WELLHEAD PROTECTION PROGRAM PLAN

Associated with the City of Kalamazoo Public Water Supply System
Wellhead Protection Program
(WSSN: 3520)

Prepared for:

The Michigan Department of Environment, Great Lakes, and Energy
Drinking Water and Environmental Health Division
Environmental Health Section
Source Water Protection Program

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Water Resources Division

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1.0 INTRODUCTION

1.1 Background

1.1.1 Michigan Wellhead Protection Program

Michigan's Wellhead Protection Program (WHPP) was developed in response to the 1986 amendments to the federal Safe Drinking Water Act. The purpose of Michigan's WHPP is to protect public water supply systems (PWSS) which use groundwater, from known and potential sources of contamination. Unlike many WHPPs in the country, Michigan's is a voluntary program that is implemented at the local level with the coordination of other organizations.

Although the program is voluntary, PWSSs who choose to participate must develop a local WHPP consistent with the guidelines established by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). The seven required program elements are: roles and responsibilities; wellhead protection area delineation; contaminant source inventories; wellhead protection area management; contingency planning; proper siting of new wells; and public education and participation.

The 1996 reauthorization of the federal Safe Drinking Water Act (SDWA) required the EGLE to complete a Source Water Assessment Program to identify the areas that supply public drinking water, inventory contaminants and assess water susceptibility to contamination, and inform the public of the results. In Michigan, a EGLE approved local PWSS WHPP is considered a complete source water assessment. PWSSs that do not have an approved WHPP must complete a Source Water Assessment.

1.1.2 Location

The City of Kalamazoo is located in Kalamazoo County in the southwestern corner of Michigan, approximately midway between Detroit and Chicago, and 35 miles east of Lake Michigan (**Appendix A, Figure 1**), covering an area of approximately 26 square miles. According to the U.S. Census data, the City had a population of 73,257 people (V2021), and Kalamazoo County had a population 261,108 people (V2021).

1.1.3 History of the City of Kalamazoo Wellhead Protection Program

Historically, the City had incorporated measures to protect its PWSS groundwater sources before the term "Wellhead Protection" was used. Some of these early examples of groundwater protection efforts included: proper selection of well/wellfield locations with consideration to known and high risk potential contamination sources; purchasing as much available property surrounding wellheads as possible to control land use; proper well construction and wellhead sealing methods; installation of numerous monitoring wells for the collection of groundwater quality samples and water level monitoring; cooperative/cost sharing agreement with the United States Department of Geological Survey (USGS) for observation well installation and monitoring;

abandonment of discontinued wells; initiation of an aggressive underground storage tank (UST) removal program by the Fire Marshal (prior to the Leaking Underground Storage Tank (LUST) regulations), and use of “Sanitation Isolation Districts” around select wellfields to prohibit sanitary and other threats to groundwater.

This City of Kalamazoo Wellhead Protection Program Plan (Plan) represents a summary of selected past, on-going, and planned groundwater supply protection efforts since 1992, the year the City of Kalamazoo (City) formally began a WHPP. This Plan is an update to the revised Plan submitted in May 2018 and subsequently approved by the EGLE. The Plan reflects the current and future PWSS in accordance with the City’s updated Water System Reliability Study, December 2022. The Plan was written in accordance with guidance documents available from the EGLE. Much of the work discussed in this Plan was made possible by funding received from the Michigan Wellhead Protection Grant Program.

It is important to understand the characteristics of the specific hydrogeology and PWSS so that the approach of and selected strategies of the local WHPP are fully understood. The following two sections provide detail regarding both aspects.

1.2 Regional Geology and Hydrology

Kalamazoo County is covered with a blanket of unconsolidated glacially derived deposits and alluvial deposits. The glacial sediments range in thickness from 50 to 600 feet and generally consist of outwash of medium to coarse size sands and gravels, and downcut drainage channel sands and gravels. The alluvial deposits consist mostly of recent sands and gravels deposited in present-day streams and are inter-connected with and usually indistinguishable from the glacial deposits. The bedrock consists of the Mississippian-aged Coldwater Shale that underlies the glacial materials, with no known surface outcrops in Kalamazoo County. Mississippian-aged Marshall Sandstone subcrops in the northeastern portion of the County.

All of the groundwater withdrawn for the Kalamazoo PWSS is from glacial drift aquifers. These unconsolidated materials are primarily glacial outwash and channel deposits, consisting of permeable sands and gravels interbedded with relatively low permeable sands, silts, and clays. Although some of these deposits consist of glacial till and glacial lake deposits, it is the outwash plains and downcut glacial drainage channels that constitute the most productive aquifers in the area. Various previous works have identified several aquifers in Kalamazoo County by horizontal geographic extent and recognized that one to three vertically separated aquifers may exist at one geographic location, generally separated by relatively low permeable silty and/or clayey aquitards. Research and field investigations during the course of the Kalamazoo PWSS capture zone delineations noted as many as four separate vertically distinct but generally hydraulically connected aquifers in the western portion of Kalamazoo County. Aquifer types identified at Kalamazoo’s current wellfields include water table/unconfined, semi-confined/leaky artesian, confined/artesian, and flowing artesian.

The regional geology and hydrology are discussed and illustrated in detail in the report "*Kalamazoo, Michigan Regional Groundwater Flow Model*" dated October 1996, and also within five, water pumping station (WPS) groundwater flow model & capture zone delineation reports referenced later in this plan. In addition, the capture zone delineations were updated in 2023, again discussed in a later section.

1.3 Public Water Supply System Characteristics

1.3.1 Water Service Area

Several important changes to the City of Kalamazoo PWSS occurred since the last update of the May 2018 WHPP Plan was submitted to EGLE.

1) In 2018, Per- and Polyfluorinated Substances (PFAS) was detected in groundwater samples collected from the City of Parchment municipal wells, select residential wells and monitoring wells associated with a former Crown Vantage paper mill site. These impacts were identified during sampling events that were completed by EGLE and their contractors from June 2018 through September 2018. Initial results were immediately addressed with a "Do Not Drink" advisory, and bottled water for the citizens. The City of Parchment was connected to the City of Kalamazoo's water supply within one month and the "Do NOT Drink" advisory was lifted. The sampling was completed as part of the State of Michigan's proactive statewide testing of drinking water, groundwater, lakes and streams, soils, sediments and wastewater. The City of Kalamazoo PWSS now owns the former Parchment water system which includes a 200,000-gallon elevated water tank. Parchment's wells were decommissioned, and the drinking water supply is supply by the Kalamazoo municipal system.

2) From 2020 through 2022, approximately eight miles of new water main were installed in Cooper and Richland Townships to address PFAS contamination associated with the former Crown Vantage paper mill site in Cooper Twp and former Production Plated Plastics site in Richland Twp. The project involved connecting approximately 450 new customers to the PWSS and abandoning associated residential potable wells.

3) Water main extensions were completed in 2017 and 2023 to address 1,4-Dioxane contamination emanating from the former KL Landfill site in Oshtemo Township. These extension were completed along Big Rock Drive, 2nd Street, W. J Avenue, Rosemary Avenue, and Josiane Drive.

4) Two well fields (Stations 15 and 16) were decommissioned and removed from the Wellhead Protection Area and two well fields (Stations 17 and 18) were temporarily taken out of service due to PFAS contamination.

5) Two new water towers were placed into service, including the 2.5-million-gallon Siesta Tank and 1.5 million gallon 6th Street South Tank located in Oshtemo Township and Texas Township, respectively.

6) Several water main replacement projects have occurred since 2018, including: Oakland Drive (Parkview to Howard), Cork Street (Portage to Sprinkle roads), Portage Street (Stockbridge to Lovell roads), Parkview Avenue (Oakland to Tamsin roads), Whites Road (Oakland to Westnedge roads – 2024 construction) and Westnedge Avenue (Whites to Vine roads – 2024 construction).

7) In 2023, three miles of new transmission water main was installed along 33rd Street between E. G Avenue and E. K Avenue in Comstock Township to combine the High Pressure District with the East Side High Pressure District, although these pressure districts have not yet been combined.

8) Several privately funded water main extensions have been completed for new plats and subdivisions throughout the PWSS' service area.

The City of Kalamazoo PWSS currently provides services (via written contracts) for the City of Kalamazoo, the northern portion of the City of Portage, The City of Parchment, the Village of Richland, Kalamazoo Township, Comstock Township, Texas Township, Richland Township, Oshtemo Township, Cooper Township, and Pavilion Township **(Appendix A, Figure 2)**.

1.3.2 Limited Treatment PWSS

The City's PWSS is categorized and licensed as a "Limited Treatment" PWSS, using chlorine as a disinfectant, fluoride for dental health, and sodium hexametaphosphate/Carus 8400 for iron and corrosion control. In addition, two of its 13 water pumping stations, WPS 1 and WPS 11, have air stripping and iron removal capabilities.

1.3.3 Pumpage

The City of Kalamazoo PWSS is the largest in Michigan that relies entirely on groundwater, pumping an average of approximately 20 million gallons a day (mgd). The system has a design pumping capacity of approximately 61.67 mgd. When mechanical limitations and managed capacity for water resources management are considered, the system has a capacity of approximately 40.6 mgd.

Appendix A, Figure 3 shows annual pumpage and average for the period 1977 through 2023, and **Table 1** lists details about the WPSs.

Table 1. CITY OF KALAMAZOO, PUBLIC WATER SUPPLY SYSTEM WATER PUMPING STATIONS

Station Number	Station Name	Constructed /Renovated	Wells	Design Capacity, GPM (MGD)	Limited (L)[1] or Managed (M)[2] Capacity, GPM (MGD)	Pressure District
1	Central	1884/1995	6	6,750 (9.73)	6,000 M (8.64)	Low
3	Balch Street	1917/1969	7	2,800 (5.48)	1,900 L (2.74)	Low
4	Maple Street	1928/1982	8	4,400 (6.34)	2,200 M (3.00)	Low/High
5	Schippers Lane	1914/1952	4	1,200 (1.73)	1,200 (1.73)	Intermediate
8	East Kilgore	1949/1974	5	2,400 (3.46)	2,400 M (2.50)	High
9	West Kilgore	1955/1984	12	2,800 (4.03)	2,000 M (2.50) [3]	High
11	Kendall	1955/1989	7	1,800 (2.59)	1,800 (2.59)	High
12	DeHaan	1957	4	1,200 (1.73)	1,200 (1.73)	High
14	Spring Valley	1958/1969	5	1,600 (2.30)	1,600 (2.30)	Intermediate
22	Colony Farm	1963/1996	6	2,200 (3.12)	2,200 (3.12)	Super High/High
24	Atwater	1971	16	7,600 (10.94)	3,500 M (5.00)	Super High
25	Campbell	1978	9	4,500 (6.48)	1,400 M (2.00)	East Side High
39	Morrow Lake	1988	1	2,600 (3.74)		High
	TOTAL		**90**	**41,850 (61.67)**	**29,300 (40.6)**	

NOTES: [1]Limited Capacity Reflects Mechanical Limitations
[2]Managed Capacity is Selected Pumpage for Water Resources Management

1.3.4 Pressure Service District Configuration

The Kalamazoo PWSS is uniquely configured by the use of eleven distinct Water Pressure Service Districts, generally defined by topographic elevations. The eleven districts are described as the Low, Intermediate, High, Parchment, East Side High, Super High, Northwest High, Ultra High, Southwest Super High, West Side Low, and the West Side High. Water can be and is routinely conveyed between pressure districts by use of booster (pumping) stations, bleeder (pressure reducing valves) stations, or a combination booster/bleeder stations. There are also various check valves and small bypasses throughout the system that serve as Pressure District connections. Currently, five of the eleven districts have at least one groundwater source (wellfield), with the remaining six of the districts (Northwest High, Ultra High, Parchment, Southwest Super High, West Side Low, and the West Side High District) receiving water only from other districts via use of a booster or bleeder station(s). Eight of the eleven districts have at least one water storage facility. **Appendix A, Figure 4** shows the water service area, pressure districts and water related facilities, and **Table 2** lists details about the Booster and Bleeder Stations.

1.3.5 Wellfields and Production Wells

Groundwater pumping stations supply all of the water to the Kalamazoo PWSS. Currently, the PWSS consists of 90 active production wells of both gravel-packed and tubular (naturally developed) designs and are located within 14 wellfields. **Table 2** provides detail regarding the WPSs.

The City also anticipates two future WPSs/wellfields possibly within 10 to 20 years: a 3.0 million mgd facility in Ross Township near 37th Street/Greer Drive on approximately 200 acres in the East Side High Pressure District, and a 2.5 mgd facility in Oshtemo Township near the 6th Street and G Avenue intersection on approximately 28 acres in the Ultra High Pressure District. Initial hydrogeologic investigations and property purchases have been completed for both locations.

Current well design capacities range from 300 gallons per minute (gpm) to 1,500 gpm and well depth ranges from 61 to 348 feet deep. All wells are screened within unconsolidated glacial sands and gravels. Two production wells, one at WPS-15 and the second at WPS-16 were abandoned and decommissioned in 2022. WPSs 2, 17, and 18 are currently inactive.

Table 2. CITY OF KALAMAZOO, PUBLIC WATER SUPPLY SYSTEM
BOOSTER / BLEEDER STATIONS

Station Number	Name	Constructed	Type	Boost (gpm)	Bleed (gpm)	Pressure District
6	Parker	1938	Booster/Bleeder	2,400	700	Low/High
10	East Main	1954	Booster/Bleeder	2,000	1,000	Low/Intermediate
11A	Kendall	2006	Booster	1,600		High/Northwest High
21	Miller Road	1954	Bleeder		1,400	High/Low
23	Gull Road	1969	Booster/Bleeder	1,000	650	Intermediate/East Side High
26	Maple Glen	1976	Bleeder		750	Low/High
27	28th Street	1990	Booster/Bleeder	750	500	Low/High
28	Beech	1993	Booster	1,600		High/Ultra High
29	9th Street	1994	Booster	1,600		Super High/Ultra High
30	Parkview	1980	Bleeder		2400	Super High/High
31	Prairie	1996	Booster	3,200		Low/Northwest High
32	Almena	2003	Bleeder		3,100	Westside High/Super High
33	33rd Street	1990	Bleeder		1,300	High/Low
34	"KL Ave"	2003	Bleeder		2,000	Westside High/Super High
35	Drake/KL	2009	Booster/Bleeder	1,000 each	750 each	Super High/High NWH/High NWH/Super High
36	West Main	2011	Bleeder		4,900	Super High/West Side Low
40	Barrington	2018	Booster	1,000		Super High/ Southwest Super High
41	West Main	2018	Bleeder		7,000	West Side High/West Side Low
42	Parkdale Ave	2018	Bleeder		3,100	Intermediate/ Parchment
43	East "G" Ave	2018	Bleeder		3,100	Intermediate/ Parchment
44	S. Orient St.	2018	Bleeder		3,100	Intermediate/ Parchment
48	Sprinkle	1984	Bleeder		200	East Side High/Intermediate
49	East Main	1984	Bleeder		200	East Side High/Intermediate
60	Mt Olivet	2021	Bleeder		100	Intermediate/ Parchment
62	Big Rock Dr.	2023	Bleeder		100	Ultra High/West Side Low

1.3.6 Storage Facilities

There are ten water storage facilities that collectively store 18.95 million gallons. They consist of nine above-ground tanks and one below-ground level facility. The Dartmouth Tank was taken out of service and two new tanks were constructed in the last three years, Parchment and 6th Street South. The storage facilities range in capacity from 200,000 gallons to 7 million gallons. **Table 3** summarizes details regarding the water storage facilities.

Table 3. CITY OF KALAMAZOO, PUBLIC WATER SUPPLY SYSTEM WATER STORAGE FACILITIES

Name	Constructed	Type	Capacity (gallons)	Pressure District
Beech	2007	Elevated	2,500,000	Northwest High
Blakeslee	1932	Ground	7,200,000	Low
Edgemoor	1939	Elevated	750,000	High
Siesta	2019	Elevated	2,500,000	High
Gull Road	1982	Elevated	1,500,000	East Side High
Mount Olivet	1955	Elevated	500,000	Intermediate
Parchment	1973	Elevated	200,000	Parchment
6th Street South	2022	Elevated	1,500,000	Super High
Stadium Drive	1994	Elevated	1,500,000	Super High
6th Street North	2005	Elevated	1,000,000	Ultra High
TOTAL			**18,950,000**	

1.3.7 Customer Base

As stated earlier in the Plan, the City of Kalamazoo PWSS currently provides services via written contracts to the City of Kalamazoo, the City of Parchment, the northern portion of the City of Portage, the Village of Richland, and all or part of Kalamazoo Township, Comstock Township, Texas Township, Richland Township, Oshtemo Township, Cooper Township, and Pavilion Township. There are approximately 45,331 accounts, including 39,306 residential, 3,492 commercial, 1,788 multifamily, 421 seasonal, and 236 industrial. The Kalamazoo PWSS serves approximately 196,000 customers.

The City has established Water Service Agreements between these communities establishes a Utility Policy Committee (UPC), which consists of seven members. Three are appointed by the City of Kalamazoo and four are appointed from the other stakeholder communities. The UPC meets with City of Kalamazoo officials, including the

City Manager (or their designee) and the Public Services Director, to review and discuss matters affecting the water system, including operations and maintenance, financial policy, utility rates, and capital planning. The committee must meet a minimum of four times per year, once per quarter.

2.0 CITY OF KALAMAZOO WELLHEAD PROTECTION PROGRAM

As stated previously, this WHPP Plan represents a summary of selected past, on-going, and planned groundwater supply protection efforts since 1992, the year the City formally began a WHPP. This Plan was written in accordance with guidance documents available from the EGLE. Much of the work was made possible by funding received from the Michigan Wellhead Protection Grant Program.

The City's original WHPP Plan was submitted to the EGLE in December 2003 and approved by the EGLE in early 2004. Subsequently, the City of Kalamazoo received the Exemplary Wellhead Protection Program Award by the Michigan Section American Water Works Association (AWWA) the same year. The Michigan Section AWWA awarded the City's Wellhead Protection Team the Richard Husby Public Awareness Award for promoting, developing and implementing public education activities in 2007. The City also received the Exemplary Wellhead Protection Program Award by the Michigan Section AWWA in 2013 and by the National AWWA award in 2014.

The Michigan Section AWWA awarded the City winner for the "Best Tasting Water" several times as part of the Regional Water Taste-Off winner: 1985 for Station 4, 2012 for Station 25 and 2023 for Station 1.

In 2004 EGLE received a Commendment plaque from EGLE (MDEQ) got its efforts to protect the health of its citizens and the natural resources of Michigan by implementing an approved Wellhead Protection Program. Again in 2022, the City received a Commendment plaque from EGLE for its efforts to protect public health and the environment by implementing an approved Source Water Protection Program.

Recognition plaques from the EGLE's Water Division and the Groundwater Guardian Organizations were awarded to the City from 1998-2023 for the Wellhead Protection Program until the organization was dissolved in 2024. Copies of the awards and plaques are included in **Appendix B**.

2.1 Wellhead Protection Program Elements

Appendix A, Figure 5 shows the seven elements of the Michigan Wellhead Protection Program. Each Element will be discussed in the following section specifically as it pertains to the Kalamazoo's WHPP. **Appendix A, Figure 6** presents a conceptual model of how the City's Wellhead Protection Program process is generally organized and implemented.

2.1.1 Wellhead Protection Area / Capture Zone Delineations

By federal and state definition, a Wellhead Protection Area (WHPA) is an area(s) surrounding the WPSs through which contaminants could move toward and eventually reach and impact the wellfields. WHPAs are primarily determined by the process of delineating time-of-travel (TOT) capture zones, areas that theoretically indicate the time period in which source water – and theoretically contaminants - could reach a WPS under a given set of pumping conditions. In Michigan, the delineation of a 10-year capture zone is required. The five-year and one-year capture zones have also been performed for all of Kalamazoo's WPSs. Subsequently, these three TOT capture zones are used to concentrate three different levels of effort to prevent groundwater contamination from occurring, based upon perceived risk. The State of Michigan requires that for delineation of a WHPA, a hydrogeologic study needs to be completed to compile readily available information, complete field work necessary to better understand the hydrogeologic system and use an appropriate groundwater model to identify the WHPA.

In 1995, the City retained the services of the Peerless-Midwest Company, a highly reputable firm with extensive experience with groundwater modeling primarily in Michigan and Indiana, to complete all of the necessary groundwater flow modeling/capture zone delineations. Subsequently, representatives of the City, Peerless-Midwest, and the EGLE met to discuss the strategy to delineate all of the City's (then) 19 active wellfields. After much review and discussion of available hydrogeologic and PWSS data, it was agreed that an initial regional groundwater model was appropriate. This regional model served as a precursor to the individual capture zone delineations and demonstrated that the water budget for the west side of the Kalamazoo River (where 15 of the 19 WPSs were located) was adequately understood and served as a general hydrologic template for the subsequent models.

The U.S. Geological Survey (USGS) MODFLOW (McDonald and Harbaugh, 1988) and associated programs were selected for this and all of the subsequent groundwater models since it has the ability to simulate multiple layers, confining layers, flow between layers, and groundwater-surface water interaction. In addition, it has been thoroughly tested and consequently, there is a high degree of confidence in this software. This was critical since the hydrogeology of the Kalamazoo area is highly complex due to the multiple aquifers, variability of semi-confining to confining conditions, and large amounts of groundwater withdrawals and in some cases, artificial recharge. In October 1996 the report "Kalamazoo, Michigan Regional Groundwater Flow Model" was submitted and subsequently approved by EGLE.

The following are titles, dates, and a brief summary of the five original groundwater flow model & capture zone delineation reports/projects:

- "*Kalamazoo, Michigan Water Pumping Stations 11 & 12 Groundwater Flow Model & Capture Zone Delineations*" dated March 1998. WPSs 11 and 12 were selected for the first capture zone delineation groundwater flow model since it

was well documented that the two wellfields were hydraulically connected, there was numerous hydrogeologic data for the area, the hydrogeology was complex/multi-layered, and there were past and present contaminant concerns. WPS 11 has an air stripping and iron removal capability (due to the detection of vinyl chloride in the early 1980s). These two stations were modeled using seven layers. It is interesting to note that although these two stations are within each of their respective cone of influence, the model indicated that their capture zones do not co-mingle. They are located in the northwest portion of the PWSS.

- "*Kalamazoo, Michigan Water Pumping Stations 1, 2, 3, 4 & 7 Groundwater Flow Model & Capture Zone Delineations*" dated November 1999. This model addressed the WPSs that are geographically in the same area near the Crosstown Ponds and hydraulically connected, with the exception of WPS 4 that does not respond to or affect the other WPS pumping regimes. They were also modeled using seven layers. Central Wellfield/Water Pumping Station 1 is the oldest wellfield, serving the City since the 1880's. Central's complete renovation in 1995 included replacement of all of its 19 production wells with six higher capacity wells, and the addition of air stripping and iron removal capabilities. The renovation made it the newest and largest pumping facility.
- "*Kalamazoo, Michigan Water Pumping Stations 8, 9, 15, 16, 17, 18, 22 & 24 Groundwater Flow Model & Capture Zone Delineations*" dated September 2001. This model addressed the eight southernmost WPSs: the "Milwood Stations" or WPSs 15, 16, 17 & 18, the Kilgore Road WPSs 8 & 9, and WPSs 22 & 24, the two most southwesterly located stations in the PWSS. WPSs 15 & 16 are not currently active but were modeled to their original design pumping capacity in case they are rehabilitated later. They were all modeled using four layers.
- "*Kalamazoo, Michigan Water Pumping Stations 5 & 14 Groundwater Flow Model & Capture Zone Delineations*" dated September 2002. These two WPSs were modeled together since they are located relatively close to one another and were both located east of and near the Kalamazoo River. They were modeled in three layers. WPSs 5 & 14 are the only two Stations in the Intermediate Pressure Service District.
- "*Kalamazoo, Michigan Water Pumping Stations 25 & 39 Groundwater Flow Model & Capture Zone Delineations*" dated December 2002. WPSs 25 & 39 are the two most eastern stations and are located just west of Campbell Lake and near the southeastern portion of Morrow Pond (Kalamazoo River impoundment), respectively. They were modeled using three layers.

The original City of Kalamazoo capture zone delineations were performed by Peerless-Midwest. The groundwater modeling/capture zone reports were jointly prepared by the Peerless-Midwest Company (John R. Barnhart, Bob Masters, and Mike Chapman) and the City of Kalamazoo, Department of Public Services (John P. Paquin).

In 2017, the City retained Fleis and VandenBrink (F&V) consultants to update the capture zone delineations, incorporating the deletion of the abandoned WPS 15 and WPS 16. The project team reviewed monthly WPS flow data for the period 2012-2016. The data were used to calculate the average day pumping for the maximum months at each WPS. This was done using both a 5 and a 10-year span. The pumping updated models were run using the pre/post processor Groundwater Vistas Version 7, which incorporates MODFLOW. The models were run in in steady-state mode. Model output was used as import into MODPATH. Particles were tracked in reverse from the pumping centers. 1-, 5- and 10-year time-of-travel zones were calculated for each WPS. A high density of particles was used to provide clear definition of each WHPA.

In 2018, the delineations boundaries were further refined using a computer program that provided more detail and accuracy. In 2021, EGLE approved the City's delineation map (overlay map). **Appendix A, Figure 7** shows the *2018 final version* of the updated composite capture zone delineation figure (1-, 5- and 10-year times-of-travel).

Kalamazoo's updated Zoning Code references parcels by street addresses and enforcement is for the entire parcel, whereas the WHPAs are not. In 2022, the Wellhead Protection Ordinance 1825 was repealed from the Zoning Codes. An updated Wellhead Protection Ordinance 2057 and overlay map were adapted by the City Commission on October 17, 2022, as Chapter 39 in the Code of Codes. Accordingly, the City's Performance Standards for Groundwater Protection within Wellhead Protection Capture Zones and Stormwater Management were also revised in 2022.

2.1.2 Contaminated Source/Transport Study

In 1981, volatile organic compounds (VOCs), primarily Vinyl chloride, were detected in the water supply at the WPS 11. In response, the station was shut down in 1985. Since the discovery of VOCs, groundwater samples have been routinely collected from production wells and monitor wells at WPS 11. The discovery of VOCs also promoted researchers to evaluate the hydrogeological characteristics of this wellfield site in more detail. The City retained F&V consultants to complete a contaminant source/transport study for near WPS 11 using a WHP Grant. The City has also done its own investigations of VOCs at WPS 11 and maintains a comprehensive database of information.

The subsequent hydrogeologic contamination source investigations did not identify the source(s). As a remedial action, the City installed an air stripping tower to the water system to remove the VOCs. The air stripping treatment system also removes iron as part of the treatment. Although VOC concentrations diminished over time to trace levels below the Maximum contaminant Levels, traces of VOC persisted. In 2018, F&V was contracted to update and reassess the water quality data and hydrogeologic information in the vicinity of WPS 11 by sampling all the monitor wells. The identification of source(s) is still unknown, and the study concluded that trace levels of VOCs will persist for some time. The City continues to monitor VOC concentrations in the groundwater at WPS 11 and operate the air stripper for treatment.

2.1.3 Contaminant Source Inventories

Initial Contaminant Source Inventories

Initially, Contaminant Source Inventories (CSIs) were prepared for each respective delineated area(s) after completion and approval of each groundwater flow model/capture zone delineation report. The goal of a CSI is to identify existing (known) and potential sources of contamination (sites) that might represent a threat to the PWSS. The City used the required 10-year TOT capture zones with a one-quarter to one-half mile buffer area as the CSI data boundaries since the City recognized that there may be cases that a groundwater contaminant plume exists upgradient from a currently delineated capture zone that has the potential to migrate downgradient into a WHPA.

After much consideration, it was decided that the most cost-effective and comprehensive strategy to complete the City's CSIs was to start with an electronic database service that provided the majority of potential sources of contamination information requested by EGLE (formerly MDEQ). EcoSearch Environmental Resources, Inc. provided the database listings for the first two CSI reports, Environmental Database Resources, Inc. (EDR) provided the database listings for the third and fourth CSI reports, and FirstSearch Technology Corporation (FTC) provided the database listings for the fifth and sixth CSI reports.

After the database listings were reviewed, modifications and additions were then made to the report based on in-house knowledge and other supplemental informational sources, including the:

- City Fire Marshal Office, EGLE Storage Tank Division (Kalamazoo District Office),
- EGLE Remediation and Redevelopment Division (formerly MDEQ, Environmental Response Division,
- EGLE Drinking Water and Environmental Health Division (formerly MDEQ Drinking Water and Radiological Protection Division, and
- EGLE Materials Management (formerly MDEQ Waste Management Division,
- Kalamazoo County Health & Community Services (formerly Kalamazoo County Environmental Health and Laboratory Services Bureau).

Examples of non-database service information that was acquired include oil and gas well permit locations, groundwater dischargers, land restricted (covenant) sites, abandoned wells, and stormwater related sites. Subsequently, all of the information was reviewed, cross-checked, re-organized, and plotted in various figures as considered appropriate.

The following are all of the initial CSI reports prepared by the City and approved by the EGLE:

- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 1, 2, 3, 4, 7, 11 & 12"* dated September 2000. This report combined the 10-year TOT capture zones for the first two groundwater delineation models that addressed seven WPSs.
- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 15, 16, 17 & 18"* dated September 2002.
- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 8 & 9"* dated September 2002.
- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 22 & 24"* dated September 2002.
- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 5 & 14"* dated December 2002.
- *"Kalamazoo, Michigan Contaminant Source Inventory for Water Pumping Stations 25 & 39"* dated March 2003.

2005 CSI Update, GIS Database, and Risk Assessment Project

In 2005, the City of Kalamazoo worked with Fishbeck, Thompson, Carr & Huber (Fishbeck) to collectively update its CSIs for all of its WHPAs. The update consisted of the following:

1. Updating various state and federal database information;
2. Conducting Freedom of Information Act Requests for and file review of selected state agency files;
3. Contacting local agencies;
4. Populating the existing CSI MS-Access database with the new information; and
5. Updating the Geographic Information System (GIS) capabilities of the MS ACCESS database.

New to the CSI process was a prioritization method that used a numeric ranking system to help prioritize the CSI data. Primarily, the ranking tool took into consideration four general data types:

1. Current Land Use – how the site is currently used;
2. Environmental Data – a variety of environmental data available from state and federal databases, and consideration whether the site has participated in environmentally-friendly programs;
3. Groundwater Vulnerability – such factors as depth to groundwater, soil type and recharge; and
4. Water Supply Vulnerability – whether the site is within the 1-, 5- or 10-year capture zone.

The scoring tool applied weight to the various data types which resulted in a numeric score for each site. The greater the score, the higher the likelihood the site will pose a threat to water supply wells. Details of the process and results of the 2005 Contaminant Source Inventory Update, City of Kalamazoo, Michigan September 2005 were reported.

2010 CSI, GIS Database, and Risk Assessment Update

In 2010, the City and Fishbeck again performed the five-year CSI update for all of the WHPAs and in some cases, slightly revised the numeric ranking system either by adding new criteria or adjusting some of the weight values. For example, known nonconforming use sites relative to the formal adoption of the Wellhead Protection Overlay (former Ordinance No. 1825) in 2007 (updated in 2015) were taken into consideration. In addition, new environmental information was available during this update period, resulting in additional site categories and significant increases in sites listed in the Facility Index System (FINDS) and Liquid Industrial Waste or Emergency Generator categories. Subsequently, the MS ACCESS database/GIS were also updated.

2017 CSI, GIS Database, and Risk Assessment Update

In 2015/16, the City and Fleis & VandenBrink **(**F&V) performed the five-year CSI and Risk Assessment update for all of the WHPAs and in some cases, slightly revised the numeric ranking system either by adding new criteria or adjusting some of the weight values.

Nonconforming use sites relative to the 2015 Wellhead Protection Overlay were again revised and the project was expanded to include the City's ongoing Chemical Storage Inventory Project. This further categorized CSI sites into four status categories: Acceptable Nonconforming, Conforming, Status Unknown (Higher Potential) and Unknown Nonconforming. Subsequently, the MS ACCESS database was also updated. A CSI GIS layer was finalized by F&V and added as a layer in 2018 on the GIS website for use by employees, especially in the Site Plan Review process.

2024 CSI, GIS Database, and Risk Assessment Update

In 2024, the City performed the five-year CSI and Risk Assessment update for the recently updated 2022 WHPA Ordinance and Overlay. The City removed sites that were outside the City boundaries, slightly revised the numeric ranking system either by adding new criteria or adjusting some of the weight values. For example, PFAS sites and 2020 Corrective Action sites were identified resulting in the addition of these two categories and updates to the scoring. New to the CSI process was an addition of a fifth data type to the ranking tool: Regulated Substance Usage. In addition, new environmental information was available during this update period, resulting in a significant increase in the number of sites identified in the 2024 CSI update. Subsequently, the MS ACCESS database/GIS were also updated. The 2024 CSI Report file size is large and has been provided to EGLE separate from this report.

In summary, 1,813 sites were scored in the 2024 CSI with 118 different scores. The range of the scores was 35 to 335 points. Of the eight jurisdictions that the City's capture zones extend, 73 percent of the sites in the CSI are located within the City of Kalamazoo, 10 percent in the City of Portage, 7 percent in Kalamazoo Township, 5 percent in Comstock Township, 3 percent in Texas Township, 3 percent in Oshtemo Township, and less than one percent cumulative total within the Richland Township, Pavilion Township, or situated across multiple jurisdictions. The 2024 CSI update is reported in "Contaminant Source Inventory Update for the City of Kalamazoo Michigan May 2024."

2.1.4 Roles and Responsibilities

The goal of this element is to identify and indicate involvement of individuals and/or organizations that will help develop and implement the local WHPP.

City of Kalamazoo

The City of Kalamazoo administration is solely responsible for complying with and for the administration of the WHPP. Examples of these duties and responsibilities includes preparing and submitting all appropriate program reports to EGLE; preparing and submitting WHP Grant Contract reports to the EGLE and fulfilling obligations therein (project management); and ensuring that the obligations of all seven required program elements are met (including WHPP updates). The City is also responsible for integrating wellhead protection strategies within all water resources management programs and projects as appropriate and to the most practical extent possible. City staff also selects and supervises all consultant/contractor assistance on a project-by-project basis.

Wellhead Protection Committee

The local WHP Committee serves three purposes: to fulfill the general EGLE requirements for a local WHP Committee, fulfill the EGLE WHP Grant Program requirements, and fulfill the national Groundwater Foundation Groundwater Guardian Program requirements. The City has consistently exceeded the minimum requirements for committee membership for all three purposes. **Table 4** indicates the current members of the committee. The local WHP Committee is typically used in non-technical roles, but members do periodically contribute to technical issues, especially from a review and comment role. The Committee meets quarterly and typically focuses on public education and participation, selection of management strategies and projects for grants, the Groundwater Guardian Program (until 2023), contamination issues, and interaction with the community regarding the WHPP. The team members are carefully selected to optimize opportunities to tap local expertise for all of the seven elements.

Kalamazoo County Health and Community Services Department

The City has had a collaborative relationship with the Kalamazoo County Health and Community Services (KCHCS) on groundwater programs and projects, focusing

primarily on public education and participation, well abandonments, contamination issues, and public media releases regarding certain water quality issues. An example of this collaborative relationship was the joint-funded and managed Kellogg Foundation Grant Project “Groundwater Protection Through Local Government and Business Community Action and Education” from 1995-2001. Through this grant, two committees were formed: the “Kalamazoo Area Wellhead Information Network (KAWIN)” – currently titled the “Safe Drinking Water Partners of Southwest Michigan” (SDWP) – and the Kalamazoo Area Groundwater Education Committee (KAGEC). The City was a primary member in both of these committees. KAGEC eventually merged with KAWIN/SDWP largely through derivatives of the joint grant through the Kellogg Foundation. KEGEC, KAWIN, and SDWP are no longer in existence.

The City also co-managed the Kalamazoo County Monitoring Well Inventory Project with Kalamazoo County that resulted in approximately 7,000 monitoring wells being identified and entered into the County’s well database. The City also promoted Kalamazoo County’s past “Business Environmental Education Assistance Program” (BEEAP) that linked area businesses with the County’s and City’s groundwater protection programs.

Table 4. WELLHEAD PROTECTION COMMITTEE MEMBERSHIP 2024

Name	Representing	Title	Reference
Brock VanDyken	PWSS Superintendent	City of Kalamazoo, Water Resources Division, Superintendent	City of Kalamazoo
Jean Talanda	Water Programs Manager	City of Kalamazoo, Dept. of Public Services	City of Kalamazoo
John Paquin	General Public	Environmental Consultant - Marshall Wellhead Protection Grant Specialist	City of Marshall
Chad Tackett	Local Fire Department	Chief	Charter Township of Texas Fire & Rescue Dept
Chris Gallup	Agriculture	Farmer	Timberline Farms
Jeff Reicherts	Local Health Department	Groundwater Specialist	Kalamazoo County Environmental Health
Becky Gross	Business and Industry	Environment, Health & Safety Manager	Zoetis
Megan Kaiser	Business and Industry	Sustainability/Environmental Engineer	Bell's Brewery
Katie Strohauer	Business and Industry	Environmental Consulting, Project Manager	Fleis & Vanderbrink
Matt Reeves	Education	Associate Professor	Western Michigan University, Dept. of Geological Sciences
Bobby Durkee	Planning	Assistant City Planner	City of Kalamazoo, Community Planning and Economic Dev.
Linda Zabik	Environmental Organization	Conservation Program Assistant	Kalamazoo Conservation District
Jeff Sorenson	Adjoining Municipality	Township Supervisor	Cooper Charter Township

More recent examples of collaborative efforts include responses to the contamination in various drinking water supplies since 2018 at the City of Parchment (PFAS), City of Richland (PFAS), Oshtemo Township (1,4-Dioxane and PFAS), and Kalamazoo/Battle Creek International Airport (PFAS); as well as other sites of know contamination, Georgia-Pacific Paper Mills Superfund Site (Polychlorinated biphenyls or PCBs), Allied Paper Operation Unit 1 Superfund Site (PCBs), the Enbridge Energy crude oil release. Refer to Section 2.2.7 for more detailed information. Together the City and KCHCS put out media releases for water quality issues such as sanitary sewage overflows (SSOs).

The historic close relationship between the City and the County on groundwater related efforts has been beneficial to both governments and is anticipated to continue into the foreseeable future.

EGLE

The City recognizes the critical role of the EGLE to administer and manage the WHPP from a regulatory standpoint (approving groundwater models, contaminant source inventories, local WHPPs, etc.), from an advisory role (providing guidance documents, attending meetings, etc.), and to provide funding where possible, such as through the WHP Grant Program.

Other Roles and Responsibilities

In general, non-City water contract customers (neighboring governments) and the general citizens using City water should have a vital interest in and should take seriously their organizational and/or personal role in helping protect their own drinking water supply.

Business, professional, and environmental organizations such as the Utility Policy Committee, City of Kalamazoo Environmental Concerns Committee (ECC), the former Kalamazoo Environmental Council (KEC), Kalamazoo River Watershed Council (KRWC), Kalamazoo River Cleanup Coalition (KRCC), Kalamazoo River Superfund Community Advisory Group, Southwest Michigan First Chamber, local media, etc., all have a role in wellhead protection, either by their direct (formal) or indirect (informal) professional services provided to the City, or by initiating public interest and educating citizens regarding environmental protection issues in general, or specifically by providing support to drinking water protection initiatives.

City staff has had memberships/participation with the Michigan AWWA and their Groundwater Committee, Michigan Water Environment Association (MWEA), the National Ground Water Association (NGWA), and the national Groundwater Foundation Groundwater Guardian Community Program (until 2023). Staff continues to provide and help coordinate various groundwater presentations at conferences, seminars, workshops, and meetings. In addition, the City has in the past teamed up with the Michigan Water Stewardship Program in well abandonment and groundwater education projects, and periodically works with faculty and students at Western Michigan University in water related projects. Finally, the K-12 public and private educational institutions have had a role in groundwater education by allowing presenters into their classrooms and participate in other events, and by incorporating groundwater education into their curriculums.

2.1.5 New Production Wells/Wellfields

The goal of this element is to ensure that a mechanism exists for incorporating new or replacement wells or wellfields into the WHPP when the water supply is expanded, an

increase in water use is desired, or susceptibility of existing wells or wellfields to contamination may necessitate the future development of new production facilities.

The City has historically and routinely considered groundwater source protection/wellhead protection in its decision-making when replacing or adding a new water production well. However, the City can now more thoroughly investigate area conditions with the CSI/Risk Assessment (RA). Collaboration between Water Resources Division staff (Environmental Programs Manager) and the Engineering Division staff (Senior Civil Engineer) serves as an effective current mechanism: Water Resources staff addresses the hydrogeologic assessment/safe yield, property management and acquisition, potential environmental impacts, known and potential sources of contamination, current and proposed land use,; and Engineering staff addresses and current and projected water use, the water main, electrical, necessary engineering drawings, and other engineering details of the well/wellfield project. They work jointly to prepare and submit necessary permits.

2.1.6 Contingency Planning

The goal of a WHPP contingency plan is to prepare a PWSS for natural, environmental, or other threats by the use of carefully prepared actions/responses. The main elements of a WHPP contingency plan are the identification of personnel, testing equipment, procedures, materials, etc. that can be used for the rapid correction or mitigation of threats to the water supply.

Generally, all of the components of a WHPP contingency plan are contained within the City's "City of Kalamazoo Department of Public Services Water Pumping and Distribution System Emergency Response Plan" (ERP), prepared in compliance with "The Public Health Security and Bioterrorism Preparedness and Response Act of 2002." The City's emergency planning documents were last updated in 2020 and are in the final draft stage for 2024. The ERP serves as the guide for the Kalamazoo Department of Public Services to decide what actions are necessary to govern the immediate response to an emergency, including how to remedy the problems caused by the emergency and recover from it. EGLE understands the importance of maintaining confidentiality in respect to certain PWSS protection strategies, especially relative to fulfillment of recommendations from the confidential "Vulnerability Assessment," a mandated document. Those sensitive strategies will not be discussed in this WHPP Plan document. For more information or to request a copy for the most recent draft call the City's Water Resources Division Manager.

2.1.7 Wellhead Protection Area Management

The goal of developing management strategies (management plans) is to recognize, categorize, and prioritize threats to the PWSS and plan for and implement measures to minimize risk to its groundwater supplies. The City has numerous challenges, given the large and widely distributed capture zone areas, older urban core, and the significant number of older wellfields. Consequently, the City has implemented and currently uses

numerous and a wide variety of management strategies in the attempt to minimize risk to its PWSS groundwater source areas. **Appendix A, Figure 8** shows the large array of WHPP management strategies implemented for the City of Kalamazoo's PWSS.

Groundwater Protection Resolution

On July 20, 1998, City of Kalamazoo, Michigan Resolution No. 98-77 – "A Resolution which Expresses Intent of the City of Kalamazoo to Participate in Groundwater Protection Efforts and Which Encourages Its Citizens to Do So" was adopted by the City Commission. This was a formal first step in introducing the City Commission to the Wellhead Protection Program. The Resolution also set the groundwork for the City's efforts in completing all of the necessary program elements, preparation of the Wellhead Protection Program Plan and subsequent EGLE approval, and served as a precursor to the formal adoption of the WHP Ordinance Overlay and Performance Standards Ordinances.

Wellhead Protection Ordinance Overlay and Performance Standards

From a regulatory perspective, the two primary WHPP management strategy tools. In 2022, the Wellhead Protection Ordinance 1825 was repealed from the Zoning Codes. An updated Wellhead Protection Ordinance 2057 and overlay map were adopted by the City Commission on October 17, 2022, as Chapter 39 in the Code of Codes. Accordingly, the City's Performance Standards for Groundwater Protection within Wellhead Protection Capture Zones and Stormwater Management were also revised in 2022. The City updated the Performance Standards, primarily to align them with new requirements in the 2019 Phase II Stormwater NPDES Permit. **Appendix C** contains Ordinance 2057 and Ordinance 1826.

Wellhead Protection Overlay
The objectives of the Wellhead Protection Overlay Ordinance (Overlay Ordinance) are to:

1. Prevent the creation or establishment of non-compatible land use activities within WHP capture zones that have the potential to contaminate groundwater sources, or prevent/limit the City's ability to obtain necessary State well permits to replace or add wells when necessary;
2. Protect designated groundwater supplies from contamination resulting from spills, leaks, and other releases into groundwater supplies caused by the improper storage, handling, use, production, or discharge of Regulated Substances within capture zones by the use of Performance Standards and/or other best management practices (BMPs);
3. Minimize interruptions to businesses by only regulating specific designated land-use activities within specific designated time-of-travel capture zones, as based upon determined potential risk to the PWSS; and

4. Prevent or minimize public and private losses due to contamination of the public water supply by avoiding expenditure of public money for costly pollution remediation projects and/or replacement of PWSS assets.

Generally, the above objectives are accomplished by prohibiting certain higher risk to groundwater activities within the one-year capture zone and requiring that sites within the 5-year and 10-year capture zones to adhere to the Performance Standards or implement other acceptable BMPs and/or the prepare Spill Response Plans or Spill Containment Plans to prevent/minimize the risk of groundwater contamination. It also addresses existing nonconforming sites.

In 2022, the City's Water Resources Division created a living document titled "Spill Response Procedures" to train new staff and to be available in the immediate need of a spill or release. It is updated annually and provided to Public Safety, and the other divisions of Public Services who are most likely to respond to a spill.

Performance Standards
Updated in 2022, the Performance Standards for Groundwater Protection Within Wellhead Protection Capture Zones and General Stormwater Quality Management (Performance Standards) serves as the technical reference for the WHP Overlay Ordinance and for Site Plan Review. It provides:

1. General Site Plan Review Standards (e.g., regarding site design, process activities, regulated substance storage, waste, etc.);
2. Land use specific Site Plan Review Standards (e.g., dry cleaning, fueling, repair shops, junk/savage yards, etc.);
3. Stormwater quality management criteria (groundwater risk assessment, discharge strategies, treatment, spill containment, etc.);
4. Addresses nonconforming land uses;
5. References potentially applicable environmental regulations;
6. Provides information regarding contaminated property management; and
7. Provides other useful information within the Appendices.

The most common applications of these standards have been the requirement for secondary containment of Regulated Substances over the 55 gallon/440 pound threshold, stormwater discharge management within WHPAs by either prohibiting stormwater infiltration within one-year and five-year TOT capture zones or requiring stormwater treatment prior to infiltration dependent on various factors, and/or the preparation of spill contingency plans.

2.1.8 Other Jurisdictions with Capture Zones

The City has worked with Prein & Newhof consultants, which represents many of the outside-the-City township water customers via the Utility Policy Committee (UPC), to present, explain, and encourage the formal adoption of both the WHP Overlay Ordinance and the Performance Standards for their jurisdictions. Consequently, a

“Model Township Ordinance” and “Model Performance Standards” were prepared all were adopted in 2024. The Township versions of the ordinances are primarily the same as the City’s with the exception of revisions to accommodate certain rural conditions, such as the use of septic systems where sanitary service is not available, private wells where water service is not available and accommodating stormwater infiltration in capture zones where surface waters are not readily available for discharge.

2.1.9 Site Plan Review

The second primary management strategy is a formalized Site Plan Review process developed in 2000 that addresses proposed new and re-development that meets specific criteria.

In addition to the previously discussed use of the WHP Overlay Ordinance and the Performance Standards, the Site Plan Review Process also uses a Site Plan Review Application Packet. Originally the packet contained a “Water Resources and Environmental Protection Questionnaire” that provided the first set of pertinent questions regarding potential environmental issues and initiates the consideration of setting certain conditions for site plan approval, as appropriate. The City provided the Water Resources and Environmental Protection Questionnaire to select neighboring Townships and has encouraged its use.

The Environmental Protection Questionnaire was recently incorporated into the Site Plan Review Project Checklist included as **Appendix D**. The City utilizes the Site Plan Review process on 50 to 90 proposed new and re-development sites per year.

2.1.10 Nonconforming Use Project

In 2010 as a follow-up to the adoption of the WHP Overlay and Performance Standards Ordinances, City staff worked with Fishbeck to identify businesses located within WHP capture zones, and specifically those that were known to or were likely to possess Regulated Substances above the designated thresholds. A cover letter and Questionnaire were sent out to 34 businesses that were identified as priority sites, based on a number of developed criteria. Subsequently, the objective was to determine which businesses were in compliance and those that needed to meet the Performance Standards and/or prepare a Spill Response Plan. Currently the City updates compliance of nonconforming use properties during the Site Review Process by use of Chemical Storage Inventory forms and environmental reviews including but not limited to: Environmental Site Assessments, Baseline Site Assessment and Due Care Plans.

2.1.11 Voluntary Spill Response Plans

In 2004 and 2005 (prior to the adoption of the WHP Overlay and Performance Standards), the City initiated a MDEQ grant funded project with Fishbeck to identify businesses located within capture zones that were not currently obligated under state or federal law to prepare spill response plans (SRPs) but still posed a reasonable risk to

groundwater, based on their land use activities (e.g., storage and/or use of chemicals). One unique part of the project was that the information about the businesses would be kept confidential unless the business voluntarily provided the City a copy. The City contacted 59 businesses by providing them a letter explaining the free and confidential project. General information was provided to the City from Fishbeck, such as how many SRPs were completed, type of businesses, location relative to capture zones, and the type and quantities of chemicals that existed.
Of the 59 businesses contacted, six declined due to lack of interest, seven declined since they reportedly did not have significant storage of chemicals, nine declined since they already had an SRP, six did not respond, four were subject to PIPP or SPCC regulations and thus were not eligible, seven declined but would consider participation in the future, and 20 accepted. Of the 20 that businesses that were interested and eligible, Fishbeck performed site assessments and conducted a walk-through of each of the sites. SRPs were then prepared for the businesses using a template prepared by Fishbeck (contained as Attachment 2 in the Performance Standards). Following the preparation of the SRPs, the materials were delivered to the site, along with a cover letter that listed additional recommended practices (if appropriate) to reduce the probability of chemical releases. All of the 20 businesses allowed the City to recognize them with a framed Certificate of Appreciation, and in a groundwater education pre-movie theater video ad.

2.1.12 CSI GIS Database and Risk Assessment

Details regarding the CSI GIS Database and Risk Assessment were provided earlier in this Plan. Since these initiatives were above and beyond the scope of the traditional CSI requirement, they are also considered management strategies developed to help manage actual and potential sources of contamination. The Water Resources Division and the Fire Marshal had discussed the possibility of having a common database that has chemical storage information since the information is important for both assessing risk to groundwater and the safety of Public Safety Officers responding to fires. Due to the COVID lockdowns since the last Plan update, no action occurred. Eventually this could be accomplished in a variety of ways, including the expansion of the existing CSI database that covers approximately half of the City, using the existing BS&A parcel database, or preparing a new GIS compatible database for all City properties, using all available information. The acquisition of chemical storage information has also been taken place and the information shared during the Site Plan Review process.

The City currently utilizes the Chemical Inventory and Storage Form questionnaire as part of the Right To Know regulations and for the wellhead protection programs. This questionnaire included as **Appendix E** is distributed via the Public Safety Officers during annual inspections and Site Plan Reviews and can be obtained on the City's Protect Your Water Website (www.protectyourwater.net).

In 2010 as a follow-up to the adoption of the WHP Overlay and Performance Standards Ordinances, City staff worked with Fishbeck to identify businesses located within WHP capture zones, and specifically those that were known to or were likely to possess

Regulated Substances above the designated thresholds. A cover letter and Questionnaire were sent out to 34 businesses that were identified as priority sites, based on a number of developed criteria. Subsequently, the objective was to determine which businesses were in compliance and those that needed to meet the Performance Standards and/or prepare a Spill Response Plan. A comprehensive "Nonconforming Use Identification and Action Plan" table was prepared to track all of the businesses.

2.1.13 Cooperation and Coordination with Other Units of Government

Cooperation and coordination with EGLE and participation with Kalamazoo County programs were discussed in the previous Roles and Responsibilities section of the Plan. However, the extra effort and progress made to achieve these objectives also make them management strategies, along with assistance provided to other governments, discussed as follows.

Staff works with EGLE to prioritize and cooperate as much as possible to investigate, evaluate, and remediate (if necessary) sites of concern. Examples of the type of past cooperative efforts by the City include: use of staff in researching, evaluating, and recommending courses of action on contaminated groundwater sites; sharing water level measurements and water quality data from samples collected from the numerous City owned production and monitoring wells in the area; analyzing groundwater samples at the Kalamazoo Water Reclamation Plant state-certified laboratory to assist in lowering site investigative costs; and drilling and installing monitoring wells to assist in site investigations.

The City actively promotes the use of the Kalamazoo County Household Hazardous Waste Collection Program and the Kalamazoo County's Well Abandonment Program. In addition, the cities of Kalamazoo and Portage work together on land use projects that may pose environmental concerns to the other's jurisdiction (e.g., proposed development within WHPAs). Information and links to the County's program are provided on the City's websites, View from the Curb pamphlet and the CCR.

Finally in 2022, staff has assisted other Kalamazoo County governments by providing presentations to them about the City's WHPP, providing Ordinances and Performance Standards to be used as templates to be used to establish their own Ordinances and Performance Standards in 2024. This includes

2.1.14 U.S. Geological Survey Cooperative Water Level Monitoring Program

The City has participated in the cost-sharing USGS Cooperative Water Level Monitoring Program for several decades. In 2011, the City contributed approximately $50,000 to the program. The City's participation has made possible the collection of groundwater and surface water levels from numerous USGS observation wells (OWs) and surface water gauging stations in Kalamazoo County. This water level data is periodically used in hydrogeologic/hydrologic studies, exploratory source investigations, and

groundwater-surface water inter-relationship evaluations. USGS OWs are located at City's WPSs 1, 4, 9, 11, 18, 22, 24, 25, and 39. The City also initiated and was a primary partner in a regional group to have additional OWs either installed or incorporated into the USGS network, including at the Gourdneck State Game Area and the Western Michigan University (WMU) former Lee Baker property.

In 2018, the City funded a "Real Time" groundwater gauging station at its Central Wellfield location and a Real Time surface water gauging station on Portage Creek at Reed Street. Real time gaging was also installed in 2019 on the West Fork Portage Creek at Kalamazoo USGS 04106400 and West Fork Portage Creek near Oshtemo at USGS 04106320. These gage stations significantly improved our better understanding of water management between Station 24 and Stations 22 and 9.

2.1.15 Local Monitoring Well Network

Since 1981, the City has installed numerous monitoring wells at and/or in the vicinity of some of its wellfields to assist in hydrogeologic and/or contaminant investigations. Some of the general locations of Monitor Wells (MWs) include in and around the Central Wellfield (WPS 1), WPSs 11 and 12, WPS 14, WPS 4, WPS 2, WPS 5, and WPS 18. In addition, the City worked with EGLE to have principle responsible parties (PRPs) of groundwater contamination install many MWs near Wellfield 7 to assess the migration of two groundwater plumes and the seasonal operation of a remedial purge system.

MWs installed on City owned property or Right-of-Ways by other organizations – primarily consultants retained by PRPs – are recorded by the use of Temporary Access Agreements. To date, there have been nearly more than 180 MWs installed via the Temporary Access Agreement process.

2.1.16 Well Abandonments

The City has a policy to properly plug old production and monitoring wells after they are replaced or are no longer usable or accessible. Two examples of extended well plugging efforts include the following.

In 1998, the City prepared and submitted a proposal to participate in the EGLE Abandoned Well Management Program Demonstration Project. Although the project was not selected and consequently no funds were available to perform the proposed work, significant work was accomplished, including research of potential well plugging candidates within WHPAs; prioritization of identified candidates; and the preparation of a collaborative framework to perform well abandonments.

In 1999/2000, a specific well abandonment project was used as a Groundwater Guardian Program Project. The City collaborated efforts with Kalamazoo County and the Michigan State University (MSU) Groundwater Stewardship Program (GSP) to have well abandonment efforts partially funded by a GSP grant. Criteria for well abandonment candidates included residential wells only, wells located within a WHPA, and wells

abandoned or unused prior to 1983. A City Registered Well Driller and other staff performed the removal of existing pumps and motors and drop pipes, and well plugging of approximately 10 wells. One well plugging was used as a demonstration project for public education of neighborhood residents and a WMU geology class. The demonstration well plugging was performed at no cost by the Ohio Drilling Company.

The City is continuously with KCHCSD updating the well abandonment list and seeking funding to implement the next well abandonments in WHPAs. The list includes private monitor or irrigation wells within the capture zones.

2.1.17 Land Purchases for Wellfields

The City attempts to purchase as much property for and around wellfields as possible so land use activities can be directly controlled by the City, thus minimizing risk to the groundwater. In addition, greater property size provides more flexibility in the original design of wellfields and well spacing, and better allows for the accommodation for future well replacements or additions to meet well isolation distance requirements. Some examples of large tracks of land purchased for wellfields include: WPS 9 (50.4 acres), WPS 14 (20 acres), WPS 22 (22 acres), WPS 24 (717 acres), WPS 25 (406 acres), and WPS 39 (68 acres). Other notable wellfield sizes include: WPS 1 (18.4 acres), WPS 4 (8.5 acres), WPS 11 (16.2 acres), WPS 12 (12.6 acres), and WPS 18 (7.8 acres). In 1993 after the first of three hydrogeological investigations, the City purchased approximately 204 acres in Ross Township for a proposed 3 MGD wellfield. In 2003, two parcels of property adjacent to WPS 11 were acquired for the purpose of adding vacant property adjacent to the wellfield. In 2009 after a hydrogeological investigation, the City purchased approximately 28 acres for a future 2.5 MGD wellfield site in Oshtemo Township. In 2010, the City purchased approximately 1.5 acres of additional property to square off the existing parcels owned in Ross Township.

2.1.18 Integration with Stormwater Management Program/Multi-Program Facility Inspections

Since 2003, the City of Kalamazoo's separated stormwater collection system has been considered a "Municipal Separate Storm Sewer System (MS4)" and consequently is regulated under the Environmental Protection Agency (EPA) Phase II Stormwater Rules of the Clean Water Act, administered by the EGLE. Since both the WHPP and the Phase II Stormwater Program are water quality-based programs, they have some similarities: Both have a requirement for a public education program; both can require that evaluations/inspections of facilities be performed to determine contaminant sources and the need to implement best management practices; and both have a goal of improving water quality.

To cost-effectively address the public education requirements of both programs, City staff has developed a Public Education and Outreach Plans to optimize its opportunities to educate the public about wellhead protection and stormwater quality management The City uses many of the same outreach strategies for both programs.

In a similar manner, City staff optimizes the opportunities to obtain as much relevant information about a facility's potential to affect water quality as possible at each facility visit, whether the inspection was initiated by concerns about wellhead protection, stormwater quality, cross-connections or the industrial pre-treatment inspection program. This approach has proven to be cost-effective since it optimizes staff time and to minimizes interruption to the businesses by avoiding unnecessary multiple visits. Another benefit is that since groundwater and surface water are typically inter-connected in Kalamazoo County, if you help protect either groundwater or surface water quality, you are likely helping protect the other.

2.1.19 Public Education Targeted Within WHPAs

The City recognizes groundwater education targeted toward specific WHPAs as a management strategy for WHPAs, relative to groundwater education used to reach the other public sectors discussed in the next element section "Public Education and Participation." Two examples how the City has used groundwater education as a WHPA management strategy include the distribution of a two-sided 11 x 17-inch flyer to neighborhood residents within the WHPAs for WPS 11 and WPS 12 via formal neighborhood associations, and neighborhood residents invited to experience plugging of an abandoned well.

2.2 Public Education and Participation

Appendix A, Figure 9: Public Education & Outreach illustrates the large number of and wide diversity of strategies that the City of Kalamazoo has implemented since 1992. In general, the puzzle piece colors represent the following Categories of public education and outreach: Green is primarily strategies that include school and community events; red represents strategies that are designed to target the general public on an ongoing basis, with the exception of the large Home Builder Expo annual event; blue targets water customers, City employees, and visitors; and the purple piece represents the Groundwater Guardian Program.

Appendix F provides the table "City of Kalamazoo Water Resources Public Education & Outreach Summary" for the period October 2018 through December 2023. For the period of March 2020 to June 2022, the City's Public Services Education Programs were shut down due to the spread of the viral infection commonly referred to as COVID-19. Once the state mandated quarantine and shutdowns were ending in Michigan, and health related restrictions were lifted on June 2, the City slowly resumed its Educational Programs. During the COVID-19 shutdowns, many people gravitated to the City's wellfields where public passive recreation is allowed. The increase in traffic, vandalism and trash resulted in new signage at both the Al Sabe Preserve (WPS 24) and at the McLinden Nature Trails (WPS 25). The signs explicitly stated these properties were the City's wellfield and that they were under the Wellhead Protection Program. List of DO's and DON'Ts were placarded along the trailways.

The table in Appendix F summarizes events/locations, attendees, type and number of items distributed, and educational model demonstrations given. As can be seen by

reviewing our attached “Water Resources Public Education & Outreach Summary” table, we again had a significant variety of strategies and reached tens of thousands of people.

The City was recognized for its efforts by receiving the “2007 Richard Husby Public Awareness Award” and plans to continue its current approach and continually seeks to initiate additional opportunities and innovative techniques to educate the public regarding groundwater protection. The following provides additional detail regarding these strategies shown in **Appendix A, Figure 9**.

2.2.1 School and Community Outreach and Education

Groundwater School Education Program

The City considers its groundwater education efforts in schools as a priority, and it is a primary component of its public education and outreach efforts. Many of the current and past WHP Committee members have participated in the preparation, organization, and implementation of the on-going successful groundwater school education program. Over the years, the Committee has prepared various teacher handouts, including tables listing various groundwater education activities and how they met the Science Standards and Benchmarks, a volunteer presenter network summary, and “Learn About Groundwater! Hands-On Educational Tools for Classrooms” brochure.

The City has used WHP Grant funding to purchase five Groundwater Simulators, two EnviroScapes, a TerraFlow Simulator, an Awesome Aquifer, and numerous “Jugs Kits” for demonstrations at schools and other events. Several types of “teaching’ posters and groundwater lesson books have been distributed to elementary teachers in previous years. The Committee initially focused on several Kalamazoo Public Schools (KPS) since a team member was the Science and Math Curriculum Coordinator for KPS; this provided a unique opportunity to directly engage many teachers in “train the trainer,” “Career Day,” and curriculum-oriented meetings. For a few years in the early 2000s, the models were stored at the KPS Stockroom Facility for teacher use via a formal material check-out list. At that time, each model contained a teacher model evaluation form.

Subsequently, school presentations/model demonstrations were expanded from KPS and provided on a regular basis to other school districts, including Mattawan, Portage, Parchment, and various private schools, including a “Home School” Group. With the change in KPS’s curriculum by the state, the routine demonstrations by the WHP group were removed from the curriculum and are now provided on an invitation basis only.

The City’s volunteers expanded the demonstration into other schools including Spring Valley, Gull Lake, Battle Creek, Coldwater, Vicksburg, and Galesburg-Augusta schools. In addition, Committee members and other volunteers have provided presentations, model demonstrations, and facility tours to college classes and specialized learning institutions, including WMU, Kalamazoo Valley Community College (KVCC), Kalamazoo College (K-College), Davenport College, Miller College, the Kalamazoo Area Math and Science Center (KAMSC), Turn 2 Middle School Youth Group, and the Mobile Learning

Adventure. Our success was partially demonstrated by the repeat requests that we receive for presentations.

Currently, all of the City demonstration models, and educational distribution items are stored by Public Services at its 1415 N. Harrison Street Facility.

Community Groups and Events

A wide variety of organizations have used our group to provide presentations and model demonstrations and/or make available/provide groundwater and other water quality education materials to their members, including: 4-H, Boy Scouts, Girl Scouts, Master Gardeners, City of Kalamazoo Environmental Concerns Committee, Kalamazoo County Environmental Health Advisory Group (EHAC), Kalamazoo County Chamber of Commerce Environmental Committee, Neighborhood Meetings, Optimist Club, and churches. Perhaps the most unusual groups to which we have provided groundwater information to include visiting dignitaries, Colleagues International from Tajikistan, and the Army 415 Liaison Unit. In addition, informational booths have been set up during "Bronco Bash" festivities during WMU's Homecoming celebrations, Conservarama, Bronson Health Fair, and Earth Day events. The City has also regularly participated in the annual Battle Creek Water Festivals, Grand Rapids Water Pool-Ooza, Charlotte Science Days Program and more. The City provides staff and model demonstrations and presentations. Frequently, staff provide facility tours and distributes water quality related information to a wide variety of organizations (see **Appendix F**).

2.2.2 Professional and Governmental Organizations

City staff has provided numerous presentations to a wide variety of professional and governmental organizations. Some examples include presentations at the AWWA Annual and Regional Meetings; MWEA Conferences; EGLE Groundwater and Source Water Conferences; NGWA Conferences, EGLE Seminars and Workshops, Michigan Water Rural Association (MRWA) Conferences and meetings, Michigan Society of Planning Officials (MSPO); Kalamazoo's Industry Day Seminars, AWWA Safe Drinking Water Partner meetings, EHAC, and at various watershed related forums and meetings. Periodically, City staff serves on various professional organizational committees.

2.2.3 General Public Outreach and Education

Website and Social Media

In March 2003, the City launched the first wellhead protection website in Michigan "www.protectyourwater.net" – a stand-alone website to the City's main one. In 2007, using WHP Grant funding, the City retained LKF Marketing and performed a major upgrade to www.protectyourwater.net, including placing it on the City's main server and organizational framework, and significantly enhancing the graphics. The City tested Survey Monkey for the website to include a brief survey to website visitors to learn how they found out about the website, and to ask some brief questions regarding interest in and knowledge of water topics. In, August 2019 the City entered into the Social Media arena, expanding into Facebook/Instagram Ads, Video Ads, Google Ads, and Display

Ads. By October 2019, the City increased its Social Media outreach significantly and was receiving excellent metrics showing the impact and engagement of ad viewers going to the PYW website for more information.

When COVID-19 resulted in lockdowns etc., the City's educational efforts were very effective because they were not in person. The City also developed a "Kid's Corner" for teachers and students during the timeframe all educational classes were online. As an example of the success of the City's educational outreach program, **Appendix G** contains the analytics referred to "metrics" reported for January to March 2024 covering the website and social medial campaigns. The metrics are used to evaluate general user statistics, demographics, access devices, traffic sources, network connections, average search engine ranking, and content accessed. The City continues routine operations and maintenance for the website using WHP Grants.

Movie Theater Ads

On Friday, March 18, 2005, three 30-second Groundwater Education and Outreach Cinema Ads debuted in a 15-minute trailer that continuously looped before and in-between movies at the Kalamazoo 10 Goodrich Quality Theatres. The City of Kalamazoo Wellhead Protection Team came up with the original ideas and material for the Ads in PowerPoint, and Digital Talking Screen Media professionally produced them, including graphic design, animation of our water drop "mascot," and a professional voice for the text. Additional videos and theater changes have occurred since then. Additional theaters were added and removed during the timeframe when COVID-19 lockdowns were mandated in 2020. The theater vendor, CineMedia, eventually entered into bankruptcy and 2 theaters were permanently closed. CineMedia responded by developing online Streaming TV (STV) ads in late 2020. The City ran STV ads until the lockdowns were lifted, eventually advertising in the theaters when two opened in 2022.

Currently the City runs ads in three local theaters, Celebration Cinema, Kalamazoo 10 theater and KP Cinemas using WHP Grant funding. Theater advertisement includes videos in the theater, Lobby entertainment networks and other digital ads. STV ads have been continued as well. Currently 11 videos rotate on a seasonal schedule, including videos created by local high school students from the Kalamazoo Regional Educational Service Agency (KRESA).

Video Contests

Class project contests for its multi-media film classes were conducted starting in 2014 for high school students through KRESA using WHP Grant funding. Prizes were awarded to the top videos selected by the Wellhead Protection Committee; the winners videos are added to the active ads that are periodically rotated at the theaters, by STV, and posted on the City's www.protectyourwater.net website on the Media webpage. The successful pre-movie trailer campaign continues, rotating original and professional 30-second ads. The City continues the KRESA contests through the Kalamazoo Public School System's high-school media classes as frequently as allowed.

Public Survey

In 2005, the City's WHP Committee decided to have a public survey prepared to learn more about community attitudes and knowledge of certain aspects of water resources related issues. The project was made possible by a WHP Grant received from the EGLE. The Committee contracted the services of the independent Kercher Center for Social Research at WMU to assist with the selection and wording of the questions, and the mailing, collection, examination, and analysis of the survey data.

In April 2006, an anonymous survey was sent to a random sample of 2000 Kalamazoo County residents. The sample was generated by Survey Sampling, Inc. The response rate was 27.7% and is quite normal for community mailed questionnaires of this nature. This sample size enables us to infer about the population (Kalamazoo County) from the sample with 95% confidence (i.e., a 5-point margin of error).

Five-year updates to the public water resources and behavioral surveys were conducted in July 2012 and May 2017 using a WHP Grant received from the EGLE. Again, the City's WHP Committee contracted the services of the Kercher Center for Social Research to select a random sample of 2000 Kalamazoo County residents. The response rate was 22% in 2012 and was quite normal for community mailed questionnaires of this nature. The response rate was 15.4% in 2017 which is slightly lower than typical for previous surveys of this area but within normal ranges for mailed questionnaires to general audiences. The survey results have been very useful in helping select and support management and education and outreach strategies (e.g., public support for the WHP Ordinance). Unfortunately, the cost of continuing the surveys rose beyond the available funding sources. The City elected to use the monthly and quarterly metrics for all of its social media, theater, STV and website provided by our vendors instead of surveys. The information and demographics are much more effective in evaluating the effectiveness of the outreach efforts. Most people are now digitally connected, and survey mailings have become a mechanism of the past.

Metro Bus Ad Campaign

On July 1, 2008, the City began using the rear placards on 20 City metro buses to present the groundwater protection message "Protect Groundwater – It's What You Drink" (see website for additional information and photograph). After one year, the number of buses was reduced from 20 to 10 to save costs and continued through September, 2010 when WHP grant funding expired. The City continued use of this strategy with WHP grant funds received through 2019, when the vendor, Crosstown Communication, began failing.

Articles

Staff has written articles for the various publications, including a wellhead protection article in "Enterprise" (Chamber of Commerce), a water conservation article "Encore Magazine," an article regarding movie theater ads in "The Aquifer" (Groundwater Foundation), an article about the City's WHP Ordinances in "Water Works News" (AWWA, Michigan Section), and various brief articles in the City's "CityLink" publication

about the Wellhead Protection Program and the Groundwater Guardian Program/Community Designation status.

Webinar

In 2009, the City was featured in the Groundwater Foundation Webinar titled "Groundwater Guardian Showcase: Adult Groundwater Education" that included presenters John Paquin, Kalamazoo, Michigan; Janine Reed, Sequim-Dungeness, Washington; and Gabrielle Belfit, Barnstable County (Cape Cod), Maine.

In summary, the webinar educated viewers about how Groundwater Guardian teams from across the U.S. are educating adults about groundwater and related resources in their community. The webinar presented case studies of innovative and successful adult education programs, including using movie trailers to share wellhead protection information, providing training for septic system owners, and targeting education efforts at tourists and regional municipal officials.

Home Builder Expos

From 2006 through 2012, the City partnered with the City of Portage, Kalamazoo County Administration, Kalamazoo County Road Commission, and the Kalamazoo County Drain Commissioner's Office in cost sharing for two booths at the Kalamazoo Home Builders Expos. Approximately one-third of the booth space has been dedicated to groundwater protection/wellhead protection information. As can be seen on **Appendix F**, tens of thousands of groundwater educational materials have been distributed just via this one annual event.

Billboards, Television Segment, and Radio Ads

In the mid-1990s, part of the funding received from the groundwater grant from the Kellogg Foundation via the Kalamazoo County Environmental Health was used to display several "Protect Groundwater" billboards across the County. The City was a primary partner with the County in this grant project that was discussed previously in this Plan.

Also, in the mid-1990s, a gardening television segment was used on a local TV network to briefly discuss the importance of reducing the use of chemicals in gardening to minimize the risk to groundwater.

From 2011 through 2024 the City has collaborated with the City of Battle Creek in using radio groundwater protection ads using WHP Grant funding. The City continues to utilize the radio ad campaigns. The City measures success by the number and cross-section of people reached, number and type of materials distributed, variety of strategies implemented, and feedback received. The continued radio ad campaign that carefully considered geographic coverage, demographics, ad type, frequency, and duration, and overall cost effectiveness expanded to make the important relationship between safe and reliable drinking water and consumable goods – specifically beer and coffee since there are several microbreweries and coffee shops that serve beverages that are a minimum 90% water. Many new topics have been created for these ads including fluoridation, water affordability, earth day, public services week, COVID-19

awareness, Protect Al Sabo Preserve, MISS DIG, road services, lead services awareness, backflow prevention, and boil water advisories, etc.

The implementation of the radio ad campaign and its collaborative efforts with the City of Battle Creek was a success, using 15-second ads, and three 30-second ads, which have been available for listening on our website since the fall of 2015. From 2017 to 2018, the City ran its radio ads independently since Battle Creek decided not to fund the ads. The collaborate radio ad campaign with Battle Creek was re-initiated in 2019 and continues.

2.2.4 Water Customer Outreach

Utility Bill Inserts
In 2003, the City included approximately 34,000 water drop magnets on a groundwater protection message card in the residential billings. The card and magnet were previously provided as a grant project deliverable. Since 2022, the City no longer does mailings; all utility bills and information are online at https://www.kalamazoocity.org/Residents/Make-a-Payment/Pay-a-Water-and-Sewer-Bill.
Annual Consumers Confidence Report/Water Quality Report (CCR)
The City of Kalamazoo's Consumers Confidence Report is available online at https://www.kalamazoocity.org/Residents/Water-Sewer-Service/More-About-Kalamazoos-Utility-Systems/Utility-Plans-Reports-and-Standards/Water-Quality-Report.

It is also mailed to customers each year. The City has always included a section of the CCR to specifically discuss wellhead protection and stormwater quality management. All of the water customers review this publication. Between 40,000 and 42,000 of these are distributed on an annual basis. According to the Public Surveys performed in 2006, 2012, and 2017, approximately one-half of the customers read the CCR.

Facility Customer Interface/Tours/Newsletters
The City provides tours of its facilities on a frequent basis. **Appendix F** shows the number of tours provided, to whom the tours were being provided to, and what information was distributed to the attendees. Since 2001, the number of water pumping station/wellfield tours has decreased due to security concerns. However, wellhead protection is always discussed at each facility tour, including many at the wastewater treatment plant.

In addition to tours, the City has information available to the public regarding water (CCR, etc.) at the Public Services Stockbridge and Harrison Street Facilities, City Hall and on the City's websites. At the Stockbridge Facility, information regarding well abandonment is provided since water service connections are arranged there. People that may have a private well that are hooking up to municipal water are encouraged to plug their old well. In addition, the City's bi-annual "View from the Curb" publication is frequently used to distribute water related information and is available by mailings and the City's websites.

Public Services Week, Industry Day, Bring Your Child to Work Day, and City Visitors
In May 2018 and 2019, the City held "Public Services Week" that included two days of presentations and two evenings of facility tours. However, from 2020 to 2022, the COVID-19 shutdowns prevented the City from continuing this event until 2023. In 2024, the City will have three days of presentations, tours, fun activities and more at 3 facilities from 5:30 to 7:30 p.m.

Periodically, the Wastewater Treatment Plant hosts "Industry Day" when representatives of area industries are invited to hear or provide presentations, have lunch, and tour the facilities. Wellhead protection is always discussed as one of the subjects. A bag of groundwater education items is provided to the attendees during "Bring Your Child to Work Day." Finally, in most cases, official City visitors are presented various items from the City, typically including groundwater protection educational items.

2.2.5 Groundwater Guardian Program, Groundwater Foundation

The City has been recognized as a Groundwater Guardian Community for 19 straight years (1998-2022) from The Groundwater Foundation, "a private non-profit educational organization that informs and motivates people to care about and for groundwater." The Groundwater Guardian Program was discontinued in 2023.

To apply for the Program, each year applicants had to submit an Annual Application to the Groundwater Foundation, describing Result Oriented Activities" or "ROAs." On August 31 of each year, an Annual Report was submitted detailing the completion of or significant progress of the ROAs. The Groundwater Guardian Review Committee reviewed and made a recommendation whether or not a community qualified as a Groundwater Guardian Community. City staff served on the Groundwater Council Review Committee and served as Chair of the Groundwater Guardian Council from 2009 to 2013.

2.2.6 EGLE Wellhead Protection Grant Program

The City has received nine $70,000 grants from the State of Michigan Wellhead Protection Grant Program for the following time periods:

- April 1, 1999 through May 31, 2000 (Round 1);
- October 1, 2000 through September 30, 2001 (Round 3);
- October 1, 2001 through September 30, 2002 (Round 4);
- October 1, 2002 through September 30, 2003 (Round 5);
- October 1, 2003 through September 30, 2004 (Round 6);
- October 1, 2004 through September 30, 2005 (Round 7);
- October 1, 2005 through September 30, 2006 (Round 8);
- October 1, 2006 through September 30, 2007 (Round 9);
- July 1, 2008 through June 30, 2009 (Round 10); and
- October 1, 2009 through September 30, 2010 (Round 11).

The City applied for the grant period of October 1, 2010 through September 30, 2011 but for the first time it was not awarded any funding.

The City has received additional grants from the State of Michigan Wellhead Protection Grant Program for the following time periods:

- October 1, 2010 through September 30, 2011 (Round 13) for $70,000;
- October 1, 2011 through September 30, 2013 (Round 14) for $54,400;
- October 1, 2012 through September 30, 2012 (Round 15) for $44,000;
- October 1, 2013 through September 30, 2014 (Round 16) for $49,000;
- October 1, 2014 through September 30, 2015 (Round 17) for $63,312.50;
- October 1, 2015 through September 30, 2016 (Round 18) for $60,000;
- October 1, 2016 through September 30, 2017 (Round 19) for $70,000;
- October 1, 2017 through September 30, 2018 (Round 20) for $70,000;
- October 1, 2018 through September 30, 2019 (Round 21) for $70,000; &
- October 1, 2019 through September 30, 2020 (Round 22) for $70,000,

The City applied for the grant period of October 1, 2000, through September 30, 2021 but for the second time it was not awarded any funding due to lack of EGLE funds.
The City has received additional grants from the State of Michigan Wellhead Protection Grant Program for the following time periods:

- October 1, 2021 through August 31, 2022 (Round 24) for $70,000;
- October 1, 2022 through August 31, 2023 (Round 25) for $70,000; and
- October 1, 2023 through August 31, 2024 (Round 26) for $70,000.

Primarily, these grants have been used to complete all of the groundwater flow models and capture zone delineations and prepare CSI/Ras. Secondarily, the funds provided funding necessary for public education and participation projects — especially the purchase of groundwater education materials for the school groundwater education program and public events — and for the development and maintenance of www.protectyourwater.net. Finally, grant funds have helped finance management strategies, such as the WHP Overlay Ordinance, the Performance Standards Ordinance, site-specific spill contingency plans, and many related projects discussed in previous sections of this Plan.

The City was able to complete most of the grant eligible activities such as capture zone delineations, chemical source inventories and contingency planning by 2018. Knowing that the younger demographic audience has become “digital” in the sense of using computers and cell phones as their main means of communication, the City has of the utilized the grant funding exclusively on establishing Social Media tactics of outreach and interconnecting them with the website and radio ads. An example of this is when the radio ads run and direct the audience to the website to learn more, the data showing how many website visits the ad generated is captured and reported in the monthly “metrics” report. This use of funding, especially during the COVID-19 shutdowns, proved to be a highly effective use of the funds in delivering drinking water and other associated educational topics to our target audience.

2.2.7 Wellhead Protection Reality: Examples of Contamination and Responses

Unfortunately, the City has had its share of experiences of groundwater contamination affecting its wellfields – one of the primary reasons that the City takes its WHPP so seriously.

WPS 1 (Central Wellfield)

In 1980, contaminant detections of VOCs, most notably Tetrachloroethylene (Perchloroethylene/PERC/PCE), were detected at Water Pumping Station 1 (Central Wellfield). The hydrogeologic/contamination source investigation determined that the VOCs originated from a former dry cleaners company. In response, two production wells were taken out of service and used as "capture" or "interceptor" wells to keep the VOCs from entering the PWSS. The water was then diverted to the stormwater collection system. The aquifer was too prolific to abandon. Consequently, in 1995, after more test drilling, all of the 17 remaining production wells were properly abandoned/plugged, and six new 1,500 gpm wells were constructed. A new water pumping station with air stripping to remove the VOCs and iron removal filtration was constructed – at a cost of approximately $7,000,000.

WPS 11 (Kendall Wellfield)

In 1981, VOCs, primarily Vinyl Chloride, were detected in the WPS 11 wellfield, eventually causing the shutdown of the station in 1985. The subsequent hydrogeologic/contamination source investigation did not determine the source. However, like the Central Wellfield, it was too important of a WPS to abandon so air stripping was added, along with iron removal. The total cost of this project was approximately $2,500,000. The station is currently in service.

Wellfield 7 (S. Park/Crosstown)

In 1997, detections of low levels of hydrocarbons were found in two of the production wells at WPS 7. This five well wellfield is piped to the five production wells at WPS 3. Consequently, WPS 3 was shutdown, a hydrogeologic/source contamination investigation was conducted. It was determined that a Leaking Underground Storage Tank (LUST) system immediately next to the wellfield property was responsible. The gasoline station shut down and went out of business. EGLE responded and provided approximately $500,000 of funding toward the project, resulting in the installation of monitor wells, purge wells, and a groundwater remediation system. The purged groundwater is discharged to the City's sanitary sewer system and treated at the Kalamazoo reclamation Plant.

Due to the initially high annual operations and maintenance costs, there were periods where the groundwater remediation system was inactive. However, since the beginning of the detection of groundwater contamination, City and EGLE staff worked collaboratively to make this project as cost-effective as possible. For example, annual

operations and maintenance costs have been significantly reduced by changing the operation schedule from a 24/7 scenario to operating the system only during the four-month summer peak season. In addition, the City has waived the wastewater discharge fees.

The heir al system continues to operate by EGLE and allows the City to safely operate pumping at WPS 7 as well as the adjoining wellfield, WPS 3.

Other Wellfield Contamination

Low (non-action) levels of VOCs have also been detected at WPS 2 (Born Court) in 1988, WPS 12 (Stadium Drive) in 1997, and WPS 14 (Spring Valley) in 1982. In addition, spills have occurred at WPS 4 (back-up diesel fuel generator), WPS 22 (broken hydraulic hose on equipment), and WPS 24 (back-up diesel fuel generator). All of these incidents have been successfully remediated allowing the operation and pumping to continue.

Crown Vantage, City of Parchment

The Crown Vantage Property encompasses a former Type II and III landfill historically utilized for disposal of papermaking waste, a historic wastewater treatment plant, former settling lagoons, and the former mill property. The property is a major source of PFAS that was detected in July 2018 in the City of Parchment's municipal water system and later in nearby residential water wells. Parchment adjoins the City of Kalamazoo to the north.

On July 26, 2018, EGLE received results showing high levels of PFAS compounds in the Parchment's municipal water supply. The municipal supply had been sampled on June 18, 2018, as part of EGLE's statewide sampling initiative for public water supplies and schools on their own wells. The three water supply wells served over 1,200 customers and 3,100 people in the City of Parchment and Cooper Township. A "Do Not Drink" advisory was immediately issued, a state of emergency was called, and within a month the City of Parchment had connected to the City of Kalamazoo's water supply and was able to lift the "Do Not Drink" advisory.

EGLE immediately began testing private residential wells in the area. Some of the private wells were found to contain high levels of PFAS. Alternate water sources were obtained while local and state officials worked to ensure the health of the public. EGLE also immediately began an investigation into the source of the contamination, locating several potential sources in the area.

As part of the source investigation, EGLE began testing existing monitoring wells at the former Crown Vantage landfill and mill site. Results from this testing showed high levels of PFAS in the groundwater. The former Crown Vantage Property is north of the City of Parchment and is immediately adjacent to the Kalamazoo River. The former landfill was used to dump paper-making waste associated with the Crown Vantage Papermill. Over the years, the mill used an oil and grease repellant as an additive to laminated paper

products. The mill was closed in November of 2000 and is currently owned by Cooper Township.

In September of 2018, EGLE was contacted by Georgia-Pacific, LLC (GP) to propose committing resources to the ongoing investigation related to potential PFAS sources that have impacted the city of Parchment's water supply and private drinking water wells in Cooper Township. The former paper mill property and associated landfill are the major sources in the area. EGLE continues to investigate potential sources.

The presence of PFAS has resulted in the City owning the Parchment water system and water tower, as well as the extension of the municipal drinking water system to Parchment and Cooper Township residences. In doing so, the City could not meet corrosion control regulations and an Administrative Consent Order with EGLE was implemented to address this issue with the City's drinking water supply system along with other issues.

North 34th Street (Production Plated Plastics, City of Richland

The North 34th Street site includes the former location of Production Plated Plastics and is located in Richland Township in Kalamazoo County It lies northeast of the City of Kalamazoo. In 1977, heavy metal contamination was discovered in groundwater samples that were collected from residential wells along North 34th Street. EGLE investigations determined the source was a plastics plating company. Pursuant to court orders, the plastics plating company replaced the affected residential drinking water wells and undertook other response activities. In 1985, halogenated volatile organic compounds (HVOCs) were also identified in the groundwater. EGLE investigations determined the plastics plating company, as well as a laundry and dry-cleaning business were the cause of the HVOC contamination. As such, the area-wide impacts were designated as the North 34th Street site.

In the 1980s, the plastics plating company completed work to install, operate, and maintain a groundwater cleanup system. The treated water was discharged the City's Kalamazoo Water Reclamation Plant (KWRP). In 1988, EGLE extended municipal water to the site to provide safe drinking water to the residents with contaminated drinking water wells. In 1991, EGLE took over operation and maintenance (O&M) of the groundwater cleanup system. Since 1991, numerous cleanup efforts have been implemented—and continue to be implemented—to evaluate conditions and the effectiveness of the groundwater cleanup system.

In March of 2018, the City of Kalamazoo informed EGLE that as part of a state-wide requirement to test publicly owned treatment works for PFAS, the City was proactively collecting effluent samples from permitted discharges to the sanitary system. Effluent samples from the groundwater pumping system at 34th Street resulted in and effluent PFOS concentration of 8,000 parts per trillion (ppt), exceeding the allowable discharge limits. The City notified EGLE to shut down its treatment system accordingly. Eventually EGLE added PFAS treatment to its system and was allowed to discharge to the City's KWRP once again.

EGLE has been in the process of completing a remedial investigation for many years and identified contamination in residential wells migrating a substantial distance to the south-south-east. EGLE will continue to determine the nature and extent of PFAS impacts in the North 34th Street area. This, however, has resulted in the City's extension of the municipal drinking water system within Richland Township and extending east to the Ross Township boundary on E. D Avenue and E. DE Avenue.

West KL Avenue Landfill, Oshtemo Charter Township

The West KL Avenue Landfill is a closed sanitary landfill located on 87 acres at 8606 West KL Avenue. The site served as a local garbage dump for the township from the 1960s until 1968 when it became the county sanitary landfill. The landfill closed in 1979 after contaminants appeared in residential wells. Waste disposal operations contaminated soil and groundwater with hazardous chemicals. EPA has been overseeing this site since placing it on the National Priorities List in September 1983. The West KL Potentially Responsible Parties (PRP) Group (KLA Group) is addressing environmental impacts to groundwater. The KLA Group is comprised of Kalamazoo County, Oshtemo Township, the City of Kalamazoo and The Upjohn Company.

The remedy approved by the EPA includes prohibiting the use of groundwater that has been impacted above health-based drinking water levels and providing an alternative water supply. Although most contaminants associated with the landfill have naturally broken down to the point that they no longer present a concern, some contamination remains in groundwater, including the chemical 1,4-dioxane. The area of impacted groundwater extends west from the landfill into Van Buren County.

Per EPA requirements, in 2016, a groundwater restricted zone (GRZ) was established in the Kalamazoo County Sanitary Code to prohibit groundwater wells in the affected area plus a 1,000 foot "buffer zone." Properties in this area have been connected to municipal water. Accordingly, the KLA Group is applying to the Kalamazoo County Board of Commissioners to amend and expand the GRZ. In anticipation of this expansion, municipal water mains have been extended into the proposed area by the City of Kalamazoo in 2017 & 2023.

EGLE requested West KL PRP Group sample groundwater for PFAS due to the potential of groundwater contamination from the site. In 2019 and 2020, PFAS was evaluated in samples at the source, the landfill and throughout the extent of the known 1,4-Dioxane groundwater plume. Low levels of PFAS compounds were detected in some monitor wells at the landfill and at limited distances off-site. These findings did not require an amended remedy. The PFAS plume, however, will be continuously monitored along with 1,4-Dioxane and other contaminants.

Kalamazoo/Battle Creek International Airport (Airport)

The Airport, located at 5235 Portage Road in Portage, is a certified commercial service airport that has Class B Aqueous Film Forming Foam (AFFF) to meet federal aviation requirements. AFFF is a firefighting foam that is known to contain PFAS compounds.

The Airport received grant funding from Michigan Department of Transportation to assess areas of historic AFFF storage and use. The Airport identified and investigated the soil and groundwater at six locations where AFFF was stored, used for testing, or deployed as a result of a plane crash.

The direction of groundwater flow at the site is generally to the north, northwest. There are approximately 30 residential drinking water, irrigation, or Type III wells located in close proximity to the Airport. EGLE, in coordination with the Department of Health and Human Services (DHHS) and the Kalamazoo County Health and Community Services Department (KCHCSD), began sampling the private wells in July 2020. As a result, there was one residential drinking water well with PFAS exceeding criteria. All well owners have been notified of their sample results and the home with the criteria exceedance has been provided a water filter from the local health department. The location where PFAS was detected above criteria does not appear to be related to any of the investigation areas identified by the Airport.
The City of Kalamazoo has two municipal wellfields with associated pumping stations north of the Airport where low levels of PFAS compounds have sporadically been detected (below regulatory limits). In response to these findings, the production wells at these two City wellfield have been out-of-service since mid-2019.

Georgia-Pacific Paper Mills, Kalamazoo Township
The former Georgia-Pacific (GP) property located at 2425 King Highway consisted of six mills on 23 acres and is located on the Kalamazoo River. This property has gone through several ownership changes since the mid 1800's when the mill was originally established by Wolverine Paper Company. In 1967, GP purchased five mills (three paper and two coating) and the mill located in the eastern portion of the site was purchased in 1978. EPA established the Record of Decision in 1998 for the cleanup of this superfund site. The remedy included excavation of PCB contaminated waste from several areas, with placement in the landfill, capping of those waste materials, and long-term monitoring.

The GP mill property was sampled in 2018 for PFAS due to the probable use of PFAS in the paper manufacturing process, the site's location within the city of Kalamazoo Wellhead Protection Area (downgradient from the City wellfield) and PFAS results from the adjoining former Nolichucky paper mill site. Shallow groundwater discharges toward the Kalamazoo River, which borders the site to the north and east. The Type 1 water wells operated by the City of Kalamazoo are located 0.5 miles north of the landfill, with the Kalamazoo River between them. The Kalamazoo River is the major regional groundwater discharge surface water body. Because the contaminated groundwater at the GP site discharges to the river, no action was required by the City to prevent potential harm to its wellfield.

Allied Paper Site (Operating Unit 1), City of Kalamazoo
The Allied Paper Site is Operating Unit 1 (OU-1) of the Allied Paper/Portage Creek/Kalamazoo River Superfund Site. The OU1 is located on 89 acres within the City

limits where multiple historical paper manufacturing operations were located along Portage Creek. The discovery of polychlorinated biphenyls (PCBs) contamination at unacceptable concentrations prompted the designation of the area as a Superfund site. An estimated 1.6 million cubic yards of contaminated waste is present at the site. The site is within an EGLE-approved 5-year WHP Capture Zone for WPSs 1, 2, 3, 4, and 7. The City, a non-liable party, has been on record for stating that the Remedial Investigation (RI) did not efficiently characterize the hydrogeology or contaminants at the site, resulting in a flawed Remedial Investigation Report. The City has stated that only two long-term remedy alternatives would be acceptable: off-site waste removal or a contaminant containment system that provides hydraulic barriers both horizontally and vertically.

The site passed the feasibility portion of EPA's Superfund remedial process, and a remedy was selected in 2016 as outlined in the *Record of Decision Report.* The remedy was chosen to protect human health and the environment from actual or threatened releases of hazardous substances. Existing unacceptable risks associated with PCBs include exposure to soil and sediment which are contaminated and to human and ecological receptors though consumptions of PCB-contaminated fish from Portage Creek and the Kalamazoo River. The selected remedy involves excavation of contaminated soils, sediments, and residuals from the historical waste disposal areas and consolidation into the main body of the existing landfill. Essentially, the historical contaminated materials and historically landfilled materials would be re-excavated, mixed with a binding agent to reduce leachability or mobilization of contaminants, and re-landfilled and capped with an impervious material. Since 2019, EPA and its contractors have developed and implement the remedy which is expected to be completed in the next few years. Prior to completion, the City expects a network of monitoring wells to be installed to identify any potential migration of contaminants to the groundwater and potentially to the City's wellfields.

In May and June 2018, the City of Kalamazoo collected three effluent samples from the Superfund site's groundwater recovery and extraction (dewatering) system as required by the Industrial Pretreatment Program. PFAS was identified in the effluent at 38 ppt PFOS, which exceeds water quality standards. A memo provided by EPA to EGLE suggested that PFAS was used on the site. EPA requested that additional sampling be performed onsite.

Shallow groundwater discharges radially toward Portage Creek, which borders the site to the east. A strong upward gradient is present at the site, potentially limiting the flow of contaminants into the deeper regional aquifer. Type 1 water wells operated by the City of Kalamazoo are located approximately 0.7-miles north of the landfill. The nearest private drinking water wells are located approximately 2.4-miles northwest of the landfill.

Enbridge Energy Crude Oil Release, City of Marshall

On July 26, 2010, a rupture of a 30-inch pipeline in Marshall, Michigan owned by the Enbridge Energy Company released approximately one million gallons of crude oil during a flood event into Talmadge Creek, a tributary to the Kalamazoo River.

Consequently, the EPA initiated an emergency response and created an Incident Command. The City of Kalamazoo WPS 39, a Ranney Collector Well, is located approximately 36 miles downstream from the release location on the south side of Morrow Lake, an impoundment of the Kalamazoo River. A portion of the oil reached Morrow Lake and within the WHP Capture Zone of WPS 39.

It was reasoned that if the oil was within the capture zone, it could be infiltrated through the bottom of the river sediment, into the groundwater, and eventually be drawn into the Ranney Collector laterals (the closest end of one is approximately 120 feet from the river). The action taken has eliminated any possibility that contaminants from the oil spill could impact drinking water quality provided to the customers on the Kalamazoo Area Water System. Consequently, wellhead protection measures were implemented, including the following: immediate shutdown of WPS 39; participation in the Enbridge Pipeline Release Unified Command meetings; close monitoring of the status of the contamination; collaboration with Kalamazoo County, EGLE, and Enbridge Energy and their contractors; preparation and implementation of an EGLE-approved WPS 39 re-activation plan; installation of five monitoring wells at WPS 39 property; and sampling of WPS 39 on a monthly basis for several years.

The EPA remedy concluded in 2014 after the collection of 766,228 gallons of discharged oil from surface waters; recovery of approximately 435,000 gallons of oil from other sources, including oil-saturated soils, debris, sorbent material, and water treatment; agitation of submerged oil; and sediment dredging in numerous areas of the river over a several year span.

After sampling of the monitor network and the City’s WPS 39 water supply, no detection of contamination was identified in the system. The City was allowed to resume pumping operations.

3.0 SUMMARY

The City of Kalamazoo has always taken a comprehensive and thorough approach to its WHPP since it formally began its program in 1992. It became obvious early on that the groundwater modeling and capture zone delineations would take several years due to the number of and wide distribution of its wellfields. Therefore, all elements were worked on simultaneously as much as possible to continue the progress of the program. One exception was that the contaminant source inventories could not be performed until the delineations were done. However, the other elements – especially public education and outreach – quickly developed into effective portions of the program.

Generic (not specific to capture zones) management strategies also were developed in the early years and with a couple exceptions, were effectively implemented. It became clear that there was no single or even known defined group of strategies that would necessarily be appropriate for Kalamazoo; therefore, many strategies were tried.

It was decided after the WHPAs were delineated, and despite the WHPP's progress, formal Ordinances were needed to more effectively reduce higher groundwater risk land uses from occurring within WHPAs, and to minimize risk to those that were present. The formal adoption of the WHP Overlay and Performance Standards, and the Site Plan Review process are arguably the three most important management strategies from an administrative and regulatory level for Kalamazoo's WHPP.

Much of Kalamazoo's past and ongoing WHPP activities are well established in the City's documentation associated with EGLE WHP Grant Program. For example, the grant proposals show the selected activities, and the final reports show the completion or significant progress made, documented by the deliverables.

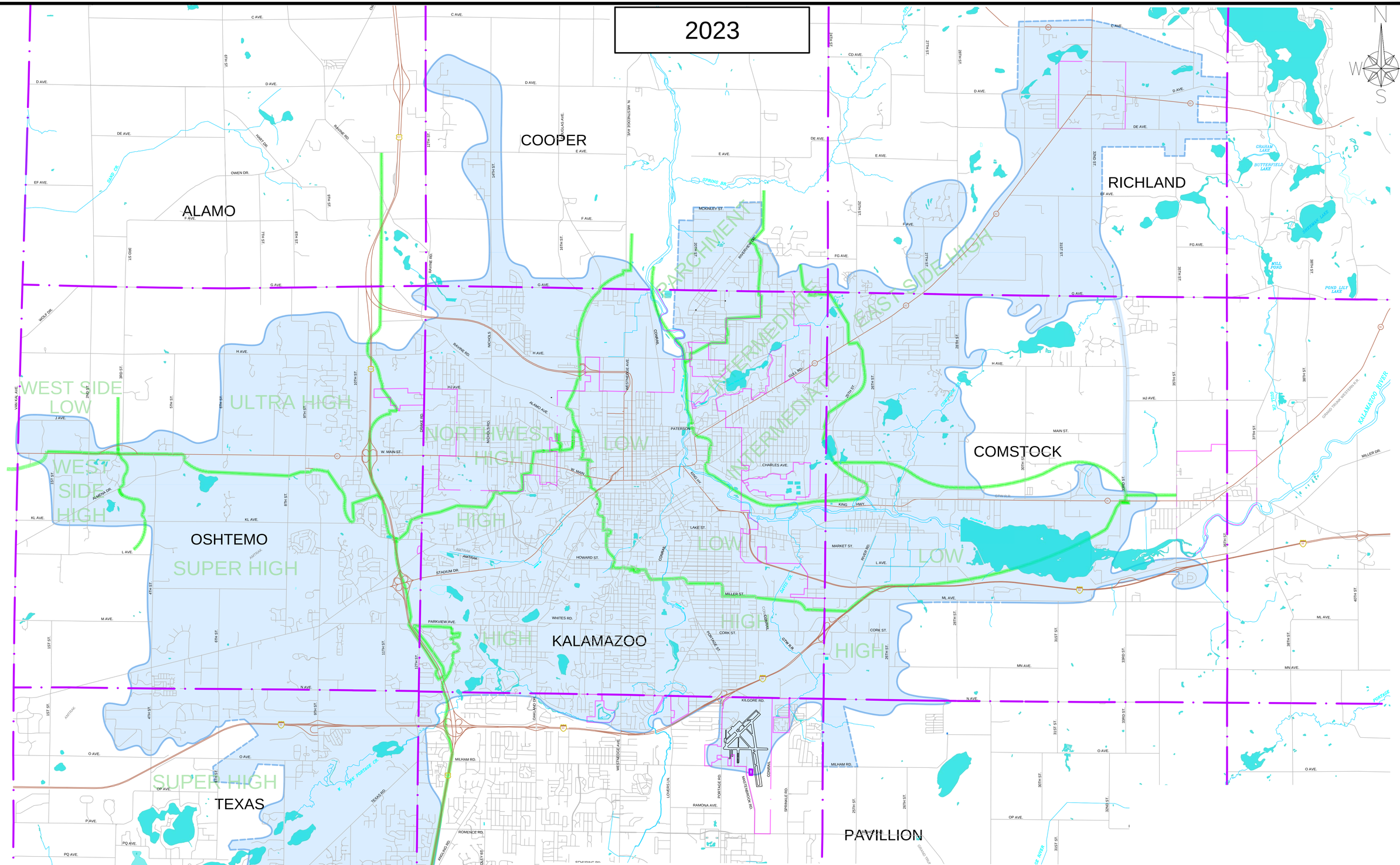
The City of Kalamazoo plans to continue its aggressive and pro-active WHPP approach by: participating in the EGLE WHP Grant Funding Program as it is available; maintaining as many existing management strategies as possible while considering new ones; completing its 2024 revisions to the 2020 Water Emergency Response Plan; maintaining updates to its Contaminant Source Inventories every five years; maintaining currency in capture zone delineations as necessary; enhancing its public groundwater education, outreach, and participation activities; and following proper new well placement protocol.

APPENDICES

APPENDIX A

Figure 1

2023



CITY OF KALAMAZOO

Department Of Public Services

Water Resource Division

PH.# (269)-337-8601

415 STOCKBRIDGE AVE. KALAMAZOO, MICHIGAN 49001

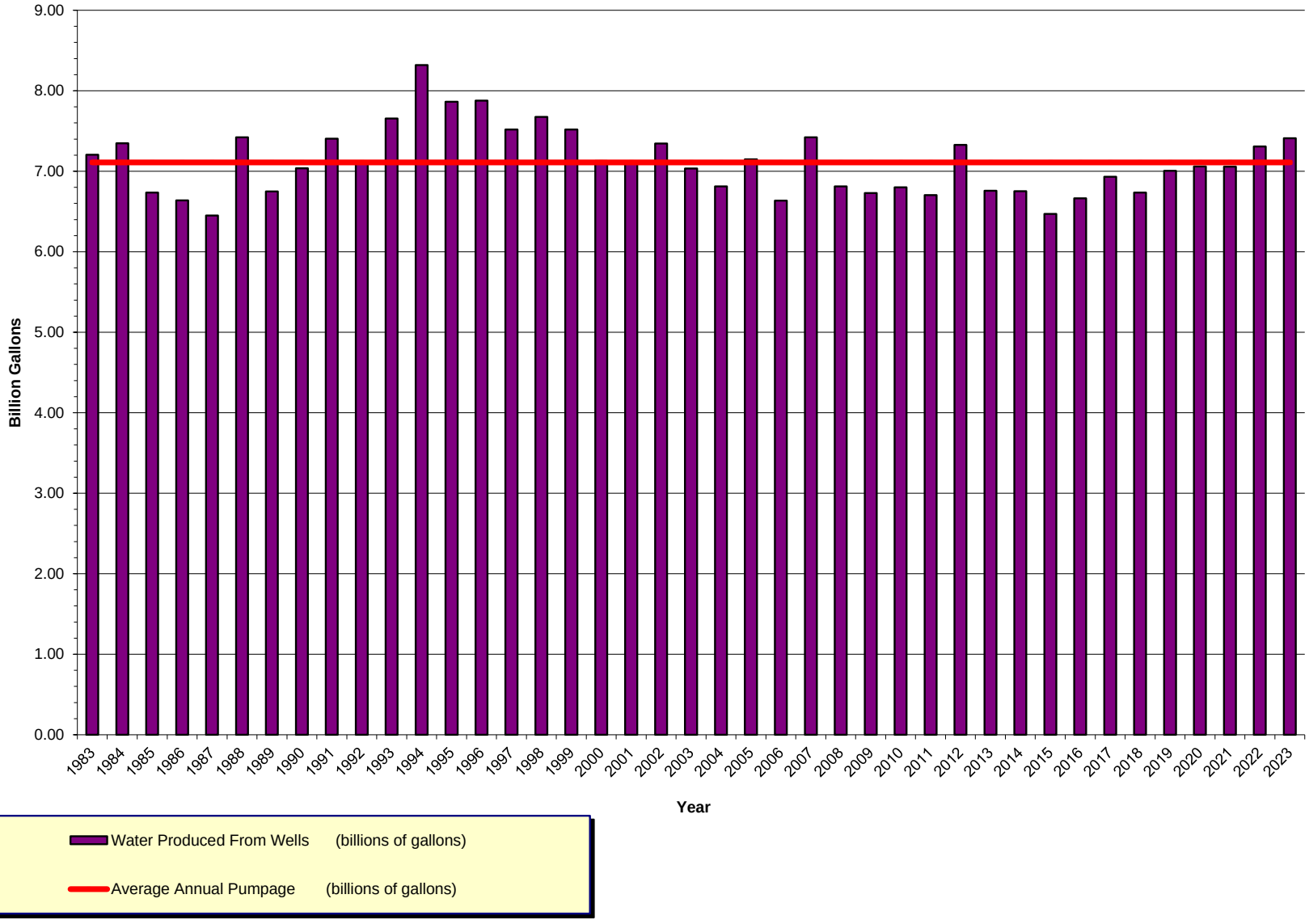
CITY OF KALAMAZOO WATER SERVICE AREA ~ 2023

DATE: 08/30/23

FIGURE - 2

Figure 3

Public Water Supply
Annual Pumpage: 1983 - 2023




2023
COOPER
ALAMO
RICHLAND
COMSTOCK
OSHTEMO
KALAMAZOO
TEXAS
PAVILLION
WEST SIDE LOW
WEST SIDE HIGH
ULTRA HIGH
NORTH WEST HIGH
LOW
HIGH
SUPER HIGH
PARCHMENT
INTERMEDIATE
EAST SIDE HIGH
SOUTHWEST SUPER HIGH
STATION #36 2011
STATION #41 2017
STATION #32 2003
STATION #34 2003
STATION #29 1994
STATION #28 1993
STATION #26 1976
STATION #43 2018
STATION #44 2018
STATION #42 2018
STATION #23 1969
STATION #25 1978 (8 WELLS)
STATION #23-A 1984
STATION #14 1958 (5 WELLS)
STATION #23-B 1984
STATION #31 1996
STATION #10 1954
STATION #5 1914 (4 WELLS)
STATION #11 1989
STATION #11A 2006
STATION #33 1990
STATION #27 1990
STATION 2 #1967
STATION #7 1969
STATION #1 1995
STATION #6 1939
STATION #3 1940
STATION #35 2009
STATION #12 1957 (4 WELLS)
STATION #4 1982 (10 WELLS)
STATION #39 1988
STATION #21 1954
STATION #30 1980
STATION #17 1953
STATION #18 1955 (2 WELLS)
STATION #22 1963 (5 WELLS)
STATION #9 1984 (12 WELLS)
STATION #8 1949 (6 WELLS)
STATION #24 1971 (18 WELLS)
STATION #40 2017
SIXTH STREET TANK 2005
BEECH TANK 2007
BLAKESLEE TANK 1932
MOUNT OLIVET TANK 1955
GULL ROAD TANK 1982
EDGEMOOR TANK 1939
STADIUM DRIVE TANK 1994
SIESTA TANK 2021
6TH STREET SOUTH TANK 2022
N
S
W
E

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CITY OF KALAMAZOO WATER SERVICE AREA ~ 2023

DATE: 08/30/23

FIGURE - 4

Figure 5

WELLHEAD PROTECTION PROGRAM

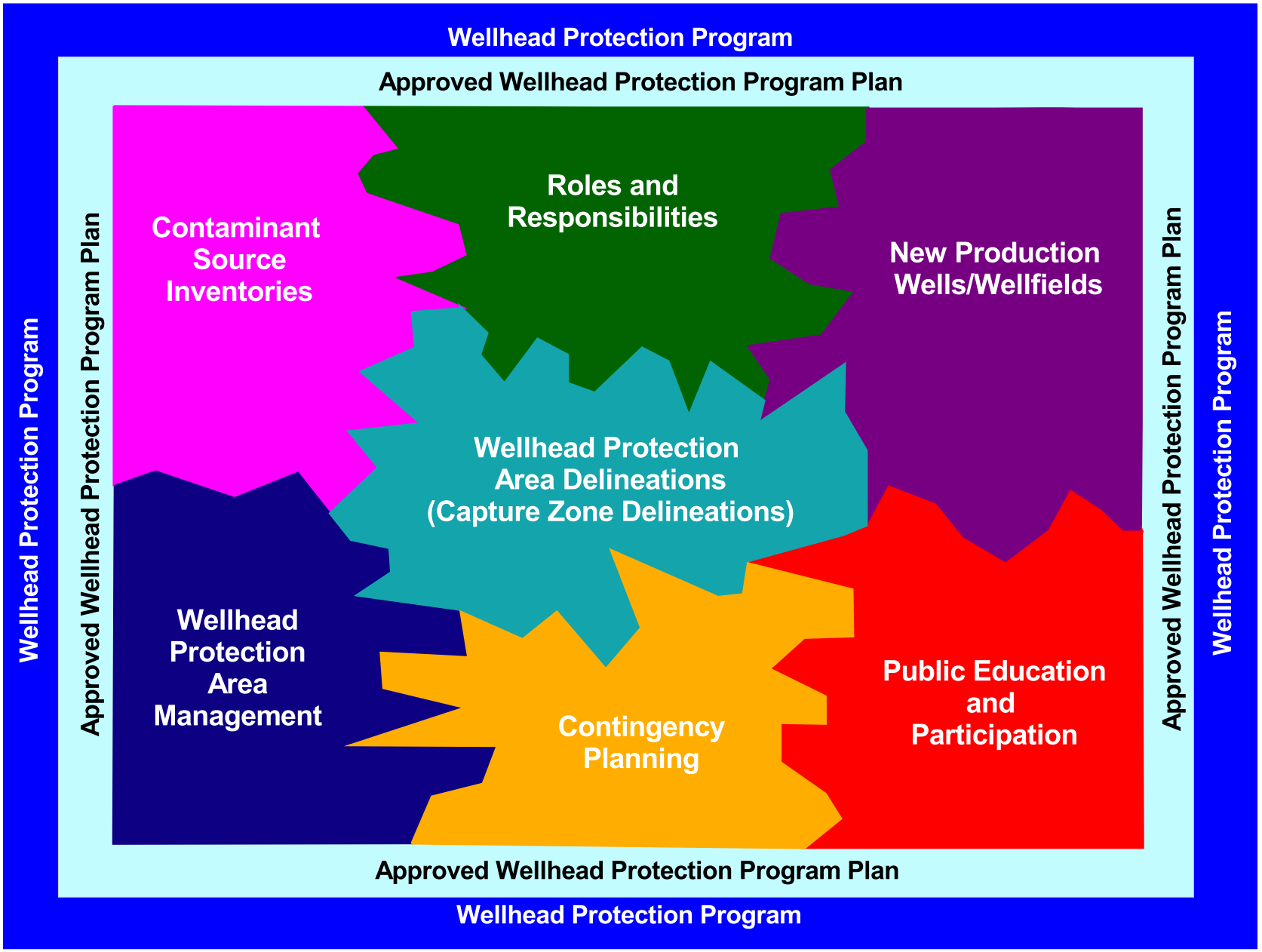
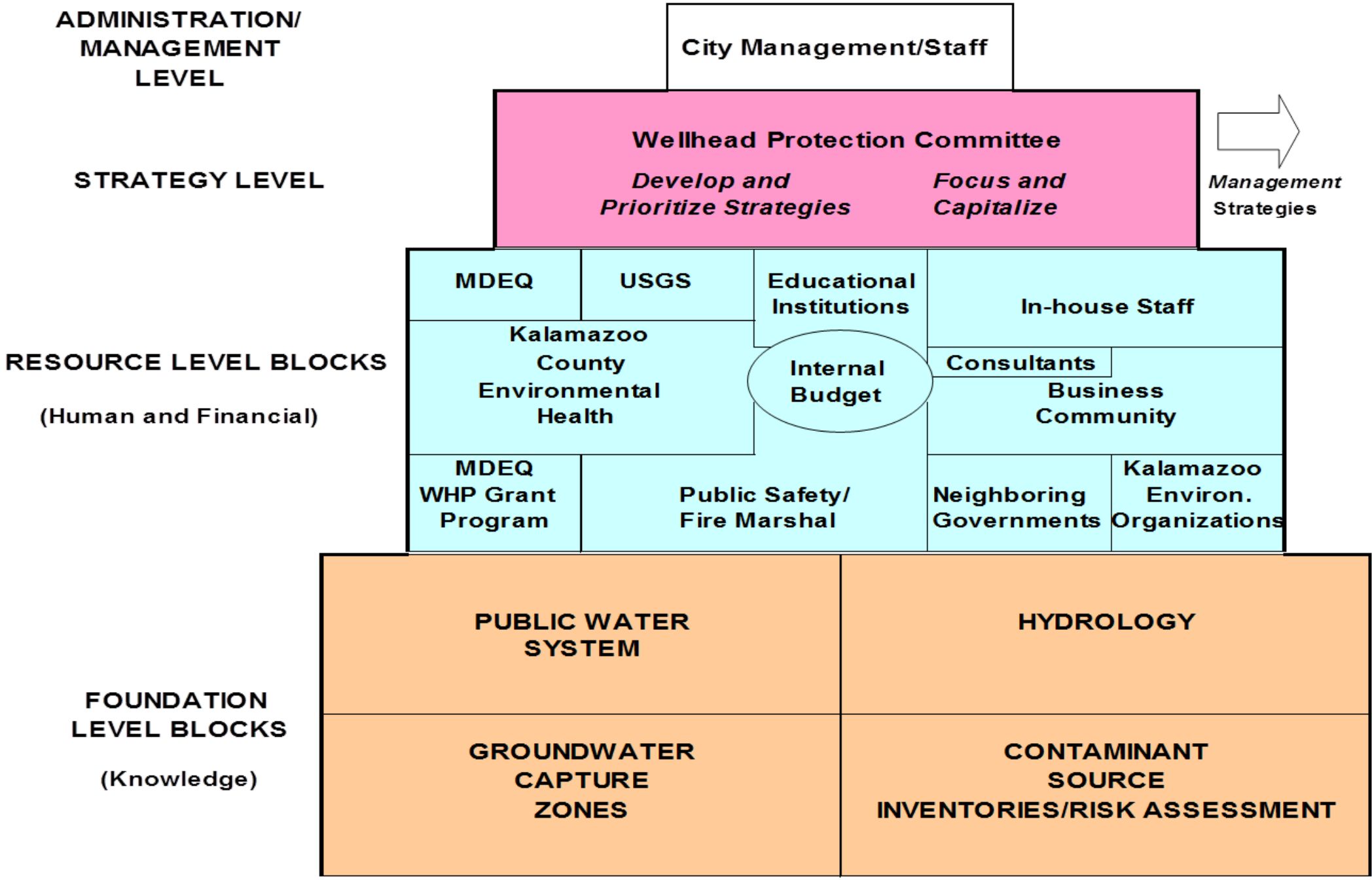


Figure 6: KALAMAZOO WHPP MODEL



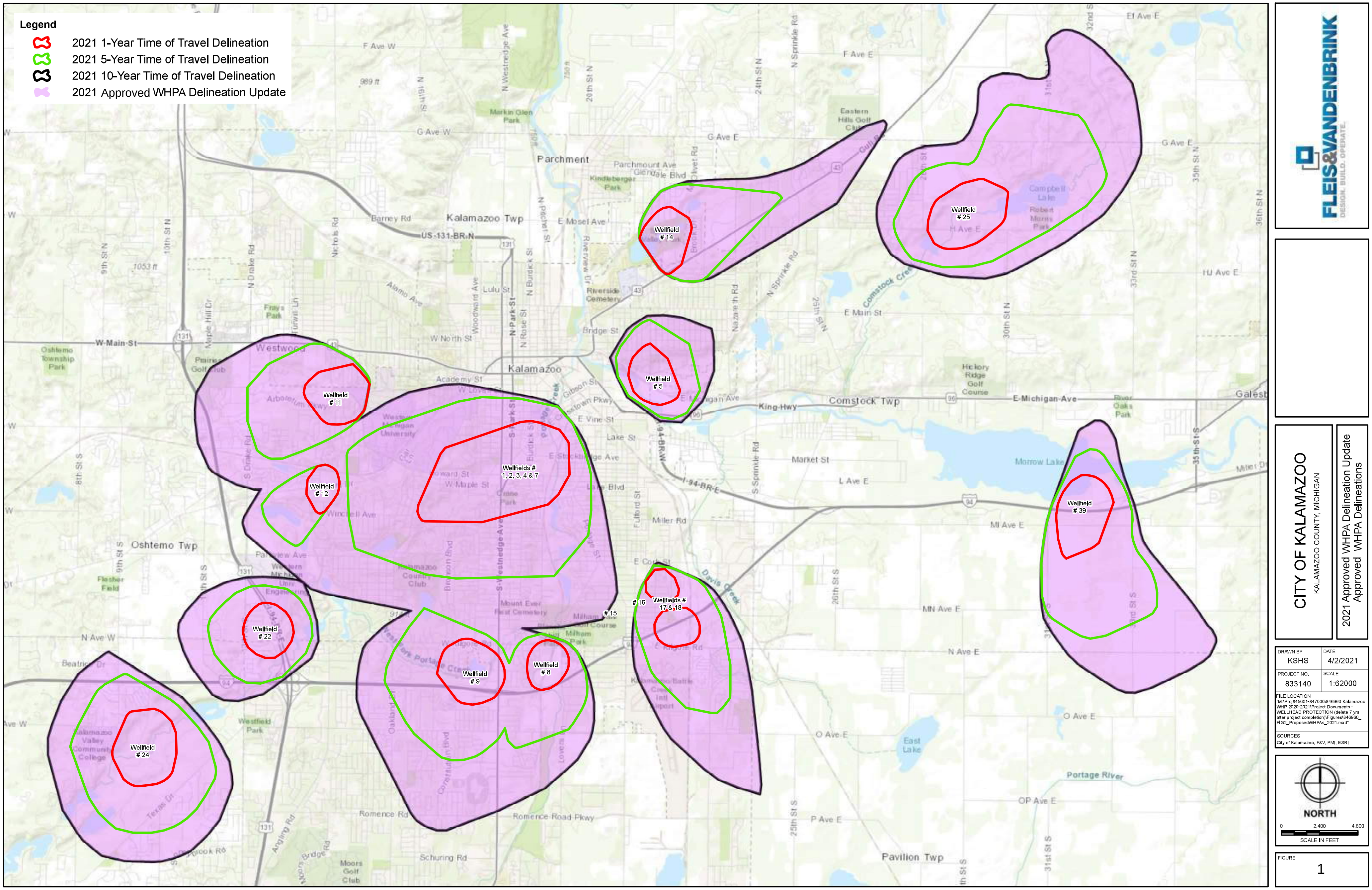

Legend
2021 1-Year Time of Travel Delineation
2021 5-Year Time of Travel Delineation
2021 10-Year Time of Travel Delineation
2021 Approved WHPA Delineation Update
Wellfield # 11
Wellfield # 12
Wellfields # 1, 2, 3, 4 & 7
Wellfield # 14
Wellfield # 25
Wellfield # 5
Wellfield # 39
16
Wellfields # 17 & 18
15
Wellfield # 22
Wellfield # 24
Wellfield # 9
Wellfield # 8
Kalamazoo
Parchment
Kalamazoo Twp
Comstock Twp
Oshtemo Twp
Pavilion Twp
Morrow Lake
FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.
CITY OF KALAMAZOO
KALAMAZOO COUNTY, MICHIGAN
2021 Approved WHPA Delineation Update
Approved WHPA Delineations
DRAWN BY
KSHS
DATE
4/2/2021
PROJECT NO.
833140
SCALE
1:62000
SOURCES
City of Kalamazoo, F&V, PMI, ESRI
NORTH
0
2,400
4,800
SCALE IN FEET
FIGURE
1

Figure 8

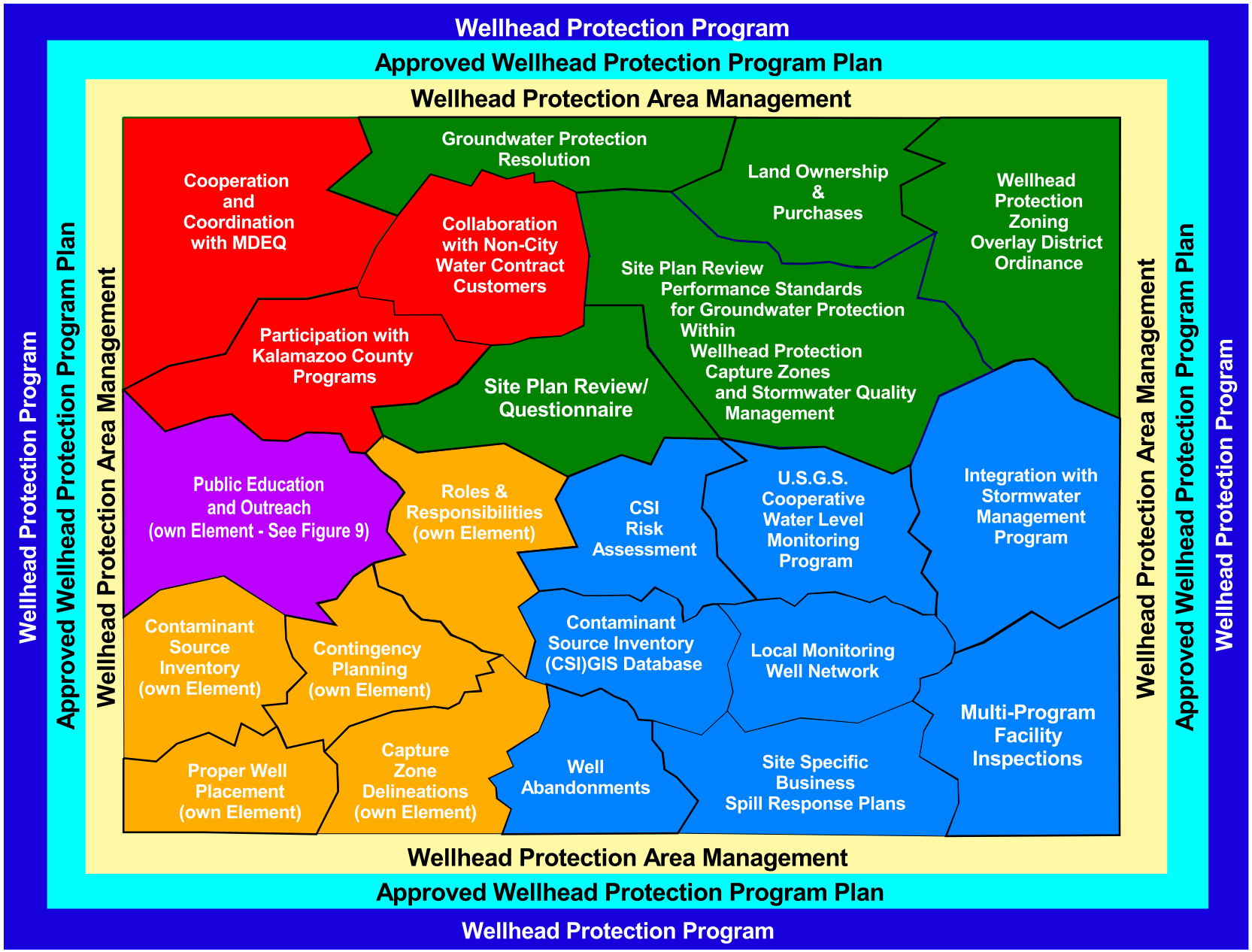
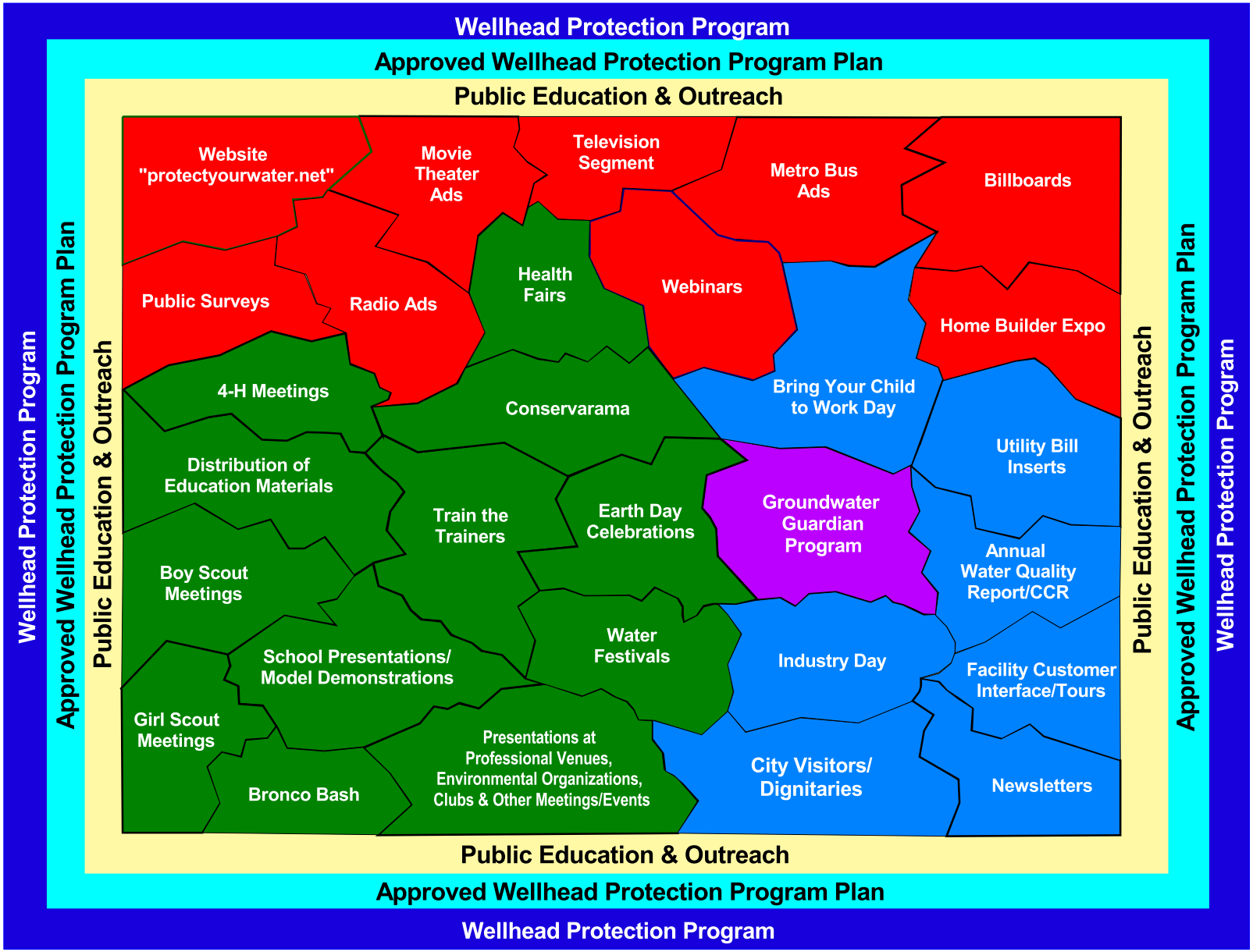

Wellhead Protection Program
Approved Wellhead Protection Program Plan
Wellhead Protection Area Management
Groundwater Protection Resolution
Cooperation and Coordination with MDEQ
Collaboration with Non-City Water Contract Customers
Land Ownership & Purchases
Wellhead Protection Zoning Overlay District Ordinance
Site Plan Review Performance Standards for Groundwater Protection Within Wellhead Protection Capture Zones and Stormwater Quality Management
Participation with Kalamazoo County Programs
Site Plan Review/ Questionnaire
Public Education and Outreach (own Element - See Figure 9)
Roles & Responsibilities (own Element)
CSI Risk Assessment
U.S.G.S. Cooperative Water Level Monitoring Program
Integration with Stormwater Management Program
Contaminant Source Inventory (own Element)
Contingency Planning (own Element)
Contaminant Source Inventory (CSI)GIS Database
Local Monitoring Well Network
Multi-Program Facility Inspections
Proper Well Placement (own Element)
Capture Zone Delineations (own Element)
Well Abandonments
Site Specific Business Spill Response Plans
Wellhead Protection Area Management
Approved Wellhead Protection Program Plan
Wellhead Protection Program

Figure 9

Public Education & Outreach

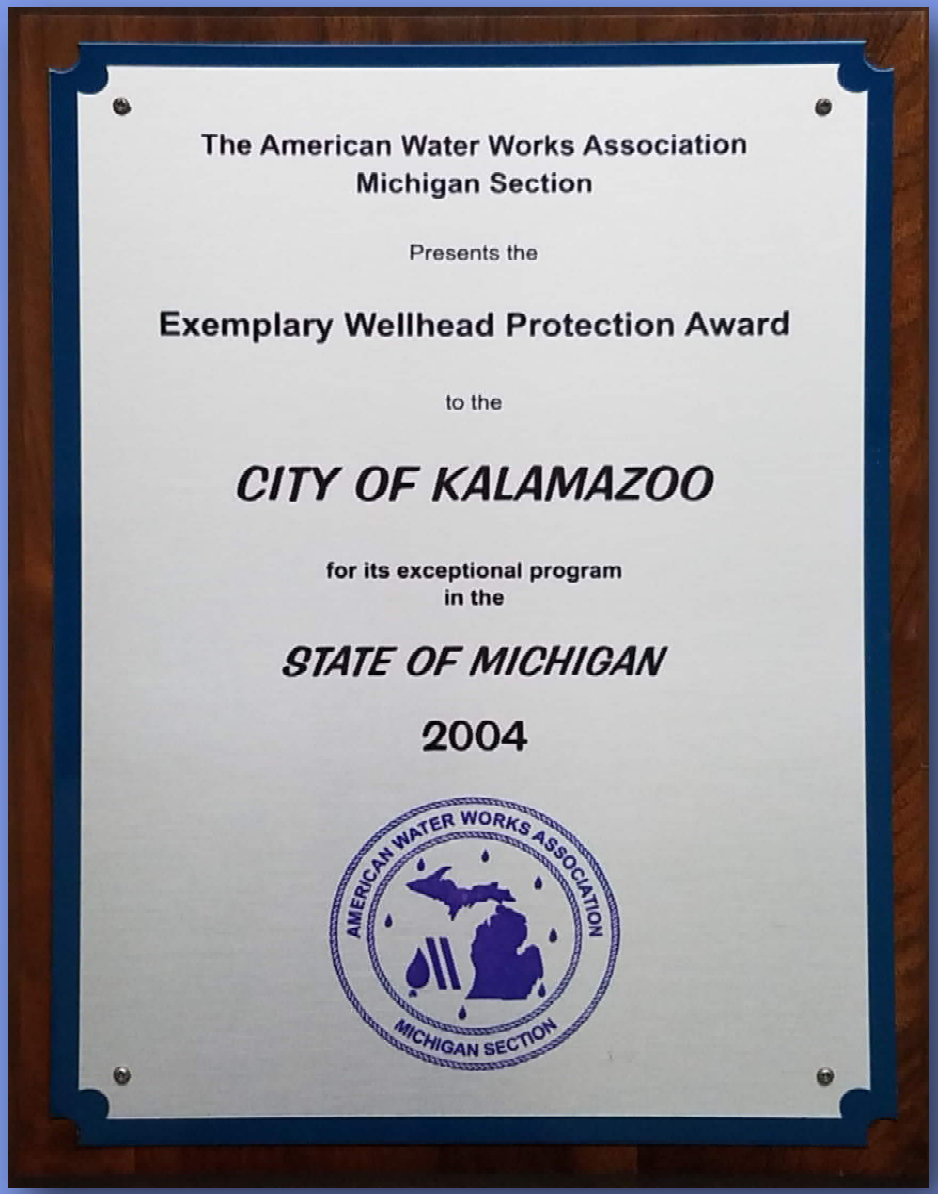


APPENDIX B

Wellhead Protection Program Awards by American Water Works Association, EGLE and Groundwater Guardian Organizations

1985 Michigan Section AWWA

Annual Water Taste-off Winner



2004 Michigan Section AWWA

Exemplary Wellhead Protection Program

City of Kalamazoo

2004 MDEQ Wellhead Protection

City of Kalamazoo

THE CITY OF Kalamazoo

GROUNDWATER GUARDIAN

2012 Michigan Section AWWA

Reginal Water Taste-off Winner

City of Kalamazoo

2013 Michigan Section AWWA

Exemplary Wellhead Protection Program

City of Kalamazoo

2014 AWWA Exemplary Source Water Protection

Large Groundwater System

City of Kalamazoo

THE CITY OF Kalamazoo

2022 EGLE Source Water Protection Program

City of Kalamazoo

GROUNDWATER GUARDIAN

2023 Michigan Section AWWA

Reginal Water Taste-off Winner

City of Kalamazoo

1998-2022 Groundwater Guardian

City of Kalamazoo

APPENDIX C

Ordinance No. 2057 (Wellhead Protection Overlay)

Ordinance 1826 (Performance Standards)
Note: The Actual Performance Standards document is available upon request

Chapter 39. Wellhead Protection

[HISTORY: Adopted by the City Commission of the City of Kalamazoo 10-17-2022 by Ord. No. 2057.[1] Amendments noted where applicable.]

[1] *Editor's Note: This ordinance also repealed former Ch. 39, Weights, Scales and Measures, adopted as Adm. Code § A213.41, as amended 8-27-1979 by Ord. No. 1169.*

§ 39-1. Intent; purpose.

The intent of the City of Kalamazoo Wellhead Protection Ordinance is to safeguard the health, safety, and welfare of persons served by the City of Kalamazoo Public Water Supply System by protecting groundwater that serves as drinking water, thus providing a safe potable water supply now and for future generations.

§ 39-2. Definitions.

The following definitions apply to this chapter:

AVAILABLE MUNICIPAL SANITARY SEWER SYSTEM
: A public sanitary sewer system located in a right-of-way, easement, highway, street, or public way which crosses, adjoins, or abuts upon the property and passing not more than 200 feet at the nearest point from a structure in which sanitary sewage originates.

BEST MANAGEMENT PRACTICES (BMP)
: The best available methods, activities, maintenance procedures, technologies, operating methods, or management practices for preventing or reducing the quantity of regulated substances entering groundwater and surface water from a particular land use activity.

CAPTURE ZONE
: That area through which water travels below the surface and reaches a City well or wellfield within a specified period (under specified conditions set by the EGLE). This chapter addresses both a one-year and ten-year time-of-travel capture zone.

CITY
: The City of Kalamazoo.

GROUNDWATER
: The water below the land surface in a zone of saturation, excluding those waters in underground piping for water, wastewater, or stormwater distribution/collection systems.

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE)

Including its predecessor and successor agencies.

PERFORMANCE STANDARDS

Those BMPs and engineering controls contained within the document "City of Kalamazoo Performance Standards for Groundwater Protection within Wellhead Protection Capture Zones and Stormwater Quality Management."

RCRA

The Resource Conservation and Recovery Act of 1976 (Pub. L. No. 94-580; 42 U.S.C. § 6901 et seq.), as amended.

REASONABLY AVAILABLE PUBLIC WATER SERVICE

Municipal potable water service is available at a street adjacent to the property and can be delivered to the property at pressures and flows that meet the 10 States Standards for Water Works.

REGULATED SUBSTANCES

A. Includes:

(1) Substances for which there is a safety data sheet (SDS), as established by the United States Occupational Safety and Health Administration, and the SDS cites possible health hazards for said substance;

(2) Hazardous waste, as defined by the Solid Waste Disposal Act, being Title II of Public Law 89-272, as amended by the Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901 to 6992k, Part 111, as amended;

(3) Hazardous substances, as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with the U.S. EPA regulations;

(4) Radioactive materials; and

(5) Biohazards.

B. The term "regulated substances" does not include:

(1) Substances in an amount equal or less than 2,200 pounds that are in an area capable of fully containing a total release of said substance or an area that would drain the substance to a wastewater treatment system, excluding septic tanks systems, capable of treating the released substance(s);

(2) Substances in a parked or stopped vehicle in transit, provided the vehicle is stopped or parked for less than 72 hours;

(3) Substances, such as gasoline or oil, in operable motor vehicles or boats so long as used solely for the operation of the vehicle, but not the tanker portion of a tank truck;

(4) Pressurized gases such as chlorine, propane, hydrogen, and nitrogen when in a chemical storage tank;

(5) Refrigerants contained within equipment and used for on-site air cooling or in household appliances;

(6) Substances contained within electrical utility transformers/switches; or

(7) Substances used in construction for which all necessary permits have been obtained, and in accordance with the "Performance Standards."

RELEASE

The spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of one or more regulated substances upon or into any land or water within a capture zone. "Release" includes, without limitation, leakage of such materials from failed or discarded containers or storage systems and disposal of such materials into any on-site sewage disposal system, dry well, catch basin, or landfill. The term "release," when used and applied in this chapter, does not include:

A. Disposal, in accordance with all applicable legal requirements, including those in RCRA and CERCLA, of hazardous wastes in a facility that has received and maintained all necessary legal approvals for that purpose;

B. Disposal of any substance in compliance with applicable legal requirements, including, without limitation, the terms and provisions of a valid municipal, state, or federal permit;

C. Disposal, in accordance with all legal requirements, of any substance to a sanitary sewer system that has received and maintained all necessary legal approvals for that purpose;

D. Disposal, in accordance with all legal requirements, of sanitary sewage to subsurface sewage disposal systems as defined and permitted by the State of Michigan or Kalamazoo County Environmental Health;

E. A release for which there is no obligation to report under federal, state, or other local regulations that occurs on an impervious ground surface (e.g., building floor or concrete driveway) that is effectively cleaned up before reaching permeable ground (e.g., unpaved), a dry well, a storm sewer, or surface water body; or

F. The application of agricultural chemicals, fertilizers, mineral acids, organic sulfur compounds, etc., as used in routine agricultural operations and applied under the Generally Accepted Agricultural and Management Practices, and consistent with label directions approved by the United States Environmental Protection Agency or the Michigan Department of Agriculture.

SPILL CONTINGENCY PLAN

A written site-specific plan conforming to the specifications contained in the Performance Standards, including the documentation of general site operations; regulated substance storage areas; potential for releases of regulated substances and an analysis of the potential destination of such releases; and procedures to be followed in the event of a release.

WELLHEAD

Any well used for supplying water.

§ 39-3. Responsibility for administration.

The City's Department of Public Services ("Department") shall administer, implement, and enforce the provisions of this chapter. Any powers granted or duties imposed upon the Department may be delegated in writing by the Department Director to third parties as said Director deems appropriate.

§ 39-4. Prohibitions within ten-year time-of-travel (TOT) capture zone.

Within a ten-year time-of-travel (TOT) capture zone, no person shall, nor cause or allow another over whom he or she has control to:

A. Release or allow the release of a regulated substance, alone or in combination with other materials (such as fill) in such a manner that the substance gains access to the ground, to a storm sewer or surface water or in any other way such that the substance might enter the groundwater if doing so creates a reasonable likelihood of an adverse impact upon the groundwater.

B. Possess a regulated substance, including fuels (e.g., gasoline, diesel, kerosene, etc.) exceeding 55 gallons aggregate for liquid materials, or 440 pounds aggregate for dry weights, unless prepackaged and intended for retail sale or for commercial or household use (such as salt used in water softeners, fertilizers, pesticides, herbicides, etc.), or unless engineering controls are designed and implemented consistent with the City's Performance Standards, BMPs, the City's Fire Code, and applicable State of Michigan and federal laws and regulations. The following, however, shall not be considered prohibited activities:

   (1) The use of underground oil/water separators and stormwater treatment structures which meet the conditions of the Performance Standards;

   (2) The use of current hazardous waste storage areas at RCRA permitted facilities; and

   (3) Laboratory activities, consistent with all federal, state, and local regulations.

C. Operate a junk, scrap, recycling, or salvage yard;

D. Operate a sanitary/solid waste landfill;

E. Use oil, waste oil or similar liquid petroleum-type products for dust suppression;

F. Install a private water well for the purpose of drinking water or irrigation if, in the determination of the Department, a reasonably available public water service exists;

G. Install or use a private water well for a purpose other than drinking water or irrigation unless it is determined by the Department that the well owner (or the representative of the well owner) has scientifically demonstrated that the well will not cause an adverse impact to the public water supply;

H. Excavate, extract, or mine sand, gravel, bedrock, or any other type of earth if a permit or site plan review is required unless the property owner has established, to the Department's satisfaction, that the activity will not cause an adverse impact to the public water supply;

I. Allow the presence of an abandoned well, which is defined as any well which has either been discontinued for more than one year, is in such disrepair that its continued use for obtaining groundwater is impractical, has been left uncompleted, is a threat to groundwater resources, or is a health or safety hazard. A well shall not be considered abandoned if it has been properly plugged pursuant to the Groundwater Quality Control Act, Part 127, 1978 P.A. 368; or

J. Drill for natural gas or petroleum, whether for exploration, production or otherwise.

K. Except for facilities approved by the Kalamazoo County Human Services Department in accordance with the county public health code sewage disposal regulations, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool, or other facility intended or used for the disposal of domestic or nondomestic wastewater within the City.

§ 39-5. Prohibitions within one-year time-of-travel (TOT) capture zone.

Within a one-year time-of-travel (TOT) capture zone, no person shall, nor cause or allow another, over whom he or she has control, to:

A. Engage in any activity prohibited in the ten-year TOT capture zone;

B. Possess regulated substances, including fuels (e.g., gasoline, diesel, kerosene, etc.) exceeding 55 gallons aggregate for liquid materials or 440 pounds aggregate for dry weights, such as sometimes occurs with activities such as fueling service establishments, motor vehicle repair, body repair; trucking or bus terminals; primary metal product industries; metal plating, polishing, etching, engraving, anodizing or similar processes; lawn, garden, pesticide and agricultural services with on-site bulk mixing or blending of fertilizers, pesticides and other industry-related chemicals for commercial application; and dry-cleaning facilities with on-site cleaning service;

C. Construct or replace any privy, privy vault, septic tank, cesspool, or other facility intended or used for the disposal of domestic or nondomestic wastewater where an available municipal sanitary sewer system exists; or

D. Construct or replace any dry wells.

§ 39-6. Well isolation distance restrictions.

Within either capture zone, no person shall cause or allow uses or activities that would violate the terms and conditions set forth in the document "Minimum Well Isolation Distances (From Contamination Sources and Buildings), Part 127, Act 368, P.A. 1978 and Act 399, P.A. 1976," as prepared by the EGLE, Water Division, as it may be amended,

which, for the purpose of this section, shall be deemed to apply to all persons, unless approved in writing by the Department Director or his or her designee.

§ 39-7. Determination of capture zone boundaries.

In determining whether a property is within a capture zone, the following shall apply:

A. Where a capture zone line that delineates the boundary of one or more TOT zones passes through a property, the entire parcel shall be subject to the restrictions that apply to the more restrictive zone.

B. The Public Services Director, or his or her designee, shall have the authority to interpret the capture zone and determine where the boundaries of the different zones fall, if in dispute. Said interpretation may be appealed to the Director.

§ 39-8. Continuation of existing nonconforming facilities and land uses.

A. Existing nonconformities for land uses/activities will be allowed within a capture zone only when in conformance with the City of Kalamazoo Zoning Ordinance.

B. In addition, the facility must meet the requirements of the Performance Standards and/or shall prepare a spill contingency plan within two years from the adoption date of this chapter or one year from the date of contact from the City regarding recognition of the nonconforming status, whichever is sooner. The City reserves the right to approve/determine which option(s) is to be implemented for the specific circumstance.

C. Nothing in this chapter shall be interpreted to prevent the City from undertaking any actions to prevent or enjoin a nonconforming use in a capture zone from activities that negatively impact groundwater within a capture zone that violate the provisions of this chapter.

§ 39-9. Requirements regarding release of regulated substances.

A. If hazardous substances or any other contamination is known or suspected to have migrated or discharged to a City-owned utility or corridor, or caused an illicit stormwater discharge, the City shall be immediately contacted to abate or remedy any potential public health and safety risks, including, but not limited to, vapor inhalation, fire, explosion, direct contact, discharge to a surface water body and/or impact to groundwater drinking water supplies.

B. Upon discovery of a release within a capture zone, the owner and person in control of the property on which a release occurred, as well as the person responsible for the release, shall take appropriate reasonable actions to mitigate the potential impact of the release on groundwater and remediate the release. Within 24 hours of a known or suspected release, the release must be reported to the State of Michigan, Pollution Emergency Alerting System (PEAS) at (800) 292-4706. Remediation must be

conducted in a timely manner and in accordance with applicable law. Wastes generated during remediation of a regulated substance release must be handled in accordance with all applicable legal requirements. Storage of these materials for a period of greater than 90 days must be reported to, and approval obtained from, the Public Services Director or designee of said official.

C. All releases shall be documented in writing and mailed or emailed to the Department within 10 business days of said incident. Initial release notification shall include, at a minimum, the following:

(1) Location of the release (name, parcel address, and phone);

(2) Reporting party's name, mailing address, email address and phone (if different from above);

(3) Emergency contact person(s) (including email address and phone);

(4) Description of the nature of the incident, including date, time, location, and cause of the incident; type, concentration, and volume of substance(s) released;

(5) Map showing exact release location, and relevant site features (i.e., streets, paved area, storm sewer catch basins/inlets, water features, etc.), scale, and North arrow;

(6) All measures taken to clean up the release; and

(7) All measures proposed to be taken to reduce and prevent any future release.

D. The Public Services Director or his/her designee shall use the regulated substance release report to determine if and where any additional investigative work needs to be completed to assess the potential impact of the release. The owner or operator shall retain a copy of the written notice for at least three years.

§ 39-10. Inactive operations.

This section applies to any business or other operation ("operation") that is inactive, is within a capture zone, and at which there are regulated substances. For purposes of this section, "inactive" is defined to include those businesses/operations that are unoccupied and have no activity for at least 30 days. Those who own or control such an inactive operation shall do the following:

A. Within seven days of the operation becoming inactive, take such steps as necessary to secure the site such that vandals and all other persons cannot gain access to the regulated substances;

B. Within 30 days of the operation becoming inactive, provide to the Public Services Director a document that identifies the site, the date of inactivity, the regulated substances that exist on site, and the name, address, and telephone number of both the owner and the person in control of the site; and

C. Within six months of the operation becoming inactive, remove all regulated substances from the site; this does not include those substances used for heating, cooling, or electrical lighting.

§ 39-11. Enforcement.

A. Municipal civil infraction. Any violation of this chapter is a municipal civil infraction, punishable by a fine of up to $10,000 and any equitable remedies necessary to abate the violation, including but not limited to the costs incurred for abatement and cleanup. Each day a violation exists shall be deemed a separate violation. A citation charging such a violation may be issued by the Director, his or her designee, or an officer of the Department of Public Safety.

B. Abatement/remedial activities by the Department.

(1) The Department is authorized to take or contract with others to take reasonable and necessary abatement or remedial activities whenever the Department determines a violation of this chapter has occurred and that the responsible party cannot or will not timely correct the violation, or when no known responsible party exists. The responsible party shall reimburse the City for all reasonable expenses thus incurred by the City.

(2) If the City desires the responsible party to reimburse it for reasonable abatement activity expenses, the City shall, within 90 days of the completion of said activities, mail to that person a notice of claim outlining the expenses incurred, including reasonable administrative costs, and the amounts thereof. The person billed shall pay said sum in full within 30 days of receipt of the claim. If the person billed desires to object to all or some of the amount sought by the Department, said person may file, within the same thirty-day period, a written objection so stating. The Department shall, within 30 days of its receipt of the objection, provide an opportunity for the objecting party to present facts or arguments supporting said objection. If the Department determines that some or the entire amount originally billed is appropriate, the person shall pay said sum within 30 days of receipt of that determination. If the amount due is not timely paid, the City may cause the charges to become a special assessment against the property and shall constitute a lien on the property. In the alternative, the City may attempt collection of the sum due by filing a civil lawsuit.

C. Injunctive relief. If a person has violated or continues to violate the provisions of this chapter, the Department may petition the appropriate court for injunctive relief restraining the person from activities that would create further violations or compelling the person to perform necessary abatement or remediation.

D. Violations deemed a public nuisance. In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken by the City.

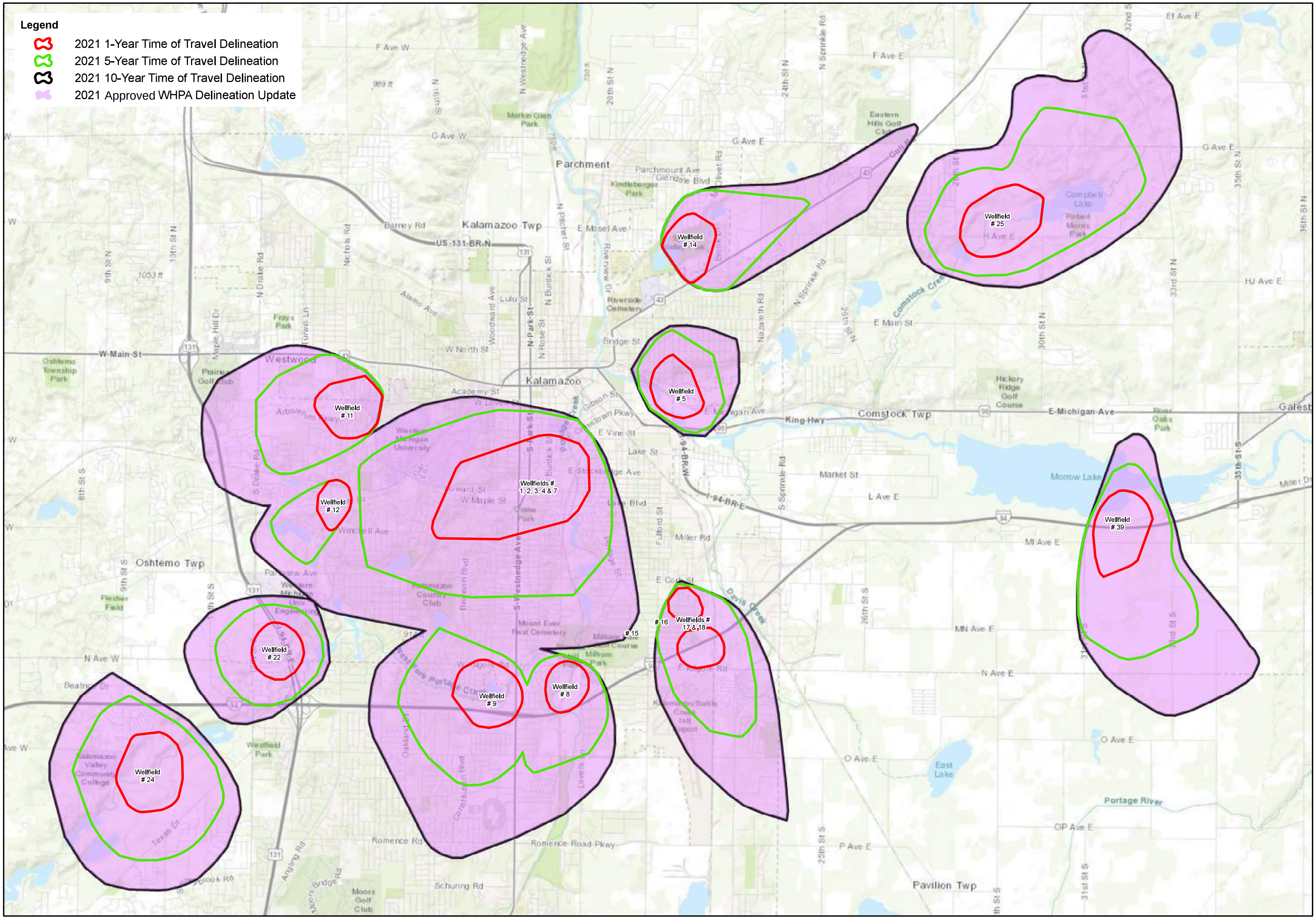
E. Remedies not exclusive. The remedies listed in this chapter are not exclusive of any other remedies available under any applicable federal, state, or local law and it is within the discretion of the Department to seek cumulative remedies.

§ 39-12. Variance/appeal rights.

A. If an owner of property within a capture zone believes the requirements of this chapter impose an unreasonable burden on the use of the owner's property, the owner may seek a variance from the Department Director (or his or her designee). Such a request must be in writing with enough detail to allow the Director to understand the situation and proposed variance. If the Director determines that additional information is needed, the request for additional information shall be made within 30 days of the owner's request. Within 30 days of the receipt of such additional information, or, if no such request is made, within 30 days of the owner's request, the Director shall issue a written response to the owner. The response shall grant, deny, or partially grant the request. A grant, partial or complete, may relieve the property owner from strict compliance with this chapter. Reasonable conditions may be imposed as part of such a grant. The Director shall be guided by the primary goal of protecting the City's wellfields without creating undue hardship upon the property owners affected.

B. Any person receiving a notice of violation may appeal the determination set forth within the notice to the Department Director by submitting a written notice of appeal to the Department. The notice of appeal must be received by the Director within 30 days from the date of the notice of violation, with enough detail to allow the Director to understand the situation. Within 30 days of the receipt of such an appeal, the Director shall issue a written response to the appeal unless additional information is requested by the Director, in which case the response shall issue within 30 days of receipt of the information. The Director's response shall affirm, reverse, or modify the notice of violation being appealed.

C. If the person who has made a variance request or an appeal of a notice of violation does not agree with the Director's decision, said person may appeal the matter by filing an action in the Kalamazoo Circuit Court, which may affirm, reverse, or modify the decision being appealed. Such an appeal must be filed within 30 days of the Director's final decision.


Legend
2021 1-Year Time of Travel Delineation
2021 5-Year Time of Travel Delineation
2021 10-Year Time of Travel Delineation
2021 Approved WHPA Delineation Update
Wellfield # 11
Wellfield # 12
Wellfields # 1, 2, 3, 4 & 7
Wellfield # 14
Wellfield # 25
Wellfield # 5
Wellfield # 39
Wellfield # 22
Wellfield # 24
Wellfield # 9
Wellfield # 8
15
16
Wellfields # 17 & 18
Parchment
Kalamazoo Twp
Kalamazoo
Comstock Twp
Oshtemo Twp
Pavilion Twp
Morrow Lake
Western Michigan University
Kalamazoo Valley Community College
NORTH
0
2,400
4,800
SCALE IN FEET

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

CITY OF KALAMAZOO
KALAMAZOO COUNTY, MICHIGAN

2021 Approved WHPA Delineation Update
Approved WHPA Delineations

DRAWN BY	DATE
KSHS	4/2/2021
PROJECT NO.	SCALE
833140	1:62000

FILE LOCATION
"M:\Proj845001-847000\846960 Kalamazoo WHP 2020-2021\Project Documents - WELLHEAD PROTECTION (delete 7 yrs after project completion)\Figures\846960_FIG2_ProposedWHPAs_2021.mxd"

SOURCES
City of Kalamazoo, F&V, PMI, ESRI

FIGURE
1

CITY OF KALAMAZOO, MICHIGAN

ORDINANCE NO. 1826

AN ORDINANCE TO ADOPT PERFORMANCE STANDARDS FOR GROUNDWATER PROTECTION WITHIN WELLHEAD PROTECTION CAPTURE ZONES AND STORMWATER QUALITY MANAGEMENT AND TO AMEND SECTION 8.3 OF THE ZONING ORDINANCE (APPENDIX A OF THE CODE OF ORDINANCES)

WHEREAS, the Kalamazoo City Zoning Ordinance includes regulations that pertain to the submission, review and approval of site plans for development and redevelopment projects for properties within the city and includes specific information that must be provided on all site plans; and

WHEREAS, the site plan regulations contain language that pertains to storm water management and ground water protection measures that must be adhered to for all such projects; and

WHEREAS, the Department of Public Services has created a new set of regulations entitled Performance Standards for Groundwater Protection Within Wellhead Protection Capture Zones and Stormwater Quality Management, which are intended to be used during the site plan review process and in association with the Wellhead Protection Overlay Zoning District; and

WHEREAS, the Performance Standards provide more in-depth requirements that are intended to help safeguard the drinking water source for Kalamazoo and protect surface water quality from high-risk land use activities; and

WHEREAS, on April 11, 2007, the Planning Commission reviewed the draft of the Performance Standards and unanimously recommended its implementation and adoption by the City Commission; and

WHEREAS, the City Commission has determined that the implementation of the Performance Standards will promote the health, welfare, and safety of the community, will advance the continued economic growth and redevelopment of the City of Kalamazoo, and will help to protect the vital water resources in the city for the benefit of the citizens and business community; and therefore, it is in the best interest of the City to adopt the Performance Standards.

THE CITY OF KALAMAZOO ORDAINS:

Section 1: Section 8.3.H.7.L.and Section 8.3.H.7.X.of the Zoning Ordinance, Appendix A to the Code of Ordinances, City of Kalamazoo, Michigan are amended by adding the following language to both sections: *The proposed development shall comply with the regulations of the City of Kalamazoo's "Performance Standards for Groundwater Protection within Wellhead Protection Capture Zones and Stormwater Quality Management."*

SEVERABILITY

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held invalid or unconstitutional by any Court of competent jurisdiction, said portion shall be deemed a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portions of this Ordinance.

CERTIFICATE

The foregoing is a true and complete copy of an ordinance adopted by the City Commission of the City of Kalamazoo at a regular meeting held on May 21, 2007. Public notice was given and the meeting was conducted in full compliance with the Open Meetings Act, (PA 267, l976). Minutes of the meeting will be available as required by the Act, and the ordinance was duly recorded, posted and authenticated by the Mayor and City Clerk as required by the Charter of said City.

Hannah J. McKinney, Mayor

Scott A. Borling, City Clerk

CITY OF KALAMAZOO

PERFORMANCE STANDARDS

FOR

GROUNDWATER PROTECTION WITHIN

WELLHEAD PROTECTION CAPTURE ZONES

AND

STORMWATER MANAGEMENT

(REFERENCE ORDINANCES NOS. 1826 AND 2057,
AND CHAPTERS 29 AND 39 OF THE
KALAMAZOO CITY CODE)

REVISED BY THE CITY OF KALAMAZOO
REVISION 2022

Excerpted Pages 1-7 only

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LIST OF STORMWATER WORKSHEETS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This document provides Performance Standards (Standards) for groundwater protection within Wellhead Protection Areas (Capture Zones) and stormwater management throughout the City of Kalamazoo, Michigan (City). The objective of this document is to define technical standards for groundwater and surface water (stormwater) protection during site development and redevelopment activities. These Standards are designed to be consistent with the objectives of the City's Wellhead Protection Program (WHPP) and to maintain compliance with the City's municipal separate storm sewer system (MS4) National Pollutant Discharge Elimination System (NPDES) Permit Certificate of Coverage and the federally mandated Total Maximum Daily Load for phosphorus reduction within the Kalamazoo River Watershed.

These Standards may be applied at all sites within the City but were developed primarily for use during Site Plan Review and/or Building Division plan review. These Standards supplement the City's Wellhead Protection Overlay Ordinance, the Stormwater System Ordinance (Chapter 29 of the City of Kalamazoo Code of Ordinances), and other associated City Ordinances associated with stormwater, wellhead protection and natural features protection.

The intent/purpose of the Wellhead Protection Overlay (WP-O) Ordinance is to protect the groundwater supplies that serve as drinking water by: 1) defining *non-compatible land uses within Capture Zones,* 2) preventing their creation or establishment, including those that would prevent/limit the City's ability to obtain necessary well permits to replace or add new potable water production wells, and 3) minimizing the risk to drinking water sources posed by both approved and non-conforming land uses by requiring compliance with the Standards established in this document. The objectives of the Stormwater System Ordinance are to provide environmental protection to surface waters by regulating discharges into the City's stormwater system, and to provide the City with specific legal authority to find and eliminate illicit stormwater connections and discharges.

For the purpose of these Standards, the City's Capture Zones have been divided into three groundwater contamination risk areas based on groundwater's Time-of-Travel (TOT) to a municipal wellfield: 1-Year Capture Zone = Area located within a 1-Year Capture Zone to a municipal wellfield; 5-Year Capture Zone = Area located within a 5-Year Capture Zone, but outside the 1-Year Capture Zone to a municipal wellfield; and 10-Year Capture Zone = Area located within a 10-Year, but outside the 1-Year and 5-Year Capture Zones to a municipal wellfield. To determine if a site is located in a Capture Zone area, refer to Figure 1 and/or the City's online Geographic Information System (GIS) (https://www.kalamazoocity.org/maps) under the Wellhead Capture Zones Layer.

In certain cases, more stringent standards have been developed for sites located closer to City wellheads. Consequently, proposed development of sites within the 1-Year Capture Zones is expected to implement

greater controls than that within the 5 or 10-Year Capture Zones.

This document includes a variety of Best Management Practices (BMPs) related to groundwater and surface water protection and are considered commonly accepted practices associated with groundwater and/or surface water protection. These BMPs were derived from a variety of sources, including "Low Impact Development Manual for Michigan - A Design Guide for Implementers and Reviewers" (SEMCOG, 2008), and "Michigan Nonpoint Source Best Management Practices Manual" (EGLE, 2017), and various state and federal rules, regulations, manuals, and guidance documents.

Maps showing the Capture Zones are maintained by the Water Programs Manager and the City Planner or their designee(s) and are available for viewing at the Department of Public Services, Water Resources Division, Water Programs Manager, 1415 North Harrison Street. Figure 1: Wellhead Protection Overlay (2022) is the official map reference of the WP-O and includes the 1-Year, 5-Year and 10-Year Time-of-Travel Capture Zones.

The Standards are divided into sections, which follow this Section 1.0 Introduction.

Section 2.0 "Groundwater Contamination Risk Assessment" discusses what risk category to groundwater (i.e., high or low risk) based on the Zoning Districts and various land use designations. Also, supporting rationale for the designations are provided.

Section 3.0 "General Plan and Construction Standards" details standard practices expected of any site, including those sites in possession of regulated substances (defined in the WP-O Ordinance).

Section 4.0 "Land-Use Specific Standards" includes more specific standards for several high-risk land uses that are prohibited in one or all of the Capture Zones.

Section 5.0 "Stormwater Management Requirements" establishes technical standards that apply for stormwater management both inside and outside the Capture Zones. These standards are intended to address groundwater vulnerability and land-use risks; prevent or minimize pollutant loadings to surface water to ensure compliance with the City's Stormwater NPDES Permit; and minimize potential adverse impacts to general surface water quality from stormwater runoff.

Section 6.0 "Treatment and Spill Containment" provides guidance regarding BMPs that can meet treatment requirements for stormwater quality and provides specific requirements, for spill containment cells and volumes, water quality swales, and proprietary systems.

Section 7.0 "Non-Conforming Land Uses" specifically addresses sites within the Capture Zones with existing non-conforming land uses pursuant to the WP-O Ordinance, including the requirement for the implementation of BMPs and/or Spill Contingency Plans (SCPs).

Section 8.0 "Potentially Applicable Environmental Regulations" discusses the requirement of developers to comply with all local, state, and federal regulations.

Section 9.0 "Contaminated Properties" addresses contaminated sites and special considerations and requirements for these sites.

APPENDIX D

Site Plan Review Checklist

THE CITY OF Kalamazoo

Community Planning & Economic Development
245 N Rose Street, Suite 100 • Kalamazoo, MI 49007
(269) 337-8026 • www.kalamazoocity.org
www.kalamazoocity.org/siteplanreview

CITY OF KALAMAZOO – SITE PLAN APPLICATION & CHECKLIST

Site Plan Review is an administrative process through the Site Plan Review Committee. The Committee is comprised of members of many City Departments, including Public Safety, Public Services, Building and Trades, Community Planning and Economic Development (CPED).

The first step in Site Plan Review, Is the Pre-Application meeting. If you have not yet scheduled this meeting, please contact us at 269-377-8044 or email us at siteplan@kalamazoocity.org. The Pre-Application meeting allows applicants to ask questions about their plan, the process, this checklist as it relates to their project, or to finalize an application with staff. Staff contact for Site Plan Review is Bobby Durkee and may be reached at above lister number or durkeer@kalamazoocity.org

All Site Plans must be developed using this checklist. You will use this checklist as your cover page to your Site Plan. Using this checklist, provide all information pertinent to the project and note on which plan page the information can be found. Assistance and questions with this form or the process can be answered by CPED staff at any point during the process.

SITE PLAN REVIEW REQUIREMENTS

- Drawn at an engineering scale of between 1”=50’ or 1”=20’ with a north arrow
- Name, address, email, phone number of property owners, applicant, and firms/professionals involved in the project. *Verify property address with City Assessor’s Office*
- Address, legal description, and Parcel Identification Number (PIN) of subject property.
- All plans *must* be submitted in an **electronic format (PDF) plus one hard copy in 11”x17” format, one physical copy of application and supporting document required.**
- Supporting documents such as surveys, environmental reports, stormwater worksheets and stormwater agreements if required.
- Application is not complete until the application completed in full and fee are submitted.

DEPOSIT & FEES

You can find a copy of our fee schedule here: https://www.kalamazoocity.org/cpdfeeschedule/file

COMPLETED APPLICATIONS

Once completed, please submit this checklist and your completed site plan in PDF format to siteplan@kalamazoocity.org. If you have any questions, please visit www.kalamazoocity.org/siteplanreview or call 269-377-8044**.** Only completed applications following all Site Plan Review requirements will be accepted.

SITE PLAN REVIEW CHECKLIST

APPLICANT INFORMATION		
Applicant Name:		
Applicant Mailing Address:		
Applicant City:	Applicant State:	Applicant ZIP Code:
Applicant Phone:	Preferred Contact: ☐ Email ☐ Phone	
Applicant Email:		

PROPERTY OWNER INFORMATION		
Owner Name:		
Owner Mailing Address:		
Owner City:	Owner State:	Owner ZIP Code:
Owner Phone:	Preferred Contact: ☐ Email ☐ Phone	
Owner Email:		

PROPERTY INFORMATION
Property Address:
Parcel Identification Number (PIN):

EXISTING CONDITIONS: All projects should provide information related to the site's existing conditions. Projects involving no new construction of buildings or additions less than 1,500 square feet and those not increasing a site's impervious coverage more than 10%, do not need to include a topographic site survey.

Site Plan Review Checklist Item	Site Plan: Found on Page
Vicinity Maps illustrating adjacent streets and existing structures (within 200'), zoning, land use, and 2025 Master Plan Land Development designation of adjacent parcels.	
Note presence of special district or designation such as:	
➢ Historic District	
➢ Brownfield Redevelopment Authority	
➢ State/Federal List for Soil/Groundwater Contamination – If yes, also contact MEGLE	
➢ Endangered/rare species/habitat area -if yes, also contact MDNR	
➢ Required reporting for RCRA/US EPA Hazardous Waste Handler site (note site type: small quantity generator, large quantity generator, transporter, treatment/storage/disposal, notifier, other)	
➢ Solid Waste Facility	
➢ Baseline Environmental Assessment (BEA)	
➢ Tax capture or deferment area (such as CIA, TIF, NEZ, etc.)	
➢ Natural Features Protection – 2025 Master Plan	
➢ Wellhead Protection Area	

SITE PLAN REVIEW CHECKLIST - COMPLETE IN FULL, ITEMS THAT DON'T APPLY MARK 'NA' AND NOTE WHY

EXISTING CONDITIONS: All projects should provide information related to the site's existing conditions. Projects involving no new construction of buildings or additions less than 1,500 square feet and those not increasing a site's impervious coverage more than 10%, do not need to include a topographic site survey.	
Site Plan Review Checklist Item	Site Plan: Found on Page
Location and type of existing features on the subject property and on adjacent properties, such as woods, wetlands, streams, rivers, lake, drains, 100-year flood plains, floodway, wetland, soil contamination, groundwater contamination etc. Also required are:	
➢ Topography (2' contour lines labeled with USGS datum)	
➢ Tree Inventory (note all trees 10" or greater at diameter breast height or dbh on the site with species type, condition, and remain/ remove status)	
If project disturbs an area greater than 1 acre within 500' of a lake or steam, EGLE permit req'd.	
Location, dimensions, and/or capacities of existing property lines; lots; recorded and unrecorded easements (including County drains); all utilities, including water, sewer, electric, gas, phone, cable, Internet, etc.; wells and cisterns, hydrants; Fire Department Connections, rights-of-way (including sidewalk, trails, landscaping, lighting, pavement, notes on vacation, etc. within it); and points of access	
Location of existing buildings and structures (such as signs, light fixtures, refuse areas, parking areas, fences, drainage, above/underground storage tanks, Fire Department Connection, fire service with backflow prevention type etc.) on the subject property, including setbacks, structure use, if planned to remain or be demolished, and age of structure if to remain.	
PROPOSED SITE PLAN: The following is the checklist of plan details and documentation required for the proposed site plan. Provide all information relevant to project. Please check with the Senior Development Planner if you are unclear on any provision prior to making application.	
PLANNING & ZONING ITEMS:	
Alignment with 2025 Master Plan	
Building Location, including distance from property lines and	
Building elevations, including number of stories and locating doors windows, facade materials, signage, and lighting	
Off-street parking (vehicle and bicycle) & loading, including location, barrier free, quantity, dimensions, signage	
All on-site lighting, including location, height, type, wattage	
Signage - type, location, and size	
Site Access for All Modes (vehicle, pedestrian, bicycle, transit) including location, dimension, radii, materials, signage	
Impervious surface, pre an post construction	
Refuse location & screening	
Landscape Plan, including fences, walls, plant schedule (number, size, species), and incorporate of existing trees and vegetation	

SITE PLAN REVIEW CHECKLIST-COMPLETE IN FULL, ITEMS THAT DON'T APPLY MARK 'NA' AND NOTE WHY

PROPOSED SITE PLAN: The following is the checklist of plan details and documentation required for the proposed site plan. Provide all information relevant to project. Please check with the Senior Development Planner if you are unclear on any provision prior to making application.	
BUILDING & TRADES	
Soil erosion control measures	
Final site grading/topography (2' contour lines labeled with USGS datum)	
USGS first floor elevation of buildings	
Locations, dimensions, area, use and construction type of all buildings	
ADA accessible routes	
Occupant egress path from all structures	
KDPS – FIRE MARSHALL	
Installation of Knox Box	
Proper location & sizing of:	
➢ Fire Department Connection (FDC)	
➢ FDC Signage	
➢ Hydrants	
➢ Water mains serving fire protection systems	
➢ Building identification (street number & name)	
Protective bollards	
Vehicular access & circulation	
On-site Storage or Use of Hazardous Chemicals. *Permit from Fire Marshall may be required*	
➢ SDS information	
➢ Right to Know Survey/Chemical Inventory Storage Form Part I	
➢ Wellhead Protection/Chemical Inventory Storage Form Part II	
➢ Classify hazard class of site and/or structure(s)	
PUBLIC SERVICES – TRANSPORTATION & UTILITIES	
Location and dimensions of new rights-of-way	
Site access for all modes (vehicle, pedestrian, bicycle, transit) including location, approach type, dimension, radii, materials, signage	
Access & circulation of site or proposed street network	
Improvements to existing off-site rights-of-way for all modes (vehicle, pedestrian, bicycle, transit)	
Timeline of proposed right of way work, street closures, lane restrictions or sidewalk closures.	
Location and dimension of proposed traffic control measures, including acceleration, deceleration, and passing lanes, traffic signals or signs, etc.	
Location and dimension of utilities & easements for gas, electric, phone, cable, etc.	

SITE PLAN REVIEW CHECKLIST-COMPLETE IN FULL, ITEMS THAT DON'T APPLY MARK 'NA' AND NOTE WHY

PROPOSED SITE PLAN: The following is the checklist of plan details and documentation required for the proposed site plan. Provide all information relevant to project. Please check with the Senior Development Planner if you are unclear on any provision prior to making application.	
Public Services - Environmental/Wellhead Protection	
Wellhead Protection Area (WHPA)	
➢ Stormwater Compliance with Performance Standards	
➢ Groundwater Infiltration Compliance	
Manufactured Treatment Device Worksheet	
Hazardous Material Storage present? If yes, complete Hazard Material Storage Forms 1 & 2	
Management of abandoned wells, cisterns, and above or underground storage tanks, including information on installation, operation, capping, or removing	
Installation of new well (temporary or permanent) with or without a Reduced Principle Backflow Prevention Assembly.	
Soil contamination present? If yes, MEGLE approval required for proposed stormwater infiltration.	
Property/site drains present? Detail connection to sanitary or storm sewer, on-site holding tank with pumping/disposal plan, or other.	
Detail direct or indirect discharge into or toward a storm sewer, drain, wetland, pond, lagoon, or other surface water feature?	
Detail all grade changes, cutting, and fill, including management of existing vegetation and soil erosion and/or sedimentation.	
Public Services – Stormwater Management	
Stormwater structures and systems, including size of development area (small 1/2 acre or less, medium 1/2 to 1 acre, and large 1+ acres)	
If there is any change (increase or decrease), complete:	
➢ Uniform Standard 1: Water Quality Treatment Volume Work sheet	
➢ Uniform Standard 2: Chanel Protection Volume Worksheet	
Geothermal Wells on the property.	
Site Discharge Calculation Worksheet Properly buffer water features on adjacent properties If site is to discharge into a County drain and/or is adjacent to an MDOT street, please contact appropriate authority for more information, additional standards, and permitting	

PROPOSED SITE PLAN: The following is the checklist of plan details and documentation required for the proposed site plan. Provide all information relevant to project. Please check with the Senior Development Planner if you are unclear on any provision prior to making application.	
Public Services - Water	
Location & capacity of water main, water service, and hydrants.	
➢ For new water service also detail:	
➢ Size of line required	
➢ Use for fire service	
➢ Domestic meter size required	
➢ Irrigation meter size required	
➢ For new public water mains:	
➢ Located in public right-of-way -or -	
➢ Located in easement dedicated to COK	
➢ MDEQ PA399 Permit Application	
Quantity of new hydrants _____	
Fire Service (note: existing systems may require inspection & upgrade)	
➢ Locate cross-connections	
➢ Backflow prevention devices	
Public Services – Sanitary Sewer	
Sanitary sewer service lateral location and sizing	
➢ All existing & proposed new, including identification & depth of	
➢ underground utility crossings	
Invert elevation of existing lateral at ROW/easement lines which will continue to be active.	
Invert Elevation of proposed new lateral at ROW/easement line.	
Sanitary main U.S. invert elevation.	
Sanitary main D.S. invert elevation.	
Compliance with Chapter 28 of the City of Kalamazoo Ordinances & Engineering Best Practices	
Discharge Basis of Design Flow Rate, per connection: (Residential – Multi-Family 3+; Commercial – Restaurant, Laundry Facility, Manufacturing, Hotel/Motel, Medical, and others as required)	
➢ Contribution Per REU: (gpd)	
➢ Total REU's with justification/calculation	
➢ Average Flow Rate(gpm)	
➢ Peaking Factor with justification/calculation	
➢ Peak Flow Rate(gpm)	
If a new connection is proposed, a Sanitary Sewer Connection Application Form is required	

SITE PLAN REVIEW CHECKLIST-COMPLETE IN FULL, ITEMS THAT DON'T APPLY MARK 'NA' AND NOTE WHY

PROPOSED SITE PLAN: The following is the checklist of plan details and documentation required for the proposed site plan. Provide all information relevant to project. Please check with the Senior Development Planner if you are unclear on any provision prior to making application.	
Summary of Site Calculations	
Gross site area	
Area of site covered with impervious and semi-pervious surfaces	
Number and type of housing units	
Square footage of commercial, manufacturing, or institutional uses - site total and by floor area per building	
Number of vehicle & bicycle parking spaces provided, including barrier-free	
Number of trees (at or greater than 10" (dbh) saved and/or removed with proposed plan, including species type, size, and health	
Estimated number of vehicle trips per day generated by the proposed use (refer to ITE trip generation)	
If generating more than 1,000 vehicle trips/day are generated, a complete traffic impact analysis	
Light grid/illumination plan, if required.	
If requiring 20 or more parking spaces or impervious surface greater than 6,000 square feet, complete the following:	
➢ Water Quality Treatment Volume worksheet	
➢ Chanel Protection Volume Worksheet	
Calculations for proposed sewer main, sewer lead, water main, water service, and hydrants.	

Description of Project:

_____

_____

_____

_____

Applicant name & Signature

_____

_____

Date:

_____

SITE PLAN REVIEW RESOURCES

- Zoning Ordinance
- 2025 Master Plan
- 2015 Michigan Building Code
- 2015 Michigan Residential Code
- 2015 Michigan Mechanical Code
- 2015 Michigan Plumbing Code
- ADA - ICC A117.1-2009
- Chapter 28, Kalamazoo Code of Ordinances, as Amended, as Amended
- Soil Erosion and Sedimentation Control - Chapter 30, Kalamazoo Ordinances, as Amended
- Flood Plain Management - Chapter 29 City of Kalamazoo Ordinances, as Amended
- Chapter 38 of the City of Kalamazoo's Code of Ordinances, as Amended
- MMUTCD
- NACTO
- Complete Streets Policy, City of Kalamazoo
- ITE Trip Generation
- MDEQ - Uniform Stormwater Standards 1-4
- Title 40 of the Code of Federal Regulations (CFR) as Amended, US EPA
- Natural Resources and Environmental Protection Act (NREPA), Act 451 of 1994 Part 41, as Amended Recommended Standards for Wastewater Facilities, Current Addition (10 States Standards)
- Standard Construction Specifications for Wastewater, City of Kalamazoo, Current addition
- Wellhead Protection Zoning Overlay - Chapter 3, Section 3.5, Ordinance No. 1825 as Appendix A
- Performance Standards for Groundwater Protection Within Wellhead Protection Capture Zones and Stormwater Quality Management - Ordinance No. 1826 as Appendix A, Chapter 8, Section 8.3
- Phase II Stormwater NPDES Permit
- https://kalamazoopublisafety.org/fire/marshall
- Maker of Acceptable Knox Box (www.knoxbox.com)
- USEPA Safe Drinking Water Act, 42 U.S.C. §300f et seq. (1974)
- MDEQ, Michigan Safe Drinking water Act 1976 PA 399, as Amended
- Recommended Stardards for Water Works, Current Addition (10 States Standards)
- City of Kalamazoo's Standard Specifications for Water Main and Service Installation, Current Edition
- www.protectyourwater.net

APPENDIX E

Chemical Inventory and Storage Form

CHEMICAL INVENTORY AND STORAGE FORM
PART 1

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

DATE COMPLETED:		
NAME OF PREMISES:		
SITE ADDRESS:		
SITE TELEPHONE:		
EMERGENCY TELEPHONE:		(Numbers should be direct to facility representatives and available 24 hrs. Number should by-pass automated phone trees)
QUESTIONAIRE COMPLETED BY:		
PHONE:		
EMAIL ADDRESS:		
SITE USE: Please check most appropriate box	☐	CHEMICAL USER (Chemicals used in activities on site)
	☐	CHEMICAL PRODUCER (Chemicals manufactured at this site, includes packaging)
	☐	OTHER (Chemicals are stored on site, but not used or produced. Such as service stations, retail store, storage facility)

Emergency Contacts: (Include Private Alarm / Security Companies, Maintenance Staff)				
NAME	TITLE	BUSINESS PHONE	HOME PHONE	CELL PHONE

EMERGENCY VENDORS	
SPILL CLEAN UP COMPANY	
ADDRESS:	
PHONE NUMBERS REGULAR and AFTER HOURS NUMBERS:	

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

CHEMICAL TYPE SURVEY Check 1 Box for Each Category				
CHEMICAL TYPE	**SPECIFIED QUANTITY**	**HAVE AT OR ABOVE SPECIFIED QUANTITY**	**HAVE BUT BELOW SPECIFIED QUANTITY**	**DO NOT HAVE**
CLASS 1				
Explosives & Blasting Agents (Not including Class C Explosives)	Any Quantity	☐	☐	☐
CLASS 2				
Poison Gas	Any Quantity	☐	☐	☐
Flammable Gas	100 gal. Water Capacity	☐	☐	☐
Non-Flammable Gas	100 gal. water capacity	☐	☐	☐
CLASS 3				
Flammable Liquid	1000 gallons	☐	☐	☐
Combustible Liquid	10,000 gallons	☐	☐	☐
CLASS 4				
Flammable Solid (Dangerous when wet)	100 lbs.	☐	☐	☐
Flammable solid	500 lbs.	☐	☐	☐
Spontaneously Combustible Material	100 lbs	☐	☐	☐
CLASS 5				
Oxidizer	500 lbs	☐	☐	☐
Organic Peroxide	250 lbs	☐	☐	☐
CLASS 6				
Poison	500 lbs	☐	☐	☐
Irritating Material: Liquid	1000 gallons	☐	☐	☐
Irritating Material: Solid	500 lbs	☐	☐	☐
CLASS 7				
Radioactive Material (Yellow III Label)	Any Quantity	☐	☐	☐
CLASS 8				
Corrosives: Liquid	1000 gallons	☐	☐	☐
Corrosives: Solid	500 lbs	☐	☐	☐
NO DOT CATEGORY				
Known Human Carcinogen	Any Category	☐	☐	☐

The Michigan Occupational Safety and Health Act (MIOSHA) requires that the Department of Public Safety prepare and disseminate to our Officers a plan for executing the department's responsibilities with respect to each site within the City of Kalamazoo where hazardous chemicals are used or produced. There are no exemptions based on the quantity of chemicals at the site. The purpose of the act is to ensure firefighter safety.

KALAMAZOO DEPARTMENT OF PUBLIC SAFETY
RIGHT TO KNOW QUESTIONAIRE

HAZARDOUS CHEMICAL DEFINITIONS

Carcinogen – A chemical is considered to be a carcinogen if: 1) it has been evaluated by the International Agency for Research on Cancer (IARC) and found to be a carcinogen or potential carcinogen; or 2) it is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition), or 3) it is regulated by OSHA as a carcinogen.

Combustible liquid – Any liquid having a flashpoint at or above 100 degrees F (37.8 degrees C), but below 300 degrees F (93.3 degrees C), or higher, the total volume of which make up 99 percent or more of the volume of the mixture.

Corrosive (liquid and solid) – Any liquid or solid that causes visible destruction or irreversible damage to human skin tissue. Also, it may be a liquid that has a severe corrosion rate on steel.

Explosives and blasting agent (not including Class C explosives) – "Explosive" means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high pressure. "Blasting Agent" means a material designed for blasting. It must be insensitive that there is very little probability of: 1) accidental explosion, or 2) going from burning to detonation.

Flammable liquid – Any liquid having a flashpoint below 100 degrees F (37.8 C), except any mixture having components with flashpoints of 100 degrees F (37.8 C) or higher, the total of which makes up 99 percent or more of the total volume of the mixture.

Flammable gas – A gas that can burn with the evolution of heat and a flame. Flammable compressed gas is any compressed gas of which: 1) a mixture of 13 percent or less (by volume) with air is flammable, or 2) the flammable range with air is under 12 percent.

Flammable solid – A solid, other that a blasting agent, or explosive, that is liable to cause fire through friction, absorption or moisture, spontaneous chemical change, or retained hear from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.

Flammable solid (dangerous when wet) – - Water Reactive Material (Solid) - Any solid substance (including sludges and pastes) which react with water by igniting or giving off dangerous quantities of flammable or toxic gases. (Sec.171.8).

Irritating material - liquid and solid - A liquid or solid substance which, upon contact with fire or air, gives off dangerous or intensely irritating fumes.

Non-flammable gas - Any compressed gas other than a flammable compressed gas.

Organic peroxide - An organic compound that contains the bivalent -0-0 structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer - A chemical that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases. Example being: chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily.

Poison (Less dangerous poisons, toxic) - substances, liquid or solids (including pastes and semi- solids) so toxic to man that they are a hazard to health during transportation.

Poison gas (Extremely dangerous poisons, highly toxic poisonous gases or liquids) - a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life.

Radioactive material (yellow 111 label) - Any material, or combination of materials, that spontaneously gives off ionizing radiation.

Spontaneously combustible material (Solid) - A solid substance (including sludge's and pastes) which may undergo spontaneous heating or self-burning under normal transportation conditions. These materials may increase in temperature and ignite when exposed to air.

THE CITY OF Kalamazoo

CHEMICAL INVENTORY AND STORAGE FORM
PART 2

DRINKING WATER PROTECTION QUESTIONNAIRE

Please summarize the activities at this site, including principal products or services provided:

_____

_____

Please check the corresponding box if your facility has prepared any of the following:
☐ Pollution Incident Pollution Plan (PIPP)
☐ Risk Management Program/Plan (RMP)
☐ Spill Prevention Control and Countermeasures Plan (SPCC)
☐ Storm Water Pollution Prevention Plan (SWPPP)
☐ Hazardous Waste Contingency Plan (HWCP)
☐ Other Spill Contingency Plan, please explain.

Please check the corresponding box if your facility has prepared or is designated as any of the following:
☐ Listed as a Part 201 Site under Act 451
☐ Listed as a Part 213, Leaking Underground Storage Tank, Site under Act 451
☐ Baseline Environmental Assessment
☐ Due Care Plan
☐ Other known release of a regulated substance or ongoing contamination, please explain.

Kalamazoo's wellhead protection ordinance (No. 1825) defines the following as Regulated Substances:

1. Substances for which there is a materials safety data sheet (MSDS), and the MSDS cites possible health hazards
2. Hazardous Waste, as defined by the Resource Conservation and Recovery Act (RCRA) of 1976
3. Hazardous Substance, as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
4. Radiological materials
5. Biohazards

EXAMPLES OF REGULATED SUBSTANCES INCLUDE

A. PETROLEUM PRODUCTS Examples: Gasoline, Motor Oil, Heating Oil, Diesel, Used Oil
B. RADIOLOGICAL MATERIALS Common Uses: Gas Chromatography, Scientific Research, Gauges, Manufacturing, Medicine
C. INORGANIC COMPOUNDS (Metals, Metal Compounds and certain Acids and Bases) Examples: Chromium, Arsenic, Cyanide, Nitrate, Hydrochloric Acid, Sodium Hydroxide
D. FERTILIZERS, PESTICIDES, AND OTHER SYNTHETIC ORGANIC COMPOUNDS Examples: 10-10-10, Ammonium nitrate, Atrazine, Carbofuran, Simazine, Bone Meal
E. VOLATILE ORGANIC COMPOUNDS (VOCs) Examples: Paints, Varnish, Solvents, Thinners, Adhesives,
F. SALT Examples: Calcium Chloride, Sodium Chloride, Sand/Salt Mixtures

Do you use or store regulated substances onsite?

◯ **Yes** ◯ **No**

If you answered "no" to this question, you do not need to complete page 5 of the questionnaire.

DRINKING WATER PROTECTION QUESTIONNAIRE

Please check any boxes that describe the activities that occur at your property.

Commercial

- ☐ Analytical and clinical laboratories
- ☐ Animal feedlots
- ☐ Auto washes
- ☐ Boat builders/refinishers
- ☐ Car rental and service stations/automotive repair
- ☐ Commercial establishments with fleets of trucks and cars
- ☐ Concrete/asphalt/coal/tar companies
- ☐ Drum recycling and cleaning
- ☐ Dry cleaners and laundries
- ☐ Equipment repair
- ☐ Food processors/meat packers/slaughter houses
- ☐ Fuel oil distributors/stores
- ☐ Furniture stripping or refinishing
- ☐ Gas stations
- ☐ Junk and salvage yards
- ☐ Motor vehicle repair/service shops
- ☐ Pesticide application services/pesticide stores/retailers
- ☐ Petroleum bulk storage (wholesale)
- ☐ Photographic development
- ☐ Printing
- ☐ Salvage yards/impoundment lots
- ☐ Truck or rail tanker cleaning
- ☐ Wood preserving and treatment

Manufacturing

- ☐ Chemical, paint, and plastics manufacturing
- ☐ Furniture manufacturing
- ☐ Metal manufacturing (including metal plating)
- ☐ Mining operations/injection wells
- ☐ Other manufacturing (textiles, rubber, glass, etc.)
- ☐ Pulp and paper industry

Transportation

- ☐ Airport maintenance/fueling areas
- ☐ Governmental agencies with fleets of trucks and cars
- ☐ Salt piles/sand-salt piles
- ☐ Trucking/bus terminals
- ☐ Vehicle maintenance operations (transportation/trucking, contractors/construction, auto dealers)

Utilities

- ☐ Aboveground oil pipelines
- ☐ Electric power generation substations

Waste Disposal

- ☐ Landfills/dumps/transfer stations

If you store regulated substances onsite, please summarize the security measures at this site, including fencing, lighting, and flow valves (are they locked when not in use?):

DRINKING WATER PROTECTION QUESTIONNAIRE

REGULATED SUBSTANCES INVENTORY – INDOOR STORAGE AREAS

Our priority is to inventory materials stored in aggregate quantities greater than 55 gallons or 440 pounds. Aggregate quantity means the total storage amount of each material onsite, regardless of container size.

If your facility stores any regulated substances in <u>INDOOR</u> storage areas onsite, please list the specific types of materials below.

Material Name *(Chemical or Brand)*	Material Use	Container Type[1]	Container Material	Max. Quantity Stored Onsite (with Units)	Are floor drains present in storage area? If yes, are they connected to sanitary sewer, storm sewer, or other?		Containers properly labeled?	How often is the area inspected?	Are walls and floors impervious? Please list material.
Example: **Hydraulic oil**	**Lubricant**	**Drum**	**Steel**	**55 Gallons**	☐ Yes ☑ No		**Yes**	**Weekly**	**Yes, concrete**
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				
					☐ Yes ☐ No				

[1] Examples: aboveground storage tank (AST), underground storage tank (UST), drum, bags, bottles, pails.

DRINKING WATER PROTECTION QUESTIONNAIRE

REGULATED SUBSTANCES INVENTORY – OUTDOOR STORAGE AREAS

Our priority is to inventory materials stored in aggregate quantities greater than 55 gallons or 440 pounds. Aggregate quantity means the total storage amount of each material onsite, regardless of container size.

If your facility stores any regulates substances in <u>OUTDOOR</u> storage areas onsite, please list the specific types of materials below.

Material Name *(Chemical or Brand)*	Material Use	Storage Container Type[1]	Storage Container Material	Max. Quantity Stored Onsite (with Units)	Secondary containment structure present? If yes, describe containment, including material and size.		How often is the area inspected?	Is the storage area covered?
Example: **Diesel**	**Truck Fuel**	**AST**	**Steel**	**500 Gallons**	☑ Yes ☐ No	**Concrete dike, 750 gallons**	**Weekly**	**Yes**
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			
					☐ Yes ☐ No			

[1] Examples: aboveground storage tank (AST), underground storage tank (UST), drum, bags, bottles, pails.

APPENDIX F

Water Resources Public Education
&
Outreach Summary:

October 2018 through December 2023

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Colleagues International Wastewater & Drinking Water Protection Presentation to members of African nations		10/2/2018	Professionals/Engineers in Planning, Development, Water Resources, Sanitation, Irrigation, Environment, Hydrogeology, Journalism	20
Groundwater Protection Message Notepads	20		Professionals/Engineers	
Groundwater Protection Key Chains	20		Professionals/Engineers	
Water Drop "stress ball" figure	20		Professionals/Engineers	
Kalamazoo Water System & Water Resources Presentation		10/2/2018	Milwood Neighborhood Association	25
Common Questions About Your Water Quality - AWWA	15			
Consumer Confidence Reports	15			
MDEQ / AWWA Fall Regional Meeting		10/3/2018	City of Parchment PFAS Project Presentation	100
Industry Day, Tour KWRP & Wellhead Protection Presentation		11/7/2018	Industrial Waste Water Users	40
Groundwater Protection Message Notepads	20		Professionals/Engineers	
Common Questions About Your Water Quality - AWWA	20		Professionals/Engineers	
Household Water Conservation Brochures	25		Professionals/Engineers	
Cross Connection Brochure	17		Professionals/Engineers	
Protect Groundwater Keychains	15		Professionals/Engineers	
Kalamazoo Water Bottles	22		Professionals/Engineers	
Groundwater Simulator Demonstration	17		Professionals/Engineers	
Arcadia Elementary School Girl Scout Troop		11/7/2018	Brownie Troop	12
Tour of Central Water Pumping Station	12		Instructors & Students	
Groundwater Simulator Demonstration	12		Instructors & Students	
Groundwater Protection Message Notepads	12		Instructors & Students	
Groundwater Protection Key Chains	4		Instructors & Students	
Water Drop "stress ball" figure	12		Instructors & Students	
Groundwater Protection Magnets	12		Instructors & Students	
Common Questions About Your Water Quality Brochure	4		Instructors & Students	
Our World of Water Activity Book	16		Instructors & Students	
Water Conservation Animal Sticker	8		Instructors & Students	
Groundwater Protection Pencils with Erasers	8		Instructors & Students	
Big Brothers Big Sisters, Tour KWRP & Wellhead Protection Presentation		12/12/2018	Program Participants	12
Tour of KWRP and Water Presentation	12		Children and Sponsors	
Water Cycle Cards	4		Children and Sponsors	
Groundwater Protection Message Notepads	12		Children and Sponsors	
Kalamazoo Water Bottles	6		Children and Sponsors	
Kalamazoo Lanyards	12		Children and Sponsors	
Groundwater Protection Magnets	12		Children and Sponsors	
Kalamazoo Water Plastic Hardhats	3		Children and Sponsors	
MDOT Better Roads, Cleaner Streams	6		Children and Sponsors	
Protect Groundwater Coasters	6		Children and Sponsors	
Stormwater Education Sponges	6		Children and Sponsors	
Groundwater Protection Pencils with Erasers	6		Children and Sponsors	
Kalamazoo Regional Educational Service Agency, Education of the Arts Class, Kalamazoo Central High School		12/19/2018	Teacher and Students	12
Groundwater Protection Mechanical Pencils	11		Teacher and Students	
PFAS EPA Fact Sheets	29		Teacher and Students	
Household Guide to Water Conservation Brochure	15		Teacher and Students	
Hazardous Houselhold Waste Disposal Brochure	15		Teacher and Students	
Loy Norrix High School-Speecial Needs, Tour KWRP & Wellhead Protection Presentation		1/18/2019	Teacher, Parents and Students	11
Tour of KWRP and Water Presentation	11		Teacher, Parents and Students	
Groundwater Protection Pencils with Erasers	11		Teacher, Parents and Students	
Groundwater Protection Message Notepads	11		Teacher, Parents and Students	
Kalamazoo Water Bottles	11		Teacher, Parents and Students	
Let's Learn About Drinking Water Brochure	11		Teacher, Parents and Students	
Groundwater Protection Magnets	11		Teacher, Parents and Students	
Groundwater Basics	11		Teacher, Parents and Students	
The Montessori School, Tour KWRP & Wellhead Protection Presentation		2/25/2019	Teacher, Parents and Students	17
Tour of KWRP and Water Presentation	17		Teacher, Parents and Students	
Groundwater Protection Pencils with Erasers	17		Teacher, Parents and Students	
Groundwater Protection Message Notepads	17		Teacher, Parents and Students	
Kalamazoo Water Bottles	17		Teacher, Parents and Students	
Let's Learn About Drinking Water Brochure	17		Teacher, Parents and Students	
Groundwater Protection Magnets	17		Teacher, Parents and Students	
Groundwater Basics	17		Teacher, Parents and Students	
Water Cycle Bookmarks	17		Teacher, Parents and Students	
Animal & Gecko Save the Water Stickers	34		Teacher, Parents and Students	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Western Mich. Univ., Tour KWRP/ Presentation		4/11/2019	Teacher and Students	17
Tour of KWRP and Water Presentation	17		Teacher and Students	
Groundwater Protection Message Notepads	17		Teacher and Students	
Household Guide to Water Conservation Brochure	7		Teacher and Students	
Groundwater Protection Key Chains	13		Teacher and Students	
Common Questions About Your Water Quality Brochure	7		Teacher and Students	
Backflow Prevention Brochures (AWWA)	5		Teacher and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	7		Teacher and Students	
Earth Day Celebration at Bronson Park, Kalamazoo		4/20/2019	Public	Hundreds
Common Questions About Your Water Quality Brochure	50		Public	
Splash Activity Books	50		Public	
Groundwater Protection Magnets	50		Public	
Groundwater Protection Pencils with Erasers	50		Public	
Protect Groundwater Coasters	75		Public	
Water Conservation Animal Sticker Sheets	100		Public	
Household Water Conservation Brochures	50		Public	
Backflow Prevention Brochures (AWWA)	50		Public	
Loy Norrix High School-Special Needs, Tour KWRP & Wellhead Protection Presentation		5/9/2019	Teacher, Parents and Students	18
Tour of KWRP and Water Presentation	18		Teacher, Parents and Students	
Groundwater Protection Pencils with Erasers	18		Teacher, Parents and Students	
Groundwater Protection Message Notepads	18		Teacher, Parents and Students	
Household Water Conservation Brochures	18		Teacher, Parents and Students	
Kalamazoo Water Bottles	20		Teacher, Parents and Students	
The Surprising Story of Stormwater Activity Books	18		Teacher, Parents and Students	
Groundwater Protection Magnets	18		Teacher, Parents and Students	
Water Cycle Bookmarks	18		Teacher, Parents and Students	
Stormwater Education Sponges	18			
COK Public Services Week / Tours		5/13/19 Week	Public	100
Tour of KWRP and Water Presentation	27		Public	
Tour of Central Water Pumping Station/Groundwater Simulator Demo	21		Public	
Enviroscape Model Demonstration	24		Public	
Common Questions About Your Water Quality Brochure	60		Public	
The Wonderful World of Water Activity Book	60		Public	
The Surprising Story of Stormwater Activity Books	60		Public	
Household Water Conservation Brochures	60		Public	
Groundwater Protection Message Notepads	60		Public	
Splash Activity Books	60		Public	
Water Conservation Animal Sticker	60		Public	
Groundwater Protection Magnets	60		Public	
Protect Stormwater Keychains	60		Public	
Backflow Prevention Brochures (AWWA)	60		Public	
Groundwater Protection Pencils with Erasers	60		Public	
Stormwater Education Sponges	60		Public	
Groundwater Basics Brochure (AWWA)	60		Public	
Toothbrush Cover Antibacterial	60		Public	
Loy Norrix High School-Summer Water Research Class, Tour KWRP & Wellhead Protection Presentation		5/16/2019	Teachers and Students	11
Tour of KWRP and Water Presentation	11		Teachers and Students	
Careers in the Water Industry	11		Teachers and Students	
24-Hour Water Pollution HOTLINE IDEP	11		Teachers and Students	
Groundwater Protection Magnets	11		Teachers and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	11		Teachers and Students	
Groundwater Basics Brochures	11		Teachers and Students	
The Wonderful World of Water Activity Book	11		Teachers and Students	
The Surprising Story of Stormwater Activity Books	11		Teachers and Students	
Groundwater Protection Message Notepads	11		Teachers and Students	
Household Water Conservation Brochures	11		Teachers and Students	
Kalamazoo Water Bottles	11		Teachers and Students	
Protect Stormwater Keychains	11		Teachers and Students	
Groundwater Protection Pencils with Erasers	11		Teachers and Students	
Toothbrush Cover Antibacterial	11		Teachers and Students	
Stormwater Education Sponges	11		Teachers and Students	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
KAMSC High School Class, Tour KWRP & Wellhead Protection Presentation		5/18/2019	Teachers and Students	11
Tour of KWRP and Water Presentation	12		Teachers and Students	
Careers in the Water Industry	12		Teachers and Students	
The Wonderful World of Water Activity Book	12		Teachers and Students	
The Surprising Story of Stormwater Activity Books	112		Teachers and Students	
Groundwater Protection Magnets	12		Teachers and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	12		Teachers and Students	
Groundwater Protection Message Notepads	12		Teachers and Students	
Household Water Conservation Brochures	12		Teachers and Students	
Kalamazoo Water Bottles	12		Teachers and Students	
Protect Stormwater Keychains	12		Teachers and Students	
Groundwater Basics Brochures	12		Teachers and Students	
Toothbrush Cover Antibacterial	11		Teachers and Students	
Stormwater Education Sponges	12		Teachers and Students	
Kalamazoo College Epidemiology Class, Tour KWRP & Wellhead Protection Presentation		5/21/2019	Teachers and Students	30
Tour of KWRP and Water Presentation	30		Teachers and Students	
Careers in the Water Industry	2		Teachers and Students	
The Wonderful World of Water Activity Book	3		Teachers and Students	
The Surprising Story of Stormwater Activity Books	3		Teachers and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	8		Teachers and Students	
Cross Connection Brochure	5		Professionals/Engineers	
Groundwater Protection Message Notepads	6		Teachers and Students	
Household Water Conservation Brochures	10		Teachers and Students	
Protect Stormwater Keychains	18		Teachers and Students	
Groundwater Protection Magnets	30		Teachers and Students	
Groundwater Basics Brochures	20		Teachers and Students	
Pocket Frisbee	13		Teachers and Students	
Toothbrush Cover Antibacterial	29		Teachers and Students	
Stormwater Education Sponges	7		Teachers and Students	
Merze Tate Travel Club, Tour Central Water Treatment & Groundwater Model Presentation		6/15/2019	Teacher and Students	22
Tour of Central Water Treatment Plant	22		Teacher and Students	
Groundwater Protection Pencils with Erasers	22		Teacher and Students	
The Wonderful World of Water Activity Book	22		Teacher and Students	
The Surprising Story of Stormwater Activity Books	22		Teacher and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	22		Teacher and Students	
2017 Water Quality Reports-CCRs	22		Teacher and Students	
Groundwater Protection Message Notepads	22		Teacher and Students	
Household Water Conservation Brochures	22		Teacher and Students	
Protect Stormwater Keychains	22		Teacher and Students	
Groundwater Protection Magnets	22		Teacher and Students	
Groundwater Basics Brochures	22		Teacher and Students	
Toothbrush Cover Antibacterial	22		Teacher and Students	
Stormwater Education Sponges	22		Teacher and Students	
KAMSE Class, Tour KWRP & Wellhead Protection Presentation		7/11/2019	Teacher and Students	22
Tour of Central Water Treatment Plant	7		Teacher and Students	
Groundwater Protection Pencils with Erasers	7		Teacher and Students	
The Wonderful World of Water Activity Book	7		Teacher and Students	
The Surprising Story of Stormwater Activity Books	7		Teacher and Students	
Kalamazoo Water Bottles	7		Teacher and Students	
2017 Water Quality Reports-CCRs	7		Teacher and Students	
Groundwater Basics Brochures	7		Teacher and Students	
Household Water Conservation Brochures	7		Teacher and Students	
Animal & Gecko Save the Water Stickers	7		Teacher and Students	
Groundwater Protection Magnets	7		Teacher and Students	
Toothbrush Cover Antibacterial	7		Teacher and Students	
Stormwater Education Sponges	7		Teacher and Students	
Girl Scout Troops, Stormwater & Wellhead Protection Presentation		8/6/2019	Scouts & Leaders	37
Enviroscape Model Presentation	37		Scouts & Leaders	
Groundwater Protection Pencils with Erasers	35		Scouts & Leaders	
The Wonderful World of Water Activity Book	35		Scouts & Leaders	
The Surprising Story of Stormwater Activity Books	35		Scouts & Leaders	
Groundwater Protection Message Notepads	35		Scouts & Leaders	
Stormwater Bookmarkers	35		Scouts & Leaders	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
WMUK Radio Interview at Station 4 - Wellhead Protection Presentation		8/20/2019	Radio Host with Local Citizen, Radio Listeners	Hundreds
Tour of Station 4 Artesian Wellfield	2		Radio Host & Local Citizen	
Groundwater Protection Pencils with Erasers	2		Radio Host & Local Citizen	
Groundwater Basics Brochures	2		Radio Host & Local Citizen	
Household Water Conservation Brochures	2		Radio Host & Local Citizen	
Groundwater Protection Magnets	2		Radio Host & Local Citizen	
Kalamazoo Lanyards	2		Radio Host & Local Citizen	
Toothbrush Cover Antibacterial	2		Radio Host & Local Citizen	
Stormwater Education Sponges	2		Radio Host & Local Citizen	
Kanoe the Kazoo (River) - Wellhead Protection Outreach		9/14/2019	Participants - Public and City Employees	45
Brown Water, Green Weeds (non-point source pollution)	35		Participants	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	35		Participants	
Common Questions About Your Water Quality Brochure	45		Participants	
Household Water Conservation Brochures	45		Participants	
Protect Stormwater Keychains	50		Participants	
Groundwater Protection Message Notepads	50		Participants	
Stormwater Education Sponges	35		Participants	
Threads Church, Tour KWRP & Wellhead Protection Presentation		9/21/2019	Adult and Children Participants	40
Tour of KWRP and Water Presentation	40		Participants	
Careers in the Water Industry	40		Participants	
The Wonderful World of Water Activity Book	20		Participants	
The Surprising Story of Stormwater Activity Books	20		Participants	
Groundwater Protection Magnets	40		Participants	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	20		Participants	
Groundwater Protection Message Notepads	40		Participants	
Household Water Conservation Brochures	40		Participants	
Kalamazoo Water Bottles	40		Participants	
Protect Stormwater Keychains	40		Participants	
Groundwater Basics Brochures	40		Participants	
Toothbrush Cover Antibacterial	20		Participants	
Stormwater Education Sponges	20		Participants	
Social Media Educational Ads (LKF Marketing) (trial Aug.-Sept. 2018, start 1/1/19)		Ongoing	Internet users - City/LKF Marketing Project	Thousands
Radio Educational Ads (Townsquare Media) (with City of Battle Creek 2011 to 2017)		Ongoing	Radio listeners of 89.1, 96.5 and 102.5 (previously 103.3 FM and 107.7 FM)	Thousands
Handouts during Industry Inspections (Cross-connections, Common Water Questions)		Ongoing	Industrial Uses	Hundreds
Continuation of 30-second pre-movie and theater lobby water ads		Ongoing	Movie goers at Kal. 10, Portage 10 and Celebration Cinema	50,000 monthly
Metro Bus Placard Educational Ads		Ongoing	Gen. Public in Kalamazoo Metropolitan Area	Thousands
www.protectyourwater.net - Major Technology Upgrades in 2015 & 2019		Ongoing	Internet users - City/LKF Marketing Project	Thousands

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. Attendees
Homeschool Group, Presentation via Kalamazoo River Watershed Council		10/2/2019	High School and Elementary Students	20
Enviroscape Model Presentation	20		Participants	
The Surprising Story of Stormwater Activity Books	10		Participants	
Stormwater Education Sponges	10		Participants	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	20		Participants	
Groundwater Protection Pencils with Erasers	15		Participants	
Water Conservation Animal Sticker	15		Participants	
MDOT Better Roads, Cleaner Streams	20		Participants	
Stormwater Bookmarkers	10		Participants	
Michigan American Water Works Association - Presentation on integration of wellhead protection & stormwater protection		10/28/2019	High School and Elementary Students	60
Professional Attendees	~60		Attendees	
The Montessori School, Presentation via Kalamazoo River Watershed Council		2/5/2020	Elementary Students	19
Enviroscape Model Presentation	19		Participants	
The Surprising Story of Stormwater Activity Books	19		Participants	
Stormwater Education Sponges	19		Participants	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	19		Participants	
Groundwater Protection Pencils with Erasers	19		Participants	
Water Conservation Animal Sticker	19		Participants	
MDOT Better Roads, Cleaner Streams	19		Participants	
Stormwater Bookmarkers	19		Participants	
City of Parchment - Loaned Four Stormwater Educational Videos for Employee NPDES Training		7/29/2020	City Employees	7
Pollution Prevention, Illicit Discharge Detection, Spills and Skills, and Stormwatch videos	7		City Employees	
Public Services, Middle School Wellhead Protection Presentation		8/27/2020	Students	5
Tour of Central Water Treatment Plant	5		Students	
Groundwater Protection Pencils with Erasers	5		Students	
The Wonderful World of Water Activity Book	5		Students	
The Surprising Story of Stormwater Activity Books	5		Students	
Kalamazoo Water Bottles	5		Students	
2017 Water Quality Reports-CCRs	5		Students	
Groundwater Basics Brochures	5		Students	
Household Water Conservation Brochures	5		Students	
Animal & Gecko Save the Water Stickers	5		Students	
Groundwater Protection Magnets	5		Students	
Toothbrush Cover Antibacterial	5		Students	
Stormwater Education Sponges	5		Students	

Kalamazoo Valley Community College - Loaned Four Stormwater Educational Videos for Employee NPDES Training		10/15/2020	Maintenance Employees	5
Pollution Prevention, Illicit Discharge Detection, Spills and Skills, and Stormwatch videos	5		Maintenance Employees	
City of Galesburg - Loaned Four Stormwater Educational Videos for Employee NPDES Training		11/25/2020	City Employees	3
Pollution Prevention, Illicit Discharge Detection, Spills and Skills, and Stormwatch videos	3		City Employees	
City of Vicksburg - Loaned Four Stormwater Educational Videos for Employee NPDES Training		12/9/2020	City Employees	4
Pollution Prevention, Illicit Discharge Detection, Spills and Skills, and Stormwatch videos	4		City Employees	
City of Kalamazoo - Four Stormwater Educational Videos for Employee NPDES Training		1/29/2021	City Employees	1
Pollution Prevention, Illicit Discharge Detection, Spills and Skills, and Stormwatch videos	1		City Employees	
Western Michigan University - Online Water Resources & Wastewater Presentation, and Spring Valley Lake Wellfield Field Trip		3/19/2021	Students	16
Three online presentations: Water Distution System, Wellfield Hydrogeology, and Wastewater Treatment.	16		Students	
Freemont Elementary, Battle Creek - in Collaboration with City of Kalamazoo (Environscape)		2/6/2021	Students	45
Groundwater Protection Pencils with Erasers	45		Students	
The Wonderful World of Water Activity Book	45		Students	
Groundwater Protection Magnets	45		Students	
Toothbrush Cover Antibacterial	45		Students	
Stormwater Education Sponges	45		Students	
Public Services, Wellhead Protection Committee Presentation		5/20/2021	Members	10
Tour of Al Sabo Well Pumping Station #24	10		Members	
2020 Water Quality Reports-CCRs	10		Members	
Groundwater Basics Brochures	10		Members	
Household Water Conservation Brochures	10		Members	
Protect Groundwater Coasters	10		Members	
Groundwater Protection Magnets	10		Members	
Toothbrush Cover Antibacterial	10		Members	
Stormwater Education Sponges	10		Members	
Tour of Al Sabo Well Pumping Station #24	10		Members	

Public Services, NPDES Annual Stormwater Staff Training - Point & Non-Point Sources		6/14 to 7/8/2021	City of Kalamazoo Employees	89
City of Kalamazoo Annual Stormwater Training, June - July 2021	89		Employees	
Farmers Market, Battle Creek - in Collaboration with City of Kalamazoo (Environscape)		7/14/2021	Citizens	60
Enviroscape presentations	60		Citizens	
Farmers Market, Kalamazoo - in Collaboration with City of Battle Creek (Stormwater Wheel)		7/31/2021	Citizens	198
Enviroscape presentations	198		Citizens	
Groundwater Basics Brochures	30		Citizens	
Household Water Conservation Brochures	24		Citizens	
Splash Coloring Books	25		Citizens	
Groundwater Protection Pencils with Erasers	39		Citizens	
Protect Groundwater Coasters	27		Citizens	
Groundwater Protection Message Notepads	40		Citizens	
The Wonderful World of Water Activity Book	15		Citizens	
Water Conservation Animal Stickers, etc.	50		Citizens	
Douglass Community Association Annual Fun Night		8/5/2021	Citizens	60
Toothbrush Cover Antibacterial	40		Citizens	
Let's Learn about Drinking Water Brochure	40		Citizens	
Kalamazoo Water Bottles filled with the other materials given away	40		Citizens	
Groundwater Protection Pencils with Erasers	40		Citizens	
Groundwater Protection Message Notepads	40		Citizens	
Water Conservation Animal Stickers, etc.	40		Citizens	
Douglass Community Association Annual Fun Night		8/6/2021	Citizens	56
Toothbrush Cover Antibacterial	40		Citizens	
Let's Learn about Drinking Water Brochure	40		Citizens	
Kalamazoo Water Bottles filled with the other materials given away	40		Citizens	
Groundwater Protection Pencils with Erasers	40		Citizens	
Groundwater Protection Message Notepads	40		Citizens	
Water Conservation Animal Stickers, etc.	40		Citizens	
Girl Scouts, Kalamazoo - Water Week Camp		7/31/2021	Teacher and Students	37
Enviroscape presentations	37		Teacher and Students	
Groundwater / Drinking Water PowerPoint presentation	37		Teacher and Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	32		Teacher and Students	
Toothbrush Cover Antibacterial	34		Teacher and Students	
Water Cycle Acitivy Page	20		Teacher and Students	
Fish and Water Coloring Page	20		Teacher and Students	
Save Water Coloring Book	20		Teacher and Students	
Splash Coloring Books	34		Teacher and Students	
Groundwater Protection Pencils with Erasers	33		Teacher and Students	
Common Questions About Your Water Quality Brochure	32		Teacher and Students	
Let's Learn about Drinking Water Brochure	32		Teacher and Students	
Groundwater Protection Magnets	34		Teacher and Students	
The Wonderful World of Water Activity Book	20		Teacher and Students	
Water Conservation Animal Stickers, etc.	34		Teacher and Students	

Kanoe the Kazoo (River) - Wellhead Protection Outreach		9/11/2021	Participants	37
Enviroscape presentations	37		Participants	
Groundwater / Drinking Water PowerPoint presentation	37		Participants	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	32		Participants	
Toothbrush Cover Antibacterial	34		Participants	
Water Cycle Acitivy Page	20		Participants	
Fish and Water Coloring Page	20		Participants	
Save Water Coloring Book	20		Participants	
Splash Coloring Books	34		Participants	
Groundwater Protection Pencils with Erasers	33		Participants	
Common Questions About Your Water Quality Brochure	32		Participants	
Let's Learn about Drinking Water Brochure	32		Participants	
Groundwater Protection Magnets	34		Participants	
The Wonderful World of Water Activity Book	20		Participants	
Water Conservation Animal Stickers, etc.	34		Participants	
Wellfield #24 Birchwood Neighborhood Presentation& Trail Walk - Wellhead Protection Outreach		9/17/2021	Birchwood Neighborhood	17
Tour of Al Sabo Well Pumping Station #24	17		Neighbors	
Groundwater / Drinking Water Presentation	17		Neighbors	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	17		Neighbors	
Household Water Conservation Brochures	17		Neighbors	
Common Questions About Your Water Quality Brochure	17		Neighbors	
Backflow Prevention	17		Neighbors	
Protect Stormwater Keychains	17		Neighbors	
Groundwater Protection Message Notepads	17		Neighbors	
Protect Groundwater Coasters	17		Neighbors	
Groundwater Protection Magnets	17		Neighbors	
Farmers Market, Kalamazoo - in Collaboration with City of Battle Creek (Stormwater Wheel)		10/23/2021	Citizens	33
Enviroscape presentations	33		Citizens	
Save Water Coloring Book	4		Citizens	
Household Water Conservation Brochures	9		Citizens	
Splash Coloring Books	3		Citizens	
Groundwater Protection Pencils with Erasers	7		Citizens	
Protect Groundwater Coasters	6		Citizens	
Groundwater Protection Message Notepads	7		Citizens	
The Wonderful World of Water Activity Book	4		Citizens	
Water Conservation Animal Stickers, etc.	10		Citizens	

COVID 19 Quarantine - all presentations suspended March 2020 to June 2021 except for education outreach through radio, movies, social media and website efforts	Ongoing	See below	See below
Social Media Educational Ads (Townsquare Media Oct. 2019 to present; LKF Marketing Aug.-Sept. 2019)	Ongoing	Internet users - City/TSM Marketing Project	> 80,000 impressions monthly
Facebook & Instagram (Oct. 2019 to present; Townsquare Interactive)	Ongoing	Internet users - City/TSI Marketing Project	215,000 monthly times; 152,000 unique individual people; 522 engagements
Radio Educational Ads (Townsquare Media) (with City of Battle Creek 2011 to 2017, 2019-2021)	Ongoing	Radio listeners of 103.3 FM, 107.7 FM, and 102.5 FM (previously 89.1, 96.5)	thousands monthly
Handouts during Industry Inspections (Cross-connections, Common Water Questions)	Ongoing	Industrial Uses	hundreds yearly
Continuation of 15-second & 30-second pre-movie, theater lobby and online streaming video ads (National CineMedia)	Ongoing	Movie goers at Kalamazoo 10, Portage Street 10 and Celebration Cinema	50,000 monthly
www.protectyourwater.net (Timesquare Interactive) 2001-present) - Major Technology Upgrades in 2015 & 2019	Ongoing	Internet users - City/TMS Marketing Project	> 1000 monthly
Wellhead Protection Signage at Water Pumping Station #24, Al Sabo Preserve	2020-21	Public Bikers and Hikers	hundreds monthly
Metro Bus Placard Educational Ads	2003-2020	Gen. Public in Kalamazoo Metropolitan Area	thousands yearly

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
The Montessori School Online Presentation		1/21/2022	Students Ages 6 to 12	55
Enviroscape presentations	55		Students	
Stormwater Bookmarkers	55		Students	
Groundwater Protection Magnets	55		Students	
Water Conservation Animal Stickers, etc.	55		Students	
Groundwater Protection Pencils with Erasers	55		Students	
Kalamazoo Area Math & Science Center		2/16/2022	High School Students	20
Presentations and Wastewater Treatment Plant Tour	20		Students	
Toothbrush Cover Antibacterial	8		Students	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	9		Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	7		Students	
Household Water Conservation Brochures	8		Students	
Common Questions About Your Water Quality Brochure	5		Students	
Groundwater Protection Message Notepads	7		Students	
MDOT Better Roads, Cleaner Streams	7		Students	
Kalamazoo Regional Educational Service Agency (KRESA)		5/26/2022	High School Students	11
Presentations and Awards to High School Video Contest Winners	6		Students	
Protect Stormwater Keychains	6		Students	
Groundwater Protection Message Notepads	6		Students	
Groundwater Protection Magnets	6		Students	
Household Water Conservation Brochures	6		Students	
Common Questions About Your Water Quality Brochure	6		Students	
Groundwater Protection Message Notepads	6		Students	
City of Kalamazoo Lanyard	6		Students	
Groundwater Protection Pencils with Erasers	6		Students	
Great Lakes Water Infrastructure Conference		5/10/2022	Conference Attendees	~50
Wellhead Protection - Educational Outreach Strategy Presentation	~50		Conference Attendees	
Public Services, Wellhead Protection & NPDES Annual Stormwater Staff Training - Point & Non-Point Sources		6/21/2022	City of Kalamazoo Employees	85
City of Kalamazoo Annual Training, June 2022	85		Employees	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
COVID 19 Quarantine - all presentations suspended March 2020 to April 2022 except for education outreach through radio, movies, social media and website efforts		Ongoing	See below	See below
Social Media Educational Ads (Townsquare Media Oct. 2019 to present; LKF Marketing Aug.-Sept. 2019)		Ongoing	Internet users - City/TSM Marketing Project	> 80,000 impressions monthly
Facebook & Instagram (Oct. 2019 to present; Townsquare Interactive)		Ongoing	Internet users - City/TSI Marketing Project	215,000 monthly times; 152,000 unique individual people; 522 engagements
Radio Educational Ads (Townsquare Media) (with City of Battle Creek 2011 to 2017, 2019-present)		Ongoing	Radio listeners of 103.3 FM, 107.7 FM, and 102.5 FM (previously 89.1, 96.5)	thousands monthly
Handouts during Industry Inspections (Cross-Connections, Common Water Questions)		Ongoing	Industrial Uses	hundreds yearly
Continuation of 15-second & 30-second pre-movie, theater lobby and online streaming video ads (National CineMedia) 2008 to present		Ongoing	Movie goers at Kalamazoo 10, Portage Street 10 and Celebration Cinema	50,000 monthly
www.protectyourwater.net (Timesquare Interactive) 2001-present) - Major Technology Upgrades in 2015 & 2019		Ongoing	Internet users - City/TMS Marketing Project	> 1000 monthly
Wellhead Protection signage/trail mapping at Water Pumping Station #24, Al Sabo Preserve; and Station 25, Campbell Lake		2020-22	Public Bikers and Hikers	hundreds monthly
Metro Bus Placard Educational Ads		2003-2020	Gen. Public in Kalamazoo Metropolitan Area	thousands yearly

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Farmers Market, Kalamazoo - in Collaboration with City of Battle Creek (Stormwater Wheel)		6/25/2022	Citizens	124
Enviroscape presentations	~80		Citizens	
2021 Water Quality Reports-CCRs	13		Citizens	
Household Water Conservation Brochures	9		Citizens	
Splash Coloring Books	7		Citizens	
Groundwater Basics Brochures	7		Citizens	
Toothbrush Cover Antibacterial	10		Citizens	
Groundwater Protection Pencils with Erasers	16		Citizens	
Protect Stormwater Keychains	7		Citizens	
Various brochures	5		Citizens	
Groundwater Protection Message Notepads	7		Citizens	
The Wonderful World of Water Activity Book	5		Citizens	
Water Conservation Animal Stickers, etc.	many		Citizens	
Girl Scouts of Kalamazoo Presentation		7/12/2022	High School Students	11
Common Questions About Your Water Quality Brochure	21		Students	
Protect Stormwater Keychains	21		Students	
Toothbrush Cover Antibacterial	21		Students	
Groundwater Protection Message Notepads	21		Students	
Groundwater Protection Magnets	21		Students	
Household Water Conservation Brochures	21		Students	
Stormwater Education Sponges	21		Students	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	21		Students	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	21		Students	
Groundwater Basics Brochures	21		Students	
Use Phosphorus Free Fertilizer	21		Students	
Backflow Prevention Brochure	21		Students	
Groundwater Protection Pencils with Erasers	21		Students	
2022 International Visitor Leadership Program		7/13/2022	International	7
Tour of Central Water Pumping Station/Groundwater Simulator Demo	7		Participants	
Kalamazoo Water Bottles	7		Participants	
Kalamazoo Lanyards	7		Participants	
Groundwater Protection Magnets	7		Participants	
Kalamazoo Water Plastic Hardhats	7		Participants	
MDOT Better Roads, Cleaner Streams	7		Participants	
Protect Groundwater Coasters	7		Participants	
Stormwater Education Sponges	7		Participants	
Household Water Conservation Brochures	7		Participants	
Groundwater Protection Pencils with Erasers	7		Participants	
Protect Groundwater Coasters	7		Participants	
Groundwater Protection Message Notepads	7		Participants	
The Wonderful World of Water Activity Book	7		Participants	
Water Conservation Animal Stickers, etc.	7		Participants	
Girl Scouts, Kalamazoo - Water Week Camp		8/12/2022	Teacher and Students	36
Pesentation/Tour of Water Pumping Station 4/Enviroscape Demo	36		Participants	
Stormwater Bookmarkers	32		Participants	
Our World of Water Activity Book	14		Participants	
Groundwater Protection Magnets	32		Participants	
Splash Activity Books	4		Participants	
Let's Learn about Drinking Water Brochure	32		Participants	
Groundwater Protection Pencils with Erasers	32		Participants	
Groundwater Protection Message Notepads	32		Participants	
The Wonderful World of Water Activity Book	14		Participants	
Water Conservation Animal Stickers, etc.	32		Participants	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Farmers Market, Kalamazoo - in Collaboration with City of Battle Creek (Stormwater Wheel)		7/30/2022	Citizens	165
Enviroscape presentations	~75		Citizens	
Save Water Coloring Book	7		Citizens	
Toothbrush Cover Antibacterial	11		Citizens	
Protect Stormwater Keychains	1		Citizens	
Splash Activity Books	6		Citizens	
Groundwater Protection Message Notepads	1		Citizens	
Groundwater Protection Pencils with Erasers	8		Citizens	
2021 COK Water Quality Report	5		Citizens	
Crayon Packs	10		Citizens	
Farmers Market, Kalamazoo - in Collaboration with City of Battle Creek (Stormwater Wheel)		8/25/2022	Citizens	31
Enviroscape presentations	~25		Citizens	
Save Water Coloring Book	3		Citizens	
Common Questions About Your Water Quality Brochure	3		Citizens	
Let's Learn about Drinking Water Brochure	1		Citizens	
Groundwater Basics Brochures	2		Citizens	
Toothbrush Cover Antibacterial	4		Citizens	
Groundwater Protection Pencils with Erasers	8		Citizens	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	2		Citizens	
Phosphorus TMDL for Lake Allegan & The Kalamazoo Rivershed	2		Citizens	
Groundwater Protection Message Notepads	9		Citizens	
The Wonderful World of Water Activity Book	5		Citizens	
Backflow Prevention Brochure	1		Citizens	
Pocket Frisbee	8		Citizens	
Crayon Packs	6		Citizens	
Water Pool-Ooza Event, Grand Rapids Technical Center		3/11/2023	Participants	~50
Groundwater Simulator Demostration	36		Participants	
Human Water Cycle Bracelet Activity	16		Participants	
Protect Groundwater Coasters	8		Participants	
Groundwater Basics Brochures	4		Participants	
Groundwater Protection Pencils with Erasers	9		Participants	
Groundwater Foundation Wordsearch	3		Participants	
Water Conservation Animal Stickers, etc.	12		Participants	
Groundwater Foundation Coloring Sheets	7		Participants	
Crayon Packs	7		Participants	
Wellhead Protection Committee - Water Treatment Tour		4/1/2023	Members	18
Groundwater Simulator Demostration	18		Members	
Protect Stormwater Keychains	18		Members	
Kalamazoo County Administration - Water Treatment Tour		4/6/2023	Administrators	3
Groundwater Simulator Demostration	3		Administrators	
Protect Stormwater Keychains	3		Administrators	
Kalamazoo College, Nature & Society - Water Treatment Tour		4/27/2023	Participants	28
Groundwater Simulator Demostration	28		Students	
2022 COK Water Quality Report	28		Students	
Protect Groundwater Coasters	28		Students	
Pocket Frisbee	28		Students	
Groundwater Protection Magnets	28		Students	
Groundwater Protection Message Notepads	28		Students	
Backflow Prevention Brochure	28		Students	
Careers in the Water Industry	28		Students	
Household Water Conservation Brochures	28		Students	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
COK Public Services Week		5/22/23 Week	Public	~250
Tour of KWRP and Water Presentation	50		Public	
Tour of Central Water Pumping Station	35		Public	
Groundwater Simulator Demostration	65		Public	
Common Questions About Your Water Quality Brochure	25		Public	
Careers in the Water Industry	25		Students	
Our World of Water Activity Book	25		Public	
Groundwater Protection Erasers	40		Public	
Groundwater Protection Message Notepads	50		Public	
Splash Activity Books	35		Public	
Enviroscape presentations	60		Public	
Human Water Cycle Bracelet Activity	55		Public	
Water Conservation Animal Sticker	70		Public	
Backflow Prevention Brochures (AWWA)	20		Public	
Groundwater Protection Pencils with Erasers	20		Public	
Groundwater Basics Brochure (AWWA)	15		Public	
Rain Gauges	75		Public	
Farmers Market, Kalamazoo		6/11/2023	Citizens	72
Enviroscape presentations	50		Citizens	
Awesome Aquifer presentation	25		Citizens	
Human Water Cycle Bracelet Activity	35		Citizens	
Groundwater Basics Brochures	30		Citizens	
Household Water Conservation Brochures	15		Citizens	
Common Questions About Your Water Quality Brochure	12		Citizens	
Careers in the Water Industry	20		Citizens	
Splash Coloring Books	25		Citizens	
Water Conservation Animal Sticker	27		Citizens	
Groundwater Protection Message Notepads	40		Citizens	
The Wonderful World of Water Activity Book	22		Citizens	
Rain Gauges	42		Citizens	
Science Adventure Camp, Charlotte		6/20/2023	Students & Councilors	40
Enviroscape presentations	40		Students & Councilors	
Human Water Cycle Bracelet Activity	40		Students & Councilors	
Stormwater Bingo Activity	40		Students & Councilors	
Aquifer Coloring Diagrams & Water Resources Word Search	15		Students & Councilors	
Splash Coloring Books	10		Students & Councilors	
Water Conservation Animal Sticker	32		Students & Councilors	
Groundwater Protection Magnets	31		Students & Councilors	
The Wonderful World of Water Activity Book	11		Students & Councilors	
Pocket Frisbee	25		Students & Councilors	
Girl Scouts, Kalamazoo - Water Week Camp		7/18/2023	Teachers & Students	26
Enviroscape presentations	26		Teachers & Students	
Human Water Cycle Bracelet Activity	~10		Teachers & Students	
Stormwater Bingo Activity	26		Teachers & Students	
Stormwater or Water Cycle Bookmarkers	26		Teachers & Students	
Splash Coloring Books	11		Teachers & Students	
Water Conservation Animal Sticker	26		Teachers & Students	
Groundwater Protection Magnets	26		Teachers & Students	
Water Drop "stress ball" figure	5		Teachers & Students	
Pocket Frisbee	2		Teachers & Students	
Protect Groundwater Notepads	26		Teachers & Students	
The Surprising Story of Stormwater Activity Books	15		Teachers & Students	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Farmers Market, Kalamazoo		7/27/2023	Citizens	36
Awesome Aquifer Presentation	~10		Citizens	
The Surprising Story of Stormwater Activity Books	4		Citizens	
Human Water Cycle Bracelet Activity	~10		Citizens	
Pick a Duck from the Pond Activity	~10		Citizens	
2022 COK Water Quality Report	2		Citizens	
Pocket Frisbee	1		Citizens	
The Surprising Story of Stormwater Activity Books	5		Citizens	
Rain Gauges	8		Citizens	
Milwood Neighborhood Assoc. - Water Resource Presentation		8/8/2023	Public	15
2022 COK Water Quality Report	15		Public	
Common Questions About Your Water Quality Brochure	15		Public	
Protect Groundwater Coasters	5		Public	
Backflow Preventors	5		Public	
Groundwater Basics Brochure (AWWA)	15		Public	
Rain Gauges	15		Public	
Farmers Market, Kalamazoo		8/12/2023	Citizens	76
Enviroscape presentations	~20		Citizens	
Groundwater Basics Brochure (AWWA)	2		Citizens	
Human Water Cycle Bracelet Activity	~20		Citizens	
2022 COK Water Quality Report	3		Citizens	
Pocket Frisbee	10		Citizens	
Splash Coloring Books	7		Citizens	
Pick a Duck from the Pond Activity	~20		Citizens	
Common Questions About Your Water Quality Brochure	5		Citizens	
The Wonderful World of Water Activity Book	1		Citizens	
Rain Gauges	12		Citizens	
Crayon Packs	7			
Westnedge Hill Neighborhood Assoc. - Water Resource Presentation		9/20/23	City Commissioner & Public	2
Let's Learn about Drinking Water Brochure	2		Public	
Keep Your Lawn Green and Your Water Clean! Don't Guess, Soil Test!	2		Public	
Protect Groundwater Notepads	2		Public	
Groundwater Protection Magnets	2		Public	
Protect Groundwater Coasters	2		Public	
Water Conservation Animal Sticker	2		Public	
Backflow Preventors	2		Public	
Groundwater Basics Brochure (AWWA)	2		Public	
Rain Gauges	2		Public	
Kalamazoo Valley Community College - Water Resource Presentation		10/5/23	Teacher & Students	16
Groundwater Simulator Demostration	16		Public	
2022 COK Water Quality Report	15		Public	
Protect Groundwater Notepads	15		Public	
Groundwater Protection Magnets	15		Public	
Protect Groundwater Coasters	15		Public	
Water Conservation Animal Sticker	15		Public	
Careers in the Water Industry	15		Public	
MDOT Better Roads, Cleaner Streams	15		Public	
Groundwater Basics Brochure (AWWA)	15		Public	
Rain Gauges	15		Public	

Water Resources Public Education & Outreach Summary

Item	Quantity	Date	Event or Location	No. in Attendance
Social Media Educational Ads (Townsquare Media Oct. 2019 to present; LKF Marketing Aug.-Sept. 2019)		Ongoing	Internet users - City/TSM Marketing Project	> 80,000 impressions monthly
Facebook & Instagram (Oct. 2019 to present; Townsquare Interactive)		Ongoing	Internet users - City/TSI Marketing Project	215,000 monthly times; 152,000 unique individual people; 522 engagements
Radio Educational Ads (Townsquare Media) (with City of Battle Creek 2011 to 2017, 2019-present)		Ongoing	Radio listeners of 103.3 FM, 107.7 FM, and 102.5 FM (previously 89.1, 96.5)	thousands monthly
Handouts during Industry Inspections (Cross-Connections, Common Water Questions)		Ongoing	Industrial Uses	hundreds yearly
Continuation of 15-second & 30-second pre-movie, theater lobby and online streaming video ads (National CineMedia) 2008 to present		Ongoing	Movie goers at Kalamazoo 10, Portage Street 10 and Celebration Cinema	50,000 monthly
www.protectyourwater.net (Timesquare Interactive) 2001-present) - Major Technology Upgrades in 2015 & 2019; KSWG webpage 2021 to present		Ongoing	Internet users - City/TMS Marketing Project	> 1000 monthly
Wellhead Protection signage/trail mapping at Water Pumping Station #24, Al Sabo Preserve; and Station #25, Campbell Lake		2020-23	Public Bikers and Hikers	hundreds monthly
Metro Bus Placard Educational Ads		2003-2020	Gen. Public in Kalamazoo Metropolitan Area	thousands yearly

APPENDIX G

Analytical/Metrics Reports

January through March 2024

CITY OF KALAMAZOO
WELLHEAD PROTECTION DELIVERABLES

Deliverable 1 – Radio Ad Campaign

Deliverables 2 & 3 – Protect Your Water Website Routine Operations and Maintenance Updates, Social Media Outreach and Links to Radio Ads

Deliverables 4 – Social Media Mobile Targeting for Website / Radio, and Facebook and YouTube Ads

Deliverable 5 – Programmatic Audio Ads (Spotify)

Deliverable 6 – Movie Theater and Video Contest

Deliverable 7 – Online Streaming TV (STV) Ads – Addressable Audio

Deliverable 1 – Radio Ad Campaign

Townsquare Media/Ignite created a series of "Water Quality Wednesday" (WWW) ads for Kalamazoo and Battle Creek as a special package for media branding our ongoing ads for a whole week on multiple radio stations. These ads have been added to our multimedia campaign. Topics rotate periodically and new ads are frequently added to the rotation as shown below for this quarter.

"Water Quality Wednesdays" Focused Ads & Weekly Support Ads

WWW Plumbing Leaks :30 (repeat)

Regular Ads

Water Affordability Assistance :15 and :30 (new)
Plumbing Leaks :30 (repeat)
Bells Brewery :15 (repeat)
Restaurant-Brew Pub :15 and :30 (repeat)
Best Tasting Water 2023 Winner :15 (repeat)

The takeaway from this quarter is that the "Best Tasting Water" ad did best when considering that it only ran on one station (WRKR) with only 38 commercials. Overall, the "Water Affordability" ad garnered the most visits with a total of 27 visits to the website. And, interestingly the majority share of website visits took place in the evening.

The Water Quality Week ads had the greatest percentage of engagement, with 2 of the 6 ads served on Monday alone within the 5 day schedule. These had the highest percentage of viewing at 33%. Our weekend ads, especially on Saturday, came in respectably averaging 20% (Saturday alone at 27%).

There was an approximately 5% lift in broadcast-attributed visits against total website visits, with over 1031 total website visits on days ad spots aired.

Local Targeted Display Ads

The local radio station websites display the City's targeted ads as banners online. Click-Through-Rates (CRT) indicate the Conserve Your Water ads (English and Spanish translations) and Proper Disposal of Pharmaceuticals ads resonated the most. These ads generated 21,684 interactions and 18,438 video views in Q2.

With the Industry Benchmark at .09%, the results show that the targeted display is performing well over the standard with a 74% increase!

Measurable Outcome Metrics

Please see the following pages showing the metrics for radio ads from Townsquare Media.

Radio Metrics

townsquare Analytics

TOWNSQUARE MEDIA

AD REPORT FOR CITY OF KALAMAZOO

THE CITY OF Kalamazoo

01/01/2024 to 03/31/2024

G-380444976

CREATIVE INSIGHTS

CAMPAIGN METRICS

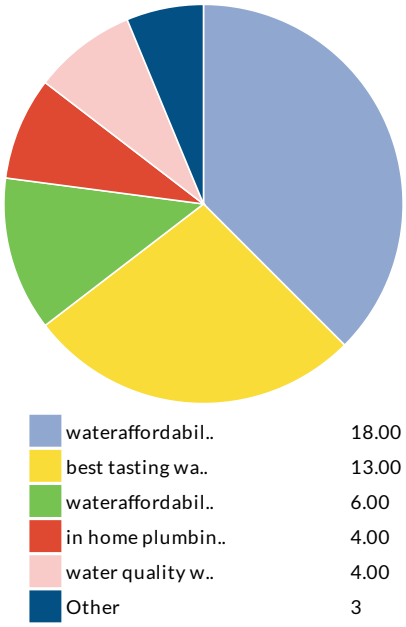
BEST TASTING WA..
TOP CREATIVE
0.34
VPA - VISITS PER AIRING™

48
TOTAL VISITS

248
TOTAL AD SPOTS

0.19
AVG VPA - VISITS PER AIRING™

CREATIVE VISITS %



CREATIVES BY NAME

Creative	Length	Ads	Share of Ads	Station(s)	Visits	Share of Visits	VPA - Visits per Airing™
best tasting water 15	15	38	15.32%	WRKR-FM	13	27.08%	0.34
wateraffordabilityprg 15	15	75	30.24%	WBXX-FM, WKFR-FM, WRKR-FM	18	37.50%	0.24
water quality wed 2024	30	24	9.68%	WBXX-FM, WKFR-FM, WRKR-FM	4	8.33%	0.17
in home plumbing/boil ord	30	25	10.08%	WKFR-FM	4	8.33%	0.16
water affordability prg24	30	24	9.68%	WBXX-FM, WKFR-FM, WRKR-FM	3	6.25%	0.13
wateraffordabilityprogram	15	62	25.00%	WBXX-FM, WRKR-FM	6	12.50%	0.10

SCHEDULE INSIGHTS - RADIO

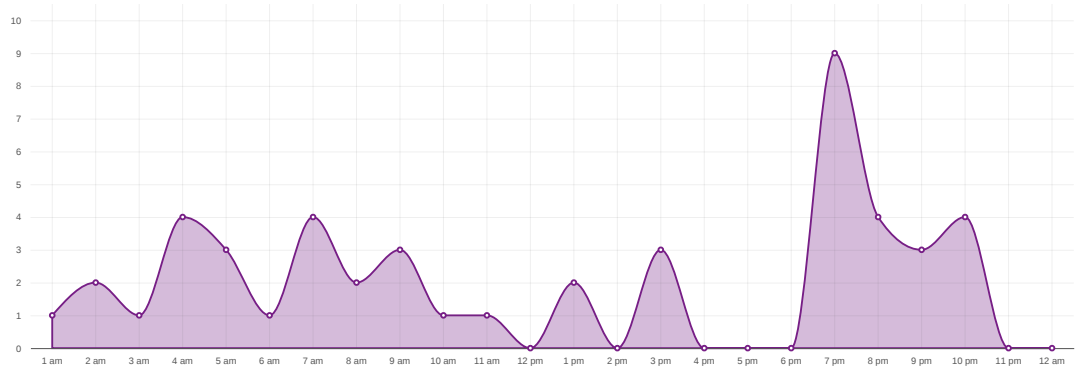
CAMPAIGN METRICS

EVENING
TOP DAYPART
0.42

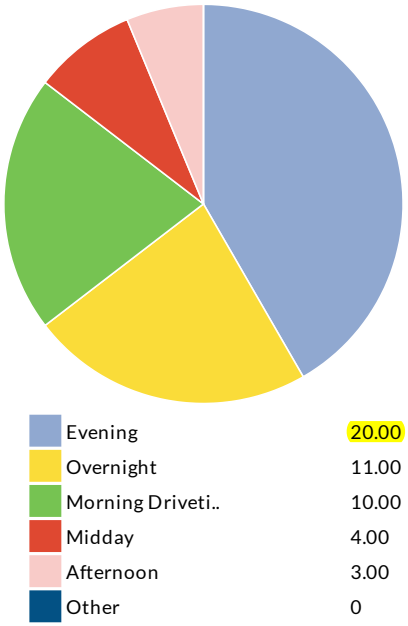
48
TOTAL RADIO VISITS

248
TOTAL AIRED SPOTS

RADIO VISITS BY DAYPART



DAYPART VISITS %



DAYPART DETAILS

Daypart	Ads	Share of Ads	Visits	Share of Visits	VPA - Visits per Airing™
Evening (7pm-Midnight)	48	19.35%	20	41.67%	0.42
Morning Drivetime (6am-10am)	61	24.60%	10	20.83%	0.16
Afternoon (3pm-7pm)	22	8.87%	3	6.25%	0.14
Overnight (Midnight-6am)	84	33.87%	11	22.92%	0.13
Midday (10am-3pm)	33	13.31%	4	8.33%	0.12

STATION DETAILS

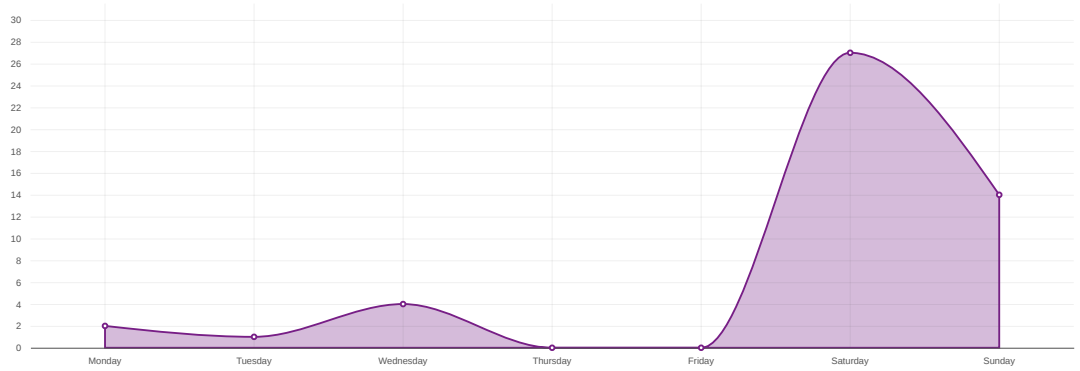
CAMPAIGN METRICS

MONDAY
DAY OF WEEK
0.33

48
TOTAL RADIO VISITS

248
TOTAL AIRED SPOTS

RADIO VISITS BY DAY OF WEEK



Stations	Market	Ads	Share of Ads	Visits	Share of Visits	VPA - Visits per Airing™
WRKR-FM	BC_Kalamazoo	116	46.77%	24	50.00%	0.21
WKFR-FM	BC_Kalamazoo	66	26.61%	14	29.17%	0.21
WBXX-FM	BC_Kalamazoo	66	26.61%	10	20.83%	0.15

Deliverables 2 & 3 – Protect Your Water Website Routine Operations and Maintenance Updates, Social Media Outreach and Links to Radio Ads

Our website had 4,631 views and an average of 1,544 views per month in our second quarter on average. The website was optimized for media approximately 100%. The website is listed in the number 1 position when viewers use search engines looking for most keywords related to drinking water information. Our radio ads and social media also direct viewers to the website and the metrics are trackable.

January through March 2024 – Our webpage rotated new videos and resources on the https://protectyourwater.net/kswg/ webpage:

- **Watershed Management**

- **Commercial, Industrial and Institutional entities can help mitigate stormwater pollution**

- **Pollution in Surface Water**

January through March 2024 – Our webpage added a new message to the home page to add the public needing help with their water bills:

Measurable Outcome Metrics

Please see the following pages showing the metrics for the website from Townsquare Interactive.

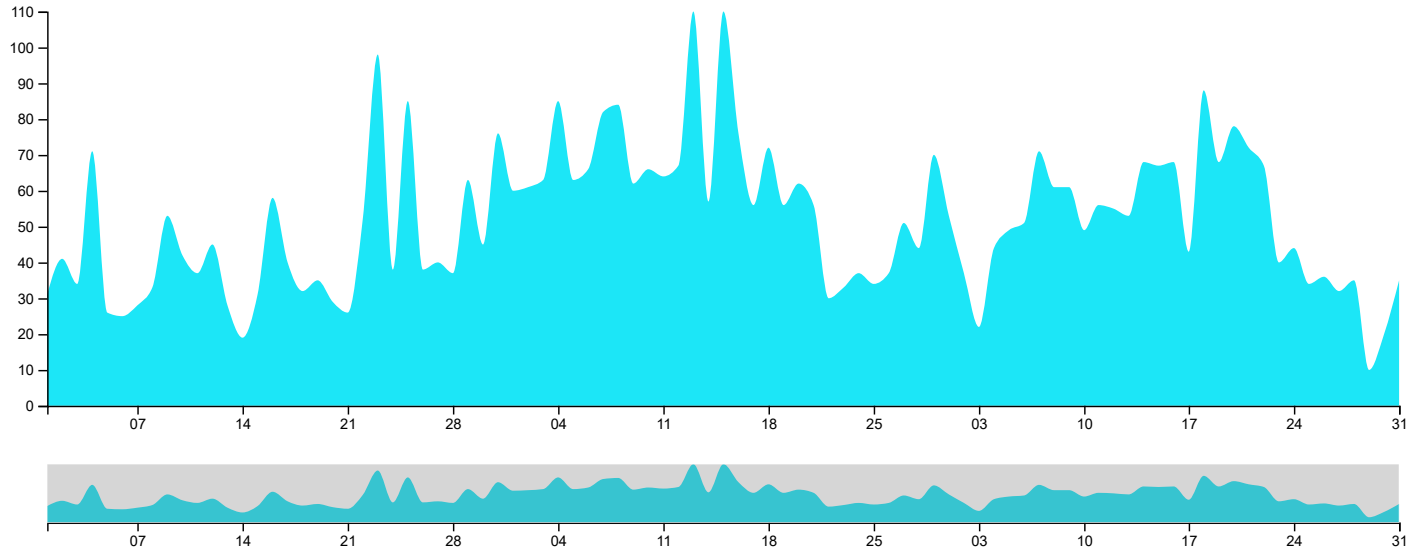
City of Kalamazoo - Water Resources Division

Website | SEO | Directory Listings | Reputation | Download PDF

01/01/2024 - 03/31/2024

Page Views

JANUARY 1 - MARCH 31, 2024



The small graph above allows you to select a range. Try it out by resizing and moving the gray box.

2	14	4	4,717	98,698
CLICKS TO CALL	CLICKS TO DIRECTIONS	FORM SUBMISSIONS	VIEWS	LIFETIME VIEWS

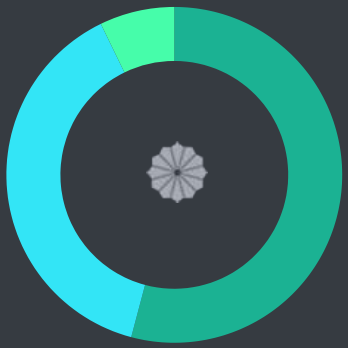
Mobile Page Views

51%

Desktop Page Views

48%

Page Views Traffic Sources



SEARCH	REFERRAL	DIRECT
38%	7%	54%

Search Engine Optimization Report

Key Phrases	Prior Rank	Current Rank
kalamazoo water resources	Page 1 (#1 Overall)	Page 1 (#4 Overall)
kalamazoo water facts	Page 1 (#2 Overall)	Page 1 (#2 Overall)
kalamazoo water quality report	Page 1 (#5 Overall)	Page 1 (#6 Overall)
groundwater safety kalamazoo mi	Page 1 (#3 Overall)	Page 1 (#2 Overall)
water quality issues kalamazoo mi	Page 1 (#8 Overall)	Page 1 (#8 Overall)
groundwater regulations kalamazoo mi	Page 1 (#1 Overall)	Page 1 (#1 Overall)
groundwater quality issues kalamazoo mi	Page 1 (#3 Overall)	Page 1 (#3 Overall)
wellhead protection kalamazoo mi	Page 1 (#1 Overall)	Page 1 (#1 Overall)
stormwater management kalamazoo mi	Page 1 (#2 Overall)	Page 1 (#1 Overall)
well abandonment kalamazoo mi	Page 1 (#1 Overall)	Page 1 (#1 Overall)
ground water kalamazoo mi	Page 1 (#2 Overall)	Page 1 (#2 Overall)
storm water kalamazoo mi	Page 1 (#2 Overall)	Page 1 (#2 Overall)
stormwater program kalamazoo mi	Page 1 (#1 Overall)	Page 1 (#1 Overall)
stormwater runoff kalamazoo mi	Page 1 (#2 Overall)	Page 1 (#2 Overall)
kalamazoo river pollution	Page 3 (#26 Overall)	Page 4 (#34 Overall)
yard waste disposal kalamazoo mi	No Results Yet	No Results Yet
pet waste disposal kalamazoo mi	Page 4 (#40 Overall)	Page 4 (#40 Overall)
kalamazoo stormwater working group	Page 1 (#1 Overall)	Page 1 (#1 Overall)
kalamazoo river drainage	Page 1 (#5 Overall)	Page 1 (#6 Overall)

Search Engine Optimization Report Guide

Search Engine Optimization

Also known as organic or natural results, SEO accounts for the search terms your audience uses when using search engines. By default, Google will return a list of 10 websites per page it believes are the most relevant to the user's search.

Listed to the right are the terms and phrases used to target your website to potential customers.

Featured on Google

In an effort to provide better search results and give their users a complete picture, Google introduced a new interactive tool called Carousel. Now, above your Google Search Bar, you will see a visual slideshow of potential results tailored to the user's original search. When you see the 'Featured by Google' badge, we're happy to report that the team effort of your business and ours has placed you within the new Google Carousel rankings.

Prior Ranking

This column provides results of the listed key phrases within the last search results scan.

Current Ranking

Deliverables 4 – Social Media Mobile Targeting for Website / Radio, and Facebook and YouTube Ads

Townsquare Media/Ignite oversees the marketing and outreach strategies of the City's website (protectyourwater.net) and other related digital media to ensure optimization and increased awareness and traffic via ads. All ads from the website, radio, Facebook and YouTube are interconnected for increased effectiveness. Approximately 40 of 80 search engines are normally utilized to achieve the metrics included. The metrics (Click-Through-Rates and Video Completion Rates) show a significant increase across the board from the previous year and continue to exceed the national average metrics.

The **Targeted Displays** ran 470,178 impressions for the "Use your property wisely" ad. This generated 3,680 clicks by viewers to go to the website, a significant increase from Q1. Due to the skippable nature of YouTube, this has a lower industry average completion rate of 51%.

YouTube was added to the City's outreach tactics and ran 25,500 impressions this quarter or 8,500 impressions per month on average. The "How to Dispose of Prescription Medications" and "Conserve Your Water ads" ran with a Video Completion Rate (VCR) of 72%. This tactic is performing well.

Facebook messaging for this quarter was successful for engagement (clicks to the website) which reflects awareness of messaging and 'likes' of the 30-second video topics "Fluoridation of Water", "Save Water", "Proper Disposal", and advertising the City's services. The featured ad was a 30-second video "True or False, Groundwater…". The total impressions delivered for three months on Facebook averaged 141,997 per month. The Click-Through-Rate was 0.05%, which is below the national average of 0.10%. The City has requested updating the campaign from impression-based awareness to website traffic (link clicks). This will drive more people to our website and increase the CTR and focus specific topics to source water protection. Next month should have a noticeable increase in performance. Age distribution was highest in the 35-to-44-year age range. Few engagements are the age range less than 35 years old.

Instagram ads are a part of the Facebook Platform and included 57,057 ads this quarter with a CTR of 0.02%. The featured ad was a 30-second video "True or False, Groundwater…".

Radio ads and corresponding **radio website banners** were also effective for those who listen and view related materials through a radio online website app. Articles, banners and other materials are viewed on the apps for each of the radio stations. In Q2 the "Safe and Reliable Water" banners were displayed. The total impressions delivered for three months on the displays averaged 35,193 per month. The Click-Through-Rate was 0.04%.

Measurable Outcome Metrics

Please see the following pages showing the metrics for media mobile targeting from Townsquare Media/Ignite.

Social Media
City of Kalamazoo
From Jan 01, 2024 **to** Mar 31, 2024

Social Media Overview of all Tactics

PulseMAX REPORT

Key Takeaways

Targeted Display: With the Industry Benchmark at .09%, we are seeing targeted display performing well over the standard… a 74% increase!

YouTube: Due to the skippable nature of YouTube, this has a lower industry average completion rate of 51%.
Your campaign is performing well above at a 72% increase (Video Click Rate)!

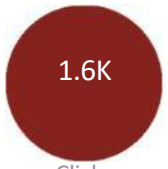
STV/CTV (Streaming TV): Compared to Jan-March 2023 at VCR% of 97.55%, we had an increase in 1Q 2024 to 98.35% . We are seeing OTT performing over the standard VCR of 95%. Your campaign is performing at a 103.5% increase over the standard.

Social/Facebook: We like to see .05% CTR, which was achieved during this quarter, outperforming the same time frame in 2023 that came in at .03%.
Optimization recommendation:
Updating campaign from impression based awareness to website traffic (link click). This will drive more people to your website and increase CTR.

Amped (Radio station website banners): We like to see a minimum of .05% CTR. Q1 2024 was above that benchmark at .08%, outperforming 1Q in 2023 by 38% that came in at .03%

Programmatic Audio: Although we came in below the 95% benchmark for Audio Completion Rate, 70% of the ads pertained to "Water Affordability" creative that may have had limited audience interest.
However, this tactic had a .13% CTR, which is uncommon for Programmatic Streaming campaigns due to the audio delivery of the ads.

Display | Overview



Display - Product Performance

Product	Impressions	Clicks	CTR(%)
Targeted Display	470,178	1,613	0.34%

Notes:

With the Industry Benchmark at .09%, we are seeing targeted display performing well over the standard… a 74% increase!

Video | Overview

139.47K	18.44K	18.45K	72%	86
Impressions	Video Starts	Video Completes	VCR	Clicks

Video - Product Performance

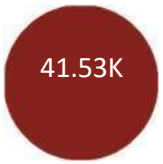
Product	Impressions	Video Completes	VCR	Clicks
YouTube	25,498	18,446	72%	2

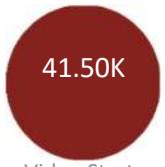
Notes:

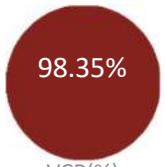
Due to the skippable nature of YouTube, this has a lower industry average completion rate of 51%.

Your campaign is performing well above at a 72% Video Click Rate.

Streaming TV (STV)/CTV | Overview







STV - Top KPIs

Product	Impressions	Video Starts	Video Completes	VCR(%)
Addressable STV	41,531	41,502	40,819	98.35%

Notes:

Compared to Jan-March 2023 at VCR% of 97.55%, we had an increase in 1Q 2024 to 98.35% .

We are seeing OTT performing over the standard VCR of 95%. Your campaign is performing at a 103.5% increase over the standard.

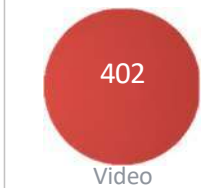
Facebook Social | Overview

Display Ad Performance

Social - Display Performance

Data Source Name	Product	Impressions	Clicks	CTR(%)
Facebook Ads	Facebook	425,987	212	0.05%

Video Ad Performance



Social - Video Performance

Data Source Name	Product	Video Start(s)	Video Complete(s)	VCR(%)
Facebook Ads	Facebook	201,083	402	0.20%

Notes:
We like to see .05% CTR, which was achieved during this quarter, outperforming Jan.-Mar. in 2023 that came in at .03%.

Optimization recommendation:

Updating campaign from impression-based awareness to website traffic (link click). This will drive more people to your website and increase CTR.

townsquare DNA

From Jan 01, 2024 **to** Mar 31, 2024

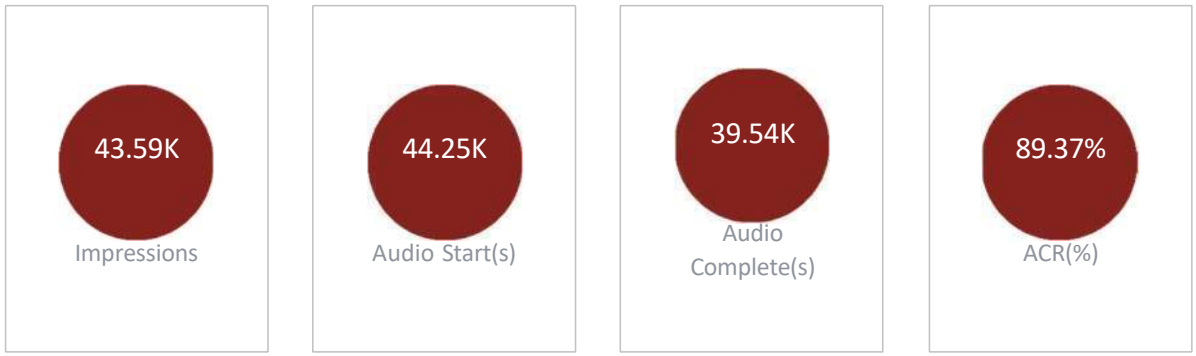
Local Display (AMPED) | Overview

Notes:
We like to see a minimum of .05% CTR, which was above that benchmark by 38% during Jan-Mar, 2024, outperforming Jan-Mar in 2023 that came in at .03%.

Local Display (AMPED) - Product Performance

Product	Impressions	Clicks	CTR
Local Targeted Display	107,701	82	0.08%

Spotify - Programmatic Audio | Overview



Notes:

Although we came in below the 95% benchmark for Audio Completion Rate, the Water Affordability spot may have a limited audience.

However, this tactic has a .13% CTR, which is uncommon for Programmatic Streaming campaigns due to the audio delivery of the ads.

Social Media Mobile Targeted Display | Overall Performance

Creative Performance

Creative Name	Impressions	Clicks	CTR(%)	Conversions
Wisely.jpg	470,178	1,613	0.34%	0

Targeted Displays

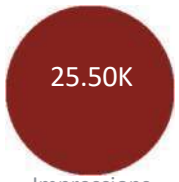
Social Media Mobile Targeted Display | Overall Performance

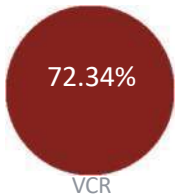
Creative Performance

Creative Name	Impressions	Clicks	CTR(%)	Conversions
Wisely.jpg	470,178	1,613	0.34%	0

YouTube

YouTube | Overview



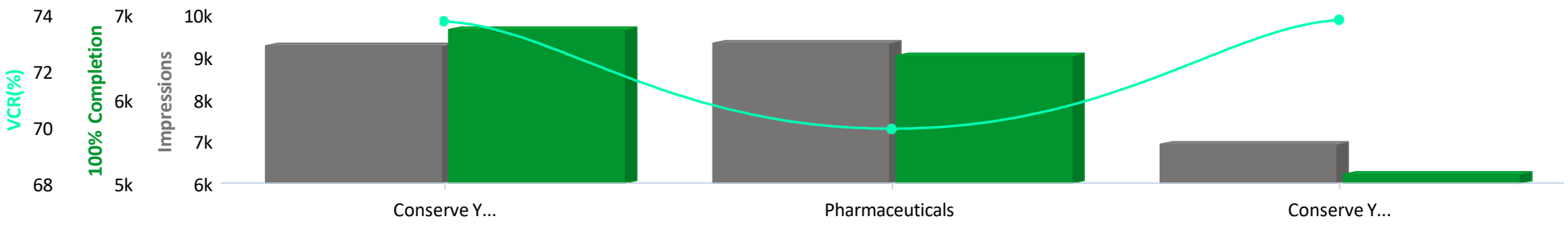


Monthly Performance

Date	Impressions	100% Completion	VCR	Clicks
Mar 2024	7,667	5,752	75.02%	1
Feb 2024	8,594	6,228	72.46%	1
Jan 2024	9,237	6,467	70.01%	0

YouTube | Creative Performance

Creative Performance



Creative Performance

Creative Name	Impressions	Video Views	25% Completion	50% Completion	75% Completion	100% Completion	VCR(%)
Conserve Your Water Video-EnglishFULL HD	9,257	6,819	8,528	7,606	7,191	6,826	73.73%
Pharmaceuticals	9,320	6,519	8,203	7,237	6,813	6,516	69.91%
Conserve Your Water Video SpanishFULL HD	6,921	5,100	6,334	5,587	5,305	5,105	73.76%

Your Monthly Facebook Report

01/01/2024 - 01/31/2024

Overview:

Welcome to your monthly report! This report gives you an overview of the content we've published on your Facebook page to help keep your brand top of mind with your target audience, along with a snapshot of how your page performed over the past month. We analyze this data to make monthly changes to your Facebook page, and optimize your posts to better target your audience and humanize your brand online.

Remember, if you have any photos, videos, specials, or events that you'd like our social media team to incorporate into the weekly content, you can send us that information and we'll create a custom post on your Facebook page!

---

142 Total Fans **0** New Fans

Your Page Had	You Reached	You Engaged
161,044 impressions	136,907 unique people	152 unique people

Your Page At-A-Glance

Your Monthly Facebook Report

02/01/2024 - 02/29/2024

Overview:

Welcome to your monthly report! This report gives you an overview of the content we've published on your Facebook page to help keep your brand top of mind with your target audience, along with a snapshot of how your page performed over the past month. We analyze this data to make monthly changes to your Facebook page, and optimize your posts to better target your audience and humanize your brand online.

Remember, if you have any photos, videos, specials, or events that you'd like our social media team to incorporate into the weekly content, you can send us that information and we'll create a custom post on your Facebook page!

---

142 Total Fans **0** New Fans

Your Page Had	You Reached	You Engaged
119,302 impressions	107,210 unique people	129 unique people

Your Page At-A-Glance

Your Monthly Facebook Report

03/01/2024 - 03/31/2024

Overview:

Welcome to your monthly report! This report gives you an overview of the content we've published on your Facebook page to help keep your brand top of mind with your target audience, along with a snapshot of how your page performed over the past month. We analyze this data to make monthly changes to your Facebook page, and optimize your posts to better target your audience and humanize your brand online.

Remember, if you have any photos, videos, specials, or events that you'd like our social media team to incorporate into the weekly content, you can send us that information and we'll create a custom post on your Facebook page!

---

142 Total Fans **0** New Fans

Your Page Had	You Reached	You Engaged
88,211 impressions	82,265 unique people	68 unique people

Your Page At-A-Glance

Sample Posts

These are examples of posts that were published to your Facebook page in the past month

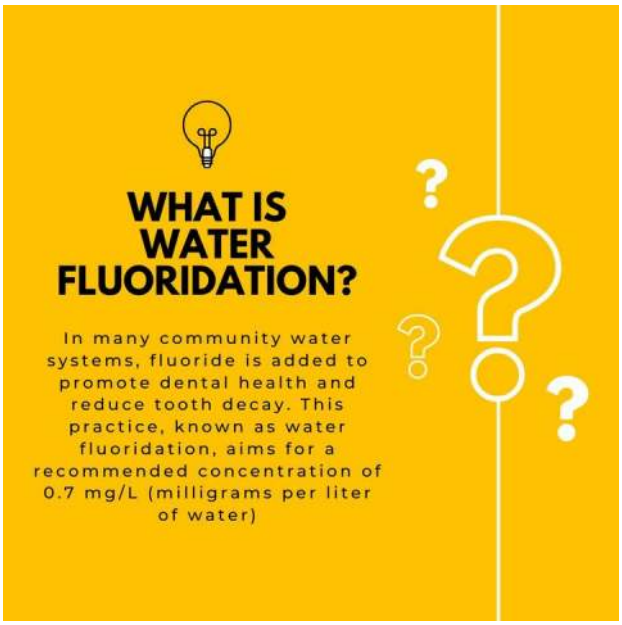
Kalamazoo - Protectyourwater.net

Got questions? We've got answers! Contact us today for all your inquiries. We're here to help.

Like · 1 · Comments · 0 · Shares · 0

Kalamazoo - Protectyourwater.net

Unlocking smiles one sip at a time! Discover the power of water fluoridation for stronger, healthier teeth.



Like · 1 · Comments · 0 · Shares · 0

Top Posts

The top performing posts that we posted on your Facebook page

Date	Post	Reach [1]	Engaged Users [2]
Mar 26th	Got questions? We've got answers! Contact us tod...	5	1
Mar 20th	Unlocking smiles one sip at a time! Discover the p...	6	1
Mar 14th	There's something for everyone on our site - Even ...	5	1
Mar 12th	You can learn all about your water at http://protec...	8	1
Mar 8th	Take a breath, is here to help you Protect Your Wa...	5	1

[1] **Reach** is the total number of views a post received.

[2] **Engaged Users** are the number of *unique* users that interacted with each post.

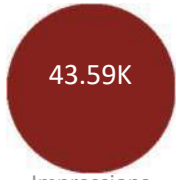
Deliverable 5 – Programmatic Audio Ads (Spotify)

The Spotify online streaming radio ads are averaging 14,530 impressions (audio ads) per month. The Q2 Audio Completion Rate (ACR) was 89%. In other words, about 89% of those that had listened to our audio ads while on Spotify, completed the entire ad. Although we came in below the 95% benchmark for Audio Completion Rate, 70% of the ads pertained to "Water Affordability" creative that may have had limited audience interest. However, this tactic had a .13% CTR, which is uncommon for Programmatic Streaming campaigns due to the audio delivery of the ads. The ads, "Best Tasting Water" and "Safe and Reliable Water" also ran this quarter. The metrics for Spotify show it remains an effective mechanism for educational outreach on wellhead protection and will be monitored for continued performance.

Measurable Outcome Metrics

Please see the following pages showing the metrics for Spotify ads from Townsquare Media/Ignite.

Spotify - Programmatic Audio | Overview



Monthly Performance

Date	Impressions	Audio Complete(s)	ACR(%)	Clicks
Jan 2024	15,292	14,286	92.42%	18
Mar 2024	14,515	13,429	90.84%	13
Feb 2024	13,785	11,826	84.45%	27

Notes:

Although we came in below the 95% benchmark for Audio Completion Rate, the Water Affordability spot may have a limited audience.

However, this tactic has a .13% CTR, which is uncommon for Programmatic Streaming campaigns due to the audio delivery of the ads.

townsquare DNA

From Jan 01, 2024 **to** Mar 31, 2024

Spotify - Programmatic Audio | Geo Performance

Geo Performance - Metro Area

Metropolitan/DMA Area	State	Impressions	Audio Completions	ACR(%)
Grand Rapids-Kalamazoo-Battle Creek MI	Michigan	43,592	39,541	89.31%

Geo Performance - City

Metropolitan/DMA Area	City	Impressions	Complete	ACR(%)
Grand Rapids-Kalamazoo-Battle Creek MI	Kalamazoo	23,975	21,622	88.59%
Grand Rapids-Kalamazoo-Battle Creek MI	Portage	8,065	7,339	89.43%
Grand Rapids-Kalamazoo-Battle Creek MI	Plainwell	2,580	2,358	91.08%
Grand Rapids-Kalamazoo-Battle Creek MI	Vicksburg	1,614	1,481	90.25%
Grand Rapids-Kalamazoo-Battle Creek MI	Richland	1,480	1,334	89.59%
Grand Rapids-Kalamazoo-Battle Creek MI	Mattawan	1,013	932	90.93%
Grand Rapids-Kalamazoo-Battle Creek MI	Otsego	1,008	895	87.92%
Grand Rapids-Kalamazoo-Battle Creek MI	Climax	877	816	91.89%
Grand Rapids-Kalamazoo-Battle Creek MI	Galesburg	732	671	90.80%
Grand Rapids-Kalamazoo-Battle Creek MI	Schoolcraft	671	620	93.94%
Grand Rapids-Kalamazoo-Battle	Augusta	604	542	86.72%

Deliverable 6 – Movie Theater and Video Contest

Movie theater ads reach the younger viewers due to the pre- and post- movie online engagement between National CineMedia (NCM) and the viewers via cell phone. NCM is displaying eleven 30-second videos in rotation in the 2 existing local movie theaters and the attendance rate remains high. In the second quarter 103,815 Video impressions were delivered in the theaters (ads per month). The impressions include On Screen and the Lobby Entertainment Network (LEN). Ads viewed in movie theaters have a high retention rate by the viewers. Attention scores in cinema are 4 to 7 times greater than all other video tactics. They are also generating the most positive and frequent viewer comments to the City of Kalamazoo.

A third theater called KP Cinemas is located in downtown Kalamazoo and opened its doors in early 2024. The City has contracted with NCM to run our videos in this third theater from March to September using non-grant funds. (This theater went bankrupt during the COVID lockdowns.)

Note: Audience attendance figures are derived from actual box office ticket sales.

The City of Kalamazoo also initiated a **Wellhead Protection Video Contest** with the high school students at the Kalamazoo Regional Educational Service Agency (KRESA). Once selected, the winning videos will run in the local theaters and on ProtectYourWater.net if they meet all of the Wellhead Protection video qualifications.

Measurable Outcome Metrics

Please see the following page showing the metrics for movie ads from NCM.

Public Services of Kalamazoo

2304-0501-001

NCM Proposal ID

Net Media Spend (Onscreen, LEN)	$16,000		
Onscreen Run Dates	1/01/2023	—	03/31/2024
LEN Run Dates	1/01/2023	—	03/31/2024
Spot Length (Seconds)	30		

103,815

Delivered Impressions Grand Total

Breakdown by Product

ONSCREEN

Product	Delivered Impressions
Segment 2 CPT	68,615
Onscreen Total	**68,615**

LEN

Product	Delivered Impressions
LEN CPT	35,200
LEN Total	**35,200**

Impression figures are derived and audited using (i) actual box office ticket sales when available from NCM's internal automated reporting system for in-theater advertising, and (ii) reported impressions for other advertising. Figures for certain dates and movies at select theaters, for which actual box office ticket sales may not be available at time of measurement, are estimated based on historical percentage of total domestic box office. Audience demographic percentages are supplied by a third party.

Deliverable 7 – Online Streaming TV Ads (STV) - Addressable Video

Townsquare Ignite is displaying ten videos in rotation in online streaming services. The online streaming of TV ads highlighted "How to Dispose of Prescription Medications" and "Conserve Your Water ads" this quarter.

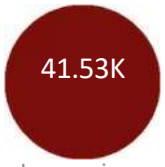
In Q2, 41,530 STV ad impressions were delivered, compared to January to March 2023 at a VCR% of 97.55%. This shows an increase in 2024 to 98.69%. "Over-the-Top platforms that deliver streamed content (OTT), however, is performing over the standard VCR of 95%, at 103.5% over the standard. The industry average Video Completion Rate (VCR) is 96.5%.

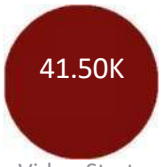
The City's campaign average VCR is 98.4%, meaning the 30-second ads were completely viewed 98.4% of the time. The Spanish audience has a slightly higher engagement rate for "Conserve Your Water" ads.

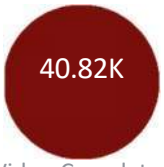
Measurable Outcome Metrics

Please see the following pages showing the metrics for movie ads from Townsquare Media/Ignite.

Streaming TV | Overall Performance







Monthly Performance

Date	Impressions	100% Completes	VCR(%)
Jan 2024	14,070	13,924	97.86%
Mar 2024	14,159	13,845	98.66%
Feb 2024	13,302	13,050	98.56%

Notes:
Streaming TV is performing above industry average of a 95% VCR.

Spanish audience has a slightly higher engagement rate (see next page).

Top performing ZIP is 49048.

Compared to Jan-March 2023 at VCR% of 97.55%, we had an increase in 1Q 2024 to 98.35% .

We are seeing OTT performing over the standard VCR of 95%. Your campaign is performing at a 103.5% increase over the standard.

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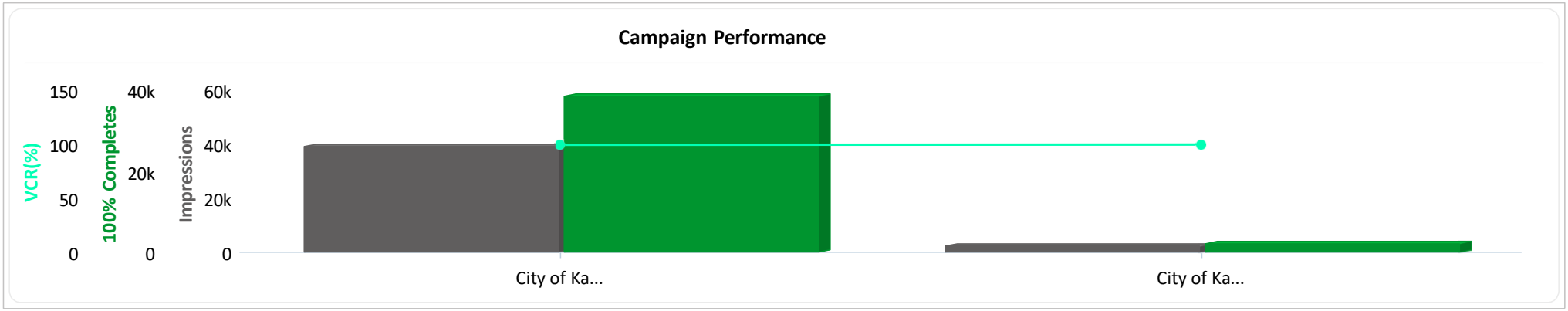
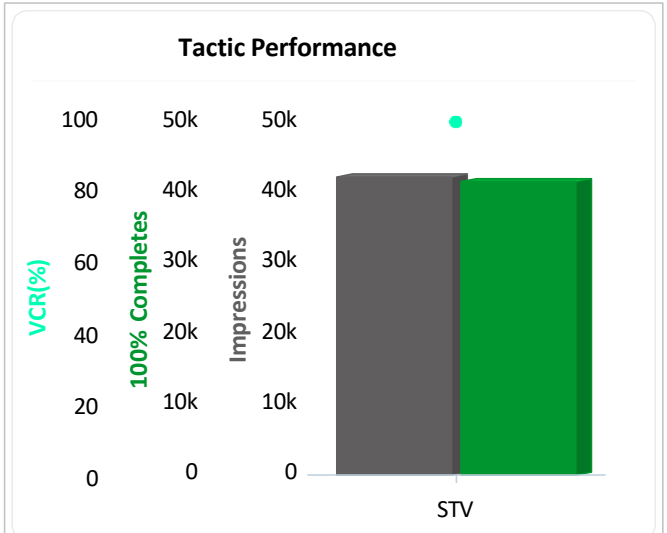
Streaming TV | Campaign Performance



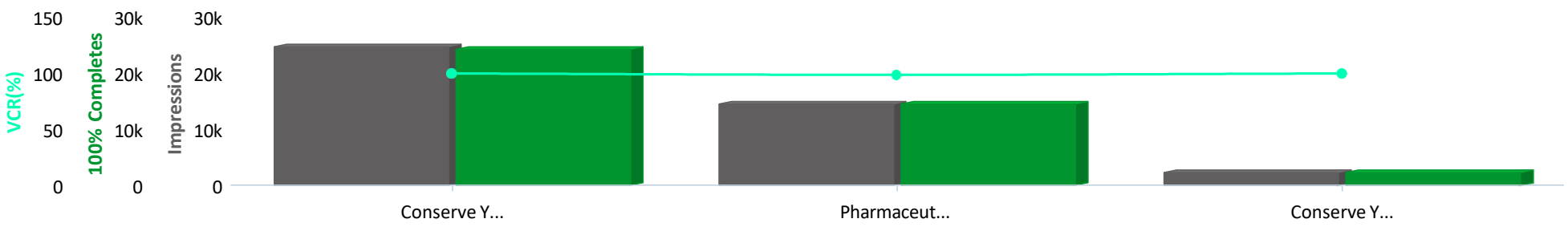
Campaign Performance

Campaign_Name	Impressions	Video Starts	50% Completes	100% Completes	VCR(%)
City of Kalamazoo_Primary_AGF-STV - English	39,287	39,287	38,892	38,623	98.35%
City of Kalamazoo_Primary_AGF-STV - Spanish	2,244	2,215	2,206	2,196	99.23%



Streaming TV | Creative Performance

Creative Performance



Creative Performance

Creative Name	Impressions	Video Starts	100% Completes	VCR(%)
Conserve Your Water Video English Full.mp4	24,753	24,607	24,256	98.57%
Pharmaceuticals ad.mp4	14,534	14,680	14,367	97.87%
Conserve Your Water Video Spanish Full.mp4	2,244	2,215	2,196	99.14%

Streaming TV | Geo Performance

Performance by State/City

State	DMA/City	Impressions	Video Complete(s)	VCR
MI	Kalamazoo	21,458	21,122	98.43
MI	Portage	4,186	4,134	98.90
MI	Plainwell	2,245	2,231	99.33
MI	Paw Paw	1,902	1,864	98.36
MI	Vicksburg	1,862	1,823	95.30
MI	Lawton	1,567	1,534	99.29
MI	Richland	1,525	1,493	98.87
MI	Mattawan	1,496	1,445	97.90
MI	Otsego	1,431	1,407	98.67
MI	Schoolcraft	868	849	98.38
MI	Galesburg	700	688	98.01
MI	Climax	556	535	96.92
MI	Scotts	549	531	97.61
MI	Augusta	456	447	98.03
MI	Martin	304	303	99.02

Geo Performance by Postal Code

DMA/City	Postal Code	Impressions	Video Complete(s)	VCR
Kalamazoo	49048-0000	3,580	3,530	99.24
Kalamazoo	49007-4628	2,340	2,288	98.37
Portage	49024-5432	2,191	2,160	99.04
Kalamazoo	49004-1574	1,741	1,709	99.30
Plainwell	49080-0000	1,639	1,634	99.39
Kalamazoo	49008-0000	1,628	1,601	98.89
Kalamazoo	49006-2268	1,297	1,265	98.06
Paw Paw	49079-9372	1,141	1,124	98.60
Kalamazoo	49007-0000	1,049	1,030	98.75
Otsego	49078-0000	1,022	1,008	98.44
Mattawan	49071-9704	912	876	97.12
Lawton	49065-0000	792	775	99.36
Richland	49083-9501	673	663	99.55
Vicksburg	49097-9301	627	618	89.70
Richland	49083-0000	579	568	99.30