, the additional sensors and associated wiring and accessories shall be provided at no additional cost to the owner.
- B. Installation of motion sensor shall be such that motion is detected as soon as a person enters the particular room and with the sensor being a minimum of four feet (4') from any HVAC diffuser/register.
- C. All sensors shall be installed on the line side of all toggle switches so that power is maintained to the sensor at all times.
- D. Prior to requesting substantial completion, contractor shall coordinate with the owner to determine the length of time the sensors shall keep the lighting illuminated after the room is vacated and shall program sensors accordingly. Time shall be adjustable from a minimum of 5 minutes to a maximum of 30 minutes. Contractor shall provide a minimum of one additional setting adjustment per sensor installed for the duration of the one-year warranty period.

3.2 SUBMITTALS

- A. Prior to installation, contractor shall submit a proposed layout in shop drawings indicating all sensor and power pack locations. The sensor Contractor shall be responsible for such layout.
- B. At time of substantial completion, contractor shall submit how each and every sensor is programmed including but not limited to trigger on technology, maintain on technology, time delay to off.

3.3 MISCELLANEOUS ITEMS

- A. Contractor shall be responsible for providing all relays, contactors, power packs, etc. to provide a complete motion detecting lighting switching circuit.

END OF SECTION 26 09 23

SECTION 26 27 13 - ELECTRICAL DISTRIBUTION SYSTEM

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions); as appropriate, apply to the work specified in this section.
- B. Refer to all Electrical specification sections, as well as the plans and specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 ELECTRIC SERVICE

- A. Contractor shall be responsible for obtaining a new 120/208 volt 3 phase 4 wire underground electric service from the local power company, Entergy, as specified herein and as shown on the Drawings. The Contractor shall be responsible for all utility company fees and for the timely coordination of all utility company work.

1.3 GENERAL

- A. All electrical gear furnished as part of this project, panelboards, switchboards, motor control centers, dry-type transformers, safety switches, etc. shall be of the same manufacturer unless specified otherwise. Electrical equipment manufactured by a subsidiary or parent company of manufacturer that is prior approved is not itself prior approved unless its own manufacturer's name specifically is listed as being prior approved.

1.4 ARC-FLASH; COORDINATION AND FAULT CURRENT STUDIES

- A. As part of the electrical gear shop drawings, the contractor shall perform and submit complete arc-flash, coordination and fault current studies, including phase-to-phase and ground faults for coordinating all elements of the distribution system. These three studies shall be performed and furnished by the successful electrical gear manufacturer. Contractor shall refer to these specification sections for specific study requirements: These studies shall be submitted simultaneously with the gear submittal, or the gear submittal will be returned un-reviewed.
 - 1. Overcurrent Protective Device Short-Circuit Study (Cannot be VE'd from project)
 - 2. Overcurrent Protective Device Coordination Study
 - 3. Overcurrent Protective Device Arc-Flash Study (Cannot be VE'd from project)
- B. Provide all arc-flash safety and short circuit current stickers on all panels, switchboards, safety switches, motor control center, etc. as required/specified. Refer to details for additional requirements. Proposed stickers for each individual piece of gear shall be submitted for review as part of shop drawings.
- C. Provide and install a fully coordinated electrical distribution system as directed by the Overcurrent Protective Device Coordination Study at no additional costs to the Owner.
- D. In addition, this study shall indicate all required settings for adjustable circuit breakers and motor circuit protectors. These settings include instantaneous, short time, long time, ground fault trip characteristics and all-time based pick-up, drop-out and re-close parameters.

- E. The contractor shall provide all breakers, trip plugs, solid state breakers, etc. to provide a fully coordinated electrical system as identified in the coordination study. This shall be accomplished as part of the Base Bid and all alternates at no additional costs to the owner and/or design team.
- F. Refer to individual specification sections of each specified study for additional requirements.
- G. Electrical gear submittals will not be reviewed until all device studies specified are performed, submitted and approved.
- H. At the conclusion of the project, contractor shall have the specified studies updated to reflect "As-Installed" conditions and submit the revised studies as part of the O&M manuals. This includes the electronic software data files, PDF of the study and PDFs of the appropriate labels.

1.5 SERIES RATING OF EQUIPMENT

- A. The electrical gear provided and installed as part of this project shall not be series rated.

PART 2 - PRODUCTS

2.1 LOW VOLTAGE SWITCHBOARDS

- A. Switchboards shall consist of completely enclosed metal structures of the required number of formed and welded vertical panel sections incorporating circuit breakers and other associated equipment as indicated on the drawings and/or described herein.
- B. All sections of the switchboards shall be nominally ninety inches (90") high and shall be of the depth shown on the drawings. Switchboards shall be furnished in conformance with the dimensions and in the configurations shown on the drawings.
- C. All sections shall align front and back. Internal components shall be removable from the front. Front covers shall be fabricated from sheet steel not less than 12-gauge and shall be sectionalized to permit removal during installation and maintenance. Top and side enclosing plates shall be removable. All of enclosure shall be fabricated of not less than 12-gauge steel and shall be furnished with openings for proper ventilation where required.
- D. All exterior and interior steel surfaces of the switchboard shall be properly cleaned and finished with gray enamel over rust inhibiting phosphatized primer.
- E. Bussing shall be copper. Temperature rise shall not exceed 65° C. Bussing (vertical and horizontal) shall be uniform throughout, not tapered. Bussing shall be braced for short circuit stress level as determined by fault current study.
- F. Sections shall contain group mounted protective devices with trip ratings as shown on the drawings. Circuit Breakers shall be solid-state or molded case type, automatic, with thermal and adjustable magnetic trip elements. Branch breakers shall be mounted in panelboard type construction with bolted connections to the bus and shall be front accessible. Side or rear access shall not be required for proper installation and maintenance. Breakers shall have interchangeable trip units and shall be rated for short circuit stress level as determined by fault current study.
- G. Switchboards shall be completely factory designed, tested, prewired, and assembled all in accordance with the latest applicable NEMA, IEEE, and ANSI standards. Shop drawings

shall show front and side views, floor plan and section views, elementary diagram and wiring diagram.

- H. Before energizing, the Contractor shall check all accessible connections for tightness including factory connections and shall tighten those found to be loose.
- I. Switchboard shall be complete with electronic amperage, voltage and power monitor. Monitor shall display amperage per phase, voltage, phase neutral, voltage phase-phase, and maximum kW and kWh. Maximum kW and kWh shall be re-settable. Provide RJ-45 jack, all required software for monitoring/logging of metered parameters via remote PC (PC not provided as part of this project).
- J. Switchboards shall be NEMA Class 1 for indoor locations and NEMA Class 3R plus Gasketing for exterior location as manufactured by General Electric, Square D, Eaton-Cutler Hammer, Siemens or approved equivalent.

2.2 PANELBOARDS

- A. Panelboards shall be circuit breaker type using quick-make, quick-break, trip free, thermal magnetic trip indicating, bolt-on circuit breakers. Two and three pole branches and mains shall be common trip. Panelboards shall be dead front safety type with main breaker or main lugs, and number and size of branches as shown on the drawings. Panelboards shall have single, feed through, or double lugs, to accommodate feeder conductors as shown on the drawings, and shall have neutral and ground bus for termination of conductors. Bussing shall be copper.
- B. Doors shall be fitted with flush cylinder locks, keys to which shall all on project be alike. Two (2) keys shall be furnished for each lock. Cabinet fronts shall be finished as directed by the Architect/Engineer. Cabinet fronts shall not be removable with door in the locked position. Provide for each panel a directory frame with waterproof transparent plastic window on inside of door and place therein a typewritten identification of all circuits.
- C. Directories shall be made only after permanent room numbers have been assigned. Room numbers shown on the construction drawings shall not be used for making directories. Each circuit shall be clearly identified as to use and location (ex: Receptacles Rooms 201, 202 or Lighting Rooms 207, 209, 211, and 213).
- D. Cabinets shall be galvanized steel not less than twenty inches (20") in width. Gutters shall not be smaller than minimum dimensions required by the National Electrical Code.
- E. Double section panelboards shall be comprised of cabinets of equal dimensions.
- F. All panels rated NEMA 1, shall be of the door-in-door type construction providing tool-less access to interior of the panelboard(s).
- G. Panelboards shall be as shown in the schedules and shall be completely factory assembled. Do not purchase panelboards or cabinets until shop drawings have been approved. Approved manufacturers include:
 - 1. General Electric
 - 2. Square D
 - 3. Eaton-Cutler Hammer
 - 4. Siemens
 - 5. Approved Equivalent

- H. Minimum short circuit current interrupting ratings for circuit breakers shall be 22,000 amps. Where a specific interrupting rating is shown on the drawings, in the panel schedules, or as required by the coordination and fault current study, panelboards and associated circuit breakers shall be rated for that value as a minimum at no additional cost to the owner.
- I. In branch circuit panelboards having two (2) vertical columns of devices, circuit numbers shall be such that, starting at the top, odd numbers shall be used in sequence down the left-hand side. See Schedule of Panelboards on drawings for circuit device sizes and number of poles.
- J. Construction of panelboards shall be such that, where applicable, any three (3) adjacent single-pole devices are individually connected to each of the three different phases in such a manner that 2 or 3 pole devices, when available, can be installed at any location.
- K. UL Listing: Panelboards shall be listed by UL and bear the UL label.
- L. Interior panelboards shall be NEMA 1 unless noted otherwise. All exterior panelboards shall be rated NEMA 3R.

2.3 LABELS

- A. All switchboards, panelboards, starters, VFD's, contactors, transformers, safety switches and fused safety switches installed by this contractor shall have laminated phenolic tags with 1/4" characters embossed thereon identifying the equipment by name, voltage, ampacity, phase and number of current carrying conductors such as:

Panel Name
 120/208 V - 400A
 3 Phase - 4 Wire
 Fed From Panel: _____, Circuit _____
 Fused @ _____**

The tags shall be fixed to the center of the equipment cover/door with a suitable heavy duty industrial grade adhesive.

**Note – For fused safety switches, label shall include fuse sizes contained therein.

- B. Color Coding of labels shall be as follows:

Normal Power

White Background with Black Letters

2.4 LIGHTING CONTACTORS

- A. The Contractor shall furnish and install lighting contactors where shown on the drawings except those contactors shown mounted in branch circuit panelboards shall be factory mounted by panelboard manufacturer. Contactors shall be suitable for use at voltage rating of circuits controlled and shall have the number of poles and ampere rating shown on the drawings as a minimum.
- B. The contactor amp rating shall be continuous per pole for all types of ballast and tungsten lighting, resistance and motor loads. The contactor shall have totally enclosed, double-break silver-cadmium-oxide power contacts. Auxiliary arcing contacts are not acceptable. Contact inspection and replacement shall be possible without disturbing line or load wiring. The contactor shall have straight-through wiring with all terminals clearly marked. The contactor shall be approved per UL508 and/or CSA and be designed in accordance with

NEMA ICS2-211B. They shall be industrial-duty rated for applications to 600 volts maximum. The contactor shall have the following:

1. Control-circuit fuse holder, with one (1) fuse.
 2. 0.2-60 second TDE (Time Delay Energize) and TDD (Time Delay De-energize) timer attachments.
- C. The contactor shall have a NEMA Type 1 enclosure and shall be the mechanically held type.
- D. Coil-clearing contacts shall be supplied so that the contactor coils shall be energized only during the instance of operation. Both latch and unlatch coils shall be encapsulated.

2.5 SAFETY SWITCHES

- A. Furnish and install safety switches at locations and in capacities shown on the drawings, as hereinafter specified and/or as required by the latest edition of the National Electrical Code.
- B. Safety switches shall be rated heavy duty and fusible.
- C. Safety switches exposed to the weather shall be rated NEMA 3R.
- D. Safety switches shall be of the solid neutral type where required by circuit or feeder specified.
- E. Safety switch covers shall be internally mechanically held closed when in the ON position and shall be allowed to open in the OFF position. The switch shall come equipped with provisions to allow the switch to be padlocked in the off position.
- F. Galvanized angle or other suitable supports shall be provided for switches that cannot be mounted on walls or other rigid surfaces. Switches shall not be supported by conduit alone and shall not be mounted on HVAC or other equipment unless specifically approved by the Architect/Engineer. Verify mounting heights for all exterior locations with Architect/Engineer prior to rough-in.
- G. Fuses shall be installed so that fuse rating and type are clearly and easily readable from the front of the disconnect.
- H. Safety switches shall be General Electric, Square "D", Eaton Electrical, Siemens or approved equivalent.

2.6 FUSES

- A. Unless otherwise noted or specified, all fuse holders shall be equipped with dual-element, time-lag, and current limiting fuses. Provide one (1) spare set of fuses for each size initially installed, with a minimum of three (3) fuses of each size. Spare fuses shall be turned over to the Owner's maintenance supervisor prior to requesting substantial completion inspection.
- B. Fuses shall be Gould, Bussman, or approved equivalent.

PART 3 - EXECUTION

3.1 MANUFACTURER'S DIRECTION

- A. All electrical gear shall be installed in accordance with the manufacturer's directions. Contractor shall review these directions prior to rough-in. Should any discrepancies exist between the contract documents and the manufacturer's direction, contractor shall advise the engineer in writing.
- B. All electrical terminations shall be properly tightened to manufacturer's specifications. Where manufacturer's specifications are not available, contractor shall refer to the NEC and adjust tightness values (torque) to the NEC published values.
- C. Install all safety switches, breakers, disconnects, etc., in accordance with manufacturer's directions and maintain all required NEC clearances. Coordinate exact locations in field with applicable contractors.

END OF SECTION 26 27 13



SECTION 26 41 13 - LIGHTNING PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes lightning protection for buildings and associated structures and requirements for lightning protection system components.
- B. The work covered by this section of the specifications consists of furnishing all labor, materials and items of service required for the design and installation and full UL certification of the complete and entire lightning protection system.

1.3 SYSTEM DESCRIPTION

- A. Protect entire building including all roof mounted equipment.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each component specified.
 - 1. Roof adhesive data.
 - 2. Decorative air terminal illustrations.
- C. Shop Drawings detailing lightning protection system design shall include air terminal locations, conductor routing and connections, and bonding and grounding provisions. Include indications for use of raceway and data on how concealment requirements will be met.
- D. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include data on listing or certification by nationally recognized testing laboratory (NRTL) or trade association. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Certification, signed by Contractor, that roof adhesive for air terminals is approved by manufacturers of both the terminal assembly and the single-ply membrane roofing material.
- F. Field inspection reports indicating compliance with specified requirements.
- G. The complete design drawing(s) must be signed and approved by the installing contractor, who is Lightning Protection Institute Certified Master Designer. This signature will assure the proper lightning protection design and installation.

1.5 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- B. Provide UL Master Label for the entire Lightning Protection System.
- C. System shall be compliant with Lightning Protection Institute Standard LPI 175 and upon completion of project Contractor shall provide LPI certification of system.
- D. Provide NFPA 780 compliant system.

1.6 SEQUENCING AND SCHEDULING

- A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by of one of the following:
1. Advanced Lightning Technology
 2. East Coast Lightning Equipment
 3. Preferred Lightning Protection, LLC
 4. Prior approved equivalent manufacturer

2.2 LIGHTNING PROTECTION SYSTEM COMPONENTS

- A. Comply with UL 96A, LPI 175 and NFPA 780.
- B. System Materials: Copper, with solid blunt-tip air terminals, except as otherwise indicated.
- C. Air Terminals for Single-Ply Membrane Roof Mounting: Units with bases especially designed for single-ply membrane roof materials.
- D. Ground Rods: Copper-clad steel with a minimum of 27 percent of rod weight in copper cladding.
1. Diameter: 3/4 inch (nominal)
 2. Length: 10 feet (nominal)

2.3 LIGHTNING PROTECTION EQUIPMENT

- A. All materials shall be copper and bronze and of the size, weight and construction to suit the application and used in accordance with LPI, UL and NFPA code requirements. Class I sized components may be utilized on roof levels 75 feet and below in height. Class II sized components are required for roof levels over 75 feet in height. Bolt type connectors and splicers shall be utilized on Class I and Class II structures. Pressure squeeze clamps are not acceptable. All mounting hardware shall be stainless steel to prevent corrosion.

2.4 ALUMINUM COMPONENTS

- A. Aluminum materials may not be used except on roofs that utilize aluminum, galvalume or galvanized metal roofing components. On aluminum, galvalume or galvanized metal roofs or where aluminum, galvalume or galvanized metal parapet caps exist, the entire roof lightning protection equipment shall utilize aluminum components to insure compatibility. However, the down leads and grounding are to utilize copper with the bimetal transition occurring at the through roof assembly with an approved bimetal through roof assembly.

2.5 SURGE PROTECTION DATA

- A. A surge protection device at the main electrical service entrance is required by lightning protection standards. The surge protection device must comply with UL Standard 1449 as a Type 1 lightning rated unit. Unit shall be a Current Technology SL3 series, or approved equivalent with main breaker. It shall be the responsibility of the Electrical Contractor to provide and install a surge protection device on the main electrical service. Refer to Electrical Specifications for additional requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces, areas, and conditions, with Installer present, for compliance with installation tolerances and other conditions affecting performance of lightning protection. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lightning protection as indicated, according to manufacturer's written instructions.
- B. Comply with UL 96A, LPI-175, and NFPA 780.
- C. Conform to the most stringent requirements when more than one standard is specified.
- D. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends and narrow loops. Where indicated, run conductors in nonmetallic raceway, Schedule 40, minimum.
- E. Conceal system conductors.
- F. Conceal down conductors.
- G. Conceal interior conductors.
- H. Conceal conductors from normal view from exterior locations at grade within 200 feet of building.
- I. Provide notification at least 48 hours before concealing lightning protection components.
- J. Cable Connections: Use approved exothermic-welded connections for all conductor splices and connections between conductors and other components, except those above single-ply membrane roofing.
- K. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer's installation instructions.

- L. Bond extremities of vertical metal bodies exceeding 60 feet in length to lightning protection components.
- M. Bond ground terminals to counterpoise conductor.
- N. All terminations to ground rods and to counter poise conductor shall be accessible through the use of hand-hole (inspection wells) with bolt-down removable covers. Refer to details for additional requirements.
- O. Bond grounded metal bodies on building within 12 feet of ground to counterpoise conductor.
- P. Bond grounded metal bodies on building within 12 feet of roof to counterpoise conductor.
- Q. Bond grounded metal bodies on building within 12 feet of roof to interconnecting loop at eave level or above.
- R. Bond lightning protection components to grounded metal bodies on building at every 60 feet with intermediate-level interconnection loop conductors.
- S. The installation shall be accomplished by an experienced installation company that is a member of the Lightning Protection Institute (LPI) and an employer of LPI Certified Master Installers of lightning protection systems and UL Listed. For example: Bonded Lightning Protection Systems, Ltd. - 1-800-950-7933 with locations in Dallas, Fort Worth, Houston, Austin, San Antonio, Oklahoma, Louisiana, Alabama. A Certified Journeyman or Master Installer shall supervise the work. All equipment shall be installed in a neat, workmanlike manner. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper down leads, and proper ground terminals. Copper down lead conductors shall be utilized even when the aluminum is required on the roof. Down lead conductors shall be installed in conduit and shall not be brought directly through the roof. Through roof assemblies with solid brass or stainless-steel rods shall be utilized for this purpose. Structural steel may be utilized in the installation as outlined by LPI, UL and NFPA standards.
- T. The lightning protection installer will work with other trades to insure a correct, neat and unobtrusive installation. The roofing contractor will be responsible for sealing and flashing all lightning protection roof penetrations as per the roof manufacturer's recommendations. However, the lightning protection contractor will be required to coordinate locations of through roofs and submit details of through roof penetrations as required. The lightning protection contractor shall use a compatible adhesive to adhere lightning protection components to the roof when required. The lightning protection contractor shall furnish and install the adhesive and obtain an approval of the compatible adhesive from the roof manufacturer/contractor prior to the installation. Should the roofing contractor/manufacturer require any special walk pads, membrane patches, pavers, etc. under the components of the lightning protection system, it shall be the responsibility of the roofing contractor to furnish and install such items. The lightning protection installer shall be responsible for marking the roof with all conductor and/or pad locations. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other ground systems.
- U. Upon completion of the installation, the lightning protection installer shall conform to the requirements standards for lightning protection systems of the LPI, UL and NFPA. Upon completion the following certifications shall be delivered to the owner; a certification letter and warranty by the installation company, i.e.: Bonded Lightning Protection Systems, Ltd. and an LPI Master Certification, LPI Re-conditioned Certification or LPI Limited Scope

Report from Lightning Protection Institute - Inspection Program (LPI-IP) depending on the lightning protection scope of work.

- V. The lightning protection contractor shall use a compatible adhesive to adhere lightning protection components to the roof when required. The lightning protection contractor shall furnish and install the adhesive and obtain an approval of the compatible adhesive from the roof manufacturer/contractor prior to the installation. Should the roofing contractor/manufacturer require any special walk pads, membrane patches, pavers, etc. under the components of the lightning protection system, it shall be the responsibility of the roofing contractor to furnish and install such items. The lightning protection installer shall be responsible for marking the roof with all conductor and/or pad locations.

3.3 CORROSION PROTECTION

- A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
- B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

3.4 FIELD QUALITY CONTROL

- A. Periodic Inspections: Provide the services of a qualified inspector to perform periodic inspections during construction and at its completion, according to LPI-177.
- B. UL Inspection: Apply for inspection by UL as required for UL master labeling of system. Provide a UL certificate for complete system.
- C. ETL Inspection: Provide the services of ETL to inspect completed system for conformance with specified requirements.

END OF SECTION 26 41 13

SECTION 26 43 13 - SURGE PROTECTION FOR LOW-VOLTAGE
ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

1.3 DEFINITIONS

- A. I-nominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. OCPD: Overcurrent protective device.
- F. SCCR: Short-circuit current rating.
- G. SPD: Surge protective device.
- H. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, I nominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.
 - 3. Copies of test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor can survive published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable. In house testing will not be accepted.
 - 4. Copy of warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For SPDs to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

- A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Comply with UL 1449.
- D. MCOV of the SPD shall be the nominal system voltage. MCOV shall be a tested value per section 37.7.3 of UL 1449 4th Edition.

2.2 SERVICE ENTRANCE AND TRANSFER SWITCH SUPPRESSOR (Type A)

- A. Basis of Design: Subject to compliance with requirements. Provide comparable product to the following:
 - 1. Current Technology "TG3" Series. Equivalent by Square D SurgeLogic "EM Series"
- B. SPDs: Listed as Type 1 SPD per UL1449 4th Edition
 - 1. SPDs with the following features and accessories:
 - a. Integral disconnect switch (where breaker not provided).
 - b. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - c. Indicator light display for protection status.
 - d. Form-C contacts: one normally open and one normally closed, for remote monitoring of protection status, and Advanced monitoring with status, surge counter and history log of events.
- C. Comply with UL 1283 with a maximum attenuation of 54dB based on 50ohm insertion loss test per MIL-STD-220B

- D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per mode shall not be less than 200 kA (400kA per phase). The peak surge current rating shall NOT be the arithmetic sum of the ratings of the individual MOVs in a given mode. SPD manufacturer shall provide independent 3rd party testing validating unit is capable of surviving a single surge at the specified rating or up to and not to exceed 200,000 kA.
- E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277V or 208Y/120V, three-phase, four-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V for 208Y/120 V.
 - 2. Line to Ground: 700 V for 208Y/120 V.
 - 3. Line to Line: 1200 V for 208Y/120 V.
- F. Protection modes and UL 1449 VPR for 240/120 V, single-phase, three-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V.
 - 2. Line to Ground: [700 V] [1000 V].
 - 3. Line to Line: 1200 V.
- G. SCCR: Equal or exceed 200 kA.
- H. I nominal Rating: 20 kA and compliance to all UL96A requirements for ac surge protection.

2.3 PANEL SUPPRESSORS (Type B and C)

- A. Basis of Design: Subject to compliance with requirements. Provide comparable product by the following:
 - 1. Current Technology "TG3". Equivalent by Square D SurgeLogic "EM Series"
- B. SPDs: Listed as Type 1 SPD per UL1449 4th Edition
 - 1. Include LED indicator lights for power and protection status.
 - 2. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - 3. Include Form-C contacts rated at 2 to 5 A and 24- V ac to 250-V ac, one normally open and one normally closed, for remote monitoring of protection status.
- C. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per mode shall not be less than 150 kA (Type B), 300kA per Phase and 50 kA (Type C) 100kA per Phase. The peak surge current rating shall NOT be the arithmetic sum of the ratings of the individual MOVs in a given mode. SPD manufacturer shall provide independent 3rd party testing validating unit is capable of surviving a single surge at the specified rating.
- D. Comply with UL 1283 with a maximum attenuation of 34dB based on 50ohm insertion loss test per MIL-STD-220B
- E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277V or 208Y/120V, three-phase, four-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V for 208Y/120 V.

2. Line to Ground: 700 V for 208Y/120 V.
 3. Neutral to Ground: 700 V for 208Y/120 V.
 4. Line to Line: 1200 V for 208Y/120 V.
- F. Protection modes and UL 1449 VPR for 240/120-V, single-phase, three-wire circuits shall not exceed the following:
1. Line to Neutral: 700 V.
 2. Line to Ground: 700 V.
 3. Neutral to Ground: 700 V.
 4. Line to Line: 1200 V.
- G. SCCR: Equal or exceed 200 kA.
- H. Inominal Rating: 20 kA

2.4 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.
- B. Outdoor Enclosures: NEMA 250, Type 3R.

2.5 CONDUCTORS AND CABLES

- A. Power Wiring: SPD shall be equipped with mechanical lugs that can accept up to #2 AWG wire. Where conductors between SPD and switchgear exceed 10' in total length, they shall be "High Performance Interconnect" (HPI) cables with Ultra Low impedance characteristics at 10kHz and above.
- B. Class 2 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 18 AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 14 AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.
- C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground. If installed lead length exceeds 10', SPD manufacturer shall provide a low impedance cable that improves the installed performance.

- D. Use crimped connectors and splices only. Wire nuts are unacceptable.
- E. Wiring:
 - 1. Power Wiring: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 2. Controls: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Contractor shall perform the following tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Compare equipment nameplate data for compliance with Drawings and Specifications.
 - 2. Inspect anchorage, alignment, grounding, and clearances.
 - 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. An SPD will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.3 SYSTEM TESTING

- A. Upon completion of installation, provide the start-up and testing services of a factory-authorized and factory-trained local service representative. The tests shall include:
 - 1. Off-line Testing: Impulse injection to verify the system tolerances as well as verification of proper facility neutral-to-ground bond. Compare field test results to factory benchmark test parameters supplied with each individual unit.
 - 2. On-line Testing: Verify that suppression and filtering paths are operating with 100% protection as well as verification of proper facility neutral-to-ground bond by measuring neutral-to-ground current and voltage and by visual inspection.
 - 3. Voltage measurements from Line-to-Ground (L-G), Line-to-Neutral (L-N), Line-to-Line (L-L), and Neutral-to-Ground (N-G), taken at the time of the testing procedure.

3.4 DOCUMENTATION AND REPORTING

- A. Record results of field testing and compare to factory benchmark test parameters supplied with each individual surge protective device. Indicate that the integrity of neutral-to-ground bonds were verified through testing and visual inspection, and that grounding bonds were observed to be in place.
- B. Submit to the Owner's representative and to the Architect/Engineer copies of the startup test results and the factory benchmark testing results for confirmation of proper suppression filter system function, as required by this section. Provide the number of copies as required by Division One and the Electrical General Provisions section; and three copies where not otherwise specified.

END OF SECTION 26 43 13

SECTION 26 51 00 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.
- B. Refer to other Electrical specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. The Contractor shall furnish and install lighting fixtures and accessories as shown on the drawings and/or described herein.
- B. Unless otherwise specified, lighting fixtures shall be permanently installed and connected to the wiring system.
- C. The Contractor shall support each new fixture independently, from the building structure. Ceiling framing members shall not be used to support fixtures except in specific areas where ceiling supports for this purpose have been specified elsewhere in these specifications.
- D. Catalog numbers scheduled on the drawings or descriptions of lighting fixtures contained herein may indicate fixture compatibility with certain types of ceiling construction. The Contractor shall determine exact type of ceilings actually to be furnished in each area and shall obtain fixtures to suit, deviating from specified catalog numbers or descriptions only where necessary, and only to the extent necessary to insure fixture-ceiling compatibility. The Contractor shall notify the Architect/Engineer in writing where such changes are to be made. Contractor shall clean all lighting fixtures of dirt and debris upon completion of project prior to requesting substantial completion inspection.
- E. Incandescent fixtures for recessed locations shall have a thermal cutout and be installed in accordance with manufacturer's requirements and in accordance with NEC.
- F. Unless noted otherwise on the drawings, lamps installed in each fixture shall be of the type specifically recommended by the manufacturer of the fixture for use in the fixture. Fixtures shall not be wired with or have any parts constructed using asbestos materials.
- G. All requests for prior approval shall contain the following:
 - 1. Photometric data for each fixture being submitted.
 - 2. For all exterior lighting, point by point foot candle levels shall be submitted. (Exception: Wall packs, ground mounted flood lights, landscape lighting).
 - 3. Listing of all deviations of fixtures proposed as compared to fixtures specified.
 - 4. For interior lighting point by point foot-candle levels shall be submitted for typical interior spaces (offices, classrooms, corridors) and for spaces with indirect and/or specialty lighting.

PART 2 - PRODUCTS

2.1 EMERGENCY BATTERY PACKS



- A. Emergency battery packs shall be provided and installed in all fixtures denoted by the letter "E" appearing at the end of the fixture type designation and where required in the light fixture schedule. Emergency battery packs shall be installed in the ballast/driver housing (not on top of the fixture) of the fixture(s) unless specifically noted otherwise on the drawings.
- B. At the contractor's option, a central inverter (or multiples thereof) may be provided in the electrical room(s) to provide emergency lighting as indicated. If contractor elects to implement this option, they shall be responsible for providing the appropriate sub-feed breaker in the lighting distribution panel as well as all required sub-feed circuitry. Any and all required generator transfer devices (GTD's) shall be provided at no additional costs. All required branch emergency circuitry shall be provided as well as all branch circuit overcurrent protective devices required in the central inverter(s). As part of the lighting submittal package, fixture supplier shall provide connection diagrams indicating installation requirements for the emergency lighting system showing all switching, inverters (battery packs), GTDs, etc.... required for a complete and fully operational emergency lighting system.
- C. Operation of the fixture shall be as follows:
- | <u>Normal A/C Power</u> | <u>Switch Position</u> | <u>Operation of Lamps/LED's</u> |
|-------------------------|------------------------|-------------------------------------|
| On | On | All lamps/LED's operating |
| On | Off | All lamps/LED's off |
| Off | On | Emergency Lamps/LED'S all operating |
| Off | Off | Emergency Lamps/LED's all operating |
- D. Emergency operation of the light fixture shall provide a minimum total lamp output of 1200 lumens for a minimum time period of ninety (90) minutes.
- E. Emergency battery packs shall be as manufactured by Bodine, Iota Engineering Co., or approved equivalent.
- F. The Contractor shall be responsible for any additional wiring, conduit, labor, etc., to provide the emergency lighting system specified at no additional cost to the Owner. This includes running of a continuously energized conductor to each and every battery pack.

2.2 LED FIXTURES

- A. Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims.
- B. The use of IESNA LM-80 data to predict luminaire lifetime is not acceptable.
- C. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRJ. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 5 years after the date of manufacture.
- D. Luminaires shall be provided with a full, non-pro-rated, non-limited, 5-year warranty covering LEDs, drivers, paint and mechanical components.

1. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array and electronic driver (power supply).
2. The rated operating temperature range shall be 30°C to +40°C.
3. Each luminaire is capable of operating above 100°F° (37°C), but not expected to comply with photometric requirements at elevated temperatures.
4. Photometry must be compliant with IESNA LF-79 and shall be conducted at 25°C ambient temperature.
5. The individual LEDs shall be constructed such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
6. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole luminaire.
7. Each luminaire shall be listed with Underwriters Laboratory, Inc. under UL 1598 for luminaires, or an equivalent standard from a nationally recognized testing laboratory.
8. Power Consumption: Maximum power consumption allowed for the luminaire shall be determined by application. The luminaire shall not consume power in the off state.
9. Operation Voltage: The luminaire shall operate from a 60 HZ $\pm$ 3HZ AC line over a voltage ranging from 108 VAC to 305 VAC. The fluctuation of line voltage shall have no visible effect on the luminous output.
10. Power Factor: The luminaire shall have a power factor of 0.90 or greater.
11. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.
12. Surge Suppression: The luminaire onboard circuitry shall include fused surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaire from damage and failure for common mode transient peak voltages up to 10 kV (minimum) and transient peak currents up to 5 kA (minimum) SPD shall conform to UL 1449 depending on the components used in the design. SPD performance shall be tested per the procedures in ANSI/IEEE C62.41-1992 (or current edition for category C (standard). The SPD shall fail in such a way as the luminaire will no longer operate. The SPD shall be field replaceable.
13. Each luminaire shall have integral UL Listed Class II power supplies. Class I power supplies will not be acceptable.
14. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.
15. RF Interference: LED drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
16. Drivers shall have a Class A sound rating.
17. Illuminance: The illuminance shall not decrease by more than 30% over the expected operating life. The measurements shall be calibrated to standard photopic calibrations.
18. Light Color Quality: The luminaire shall have a correlated color temperature (CCT) range of 3300K to 4000K. The color rendition index (CRI) shall be 80 or greater. Binning of LEDS shall conform to ANSI/G.NEMA SSL 3-2010.
19. Backlight –Uplight-Glare: the luminaire shall not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical. The luminaire shall not allow more than 2.5 percent of the rated lumens to project above 90 degrees from vertical. Backlight and Glare ratings as per fixture schedule and calculated per IESNA TM-15.
20. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.

21. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
22. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
23. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.
24. The heat sink shall be aluminum.
25. The luminaires shall be dimmable from 100 percent output to 0 percent output.
26. Driver shall be integral to the fixture and field replaceable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All surface mounted fixtures shall be properly anchored so that all sides of the fixture are butted up against the mounting surface. A minimum of two (2) anchors shall be used; however, where additional anchors are required to properly install fixture (all sides evenly spaced from ceiling), the Contractor shall provide and install them at no additional cost to the Owner.

1. Anchor types shall be as follows:

<u>Mounting Surface Material</u>	<u>Anchor type</u>
* Gypsum board (wall)	Toggle bolts or blocking with screws
Gypsum board (ceiling)	Expansion type anchor
Concrete/concrete block	Expansion type anchor
** Wood	Screws

*Anchor type shall be determined in field by Architect/Engineer as dictated by fixture weight.

** Any fixture installed on combustible material shall be installed on ½ minimum spacers unless prior approved, otherwise in writing by Architect/Engineer.

- B. All recessed fixtures in suspended ceiling shall be supported by a minimum of two (2) support wires, at opposite corners of the fixture. Each support wire shall be continuous without splices to the building structure and separately anchored. Fixture support wires shall support only the light fixture and not the ceiling. Surface mounted fixtures installed on lay-in ceiling shall be supported as lay-in fixtures. Refer to details for additional requirements.

END OF SECTION 26 51 00



SECTION 27 05 00 - TELE/DATA RACEWAY SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions), as appropriate, apply to the Work specified in this Section.
- B. Refer to all Electrical specification sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. Furnish and install a system of outlet boxes and empty conduit for a telephone raceway system as shown on the drawings and as specified herein.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

- A. Outlet boxes shall be 4-11/16" square.
- B. Outlet boxes shall have raised covers with telephone outlet cover plate to match electrical device cover plate.

2.2 CONDUIT

- A. Conduit runs shall be run concealed in walls from outlet box up through ceiling to four inches (4") above top of wall partition, turn ninety degrees using long radius ninety, and stop. Provide and install a nylon bushing at ends of conduits.
- B. Leave a No. 14 fish wire in each conduit run.
- C. Conduit shall be 1" unless specified otherwise on the drawings.
- D. Install one (1) conduit from each outlet box to above ceiling.

2.3 BACKBOARDS

- A. Contractor shall provide and install a system of backboards where shown on the plans. Backboards shall consist of one (1) 8' x 4' x 1" sheet of fire rated plywood painted to match adjacent walls. Backboard shall be attached to wall using a minimum of ten (10) screws of sufficient length to permanently secure backboard to wall.

2.4 SERVICE ENTRANCE

- A. Furnish and install two (2) 2" telephone service entrance conduits each with pull string from main telephone equipment room to property line. Refer to site plan.
- B. Furnish and install Two (2) 2" telephone service entrance conduits each with pull string, from main CATV equipment room to property line. Refer to site plan.

PART 3 - EXECUTION

- 3.1 Provide and install system raceways in accordance with cable, jack, patch panel manufacturer's recommendations and requirements.

END OF SECTION 27 05 00

SECTION 28 31 10 - INTELLIGENT COMMUNICATING FIRE DETECTION SYSTEM

PART 1 - GENERAL



1.1 DESCRIPTION:

- A. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Fire Alarm Control Panel (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Local Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
 - 1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 24 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
- C. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Auxiliary Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
 - 1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 60 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
 - 2. The Secondary Power Source installed in a system backed up by a generator need to supply 4 hours of backup power.
- D. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Local Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
 - 1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 24 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
- E. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Remote Station Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
 - 1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 60 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
 - 2. The Secondary Power Source installed in a system backed up by a generator need to supply 4 hours of backup power.
- F. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Local Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.

1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 24 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
- G. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.
- H. Underwriters Laboratories Inc. (UL) - USA:
1. No. 38 Manually Actuated Signaling Boxes
 2. No. 50 Cabinets and Boxes
 3. No. 864 Control Units for Fire Protective Signaling Systems
 4. No. 268 Smoke Detectors for Fire Protective Signaling Systems
 5. No. 268A Smoke Detectors for Duct Applications
 6. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
 7. No. 464 Audible Signaling Appliances
 8. No. 521 Heat Detectors for Fire Protective Signaling Systems
 9. No. 1971 Visual Notification Appliances
- I. The installing company shall employ NICET (minimum Level III Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.

1.2 SCOPE

- A. An intelligent, microprocessor-controlled, fire alarm detection system shall be installed in accordance to the project specifications and drawings.
- B. Basic Performance:
1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B), NFPA Style 6 (Class A) or NFPA 7 (Class A) Signaling Line Circuits (SLC).
 2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style B) or Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.
 3. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y) or Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.
 4. All circuits shall be power-limited, UL864 9th edition requirements.
 5. A single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm when wired NFPA Style 6/7.
 6. Alarm signals arriving at the main FACP shall not be lost following a primary power failure or outage of any kind until the alarm signal is processed and recorded.

1.3 BASIC SYSTEM FUNCTIONAL OPERATION

- A. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:
1. The system Alarm LED on the FACP shall flash.
 2. A local sounder with the control panel shall sound.
 3. A backlit 80-character LCD display on the FACP shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

4. In response to a fire alarm condition, the system will process all control programming and activate all system outputs (alarm notification appliances and/or relays) associated with the point(s) in alarm.

1.4 SUBMITTALS

A. General:

1. Eight identical copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein are intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. This submission shall occur a minimum of ten working days prior to bid and shall comply with all requirements for prior approval as specified in Section 16001 - Electrical General Provisions. Equivalent equipment (compatible UL Listed) from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.

B. Prior Approvals:

1. All submissions for prior approvals shall include the following information as a minimum.
 - a. Standard Manufacturer's cut sheets on every piece of equipment to be provided as part of this project. Cut sheets shall indicate performance, physical sizes, construction materials, expand ability, etc.
 - b. Listing of all differences (deficiencies and betterment) between the proposed system and the specified system.
 - c. Any other supporting information required to demonstrate equivalency to system specified.

C. Shop Drawings:

1. Contractor shall be responsible for submitting printed copies through the Architect/Engineer for review and obtaining approval from the Authority Having Jurisdiction (AHJ) for installation of the Fire Alarm System. Submittal to the State Fire Marshal shall occur after Contractor has obtained a "No Exceptions Taken", or "Make Corrections Noted" comment on Fire Detection and Alarm System Shop Drawings from the Architect/Engineer. No payment will be made to the contractor for any fire alarm system work until submittal is forwarded to the AHJ for approval. All submittals to the Architect/Engineer shall include the following as a minimum:
 - a. System Riser Diagram - include all devices and components of the system by zone, group, or individual device. Each device shall be labeled indicating location in the facility.
 - b. System Wiring Diagram - Include diagrams for equipment and for system with all terminals and interconnections identified. Make all diagrams specific to this project and distinguish between field and factory wiring.
 - c. System Component Data Sheets - Indicating current draw-in alarm mode and in standby mode. Also submit component data sheets to indicate UL compatibility with system and compatibility with rest of system. Indicate all applicable data by highlighting on ALL submittal booklets.
 - d. Zone Designations, group(s) or individual device(s).

- e. Battery Load Calculations for sizing battery for twenty-four (24) hours of continuous system operation in standby mode followed by five (5) minutes of continuous full evacuation alarm condition (fifteen (15) minutes of continuous full evacuation alarm if a voice evacuation alarm system is present in the system.) Calculations shall be on equipment manufacturer's standard form and shall clearly indicate capacity of batteries proposed to be installed.
 - f. Master list of system components by model number, description, and quantity of each.
 - g. Shop Drawings showing details of graphic annunciator
 - h. Device Address List
 - i. Annunciator Lay-out, configurations.
 - j. Review Application - Contractor's portion completed
 - k. Review Application Fee - If Required
 - l. Blueline or xerox copies of plans complying with the following criteria:
 - i. Drawn to scale
 - ii. Identify each room or area
 - iii. Show all system components, identifying each
 - iv. Show all exits, door swings, ceiling height, light fixtures, exit lights (with direction arrows), HVAC openings in ceilings, whether ceilings are sloped or flat, and show all projections 0'-4" below ceilings
 - v. Shall not have Architect's/Engineer's titlebox and/or professional stamp
 - vi. No markings showing additions, deletions or revisions after copies are made
 - vii. Highlight in yellow or blue all system components
 - viii. Proposed conductor routings
 - ix. Includes north arrow
 - x. Graphic scale
 - m. Statement on type of system - must be one of the following:
 - i. Local
 - ii. Auxiliary
 - iii. Remote Station
 - iv. Proprietary
 - n. Description of this project's specific Sequence of Operation.
 - o. Description of wiring.
 - p. Designation of type
 - q. Color of insulation
2. Manufacturer's certificate certifying supplier is an authorized factory representative along with mileage distance of office to job site.
 3. Certificate showing that supplier/installer is licensed by the State Fire Marshal's Office to install, modify and maintain fire detection and alarm system.
- D. Be aware that State Fire Marshal requirements do not allow work to occur on any portion of the fire alarm system prior to receipt of their approval on shop drawings.
- E. Manuals:
1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
 2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
 3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

F. Software Modifications

1. Provide the services of a qualified technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

G. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.5 GUARANTY:

- A. All work performed, and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be included in the submittal bid.

1.6 APPLICABLE STANDARDS AND SPECIFICATIONS:

- A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.
- B. National Fire Protection Association (NFPA) - USA:
1. No. 13 Sprinkler Systems
 2. No. 70 National Electric Code (NEC)
 3. No. 72 National Fire Alarm Code
 4. No. 101 Life Safety Code
- C. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.
- D. Local and State Building Codes.
- E. All requirements of the Authority Having Jurisdiction (AHJ).

1.7 APPROVALS:

- A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
1. UL Underwriters Laboratories Inc
 2. ULC Underwriters Laboratories Canada
 3. FM Factory Mutual

- 4. MEA Material Equipment Acceptance (NYC)
- 5. CSFM California State Fire Marshal

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL:

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment, and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a fire protective signaling system, meeting the National Fire Alarm Code.
- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2 CONDUIT AND WIRE:

- A. Conduit:
 - 1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
 - 2. All wiring shall be installed using conduit in un-accessible spaces and/or where exposed and j-hooks in accessible spaces. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.
 - 3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-55.
 - 4. Wiring for 24-volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices, and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
 - 5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
 - 6. Conduit shall be 3/4-inch (19.1 mm) minimum.
- B. Wire:
 - 1. All fire alarm system wiring shall be new.
 - 2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
 - 3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
 - 4. Wiring used for the multiplex communication circuit (SLC) shall be twisted and support a minimum wiring distance of 10,000 feet when sized at 12 AWG. The

- design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit. Shielded wire shall not be required.
 - 5. All field wiring shall be electrically supervised for open circuit and ground fault.
 - 6. The fire alarm control panel shall be capable of T-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the amount of T-taps, length of T-taps etc., is not acceptable.
- C. Terminal Boxes, Junction Boxes and Cabinets:
- 1. All boxes and cabinets shall be UL listed for their use and purpose.
- D. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod. The control panel enclosure shall feature a quick removal chassis to facilitate rapid replacement of the FACP electronics.
- 1. The FACP shall be capable of coding Notification Appliance Circuits in March Time Code (120 PPM), Temporal (NFPA 72), and California Code. Main panel notification circuits (NACs 1 & 2) shall also automatically synchronize any of the following manufacturer's notification appliances connected to them: System Sensor, Wheelock, or Gentex with no need for additional synchronization modules.

2.3 MAIN FIRE ALARM CONTROL PANEL:

- A. The FACP shall be a NOTIFIER NFW2-100 (FireWarden-100-2) and shall contain a microprocessor-based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system-controlled devices.
- B. Operator Control
- 1. Acknowledge Switch:
 - a. Activation of the control panel Acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the 80-character LCD display to the next alarm or trouble condition.
 - b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
 - 2. Alarm Silence Switch:
 - a. Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
 - 3. Alarm Activate (Drill) Switch:
 - a. The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.
 - 4. System Reset Switch:

- a. Activation of the System Reset switch shall cause all electronically-latched initiating devices, appliances, or software zones, as well as all associated output devices and circuits, to return to their normal condition.
- 5. Lamp Test:
 - a. The Lamp Test switch shall activate all system LEDs and light each segment of the liquid crystal display.

C. System Capacity and General Operation

- 1. The control panel shall provide, or be capable of, expansion to 198 intelligent/addressable devices.
- 2. The control panel shall include Form-C Alarm, Trouble and Supervisory relays rated at a minimum of 2.0 amps @ 30 VDC. It shall also include programmable Notification Appliance Circuits (NACs) capable of being wired as Class B (NFPA Style Y) or Class A (NFPA Style Z).
- 3. The fire alarm control panel shall include an operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color-coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
- 4. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel. The system shall be fully programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes. The control unit will support the ability to upgrade its operating program using FLASH memory technology. The unit shall provide the user with the ability to program from either the included keypad, a standard PS2-style PC keyboard or from a computer running upload/download software.
- 5. The system shall allow the programming of any input to activate any output or group of outputs. Systems which have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or REQUIRE a laptop personal computer are not considered suitable substitutes.
- 6. The FACP shall provide the following features:
 - a. Drift compensation to extend detector accuracy during the accumulation of dust and foreign material.
 - b. Detector sensitivity test, meeting requirements of NFPA 72, Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
 - c. The ability to display or print system reports.
 - d. Alarm verification.
 - e. Positive Alarm Sequence (PAS pre-signal), meeting NFPA 72 (2002 Edition) 6.8.1.3 requirements.
 - f. Rapid manual station reporting.
 - g. Non-alarm points for general (non-fire) control.
 - h. Periodic detector test, conducted automatically by the software.
 - i. Walk test, with a check for two detectors set to same address.
- 7. The FACP shall be capable of coding Notification Appliance Circuits in March Time Code (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Main panel notification circuits (NACs 1 & 2) shall also automatically synchronize the following manufacturer's notification appliances connected to them: System Sensor, Wheelock, or Gentex with no need for additional synchronization modules.

D. Central Microprocessor

1. The microprocessor shall be a state-of-the-art, high speed, 16-bit RISC device and it shall communicate with, monitor, and control all external interfaces. It shall include an EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
2. The microprocessor shall contain and execute all specific actions to be taken in the condition of an alarm. Control programming shall be held in non-volatile programmable memory and shall not be lost even if system primary and secondary power failure occurs.
3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file.
4. A special program check function shall be provided to detect common operator errors.
5. An auto-programming capability (self-learn) shall be provided to quickly identify devices connected on the SLC and make the system operational.
6. For flexibility and to ensure program validity, an optional Windows (TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download. This program shall also have a verification utility which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in compliance with the NFPA 72 requirements for testing after system modification.

E. Local Keyboard Interface

1. In addition to an integral keypad, the fire alarm control panel will accept a standard PS2-style keyboard for programming, testing, and control of the system. The keyboard will be able to execute the system functions ACKNOWLEDGE, SIGNALS SILENCED, DRILL and RESET.

F. Display

1. The display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, addressable modules, internal panel circuits, and software zones.
3. The display shall contain an alphanumeric, text-type display and dedicated LEDs for the annunciation of AC POWER, FIRE ALARM, SUPERVISORY, TROUBLE, MAINTENANCE, ALARM SILENCED, DISABLED, BATTERY, and GROUND conditions.
4. The display keypad shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
5. The display shall include the following operator control switches: ACKNOWLEDGE, ALARM SILENCE, DRILL (alarm activate), and SYSTEM RESET.

G. Signaling Line Circuit (SLC)

1. The SLC interface shall provide power to and communicate with up to 99 intelligent detectors (ionization, photoelectric or thermal) and 99 intelligent modules (monitor or control) for a system capacity of 198 devices. Each SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.

2. The CPU shall receive information from all intelligent detectors to be processed to determine whether normal, alarm, or trouble conditions exist for each detector. The software shall automatically compensate for the accumulation of dust in each detector up to allowable limits. The information shall also be used for automatic detector testing and for the determination of detector maintenance conditions.
3. The detector software shall meet NFPA 72, Chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.

H. Serial Interfaces

1. The system shall provide a means of interfacing to UL Listed Electronic Data Processing (EDP) peripherals using the EIA-232 communications standard.
2. One EIA-232 interface shall be used to connect an UL-Listed 80-column printer. The printer shall communicate with the control panel using an interface complying with Electrical Industries Association standard EIA-232D. Power to the printer shall be 120 VAC @ 60 Hz.

- I. The control panel will have the capability of Reverse Polarity Transmission or connection to a Municipal Box for compliance with applicable NFPA standards.

- J. Digital Alarm Communicator Transmitter (DACT). The DACT is an interface for communicating digital information between a fire alarm control panel and a UL-Listed central station.

1. The DACT shall be an integral component of the fire alarm control panel requiring no interconnecting wiring, plug-in module or supervisory circuitry.
2. The DACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to two different telephone numbers.
3. The DACT shall be completely field programmable locally from the control panel keypad or via PC software connected to the panel serial port. The DACT shall support upload/download of programming parameters from a remote location over a phone line using upload/download PC software.
4. The DACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.
5. Communication shall include vital system status such as:
 - a. Independent Zone (Alarm, trouble, non-alarm, supervisory)
 - b. Independent Addressable Device Status
 - c. AC (Mains) Power Loss
 - d. Low Battery and Earth Fault
 - e. System Off Normal
 - f. 12 and 24-Hour Test Signal
 - g. Abnormal Test Signal (per UL requirements)
 - h. EIA-485 Communications Failure
 - i. Phone Line Failure
6. The DACT shall support independent zone/point reporting when used in the Contact ID format. In this format, the DACT shall support the transmission of up addressable points with the system. This format shall enable the central station to have exact details concerning the location of the fire for emergency response.

K. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

2. The back box and door shall be constructed of steel with provisions for electrical conduit connections into the sides and top.
 3. The door shall provide a key lock and shall provide for the viewing of all indicators.
 4. The cabinet shall accept a chassis containing the PCB and to assist in quick replacement of all the electronics including power supply shall require no more than two bolts to secure the panel to the enclosure back box.
- L. Field Charging Power Supply: The FCPS is a device designed for use as either a remote 24-volt power supply or as a booster for powering Notification Appliances.
1. The FCPS shall offer up to 8.0 amps (6.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 18.0-amp hour batteries.
 2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a control relay. Four NAC outputs, wired NFPA Style Y or Z, shall be available for connection to the Notification devices.
 3. The FCPS shall optionally provide synchronization of all connected strobes or horn strobe combinations when System Sensor, Wheelock, or Gentex devices are installed.
 4. The FCPS shall function as a sync follower as well as a sync generator.
 5. The FCPS shall include a surface mount backbox.
 6. The Field Charging Power Supply shall include the ability to delay the reporting of an AC fail condition per NFPA requirements.
 7. The FCPS shall provide 24 VDC regulated and power-limited circuitry per 1995 UL standards.
- M. Power Supply:
1. The main power supply for the fire alarm control panel shall provide up to 6.0 amps of available power for the control panel and peripheral devices.
 2. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.
 3. Positive-Temperature-Coefficient (PTC) thermistors, circuit breakers, or other over-current protection shall be provided on all power outputs. The power supply shall provide an integral battery charger or may be used with an external battery and charger systems. Battery arrangement may be configured in the field.
 4. The main power supply shall continuously monitor all field wires for earth ground conditions.
 5. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
- N. Programmable Electronic Sounders:
1. Electronic sounders shall operate on 24 VDC nominal.
 2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones with an output sound level of at least 90 dBA measured at 10 feet from the device.
 3. Shall be flush or surface mounted as show on plans.
 4. Where shown to be installed outside, device shall be of the weatherproof design.
 5. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.
- O. Strobe lights shall meet the requirements of the ADA, UL Standard 1971 and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second.
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.
4. Where shown to be installed outside, device shall be of the weatherproof design.
5. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.

P. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of Section A listed above for audibility.
2. Shall meet the requirements of Section B listed above for visibility.
3. Where shown to be installed outside, device shall be of the weatherproof design.
4. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.

Q. Manual Fire Alarm Stations

1. Manual fire alarm stations shall be non-code, double action, non-break glass type, equipped with key lock so that they may be tested without operating the handle.
2. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset.
3. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet (30.5 m) front or side.
4. Manual stations shall be constructed of aluminum, with operating instructions provided on the cover. The word FIRE shall appear on the manual station in letters one half inch (12.7 mm) in size or larger.
5. All manual stations installed outdoors, in non-conditioned spaces and/or wet environments shall be installed with STI No. STI-3150-R weather stopper cover.
6. Surface mounted manual stations shall be complete with factory backbox such as the Notifier BG-2. Typical wiring device backboxes will not be accepted.

R. Conventional Photoelectric Area Smoke Detectors

1. Photoelectric smoke detectors shall be a 24 VDC, two-wire, ceiling-mounted, light scattering type using an LED light source.
2. Each detector shall contain a remote LED output and a built-in test switch.
3. The detector shall be of a separate head-in-base design.
4. The detector shall automatically provide drift compensation to minimize nuisance alarms.
5. The detector shall be capable of generating a signal when maintenance is required.
6. It shall be possible to read the sensitivity of the device in percent obscuration per foot without the need for the generation of smoke.
7. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs), on the detector, which may be seen from ground level over 360 degrees. These LEDs shall flash every 5 seconds, indicating that power is applied to the detector.
8. The detector shall not go into alarm when exposed to air velocities of up to 3000 feet (914.4 m) per minute.
9. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
10. All field wire connections shall be made to the base through the use of a clamping plate and screw.

S. Conventional Ionization Type Area Smoke Detectors

1. Ionization type smoke detectors shall be a two wire, 24 VDC type using a dual unipolar chamber.
2. Each detector shall contain a remote LED output and a built-in test switch.
3. Detector shall be provided on a twist-lock base.
4. It shall be possible to perform a calibration sensitivity and performance test on the detector without the need for the generation of smoke.
5. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs) over 360 degrees, on the detector, which may be seen from ground level. This LED shall flash every 10 seconds, indicating that power is applied to the detector.
6. The detector shall not alarm when exposed to air velocities of up to 1,200 feet (365.76 m) per minute. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
7. All field wire connections shall be made to the base through the use of a clamping plate and screw.

T. Duct Smoke Detectors

1. Duct smoke detectors shall be a 24 VDC type with visual alarm and power indicators, and a reset switch. Each detector shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes.

U. Automatic Conventional Heat Detectors

1. Automatic heat detectors shall have a combination rate of rise and fixed temperature rated at 135 degrees Fahrenheit (57.2 Celsius) for areas where ambient temperatures do not exceed 100 degrees (37.7 Celsius), and 200 degrees (93.33 Celsius) for areas where the temperature does not exceed 150 degrees (65.5 Celsius).
2. Automatic heat detectors shall be a low profile, ceiling mount type with positive indication of activation.
3. The rate of rise element shall consist of an air chamber, a flexible metal diaphragm, and a factory calibrated, moisture-proof, trouble free vent, and shall operate when the rate of temperature rise exceeds 15 degrees F (9.4 degrees C) per minute.
4. The fixed temperature element shall consist of a fusible alloy retainer and actuator shaft.
5. Automatic heat detectors shall have a smooth ceiling rating of 2500 square feet (762 square meters).

V. Waterflow Indicator:

1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
3. All waterflow switches shall come from a single manufacturer and series.
4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.
5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

W. Sprinkler and Standpipe Valve Supervisory Switches:

1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4-inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. The switch housing shall be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

X. Specific System Operations

1. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently programmed for verification of alarm signals. The alarm verification time period shall not exceed 2 minutes.
2. Point Disable: Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.
3. Point Read: The system shall be able to display the following point status diagnostic functions:
 - a. Device status
 - b. Device type
 - c. Custom device label
 - d. Device zone assignments
4. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.
5. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 1000 events. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety.
6. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.
7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
8. The fire alarm control panel shall include Silent and Audible Walk Test functions - Silent and Audible. It shall include the ability to test initiating device circuits and Notification Appliance Circuits from the field without returning to the panel to reset the system. The operation shall be as follows:
 - a. The Silent Walk Test will not sound NACs but will store the Walk Test information in History for later viewing.

- b. Alarming an initiating device shall activate programmed outputs, which are selected to participate in Walk Test.
 - c. Introducing a trouble into the initiating device shall activate the programmed outputs.
 - d. Walk Test shall be selectable on a per device/circuit basis. All devices and circuits which are not selected for Walk Test shall continue to provide fire protection and if an alarm is detected, will exit Walk Test and activate all programmed alarm functions.
 - e. All devices tested in walk test shall be recorded in the history buffer.
- 9. Waterflow Operation
 - a. An alarm from a waterflow detection device shall activate the appropriate alarm message on the control panel display; turn on all programmed Notification Appliance Circuits and shall not be affected by the Signal Silence switch.
- 10. Supervisory Operation
 - a. An alarm from a supervisory device shall cause the appropriate indication on the control panel display, light a common supervisory LED, but will not cause the system to enter the trouble mode.
- 11. Signal Silence Operation
 - a. The FACP shall have the ability to program each output circuit (notification circuit or relay) to deactivate upon depression of the Signal Silence switch.
- 12. Non-Alarm Input Operation
 - a. Any addressable initiating device in the system may be used as a non-alarm input to monitor normally open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.

2.4 SYSTEM COMPONENTS:

A. Addressable Pull Box (manual station)

- 1. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key. Manual stations shall be of the double action type.
- 2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
- 3. Manual stations shall be constructed of aluminum with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.
- 4. All manual stations installed outdoors, in non-conditioned spaces and/or wet environments shall be installed with STI No. STI-3150-R weather stopper cover.
- 5. Surface mounted manual stations shall be complete with factory backbox such as the Notifier BG-2. Typical wiring device backboxes will not be accepted.

B. Intelligent Photoelectric Smoke Detector

- 1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
- 2. The detectors shall be ceiling-mounted and available in an alternate model with an integral fixed 135-degree heat-sensing element.
- 3. Each detector shall contain a remote LED output and a built-in test switch.
- 4. Detector shall be provided on a twist-lock base.

5. It shall be possible to perform a calibrated sensitivity and performance test on the detector without the need for the generation of smoke. The test method shall test all detector circuits.
6. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs), on the detector, which may be seen from ground level over 360 degrees. These LEDs shall periodically flash to indicate that the detector is in communication with the control panel.
7. The detector shall not go into alarm when exposed to air velocities of up to 1500 feet per minute (fpm).
8. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
9. All field wire connections shall be made to the base through the use of a clamping plate and screw.

C. Intelligent Ionization Smoke Detector

1. The detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

D. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

E. Intelligent Duct Smoke Detector

1. The smoke detector housing shall accommodate an intelligent photoelectric detector that provides continuous monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

F. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any normally open dry contact device) to one of the fire alarm control panel SLCs.
2. The monitor module shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box.
3. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4-inch (70 mm) x 1-1/4-inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

G. Two-Wire Detector Monitoring

1. Means shall be provided for the monitoring of conventional Initiating Device Circuits populated with 2-wire smoke detectors as well as normally open contact alarm initiating devices (pull stations, heat detectors, etc).

2. Each IDC of conventional devices will be monitored as a distinct address on the polling circuit by an addressable module. The module will supervise the IDC for alarms and circuit integrity (opens).
3. The monitoring module will be compatible, and listed as such, with all devices on the supervised circuit.
4. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
5. The monitoring module shall be capable of mounting in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box or in a surface mount backbox.

H. Addressable Control Relay Module

1. Addressable control relay modules shall be provided to control the operation of fan shutdown and other auxiliary control functions.
2. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box, or to a surface mounted backbox.
3. The control relay module will provide a dry contact, Form-C relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% of all auxiliary relays may be energized at the same time on the same pair of wires.
4. The control relay module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

I. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Style 6 (Class A) or Style 4 (Class B branch). The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require any address setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall mount in a standard 4-inch (101.6 mm) deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

J. Serially Connected Annunciator

1. The annunciator shall communicate with the fire alarm control panel via a two wire EIA 485 (multi-drop) communications circuit.
2. The annunciator shall require no more than four wires for operation. Annunciation shall include: intelligent addressable points, system software zones, control relays, and notification appliance circuits. The following operations shall also be provided:
 - a. Up to 32 annunciators, each with up to 64 points may be installed on the system.
 - b. The annunciator shall include a single electrical key switch to disable all switch functions.
 - c. The annunciator shall provide alarm and trouble resound, with flash for new conditions.

- d. This unit shall provide for each zone: alarm indications, using a red alarm and yellow trouble LEDs, and switches for the control of fire alarm control panel functions. The annunciator will also have an ON-LINE LED, local piezo electric signal, local acknowledge/lamp test switch, and custom slide-in zone/function identification labels.
- e. Switches shall be available for remote annunciation and control of output points in the system, system acknowledge, telephone zone select, speaker select, global signal silence, and global system reset within the confines of all applicable standards.
- 3. This system shall provide a means of interfacing to graphic style annunciator.
- 4. The graphic annunciator interface will possess the capability of individually annunciating each individual addressable device in the system.

K. Alphanumeric LCD Type Annunciator:

- 1. The alphanumeric display annunciator shall be a supervised, remotely located backlit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text.
- 2. The LCD annunciator shall display all alarm and trouble conditions in the system.
- 3. An audible indication of alarm shall be integral to the alphanumeric display.
- 4. The display shall be UL listed for fire alarm application.
- 5. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6,000 feet from the control panel.
- 6. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire loop connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.

2.5 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

- 1. Addressable devices shall employ the simple-to-set decade addressing scheme. Addressable devices which use a binary-coded address setting method, such as a DIP switch, are not an allowable substitute.
- 2. Detectors shall be addressable and intelligent and shall connect with two wires to the fire alarm control panel signaling line circuits.
- 3. Addressable smoke and thermal (heat) detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.
- 4. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
- 5. Detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Base options shall include a base with a built-in (local) sounder rated for a minimum of 85 DBA, a relay base and an isolator base designed for Style 7 applications.
- 6. Detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel.
- 7. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
- 8. Detectors shall provide address-setting means using decimal switches.

2.6 BATTERIES:

- A. Upon loss of Primary (AC) power to the control panel, the batteries shall have sufficient capacity to power the fire alarm system for required standby time (24 or 60 hours) followed by 5 minutes of alarm.
- B. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.
- C. If necessary to meet standby requirements, external battery/charger systems may be used.

2.7 SURGE SUPPRESSION

- A. Provide and install Ditek No. 2MHLPB-WS on all initiating circuits entering/leaving the building. Also provide and install surge suppression at all devices mounted externally from the main building as well as on all Sprinkler/stand-pipe system monitoring/control devices. Provide and install devices in junction box concealed above accessible ceiling immediately at building exterior wall. Properly ground device per manufacturer's instruction.
- B. Provide and install Ditek No. DTK-120SRD-A on all 120V circuits providing power to any and all fire alarm system components. Provide and install empty cabinet adjacent to respective fire alarm system (match fire alarm system device cabinet). Cabinet to house surge protection device.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- C. Manual pull stations shall be suitable for surface mounting or semi flush mounting as shown on the plans and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

3.2 TEST

- A. The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72 Chapter 10. Testing shall be personally supervised by NICET Level III Certified Personnel
- B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
- C. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

- D. Verify activation of all waterflow switches.
- E. Open initiating device circuits and verify that the trouble signal actuates.
- F. Open and short signaling line circuits and verify that the trouble signal actuates.
- G. Open and short notification appliance circuits and verify that trouble signal actuates.
- H. Ground all circuits and verify response of trouble signals.
- I. Check presence and audibility of tone at all alarm notification devices.
- J. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.
- K. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
- L. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.3 SPARE PARTS

- A. Contractor shall furnish the extra materials listed below, prior to installation that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents:
 - 1. Lamps for Strobe units
 - 2. Smoke Detectors
 - 3. Heat Detectors
 - 4. Duct Detectors
 - 5. Detector Bases
 - 6. Audio/Visual Units
 - 7. Visual Only Units
 - 8. Printer Ribbons
 - 9. Monitor Modules
 - 10. Control Modules
 - 11. Isolation Modules
 - 12. Manual Fire Alarm Pull Stations (Conventional or Addressable as applicable to job)
- B. Provide a quantity equal to no less than five percent (5%) of the number of units of each type installed but not less than one (1) of each type.
- C. Each spare part shall be complete with 50' of 3/4" EMT conduit, system wiring and required system programming.

3.4 SEQUENCING AND SCHEDULING

- A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until new equipment is accepted. Remove tags from new equipment when put into service and tag existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

- B. Equipment Removal: After acceptance of the new fire detection and alarm system, remove existing disconnected fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed; deliver to Owner. Remove from site and legally dispose of remainder of existing material.

3.5 PROGRAM CODE

- A. At the end of the project and prior to requesting substantial completion, the Contractor shall provide on CD-Rom a copy of the current program code for the system.
 - 1. During program upload or download the system shall retain the capability for alarm reporting.
 - 2. The system shall download to a PC for program editing. System program shall be stored on a CD-ROM and all programming shall be multi-level password protected. A duplicate-copy of the CD-ROM shall be turned over to the Owner's personnel prior to requesting substantial completion. All system passwords shall also be turned over to the Owner at this time.

3.6 SYSTEM TESTING

- A. After installation of the Fire Detection and Alarm System is complete, the contractor shall align, adjust and balance the system and perform complete 100% operational testing as herein before described to determine conformance of the system to the requirements of the contract documents. Correct deficiencies observed in testing and replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved. Record results using the fire alarm system printer of the testing and submit to the Engineer as part of the close-out documentation. Should the installation of a permanent printer not be part of the project, contractor shall provide and install a temporary printer and all required interface hardware, paper, toner (ink), software and programming to provide the required test reports. This temporary printer shall be available for printing test reports as required until final acceptance of the fire detection system has been issued by the engineer.
- B. In addition to the testing requirements herein before specified, testing shall also include the following as a minimum:
 - 1. Verify the absence of unwanted voltages between circuit conductors and the ground conductor(s).
 - 2. Test all conductors for short circuits.
 - 3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
 - 4. Test each and every initiation and signaling device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
 - 5. Test both primary and secondary power sources for proper operation.
 - 6. Test the system to ensure that all specified functions operate as specified. This includes all function switches and indications at all Fire Detection and Alarm System control and monitoring points.

3.7 FIRE MARSHAL'S CHECKOUT

- A. Upon completing the entire installation of the Fire Detection and Alarm System, the Contractor shall perform a demonstration of the operation of the complete system in the presence of the Architect/Engineer. The above demonstrations shall encompass the work performed under this Contract. Any deficiencies found with the Fire Detection and Alarm

System installed as part of this project shall be corrected with no additional expense to the Owner prior to demonstration to "Authority Having Jurisdiction (AHJ)". After successful and accepted demonstration of the entire system to the Architect/Engineer, the Contractor shall schedule demonstration of the system with the Authority having Jurisdiction (AHJ).

- B. The Contractor shall be responsible for coordinating this demonstration with the Architect/Engineer and "Authority Having Jurisdiction (AHJ)" a minimum of forty-eight (48) hours prior to the meeting.

3.8 CLOSE-OUT DOCUMENTATION

- A. Upon successful completion of installation of the Fire Detection and Alarm System, the Contractor shall submit to the AHJ's office through the Architect/Engineer, a copy of the Fire Alarm System Certifications and Description form as described and required in NFPA 72.
- B. Contractor shall also label the Fire Detection and Alarm System as being certified by a Louisiana State Fire Marshal licensed contractor.
- C. Equipment Manuals: As part of the equipment manual submittals, the Contractor shall include the following information as a minimum:
 - 1. All information required to be submitted as part of the shop drawing submittal
 - 2. Operation and Maintenance Manual
 - 3. Device Address List
 - 4. Record of field tests of the system including the 100% operational test.
 - 5. Names, addresses, and telephone numbers of service department including nighttime and holiday access.

3.9 WARRANTY PERIOD REQUIRED WORK

- A. Three (3) months after date of substantial completion of the entire system, the Contractor shall provide a complete checkout and calibration of entire Fire Detection and Alarm System. A detailed report of this checkout shall be immediately submitted to the Architect/Engineer for review and acceptance.
- B. When requested by the owner within one (1) year of date of Substantial Completion, the contractor shall provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three (3) requested adjustment visits to the site for this purpose.
- C. At a period between eleven (11) and twelve (12) months from the date of substantial completion, contractor shall provide complete checkout and calibration of entire Fire Detection and Alarm System and shall certify the system as being fully operational.

3.10 TRAINING

- A. Contractor shall provide one (1) on-site training session with a minimum of four (4) hours of instructions on system operation to Owner's representative(s) upon completion of construction phase of the work. Contractor shall conduct instruction session prior to use by the Owner or requesting substantial completion.
- B. Contractor shall submit to the Engineer through the Architect, a sign-in sheet with the instructor's signature and signatures of all persons present during the instructional session.

- C. The sign-in sheet shall indicate time of instruction session. This sheet shall be submitted prior to use by the Owner or requesting substantial completion. Training session shall be requested in writing to the Engineer a minimum of seven (7) consecutive calendar days prior to time requested.
- D. Items to instruct the Owner's personnel on include startup, shutdown, troubleshooting, servicing, adjusting, and preventive maintenance.
- E. At the same time as the three (3) month check-out and calibration listed above, the contractor shall also provide one (1) additional training session consisting of a maximum of four (4) hours for owner's personnel. Sign-in sheets shall be submitted as hereinbefore specified. This session shall also be scheduled a minimum of seven (7) consecutive calendar days prior to requested time.

END OF SECTION 28 31 10

SECTION 31 00 00 – EARTHWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section is intended for earthwork that has to be accomplished after Demolition, if any, has been accomplished.
- B. This Section includes the following:
 - 1. Preparing and grading sub-grades for slabs-on-grade, walks, pavements, and landscaping.
 - 2. Drainage and moisture-control fill course for slabs-on-grade.
 - 3. Subbase course for walks and pavements.
 - 4. Subsurface drainage backfill for walls and trenches.
 - 5. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.
 - 6. Concrete encasings, cradles, and appurtenances for utility systems.

1.03 DEFINITIONS

- A. Excavation Consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill or topsoil materials.
- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer between the sub-grade and base course in a paving system or the layer placed between the sub-grade and surface of a pavement or walk.
- E. Base Course: The layer placed between the subbase and surface pavement in a paving system.
- F. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.
- G. Unauthorized excavation: consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.04 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specifications Sections.
- B. Test Reports: In addition to test reports required under field quality control, submit the following:
 - 1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.
 - 2. One optimum moisture-maximum density curve for each soil material.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
- B. Testing and Inspection Service: Owner shall employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

1.06 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities servicing facilities occupied by the Owner or others except when permitted in writing by the Architect and then only after acceptable temporary utility services have been provided. Coordinate all earthwork with mechanical and electrical work.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site.
- B. Satisfactory Soil Materials: Structural clay fill to be used to bring areas up to design grade for pavement sections shall consist of low-plasticity clay soils. The structural clay fill should have a liquid limit of less than 40 (preferably less than 35) and a plasticity index between 10 and 20. Structural clay fill should be free of organics and deleterious materials and have an effective clod diameter of 3 inches or less.
- C. Backfill and Fill Materials: Satisfactory soil materials.
- D. Engineered Fill: Subbase or base materials.
- E. Bedding Material: Subbase or base materials with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 8 sieve.
- G. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a NO. 50 sieve.

2.02 ACCESSORIES

- A. Warning Tape: Acid-and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2'-6" deep.
 - 1. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operators.

- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.02 DEWATERING

- A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.03 EXCAVATION

- A. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

3.04 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.05 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.06 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
- B. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- D. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduit. Remove stones and sharp objects to avoid point loading.

3.07 APPROVAL OF SUB-GRADE

- A. Notify Architect when excavations have reached required sub-grade.
- B. When Architect determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.
- D. Reconstruct sub-grades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

3.08 STORAGE OF SOIL MATERIALS

There will be no storage of soil materials on site.

3.09 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Testing, inspecting, and approval of underground utilities.
4. Concrete form work removal.
5. Removal of trash and debris from excavation.
6. Removal of temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.10 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.
- C. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
- E. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- F. Coordinate backfilling with utilities testing.
- G. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- H. Place and compact final backfill of satisfactory soil material to final sub-grade.
- I. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 FILL

- A. Once the final cut grade is obtained, the exposed subgrade shall be proof-rolled with a fully loaded dump truck or an equivalent heavy, wheeled vehicle to identify soft or weak zones. At least two complete passes shall be made over the area. The second pass is to be made perpendicular to the first pass. Weak or soft materials observed during proof-rolling shall be removed and replaced with properly compacted structural clay fill.
- B. When sub-grade or existing ground surface to receive fill has a density of less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and re-compact to required density.
- C. Place fill material in layers to required elevations for each location listed below.
- D. Under grass, use satisfactory excavated or borrow soil material.
- E. Under walks and pavements, use subbase or base material, or satisfactory excavated or borrow soil material.
- F. Under steps and ramps, use subbase material.

3.12 MOISTURE CONTROL

- A. Uniformly moisten or aerate sub-grade and each subsequent fill or backfill layer before compaction to within 1 percent dry and 3 percent wet of optimum moisture content.

- B. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- C. Remove and replace or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.
- D. Stockpile or spread and dry removed wet satisfactory soil material.

3.13 COMPACTION

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than 95 percentage of maximum dry density according to ASTM D 698 (Standard Proctor):

3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Provide a smooth transition between existing adjacent grades and new grades.
- B. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- C. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish sub-grades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
 - 2. Walks: Plus or minus 0.10 foot.
 - 3. Pavements: Plus or minus ½ inch.

3.15 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course material on prepared sub-grades. Place base course material over sub-bases to pavements.
- B. Compact subbase and base courses at optimum moisture content to required grades. Lines, cross sections and thickness to not less than 95 percent of ASTM C 4254 relative density.
- C. Shape subbase and base to required crown elevations and cross-slope grades.
- D. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
- E. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each sub-grade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
- B. Perform field in-place density tests to confirm the in-place density as recommended by the Geotechnical Consultant approved by the Architect.
- C. Paved Areas: At each compacted fill and backfill layer, perform at least one density test for every 10,000 sq. ft. or less of paved area, but in no case fewer than three tests.

- D. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 500 feet or less of trench, when outside of areas to be paved.
- E. Where trenches cross areas to be paved, a test shall be performed at each pavement crossing. Where trenches are under paved areas, one test for every 150 linear feet of trench shall be performed.
- F. When testing agency reports that sub-grades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
- C. Scarify or remove and replace material to depth directed by the Architect; reshape and re-compact at optimum moisture content to the required density.
- D. Settling: Where settling occurs during the Project correction period, removed finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
- E. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIAL

Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 31 00 00

KING ARCHITECTS, INC

SECTION 31 10 00

SECTION 31 00 00 – SITE CLEARING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01, apply to this Section.
- B. Refer to Document 00 21 13, Instructions to Bidders, for substitution of materials and products.
- C. Addenda issued during the bidding period that affect this section of the specifications.

1.2 SUMMARY

- A. Section includes protecting existing vegetation to remain, removing existing vegetation, clearing and grubbing, and stripping and stockpiling topsoil.
- B. Related Sections:
 - 1. Section 01 50 00, Temporary Facilities and Controls
 - 2. Section 01 57 19, Temporary Environmental Controls
 - 3. Section 31 00 00, Earthwork

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project Site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious and black or a darker shade of brown, gray or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials or other non-soil materials.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project Site.

1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or videotape.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks and other adjacent occupied or used facilities during site clearing operations.
 - 1. Do not close or obstruct streets, walks or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternated routed around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion and sedimentation control are in place.
- E. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation of other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources and smoking within or near protection zones.
- H. Soil Stripping, Handling and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 00 00, Earthwork. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Comply with the requirements of Section 01 50 00, Temporary Facilities and Control and Section 01 57 19, Temporary Environmental Controls.

3.3 EXISTING UTILITIES

- A. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupies by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services necessary to serve the Owner's operations:

1. Notify the Architect not less than 10 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip vegetation, topsoil, existing pavement/flatwork, and other debris/unsuitable material to depth necessary to prevent intermingling with underlying subsoil or other waste materials, but in no case less than 6 inches.
 1. Remove subsoil and non-soil materials from topsoil including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 1. Limit height of topsoil within protection zones.
 2. Do not stockpile topsoil within protection zones.
 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below- grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 10 00

[ISSUE DATE]

SECTION 31 10 13 – SITE PREPARATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Felling of trees including removal of stumps, roots, and other debris.
 - 2. Removing shrubs, grass, weeds, and other understory vegetation.
 - 3. Construction of protection fencing around trees.
 - 4. Cleanup and removal of debris and material, labor, tools, machinery, and processes necessary to complete the above.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.

1.04 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-preparation operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without written permission from Owner and Authorities Having Jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by the Owner or Authorities Having Jurisdiction.

1.05 QUALITY ASSURANCE

- A. Qualifications: Work shall be performed by personnel trained and experienced in the execution of the Work and under the direct supervision of a superintendent on Contractor's staff.
- B. Workmanship: Perform work in conformance with recognized acceptable practices. Where job requirements require deviation from those practices, obtain approval from the Owner before proceeding.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with applicable state and Federal laws.
 - 1. Store and handle materials as recommended in writing by materials manufacturer.

1.07 EXISTING CONDITIONS

- A. Protection of Existing Utilities:
 - 1. Existence and location of underground items are not guaranteed. Investigate and field verify before starting work. Excavation and backfill in the vicinity of existing items of work shall be carried out with extreme caution.
 - 2. Contractor shall be held responsible for any damage and for maintenance and protection of existing utilities.
 - 3. Indicate on record drawings where there is conflict between field conditions and Drawings.

PART 2 – PRODUCTS

2.01 EQUIPMENT

[ISSUE DATE]

- A. Machinery: Machinery shall be approved by Owner. Contractor shall provide equipment and machinery sufficient for proper execution of Work.
- B. Herbicide: Pre-emergent herbicide effective in controlling the germination or growth of weeds within planted areas.
- C. Siltation Fencing: Complying with ASTM D6461.
- D. Temporary Tree and Plant Protection Fencing:
 - 1. Provide ASTM A392, Type II, Class 1, 1.2 oz./sq. ft. zinc-coated chain link fabric in one-piece heights measured between top and bottom of outer edge of salvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
 - a. Fabric Height: Five feet.
 - b. Wire Diameter: 0.148 inch (3.76 MM).
 - c. Mesh Size: 2 inches.
 - 2. Posts: ASTM F1043, Group IC-L, light industrial round steel pipe.
 - 3. Standard Round Wire Ties: For attaching chain-link fabric to posts according to the following:
 - a. Hot-Dip Galvanized Steel: 0.106-inch- diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing site improvements to remain from damage during construction.
 - 1. Verify with the Owner which objects are to be removed and salvaged and which objects are to be preserved in place.
 - 2. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 TREE PROTECTION

- A. Erect and maintain temporary fencing around drip line before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within dripline unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect or Landscape Architect.

3.03 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner's Representative not less than two weeks in advance of proposed utility interruptions to allow conformance with Utility Department Outage Notification protocols.
 - 2. Do not proceed with utility interruptions without Owner's written permission.

3.04 EXISTING WEED AND GRASS STRIPPING

- A. Strip area within work limits shown on Drawings of lawns and vegetation under the direction of the Architect or Landscape Architect.
 - 1. Strip soil to depths and in such a manner to prevent intermingling with underlying subsoil or other objectionable material.
 - 2. Remove heavy growths of vegetation from areas before stripping soil.
 - 3. Where trees are indicated to remain, stop topsoil stripping a sufficient distance from dripline to prevent damage to main root system.
 - 4. Stockpile topsoil where directed.
 - a. Construction storage piles to freely drain surface water but not onto adjacent properties.
 - b. Cover storage piles if required to prevent windblown dust.

- B. Method of removal shall remove a minimum amount of topsoil and shall be even so that there is not a general change to overall grading.

3.05 CLEARING AND GRUBBING

- A. Comply with requirements of Division 31 Section "Clearing and Grubbing."

3.06 PROTECTION

- A. Protect prepared areas from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures or picnic tables.
 - 5. Excavation or other digging unless otherwise indicated.
 - 6. Impoundment of water.

3.07 CLEANING AND DISPOSAL

- A. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
 - 1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

SECTION 31 24 23 – EXCAVATION EMBANKMENT GRADING & SHAPING SUBBASE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This work consists of excavation, disposal, placement and compaction of all materials which are not provided for under other sections of these specifications, including excavation and embankment construction of subbase and all other grading operations necessary for the work in accordance with these specifications and in conformity with the lines, grades thickness and typical cross sections shown on the plans or established by the Engineer.
- B. It is the intent that all materials for the earthwork on this project come from this site. The contract drawings show existing grades and the proposed finished grades. It is the contractor's responsibility to calculate earthwork quantities to accomplish grades shown. If there is excess material or if more material is required, the contract drawings show locations on site for excess fill or additional borrow. There will be no additional cost to owner for this work. If excess fill or additional is required, the perimeter grades will be adjusted smoothly between lines shown and new grades.
- C. All areas of the site that require earthwork shall have vegetation and top 3" of topsoil removed and disposed of offsite at no additional cost to owner. At all areas of site that are to have cut, topsoil is to be removed to clay and stockpiled. This topsoil is not to be intermingled with waste topsoil containing vegetation or other unusable matter.
- D. In areas where asphalt concrete paving is to be installed, where buildings have slab-on-grade foundations, and oxidation ponds are to be constructed (and 3 feet outside these lines) the topsoil shall be removed to firm clay. In all other area the topsoil may remain and required fill may be installed on top of it.

1.02 GENERAL REQUIREMENTS

- A. Excavation and fill shall be finished to reasonably smooth and uniform surfaces. Excavation operations shall be so conducted that material outside construction limits will not be disturbed.
- B. Prior to beginning excavation, grading, and filling operations in the area to be surfaced, all necessary clearing and grubbing in that area shall have been completed.
- C. In preparation of the natural ground to receive fill material or preparation of the finished section in a cut area on which fill material is to be placed, the Contractor shall attempt all normal earthwork construction methods before the Engineer will consider undercutting or modifying the soil with additives. Such construction methods shall include, but not limited to the following:
 - D. Drainage and drying of the surface until the material is within reasonable limits of optimum moisture before compaction is attempted.
 - E. Using lighter construction equipment for manipulation, diskings, drying, and compacting of necessary to support the equipment while placing subsequent layers.
 - F. Rerouting heavy construction equipment around the area until the subbase can support such equipment without damage to foundation soils.
 - G. Unstable materials shall be removed by undercutting, unless otherwise directed, and the areas backfilled to the required section with usable soils as directed.
 - H. Compaction of fill may be accomplished by any method that will obtain the specified density. Dumping and rolling areas shall be kept separate.
 - I. In the event that soil additives such as hydrated lime or cement are required to accomplish desired results, the owner will only be responsible for cost of material for additives. The Contractor will be responsible for all other costs.

1.03 MATERIALS

- A. All site materials that are predominately clay are considered suitable for any required fill operations. Topsoil is considered suitable fill only for general fill areas. These general fill areas are all areas excluding areas where asphalt concrete paving is to be installed, where building have slab-on-grade foundations.

1.04 FILL AND COMPACTION

- A. Under Portland Cement Concrete Paving - All areas under asphalt concrete paving and Portland cement concrete paving shall be filled with clay in maximum of 8" lifts and compacted to 90% of Standard Proctor Density (ASTM D 698).
- B. Under Base Bid Limestone Paving - All areas under limestone paved roads included under base bid shall be filled with clay in maximum of 8" lifts and compacted to 90% of Standard Proctor Density (ASTM D 698).
- C. Under Building Slabs - All areas under Building Slabs and shall be filled with clay in maximum of 8" lifts and compacted to 95% of Standard Proctor Density (ASTM D 698).
- D. Oxidation Pond Construction - All fill and compaction for construction of oxidation ponds shall be filled with clay in maximum of 8" lifts and compacted to 95% of Standard Proctor Density (ASTM D 698).
- E. All Other Areas - all other areas on site shall be filled in maximum of 9" lifts and compacted to 85% of Standard Proctor Density (ASTM D 698), if fill material is predominantly clay, and to 85% of relative dry density of material is sandy or silt topsoil.

END OF SECTION 31 24 23

SECTION 31 31 16 – TERMITE CONTROL

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide soil treatment for termite control.

1.02 QUALITY ASSURANCE

- A. Engage a professional pest control operator, licensed in accordance with regulation of governing authorities.

1.03 RESTRICTIONS

- A. Do not apply soil treatment solution until excavating, filling, and grading operations. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instruction of the soil toxicant manufacturer.

1.04 SPECIFIC PRODUCT WARRANTY

- A. Furnish written warranty certifying that applied soil poisoning treatment will prevent infestation of termites, and that if subterranean termite activity is discovered during the five (5) year warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

PART 2 – PRODUCTS

2.01 SOIL TREATMENT SOLUTION

- A. Use an emulsible concentrate insecticide for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Provide a working solution of one of the following chemical elements and concentrations:
 - 1. Aldrin, 0.5% in water emulsion.
 - 2. Dieldrin, 0.5% in water emulsion.
 - 3. Heptachlor, 0.5% in water emulsion.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen and level soils to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

3.02 APPLICATION RATES

- A. Apply soil treatment solution as follows:
 - 1. Under slab-on-grade structures treat soil before concrete slabs are placed using either power sprayer or tank-type garden sprayer.
 - a. Apply 4 gallons of chemical solution per 10 lin.ft. to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition wall, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.

-
- b. Apply one gallon of chemical solution per 10 sq. ft. as an overall treatment under slab and attachment slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
 - c. Apply 4 gallons of chemical solution per 10 lin. ft. of trench, for each foot of depth from grade to footing, along outside edge of building. Dig a trench 6" and 8" wide along outside of foundation to a depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench.
 - 2. Under crawlspace and basement structures, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures. Treat soils under or around crawl-space structures as follows:
 - a. Apply 4 gallons of chemical solution per 10 lin. ft. of trench along outside of foundation walls, along both sides of interior partitions, and around piers and plumbing. Do not apply an overall treatment in crawlspaces.
 - b. Apply 4 gallons of chemical solution per 10 lin. ft. of trench, for each foot of depth from grade to footing, along outside of foundation walls, including part beneath entrance platform porches, etc.
 - c. Apply 4 gallons of chemical solution per 10 lin. ft. along the inside and outside of foundation walls of porches.
 - d. Apply one gallon per 10 sq.ft. of soil surface as an overall treatment, only where attached concrete platform and porches are on fill or ground.
 - B. At hollow masonry foundations or grade beams, treat voids at rate of 2 gallons per 10 lin. ft. poured directly into the hollow spaces.
 - C. At expansion joints, control joints, and areas where slabs will be penetrated, at rate of 4 gal. per 10 lin. ft. of penetration.
 - D. Allow not less than 12 hours for drying after application before beginning concrete placement or other construction activities.
 - E. Post signs in areas of application warning workers that soil poisoning has been applied. Remove signs when areas covered by other construction.
 - F. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.

END OF SECTION 31 31 16

SECTION 316329 - DRILLED CONCRETE PIERS AND SHAFTS

PART 1 - GENERAL



1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Dry-installed drilled piers.
 - 2. Slurry displacement-installed drilled piers.
 - 3. Dry-installed or slurry displacement-installed drilled piers at Contractor's choice.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternative design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings: For concrete reinforcement, detailing fabricating, bending, supporting, and placing.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that specialized in drilled-pier work.
- B. Testing Agency Qualifications: Qualified according to ASTM C1077, ASTM D3740, and ASTM E329 for testing indicated.

1.6 FIELD CONDITIONS

- A. Existing Utilities: Locate existing underground utilities before excavating drilled piers. If utilities are to remain in place, provide protection from damage during drilled-pier operations.

1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, adapt drilling procedure if necessary to prevent damage to utilities. Cooperate with Owner and utility companies in keeping services and facilities in operation without interruption. Repair damaged utilities to satisfaction of utility owner.
- B. Interruption of Existing Utilities: Do not interrupt any utility to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
 1. Notify Architect/Owner no fewer than two days in advance of proposed interruption of utility.
 2. Do not proceed with interruption of utility without Architect's/Owner's written permission.
- C. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.
 1. The geotechnical report is included elsewhere in the Project Manual.
- D. Survey Work: Engage a qualified land surveyor to perform surveys, layouts, and measurements for drilled piers. Before excavating, lay out each drilled pier to lines and levels required. Record actual measurements of each drilled pier's location, shaft diameter, bottom and top elevations, deviations from specified tolerances, and other specified data.
 1. Record and maintain information pertinent to each drilled pier and indicate on record Drawings. Cooperate with Owner's testing and inspecting agency to provide data for required reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Drilled-Pier Standard: Comply with ACI 336.1 except as modified in this Section.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source, throughout Project:
 1. Portland Cement: ASTM C150, Type I/II. Supplement with the following:
 - a. Fly Ash: ASTM C618, Class F. The use of fly ash is an option, not a requirement.

- B. Normal-Weight Aggregate: ASTM C33, graded, 1-inch nominal maximum coarse-aggregate size. Provide aggregate from a single source.
 - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C94 and potable.
- D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494, Type A.
 - 2. Water-Reducing and Retarding Admixture: ASTM C494, Type D.
 - 3. High-Range, Water-Reducing and Retarding Admixture: ASTM C494, Type G.
 - 4. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

2.4 STEEL CASINGS

- A. Steel Pipe Casings: ASTM A283, Grade C, or ASTM A36, carbon-steel plate, with joints full-penetration welded according to AWS D1.1.
- B. Corrugated-Steel Pipe Casings: ASTM A929, steel sheet, zinc coated.

2.5 SLURRY

- A. Slurry: Pulverized bentonite mixed with water to form stable colloidal suspension; complying with ACI 336.1 for density, viscosity, sand content, and pH.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Limit percentage, by weight, of fly ash to 15%. The use of fly ash is an option, not a requirement.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Proportion normal-weight concrete mixture as follows:
 - 1. Compressive Strength (28 Days): 3000 psi
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50
 - 3. Minimum Slump: Capable of maintaining the following slump until completion of placement:
 - a. 4 inches for dry, uncased, or permanent-cased drilling method.
 - b. 6 inches for temporary-casing drilling method.

- c. 7 inches for slurry displacement method.
- 4. Air Content: Do not air entrain concrete.

2.7 REINFORCEMENT FABRICATION

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
 - 2. Refer to section 033000 "Cast in Place Concrete" for additional requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, vibration, and other hazards created by drilled-pier operations.

3.2 EXCAVATION

- A. Unclassified Excavation: Excavate to bearing elevations regardless of character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.
 - 1. Obstructions: Unclassified excavation may include removal of unanticipated subsurface obstructions. No changes in the Contract Sum or the Contract Time are authorized for removal of obstructions.
- B. Prevent surface water from entering excavated shafts. Conduct water to site drainage facilities.
- C. Excavate shafts for drilled piers to indicated elevations. Remove loose material from bottom of excavation.
 - 1. Remove water from excavated shafts before concreting.
- D. Excavate shafts for closely spaced drilled piers and for drilled piers occurring in fragile or sand strata only after adjacent drilled piers are filled with concrete and allowed to set.

- E. Notify and allow testing and inspecting agency to test and inspect bottom of excavation. If unsuitable bearing stratum is encountered, make adjustments to drilled piers as determined by Architect.
 - 1. Do not excavate shafts deeper than elevations indicated unless approved by Architect.
 - 2. Payment for additional authorized excavation is according to Contract provisions for changes in the Work.
- F. Slurry Displacement Method: Stabilize excavation with slurry maintained a minimum of 60 inches above ground-water level and above unstable soil strata to prevent caving or sloughing of shaft. Maintain slurry properties before concreting.
 - 1. Excavate and complete concreting of drilled pier on same day.
- G. Temporary Casings: Install watertight steel casings of sufficient length and thickness to prevent water seepage into shaft; to withstand compressive, displacement, and withdrawal stresses; and to maintain stability of shaft walls.
 - 1. Remove temporary casings, maintained in plumb position, during concrete placement and before initial set of concrete.
- H. Tolerances: Construct drilled piers to remain within ACI 336.1 tolerances.
 - 1. If location or out-of-plumb tolerances are exceeded, provide corrective construction. Submit corrective construction proposals to Engineer for review before proceeding.

3.3 STEEL REINFORCEMENT INSTALLATION

- A. Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy bond with concrete.
- C. Fabricate and install reinforcing cages symmetrically about axis of shafts in a single unit.
- D. Accurately position, support, and secure reinforcement against displacement during concreting. Maintain minimum cover over reinforcement.
- E. Use templates to set anchor bolts, leveling plates, and other accessories furnished in work of other Sections. Provide blocking and holding devices to maintain required position during final concrete placement.
- F. Protect exposed ends of extended reinforcement, dowels, or anchor bolts from mechanical damage and exposure to weather.

3.4 CONCRETE PLACEMENT

- A. Place concrete in continuous operation and without segregation immediately after inspection and approval of shaft by a qualified testing agency.

- B. Free fall of concrete shall not exceed ten (10) feet; use of a pump or tremie is required for shaft depths in excess of ten (10) feet.
- C. Dry Method: Place concrete to fall vertically down the center of drilled pier without striking sides of shaft or steel reinforcement.
 - 1. Where concrete cannot be directed down shaft without striking reinforcement; place concrete with chutes, tremies or pumps.
 - 2. Vibrate top 60 inches of concrete.
- D. Slurry Displacement Method: Place concrete in slurry-filled shafts by tremie methods or pumping. Control placement operations to ensure that tremie or pump pipe is embedded no less than 60 inches into concrete and that flow of concrete is continuous from bottom to top of drilled pier.
- E. Coordinate withdrawal of temporary casings with concrete placement to maintain at least a 60-inch head of concrete above bottom of casing.
 - 1. Vibrate top 60 inches of concrete after withdrawal of temporary casing.
- F. Screed concrete at cutoff elevation level and apply scoured, rough finish. Where cutoff elevation is above the ground elevation, form top section above grade and extend shaft to required elevation.
- G. Protect concrete work, according to ACI 301, from frost, freezing, or low temperatures that could cause physical damage or reduced strength.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 2. Do not use calcium chloride, salt, or other mineral-containing antifreeze agents or chemical accelerators.
- H. If hot-weather conditions exist that would seriously impair quality and strength of concrete, place concrete according to ACI 301 to maintain delivered temperature of concrete at no more than 90 deg F.
 - 1. Place concrete immediately on delivery. Keep exposed concrete surfaces and formed shaft extensions moist by fog sprays, wet burlap, or other effective means for a minimum of seven days.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Concrete Tests and Inspections: ASTM C172 except modified for slump to comply with ASTM C94.
 - 1. Slump: ASTM C143; one test at point of placement for each compressive-strength test but no fewer than one test for each concrete load.

2. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 deg F -and below and 80 deg F and above, and one test for each set of compressive-strength specimens.
 3. Compression Test Specimens: ASTM C31; one set of four standard cylinders for each compressive-strength test unless otherwise indicated. Mold and store cylinders for laboratory-cured test specimens unless field-cured test specimens are required.
 4. Compressive-Strength Tests: ASTM C39; one set for each drilled pier but not more than one set for each truck load. Test one specimen at seven days, test two specimens at 28 days, and retain one specimen in reserve for later testing if required.
 5. If frequency of testing provides fewer than five strength tests for a given class of concrete, conduct tests from at least five randomly selected batches or from each batch if fewer than five are used.
 6. If strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 7. Strength of each concrete mixture is satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 8. Report test results in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. List Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests in reports of compressive-strength tests.
 9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but not be used as sole basis for approval or rejection of concrete.
 10. Additional Tests: Testing and inspecting agency to make additional tests of concrete if test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
 11. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.
 12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- C. An excavation, concrete, or a drilled pier will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports for each drilled pier as follows:
1. Actual top and bottom elevations.
 2. Actual drilled-pier diameter.
 3. Description of soil materials.
 4. Description, location, and dimensions of obstructions.
 5. Final top centerline location and deviations from requirements.
 6. Variation of shaft from plumb.
 7. Shaft excavating method.
 8. Ground-water conditions and water-infiltration rate, depth, and pumping.

9. Description, length, diameter, and top and bottom elevations of temporary or permanent casings.
10. Description of soil or water movement, sidewall stability, loss of ground, and means of control.
11. Date and time of starting and completing excavation.
12. Inspection report.
13. Condition of reinforcing steel and splices.
14. Position of reinforcing steel.
15. Concrete placing method, including elevation of consolidation and delays.
16. Elevation of concrete during removal of casings.
17. Concrete volume.
18. Concrete testing results.
19. Remarks, unusual conditions encountered, and deviations from requirements.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 316329

SECTION 32 16 00 – CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This work consists of the construction of concrete sidewalks, driveways, parking areas, curbs and gutters, small slabs, head walls, embedment for posts, foundations for light standards and sign structures and other miscellaneous formed and unformed concrete in accordance with these specifications and in reasonably close conformity with the lines, grades and dimensions shown on the plans or established by the Engineer.

PART 2 - MATERIALS

2.01 PORTLAND CEMENT CONCRETE

- A. The concrete shall have a minimum compressive strength at twenty-eight (28) days as shown on the plans when tested in accordance with DOTD Designation: TR 230. Concrete shall have a minimum compressive strength of 3,000 psi unless otherwise specified on the plans. Portland cement shall comply with the standard specifications for Portland cement and shall be Type 1.

2.02 PREFORMED JOINT FILLERS

- A. Preformed joint fillers shall be used in joints when specified in accordance with the project and specifications. Unless otherwise specified, the Contractor has the option of using any of these approved preformed fillers. Other preformed fillers may be approved by the Engineer and specified in the project plans or specifications.

2.03 BITUMINOUS TYPE PREFORMED JOINT FILLER

- A. Bituminous preformed expansion joint filler shall consist of bituminous (asphalt or tar) mastic composition, formed and encased between two (2) layers of bituminous impregnated felt. The preformed filler shall conform to ASTM Designation: D 944.

2.04 REDWOOD JOINT FILLER

- A. The boards shall be clear heart redwood. Occasional medium surface checks will be permitted provided the board is free of any defects that will impair its usefulness for the purpose intended. No board of a length less than 6 feet may be used, and the separate pieces shall be held securely to form a straight line. When a section is less than 6 feet is required, no spliced board will be accepted.
- B. The dimensions shall be as specified and a tolerance of +1/16 inch thickness, +1/8 inch depth, and +/-1/4 inch length will be permitted.
- C. The load required to compress the material in an over-dry condition to 50% of its original thickness shall not exceed 1,800 psi.

2.05 PREFORMED CLOSED CELL POLYETHYLENE JOINT FILLER

- A. The joint filler shall be formed by the expansion of polyethylene base resin, extruded as a multicellular, closed cell, homogeneous section of foamed polyethylene. This material shall be used with an adhesive as recommended by the manufacturer. The joint filler and adhesive shall be approved products on the DOTD Qualified Products List. The dimensional requirements for the joint filler shall be as shown on the plans.

2.06 PREFORMED GALVANIZED KEYED JOINT FORMS

- A. The joint form shall be galvanized steel of the dimensions and thickness indicated on the plans or directed by the Engineer. The form shall be shaped such that it forms a tongue and groove joint. The form shall be of sufficient strength to resist the pressure of the concrete without springing.

2.07 POURED JOINT SEALERS

- A. These joint sealers shall be used in sealing joints when specified in accordance with the project plans and specifications. If not specified, the Contractor may use any of the poured joint sealers in Section 1005.02 of the DOTD Standard Specifications for Roads and Bridges. Other sealants may be approved by the Engineer and specified in the project plans or specifications.

2.08 REINFORCING STEEL

- A. Re-enforcing steel for concrete reinforcement shall conform to the following specifications:
- B. Billet-Steel Deformed and Plain Bars, ASTM Designation: A 615
- C. Rail-Steel Deformed and Plain Bars, ASTM Designation A 616
- D. Axle-Steel Deformed and Plain Bars, ASTM Designation A 617
- E. Cold-Drawn Steel Wire, ASTM Designation: A 82, with the following amendment: For material testing over 110,000 psi tensile strength in high strength application such as spirals and ties, the 25% minimum reduction in area shall be reduced 5% for each 10,000 minimum psi increment of tensile strength exceeding 110,000 psi.
- F. Welded Steel Wire Fabric, ASTM Designation: A 185
- G. Number 2 bars need not be deformed and shall conform to Headings 1, 2 or 3 above. Wire conforming to Heading 4 above may be used in lieu of Number 2 bars when furnished in Size W 5

2.09 CURING MATERIALS

- A. Curing materials shall conform to the following:
 - 1. Liquid Membrane - Forming Compounds
 - a. This material shall conform to AASHTO Designation: M 148, except that specimens tested for drying time shall be maintained at a temperature of 100 degrees Fahrenheit, +/-2 degrees Fahrenheit and a relative humidity of 32 +/-2%. When so tested, the membrane-forming compound shall dry to touch in not more than two (2) hours.
 - 2. Burlap Cloth Made from Jute or Kenaf
 - a. This material shall conform to AASHTO Designation: M 182, Class c.
 - 3. Waterproof Paper
 - a. This material shall conform to AASHTO Designation: M 171.
 - 4. White Polyethylene Sheeting
 - a. This material shall conform to AASHTO Designation: M 171.
 - 5. Combined Burlap and White Polyethylene Sheeting
 - a. These materials shall conform to AASHTO Designation: M 171.

2.10 FORMED CONCRETE

- A. Formed concrete shall include those items of construction which are constructed or reinforced concrete and have specified size, shape and dimensions, such as concrete headwalls, slabs and others as shown in the plans or specified by the Engineer. Formed concrete shall be constructed in accordance with these specifications.
- B. Reinforcing steel shall be bent to the shapes shown on the plans. All steel reinforcing shall be placed as near as practicable to the position shown on the plans and firmly held in place during placing of the concrete. When placed in structure, reinforcing steel shall be free from dirt, case rust, loose scale, paint, oil, grease or other foreign material.

- C. Splices of reinforcement shall be staggered as far as possible. Unless shown otherwise on the plans, bars shall be lapped a minimum of 30 bar diameters. Construction joints shall not be made within the limits of the lapped bars.

2.11 UNFORMED CONCRETE

- A. When shown on the plans or specified by the Engineer, unformed concrete shall be used for splash aprons, concrete collars and for other uses other than for patching. The concrete shall have a compressive strength of 3,000 psi at twenty-eight (28) days and shall be unreinforced.

PART 3 - EXCAVATION AND BACKFILL

Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The subgrade shall be shaped and compacted to a firm, even surface conforming to the section shown on the plans. All soft and yielding material shall be removed and replaced with approved material, at the Contractor's expense, and thoroughly compacted.

Backfill shall be approved material free of grass, weeds and other objectionable material. The backfill material shall be spread in successive layers not exceeding 8 inches loose depth and shall be compacted by an approved method of 95% maximum density, determined in accordance with DOTD Designation: TR 418. When subsurface drainage structures are to be placed under parking areas, curb and gutter, sidewalks, driveways or other formed concrete, the excavation and backfilling for them shall be completed and compacted before the sub-grade is prepared as specified herein.

Excavation and backfill will not be measured as a separate item, but shall be considered as incidental to the work.

3.01 FORMS

- A. Forms shall be of wood or metal and shall extend for the full depth of concrete. All forms shall be straight, clean, and free from warp and of sufficient strength to resist the pressure of the concrete without springing.
- B. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- C. Metal ties or anchorage within the forms shall be so constructed as to permit their removal to a depth of at least 1/2 inch from the face of the structure without damage to the concrete. In case ordinary wire ties are permitted, all wires, upon removal of the forms, shall be cut back at least 1/4 inch from the face of the concrete with chisels or nippers; for green concrete, nippers are necessary. Fittings for metal ties shall be of such design that, upon their removal, cavities which are left will be of the smallest possible size. The cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in color. For curbs, a mechanical curb forming machine may be used.

3.02 JOINTS

A. CURBS AND GUTTERS

1. Joints shall be formed in integral curbing to correspond with transverse joints in the pavement slab. All joints shall extend entirely under the curb and gutter section and through the curb and gutter and shall be finished and filled with prescribed filler.
2. All other types of curbing shall be provided with 1/2 inch expansion joints at all drainage structures and at the beginning and end of all curves; the maximum distance between expansion joints shall not exceed 200 feet. pre-molded joint filler shall be placed through the entire cross section of the curb and gutter at all expansion joints. Dummy joints shall be formed at intervals of 15 feet. Dummy joints shall be approximately 1/4 inch wide and shall extend the concrete for at least 1/4 of the depth.

B. SIDEWALKS AND DRIVEWAYS

1. Expansion joints shall be of the dimensions specified and shall be filled with a pre-formed expansion joint filler. Dummy joints shall be formed with a jointing tool or by other acceptable means as directed. The dummy joints shall extend into the concrete for at least 1/4 of the depth and shall be approximately 1.8 inch wide. Unless otherwise specified, the spacing of dummy joints for sidewalks shall be equal to the width of the

walk but not less than 4 feet. A longitudinal dummy joint shall be formed along the centerline of driveways more than 16 feet wide and transverse dummy joints shall be formed in driveways at not more than 16 foot intervals.

2. Construction joints shall be formed around all appurtenances such as manholes, etc., extending into and through the paving. Unless otherwise specified, 1/2 inch preformed expansion joint filler shall be installed in these joints. Expansion joint filler of the thickness indicated shall be installed between concrete paving and any fixed structure such as a building or bridge. The expansion joint filler shall extend for the full depth of the paving.
3. Expansion joint filler for sidewalks shall be 1/2 inch thick and shall be placed at intervals not exceeding 28 feet and at all junctions of new concrete with curbs, existing walks and driveways.

C. PARKING AREAS

1. Construction joints shall be placed concrete parking areas at intervals not to exceed 15 feet in length or width, unless noted otherwise on the plans. The joints shall be tongue and groove joints, formed with a preformed galvanized keyed joint form as specified in Article 2, Paragraph B4 of this section. All construction joints shall be contraction joints except around fixed objects. At all fixed objects, such as buildings, construction joints shall be formed and 1/2 inch preformed joint filler shall be placed in these joints unless otherwise specified. The joint filler shall extend for the full depth of paving. Expansion joints shall be formed as specified and shall be filled with a preformed expansion joint filler.

3.03 DEPOSITING CONCRETE

- A. The sub-grade shall be thoroughly moistened immediately prior to placing concrete. The concrete shall be placed on the prepared sub-grade, struck-off and compacted to the required thickness. All concrete shall be spaded or vibrated sufficiently to eliminate all voids and shall be tamped to bring the mortar to the surface. The surface shall be finished smooth and even with a wooded float. All edges shall be rounded with an approved finishing tool.
- B. For integral type curbing, after the pavement has been struck-off, the curb shall be clamped or otherwise securely fastened in place on the slab form and the additional concrete shall then be deposited and thoroughly tamped. The additional concrete shall be placed within thirty (30) minutes after the pavement slab has been finished and care shall be taken to ensure monolithic construction. The Contractor shall then proceed in accordance with these specifications.
- C. At the contractor's option, integral type curbing may be placed after completion of the pavement, provided dowels are placed in the pavement of the size, type and spacing shown on the plans. No additional cost to the Owner shall result from placing curb by this method.
- D. At the contractor's option, concrete curbing may be placed by slip-form methods. Slip-formed concrete shall be placed with an approved machine designed to spread, vibrate, consolidate and finish the concrete in one (1) pass of the machine in such manner that a minimum of hand finishing will be necessary to provide a dense, homogeneous unit. The sliding forms shall be rigidly held together to prevent spreading of forms, and after passing there shall be no noticeable slumping of concrete. The concrete shall be held at uniform consistency with a 1/2 inch to 2 inch slump unless directed otherwise by the Engineer.

3.04 FINISHING

- A. Forms on curbing shall be removed within twenty-four (24) hours after the concrete has been placed and honeycombed areas and other defects shall be filled with a mortar composed of Portland cement and sand, mixed in the same proportion as provided for the concrete. Plastering will not be permitted on the faces of curbs and all rejected concrete shall be removed and replaced without additional compensation.
- B. On parking areas, sidewalks and driveways, the forms shall remain in place for at least twenty-four (24) hours after placement of the concrete. Defective areas shall be filled in with a mortar composed of Portland cement and sand, mixed in the same proportions as provided for the concrete. The surface of sidewalks and driveways shall be finally brushed in order to leave a slightly rough finish.

- C. The forms shall remain in place for seven (7) days on formed concrete. Defective areas shall be corrected as specified for curb and gutter, sidewalks and driveways.
- D. When a rubbed finish is specified, completed concrete shall be finished by rubbing the exposed surfaces with Carborundum or other abrasive to a smooth surface and to remove all form marks. Non-exposed surfaces shall have the form finish, except that all holes and defects shall be corrected.

3.05 CURING

- A. Concrete shall be cured for at least seventy-two (72) hours. Curing shall be done with the use of white pigmented liquid membrane curing compound or by other approved methods. During the curing period, traffic detrimental to the structure shall not be permitted.

3.06 COLD WEATHER CONCRETING

- A. Unless authorized in writing by the Engineer, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reached 40 degrees Fahrenheit, and not resumed until an ascending air temperature in the shade and away from artificial heat reaches 35 degrees Fahrenheit.
- B. If the air temperature is 35 degrees or less at the time of placing concrete, the Engineer may require the water or the aggregates to be heated to not less than 70 degrees Fahrenheit nor more than 150 degrees Fahrenheit. No concrete shall be placed on a frozen subgrade nor shall frozen aggregates be used in the concrete.

3.07 REMOVE AND REPLACE CONCRETE SIDEWALKS AND DRIVEWAYS

- A. The Contractor shall remove sidewalks and driveways where designated on the plans by making a neat sawed joint. The removed concrete shall be removed from the site at no additional cost to Owner.
- B. The sidewalk or driveway shall be replaced to match the finish grade to the original width and thickness. However, in no event shall it be less than 4 inches thick.
- C. Construction of sidewalks and driveways shall conform to this section of the specifications. Wire mesh fabric reinforcing shall be required only where original concrete sidewalks and driveways were reinforced.

3.08 SAWED JOINTS

- A. Where required on the plans or directed by the Engineer, the contractor shall remove pavement, drives and walks by making a neat sawed joint. All work shall be performed with an approved saw and blade. The minimum depth of the saw cut shall be 2 inches unless specified otherwise with 0.125 inches minimum width. Damages to pavement surface designated to remain shall be repaired by the contractor at no cost to the Owner.

END OF SECTION 32 16 00

SECTION 32 92 13 – HYDROMULCH

PART 1 – GENERAL

1.01 SUBMITTALS

- A. Product Data; Hydro Mulch: Manufacturer's specifications and application rate.
- B. Product Data; Erosion Control Blanket: Manufacturer's specifications.

1.02 QUALITY ASSURANCE

- A. Field Examples: Seed samples will be taken by the Director's Representative 30 days before sowing and sent to the New York State Experiment Station, Geneva, NY 14456, for testing. Test analysis will indicate species, purity, percent of germination, and weed content. Results will be sent directly to the Director for acceptance or rejection based on these tests. Pay all expenses incurred for testing.

1.03 DELIVERY STORAGE AND HANDLING

- A. Deliver fertilizer in manufacturer's standard size bags or cartons showing weight, analysis, and the name of the manufacturer. Store as approved by Director's Representative.
- B. Store all seed at the site in a cool dry place as approved by the Director's Representative. Replace any seed damaged during storage.

1.04 SCHEDULING

- A. Time For Seeding: Sow grass seed between April 1st and May 15th or between August 15th and October 1st, except as otherwise approved in writing by the Director.

PART 2 – PRODUCTS

2.01 FERTILIZER

- A. Fertilizer: Mixed commercial fertilizers shall contain total nitrogen, available phosphoric acid and soluble potash in the ratio of 10-6-4 (50% N/UF). 50% of total nitrogen shall be derived from ureaform furnishing a minimum of 3.5% water insoluble nitrogen (3.5% WIN). The balance of the nitrogen shall be present as methylene urea, water soluble urea, nitrate and ammoniacal compounds.
- B. Other fertilizers meeting DOT Specification Section 713-03 Fertilizer can be used.

2.02 SEED

- A. Furnish fresh, clean, new-crop seed mixed in the proportions specified for species and variety and conforming to Federal and State Standards.
- B. Acceptable material in a seed mixture other than pure live seed consists of nonviable seed, chaff, hulls, live seed of crop plants and inert matter. The percentage of weed seed shall not exceed 0.1 percent by weight.
- C. All seed will be rejected if the label or test analysis indicates any of the following contaminants: Timothy, Orchard Grass, Sheep Fescue, Meadow Fescue, Canada Blue Grass, Alta Fescue, Kentucky 31 Fescue, and Bent Grass.
- D. Provide the following seed mixture:

A = Min. Percentage of Germination
B = Min. Purity Percentage
C = Weight Pure Live Seed in Mixture

SEED MIX

Name	Variety	A	B	C
Tall Fescue (Festuca arundinacea)	Alta, Kentucky 13 or an approved equal.	95	---	15
Creeping Red Fescue (Festuca rubra trichophylla)	Ensylva	95	97	20
Kentucky Bluegrass * (Poa pratensis)	Baron, Flying, Glade, or an approved equal.	75	95	25
Perennial Ryegrass ** (Lolium perenne)	Manhattan II, Pennfine, Yorktown II, or an approved equal.	90	95	40

*Approximately equal proportions of 2 or more improved Bluegrass varieties as listed in the Cornell Recommendations for Turfgrass.

**One or more of the improved Ryegrass varieties as listed in the Cornell Recommendations for Turfgrass.

2.03 MULCH

- A. Dry Application, Straw: Stalks of oats, wheat, rye or other approved crops which are free of noxious weeds. Weight shall be based on a 15 percent moisture content.
- B. Hydro Application: Colored wood cellulose fiber product specifically designed for use as a hydro- mechanical applied mulch. Acceptable Product: Conwed Hydro Mulch, Conwed Fibers, 231 4th Street SW, Hickory, NC.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Seed Bed: Scarify soil to a depth of 3 inches in compacted areas. Smooth out unsightly variations, bumps, ridges, and depressions which will hold water. Remove stones, litter, or other objectionable material.
 - 1. Obtain written approval of seed bed from the Director's Representative before commencing seeding operations.

3.02 FERTILIZING

- A. Apply 10-6-4 fertilizer evenly at the rate of 40 pounds per 1000 sq ft or 2 pounds of nitrogen per 1000 sq ft.

3.03 SEEDING

- A. Assume all risks when seed is sowed before approval of seed analysis.
- B. Do not seed when the wind velocity exceeds 5 miles per hour.
- C. Application Rate:
 - 1. Seed Mix: 5 pounds per 1,000 sq. ft..
- D. Dry Application: Sow seed evenly by hand or seed spreader on dry or moderately dry soil.
- E. Hydroseeding:
 - 1. Apply seeding materials with an approved hydroseeder.
 - 2. Fill tank with water and agitate while adding seeding materials. Use sufficient fertilizer, mulch, and seed to obtain the specified application rate. Add seed to the tank after the fertilizer and mulch have been added. Maintain constant agitation to keep contents in homogeneous suspension. Prolonged delays in application or agitation that may be injurious to the seed will be the basis of rejection of material remaining in tank.

3. Distribute uniformly a slurry mixture of water, seed, fertilizer, and mulch at a minimum rate of 57 gallons per 1000 sq ft (2500 gallons per acre). The Director's Representative may order the amount of water increased if distribution of seeding materials is not uniform.

3.04 MULCHING

- A. Dry Application: Within one day after seeding, cover the seeded areas with a uniform blanket of straw mulch at the rate of 100 pounds per 1000 sq ft of seeded area.
- B. Hydro Application: Apply approved mulch in accordance with the manufacturer's written instructions and recommended rates of application.

3.06 LAWN ESTABLISHMENT

- A. Maintain the grass at heights between 2-1/2 inches and 3-1/2 inches and include a minimum of 2 mowings.
- B. Water and protect all seeded areas until final acceptance of the lawn.

3.07 FINAL ACCEPTANCE

- A. Final acceptance of lawn areas will be granted when a uniform stand of acceptable grass is obtained, with a minimum of 95 percent coverage. Portions of the lawn areas may be accepted at various times at the discretion of the Director's Representative.
- B. Unacceptable lawn areas, hydro application: Reseed, fertilize, and mulch at one-half the specified rate, use full water rate.
- C. Once accepted, the Owner will assume all maintenance responsibilities.

END OF SECTION 32 92 13

SECTION 33 05 33 - DRAIN PIPE

PART 1 - GENERAL

- 1.01 Drainage pipe construction materials and labor shall conform to requirements of *Section 701* of the Louisiana Standards Specifications for Roads and Bridges *1992 Edition*

PART 2 - MATERIALS

2.01 PLASTIC CULVERT PIPE

- A. *Corrugated Polyethylene Culvert Pipe (Double Wall) (CPECP)*: Corrugated Polyethylene Culvert Pipe (*double Wall*) shall conform to AASHTO Designations *M252* and *M294*. Pipe and fittings shall be made from virgin *PE* compounds which conform with the requirements of cell class *32440C* as defined and described in *ASTM 03350*.

END OF SECTION 33 05 33

SECTION 33 10 00 – WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes water-distribution piping and specialties outside the building for the following:

1. Water services
2. Fire-service mains

1.02 SUBMITTALS

A. Product Data: For the following:

1. Valves and accessories
2. Backflow preventers and assemblies
3. Fire department connections

B. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For the following:

1. Valves
2. Backflow preventers

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with FM's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

F. NFPA Compliance:

1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.04 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.

1.05 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product section:
 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.03 PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint, bell- and plain-spigot end unless grooved or flanged ends are indicated.
 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
 1. Copper Fittings: ASME B16318, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- C. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket and spigot end.
 1. Comply with UL 1285 for fire-service mains if indicated.
 2. PVC Fabricated Fittings: AWWA C900, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
 3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.

2.04 JOINING MATERIALS

- A. Refer to Division 2 Section "Utility Materials" for commonly used joining materials.
- B. Brazing Filler Metals: AWS A5.8, B Cup Series.
- C. Soldering Flux: ASTM B 813, water-flushable type.
- D. Solder Filler Metal: ASTM B 32, lead-free type with 0.20 percent maximum lead content.

2.05 VALVES

- A. UL/FM, Cast-Iron Gate Valves:

1. Manufacturers:
 - a. Central Sprinkler Company
 - b. Crane Co.; Crane Valve Group; Stockham Div.
 - c. Grinnell Corporation; Mueller Co.; Water Products Div.
 - d. McWane, Inc.; Kennedy Valve Div.
 - e. McWane, Inc.; M & H Valve Company Div.
- B. UL/FM, Nonrising-Stem Gate Valves: UL 262, FM-approved iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
 1. Minimum Working Pressure: 175psig.
 2. End Connections: Flanged

2.06 VALVE ACCESSORIES AND SPECIALTIES

- A. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER", bottom section with base of size to fit over valve, and approximately 5-inch diameter barrel.
 1. Operating Wrenches: Steel tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- B. Vertical-Type Indicator Posts: UL 789, FM-approved, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.07 BACKFLOW-PREVENTION DEVICES

- A. Manufacturers:
 1. Ames Co., Inc.
 2. Cla-Val Co.
 3. Grinnell Corporation; Mueller Co.; Hersey Meters
 4. Watts Industries, Inc.; Water Products Div.
 5. Zurn Industries, Inc.; Wilkins Div.
- B. General: ASSE standard, backflow preventers.
 1. Working Pressure: 150 psig minimum, unless otherwise indicated.
 2. NPS 2 and Smaller: Bronze body with threaded ends.
 3. NPS 2½ and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
 - a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 4. Interior Components: Corrosion-resistant materials.
 5. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.
- C. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013 or AWWA C511, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2, air-gap fitting located between two positive-seating check valves.
 1. Maximum Pressure Loss: 5 psig through middle 1/3 of flow range.

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS

- B. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.
- C. Underground Water-Service Piping: Use any of the following piping materials for each size range:

1. NPS 3/4 to NPS 2: Soft copper tube, Type L; wrought-copper fittings; and soldered joints.
 2. NPS 2½ to NPS 4: Soft copper tube, Type L; wrought-copper fittings; and soldered joints.
- D. Underground Fire-Service-Main Piping: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

3.02 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FM, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FM, Cast-iron, nonrising-stem gate valves with indicator post.

3.03 JOINT CONSTRUCTION

- A. See Division 2 Section "Utility Materials" for basic piping joint construction.
- B. Make pipe joints according to the following:
1. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194
 2. Copper Tubing Soldered Joints: ASTM B 828. Use flushable flux and lead-free solder.
 3. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 2 Section "Utility Materials" for joining piping of dissimilar metals.

3.04 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Comply with NFPA 24 for fire-service-main piping materials and installation.
- C. Install copper tube and fittings according to CDA's "Copper Tube Handbook".
- D. Install PVC, AWWA pipe according to AWWA M23 and ASTM F 645.
- E. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration.
- F. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.
1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.
- G. Sleeves are specified in Division 2 Section "Utility Materials", and Division 15 Section "Basic Mechanical Materials and Methods".
- H. Mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods".
- I. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- J. Anchor service-entry piping to building wall.

3.05 ANCHORAGE INSTALLATION

- A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - 1. Fire-Service-Main Piping: According to NFPA 24
 - 2. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.06 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. UL/FM Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

3.07 BACKFLOW-PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers with relief drain in vault or other space subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2½ and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.08 CONNECTIONS

- A. Piping installation requirements are specified in other Division 2 Sections. Drawings indicate general arrangement of piping and specialties.
- B. See Division 2 Section "Utility Materials" for piping connections to valves and equipment.
- C. Connect water-distribution piping to interior domestic-water and fire-suppression piping.
- D. Ground equipment according to Division 16 Section "Grounding and Bonding".

3.09 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1½ times working pressure for 2 hours.
 - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits. Test fire main at 200 psig for 2 hours.
- C. Prepare reports of testing activities.

3.10 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-service piping. Locate below finished grade, directly over piping. See Division 2 Section "Earthwork" for underground warning

tapes.

- B. Permanently attach equipment nameplate or marker, indicating plastic water-service piping, on main electrical meter panel. See Division 2 Section "Utility Materials" for identifying devices.

3.11 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or as described below:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 33 10 00

SECTION 33 30 00 – SANITARY SEWERAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes gravity-flow, non-pressure sanitary sewerage outside the building, with the following components:
 - 1. Clean-outs
 - 2. Pre-cast concrete manholes.

1.02 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating: 10-foot head of water.

1.03 SUBMITTALS

- A. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.
- B. Coordination Drawings: Show pipe sizes, locations, and elevations.
- C. Field quality-control test reports.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

2.03 PVC PIPE AND FITTINGS

- A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 21, with bell-and-spigot ends for gasket joints with ASTM F 477, elastomeric seals.

2.04 NON-PRESSURE-TYPE PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 - 1.. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC
 - 3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-

metal tension band and tightening mechanism on each end.

1. Manufacturers:
 - a. Dallas Specialty & Mfg. Co.
 - b. Fernco Inc.
 - c. Plastic Oddities, Inc.
- D. Shielded, Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg.
 - b. Dallas Specialty & Mfg. Co.
 - c. Mission Rubber Company; a division of MCP Industries, Inc.
- E. Ring-Type, Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.
 1. Manufacturers:
 - a. Fernco Inc.
 - b. Logan Clay Products Company (The)
 - c. Mission Rubber Company; a division of MCP Industries, Inc.

2.05 CLEAN-OUTS

- A. Gray-Iron Clean-outs: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 1. Manufacturers:
 - a. Josam Company
 - b. Smith, Jay R. Mfg. Co.
 - c. Wade Div.; Tyler Pipe
 - d. Watts Industries, Inc.
 - e. Watts Industries, Inc.; Enpoco, Inc. Div.
 - f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group
 2. Top-Loading Classification: Medium duty
 3. Sewer Pipe Fitting and Riser to Clean-out: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.06 MANHOLES

- A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 1. Diameter: 48 inches minimum, unless otherwise indicated.
 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slip or base section with integral floor.
 4. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.
 5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone size that matches grade rings.
 6. Joint Sealant: ASTM C 990, bitumen or butyl rubber
 7. Resilient Pipe Connectors: ASTM C 923, Cast or fitted into manhole walls, for each pipe connection

8. Steps: ASTM A 615/A 615M, deformed, ½-inch steel reinforcing rods encased in ASTM D 4101, PP steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
9. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
10. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange and 26-inch diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER".
 - a. Material: ASTM A 536, Grade 60-40-18 ductile iron, unless otherwise indicated.

2.07 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:
 1. Cement: ASTM C 150, Type II
 2. Fine Aggregate: ASTM C 33, sand
 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 4. Water: Potable.
- B. Portland Cement Design Mix: 4000psi minimum, with 0.45 maximum water/cementitious materials ratio.
 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 1 percent through manhole.
 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 4 percent
 3. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
 4. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain
 5. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS

- A. Pipe couplings and fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
 - a. Shielded flexible couplings for same or minor difference OD pipes.
 - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.02 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and

arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, non-pressure, drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
 - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
 - 3. Install piping below frost line.
 - 4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook".
 - 5. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
- F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.03 PIPE JOINT CONSTRUCTION

- A. Basic piping joint construction is specified in Division 2 Section "Pipe Utilities - Basic Materials and Methods". Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- B. Join gravity-flow, non-pressure, drainage piping according to the following:
 - 1. Join hub-and-spigot, cast-iron piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 - 2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
 - 3. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
 - 4. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-gasket joints.
 - 5. Join dissimilar pipe materials with non-pressure type, flexible couplings.

3.04 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Form continuous concrete channels and benches between inlets and outlets.
- D. Set taps of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3

inches above finished surface elsewhere, unless otherwise indicated.

3.05 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot traffic areas.
 - 2. Use medium-duty, top-loading classification cleanouts in paved foot traffic areas.
 - 3. Use heavy-duty, top-loading classification cleanouts in vehicle traffic service areas.
 - 4. Use extra-heavy-duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 19 by 12 inches deep. Set with tops above surrounding grade.
- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.06 CONNECTIONS

- A. Connect non-pressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 15 Section "Sanitary Waste and Vent Piping".
- B. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

3.07 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.05 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat instructions until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having

jurisdiction and the following:

- a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
 - b. Close openings in system and fill with water.
 - c. Purge air and refill with water.
 - d. Disconnect water supply
 - e. Test and inspect joints for leaks.
 - f. Options: Test ductile-iron piping according to AWWA C600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig.
6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
- a. Option: Test plastic gravity sewer piping according to ASTM F 1417
 - b. Option: Test concrete gravity sewer piping according to ASTM C 924
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 33 31 00

KING ARCHITECTS, INC

SECTION 32 40 00

SECTION 33 40 00 – STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.1 SECTION SUMMARY

- A. This work consists of furnishing, installing, and cleaning pipe, pipe arch, storm drains and sewers, also referred to as culvers or conduit, in accordance with these specifications and in conformity with lines and grades shown on the plans or established.

PART 2 PRODUCTS

2.1 MATERIAL PROPERTIES

Materials comply with the following sections and subsections of the latest ed. of the DOTD standards and specifications manual:

Usable Soil-----	203.06(a)
Selected Soil-----	203.06(b)
Plastic Soil Blanket-----	203.10
Flowable Fill-----	710
Mortar-----	702.02
Portland Cement Concrete-----	901
Stone-----	1003.03(b)
Recycled Portland Cement Concrete-----	1003.03(c)
Granular Material-----	1003.07
Bedding Material-----	1003.08
Concrete Sewer Pipe-----	1006.02
Reinforced Concrete Pipe-----	1006.03
Reinforced Concrete Pipe Arch-----	1006.04
Gasket Materials-----	1006.06
Plastic Pipe-----	1006.07
Split Coupling Bands-----	1006.07(d)(4)
Plastic Yard Drain Pipe-----	1006.09
Bituminous Coated Corrugated Steel Pipe and Pipe Arch-----	1007.02
Structural Plate for Pipe, Pipe Arch and Arch-----	1007.04
Corrugated Aluminum Pipe and Pipe Arch-----	1007.05
Coupling Bands-----	1007.09
Reinforcing Steel-----	1009
Geo-textile Fabric-----	1019

MATERIAL TYPE ABBREVIATIONS:

1) REINFORCED CONCRETE PIPE:

RCP Reinforced Concrete Pipe
RCPA Reinforced Concrete Pipe Arch

2) CORRUGATED METAL PIPE:

CAP Corrugated Aluminum Pipe
CAPA Corrugated Aluminum Pipe Arch
CMP Corrugated Metal Pipe
CMPA Corrugated Metal Pipe Arch
CSP Corrugated Steel Pipe
CSPA Corrugated Steel Pipe Arch
BCCSP Bituminous Coated Corrugated Steel Pipe
BCCSPA Bituminous Coated Corrugated Steel Pipe Arch

3) PLASTIC PIPE:

PP Plastic Pipe
PVCP Polyvinyl Chloride Pipe
RPVCP Ribbed Polyvinyl Chloride Pipe
CPEPDW Corrugated Polyethylene Pipe Double Wall

PART 3 EXECUTION

3.1 EXCAVATION

- A. The bottom of the trench shall be excavated to a minimum width of 18 inches on each side for all pipes. Surplus material or excavated material that does not conform to the requirements of Subsection 203.06(a) of the DOTD MANUAL shall be satisfactorily disposed of in accordance with subsection 202.02 of the DOTD MANUAL.

3.2 FORMING PIPE BED

- A. When the rock is encountered, it shall be removed below grade and replaced with material complying with Subsection 203.06. This replacement material shall be compacted to at least the density of the surrounding soil. The compacted earth cushion shall have a thickness under the pipe of at least $\frac{1}{2}$ inch per foot of fill height over the top of the pipe with a minimum thickness of 8 inches.
- B. When pipe is not laid in a trench, a uniformly firm bed shall be made as specified for the bottom of a trench.
- C. When bedding material is specified, additional excavation shall be performed below established grade and bedding material placed.
- D. When a suitable foundation cannot be obtained, unstable soil below established grade shall be removed and replaced with granular material or bedding material constructed in accordance with Section 726 of the DOTD MANUAL. When stone or recycled Portland cement concrete is used as backfill, unstable soil below established grade shall be removed and replaced

3.3 LAYING PIPE

- A. Pipe laying shall begin at the downstream end of the line. The pipe shall be in contact with the foundation throughout its length. Bell or groove ends of pipe and outside circumferential laps of riveted metal pipe shall be placed facing upstream. Riveted seam metal pipe shall be placed with longitudinal laps at sides. Pipes in each continuous line shall have the same wall thickness. Metal pipes provided with lifting lugs shall be handled only by these lugs.
- B. After pipe has been laid and before backfill is placed, the Engineer will inspect the pipe for alignment, grade, integrity of joints, and coating damage.

3.4 JOINING PIPE

- A. Type 1 (T1) joints shall be used for side drains under grass or walking areas and similar installations.
- B. Type 2 (T2) joints shall be used for cross drains under paving, including turnouts.
- C. Type 3 (T3) joints shall be used for closed storm drain systems, flumes and siphons.

3.5 BACKFILLING

- A. Prior to backfilling, pipes found to be damaged or out of alignment or grade shall be removed and reinstalled, or replaced.
- B. Type A backfill material shall be stone, recycled Portland cement concrete, or flowable fill.
- C. Type B backfill material shall be stone, recycled Portland cement concrete, flowable fill, selected soils, or granular material.
- D. When Type A backfill material is used; geo-textile fabric shall be placed in accordance with plan details prior to placing backfill material. Care shall be taken to prevent damage to geo-textile fabric during placement of backfill material.

- E. Adjacent rolls of fabric shall be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches, including the ends of rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of backfill materials placement. When rolls are sewn, the contractor shall join adjacent rolls by sewing with polyester, or with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified shall be submitted to the Materials and Testing Section of the DOTD MANUAL for approval.

3.6 BACKFILL APPLICATIONS

- A. PAVED AREAS: Paved area subject to traffic loads such as roadway travel lanes, shoulders, and turnouts shall be backfilled with Type A material. Type B backfill material shall be used in all other paved areas including driveways, detour roads and similar installations. Selected soils will not be allowed as backfill material.
- B. NONPAVED AREAS: Pipe backfill material, except for plastic pipe, shall be Type B backfill material placed by approved methods and compacted to the density of surrounding soil. Plastic pipe shall be backfilled with granular material or Type A backfill Material.
- C. PLACEMENT AND COMPACTION: When corrugated metal pipe is used, the backfill material shall be tested and shall have a resistivity greater than 1500 ohm-cm and pH greater than 5 when tested in accordance with DOTD TR 429 and DOTD 430 respectively.
- D. If the top of pipe is even with or below the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to material shall be brought up evenly on both sides of pipe for its full length to an elevation of 12 inches above the top of pipe [or to sub grade if less than 12 inches] or to natural ground elevation, whichever is greater.
- E. When the top of the pipe is above the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to 12 inches above the tip of pipe or to sub grade if less than 12 inches. Material in the trench and above the top of the trench for a distance on metal or plastic pipe and 18 inches for concrete pipe, and to 12 inches above the tip of pipe or to sub grade if less than 12 inches shall be backfill material.
- F. The embankment shall be constructed to a minimum of 24 inches over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, installations with less than 24 inches of cover over the top of the pipe shall be constructed after heavy hauling is completed over the pipe location. After completion of hauling and backfilling operations shall be removed and reinstalled, or replaced, at no direct pay.

3.7 BACKFILL METHODS

- A. GENERAL: Compaction by flooding will not be allowed.
- B. SELECTED FILL: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418 in layers not exceeding 8 inches compacted thickness. Backfill material shall be thoroughly compacted under the haunches of the pipe. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer.
- C. GRANULAR MATERIAL: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Backfill material shall be thoroughly compacted under the haunches of the pipe and then compacted in layers not exceeding 12 inches compacted thickness. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density to prior placement of subsequent layer. Exposed slopes at the pipe ends shall be covered by at least 12 inches compacted thickness of plastic soil blanket.
- D. FLOWABLE FILL: Flowable fill shall be in accordance with Section 710 of the DOTD MANUAL.
- E. STONE OR RECYCLED PORTLAND CEMENT CONCRETE: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Back fill material shall be thoroughly compacted under the pipe haunches and then compacted in layers not exceeding 8 inches compacted thickness. With approval of the Engineer, layer thickness may be increased to 12 inches with verification of satisfactory installation and performance. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer. The contractor shall control placement operations so as not to damage protective coatings on metal pipes. The contractor shall repair damaged coatings at no additional pay.

- A. DENSITY REQUIREMENTS: Maximum dry density will be determined in accordance with DOTD TR 415 and DOTD 418 and in-place density determined in accordance with DOTD TR 401.

3.8 INSPECTION OF PIPES

- A. After completion of embankment and prior to roadway surfacing, the engineer shall inspect pipes for proper alignment and integrity of joints. Any misaligned pipe or defective joints shall be corrected by the contractor at no direct pay.
- B. PLASTIC PIPE: Installed plastic pipe shall be tested to ensure that vertical deflections do not exceed 5.0 percent. Maximum allowable deflections shall be governed by the mandrel requirements stated herein.
- C. Deflection tests shall be performed no sooner than 30 calendar days after installation and compaction of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.
- D. For pipe 36 inches and less in diameter, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections to use. Use of an unapproved mandrel or a mandrel altered or modified after approval will invalidate the test. If the mandrel fails to pass, the pipe is over deflected.
- E. Unless otherwise permitted, over deflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed and replaced with new pipe. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any over deflection, shall be removed and replaced with new pipe.
- F. The mandrel shall be a rigid, nonadjustable, odd-numbered legged (minimum 9 legs) mandrel having a length not less than its nominal diameter or 24 inches, whichever is less. The minimum diameter at any point shall be 5.0 percent less than the base inside diameter of the pipe being tested. The mandrel shall be fabricated of steel, aluminum or other approved material fitted with pulling rings at each end. The nominal pipe size and outside diameter of the mandrel shall be stamped or engraved on some segment other than a runner. A suitable carrying case shall be furnished.
- G. For pipe larger than 36 inches in diameter, deflection shall be determined by a method approved by the Engineer. If a mandrel is selected, the minimum diameter, length, and other requirements shall conform to the above requirements.
- H. Mandrel testing shall be conducted by the contractor in the presence of the Engineer.
- I. Prior to final acceptance, pipes shall be cleaned of all debris and soil to the invert of the pipe at no direct pay. Removed soil, debris, and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

END OF SECTION 33 40 00

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Pipe and fittings.
2. Cleanouts
3. Drains
4. Catch basins.
5. Pipe outlets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1. Manufacturer's product data and installation guidelines
2. Proposed details for each unique condition, including but not limited to:
 - a. Pipe Joints details and proposed materials
 - b. Penetration treatments at manholes and catch basins

- B. Shop Drawings:

1. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

- D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Type PSM Sewer Piping:

- 1. Pipe: ASTM D 3034, SDR 26, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints. SDR 35 permitted at areas under green spaces (non-paved areas) only.
- 2. Fittings: ASTM D 3034, PVC with bell ends.
- 3. Gaskets: ASTM F 477, elastomeric seals.

B. PVC Gravity Sewer Piping:

- 1. Pipe and Fittings: ASTM F679, PS 115, PVC gravity sewer pipe with bell-and-spigot ends and with integral ASTM F477, elastomeric seals for gasketed joints.

C. PVC Schedule 40 Pipe

- 1. For use at roof drain to catch basin connections (only)
- 2. Pipe: ASTM D1784
- 3. Fittings: ASTM D2665

2.2 CLEANOUTS

A. PVC Cleanouts:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. NDS Inc.
 - b. Zurn Industries, LLC.
- 2. Source Limitations: Obtain PVC cleanouts from single manufacturer.
- 3. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.3 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, and the following:

- 1. Cement: ASTM C 150, Type II.
- 2. Fine Aggregate: ASTM C 33, sand.
- 3. Coarse Aggregate: ASTM C 33, crushed gravel.
- 4. Water: Potable.

- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A1064, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615, Grade 60 deformed steel.
- C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 1064, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615, Grade 60 deformed steel.

2.4 CATCH BASINS

- A. Standard Precast Concrete Catch Basins:
 - 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 - 2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
 - 3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 - 4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 - 5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 - 6. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.
 - 1. Size: 24 by 24 inches minimum unless otherwise indicated.
 - 2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.5 PIPE OUTLETS

- A. Tie into existing curb inlet as shown in drawings as required by Local Authorities Having Jurisdiction. (City of Lake Charles)

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
 - 2. Join PVC schedule 40 according to ASTM D 2855 for solvent-cemented joints
 - 3. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 - 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
 - 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
 - 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with top 1 inch above surrounding earth grade.

- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 STORMWATER INLET AND OUTLET INSTALLATION

- A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.
- B. Construct riprap of broken stone, as indicated.
- C. Install outlets that spill onto grade, anchored with concrete, where indicated.
- D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

3.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.8 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.9 IDENTIFICATION

- A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
 1. Use warning tape or detectable warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
 - b. Option: Test plastic piping according to ASTM F 1417.
 - c. Option: Test concrete piping according to ASTM C 924.

- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 33 41 00

SECTION 33 41 16.16 - GEOCOMPOSITE FIELD SUBDRAINAGE

PART 1-GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. This section includes providing all labor, materials, and services to complete all Field Sub Drainage and related work shown on the drawings. This includes, but not limited, the following:
 - 1. Verification of existing sub grade.
 - 2. Trenching drain lines.
 - 3. Construction and installation of subsurface geo-composite drain lines and other items related to the drain lines.
 - 4. Connection of drain lines into existing collector lines
 - 5. Installation of back filling materials and compaction of trenches.
- B. Related Sections including the following:
 - 1. Section 32 81 00- Field Irrigation System
 - 2. Section 32 91 10- Field Construction
 - 3. Section 32 92 20- Field Turf

1.3 SUBMITTALS

- A. Prior to construction, contractor must submit product data/samples to be used and manufacturer's installation instructions for approval from owner's agent or representative.
- B. Record drawings.
 - 1. Accurately record locations of piping, connections and of system. Maintain progress drawings on the construction site during installation.
 - 2. Final as-built drawings shall be submitted to owner's representative upon completion of work.
- C. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.4 QUALITY ASSURANCE

- A. Material, equipment, and methods of installation shall comply with all applicable codes and ASTM standards in regard to materials to be used in sub drainage.
- B. Owner's Testing Agent: TBD
- C. Contractor Qualifications:
 - 1. Contractor must have a minimum 5 continuous years of installation experience of sports fields.
 - 2. Contractor must have the necessary licensing and bonding in the State of Louisiana.
 - 3. Contractor must provide names of facilities constructed and contacts for them.
 - 4. Contractor must provide a list of equipment and personnel to be used on this project.
 - 5. Contractor must be able to self-perform at least 85% on construction activities.
 - 6. Contractor must supply list of all sub-contractors.
 - 7. Contractor must provide a proposed schedule for this project.

1.5 PROJECT SITE PROTECTION AND CONDITIONS

- A. Take necessary precautions to protect existing and new work from damage during the construction period.
- B. Work shall not be done when site conditions are detrimental to quality of work as determined by the Architect.

1.6 DELIVERY, STORAGE AND HANDLING

- A. All piping, fittings and related materials shall be carefully and safely handled at all times as per manufacturers specifications.
- B. All pipelines, fittings and drainage structures shall be kept clean and closed during construction.

1.7 SCHEDULING

- A. Work of this section will be coordinated with all other work contained in the contract documents.

1.8 WARRANTY

- A. All materials and workmanship shall be guaranteed for a period of one year at beginning of substantial completion.

PART 2 PRODUCTS

2.1 GENERAL MATERIALS

- A. The contractor shall use materials as specified and shown on drawings. Material other than specified shall be permitted only after written application by the contractor and approval by the Architect.
- B. All material to be incorporated in this system shall be new, without flaws or defect and of quality and performance as specified. All material overages at the completion of the installation are the property of the contractor and are to be removed from the site.

2.2 PIPE MATERIAL

- A. High Density Polyethylene Pipe (HDPE)
 - 1. HDPE core pipe, used for collection of water on the field, with integrally formed smooth waterway. Normal size will be oblong shape. Pipe and fittings shall be made from PE compounds which conform to the requirements of cell class 323410C or 333410C as defined and described in ASTM D 3350.
 - 2. High density polyethylene pipe, used for connections, with integrally formed smooth waterway. Nominal size shall have a full circular cross-section, with an outer corrugated pipe wall and smooth inner wall. Pipe and fittings shall be made from PE compounds which conform to the requirements of cell class 324420C as defined and described in ASTM D 3350.
 - 3. HDPE Material Requirements shall be as follows:

Product Average	Test Value	ASTM Test Method
Compressive Strength at maximum deflection of 20%	9,200 lbs/ft2	D1621
Flow Rate at 10 psi and gradient of 0.1	21 gpm/ft width	D4716
Peel Strength (Fabric to Core)	35 lbs/ft width	D1876
 - 4. The fittings shall not impair or reduce the overall integrity of the pipeline. Couplings shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints. Only fittings recommended by the drainpipe manufacturer shall be used. When designated on the plan and required by the manufacturer, a neoprene or rubber gasket shall be supplied.
 - 5. Geo-composite drainage pipe shall be Hydaway 2000 drainage pipe as manufactured by Midwest Diversified Technologies, Inc., Belleville, IL or approved equal.
 - 6. Corrugated polyethylene pipe used for connections to existing collector lines shall be single walled drainage pipe as manufactured by Advanced Drainage System, Inc.
 - 7. Corrugated polyethylene pipe used shall be smooth interior, dual walled N-12 drainage pipe as manufactured by Advanced Drainage System, Inc.
- B. PVC Pipe
 - 1. Pipe sizes shall conform to sizes necessary to complete installation.
 - 2. All pipe damaged or rejected because of defects shall be removed from the site at the time of said rejection.

3. Primer and solvent for use with PVC pipe to conform to ASTM D2564 primer to be purple in color. Solvent used to be appropriate for pipe and fitting type and weather conditions.
4. The minimum parallel plate stiffness values when tested in accordance with ASTM D2412 shall be as follows:

Diameter	Pipe Stiffness
4 inch (100mm)	50 psi (340 kPa)
6 inch (150mm)	50 psi (340 kPa)
8 inch (200mm)	50 psi (340 kPa)
5. All piping shall be ASTM D2241, rigid, unplasticized polyvinyl chloride (PVC), extruded from virgin parent material. Provide pipe homogeneous throughout and free from visible cracks, hole foreign materials, glisters, wrinkles, and dents.
6. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size, schedule, and type of pipe, working pressure at seventy-three (73) degrees Fahrenheit and National Sanitation Foundation (NSF) approval. Cover pipe during storage.
7. PVC pipe shall be SDR-35.

2.3 GEOTEXTILE FILTER FABRIC

- A. Provide geotextile filter fabric permanently fusion bonded to core drains in field. Geotextile filter fabric conforming to the following minimum specifications:

Property	Test Method	Typical Values
Grab Tensile Strength	ASTM D 4632	120 lb.
Grab Tensile elongation	ASTM D 4632	50 %
Trapezoid Tear Strength	ASTM D 4533	50 lb.
Mullen Burst Strength	ASTM D 3786	225 psi
Puncture Strength	ASTM D 4833	65 lbs
Apparent Opening Size	ASTM D 4751	.#70 Sieve (.212 mm)
Permittivity	ASTM D 4491	1.8 sec-1
Permeability	ASTM D 4491	0.21 cm/sec
Flow Rate	ASTM D 4491	135 gal/min/ft ²
Weight	ASTM D 5261	4.5 oz

- B. Geotextile filter fabric shall be Mirafi 140 N series.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that area is ready to start work, dimensions and elevations are as indicated on drawings. Beginning of installation means acceptance of existing conditions.

3.2 GRADE VERIFICATION

- A. Using laser operation instrument, the contractor shall verify that grade has been prepared according to specifications with regard to compaction, sub grade and is free of debris prior to beginning work.

3.3 TRENCHING

- A. Contractor shall use great care to not damage or disturb existing sub drainage systems and irrigation main line.
- B. Contractor shall use great care to not disturb the grades of the field and will make provisions to avoid rutting of the field surface. All installation equipment shall have low ground pressure (LPG) floatation tires or track machine.
- C. Remove all stones or other hard matter over 1 inch in diameter that could damage drainage pipe or impede consistent backfilling or compaction.

3.4 INSTALLATION

- A. Install and join geo-composite pipe drain and pipe fittings in accordance with manufacturer's procedures and specifications.
- B. Connections into existing sub drainage system shall be done in accordance with manufacturer's procedure and specifications.

3.5 BACKFILLING AND COMPACTION

- A. Fill trenches with sand material removed while trenching.
- B. Drainage fill material shall be tamped or vibrated necessary to provide stable compacted installation. All backfilled materials shall be compacted to 90% of ASTM D698 or as directed by the Architect. Care shall be taken not to damage or displace drainage pipe when compacting.

3.6 CONNECTIONS

- A. Drawings indicate arrangement of connection points. Site verification of existing line location shall be necessary at contractor's expense.
- B. Hydraway fabric end caps shall be used in termination points of 6" and 12" geo-composite lines.
- C. Hydraway side out or end out connectors shall be used in connection to 6" and 12" geo-composite lines.
- D. Fittings used to connect into existing lines shall match existing material.

3.7 REMOVAL EXCESS AND WASTE MATERIALS

- A. Remove all extra and waste materials. Dispose of materials in an approved and legal manner as determined by the Architect.

3.8 CLEANING

- A. Make sure interior of installed piping and structures is clear of debris, including dirt, sand and other superfluous materials as work progresses. Place plugs in end of uncompleted pipe at end of each day or when work stops.

3.9 FIELD QUALITY CONTROL

- A. Before any final connection into existing system contractor shall be required, at their expense, to verify that existing collector line is clear of debris, including sand and dirt, and free flowing at that connection point and out of stadium. Verification with owner's representative is required. Any existing drainage line that is identified as broken or missing is to be brought to the attention of the owner's representative.
- B. After installation of drain line and connection into existing system repeat drain flow test until results are satisfactory.
- C. Request inspection of drainage pipe installation by Architect/Engineer prior to placing fill material over pipe.

3.10 PROTECTION OF FINISHED WORK

- A. Protect drainage pipe from damage or displacement. Do not use compaction equipment directly over pipe until sufficient sand has been placed in trenches to ensure that equipment will not damage or disturb pipe.

END OF SECTION 33 41 16.16

SECTION 33 42 00 – STORMWATER CONVEYANCE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section consists of installation of 18-inch gasketed PVC stormwater piping in areas shown on contract documents.

1.03 QUALITY ASSURANCE

- A. The Compound is PVC 1120 Type 1, Grade 1, with cell class of 12454B per ASTM D1784.
- B. ASTM D3034 compliant.
- C. For the integral bells, Reiber Gaskets are used that conform to ASTM F477.
- D. Joints shall conform to ASTM D3212.

PART 2 - MATERIALS

2.01 MANUFACTURER

- A. Manufacturer:
 - 1. Pacific Plastics, Inc
111 S berry Street
Brea, CA 92821
714.990.9050
www.pacificplastics.us

2.02 PLASTIC SEWER PIPE

- A. SDR Series Green Gasketed Sewer Pipe.
 - 1. Size: 18-inches.
 - 2. Compound: 1120 Type 1, Grade 1.
 - 3. Cell Class: 12454B.

PART 3 – EXECUTION

not used

END OF SECTION 33 05 33

SECTION 33 42 31 – CATCH BASINS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Catch basins.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 – Cast-in-Place Concrete: Concrete collars.
- B. Section 31 23 00 – Excavation and Fill.
- C. Section 33 41 00 – Storm Utility Drainage Piping.

1.03 PREINSTALLATION MEETINGS

- A. Convene preinstallation meeting 1 week before start of Work of this Section.
- B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, installer, and manufacturer's representative.
- C. Review the Following:
 - 1. Materials.
 - 2. Installation.
 - 3. Adjusting.
 - 4. Cleaning.
 - 5. Protection.
 - 6. Coordination with other Work.

1.04 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, indicating layout, dimensions, materials, components, and accessories.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Sustainable Design Submittals: Submit manufacturer's sustainable design submittals for catch basins.
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project, in miles.
- F. Manufacturer's Project References: Submit manufacturer's list of successfully completed catch basin projects, including project name and location, name of architect, and type and quantity of catch basins furnished.
- G. Installer's Project References: Submit installer's list of successfully completed catch basin projects, including project name and location, name of architect, and type and quantity of catch basins installed.
- H. Warranty Documentation: Submit manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of catch basins of similar type to that specified.
- B. Installer's Qualifications:
 - 1. Installer regularly engaged, for a minimum of 5 years, in installation of catch basins of similar type to that specified.
 - 2. Employ persons trained for installation of catch basins.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean areas, protected from exposure to harmful weather conditions.
 - 4. Store materials out of direct sunlight.
 - 5. Protect materials during storage, handling, and installation to prevent damage.

1.07 AMBIENT CONDITIONS

- A. During Cold Weather:
 - 1. Do not use frozen materials.
 - 2. Do not use materials mixed or coated with ice or frost.
 - 3. Do not build on frozen Work.
- B. During Wet Weather: Do not build on wet, saturated, or muddy subgrade.

PART 2 PRODUCTS

2.01 PRECAST CATCH BASIN

- A. Normal traffic precast concrete manholes: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
- B. Gaskets: ASTM C 443, rubber.
- C. Steps: Provide one of the following:
 - 1. Fiberglass, individual steps, or ladder of a width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step.
 - 2. Steel Reinforced Plastic or Cast-Iron individual steps. Wide enough to allow worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from invert to finished grade is less than 60 inches.
- D. Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service.
- E. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- F. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
- G. Protective Coating: Plant-applied, Bitumastic Coal Tar SSPC-Paint 1610-mil minimum thickness applied to exterior surface.

- H. Substitutions: Comply with Section 01 25 00 – Substitution Procedures.

2.02 CATCH BASIN GRATES

A. 24-Inch-Square Grates:

1. Manufacturer: NDS, Inc., 851 North Harvard Avenue, Lindsay, California 93247. Toll Free 800-726-1994. Phone 559-562-9888. Website www.ndspro.com. Email nds@ndspro.com.
 - a. Part Number: 2415.
 - b. Color: Galvanized steel.
 - c. Material: Heavy-duty galvanized steel.
 - d. Load Rating: Class C, 176 to 325 psi.
 - e. Height: 2 inches.
 - f. Grate Openings: 1-1/4 inches.
 - g. Open Surface Area: 422.45 square inches.
 - h. Inlet Capacity: 1,292.33 gpm.

- B. Substitutions: Comply with Section 01 25 00 – Substitution Procedures.

PART 3 – EXECUTION

3.01 EXAMINATION

- I. Examine areas to receive catch basins.
- J. Notify Architect of conditions that would adversely affect installation or subsequent use.
- K. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install catch basins in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install catch basins and grates level, plumb, square, and to elevations indicated on the Drawings.
- C. Install catch basins on top of compacted gravel base as indicated on the Drawings.
- D. Connect drainage piping to catch basins in accordance with manufacturer's instructions.
- E. Backfill evenly around catch basins with specified material.
- F. Ensure no large stones or debris are in contact with catch basins.
- G. Concrete Collars:
 1. Encase catch basins with concrete collars as indicated on the Drawings.
 2. Concrete: Specified in Section 03 30 00.
- H. Keep concrete, sediment, and debris out of catch basins during installation.

3.03 ADJUSTING

- A. Remove and replace with new material, damaged components that cannot be successfully repaired.

3.04 CLEANING

- B. Clean catch basins of accumulated sediment and debris before final project completion.

3.05 PROTECTION

- A. Protect Work of this Section to ensure that Work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 33 42 31