

# TAI The Reinforced Earth Company

8614 WESTWOOD CENTER DRIVE SUITE 1100, VIENNA, VIRGINIA 22182 (703) 821-1175

## TERRATREL™ A WIRE FACED MSE WALL SYSTEM

### DESIGN CRITERIA

- DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN, BEHIND, AND BENEATH THE REINFORCED VOLUME, METHODS OF CONSTRUCTION, AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO SECTION 548.
- SOIL PARAMETERS:  
SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE ( $\phi$ ), COHESION ( $c$ ) AND TOTAL UNIT WEIGHT ( $\gamma$ ) SHALL BE PROVIDED IN THE SHOP DRAWINGS.
- THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE ENGINEER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
- ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.
- THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN  
OVERTURNING = 2.0  
SLIDING = 1.5  
INTERNAL PULLOUT = 1.5  
(ALLOWABLE DEFORMATION = 0.75 INCH)  
BEARING CAPACITY = 2.5  
OVERALL STABILITY = 1.5  
STEEL SOIL REINFORCEMENT = 0.55F<sub>y</sub> AT END OF DESIGN LIFE AND 0.50 F<sub>u</sub> AT NET SECTION OF BOLTED CONNECTION  
MAXIMUM PULLOUT FACTOR  
FOR STRIPS f\* (FOR SAND) = 1.5  
(FOR LIMEROCK) = 2.0  
FOR LADDERS N<sub>p</sub>MAX = 30

### LAYOUT

- FOR LOCATION OF THE WALLS, SEE RETAINING WALL CONTROL PLANS.

### CONSTRUCTION

- BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548. INSTALLATION OF REINFORCING LADDERS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.
- IF STRUCTURES IN EXCESS OF 20' IN HEIGHT OCCUR, THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20'. FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95% OF AASHTO T-180 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

### CONFLICTING STRUCTURES

- IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON THE WALL ELEVATIONS.
- IF PILES ARE LOCATED WITHIN THE REINFORCED VOLUME, THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE WALL UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, IS PROPOSED AND APPROVED IN WRITING.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL POSTS WITHIN THE REINFORCED VOLUME. PRIOR TO PLACEMENT OF THE TOP LAYERS OF REINFORCEMENTS, INDIVIDUAL REINFORCING LADDERS MAY BE SYSTEMATICALLY SHIFTED TO AVOID THE POST LOCATIONS IF AUTHORIZED BY THE ENGINEER. ANY DAMAGE DONE TO THE REINFORCING LADDERS DUE TO INSTALLATION OF GUARDRAIL POSTS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN THE REINFORCED VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING LADDERS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN, UNLESS SHOWN OTHERWISE.
- THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING LADDERS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

### MATERIALS NOTES

#### 14. SUPPLIES

ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

- PREFABRICATED WIRE FACING PANELS
- WIRE REINFORCING LADDERS OR STRIPS
- HANDLE BAR CONNECTORS OR PINS
- MX4 SOIL RETENTION FABRIC OR EQUAL

ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR.

#### 15. LADDER OR STRIP LENGTH

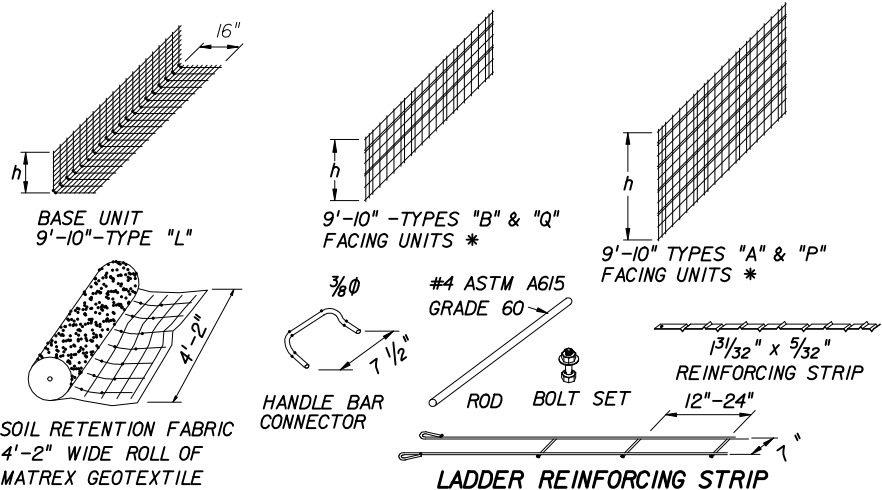
THE REINFORCING LADDER LENGTHS SHOWN ON THE PLANS ARE MEASURED FROM THE BACK FACE OF THE WIRE FACING PANELS TO THE LIMIT OF THE SELECT BACKFILL MATERIAL, AND ARE THE LENGTHS USED IN THE REINFORCEMENT DESIGN CALCULATIONS.

- THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH® RETAINING WALLS DETAILED HEREIN. THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL FURNISHED BY THE REINFORCED EARTH COMPANY IS INTENDED TO PROVIDE A GENERAL EXPLANATION OF THE SYSTEM. IT IS THE CONTRACTOR'S OBLIGATION TO DEVISE AND EXECUTE A PROJECT SPECIFIC ERECTION SEQUENCE, PANEL UNLOADING, HANDLING AND BRACING SYSTEM, AND FALL PROTECTION SYSTEM. THE BRACING SYSTEM SHOWN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL IS GENERAL IN NATURE AND DOES NOT ACCOUNT FOR PROJECT SPECIFIC CRITERIA. COMPLIANCE WITH THE GUIDELINES IN THIS MANUAL DOES NOT RELIEVE THE CONTRACTOR OF ITS RESPONSIBILITY TO ADHERE TO THE PROJECT PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS OR COMPLIANCE WITH ALL FALL PROTECTION, SAFETY, LAWS, STANDARDS AND PROCEDURES AT THE JOBSITE. CONTRACTORS SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.
- THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.
- THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR THE USE OF FLORIDA DEPARTMENT OF TRANSPORTATION ONLY IN CONNECTION WITH FDOT PROJECTS, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY. THE REINFORCED EARTH COMPANY IS EXCLUSIVE LICENSEE IN THE UNITED STATES UNDER PATENTS ISSUED TO HENRY VIDAL, AND THE FURNISHING OF THIS DRAWING DOES NOT CONSTITUTE AN EXPRESSED OR IMPLIED LICENSE UNDER THE VIDAL PATENTS.
- THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TERRATREL WIRE WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL				
Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 4	5115

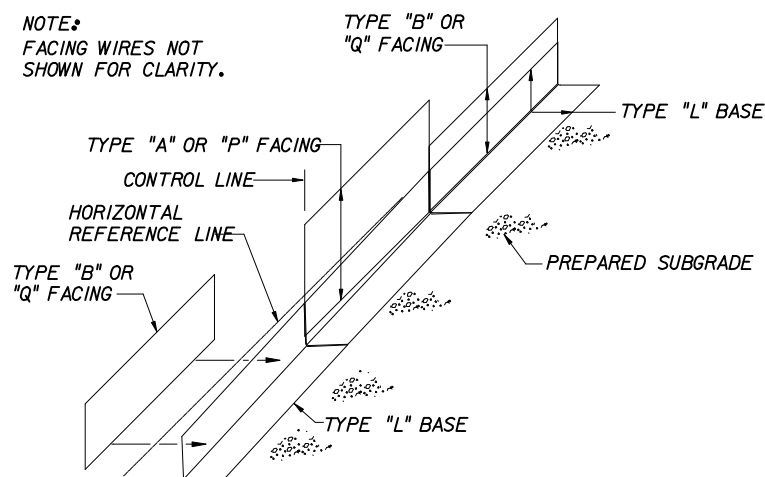
PANEL	ACTUAL HEIGHT
L	1'-4"
A	3'-11 1/4"
B	2'-3 9/16"
P	4'-9 1/16"
Q	3'-1 1/32"



\* MINIMUM WIRE SIZE = W4  
 MAXIMUM SPACING = 5 1/2"

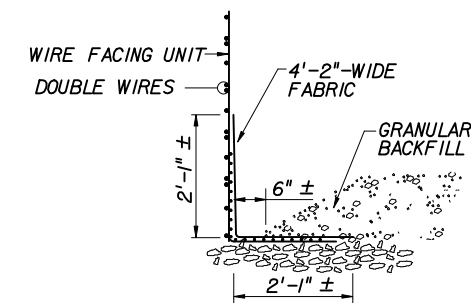
TERRATREL WALL COMPONENTS

NOTE:  
 FACING WIRES NOT SHOWN FOR CLARITY.



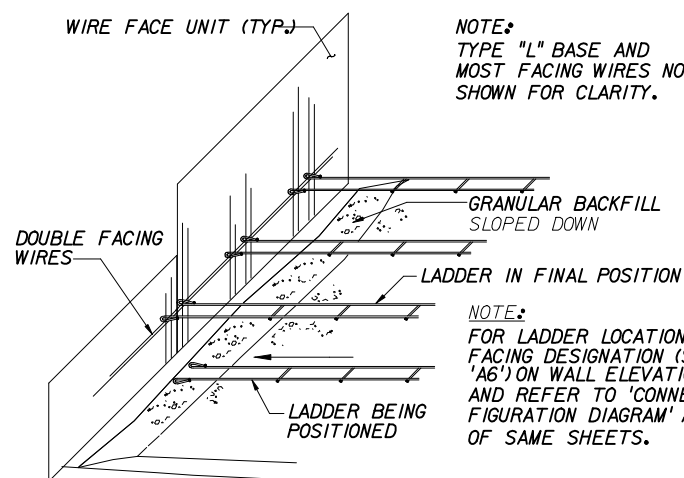
STEP 1: INSTALLATION OF BASE & 1st. FACING UNITS

- SET TYPE "L" BASE DIRECTLY ON SUBGRADE (FOLLOW SLOPE).
- ATTACH FIRST FACING UNITS TO TYPE "L" BASES. SET FACING UNITS HORIZONTALLY (EXCEPT WHEN NOTE ON ELEV. SHEETS REQUIRE UNITS TO FOLLOW SLOPE).
- ALIGN THE WIRES BETWEEN MATCHING GRIDS AND TIE-WIRE THE TWO ELEMENTS SECURELY TOGETHER.



- PLACE 4'-2"-WIDE FABRIC AS SHOWN.
- PLACE AND COMPACT FIRST GRANULAR BACKFILL. LIFT TO LEVEL OF FIRST DOUBLE WIRE LOCATION. FILL MUST BE SLOPED DOWN AS SHOWN.

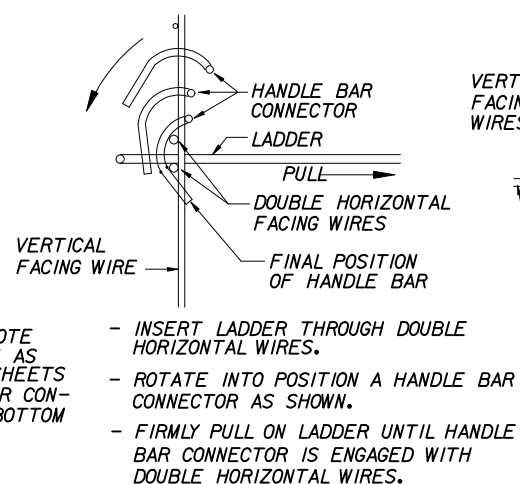
STEP 2: 1st. BACKFILL LIFT



NOTE:  
 TYPE "L" BASE AND MOST FACING WIRES NOT SHOWN FOR CLARITY.

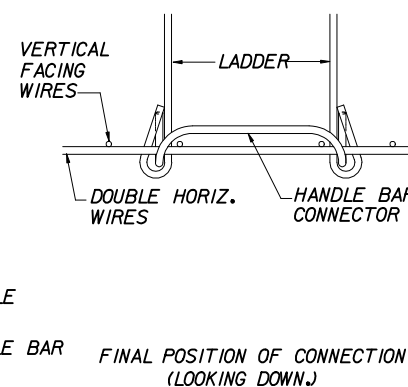
NOTE:  
 FOR LADDER LOCATIONS, NOTE FACING DESIGNATION (SUCH AS 'A6') ON WALL ELEVATION SHEETS AND REFER TO 'CONNECTOR CONFIGURATION DIAGRAM' AT BOTTOM OF SAME SHEETS.

STEP 3: INSTALLATION OF 1st. LADDERS



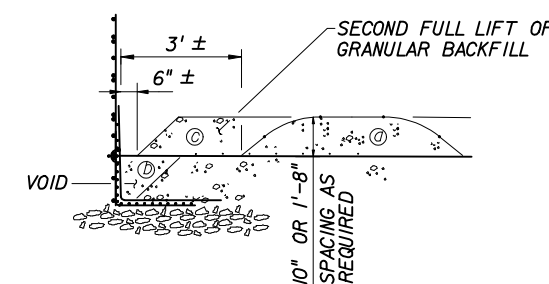
- INSERT LADDER THROUGH DOUBLE HORIZONTAL WIRES.
- ROTATE INTO POSITION A HANDLE BAR CONNECTOR AS SHOWN.
- FIRMLY PULL ON LADDER UNTIL HANDLE BAR CONNECTOR IS ENGAGED WITH DOUBLE HORIZONTAL WIRES.

SECTION DETAIL



PLAN DETAIL

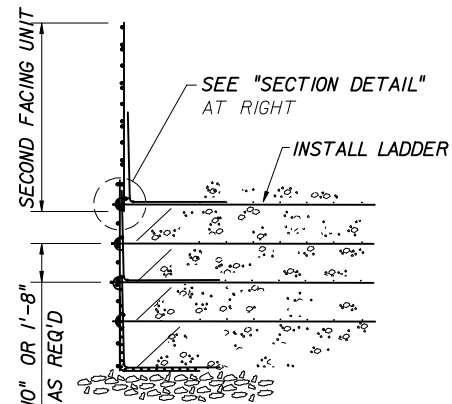
- PLACE ENOUGH BACKFILL OVER LADDERS TO SECURE POSITION AS SHOWN.
- THEN FILL VOID UNDER LADDERS NEAR FACING.
- THEN PLACE AND COMPACT SECOND GRANULAR BACKFILL LIFT TO NEXT LADDER LEVEL. FILL BEHIND WIRE FACING UNITS MUST BE SLOPED DOWN AS SHOWN.



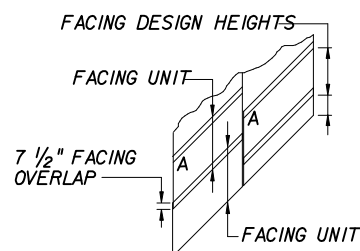
STEP 4: 2nd. BACKFILL LIFT

NOTE:  
 SEE TYPICAL "TYPICAL SECTION" IN THESE PLANS AND IN THE CONTRACT PLANS FOR TREATMENT AT TOP AND BOTTOM OF WALL.

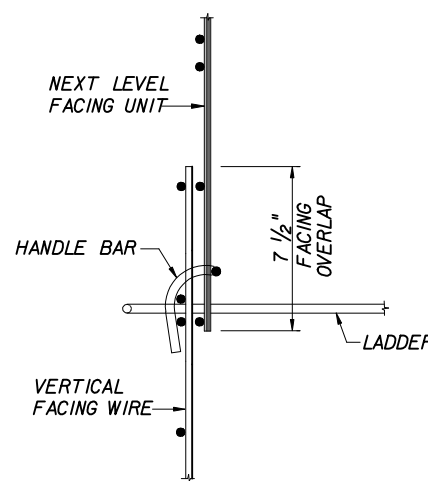
- POSITION SECOND FACING UNIT DIRECTLY BEHIND, AND OVERLAP, LOWER FACING UNIT. TIE ITS LOWER PORTION TO ADJACENT FACING UNITS.
- PLACE LADDERS AS PER "STEP 3."
- BACKFILL AS PER "STEP 4a AND 4b."
- PLACE 4'-2"-WIDE FABRIC AS SHOWN IN "STEP 2." NOTE: FABRIC MUST ALWAYS BE APPROX. 2'-1" VERTICAL. WHEN WALL ELEVATIONS CALL FOR 10" SPACING BETWEEN LADDERS, FABRIC MUST BE SLIT FOR PENETRATION OF MID-LEVEL LADDERS.
- BACKFILL AS PER "STEP 4c."



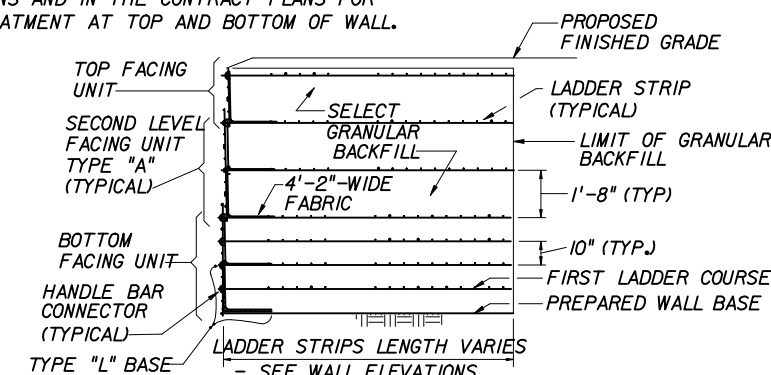
STEP 5: INSTALLATION OF 2nd. FACING UNITS



FACING DIAGRAM



SECTION DETAIL

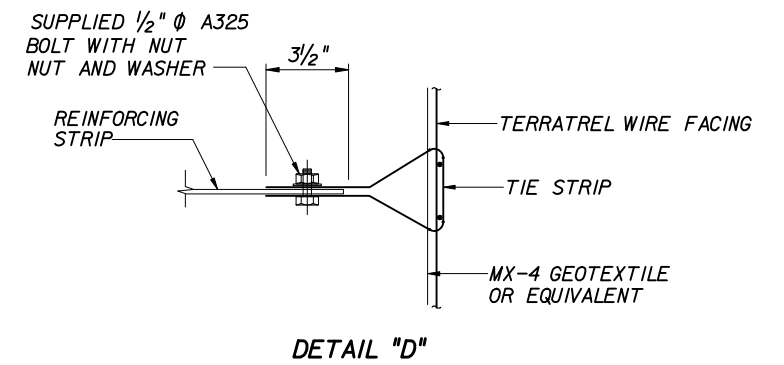
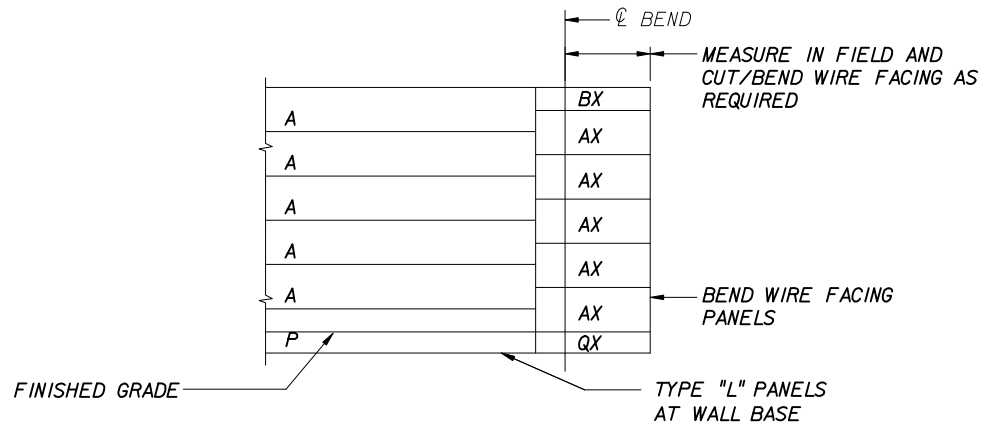
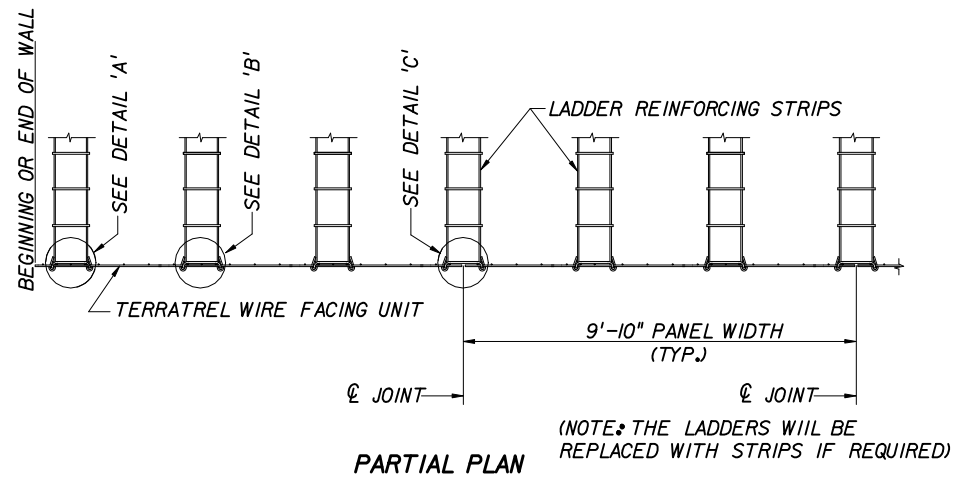


REPEAT "STEP 5" UNTIL WALL IS TOPPED OUT AS SHOWN ABOVE.  
 COMPLETED TERRATREL WALL SECTION

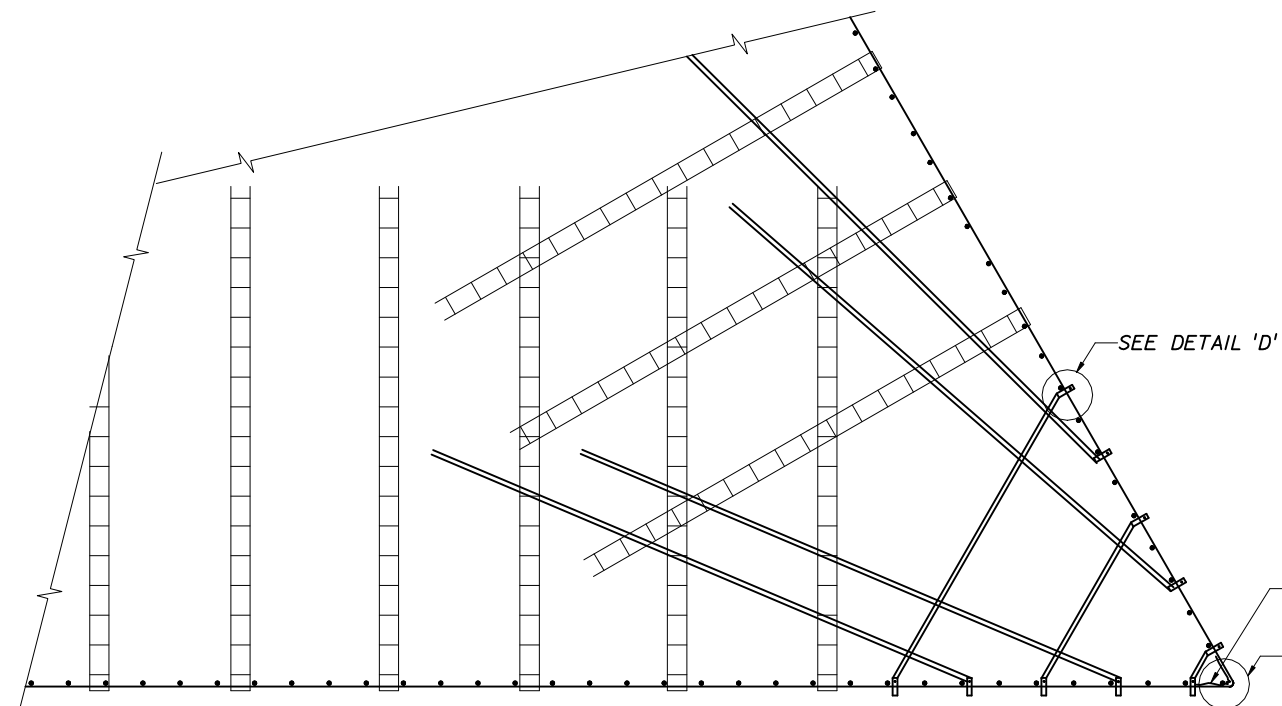
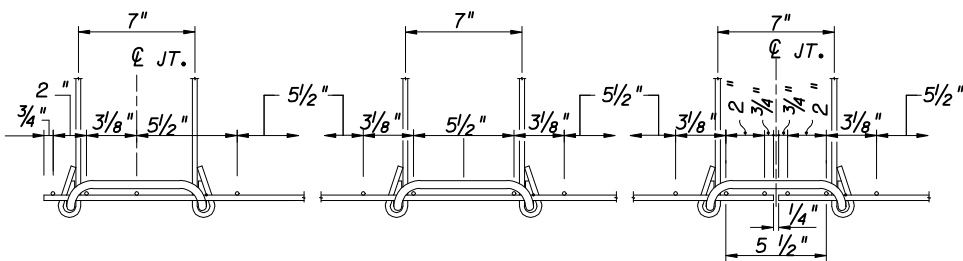
TEMPORARY TERRATREL WIRE WALL CONSTRUCTION PROCEDURE

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
 TERRATREL WIRE WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL				
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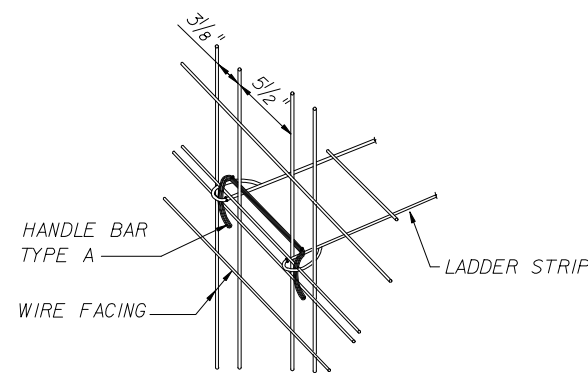


**WIRE FACING AT  
INSIDE AND OUTSIDE CORNERS**



**EXAMPLE ACUTE CORNER - SKEWED STRIPS**

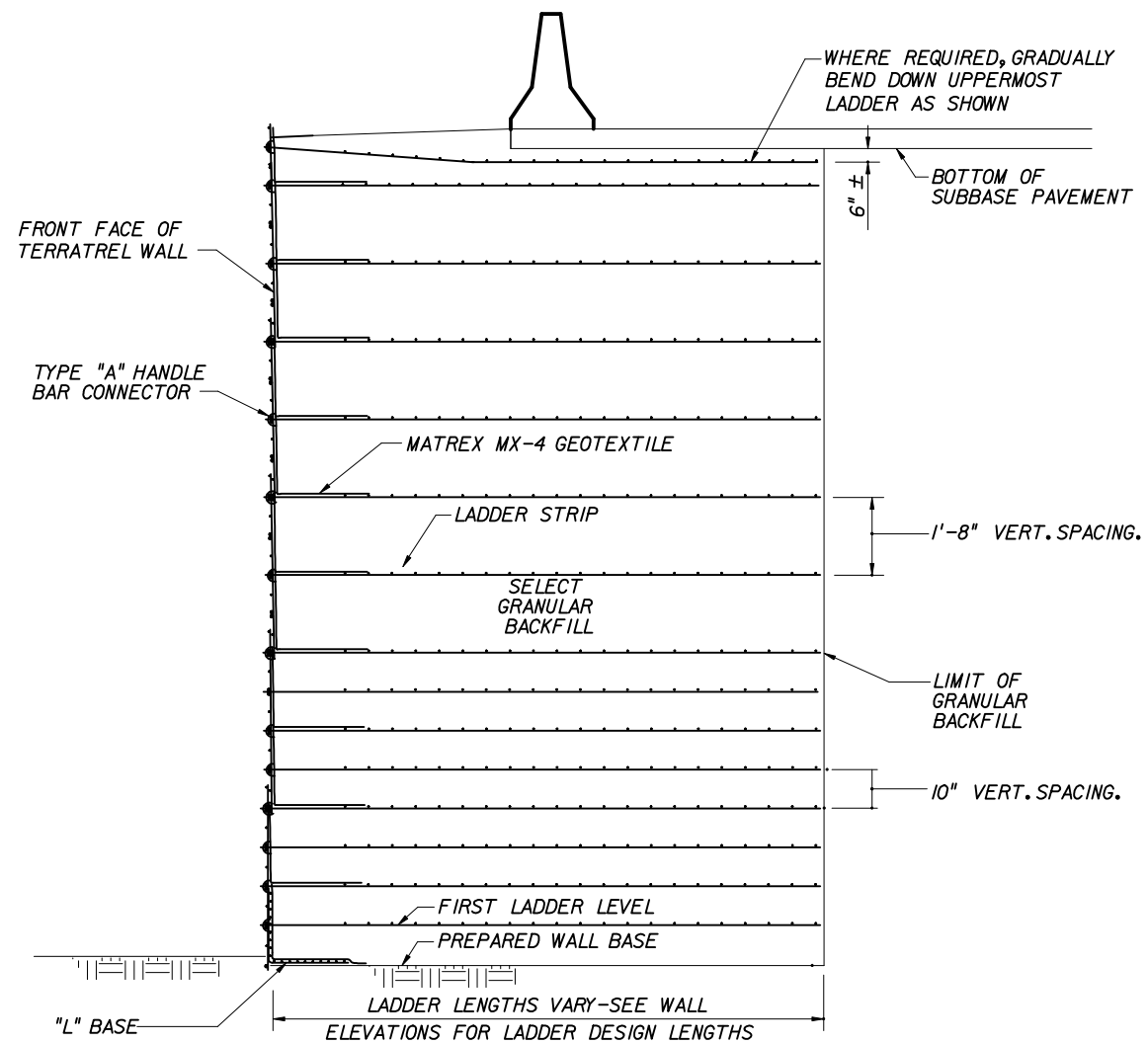
**THIS SYSTEM SHALL BE USED IN SLIGHTLY OR  
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TERRATREL WIRE WALL**



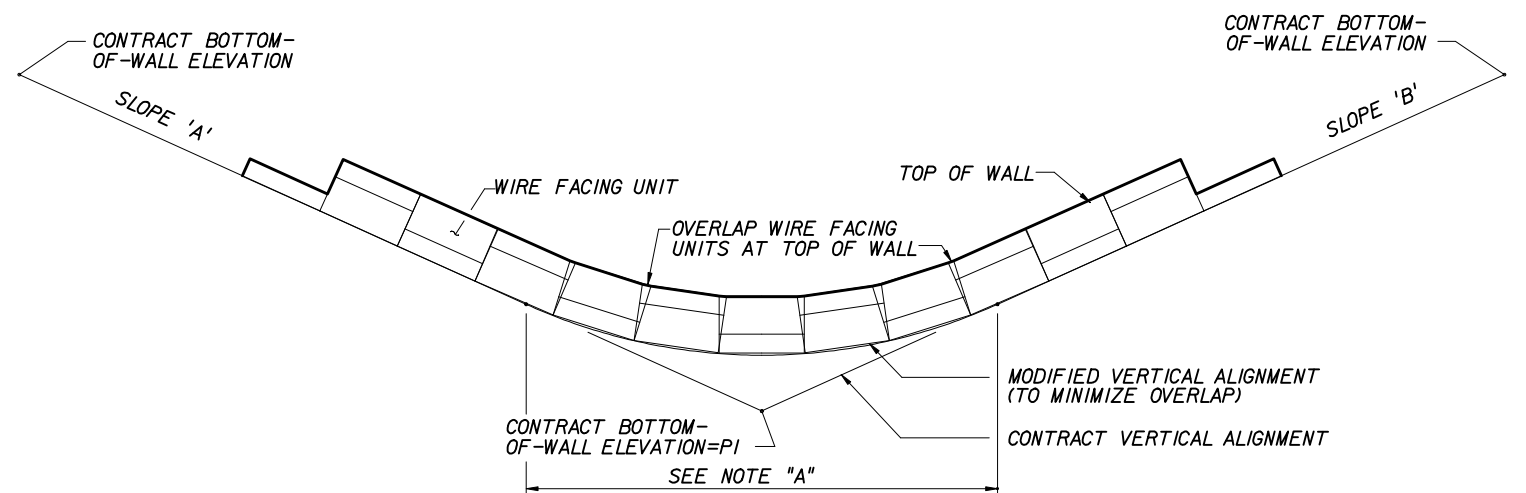
**TYPE A HANDLE BAR CONNECTION IN PERSPECTIVE**

**TERRATREL TYPE A CONNECTION DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL</b>				
Names	Dates	Approved By <i>[Signature]</i>		
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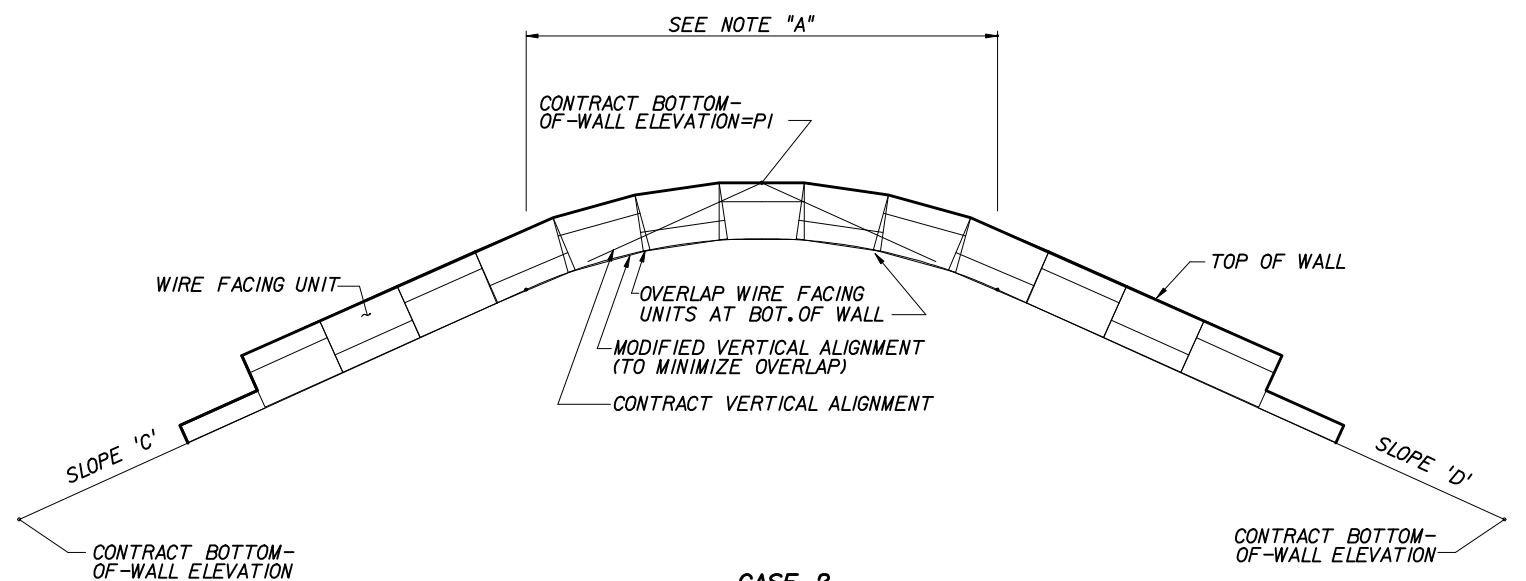


TYPICAL WALL SECTION



CASE 1

NOTE "A"  
WALL LIMITS WHERE BOTTOM OF WALL ELEVATIONS WERE MODIFIED TO MINIMIZE PANEL OVERLAP



CASE 2

VERTICAL ALIGNMENT DIAGRAMS

(SLOPES HAVE BEEN SHOWN EXAGGERATED FOR CLARITY)  
ADDING THE CURVES TO THE VERTICAL ALIGNMENT IS OPTIONAL, AND WHEN USED, MAY ELIMINATE OVERLAPPING FOR LOW WALLS (10 TO 15 FT. IN HEIGHT) WITH SMALL CHANGES IN SLOPE UP TO 3%.

THIS SYSTEM SHALL BE USED IN ALL ENVIRONMENTS.

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