

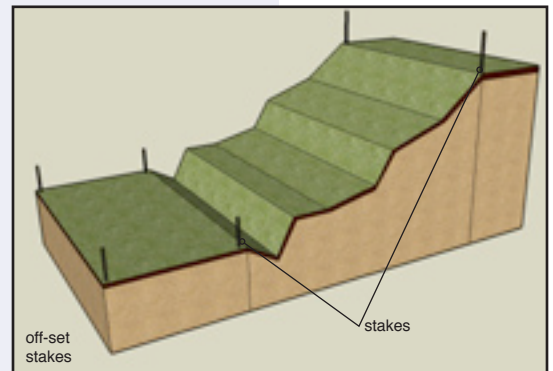
section three: INSTALLATION

section three: INSTALLATION	
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INSTALLATION

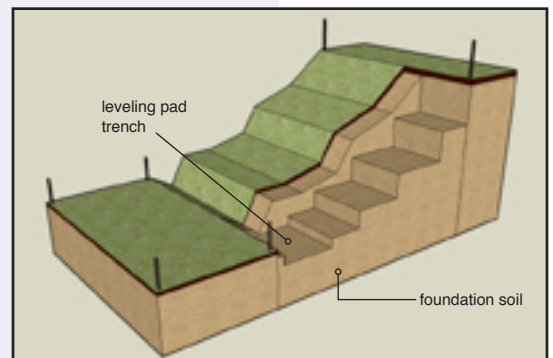
retaining wall layout

- Make sure that all components of the retaining wall and excavation are within property boundaries and construction easements.
- Mark the bottom area of the retaining wall with stakes and/or spray paint. Best practice is to offset stakes 5-10 feet from the proposed wall face so the reference points will stay intact during excavation.
- Measure from the marked area to the edge of the leveling pad and mark with spray paint and/or stakes.
- In a cut situation, measure to the back of the excavation, taking into account the amount of slope and/or benching; determined by OSHA safety requirements and local building codes. Mark this area with spray paint and/or stakes.



excavation

- Minimum leveling pad DEPTH is 6 inches. That is measured from the bottom of the first layer of proposed retaining wall units.
- Minimum leveling pad WIDTH (front to back) is 6 inches in front and 6 inches in back of the proposed retaining wall unit. Example: For a 12 inch deep retaining wall unit, from face to back, the minimum leveling pad width is 2 feet. However, because the unit is not always placed exactly in the middle of the leveling pad, it is recommended that leveling pad be 6" to 12" wider than the minimum requirement.
- The minimum BURIED DEPTH of the first row of retaining wall units is 6 inches. The typical minimum number of units buried for this program is one block. However, on walls with slopes at the bottom of wall the design may call for more than one unit to be buried. See the design tables for the correct buried depth.
- Excavate cuts to a safe slope or benching as determined by OSHA or local building codes.
- Excavate back, from the face of the wall, to the end of the longest SRW geogrid length, as indicated by your design table.



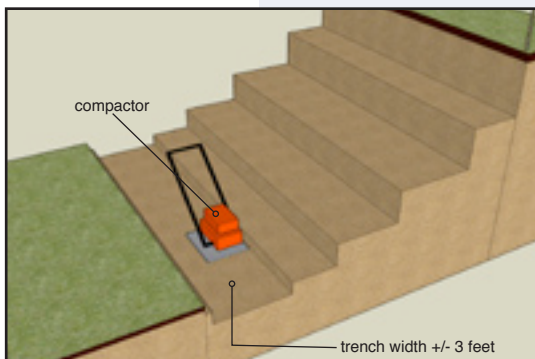
URGENT!
CALL BEFORE
you dig!

Before excavation, see the "call before you dig" instructions in Section 1: Planning.

INSTALLATION

» protection of soils

A proper moisture content is required to achieve proper compaction. Foundation soils and all fill soils should be protected from rain and freezing during construction. Frozen soils must NOT be used in retaining wall construction.

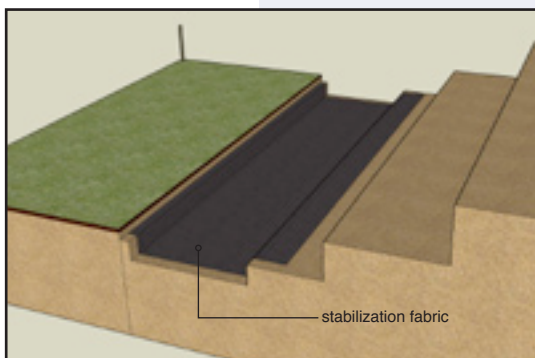


compact sub base

- Compact the soils under the leveling pad to 95% "Standard Proctor Density" or greater (page D•6).
- If organic soils are encountered they must be removed and replaced with acceptable soils.

base stabilization

- The purpose of the leveling pad is to provide a level surface to place the first course of units on. More importantly, the leveling pad spreads out the load of the retaining wall units over a larger area. The strength and quality of your retaining wall depends greatly on the strength and quality of your leveling pad materials.
- Over time the sub-base material can migrate into the leveling pad, thus contaminating it and diminishing its structural integrity. Base stabilization fabric (SRW SS5) separates the leveling pad materials from the sub-base materials so that its strength will not be compromised.



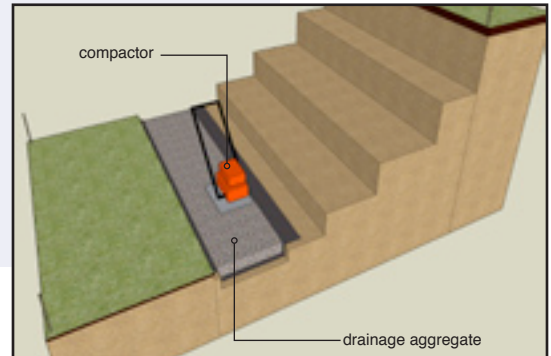
TIP:

This may, or may not, be the proper time to install the drain pipe (see the drain pipe guidelines on page C•15).

INSTALLATION

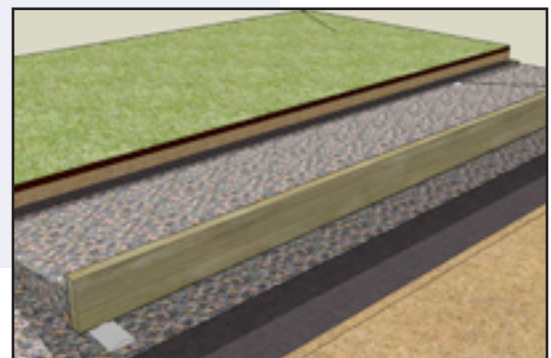
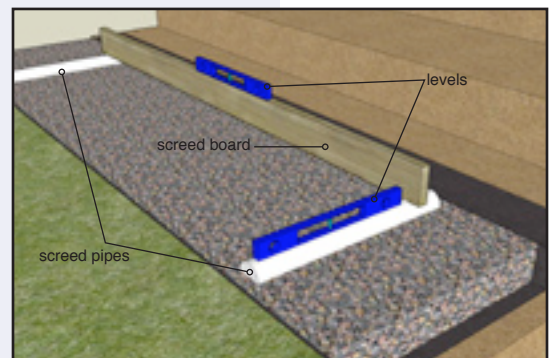
leveling pad

- If possible, start the leveling pad at the lowest elevation of the wall. It is easier to step up than to step down.
- Place well graded gravel or drainage aggregate in the leveling pad trench (see “Excavation” section for minimum leveling pad depths).
- Compact leveling pad to 95% Standard Proctor Density or greater. (page D•6)



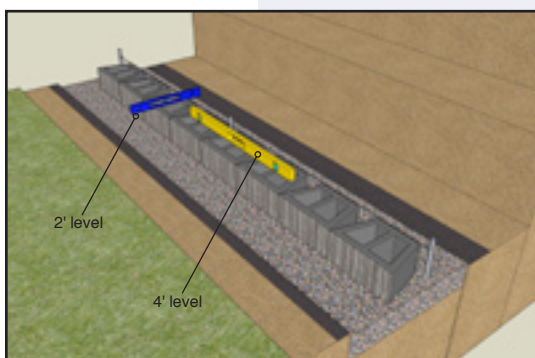
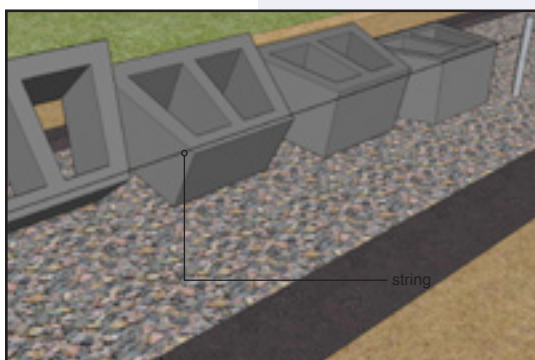
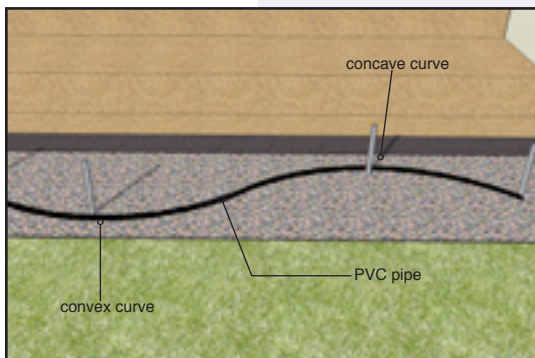
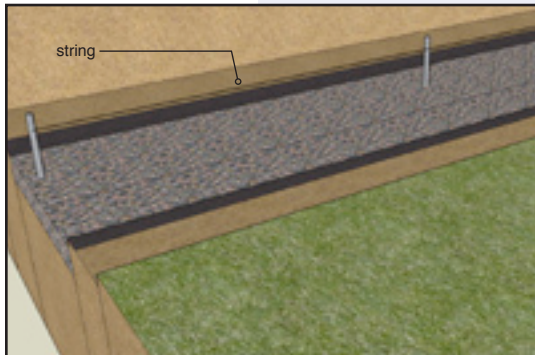
screeding leveling pad

- Place screed pipes across the compacted leveling pad (see illustration).
- If a 10 foot screed is used, an 8 - 9 foot separation of screed pipes works well on straight walls. Screed pipes may need to be closer on curves or corners.
- Make sure the top of the screed pipes are at the correct bottom of the proposed block elevation and are level.
- Place the finish leveling pad material. (If more than 1 ½” is required, do the compaction again.)
- Screed the leveling pad material smooth, being careful that the screed pipes stay level and at the correct elevation.
- Repeat the screeding operation for the length of the leveling pad or if the wall steps up, to the 1st step of the leveling pad.
- Do not walk on or otherwise disturb the leveling pad prior to laying the first course of retaining wall units.



INSTALLATION

laying first course

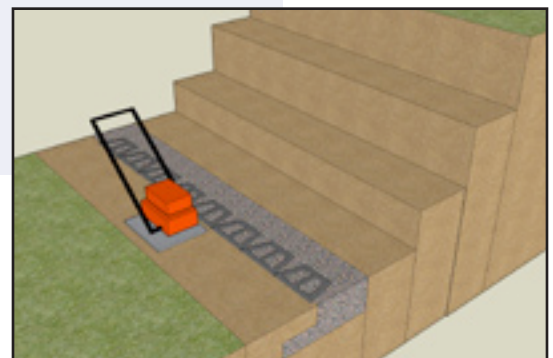
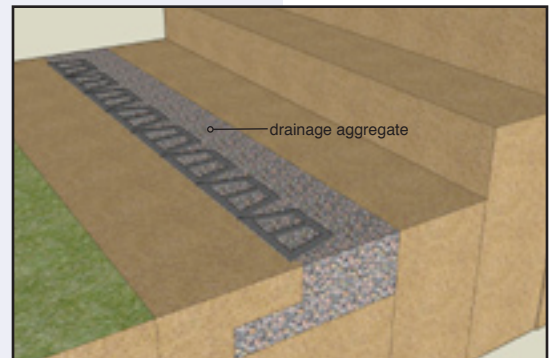
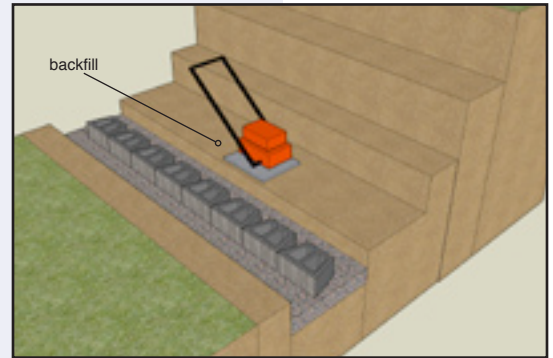


- Use steel stakes and a string line to lay out straight sections of the retaining wall.
- String lines should be placed so that they go along the BACK of the block in order to ensure a straight line. As opposed to the rock face surface on many retaining wall units.
- If the string line is placed at the correct elevation it can be used to check elevation and side to side levelness of the retaining wall unit.
- For laying out a retaining wall that curves, flexible 3/4" PVC pipe works well (see illustration for staking) (see curve and corner guidelines beginning on page C•11).
- It is very important that the 1st course of block is laid correctly because it will determine the alignment of the rest of the retaining wall. Any deviations will be magnified as the height of the wall increases.
- It is usually best to start at the lowest elevation of the retaining wall. Again, it is easier to step up than to step down.
- If the bottom of the retaining wall unit has lugs, lips, or any other protrusions, use a hammer and chisel to break them off.
- Carefully place the unit on the screeded leveling pad, using the string line (for straight walls) or the flexible PVC pipe (for curved walls) as alignment guides.
- NEVER let the unit touch the string, because if each unit touches the string it will gradually push it out of alignment, which will result in a crooked wall. A good distance from the string is 1/16 - 1/8 inch away.
- For outside or convex curves, if the retaining wall unit has wings at the back of the unit they may be broken off to facilitate tighter curves.
- Always check the level of the retaining wall units, front to back, side to side, and the elevation in relation to the adjacent units.

INSTALLATION

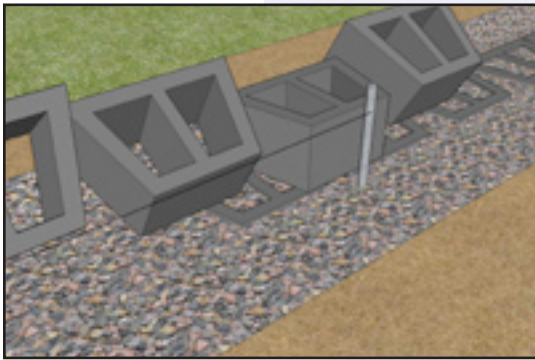
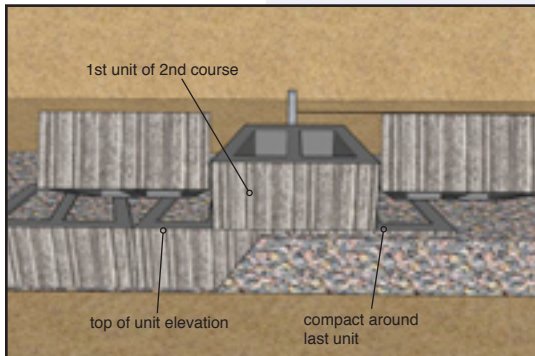
backfill and compacting

- Always backfill and compact in 6 - 8" lifts, as each course of block is installed. Do NOT stack two or more courses and backfill in deeper lifts because it will be difficult, if not impossible, to achieve proper compaction.
- Place the backfill, leaving a minimum of 12 inches of space between the retaining wall unit and the backfill, for the drainage aggregate (1/2" to 3/4" angular gravel with a minimum of 5% fines).
- Compact the backfill to 95% Standard Proctor Density or better. (page D•6)
- Keep heavy compaction equipment at least 3 feet away from the retaining wall units. Lighter, walk-behind compaction equipment can be within the three foot area.
- Compact soil nearest the retaining wall units first, then work toward the back of the excavation.
- Clean out the 12 inch space behind the retaining wall unit with a shovel.
- Place the drainage aggregate behind and in between the retaining wall units and compact. (This sequence minimizes the tendency of units to tip forward during the compaction process)
- Drainage aggregate doesn't take as much force to compact correctly as the backfill material.
- If the retaining wall units have cores or openings, fill them with the drainage aggregate.
- Any backfill placed at the bottom (front) of the retaining wall should be compacted.



INSTALLATION

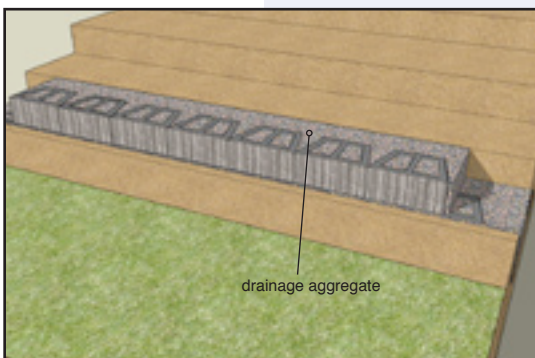
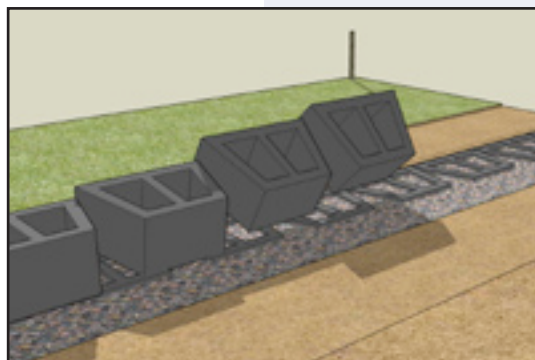
elevation changes (stepping)



- The top of the first course unit will be the elevation of the leveling pad. Add 1/8 - 1/4 inch extra, to allow for a little settlement.
- Make sure the soil is compacted in and around the last couple of units in the first course.
- Prepare the stepped up leveling pad as previously instructed for base leveling pad.
- Place the first unit of the stepped up course upon the last and second to last unit of the first course (straddling in a half bond fashion).
- Place the second unit of the step up on the last unit of the first course, 1/2 on that unit and 1/2 on the stepped up leveling pad.

» **If SRW geogrid is NOT going to be used, continue on to Additional Courses below.**

» **If SRW geogrid IS going to be used, skip to page C•10 for installation guidelines before continuing on to additional courses.**



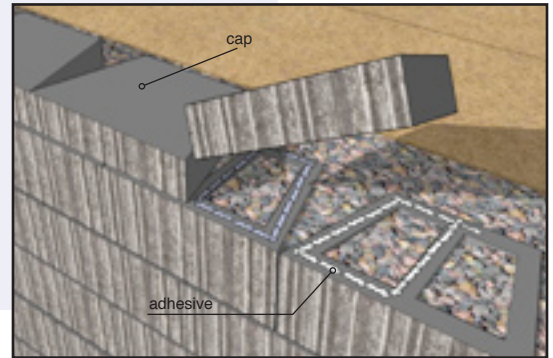
additional courses

- Retaining wall units are connected by lugs, lips, pins, clips, or keyways, which align the units, provide unit to unit shear connection, and provide the automatic setback (otherwise known as batter).
- Sweep any drainage aggregate or soil off the top of the retaining wall units.
- Install the pins or clips, if required by the retaining wall system. Note, some systems will have the pin placed after the upper unit is placed.
- Place the upper unit by straddling the 2 units below in a “half bond” fashion.
- Slide the unit forward, towards the face of the wall, engaging the connection device.
- Continue to install each course of retaining wall units; backfill and compact; place drainage aggregate; and core fill to the top of wall elevation.

INSTALLATION

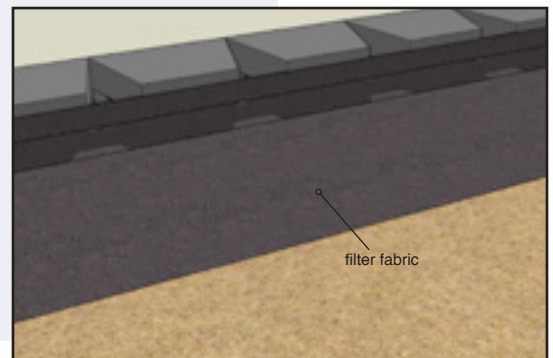
capping

- Clean the top of the retaining wall units of all rock, dirt, and dust.
- Place a bead of adhesive (SRW Retaining and Paver Adhesive) around the top of the last retaining wall unit.
- Place the cap on the retaining wall units. Note: A string line can be used to help line up the caps and straighten any waves that may have developed in the retaining wall.
- If a special cap unit is not used, bond the top course to the course just below.



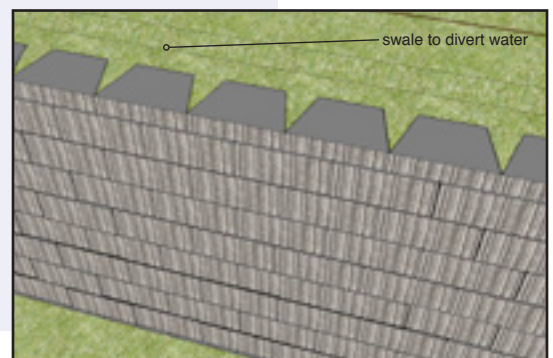
filter fabric

- Place filter fabric (SRW NW4.5) on top of the backfill; over the drainage aggregate; and up against the top units or caps before placing the top/planting soils.
- It is recommended that the top/planting soils should be an 8 inch layer of impermeable soils.
- The filter fabric will help prohibit the migration of the fines from the planting soil down into the drainage aggregate and out the face of the retaining wall, thus preventing the plugging of the drainage aggregate and staining of the wall face.



final steps of building the wall

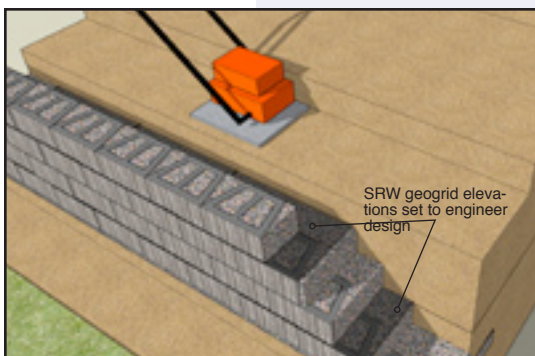
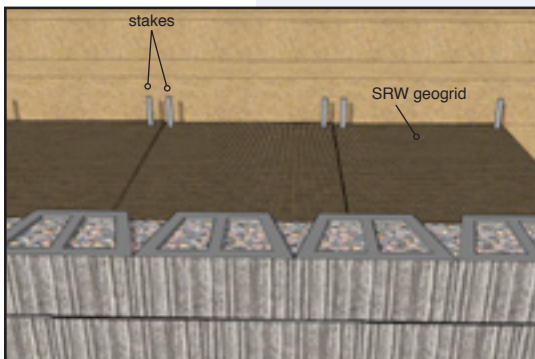
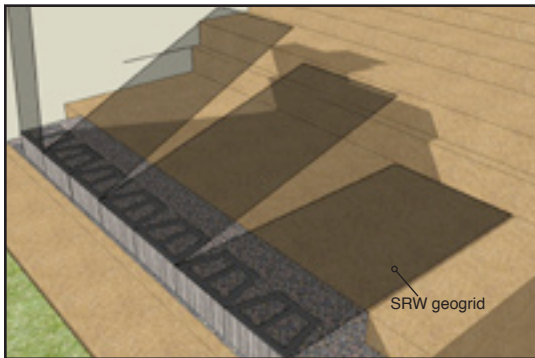
- When finishing the project make sure that the final grade, both the top and bottom of the wall, are shaped so as to divert any water runoff away from the retaining wall. Protect the planting soil from erosion during heavy rains.



INSTALLATION

» SRW geogrid

All installation instructions are the same as for gravity retaining walls EXCEPT for the addition of SRW geogrid. SRW geogrid reinforces the soil, thus allowing taller walls to be constructed. SRW Universal and SRW Series 3 SRW geogrids are bi-directional/bi-axial SRW geogrids, meaning the geogrid is the same strength in both directions. Because of that, this geogrid can be either rolled out parallel to the retaining wall or perpendicular to the retaining wall. If the geogrid depths are the same as the roll width, it may be more efficient to roll out the geogrid parallel to the retaining wall. If the geogrid depths called for are different than the roll width or if the wall curves, it is best to roll out the geogrid perpendicular to the retaining wall. (Not all geogrids are bi-axial, stronger geogrids must be rolled out perpendicular to the retaining wall.)



using SRW geogrid

- SRW geogrid depth is measured from the face of the retaining wall unit, to the back of the reinforced soil.
- Geogrid coverage should be 100%. However, the edges of the geogrid, should NEVER overlap. (See the end of this section for curve and corner SRW geogrid installation procedures.)
- Use your design table(s), found in Section 2 of this guide to determine which course(s) of block to install the geogrid on and how deep it extends into the reinforced soil.
- Place the geogrid as far forward on the retaining wall unit as possible without it showing through the front/face of the retaining wall. Make sure that any connecting devices are engaged by the geogrid.
- Lay the geogrid flat from the wall units to the tail of the geogrid. The backfill, drainage aggregate, and core fill should be level with the top of the retaining wall unit and backfill should be as smooth as possible, with no pockets that would create voids under the geogrid.
- Place the next course of block on top of the geogrid and fill the cores with drainage aggregate, if applicable.
- Pull the geogrid taught, being careful not to pull the units back away from the connecting device or disturb the alignment of the units. Use landscape staples or stakes to hold the geogrid in place.

» continued on next page

INSTALLATION

using SRW geogrid (continued)

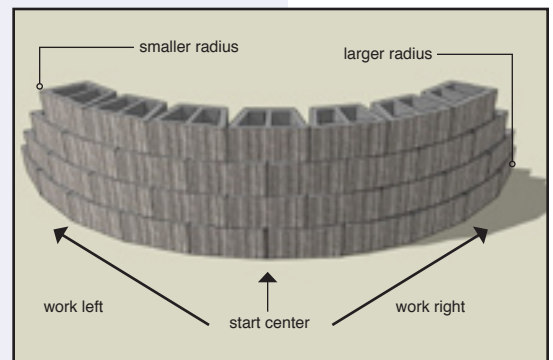
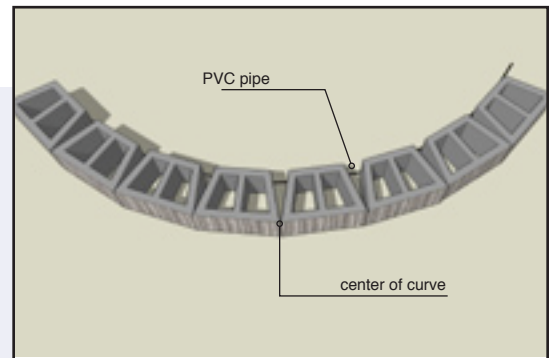
- Do not drive or compact directly on the geogrid. A minimum of 6 inches of soil is recommended to cushion the geogrid.
- When backfilling over the geogrid, work the soil from near the retaining wall units toward the tail of the geogrid. When compacting over the geogrid, work from near the retaining wall units toward the tail of the geogrid. This procedure helps keep the geogrid taught.
- See the curve and corner instructions (below), for geogrid placement.

continue building wall

- Continue building the retaining wall by returning to “additional courses” on page C-8.

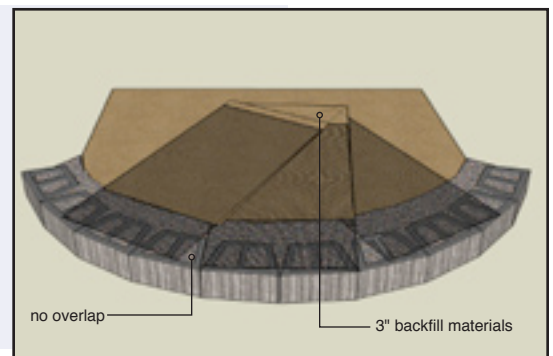
convex • outside • curves

- To achieve desired curve alignment, use 3/4” flexible PVC pipe to outline the back of your retaining wall unit location. This will give you a guideline to help achieve smooth and accurate curves. If possible, it is best to start building a curve from the center of the curve and work outward in both directions.
- Start at the same location for all additional courses of retaining wall units.
- If the unit has wings at the back of the block, one or both may be broken off to achieve a tighter radius.
- Because of the batter (unit setback), the bottom course radius will be larger than the radius of the top course. The taller the wall the larger the bottom course radius needs to be in relation to the top course radius.



convex curve SRW geogrid placement

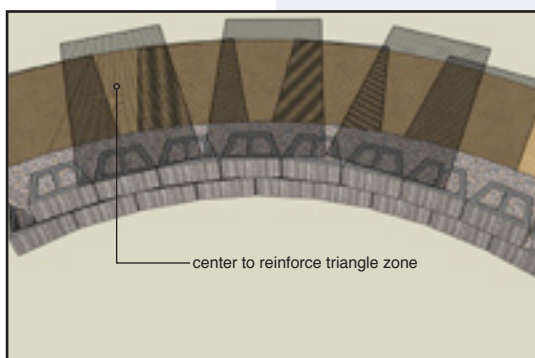
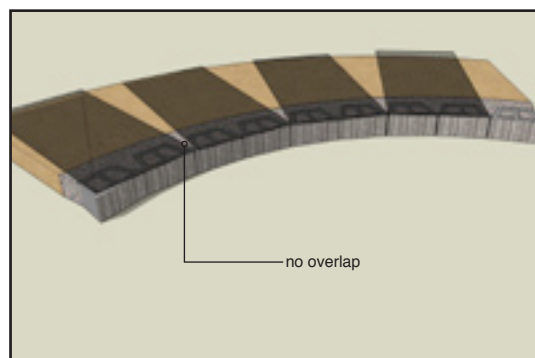
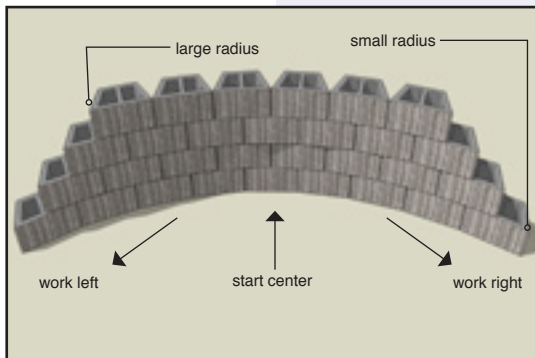
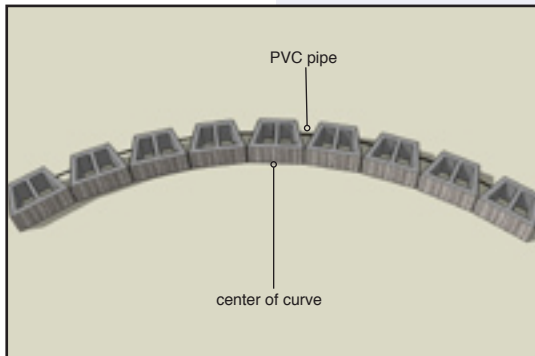
- Geogrid coverage should be 100%, butted together but NOT overlapped on the retaining wall units.
- The geogrid tail, starting just behind the unit will be overlapped. A minimum of 3 inches of soil must be placed between these overlapping geogrid layers.



INSTALLATION

concave • inside • curves

- To achieve desired curve alignment, use 3/4" flexible PVC pipe to outline the back of your retaining wall unit location. This will give you a guideline to help achieve smooth and accurate curves.
- If possible, it is best to start building a curve from the center of the curve and work outward in both directions.
- Start at the same location for all additional courses of units.
- Because of the batter (unit setback) the bottom course radius will be smaller than the radius of the top course. The taller the wall the smaller the bottom course radius will be in relation to the top course radius.



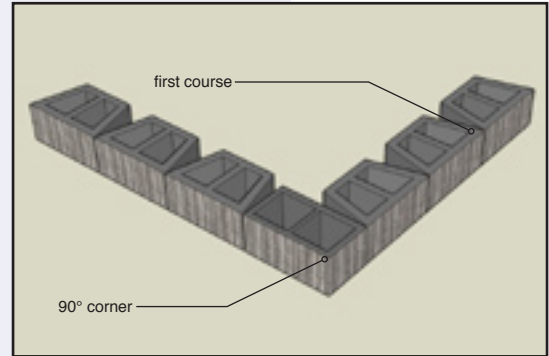
concave curve SRW geogrid placement

- Geogrid coverage should be 100% butted together, but NOT overlapped on the retaining wall units.
- There will be a V or pie shaped wedge of soil starting just behind the units which will not be reinforced. To compensate for the unreinforced section, on the next course of retaining wall units, geogrid is placed by centering over the pie shaped wedge of unreinforced soil below.

INSTALLATION

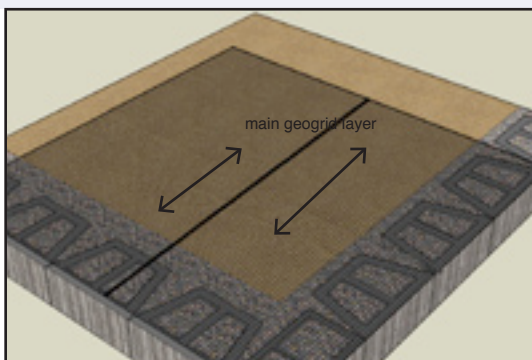
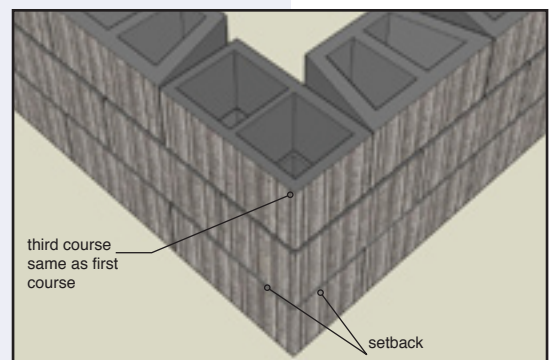
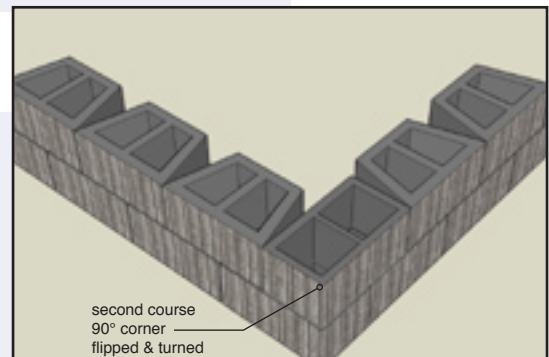
outside 90° corner

- Lay the corner according to the retaining wall system instructions. Some systems will have special corner units, some will have hand splitting lines, and others will require cutting.
- Each course is usually laid opposite of the course below.
- Where connecting devices cannot be used on corner blocks be sure to keep the same batter (setback) as the rest of the retaining wall.
- Outside corners should be bonded with adhesive (SRW Retaining Wall and Paver Adhesive) where connecting devices are unable to be used.

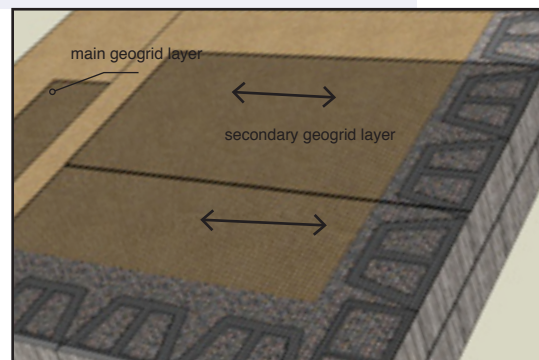


outside corner SRW geogrid placement

- SRW Universal and SRW Series 3 geogrids are bi-directional (same strength in both directions).
- Place the geogrid in the corner so that it goes across the top and towards the front of the units (just far enough so that it will not be seen out of the face of the retaining wall).
- If the geogrid is as wide or wider than the geogrid depth called for in the tables, one layer of SRW geogrid will reinforce the soil in both directions. Other unidirectional SRW geogrids would require an extra layer on the next course in a similar manner as is done on a concave curve.
- If the geogrid is not as wide as the depth called for in the tables, place grid on the next course in the opposite direction to compensate for the lack of proper depth in the layer below.



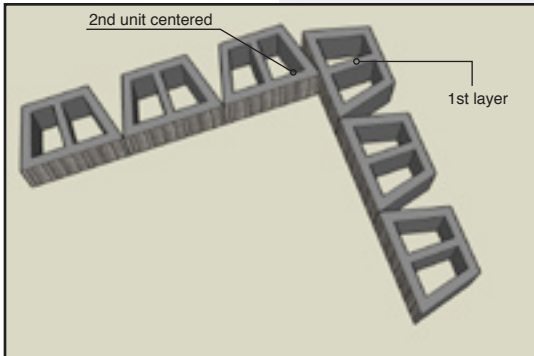
First geogrid layer



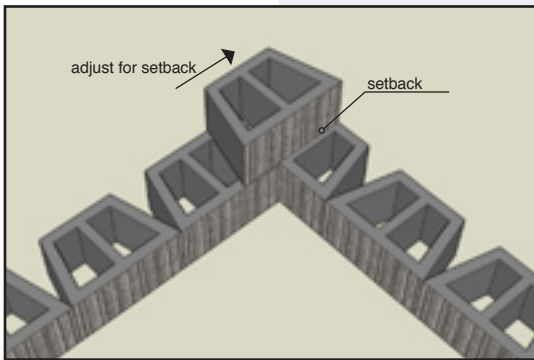
Second geogrid layer

INSTALLATION

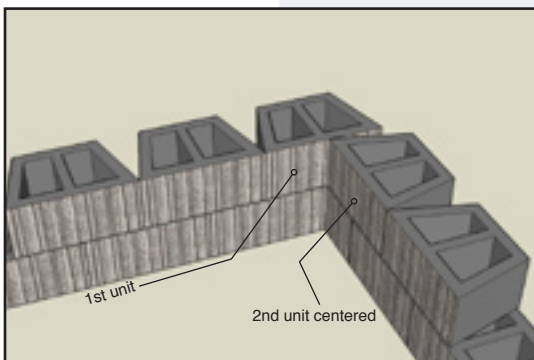
inside 90° corner



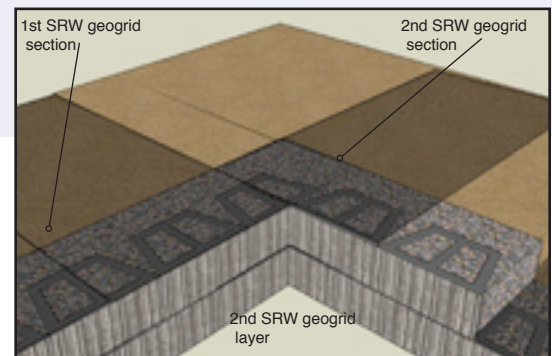
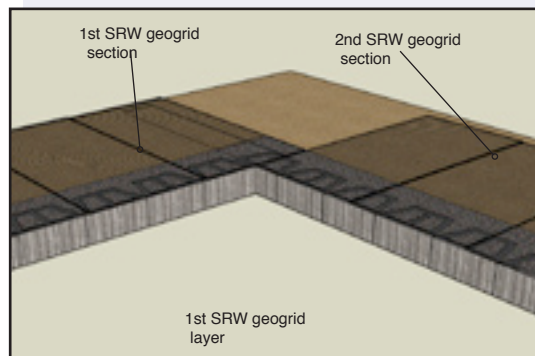
- On the first course, place the face of the first unit of the 90 degree corner at the center of and against the last unit of the wall that the corner is turning from (see illustration).
- On the second course start the corner in the opposite manner with the first unit being laid straddling the 90 degree corner.
- That unit must be set with the same amount of batter (set back) and slid into the corner the same distance as the batter (set back) for each course.
- The 90 degree unit must be placed against the face of the corner unit.
- Repeat the above steps, alternating the corner units so that they are woven together, forming the 90 degree corner.



inside curve geogrid placement



- The first layer of SRW geogrid should extend past the corner a distance which equals the height of the retaining wall divided by 4 (Height of Wall ÷ 4).
- The second layer of geogrid is laid, butting to the 1st layer.
- Per your design table, when the next layer of geogrid is required, that layer of geogrid, on the other leg of the corner, should extend past the corner a distance which equals the height of the retaining wall divided by 4. (Height of wall ÷ 4)
- Continue to alternate the geogrid extending past the corner on every other layer.



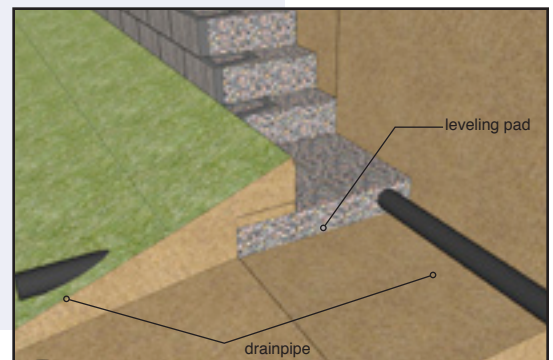
INSTALLATION

» drainage pipe specifications

- The drain pipe should be a minimum diameter of 4 inches.
- The drain pipe must be sloped in order for gravity to direct the water to an outlet.
- Drain pipe outlets can be under the wall units, through the wall units or out the end of the retaining wall. An outlet must be placed at the lowest point of the retaining wall and a minimum of every 50 feet. The drain pipe must be sloped so water can gravitate out of the pipe.

drain pipe outlet (under/out end)

- Drainage aggregate is used for the leveling pad.
- The drainage aggregate chimney extends down to the leveling pad.
- The drain pipe is placed in the leveling pad directly under the drainage aggregate chimney.
- The outlets are either T'd out under the retaining wall units and daylight out of the slope in front of the retaining wall and/or the drain pipe daylights out of the end of the wall.



drain pipe outlet (thru face of wall/out end)

- The leveling pad material can either be well graded gravel or drainage aggregate.
- Impervious soil (soil that water will not pass through such as road-base) is placed over the leveling pad and extends to the back of the excavation; between the units; in the unit cores (if applicable); and in front of the retaining wall units, up to the finish grade elevation at the bottom (front) of the retaining wall.
- The drain pipe is placed at the bottom of the drainage aggregate chimney. The drain outlets are T'd out the face or out the end of the retaining wall.
- A notch will need to be cut in the bottom of the retaining wall unit for the outlet to exit through.

Notch Removed

