| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| – | – |

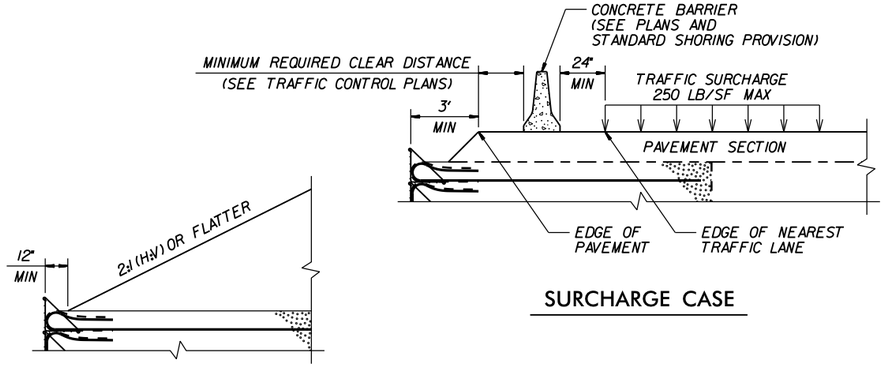
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

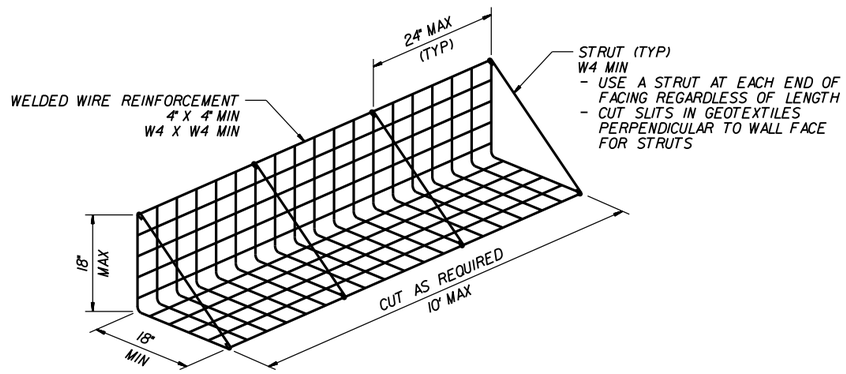
ENGINEER

SIGNATURE DATE

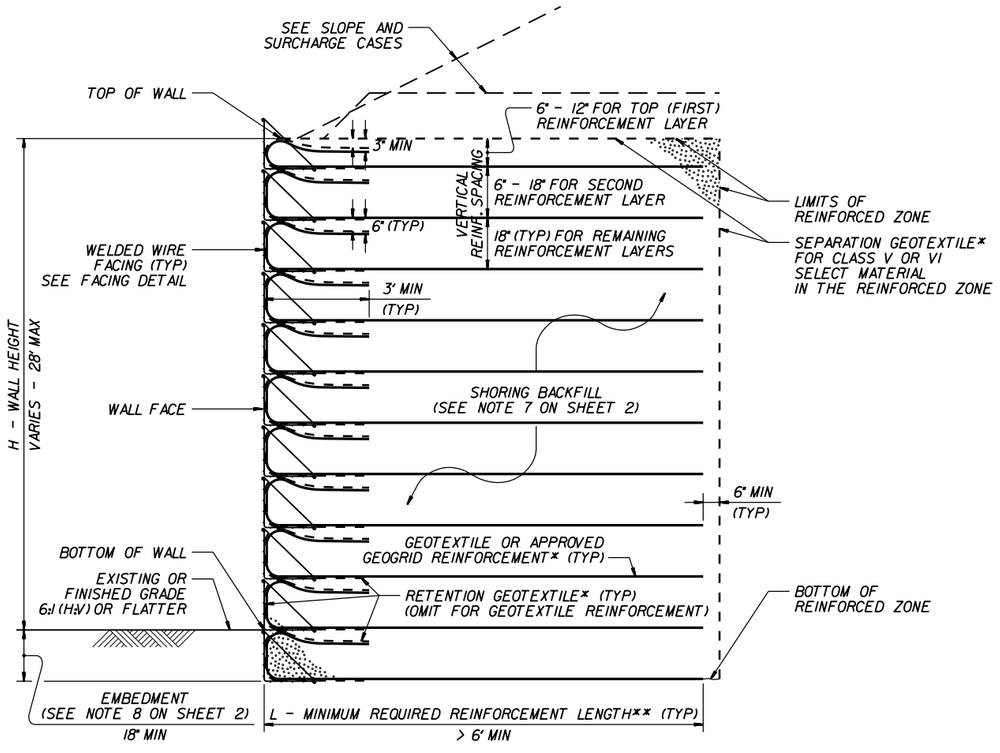



SURCHARGE CASE

SLOPE CASE

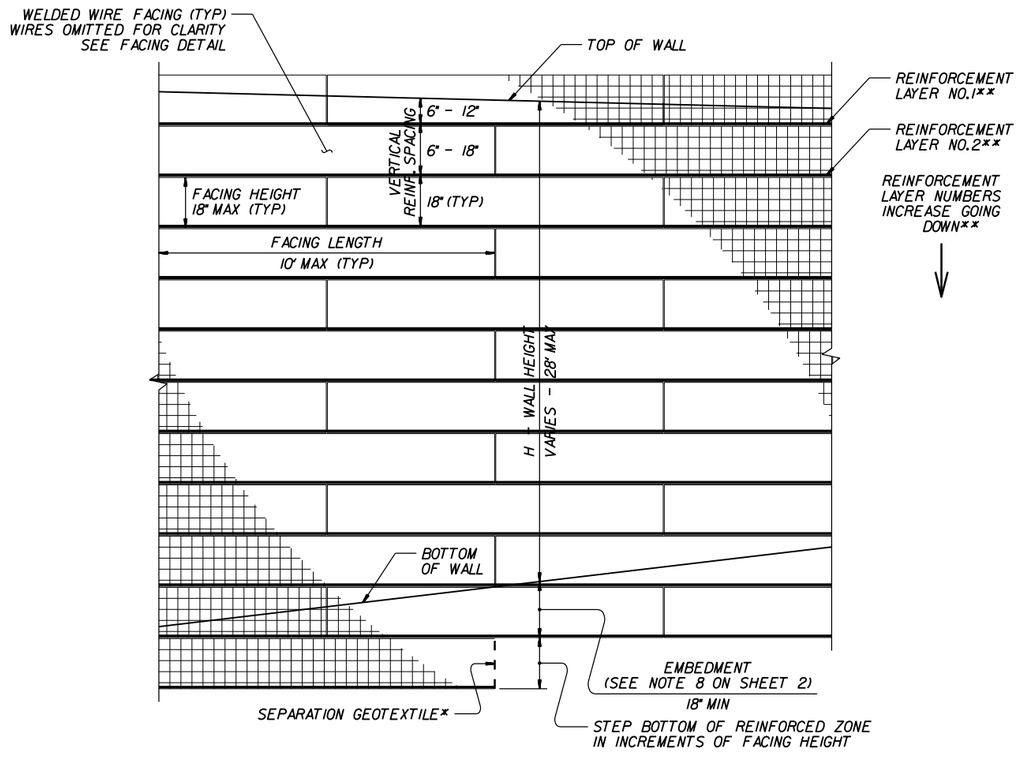



FACING DETAIL




STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.




STANDARD TEMPORARY WALL – PARTIAL ELEVATION

*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.

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STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 1 0F 3

DATE: 11-19-13

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| - | - |

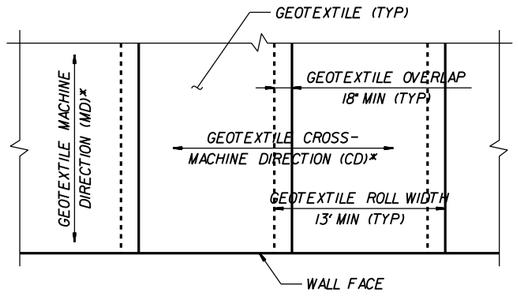
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PRINT NAME

SIGNATURE DATE

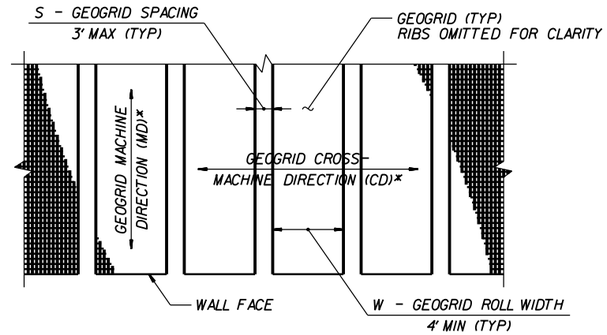
ENGINEER

SIGNATURE DATE




GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

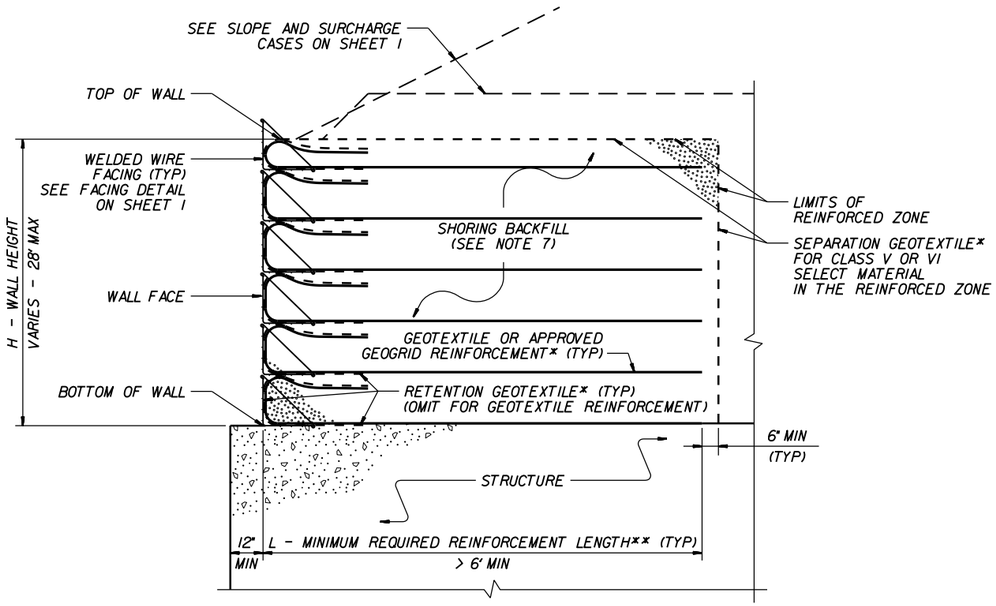



GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S}$ x 100 $\geq$ 80%, SEE NOTE 11)

## GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.




## TEMPORARY WALL ON STRUCTURE DETAIL

*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, $\gamma$ = 120 LB/CF
   FRICTION ANGLE, $\phi$ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

| MATERIAL TYPE | SHORING BACKFILL |
|---|---|
| BORROW | A-2-4 SOIL |
| FINE AGGREGATE | CLASS II, TYPE 1 OR CLASS III SELECT MATERIAL |
| COARSE AGGREGATE | CLASS V OR VI SELECT MATERIAL |

    IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

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STANDARD TEMPORARY WALL SHEET 2 OF 3

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| – | – |

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER REGISTERED SEAL NAME

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

| SLOPE OR SURCHARGE CASE | GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT) | SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2) | H – WALL HEIGHT (FT) | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | < 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| SLOPE CASE | > 0 | CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL | 6 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 24 | 25 | 26 | 27 | 27 |
| SURCHARGE CASE | > 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20' | ALL SHORING BACKFILL TYPES | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 16 | 17 | 17 | 18 | 19 | 19 | 20 | 21 | 22 |
| | > 7 FOR H < 20' > 10 FOR H ≥ 20' | A-2-4 SOIL | 6 | 6 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 16 | 16 | 17 | 18 | 18 | 19 | 20 | 20 | 21 |
| | | CLASS II,TYPE I OR CLASS III SELECT MATERIAL | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 15 | 15 | 16 | 16 | 17 | 17 | 18 | 18 | 19 | 20 |
| | | CLASS V OR CLASS VI SELECT MATERIAL | 6 | 6 | 7 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 13 | 13 | 14 | 14 | 15 | 15 | 16 | 17 | 17 | 18 | 19 | 19 |

## L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

| WALL HEIGHT (H) + EMBEDMENT (FT) | NUMBER OF REINFORCEMENT LAYERS* |
|---|---|
| 2.5 – 4 | 3 |
| 4 – 5.5 | 4 |
| 5.5 – 7 | 5 |
| 7 – 8.5 | 6 |
| 8.5 – 10 | 7 |
| 10 – 11.5 | 8 |
| 11.5 – 13 | 9 |
| 13 – 14.5 | 10 |
| 14.5 – 16 | 11 |
| 16 – 17.5 | 12 |
| 17.5 – 19 | 13 |
| 19 – 20.5 | 14 |
| 20.5 – 22 | 15 |
| 22 – 23.5 | 16 |
| 23.5 – 25 | 17 |
| 25 – 26.5 | 18 |
| 26.5 – 28 | 19 |
| 28 – 29.5 | 20 |

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

| REINFORCEMENT LAYER NUMBER* | SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2) | | | | |
|---|---|---|---|---|---|
| | SLOPE CASE | | SURCHARGE CASE | | |
| | CLASS II,TYPE I OR CLASS III SELECT MATERIAL | CLASS V SELECT MATERIAL | A-2-4 SOIL | CLASS II,TYPE I OR CLASS III SELECT MATERIAL | CLASS V SELECT MATERIAL |
| 1 | 2400 | 2400 | 2400 | 2400 | 2400 |
| 2 | 2400 | 2400 | 2400 | 2400 | 2400 |
| 3 | 2400 | 2400 | 2400 | 2400 | 2400 |
| 4 | 2400 | 2400 | 2500 | 2400 | 2400 |
| 5 | 2500 | 2400 | 3000 | 2400 | 2400 |
| 6 | 3000 | 2400 | 3500 | 2800 | 2400 |
| 7 | 3500 | 2700 | 4000 | 3200 | 2600 |
| 8 | 4000 | 3100 | 4500 | 3600 | 2900 |
| 9 | 4500 | 3500 | 5000 | 4000 | 3200 |
| 10 | 5000 | 3900 | 5500 | 4400 | 3500 |
| 11 | 5500 | 4300 | 6000 | 4800 | 3800 |
| 12 | 6000 | 4700 | 6500 | 5200 | 4100 |
| 13 | 6500 | 5100 | 7000 | 5600 | 4400 |
| 14 | 7000 | 5400 | 7500 | 6000 | 4700 |
| 15 | 7500 | 5800 | 8000 | 6400 | 5000 |
| 16 | 8000 | 6200 | 8500 | 6800 | 5300 |
| 17 | 8500 | 6600 | 9000 | 7200 | 5600 |
| 18 | 9000 | 7000 | 9500 | 7600 | 5900 |
| 19 | 9500 | 7400 | 10000 | 8000 | 6200 |
| 20 | 10000 | 7800 | 10500 | 8400 | 6500 |

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

| REINFORCEMENT LAYER NUMBER* | SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2) | | | | |
|---|---|---|---|---|---|
| | SLOPE CASE | | SURCHARGE CASE | | |
| | CLASS II,TYPE I OR CLASS III SELECT MATERIAL | CLASS V OR CLASS VI SELECT MATERIAL | A-2-4 SOIL | CLASS II,TYPE I OR CLASS III SELECT MATERIAL | CLASS V OR CLASS VI SELECT MATERIAL |
| 1 | 240 | 200 | 340 | 290 | 240 |
| 2 | 380 | 310 | 520 | 430 | 350 |
| 3 | 530 | 420 | 700 | 570 | 460 |
| 4 | 690 | 550 | 870 | 720 | 570 |
| 5 | 860 | 690 | 1050 | 860 | 680 |
| 6 | 1030 | 830 | 1220 | 1000 | 790 |
| 7 | 1200 | 970 | 1400 | 1150 | 900 |
| 8 | 1370 | 1110 | 1580 | 1290 | 1010 |
| 9 | 1550 | 1240 | 1750 | 1430 | 1120 |
| 10 | 1720 | 1380 | 1930 | 1580 | 1230 |
| 11 | 1890 | 1520 | 2100 | 1720 | 1340 |
| 12 | 2060 | 1660 | 2280 | 1860 | 1450 |
| 13 | 2240 | 1800 | 2450 | 2010 | 1560 |
| 14 | 2410 | 1940 | 2630 | 2150 | 1670 |
| 15 | 2580 | 2080 | 2800 | 2290 | 1780 |
| 16 | 2750 | 2220 | 2980 | 2440 | 1890 |
| 17 | 2930 | 2360 | 3160 | 2580 | 2000 |
| 18 | 3100 | 2500 | 3330 | 2720 | 2110 |
| 19 | 3270 | 2640 | 3510 | 2860 | 2220 |
| 20 | 3440 | 2780 | 3690 | 3000 | 2330 |

GEOGRID REINFORCEMENT
SHORT–TERM DESIGN STRENGTH (LB/FT)

(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.

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STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 0F 3

DATE: 11-19-13