PRESTO GEOSYSTEMS

GEOTERRA®

GEOTERRA® GTO

FAST DEPLOYMENT CONSTRUCTION MAT SYSTEM

SPECIFICATION & INSTALLATION GUIDELINE

PRESTO GEOSYSTEMS
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Table of Contents

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GEOTERRA® GTO System

The GEOTERRA GTO system is a strong, yet light-weight structural mat that consists of varying components depending on site conditions and loading requirements. The system's design and construction flexibility allows the use of only those components required for the project, reducing cost and waste. Individual GEOTERRA GTO units are joined together with a bolt-tight system to form larger mats sized to meet specific requirements of the application area.

GEOTERRA® GTO Units

Physical details of the GEOTERRA GTO units used to form the top load-distribution / surface-wear layer are noted below (Refer to Figure 1):

Length:	36.5 in (0.93 m)
Width:	17.5 in (0.44 m)
Depth:	2 in (50 mm)
Area:	4.43 ft² (0.41 m²)
Weight:	11.8 lbs (5.35 kg)
Material:	100% Virgin HD Polyethylene blend
Crush Strength:	550 psi (3,790 kPa)
Flexural Modulus:	200,000 psi (1,370 MPa)

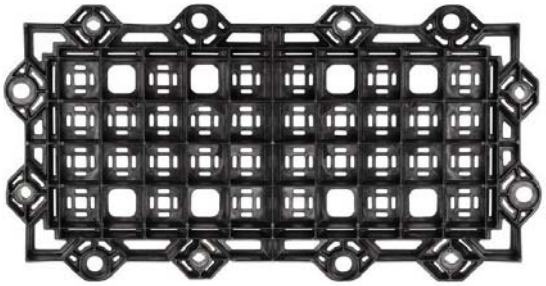


Figure 1: The GEOTERRA® GTO Unit

GEOTERRA GTO units are connected and secured with the polymer bolts to form continuous, interconnected mats. Reference Figure 2.

The Polymer Bolt Connection Device

Polymer Bolts connect and secure individual adjoining GEOTERRA GTO units to form the GEOTERRA GTO mat system. The Bolt is shown in Figure 2 and Figure 3. Yellow bolts are available for edge or centerline delineation.

A total of twelve tabbed connection points are provided on each GEOTERRA GTO unit. Four tabs exist on the long side of the GEOTERRA GTO unit and two tabs on the short side.

Each GEOTERRA GTO unit contains integral nuts for securing connector bolts. Bolts should be placed and secured in all locations.

Bolts can be installed with Manual Torsion Tool or with a Power Drill Driver Tool.

Bolts can be easily removed and the GEOTERRA GTO mat system can be disassembled for removal, storage and reuse.

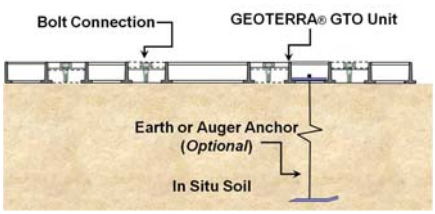
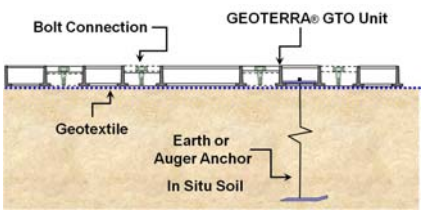
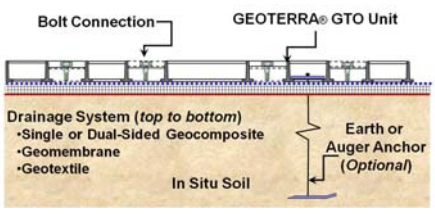
Figure 2: Bolt Connector

Figure 3: Bolt and Tab Connection

GEOTERRA® GTO Applications

Three typical mat systems are listed below, listed from the most basic requirements to the most rigorous requirements. Refer to Table 1: Application Guideline, or consult Presto Geosystems for assistance in determining appropriate system components to meet specific project needs.

Table 1: Application Guideline

1	2	3
GEOTERRA GTO Basic Mat • Earth or Auger Anchors (*optional*)	**GEOTERRA GTO Mat with Geosynthetic Underlayer** • Non-Woven or Woven Geotextile • Earth or Auger Anchors	**GEOTERRA GTO Mat with Drainage Layer** • Single or Dual-Sided Geocomposite • Geomembrane • Non-Woven or Woven Geotextile • Earth or Auger Anchors (*optional*)
		
Bolts are required as a standard connection method.		

Applications	Recommended for Use
Prevent Rutting	1, 2, 3
Protect Turf	1
Use Over Sand	1
Create a Uniform/Stable Surface	1, 2, 3
Provide Load Support over Poor/Wet Soils	2, 3
Prevent Subgrade Degradation/Contamination	3
Allows for an Integrated, Drainable Surface	3

Geosynthetic Underlayments (optional)

If required by site conditions, the following geosynthetic layers may be included under the GeoTerra GTO system:

1. Non-Woven Geotextile
2. High-Strength Woven Geotextile
3. Geomembrane
4. Drainage Composite (Single or Dual-Sided)

Non-Woven Geotextile

If required, a minimum 8 oz/ft² (240 g/m²) non-woven geotextile shall be placed directly over the subgrade. The geotextile shall be installed in accordance with Manufacturer's instructions including overlaps.

The non-woven geotextile functions as a filter, allowing water to flow through while providing a separation layer between the subgrade soils and the GEOTERRA GTO mat system. The geotextile also prevents soil-fines from

pumping and causing possible clogging of the GEOTERRA GTO drainage layer when the drainage components are part of the system.

High-Strength Woven Geotextile

If required, provide a high-strength woven geotextile with a minimum wide-tensile strength of 4800 lbs/ft (70 kN x 70 kN/m) ultimate elongation (ASTM D 4595), and a maximum apparent opening of 30 US Sieve (0.60 mm) (ASTM D 4751).

For rigorous conditions, the high strength woven geotextile provides a double function; first as a separation layer along with controlled filtration and drainage and second as soil reinforcement. The geotextile shall be installed in accordance with Manufacturer's instructions including overlaps. Depending on the application, the strength requirements may vary. Consult Presto Geosystems or your local distributor/representative for assistance.

Drainage Layer (Geocomposite)

If required, a geocomposite drainage layer can be used in areas where surface water may affect the structural integrity of the overall GEOTERRA GTO system. The geocomposites may be single or dual sided with a non-woven geotextile. The geocomposite and non-woven geotextile act as a filter and allow water to transfer within the layer.

The drainage layer may be installed over a high strength woven geotextile if additional strength is required. The drainage layer shall be installed in accordance with Manufacturer's instructions.

Geomembrane

If required, a geomembrane layer shall be placed beneath all underlayments to prevent subsoil saturation or contamination.

Anchoring (optional)

GEOTERRA GTO units may require anchoring at specified intervals with Earth Anchors or Auger Anchors specifically designed for use with the GEOTERRA GTO system.

Quantity and spacing of anchor placement is a function of soil type, saturation, loading requirements and application. Consult Presto Geosystems or your distributor/representative for assistance in determining if anchors are required and for recommendations on anchor type, density and placement.

Earth Anchors

Earth Anchors may be used for light-weight applications or small platforms to limit the assembled GEOTERRA GTO system from shifting due to torsional surface loading. Earth Anchors are limited to low torsional load applications. Refer to Figure 4.

Figure 4: Earth Anchor

Auger Anchors

Auger Anchors are recommended for use with heavy loading installations to control surface deformations and stabilize the surface. Refer to Figure 5.

Figure 5: Auger Anchor

Installation of the GEOTERRA® GTO System

Site Preparation

Level and clear the area of large objects such as rocks, pieces of wood, etc. and compact as necessary to enable the GEOTERRA GTO units to interlock properly and remain stationary after installation. If the surface is impervious, it must be graded such that water will sheet flow from the surface. No depressions should exist that will pond water.

Installing the Optional Geosynthetic Layers or Drainage System

If required, non-woven and/or woven geotextile layers should be installed in accordance with Manufacturer recommendations including overlaps. The recommendations may vary depending on site-specific conditions. Refer to Figure 6.

If drainage is required, the geocomposites drainage layer should be installed on top of the geotextile and in accordance with Manufacturer's recommendations. The site conditions will determine if a single or dual sided geocomposites drainage layer is selected. The outlet of the drainage layer should be free from any obstructions preventing free drainage.

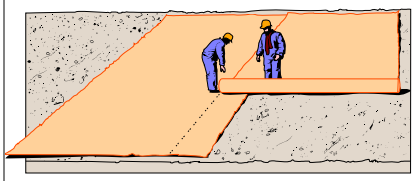


Figure 6: Placement of the Geotextile

Installing GEOTERRA® GTO Mats

GEOTERRA GTO mats are assembled in-place by connecting individual GEOTERRA GTO units by securing the tabbed connections with bolts, forming the desired mat size.

1. Staging installation is recommended to ensure installation proceeds quickly and efficiently. Refer to Figure 7.
2. Slide the units together so the tabbed connections are fully engaged. Refer to Figure 8 . The bricklayer pattern is the preferred orientation and laying pattern as shown in Figure 9 (perpendicular to the direction of traffic).

NOTE: For ease of installation, working from the middle of the area and out is typically the quickest installation method as it allows 2 crews to work simultaneously.

Figure 7: Staging of Installation

Figure 8: Connecting Units

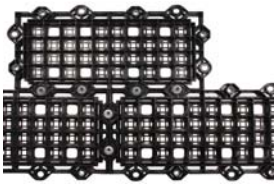


Figure 9: Bricklayer Pattern

Insert the bolt into the Manual Bolt Drive Tool as shown in Refer to Figure 10.

Power Bolt Drive Tools may also be used as shown in Refer to Figure 11.

Alternatively, the bolts are installed with either a 1-1/32 inch external hex head socket driver or internal 3/4 inch or 7/16 inch Allen hex head driver. Refer to Figure 12.

Figure 10: Manual Bolt Drive Tool

Figure 11: Power Bolt Drive Tool

Figure 12: Top of Bolt-External & Internal Drivers

With the tabs of adjacent GEOTERRA GTO units fully engaged, insert the bolts into the nut with either a Manual Bolt Drive Tool (Refer to Figure 13) or a Power Bolt Drive Tool (Refer to Figure 14) and tighten.

Note: For ease of installation, it is recommended that all bolts be installed to a **snug fit** and then go back and fully tighten all bolts after the installation is complete. ***Do not over-torque which can lead to stripping of the bolt head.***

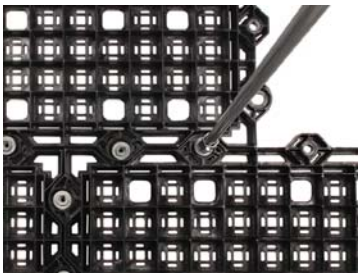


Figure 13: Installing Bolts with Manual Bolt Drive Tool

A Power Driver is recommended for quick installation of bolts, especially when constructing large mats. Refer to Figure 14.

Continue to slide the units together so the tabbed connections are fully engaged. Refer to Figure 15.

Figure 14: Installing Bolts with Power Driver

Figure 15: Placing Adjoining Units

Yellow bolts are available for edge or centerline marking as shown in Refer to Figure 16.

Figure 16: Yellow Bolt for Edge/Centerline Marking

After installation is complete, inspect the connections and fully tighten the bolts manually to ensure the connections are secure.

Refer to Figure 17 and Figure 18.

Figure 17: Completed Mat

Figure 18: Final Tightening of Nuts

Anchoring the GEOTERRA® GTO System (Optional)

Anchoring of the GEOTERRA GTO system may be required to limit shifting due to torsional loading, sliding over the geotextile due to heavy loading, or surface deformation.

Earth Anchors may be placed for light-weight, low torsional load applications.

Auger Anchors are recommended for heavy loading installations to control surface deformations and minimize lateral movement. Auger Anchors should be installed after the mat system is fully assembled.

1. Each GEOTERRA GTO panel has eight open cells for installation of the Auger anchors. Refer to Figure 19 for locations. Typically one anchor every several units is sufficient.
2. Insert the Auger Anchor into one of the open cells and manually push the Auger Anchor into the separation layer. Refer to Figure 20.
3. Auger Anchors can be installed manually with a breaker bar or ratchet or with a variable speed drill (recommended). Refer to Figure 21 and Figure 22.

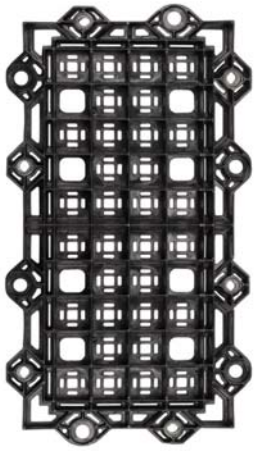


Figure 19: Open Cells for Auger anchor Installation

4. Auger Anchors should be installed until the square washer pulls the GEOTERRA GTO unit tight against the ground. Refer to Figure 23.
5. The number of Auger Anchors required will depend on the subgrade strength and site conditions.

   Consult Presto Geosystems or your distributor/representative for assistance in determining the anchor density and placement.

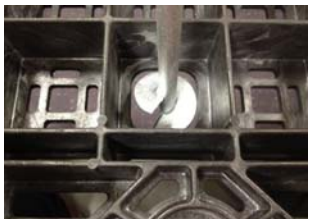


Figure 20: Insert Auger Anchor through Open Cell

Figure 21: Auger Anchor Install with Breaker Bar

Figure 22: Auger Anchor Install with Power Drill

Figure 23: Installed Auger Anchor

Equipment and Tools Needed

- For Bolts: 3/8 inch Variable Speed Drill Power Bolt Driver or Manual Bolt Drive Tool
- For Auger Anchors: 1/2 inch Variable Speed Drill with Socket or 1 1/8 inch Hex Socket

All tools available from Presto Geosystems or their authorized distributor/manufacturer's representative.

Product Limited Warranty

Presto Geosystems shall warrant each GEOTERRA® GTO unit that it ships to be free from defects in materials and workmanship at the time of shipment. Presto's exclusive liability under this warranty or otherwise will be to furnish without charge to Presto Geosystems' customer, at the original point of manufacture, a replacement for any item which proves to be defective under normal use and service during the **1-year period** which begins on the date of shipment by Presto Geosystems. Presto Geosystems reserves the right to inspect any allegedly defective items in order to verify the defect and ascertain its cause.

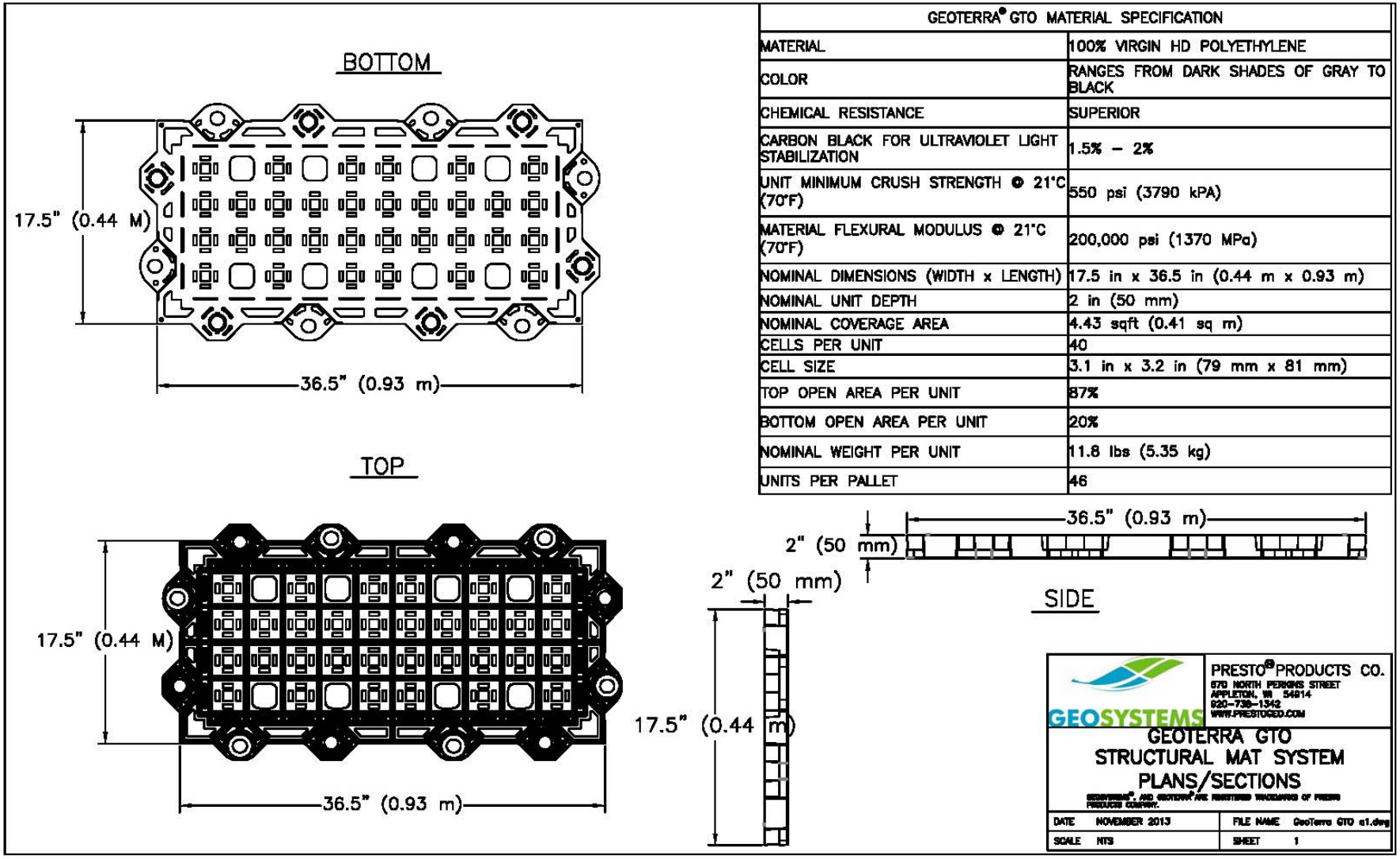
This warranty shall not cover defects attributable to causes or occurrences beyond Presto Geosystems' control and unrelated to the recommended application, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application. Some bending, scarring, and/or other surface wear is considered normal and shall not be covered by this warranty.

PRESTO GEOSYSTEMS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, IN CONNECTION WITH THE GEOTERRA® GTO SYSTEM. In no event shall Presto Geosystems be liable for any special, indirect, incidental or consequential damages for the breach of any express or implied warranty or for any other reason, including negligence, in connection with the GEOTERRA® GTO system.

Contact Presto Geosystems Co. at Ph.: 1-800-548-3424; 1-920-738-1328 Email: info@prestogeo.com.

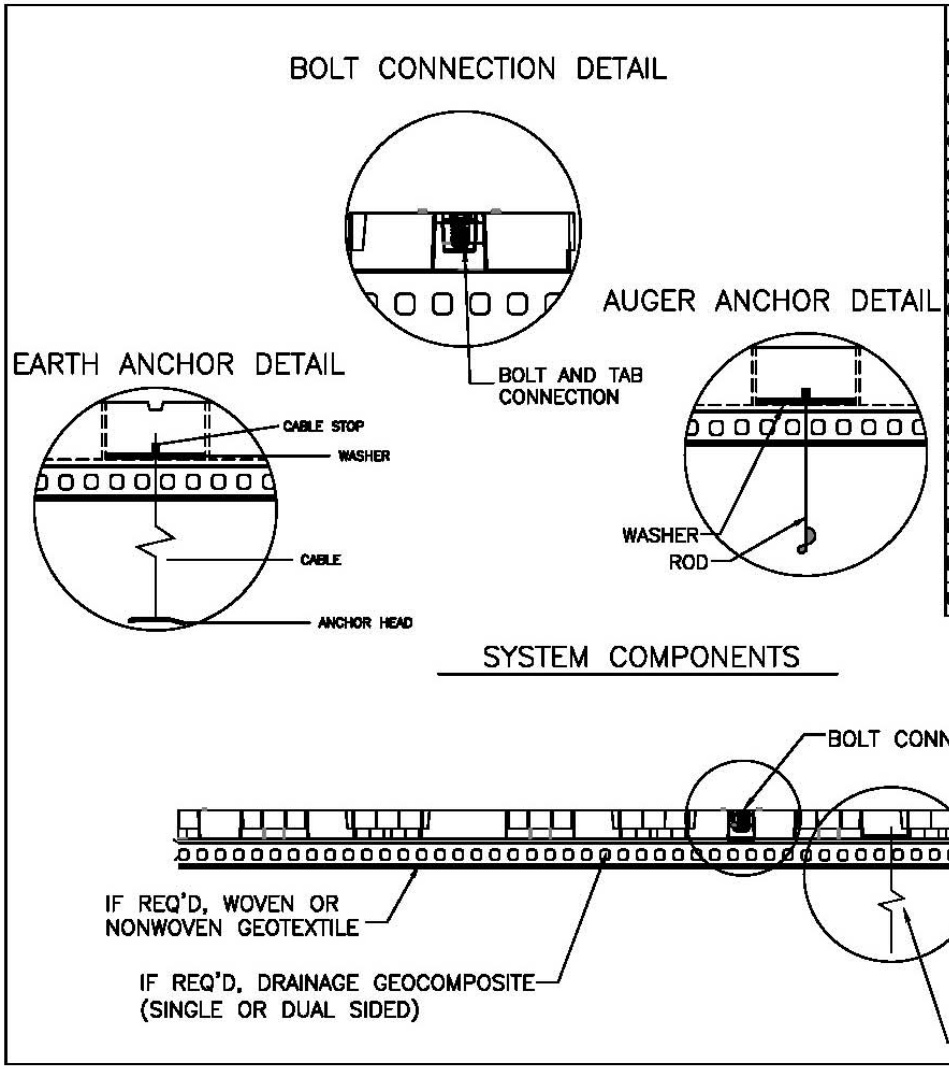
Disclaimer

This document has been prepared for the benefit of customers interested in the GEOTERRA® GTO System. It was reviewed carefully prior to publication. Presto Geosystems assumes no liability and makes no guarantee or warranty as to its accuracy or completeness. Final determination of the suitability of any information or material for the use contemplated, or for its manner of use, is the sole responsibility of the user. Project specifications take precedence over all manufacturers' recommendations.



GEOTERRA® GTO MATERIAL SPECIFICATION	
MATERIAL	100% VIRGIN HD POLYETHYLENE
COLOR	RANGES FROM DARK SHADES OF GRAY TO BLACK
CHEMICAL RESISTANCE	SUPERIOR
CARBON BLACK FOR ULTRAVIOLET LIGHT STABILIZATION	1.5% – 2%
UNIT MINIMUM CRUSH STRENGTH @ 21°C (70°F)	550 psi (3790 kPA)
MATERIAL FLEXURAL MODULUS @ 21°C (70°F)	200,000 psi (1370 MPa)
NOMINAL DIMENSIONS (WIDTH x LENGTH)	17.5 in x 36.5 in (0.44 m x 0.93 m)
NOMINAL UNIT DEPTH	2 in (50 mm)
NOMINAL COVERAGE AREA	4.43 sqft (0.41 sq m)
CELLS PER UNIT	40
CELL SIZE	3.1 in x 3.2 in (79 mm x 81 mm)
TOP OPEN AREA PER UNIT	87%
BOTTOM OPEN AREA PER UNIT	20%
NOMINAL WEIGHT PER UNIT	11.8 lbs (5.35 kg)
UNITS PER PALLET	46

Drawing 1: Typical GEOTERRA® GTO Mat Layouts



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GEOTERRA® GTO
STRUCTURAL MAT SYSTEM
SYSTEM COMPONENTS

GEOTERRA® AND GEOTERRA® ARE REGISTERED TRADEMARKS OF PRESTO PRODUCTS COMPANY.

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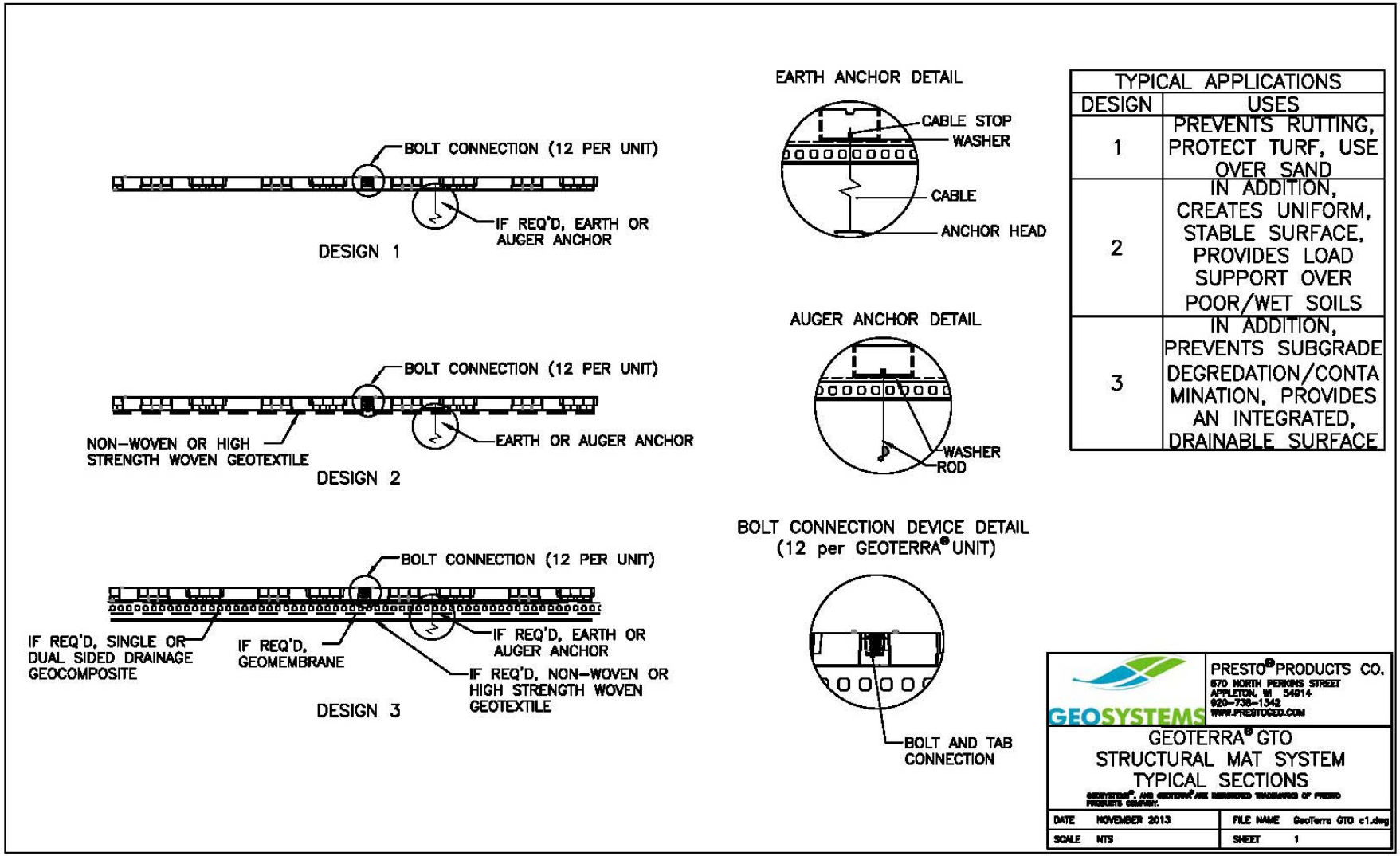
SCALE	NTS	SHEET	1

Drawing 2: GEOTERRA® GTO System Components



Drawing 3: GEOTERRA® GTO Design Guidelines