SECTION 0XX00
SPECIFICATION FOR STRATUM™ CELLULAR
FOUNDATION MATTRESS SYSTEM

PART 1   GENERAL

1.1   SECTION INCLUDES

A. Cellular Foundation Mattress System with integral formed high-density polyethylene (HDPE) geogrid forming interconnected transverse and diagonal diaphragms

B. Base stabilization with integrally formed multi-axial geogrid

C. Extruded HDPE bodkin connector

D. Backfill for cellular foundation mattress system

E. Furnishing the Stratum Cellular Foundation Mattress System as shown on the Contract Drawings, on the Shop Drawings and as directed by the Engineer. Work consists of:

   1. Providing system supplier representative for pre-construction conference with the Contractor and the Engineer

   2. Fabricating, storing, cutting and placement of the system as specified herein and as shown on the construction drawings

1.2   REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. D 6637 Determining Tensile Properties of Geogrids by Single or Multi-Rib Tensile Method
   2. D1388 Flexural Rigidity (Option A).
   3. D4759 Standard Practice for Determining the Specification Conformance of Geosynthetics.
   4. D7737 Individual Geogrid Junction Strength
   5. D1603 Standard Test Method for Carbon Black Content in Olefin Plastics
   6. D5818 Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage.

1.3   SUBMITTALS

A. Submit product samples of:
   1. Geogrid for diaphragms
   2. Geogrid for base stabilization
   3. Bodkin bar

B. Shop Drawings – Submit details of the typical sections and connections

C. Submit product data sheet and certification from the manufacturer that the product supplied meets the requirements of 2.2.

D. Submit manufacturer's general recommendations and instructions for fabrication, storing, cutting, installation and repair.

1.4   QUALITY ASSURANCE

A. Pre-Construction Conference – Prior to the installation of the cellular mattress, the Contractor shall arrange a meeting at the site with the system supplier and, where applicable, the system installer. The Owner and the Engineer shall be notified at least 3 days in advance of the time of the meeting

1.5   DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection:
   1. Prevent excessive mud, wet concrete, epoxy, or other deleterious materials from coming in contact with and affixing to geogrid composite materials.
   2. Store at temperatures above –20 degrees F (-29 degrees C).
   3. Rolled materials may be laid flat or stood on end.

PART 2   PRODUCTS

2.1   MANUFACTURERS

A. An approved source of geogrid is Tensar International Corporation, Alpharetta, GA or their designated representative.

2.2   MATERIALS

A. Transverse and Diagonal Diaphragms:

   1. All diaphragms shall be a geogrid manufactured from high density polyethylene sheet, oriented in one direction so that the resulting ribs shall have a high degree of molecular orientation.

   2. The geogrid reinforcing elements shall be durable and have excellent chemical, microbiological. UV and oxidative resistance based on 3rd party review. They shall be resistant to hydrolysis, aqueous solutions of salts, acids and alkalis, be non-biodegradable and have a minimum of 2% finely divided carbon black, as determined by ASTM D1603-14, well dispersed in the polymer matrix to inhibit attack by ultra violet light.

3. The long-term creep limited strength T_{cr} shall be in accordance with the following table. Reduction factor for Creep at 10% strain determined for in-soil temperature of 20 degrees Celsius obtained following the test procedure is ASTM D5262 for a minimum of 10,000 hours.

4. The geogrid shall have an appropriate reduction factor for site installation and construction damage, determined by the particle size distribution of the reinforced fill and in accordance with the values used in the design. This factor shall be based on full-scale tests carried out in accordance with ASTM D5818. If required by the Engineer, the Contractor shall provide supporting documented evidence of testing for this and any other reduction factors assumed in the design. Reduction factors for site installation and construction damage based on limited laboratory based testing are not acceptable.

5. Any site joints in the geogrid roll length shall be capable of carrying 100% of the geogrid long-term creep limited strength. If required by Engineer, the Contractor shall provide evidence of this.

6. The strength of the junctions between the longitudinal ribs and transverse bars, as determined per ASTM D7737 shall be not less than 95% of the geogrid ultimate tensile strength per ASTM D6637.

PROPERTY (Geogrid)	UNITS	StratumGrid1	StratumGrid2
Tensile strength at 5% Strain	kN/m (lb/ft)	52.5 (3,600)	71.4 (4,890)
Junction Strength	kN/m (lb/ft)	105 (7,190)	126 (8,640)
Creep Limited Strength at 10% Strain	kN/m (lb/ft)	43.7 (3,000)	54 (3700)
Flexural Stiffness	mg-cm	6,600,000	8,250,000
Ultraviolet Stability (Retained Strength @ 500 hours)	%	95	95

B. Base Geogrid:

1. The base of the Stratum Cellular Foundation Mattress System shall be formed using multi-axial stabilization geogrid manufactured from punched and drawn material that has been formed by regular network of integrally connected, multi-directional tensile elements of appropriate orientation, size, and shape to allow interlocking with the Stratum aggregate backfill materials.

C. Bodkin Connector:

1. The bodkin connector shall be round 3/8" (9.5mm) diameter, extruded high-density polyethylene unless otherwise approved by the Engineer.

D. Backfill

1. Backfill shall be well-graded angular material with coefficient of uniformity greater than 5 and meet the gradation requirements below.

Sieve Size	%Passing
4"	100
3"	80 – 100
1½"	65 – 100
¾"	50 – 100
#4	25 – 50
#40	10 - 20
#100	5 - 15
#200	0 - 10

2. Alternatively, gap graded natural gravel, crushed gravel, crushed rock, crushed recycled concrete with maximum size of 1.5" can be used as backfill.

PART 3   EXECUTION

3.1   PREPARATION

A. The subgrade soil shall be prepared as indicated on the Construction Drawings or as directed by the Engineer. Where required, subgrade shall be excavated to the lines and grades as shown on the drawings or as directed by the Engineer.

3.2   INSTALLATION

A. Construct the Stratum Cellular Foundation Mattress System in accordance with manufacturer installation guide.

B. Assembly Summary

1. Cell assembly is achieved by rolling out the base grid and overlapping by 12 inches (300mm). The transverse diaphragms should be fixed at one edge to the base grid with cable ties or HDPE braid then raised to the vertical plane and tensioned.

2. Cable ties shall be black UV resistance with 50lbs min. tensile strength

3. HDPE braid shall be three-strand monofilament, with a nominal breaking strength of 450 lbs.

4. Diagonal diaphragms are held in place with nodal connectors. The cells are now ready for filling.

5. Nodal connectors shall be of the size and shape shown on the drawings.

6.   Typical joints, fixings and overlaps should be as shown on the contract drawings.

7.   Cells shall be formed such that a regular "diamond" pattern is created.

3.3   FILL PLACEMENT

A.   Backfill the cells in accordance with manufacturer installation guide.

B.   Fill the first two rows of cells to half-height. Fill first row to full height, using approved granular backfill. Continue filing, ensuring that leading row is always half filled before trailing row is fully filled.

C.   Filling may be carried out by mechanical plant operating directly on top of the filled cells. It is normal practice for the fill to be placed within the Stratum system without applying direct compaction.

D.   A protective cover of 6 inches (150mm) thickness of compacted fill should be placed over the Stratum before trafficking.

3.03   REPAIR

A.   Any geogrid damaged during installation shall be repaired in a manner approved by the Engineer or shall be replaced by the Contractor. Any such measures required shall be at no additional cost to the Owner.

END OF SECTION