

Retaining Walls

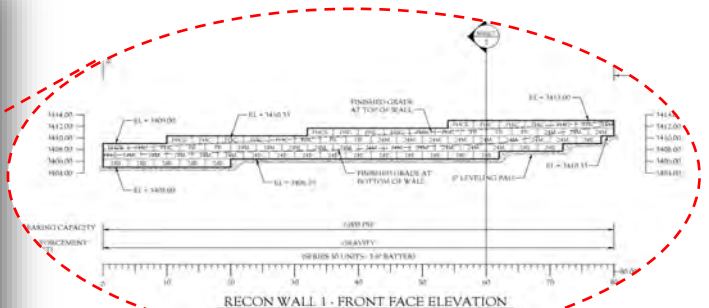
The following procedures comply with generally accepted industry standards for the installation of Precast Modular Block Retaining Walls with special attention given to the unique features of the ReCon product line. Every attempt should be made to follow these procedures unless the project specifications, drawings or the final engineered wall design directs otherwise. **Additional guidance, which should be reviewed by the contractor, is provided in the ReCon Installation Guidelines and Typical Construction Detail Drawings available at www.reconwalls.com.**

Documenting the Scope of Work

Although unrelated to the actual installation of the retaining wall, proper preparation of a quote or bid can mean the difference between a profitable project, or working hard to merely break-even. Clearly defining your scope of work during the bidding process can remove ambiguity, allow the customer to better evaluate the bid, and potentially mitigate contractor risk. To request a copy of a typical retaining wall project Scope of Work Checklist, please contact ReCon.

Preconstruction Meeting

For a project to run smoothly, it is important that all parties involved fully understand their role in the installation process. Getting the numerous sub-contractors on site to have a common understanding of the timing, coordination, sequencing, and access requirements of each trade is critical. Preconstruction meetings are a good, and often necessary, way to bring everyone together to discuss project roles and coordinate specific site activities.



Engineered Shop Drawings

For an installation contractor, having engineered shop drawings (aka: stamped plans or construction drawings) for the retaining wall, prepared by a qualified retaining wall design engineer, is an essential tool that is necessary for the proper installation of a ReCon wall. A variety of information can be obtained from the stamped plan which will guide the installer during the construction process. This information includes items such as: the proper elevation of the wall, the depth of the gravity wall blocks, the length and strength of the geogrids (if applicable), the required bearing capacity of the foundation soils, as well as the location of any curves, corners, or any structure the wall may encounter. Shop drawings can also be used to help coordinate block delivery schedules and set productivity goals for the installation crew.

Site Preparation

Before beginning work, contractors should make sure they have thoroughly studied the project specifications, the engineered shop drawings for the wall and complied with all the requirements for product submittals. Contractors should also have a clear understanding of their scope of work and their responsibilities that may be covered elsewhere in the project specifications and are not in the actual wall construction section.



For projects that do not have a formal set of grading plans or specifications, but do have engineered shop drawings, the contractor should refer to the construction procedures outlined in this manual whenever a topic is not specifically covered.

Make sure to have the retaining wall site properly surveyed and staked by a qualified surveyor. These grade stakes, and elevation hubs, will be the guide for the excavation contractor and will help the retaining wall installer determine the location of the wall. Be sure to have proper stake off-sets to avoid damaging the stakes during the installation process.

Excavation

The contractor should carefully excavate the wall construction area to the lines and grades shown on the construction drawings. Exercise caution to keep the soil undisturbed in areas that will not need modification during wall construction. Be sure to mark the location of any below ground utilities including power lines, communication lines, sewer and drainage structures, etc.



Preparing the Leveling Pad

Using the grade stakes and elevation hubs, excavate the base course trench to a minimum depth of 6-inches and to a width that extends a minimum of 6-inches in front and behind the actual location of the base blocks along their designated placement. It is suggested that a laser transit be used to establish bottom of wall elevation. If the wall layout requires either inside or outside radius curves, it is recommended to increase the width of the leveling pad to accommodate adjustment during wall alignment. Grade stakes should also show where base step-ups are located. It is important to keep in mind that each step-up causes the leveling pad location to step back by one inch due to the integral setback of the ReCon block.



Be sure to examine and test any foundation soil that appears inadequate and may not meet the bearing requirements set forth in the engineered plans.

Fill the trench and any over-excavated areas with the specified base material. Unless noted otherwise, this material should generally consist of a well-draining material that also contains enough fines that the leveling pad will hold its shape after compaction. Depending on the region, this material may be referred to as road base, $\frac{3}{4}$ -inch minus, crush-and-run, or Class 5. Fully compact the base material and add or remove material as necessary to keep the leveling pad as close to the final level grade as possible. Where step-ups are located, base material should taper up at roughly a 45-degree angle.

A concrete leveling pad may be required or desirable in lieu of a compacted granular base material. Unless the leveling pad is designed as a true strip footing that extends below frost depth, the concrete should not contain reinforcing and should consist of a relatively weak mix capable of breaking under frost pressure. This type of footing allows for resettlement as the frost dissipates. Concrete leveling pads, however, do not allow for minor adjustments to elevation or pitch once the concrete cures so it is important to take extra care to keep the pad level and any step-ups at their proper height to avoid difficulty in maintaining height tolerances.

Depending on the type of material used for the leveling pad, and how level the pad is to start with, base course leveling may be easier if the leveling pad is topped with up to $\frac{1}{2}$ -inch of clean sand or loose base course material. This increases the ability of the installer to make adjustments to block elevation, maintain a positive wall batter and minimize rotation during soil compaction when large compaction equipment is used.

Base Course Installation

The first (base) course of a ReCon wall requires the use of a **Base Block**. This block does not have a groove along the bottom, which makes for easier leveling and provides greater frictional resistance at the interface between the leveling pad and ReCon base block.



Walls should generally be built starting at the lowest elevation along the wall. However, if there are corners and/or abutting structures along the wall profile, these locations may be better places to start construction.

As base blocks are laid, ensure that they are in full contact with the leveling pad and check to confirm that the blocks are level both front-to-back and left-to-right. Lay blocks end-to-end and avoid gaps between blocks. The use of a string line will help ensure proper wall alignment along straight sections of wall. Curved base course locations can be established by using the grade stakes and a can of spray paint around the wall radius point.

Extra care should be considered for base course step-ups. Be sure to account for the 1-inch setback when establishing the next course location. If using granular material, the wedge of leveling pad material below the overlapping block must be properly compacted using a hand tamper or vibrating plate compactor. Concrete step-ups should be checked for consistent elevation from one course to the next.

After the base blocks have been placed and before compacting the backfill material behind the wall, compaction to the specified embedment depth should be done in front of the wall.

Backfilling and Compaction

When all the blocks comprising a section of wall at a single elevation have been placed, aligned and leveled, fill the pie-shaped voids between the blocks with a clean crushed rock material at least $\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch in size. Use this same material behind the back of the block to a depth of at least 1-foot or as otherwise indicated in the final engineering drawings. Because this material is generally self-compacting, this rock zone reduces the need for installers to operate compaction equipment close to the back of the blocks. In addition, this material can serve as a drainage column behind the block.

At times, a **filter fabric** may be specified behind the drainage aggregate material. This helps keep the drainage zone clean and free from sedimentation. If present, wrap the fabric forward over the drainage aggregate as the other backfill material is placed.



When **drain tile** is used, it should be located as shown in the plans or drawings. Generally, the drain tile runs along the back of the wall and is located near the bottom of the drainage aggregate zone. Drain tile should be installed at an elevation at or slightly above the finished grade level at the front of the wall, unless otherwise specified. Drain tile should daylight through the face of the wall at least every 50-feet along the length as well as at every low point in the wall, unless otherwise specified.

Place the specified backfill material and thoroughly compact the material in 8-inch lifts. Backfill material should be compacted to minimum 95% of standard proctor density. **Improper or inadequate compaction is a primary source of contractor-caused wall settlement and failures.** Close attention should be paid to changes in consistency and moisture content of all backfill material. Depending on the backfill type, it is important to use the proper type of compaction equipment. For sandy or gravelly materials, it is typical to use plate compaction equipment. Clayey materials generally require kneading by using a hand-operated jumping jack or sheep's foot roller. Only hand-operated compaction equipment shall be used within 3-feet of the back of the ReCon blocks. Large, heavy compaction equipment should be kept a minimum of 5-feet from the back of the ReCon blocks to avoid wall rotation.

Placing Additional Courses

Prior to placing successive courses, remove and keep clean any backfill material from the top of the ReCon blocks and make sure that all voids are filled with the proper drainage material. A hand-operated or backpack leaf blower makes quick work of this task. Place the next course in a running bond pattern or as otherwise shown on the engineer's detailed wall elevation. Set the upper block and **slide it forward to engage the groove with the tongue on the block below.** Check and adjust level at every course elevation.

If shimming is required, plastic shims with high compressive strength should be used. Cover as much of the low surface area as possible to achieve the desired result and to minimize any point loading.



Geogrid Placement

When a geosynthetic reinforcement (geogrid) is required, use only the type/s specified. Also, make sure the reinforcement is cut to the proper lengths as indicated on the final engineered plan. Most geogrid types are uni-axial (stronger in one direction) and ***must be laid with the manufacturer's edge perpendicular to the wall face***.

Check the manufacturer's data to insure proper orientation. The geogrid should be laid on the top of the block as near to the front face as possible and extend back over a compacted, level backfill to the length required. Sandwich the reinforcement under the next course of ReCon blocks to anchor in place. Pull the tail (loose end) of the grid taut to remove slack or wrinkles. Stake the tail of the geogrid prior to placing backfill material to maintain tension. When placing backfill over a layer of geogrid, start just behind the drainage aggregate and fill toward the tail of the geogrid. Avoid operating backfill equipment directly on the tensioned geogrid as much as possible. A minimum of 6-inches of backfill should be placed over the grid before driving any equipment on top of the grids. Avoid sharp turning and sudden braking with all types of equipment to avoid displacing, wrinkling or damaging the geogrid reinforcement.

