CONSTRUCTION NOTES FOR PLACEMENT OF TENSAR GEOGRIDS AND BACKFILL SOILS FOR TENSAR / MESA REINFORCED WALLS

1.0 MATERIAL

1.1 BACKFILL SOILS

1.1.1 REINFORCED BACKFILL SHALL CONSIST OF FREE-DRAINING GRANULAR MATERIAL FREE FROM LOAM, SILT, CLAY, ORGANIC OR FROZON MATERIAL THAT MEETS THE REQUIREMENTS FOR ITEM 704.08, GRANULAR BACKFILL FOR STRUCTURES AS SPECIFIED IN THE STATE OF VERMONT AGENCY OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR CONSTRUCTION, LATEST EDITION. THE GRADATION REQUIREMENTS ARE REPRODUCED AS FOLLOWS:

SIEVE SIZE	PERCENT PASSING
76mm (3-inch)	100
63mm (2 1/2-inch)	90 - 100
#40	50 - 75
#100	0 - 12
#200	0 - 6

1.1.2 GRANULAR BACKFILL SHALL CONSIST OF BANK RUN SAND AND/OR GRAVEL FREE FROM LOAM, SILT, CLAY, ORGANIC, FROZEN, OR OTHER DELETERIOUS MATERIAL THAT MEETS THE REQUIREMENTS FOR ITEM 703.04, GRANULAR BORROW AS SPECIFIED IN THE STATE OF VERMONT AGENCY OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR CONSTRUCTION, LATEST EDITION THE GRADUATION REQUIREMENTS ARE REPRODUCED AS FOLLOWS:

SIEVE SIZE	PERCENT PASSING
#4	20 - 100
#200	0 - 12

1.1.3 FURTHERMORE, REINFORCED BACKFILL, GRANULAR BACKFILL AND RETAINED SOIL/FILL MATERIALS SHALL BE FREE OF EXCESS MOISTURE, ROOTS, MUCK, SOD, SNOW, FROZEN LUMPS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS. ALL ROCK PARTICLES AND HARD EARTH CLODS SHALL BE LESS THAT 75mm IN THE LONGEST DIMENSION REINFORCED BACKFILL MATERIALS WHICH DO NOT MEET THIS CRITERIA SHALL BE CONSIDERED UNSUITABLE AND SHALL BE REMOVED.

1.2 GEOGRID REINFORCEMENT SHALL BE TENSAR UNIAXIAL GEOGRIDS MANUFACTURED BY TENSAR CORPORATION, MORROW, GEORGIA.

1.3 BODKIN BARS SHALL BE 38mm x 6.4mm HDPE BARS MANUFACTURED BY TENSAR CORPORATION, MORROW, GEOGRIA.

1.4 CONNECTORS SHALL BE SUPPLIED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.5 DRAINAGE MATERIALS

1.5.1 DRAINAGE STONE SHALL BE VT ÅOT ITEM 704.02B COARSE AGGREGATE AND GEOTEXTILE WRAP AROUND DRAIN SHALL MEET VT ÅOT ITEM 649.41 REQUIREMENTS.

2.0 TECHNICAL REQUIREMENTS

2.1 THE OWNER OR OWNER'S REPRESENTATIVE SHALL SUBMIT TO TENSAR EARTH TECHNOLOGIES, INC. THE GRADATION AND STRENGTH PARAMETERS OF THE REINFORCED BACKFILL MATERIAL, RETAINED SOIL/FILL AND FOUNDATION SOIL, FOR APPROVAL, PRIOR TO PROCEEDING WITH CONSTRUCTION.

2.2 PRIOR TO CONSTRUCTION OF THE TENSAR REINFORCED WALL, THE CONTRACTOR SHALL CLEAR AND GRUB THE REINFORCED BACKFILL ZONE AREA, REMOVING TOP SOIL, BRUSH, SOD OR OTHER ORGANIC OR DELETERIOUS MATERIAL. ANY UNSUITABLE SOILS SHALL BE OVER-EXCAVATED, REPLACED AND COMPACTED WITH REINFORCED BACKFILL MATERIAL TO PROJECT SPECIFICATIONS OR OTHERWISE DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.

2.3 FOUNDATION SHALL BE PROOF ROLL INSPECTED USING A LOADED TRUCK WITH 18 KIP AXLE LOADS OR PER PROJECT SPECIFICATIONS, THE OWNER OR OWNER'S REPRESENTATIVE SHALL CONFIRM THAT THE SITE HAS BEEN PROPERLY PREPARED AND THE DESIGN PARAMETERS IN SECTION 7.0 ARE APPROPRIATE PRIOR TO FILL PLACEMENT.

2.4 FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200mm IN UNCOMPACTED THICKNESS FOR HEAVY COMPACTION EQUIPMENT. FOR ZONES WHERE COMPACTION IS ACCOMPLISHED WITH HAND OPERATED EQUIPMENT, FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 150mm IN UNCOMPACTED THICKNESS. ONLY HAND-OPERATED EQUIPMENT SHALL BE ALLOWED WITHIN ONE METER OF THE BACK FACE OF WALL.

2.5 FILL MATERIALS SHALL BE PLACED FROM THE BACK OF THE MESA FACING UNITS TOWARDS THE ENDS OF THE GEOGRID TO ENSURE FURTHER TENSIONING.

2.6 FILL SHALL BE COMPACTED AS SPECIFIED BY PROJECT SPECIFICATIONS OR TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH AASHTO T-99 (STANDARD PROCTOR), AT A MOISTURE CONTENT NO GREATER THAN 2 PERCENTAGE POINTS WET AND NO LESS THAN 1 PERCENTAGE POINT DRY OF OPTIMUM.

2.7 TESTING METHODS AND FREQUENCY, AND VERIFICATION OF MATERIAL SPECIFICATIONS AND COMPACTION SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

2.8 MESA CAP UNITS SHALL BE PERMANENTLY SECURED TO THE MESA STANDARD UNITS USING AN APPROVED CONSTRUCTION ADHESIVE PER BLOCK MANUFACTURER'S RECOMMENDATIONS.

2.9 A COMPLETE SET OF APPROVED CONSTRUCTION DRAWINGS AND CONTRACT SPECIFICATIONS SHALL BE ON-SITE AT ALL TIMES, DURING CONSTRUCTION OF THE TENSAR REINFORCED RETAINING WALL.

3.0 TENSAR GEOGRID PLACEMENT

3.1 TENSAR GEOGRIDS SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SHOWN ON THE DRAWINGS.

3.2 TENSAR GEOGRID LENGTHS SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS. REINFORCED FILL ZONES LENGTH IS MEASURED FROM THE FRONT FACE OF THE WALL, EXTENDING TO THE TAIL OF THE GEOGRIDS.

3.2.1 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTH(S). BODKIN CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.

3.2.2 IF PRE-APPROVED, TENSAR UNIAXIAL GEOGRIDS MAY BE SPLICED UTILIZING THE BODKIN CONNECTION DETAIL. NO MORE THAN ONE SPLICE SHALL BE ALLOWED IN ANY ONE LENGTH OF REINFORCEMENT AND NO SPICE SHALL BE ALLOWED FOR GEOGRIDS LESS THAN 1.80m IN LENGTH (EACH). THE BODKIN CONNECTION SHALL NOT BE PLACED LESS THAN 1.80m BELOW PLANNED FINISHED GRADE. THE BODKIN CONNECTION SHALL NOT BE PLACED HORIZONTALLY OR VERTICALLY ADJACENT TO ANOTHER BODKIN CONNECTION.

3.3 PRIOR TO PLACING FILL, THE GEOGRID MATERIALS SHALL BE PLACED OVER THE SLOT IN THE TOP OF THE MESA BLOCK. DRIVE CONNECTOR BAR FINGERS THROUGH THE GEOGRID APERTURES BEHIND THE FIRST TRANSVERSE BAR. REMOVE SLACK AND ANCHOR.

3.4 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM BACKFILL THICKNESS OF SIX INCHES IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT CRACKS FROM DISPLACING THE FILL AND/OR THE GEOGRID.

3.5 RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 16 km/h. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.6 TENSAR UNIAXIAL GEOGRID SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WALL FACE.

3.7 UNIAXIAL GEOGRIDS SHALL BE CUT NEXT TO THE CROSS MACHINE DIRECTION BAR. THE CROSS MACHINE DIRECTION BAR SHALL BE PLACED AS OUTLINED IN SECTION 3.3 AND PULLED TAUT PRIOR TO FILL PLACEMENT.

3.8 A MINIMUM OF 75mm OF FILL MATERIAL SHALL BE REQUIRED BETWEEN LAYERS OF UNIAXIAL GEOGRIDS, UNLESS OTHERWISE SHOWN.

4.0 CHANGES TO GEOGRID LAYOUT OR PLACEMENT

4.1 NO CHANGES TO THE TENSAR GEOGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEOGRID TYPE, OR ELEVATION, SHALL BE MADE WITHOUT THE EXPRESSED PRIOR TO WRITTEN CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

5.0 DRAINAGE

5.1 AT THE END OF EACH WORK DAY, BACKFILL SURFACE SHALL BE GRADED AWAY FROM THE SLOPE FACE A MINIMUM OF 2 PERCENT SLOPE AND A TEMPORARY SOIL BERM SHALL BE CONSTRUCTED NEAR THE WALL CREST TO PREVENT SURFACE WATER RUNOFF FROM OVERTOPPING THE WALL.

5.2 AT THE END OF EACH WORK DAY, BACKFILL SURFACE SHALL BE COMPACTED WITH A SMOOTH WHEEL ROLLER TO MINIMIZE PONDING OF WATER AND SATURATION OF THE BACKFILL.

5.3 THE ENGINEERING, DESIGN, ANALYSIS, DETAILING AND MITIGATION OF BOTH SURFACE DRAINAGE AND SEEPAGE OF GROUNDWATER SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

5.4 PERMANENT SURFACE WATER DIVERSION SHALL BE REQUIRES AND PROVIDED BY THE OWNER OR OWNER'S REPRESENTATIVE.

5.5 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED ON THE ASSUMPTION THAT THE REINFORCED BACKFILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER (SEEPAGE). PERMANENT SUBSURFACE WATER (SEEPAGE) COLLECTION AND DIVERSION SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE

6.0 METHOD OF PAYMENT

SEE CONTRACT DOCUMENTS.

7.0 DESIGN PARAMETERS

7.1 DESIGN OF THE REINFORCED SOIL STRUCTURE IS BASED ON THE FOLLOWING PARAMETERS.

	EFFECTIVE FRICTION ANGLE	EFFECTIVE COHESION	MOIST UNIT WT.
REINFORCED FILL	34°	0 kPa	22.0 kN/m^3
RETAINED SOIL	30°	0 kPa	22.0 kN/m^3
FOUNDATION SOIL	30°	0 kPa	22.0 kN/m^3

7.2 FACTORS OF SAFETY:

7.2.1 INTERNAL STABILITY

	STATIC	SEISMIC
MINIMUM FACTORS OF SAFETY FOR UNCERTAINTIES	= 1.5	= N/A
MINIMUM FACTORS OF SAFETY FOR GEOGRID PULLOUT	= 1.5	= N/A
MINIMUM FACTORS OF SAFETY FOR SLIDING AT GEOGRID	= 1.5	= N/A

SOIL-GEOGRID INTERACTION COEFFICIENT = 0.8
PERCENT COVERAGE OF GEOGRID = 100%

7.2.2 EXTERNAL STABILITY

MINIMUM FACTORS OF SAFETY FOR SLIDING AT BASE = 1.5
MINIMUM FACTORS OF SAFETY FOR OVERTURNING = 2.0

7.2.3 GLOBAL STABILITY:

GLOBAL STABILTY HAS NOT BEEN CONSIDERED IN THIS DESIGN.

7.3 SURCHARGE LOADING = 13.2 kPa

7.4 HYDROSTATIC DESIGN = NONE

GROUNDWATER/PHREATIC SURFACES NOT CONSIDERED IN WALL DESIGN. WATER SURFACE ASSUMED TO BE SUFFICIENTLY BELOW BOTTOM OF WALL AS NOT TO INFLUENCE INTERNAL AND EXTERNAL STABILITY.

7.5 SEISMIC DESIGN = NONE

7.6 MAXIMUM APPLIED BEARING PRESSURE = 281 kPa

8.0 SPECIAL PROVISIONS

8.1 THE DESIGN PRESENTED HEREIN IS BASED ON SOIL PARAMETERS. FOUNDATION CONDITIONS, GROUNDWATER CONDITIONS, AND LOADINGS STATED IN SECTION 7.0.

8.2 WALL ELEVATION VIEWS AND LOCATIONS AND GEOMETRY OF EXISTING STRUCTURES SHALL BE VERIFIED BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.

8.3 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OR VERIFICATION OF SUBSURFACE CONDITIONS, SUITABILITY OF SOIL DESIGN PARAMETERS AND INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

8.4 THE OWNER OR OWNER'S REPRESENTATIVE IS RESPONSIBLE FOR REVIEWING AND VERIFYING THAT THE ACTUAL SITE CONDITIONS ARE AS DESCRIBED IN SECTION 7.0 PRIOR TO CONSTRUCTION. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE ON-SITE TO ASSURE THE PROVISIONS OF THE CONSTRUCTION NOTES ARE FOLLOWED.

8.5 IT IS THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE TO PROVIDE SOIL THAT MEETS THE GRADATION LISTED IN SECTION 1.1.1 AND PARAMETERS LISTED IN SECTION 7.1.

8.6 IF ANY ROCK FORMATIONS AND/OR GROUNDWATER ARE ENCOUNTERED DURING CONSTRUCTION, IMMEDIATELY CONTACT TENSAR EARTH TECHNOLOGIES, INC. AT 404-250-1290 AND THE OWNER'S REPRESENTATIVE.

8.7 ANY REVISIONS TO DESIGN PARAMETERS STATED IN SECTION 7.0 OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

8.8 THIS DESIGN IS ONLY VALID FOR THE PROPOSED TENSAR RETAINING WALL(S) AS SHOWN HEREIN.

8.9 TOTAL SETTLEMENT AND DIFFERENTIAL SETTLEMENT IN EXCESS OF 1/100 AND ITS EFFECTS ON THE TENSAR RETAINING WALL SYSTEM SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S RESPRESENTATIVE.

8.10 GLOBAL STABILITY AND BEARING CAPACITY SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

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mesa™

STATE OF VERMONT
VERNON R. KORGES
No. 5709
REGISTERED
PROFESSIONAL ENGINEER
1-9-02
{ SEAL }

REVISIONS \ ISSUE			
0	10/19/01	ISSUED FOR BID	
1	12/3/01	ISSUED FOR REVIEW	
2	1/7/02	ISSUED FOR BID	av

Project Number M10875
Date Drawn 10/19/01
Scale As Shown
Designed by WL
Drawn by KJK
Checked by av

VERMONT ROUTE - 9
BRATTLEBORO, VERMONT

CONSTRUCTION NOTES

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