

# SAMPLE INSTALLATION SPECIFICATIONS



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INSTALLATION  
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## SAMPLE INSTALLATION SPECIFICATIONS FOR 115 RETAINING BLOCKS

1. It is recommended that the owner retain an Inspection Engineer to verify wall construction in accordance with these requirements. Photographs showing wall construction should be taken daily and distributed promptly to the wall Design Engineer and Owner.
2. Excavation through layers of geogrid reinforcement is not permitted without prior written approval of the wall Design Engineer.
3. The General Contractor is responsible for protection of the wall against surface water at all times by the use of berms, diversion ditches, temporary drains, and all other means that are required.
4. This design is based upon site and grading plans prepared by \_\_\_\_\_ dated \_\_\_\_\_. Changes to these plans that are made after this date including site grading, drainage, utilities, and/or surcharge loads may affect wall design. The wall Design Engineer shall be notified of any changes, and retained to make any revisions necessary to this design resulting from the changes.

### 1.0 MATERIALS

- 1.1 Site soils used as backfill material shall not include brush, sod, peat, roots, or other organic, perishable, or deleterious material including, but not limited to snow, ice, or frozen soils.
- 1.2 Unit granular leveling pad and drainage fill shall be course aggregate conforming to No. 57 stone (1 in. to No. 4) in accordance with ASTM C33, which has the following gradation requirements:

<i>Sieve size</i>	<i>% Passing</i>
1 ½"	100
1"	95-100
½"	25-60
No. 4	0-10
No. 8	0-5

In addition, the unit granular leveling pad aggregate shall be crushed material.

- 1.3 Non-woven geotextile fabric shall be placed between drainstone and reinforced or retained soil and in any other places noted in this design. The fabric shall be needlepunched, non-woven polypropylene material, 5 oz / sq. yard, with a minimum grab tensile strength of 120 lbs @ ultimate, minimum puncture strength of 65 lbs, minimum permittivity of 1.8/ sec, and minimum flow rate of 135 gal/min/ft<sup>2</sup> (Mirafi 140N or equivalent).
- 1.4 Geogrid reinforcement shall be \_\_\_\_\_ geogrid supplied by \_\_\_\_\_ as shown in the elevation and section views included in this design.
- 1.5 The segmental retaining wall units shall be Redi-Scape 115 Retaining concrete wall units. Units shall be provided by an authorized Redi-Scape dealer and shall be in full conformance with Redi-Scape specifications.

### 2.0 GEOTECHNICAL REQUIREMENTS

- 2.1 Before construction of the retaining wall, the contractor shall clear and grub the wall area, including the reinforced soil and retained soil zones. Topsoil, brush, sod, organic material, and/or other deleterious material shall be removed. Unsuitable soils shall be over-excavated and replaced with compacted fill material as directed by the wall Design Engineer.
- 2.2 The Contractor shall excavate to the lines and grades shown in this design.
- 2.3 The Inspection Engineer shall confirm by inspection and testing that the foundation has been properly prepared and the bearing capacity requirements of Section 7 are satisfied prior to wall construction.



## 2.4 MATERIAL PLACEMENT

2.4.1 Drainstone material should be placed in uniform loose lifts of 9 inches maximum. It shall be compacted by means of vibratory compactors to not less than 90 percent relative density determined in accordance with ASTM D-4253 and D-4254. The testing lab shall check the obtained in place density of the compacted fill using the method of ASTM D-2922.

2.4.2 Reinforced material shall be placed in horizontal lifts not exceeding 9 inches, loose measure, or as required to obtain 95 percent of Standard Proctor. Wet or dry reinforced fill material as required so that reinforced fill is within 2% of optimum moisture level prior to placement and compaction.

2.4.3 Retained backfill shall be placed in horizontal lifts not exceeding 9 inches, loose measure, or as required to obtain 95 percent of Standard Proctor.

2.4.4 Hand-operated plate compaction equipment shall be used around the blocks and within 3 feet of the wall.

2.5 Testing methods, frequency, and verification of material specifications and compaction shall be as directed by the Inspection Engineer to insure minimum specifications are met or exceeded.

2.6 The project General Manager, wall construction Contractor, and Inspection Engineer shall have an approved set of wall design plans and specifications on-site at all times during construction of the walls.

## 3.0 LEVELING PAD CONSTRUCTION

3.1 Design values for in-situ soils are as follows. In-situ soils are identified as \_\_\_\_\_ with an internal angle of friction of \_\_\_\_° and a unit weight of \_\_\_\_ lb/ft<sup>3</sup>. Soil properties, including shear strength and unit weight values, should be verified by the Inspection Engineer prior to construction.

3.2 In-situ foundation soil shall be compacted to 95% of Standard Proctor prior to placement of the leveling pad material.

3.3 Leveling pad shall be placed as shown in this design. Leveling pad thickness shown in this design is a minimum value. Pad dimensions shall extend beyond the blocks in all directions to a distance at least equal to the thickness of the pad.

3.4 Leveling pad material should be placed in uniform loose lifts of 9 inches maximum. It shall be compacted by means of vibratory compactors to not less than 90 percent relative density determined in accordance with ASTM D-4253 and D-4254. The testing lab shall check the obtained in place density of the compacted fill using the method of ASTM D-2922.



#### 4.0 REDI-SCAPES UNIT INSTALLATION

4.1 The first course of wall units shall be placed on the prepared leveling pad with the aesthetic surface facing out and the front edges tight together. All units shall be checked for level and alignment as they are placed.

4.2 Ensure that units are in full contact with leveling pad. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.

4.3 Place backfill in front of the bottom row of blocks. Place drainstone in the hollow cores in and between the blocks and behind the blocks to the distance shown on the design drawings. Place non-woven geotextile fabric between the drainstone and the retained or reinforced soil as shown on the design drawings. Place retained or reinforced soil as shown on the design drawings. Compact the material in front of and behind the entire base row to firmly lock them in place. Check all units again for level and alignment. Compact backfill and reinforced or retained fill to 95 percent of Standard Proctor (ASTM D 698, AASHTO T-99) density within 2 percent of its optimum moisture content. Compact drainstone to not less than 90 percent relative density determined in accordance with ASTM D-4253 and D-4254. The testing lab shall check the obtained in place density of the compacted fill using the method of ASTM D-2922. All excess material shall be swept from top of units.

#### 5.0 GEOGRID REINFORCEMENT PLACEMENT

5.1 Geogrid reinforcement shall be placed at the locations, elevations, and to the embedment lengths shown in this design.

5.2 Reinforcement length is measured from the front face of the Redi-Scape block units unless otherwise noted on the drawings.

5.3 Drainstone in the block cores and behind the wall and reinforced fill under the geogrid layer shall be placed and compacted to the elevations shown in the design. Geogrid shall be fully supported by retaining blocks, drainstone, or reinforced fill as it is placed on the ground. Geogrid shall not be placed if there are partially filled block cores or drops in the grade immediately behind the retaining blocks.

5.4 Before placing the reinforced fill, the geogrid shall be placed to lay flat or slightly sloping downward away from the wall face and pulled taut to remove any slack. The geogrid shall be held in place with pins or other methods recommended by the geogrid manufacturer.

5.5 Drainage aggregate and reinforced fill material placement and compaction shall be perpendicular to the wall and proceed from the Redi-Scape blocks back into the retained soil to minimize the potential to "bunch" the geogrid.

5.6 Tracked construction equipment shall not be operated directly on the geogrid reinforcement. A minimum fill thickness of 6 inches is required for the operation of tracked vehicles over the geogrid reinforcement. Turning of tracked vehicles should be kept to a minimum to prevent displacement of the fill and the geogrid reinforcement.

5.7 Rubber-tired vehicles may pass over the geogrid reinforcement at a slow speed (less than 5 mph). Sudden breaking and sharp turning should be avoided.

5.8 Geogrid reinforcement must be rolled out with the machine direction perpendicular to the face of the wall. The Contractor shall verify the correct orientation.

5.9 Geogrid reinforcement shall be continuous perpendicular to the wall face. Spliced connections between shorter pieces of geogrid reinforcement shall not be used.



**5.10 GEOGRID CONNECTION**

5.10.1 Geogrid shall be placed between Redi-Scapes blocks and shall extend to the start of the texture on the front face of the blocks.

5.9.2 The next course of Redi-Scapes blocks shall be placed over the top of the geogrid layer. Drainstone shall be placed in all cores in and between Redi-Scapes blocks and shall be compacted to hold the geogrid reinforcement in place.

**6.0 SITE DRAINAGE**

6.1 Backfill shall be graded a minimum of 2 percent away from the wall face and compacted at the end of each work day to prevent ponding of water on the surface of the reinforced or retained soil mass. At the end of each work day, the Contractor shall take appropriate measures, such as the construction of a temporary berm to prevent rainwater from overtopping the wall.

6.2 Care shall be taken to keep the drainage aggregate and collection drain clean and free from clay or other poor draining material.

6.3 Temporary and long-term surface drainage, site grading, and permanent surface water diversion shall be maintained. At no time shall surface water run-off be allowed to flow toward the top or toe of the retaining wall(s).

**7.0 DESIGN PARAMENTERS**

7.1 Design of the Redi-Scapes wall is based on the following assumed soil parameters:

	<i>Effective internal Friction angle</i>	<i>Effective Cohesion</i>	<i>Unit Weight</i>
Reinforced zone soil	___°	0 psf	___ pcf
Retained soil	___°	___ psf	___ pcf
Foudation soil	___°	___ psf	___ pcf
Crushed stone leveling pad	___°	0 psf	___ pcf

Verification of the site specific soil properties by the Inspection Engineer is required before and during wall construction.

**7.2 EXTERNAL STABILITY (NCMA)**

Minimum factor of safety against base sliding	1.5
Minimum factor of safety against overturning	1.5 (non-reinforced) 2.0 (reinforced soil walls)
Minimum factor of safety against bearing failure	2.0

**7.3 INTERNAL STABILITY (NCMA)**

Minimum factor of safety against geogrid pullout	1.5
Minimum factor of safety for geogrid connection	1.5
Percent coverage of geogrid reinforcement	100%
Minimum factor of safety for tensile overstress	1.5
Minimum factor of safety for facing shear capacity	1.5

#### 7.4 GLOBAL STABILITY (STATIC)

Minimum factor of safety for overall safety	1.3
Minimum factor of safety for compound stability	1.3

#### 7.5 GLOBAL STABILITY (SEISMIC)

### 8.0 GENERAL CONSTRUCTION NOTES

8.1 Construction shall conform to all state and local building codes and manufacturer's requirements.

8.2 The Contractor is responsible for the location and protection of all underground utilities in the vicinity of the wall. Any utilities present on-site which are not shown on this design must be brought to the attention of the wall Design Engineer to evaluate any impact on the wall design.

8.3 The Contractor is responsible to maintain safe excavations and embankments.

8.4 Any utilities shown in this design which are to be located in the wall vicinity are to be constructed concurrently with the retained backfill placement.

8.5 Backfill and compact soil in front of the wall prior to exceeding 3 feet in height.

8.6 Backfill and compact around any utilities below the wall to a minimum of 98% of Standard Proctor prior to wall construction.



1.4 GLOBAL STABILITY (STATIC)

- 1.1 Minimum factor of safety for overall safety
- 1.2 Minimum factor of safety for compound stability

1.5 GLOBAL STABILITY (SEISMIC)

2.0 GENERAL CONSTRUCTION NOTES

2.1 General notes shall conform to all state and local building codes and manufacturer's requirements.

2.2 The Contractor is responsible for the location and protection of all underground utilities in the vicinity of the wall. Any utilities present on-site shown on the design must be brought to the attention of the wall Design Engineer. Evaluate any impact on the wall design.

2.3 The Contractor is responsible to maintain safe excavation and shoring conditions.

2.4 Any utilities shown in the design which are to be located in the wall vicinity are to be installed concurrently with the retained backfill placement.

2.5 Backfill and compact soil in front of the wall prior to excavating 3 feet in height.

2.6 Backfill and compact around any utilities below the wall to a minimum of 60% of Standard Proctor prior to wall construction.