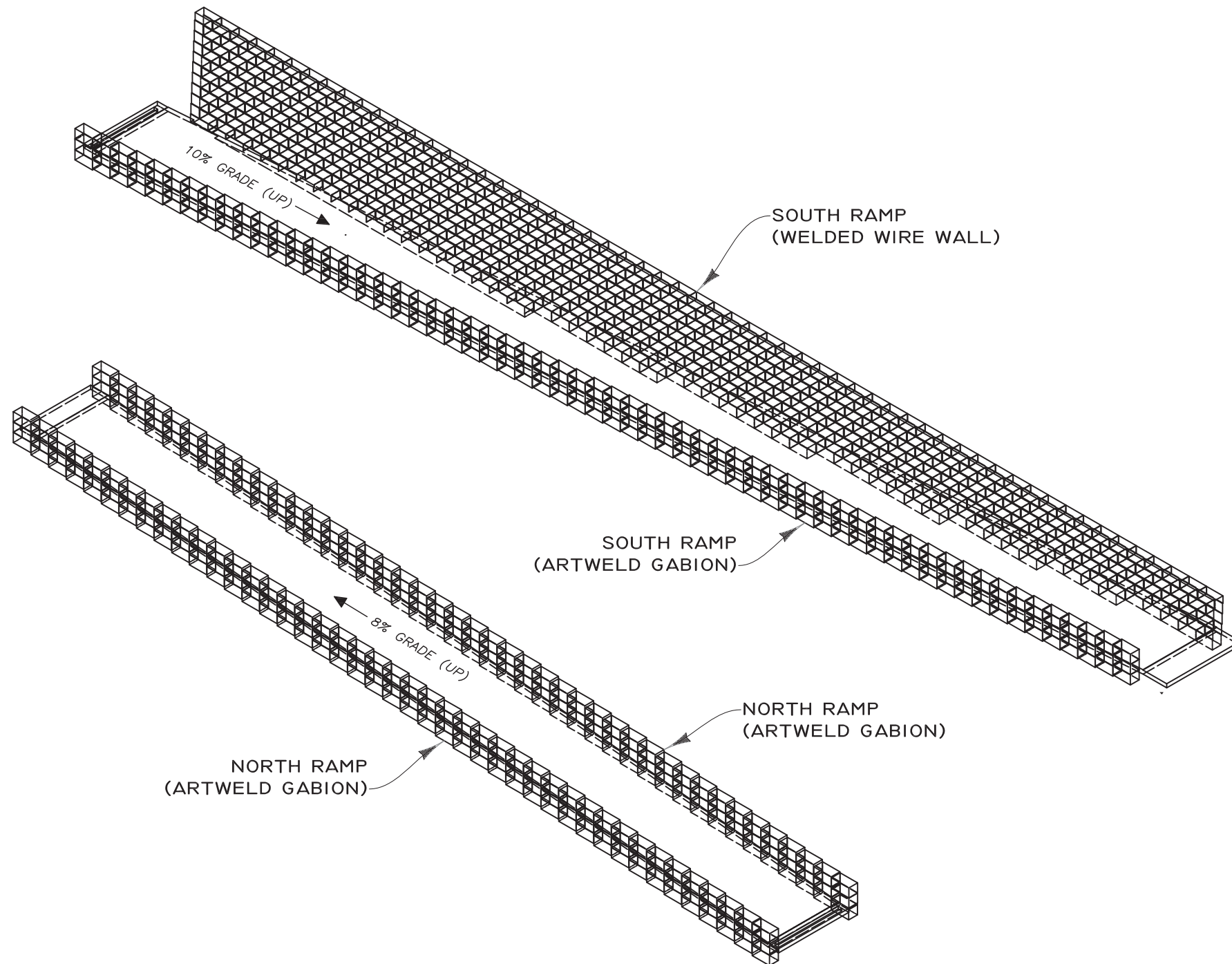


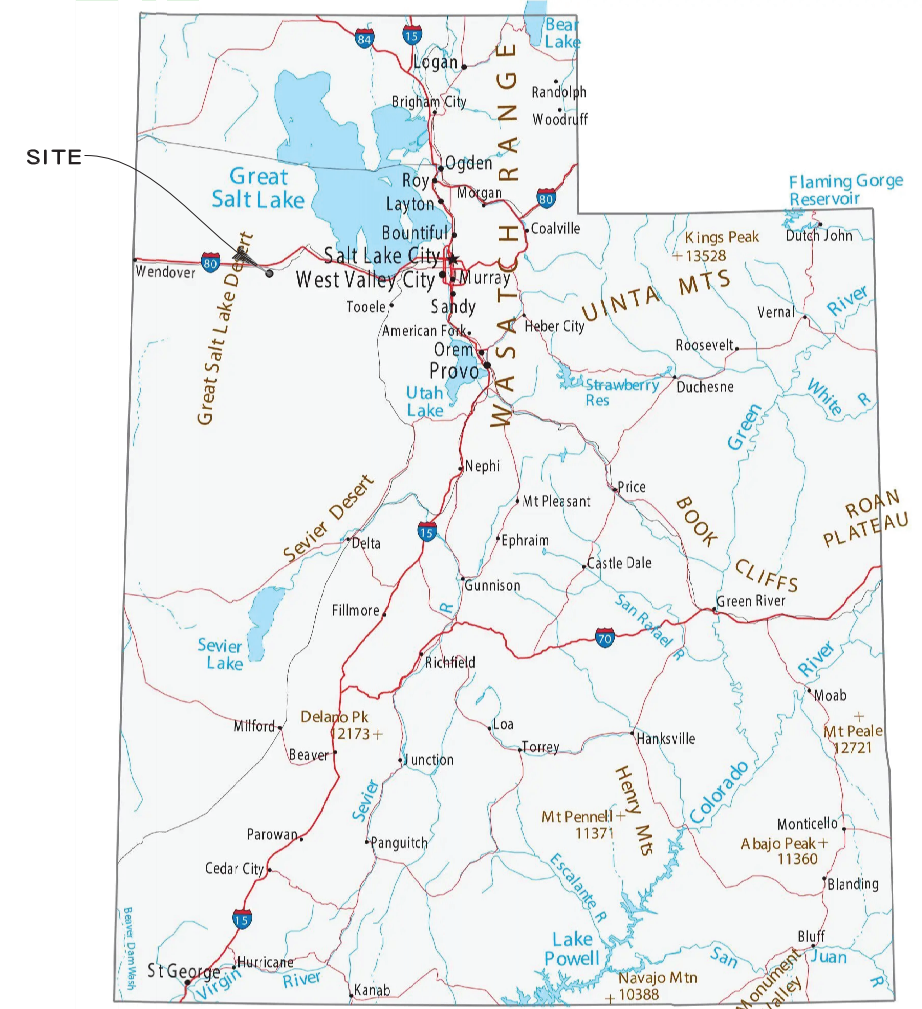
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**ISOMETRIC VIEW - NORTH & SOUTH WALLS**

NOT TO SCALE



**VICINITY MAP**

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| 1    | 12/15/2021 | RGV | ISSUED FOR CONSTRUCTION |

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|-----------|-----|
| CADD:     | RGV |
| DESIGNED: | RGV |
| CHECKED:  | SGC |

**HILFIKER RETAINING WALLS**

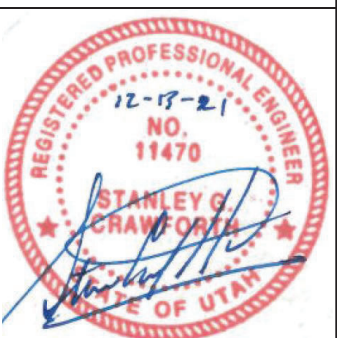
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ISOMETRIC & VICINITY MAP  
ENERGY SOLUTIONS  
CLIVE FACILITY  
RAILCAR DUMPING BUILDING  
ENERGY SOLUTIONS TOOELE COUNTY, UT

|           |             |
|-----------|-------------|
| DWG DATE: | 15 DEC 2021 |
| HRW NO.:  | 210614AW    |
| SHEET     | 1           |
| OF        | 8           |



**DESIGN NOTES**

- DESIGN IS BASED ON INFORMATION PROVIDED BY THE CONTRACTOR.
- DESIGN IS BASED ON THE ASSUMPTION THAT BACKFILL WITHIN THE REINFORCED SOIL MASS, METHODS OF CONSTRUCTION AND THE QUALITY OF MATERIALS CONFORM TO THE REQUIREMENTS OF HILFIKER RETAINING WALLS.
- ASSUMED SOIL CHARACTERISTICS:  
 WALL BACKFILL (CONTRACTOR TO VERIFY BY TEST):  
 TOTAL UNIT WEIGHT: 130 PCF  
 INTERNAL FRICTION ANGLE: 40° (ASTM D3080)  
 COHESION: 0 PSF  
 RETAINED BACKFILL:  
 TOTAL UNIT WEIGHT: 120 PCF  
 INTERNAL FRICTION ANGLE: 30°  
 COHESION: 0 PSF  
 FOUNDATION SOILS:  
 TOTAL UNIT WEIGHT: 115 PCF  
 INTERNAL FRICTION ANGLE: 30°  
 COHESION: 0 PSF  
  
 SEISMIC ACCELERATION: NA  
  
 IF ACTUAL CHARACTERISTICS, GRADES OR DIMENSIONS OF SOIL MATERIALS DIFFER FROM THOSE LISTED ABOVE OR SHOWN ON THE PLANS, HILFIKER RETAINING WALLS SHALL BE NOTIFIED TO EVALUATE THE NEED TO REDESIGN.
- THE DESIGN REQUIRES A NON-SATURATED BACKFILLED. SURFACE AND SUB-SURFACE DRAINAGE CONTROL MAY BE REQUIRED TO PREVENT SATURATION OF THE BACKFILL OR RELIEVE HYDROSTATIC PRESSURES.
- THE CONTRACTOR IS RESPONSIBLE FOR ROUTING STORMWATER DRAINAGE AWAY FROM THE WALL DURING CONSTRUCTION.
- PRIOR TO PLACING THE FIRST REINFORCEMENT OR GABION, STIFFEN THE FOUNDATION SOILS USING A VIBRATORY ROLLER.
- A SMALL BACKHOE MAY BE ALLOWED ON THE WALL WITHIN 3 FEET OF THE WALL FACE.
- NO CRANE OR EQUIPMENT IS ALLOWED ON THE WALL.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ESTABLISHING THE WALL LAYOUT LINE.
- DRAINAGE CONTROL SHALL BE AS SPECIFIED IN THE PROJECT PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE OWNER'S ENGINEER. PAYMENT FOR DRAINAGE SHALL BE AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
- WALL FACING AND CAP MAT SHALL BE FABRICATED OF WELDED WIRE CONFORMING TO AASHTO M-32 AND M-55 AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M-111 FOLLOWING FABRICATION. GEOGRID REINFORCEMENT SHALL BE MIRAGRID PER PROJECT SPECIFICATIONS.
- THIS DESIGN SUBMITTAL IS BASED ON ASTM A1115 - STANDARD PRACTICE FOR CONSTRUCTION OF MECHANICALLY STABILIZED EARTH WALLS WITH INEXTENSIBLE SOIL REINFORCEMENT (LATEST APPROVAL).
- THIS IS A PERMANENT MSE WALL DESIGNED FOR 25 YEARS OF SERVICE. THE OWNER IS ENERGY SOLUTIONS.
- AMERICAN GEOTECHNICS IS NOT THE OWNER'S "ENGINEER OF RECORD" OR THE OWNER'S "GEOTECHNICAL ENGINEER" OR THE OWNER'S "HYDRAULIC ENGINEER," AS DESCRIBED IN ASTM A1115. THE OWNER IS RESPONSIBLE FOR THE FOLLOWING:  
 A. EVALUATING GLOBAL STABILITY  
 B. ESTABLISHING FOUNDATION BEARING RESISTANCE DESIGN CRITERIA  
 C. IMPLEMENTING AN ADEQUATE QUALITY CONTROL PROGRAM
- HILFIKER RETAINING WALLS, INC (800-762-8962) IS THE "WALL SUPPLIER" WHOSE SYSTEM AND COMPONENTS ARE THE SOLE BASIS OF THIS SUBMITTAL.
- AMERICAN GEOTECHNICS (208-658-8700) IS THE "WALL DESIGN ENGINEER," AS DESCRIBED IN ASTM A1115. AMERICAN GEOTECHNICS HAS SPECIFIED THE TYPE(S), SIZES, AND LOCATIONS OF BURIED REINFORCEMENTS FOR THIS SUBMITTAL.
- THE ENGINEER OF RECORD ADMINISTERS THE OWNER'S REQUIREMENTS FOR THE LONG-TERM STABILITY OF THE MSE WALL (MSEW), INCLUDING:  
 A. FOUNDATION PREPARATION REQUIREMENTS OF THE GEOTECHNICAL ENGINEER  
 B. INTERNAL DRAINAGE FEATURES ALONG TEMPORARY CUT SLOPES  
 C. SCOUR COUNTERMEASURES ALONG THE TOE  
 D. EROSION COUNTERMEASURES AT THE ENDS  
 E. SURFACE WATER DRAINAGE CONTROLS ABOVE THE WALL  
 F. CONSTRUCTION OF THE SUPPLIED MSEW SYSTEM WITH ALL OF ITS APPURTENANT COMPONENTS

**NORTH RAMP (ARTWELD GABION) - SUPPLIED QUANTITIES**

| SUPPLIED REINFORCEMENT QUANTITIES |      |                 |          |
|-----------------------------------|------|-----------------|----------|
| SIZE LxWxH                        | CY   | REQUIRED AMOUNT | TOTAL CY |
| 6x2.5x2.5                         | 1.39 | 216             | 300 CY   |
| TOTAL:                            |      |                 | 300 CY   |

**SOUTH RAMP (ARTWELD GABION) - SUPPLIED QUANTITIES**

| SUPPLIED REINFORCEMENT QUANTITIES |      |                 |            |
|-----------------------------------|------|-----------------|------------|
| SIZE LxWxH                        | CY   | REQUIRED AMOUNT | TOTAL CY   |
| 6x2.5x2.5                         | 1.39 | 150             | 208.333 CY |
| TOTAL:                            |      |                 | 208.333 CY |

**SOUTH RAMP (WELDED WIRE-FACED WALL) - SUPPLIED QUANTITIES**

| SUPPLIED WELDED WIRE REINFORCEMENT QUANTITIES |                            |                                  |                               |
|---|----------------------------|----------------------------------|-------------------------------|
| BASE DEPTH                                    | CAP MAT W4.5XW3.5 (8"X12") | PRONGLESS MAT W4.5XW3.5 (8"X12") | STANDARD MAT W4.5XW4 (8"X21") |
| 19'   | 12                         |                                  |                               |
| 17'   | 10                         |                                  |                               |
| 15'   | 8                          |                                  |                               |
| 11'   | 7                          |                                  |                               |
| 5.25'   |                            |                                  | 386                           |
| 5'  |                            | 37                               |                               |

|                           |           |
|---------------------------|-----------|
| WALL FACE SUPPLIED        | 6,768 SF  |
| 3XT MIRAGRID (12' WIDE)   | 2,560 LF  |
| 7XT MIRAGRID (12' WIDE)   | 4,504 LF  |
| BACKING MATS (2'-0" HIGH) | 437 EA    |
| FILTER FABRIC (7.5' WIDE) | 3,496 LF  |
| HOG RINGS                 | 10,200 EA |
| PLIERS                    | 5 EA      |

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| 2    | 12/21/2021 | RGV | UPDATED SUPPLIED QUANTITIES |

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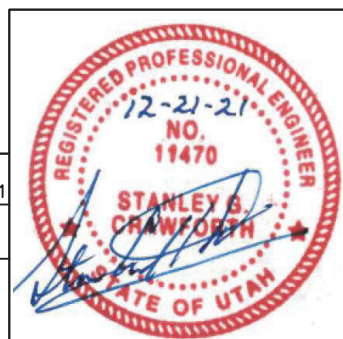
American Geotechnics  
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DESIGN NOTES & QUANTITIES

ENERGY SOLUTIONS  
 CLIVE FACILITY  
 RAILCAR DUMPING BUILDING

ENERGY SOLUTIONS TOOELE COUNTY, UT

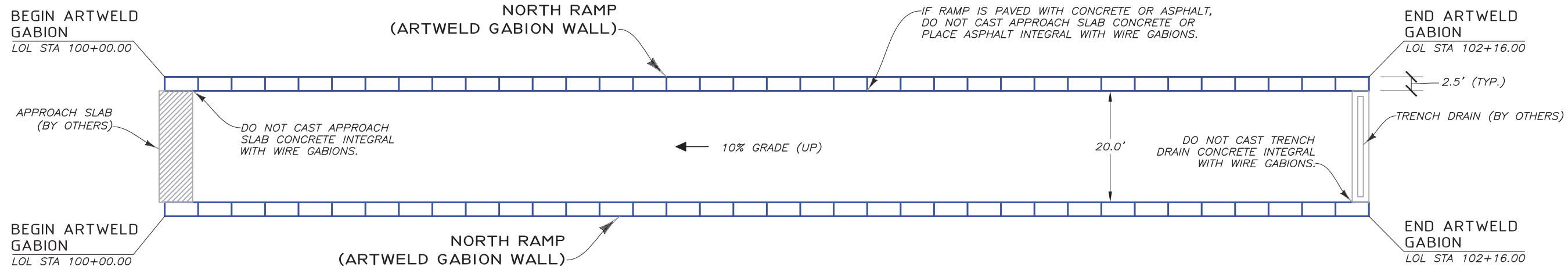
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 HRW NO.: 210614AW  
 SHEET 2 OF 8



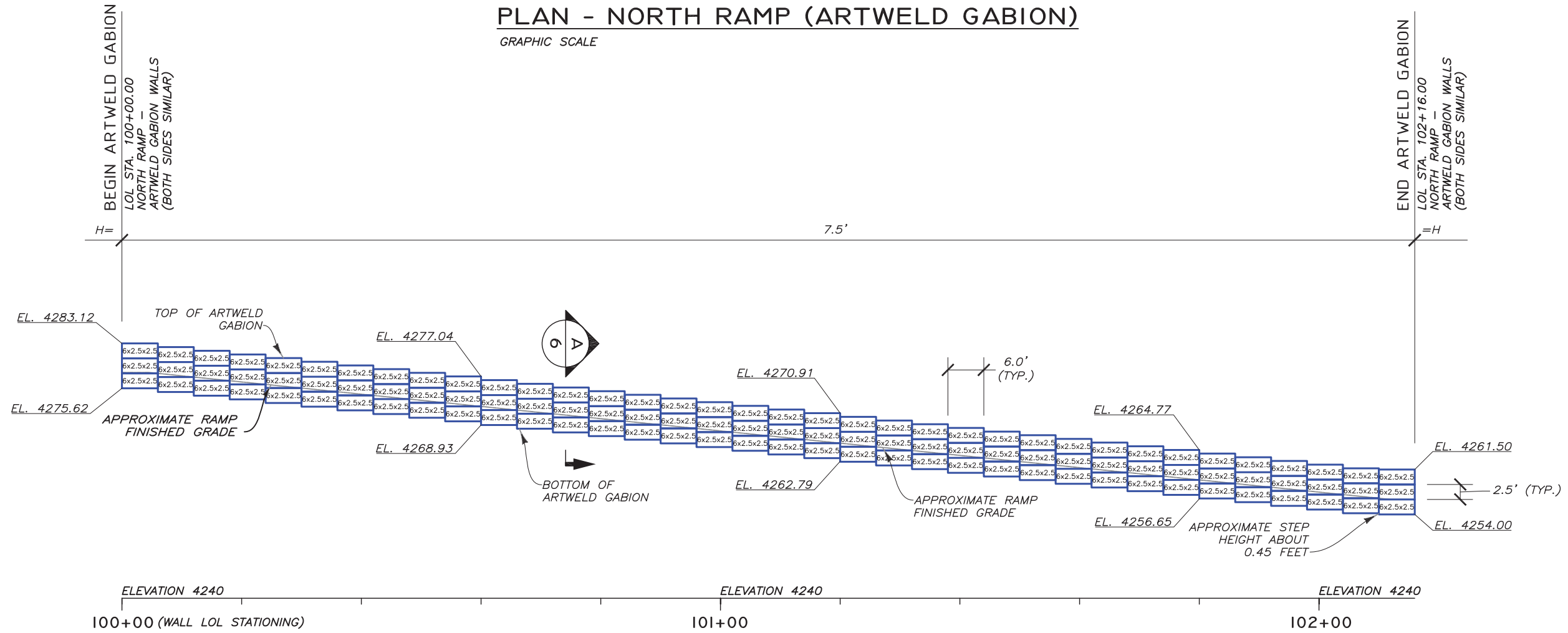


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**PLAN - NORTH RAMP (ARTWELD GABION)**  
GRAPHIC SCALE



**DEVELOPED ELEVATION - NORTH RAMP (ARTWELD GABION)**  
GRAPHIC SCALE (BOTH SIDES SIMILAR)

**LEGEND**

- 6x2.5x2.5 6x2.5x2.5 ARTWELD GABION
- LOL LAYOUT LINE
- H HEIGHT

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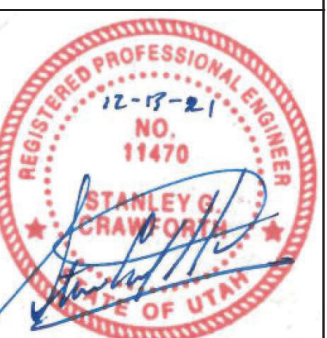
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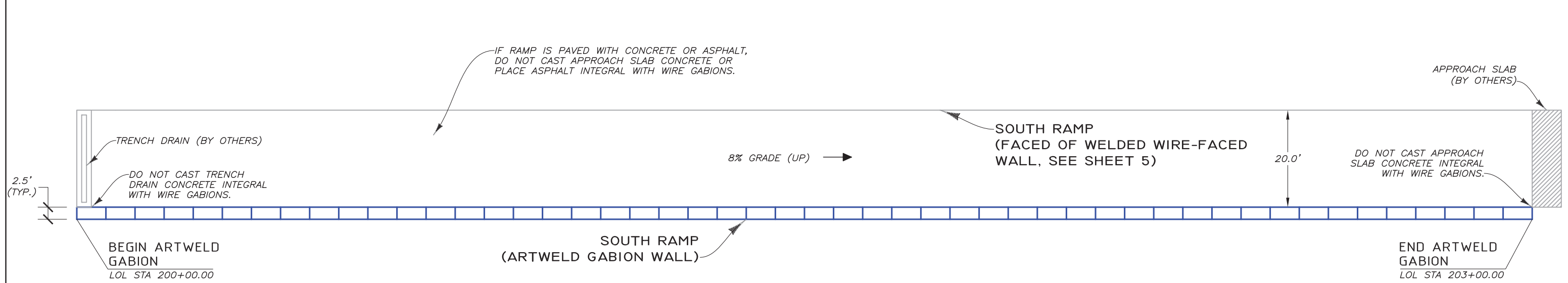
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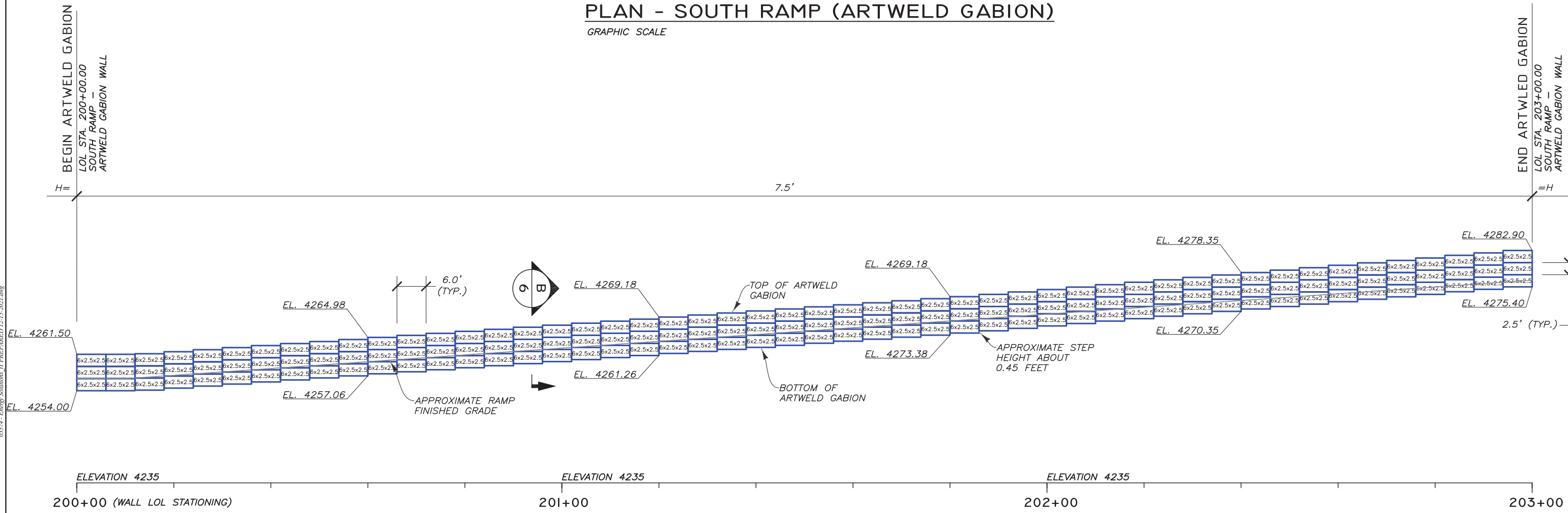
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HRW NO.: 210614AW  
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**PLAN - SOUTH RAMP (ARTWELD GABION)**  
GRAPHIC SCALE



**DEVELOPED ELEVATION - SOUTH RAMP (ARTWELD GABION)**  
GRAPHIC SCALE

**LEGEND**

|     |                          |
|-----|--------------------------|
|     | 6x2.5x2.5 ARTWELD GABION |
| LOL | LAYOUT LINE              |
| H   | HEIGHT                   |

| REV. | DATE       | BY  | DESCRIPTION             | CADD:        |
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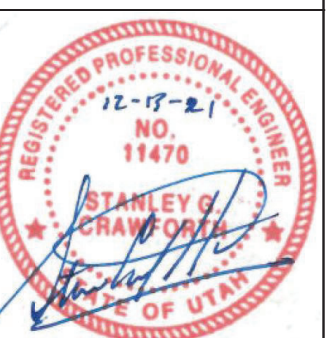
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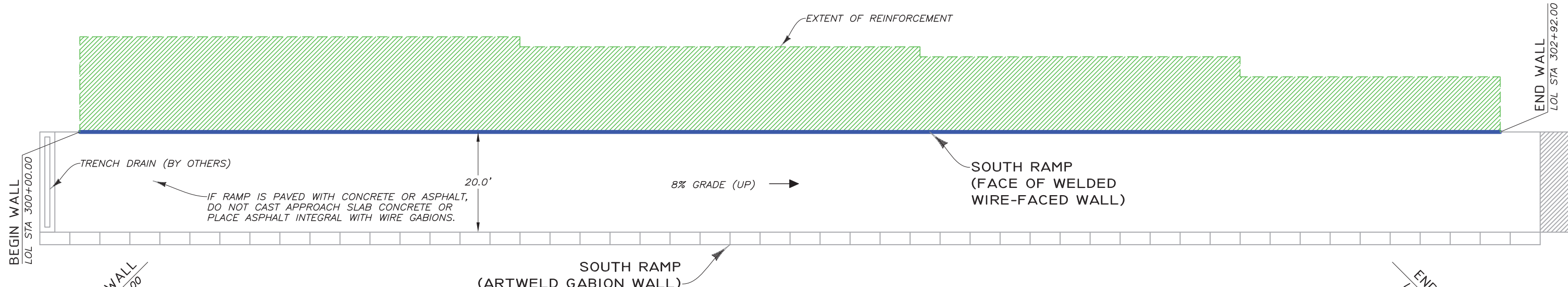
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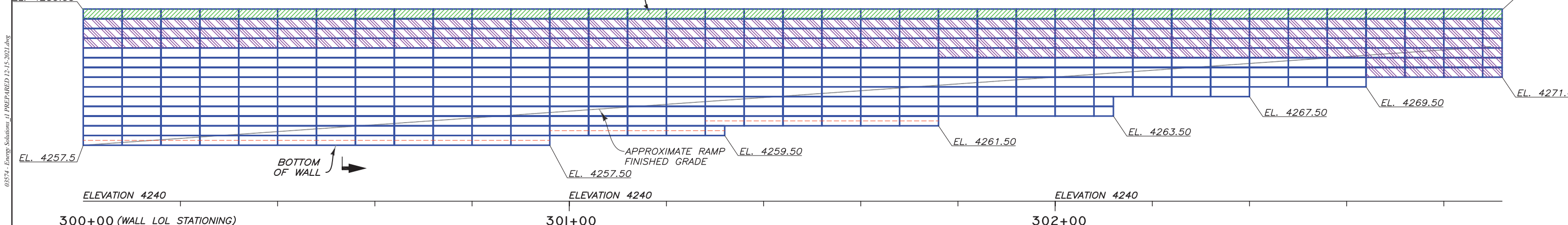
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### PLAN - SOUTH RAMP (WELDED WIRE WALL)

GRAPHIC SCALE

| REINFORCEMENT LENGTH (TYP)<br>CUT LENGTH - REINFORCEMENT<br>LENGTH + 5.5' FACING WRAP (TYP) | 28'             | 26'             | 24'             | 22'           | 18'           | 16'           | 14'           |
|---|-----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|
| H=  |                 |                 |                 |               |               |               |               |
| B1=   | 19.0' (24.5')   | 17.0' (22.5')   | 17.0' (22.5')   | 15.0' (20.5') | 15.0' (20.5') | 11.0' (16.5') | 11.0' (16.5') |
| B2=   | 18.5' (24.0')   | 16.5' (22.0')   | 16.5' (22.0')   | 14.5' (20.0') | 14.5' (20.0') | 10.0' (15.5') | 10.0' (15.5') |
| B3=   | 18.5' (24.0')   | 16.5' (22.0')   | 16.5' (22.0')   | 14.5' (20.0') | 14.5' (20.0') | 10.0' (15.5') | 10.0' (15.5') |
| B4=   | 18.5' (NO WRAP) | 16.5' (NO WRAP) | 16.5' (NO WRAP) | -             | -             | -             | -             |



### DEVELOPED ELEVATION - SOUTH RAMP (WELDED WIRE WALL)

GRAPHIC SCALE

#### LEGEND

- B1 8"X12", W4.5xW3.5-HDG WW CAP MAT AND FACING MAT WITH "MIRAGRID 3XT" REINFORCEMENT
- B2 8"X21", W4.5xW4-HDG FACING MAT WITH "MIRAGRID 3XT" REINFORCEMENT
- B3 8"X21", W4.5xW4-HDG FACING MAT WITH "MIRAGRID 7XT" REINFORCEMENT
- B4 INTERMEDIATE MIRAGRID 7XT REINFORCEMENT

- LOL LAYOUT LINE
- H WALL HEIGHT (BOTTOM TO CAP MAT)
- B REINFORCEMENT LENGTH
- WW WELDED WIRE

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**HILFIKER RETAINING WALLS**

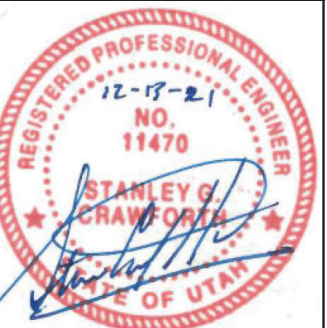
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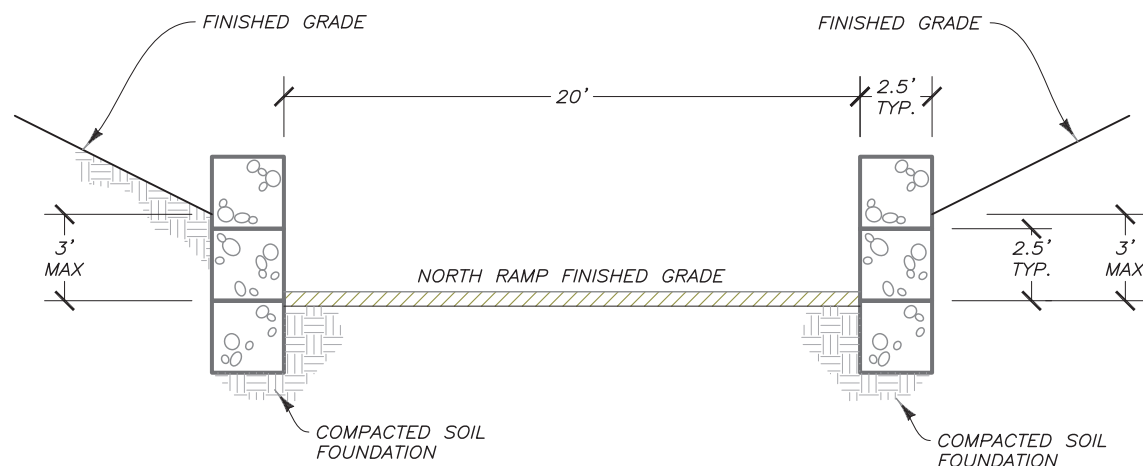
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ENERGY SOLUTIONS TOOELE COUNTY, UT

DWG DATE: 15 DEC 2021  
HRW NO.: 210614AW  
SHEET 5 OF 8

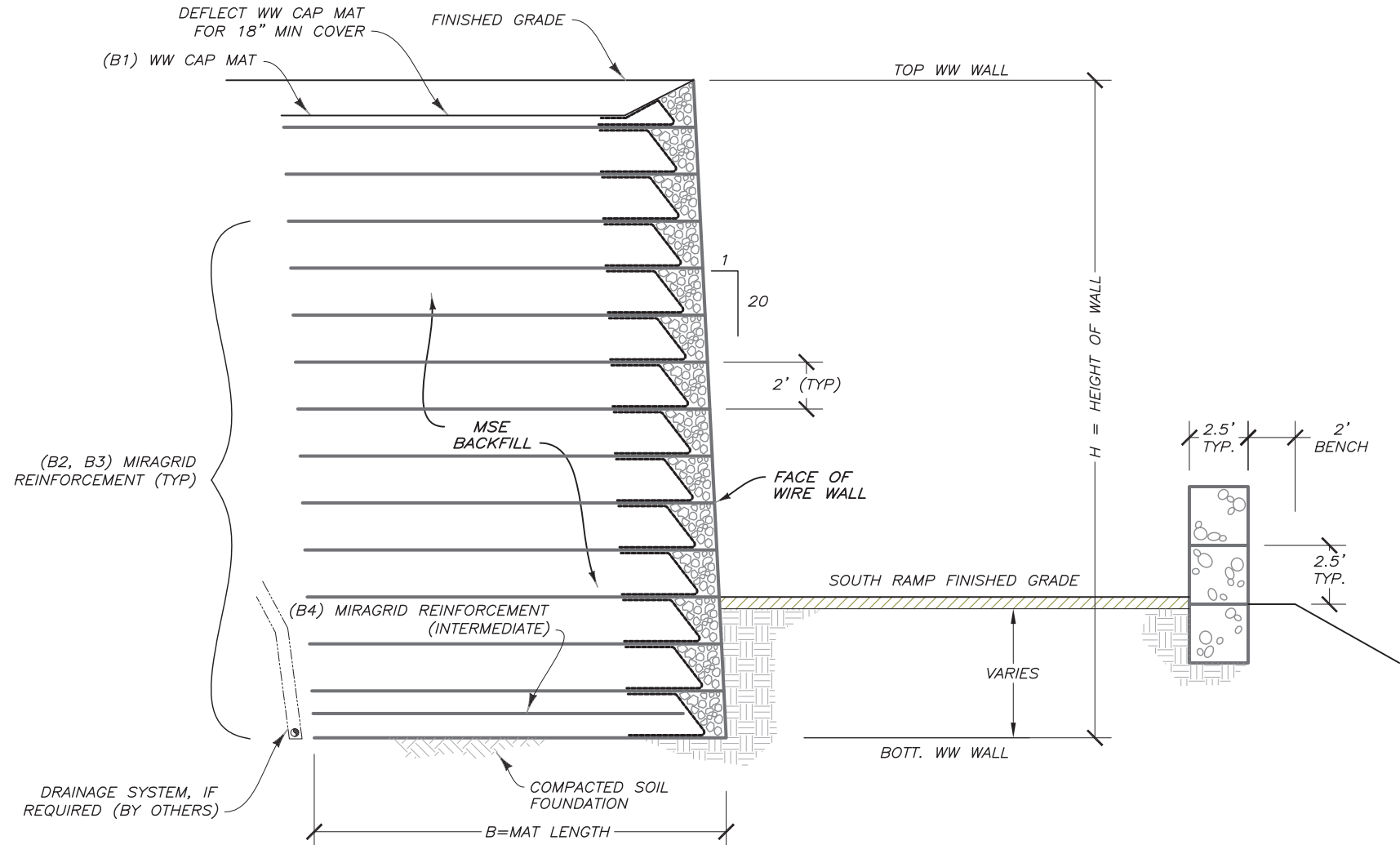


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**TYPICAL SECTION A**  
NOT TO SCALE



**TYPICAL SECTION B**  
NOT TO SCALE

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|------|------------|-----|-------------------------|--------------|
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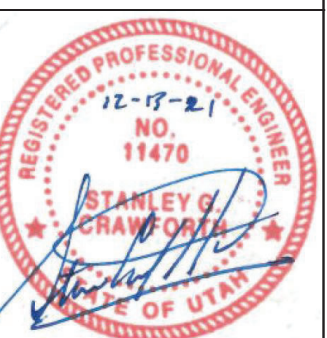
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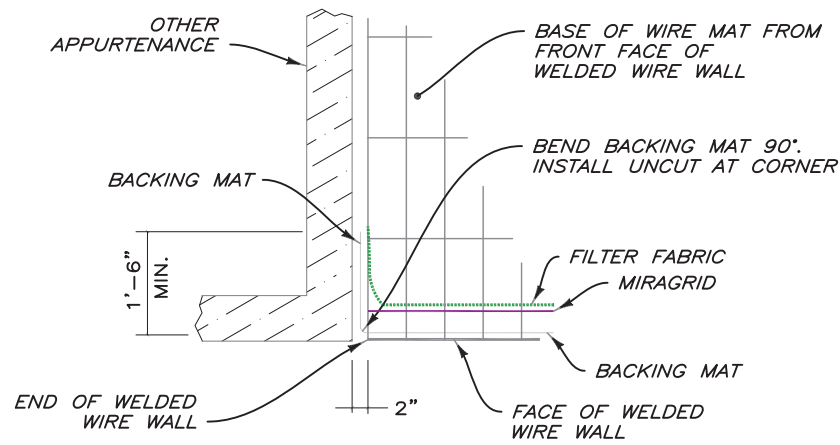
| SECTIONS                 |                   |
|--------------------------|-------------------|
| ENERGY SOLUTIONS         | TOOELE COUNTY, UT |
| CLIVE FACILITY           |                   |
| RAILCAR DUMPING BUILDING |                   |

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| DWG DATE: | 15 DEC 2021 |
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| OF        | 8           |

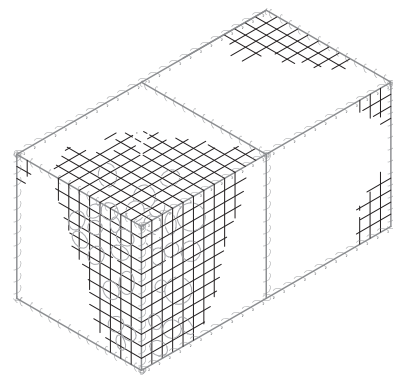


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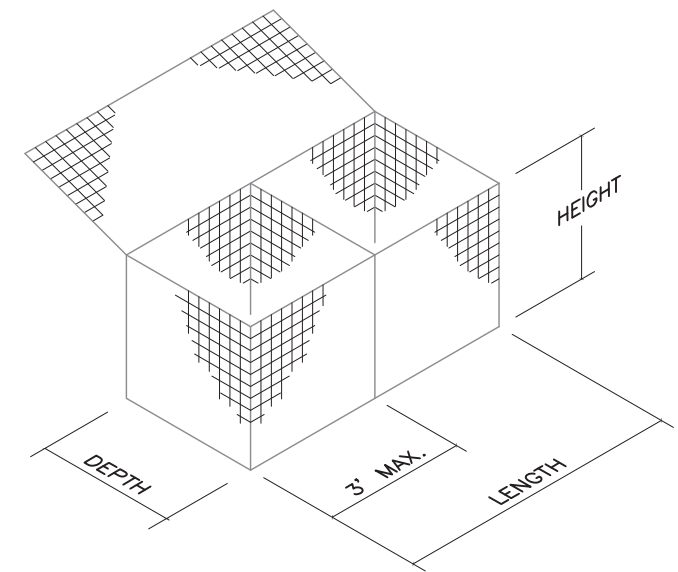




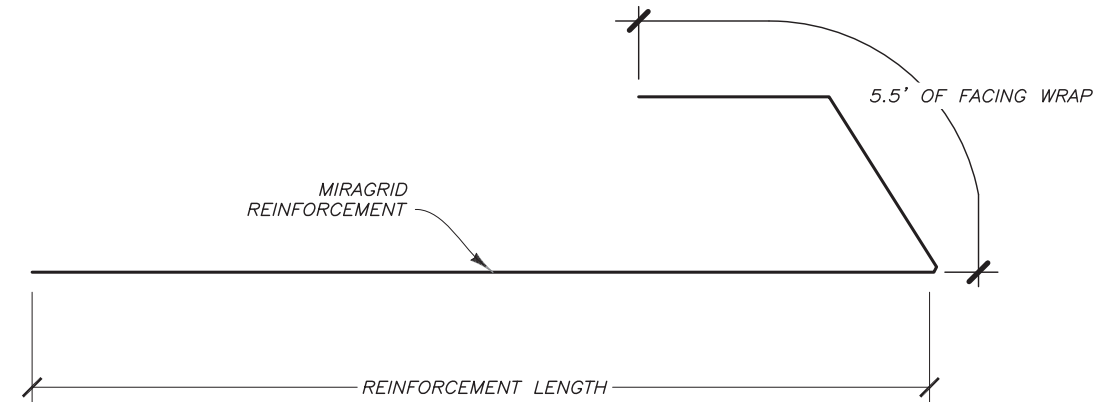
PLAN VIEW  
**WELDED WIRE WALL END AT OTHER APPURTENANCE**  
 NOT TO SCALE



TYPICAL ASSEMBLED GABION  
 NOT TO SCALE

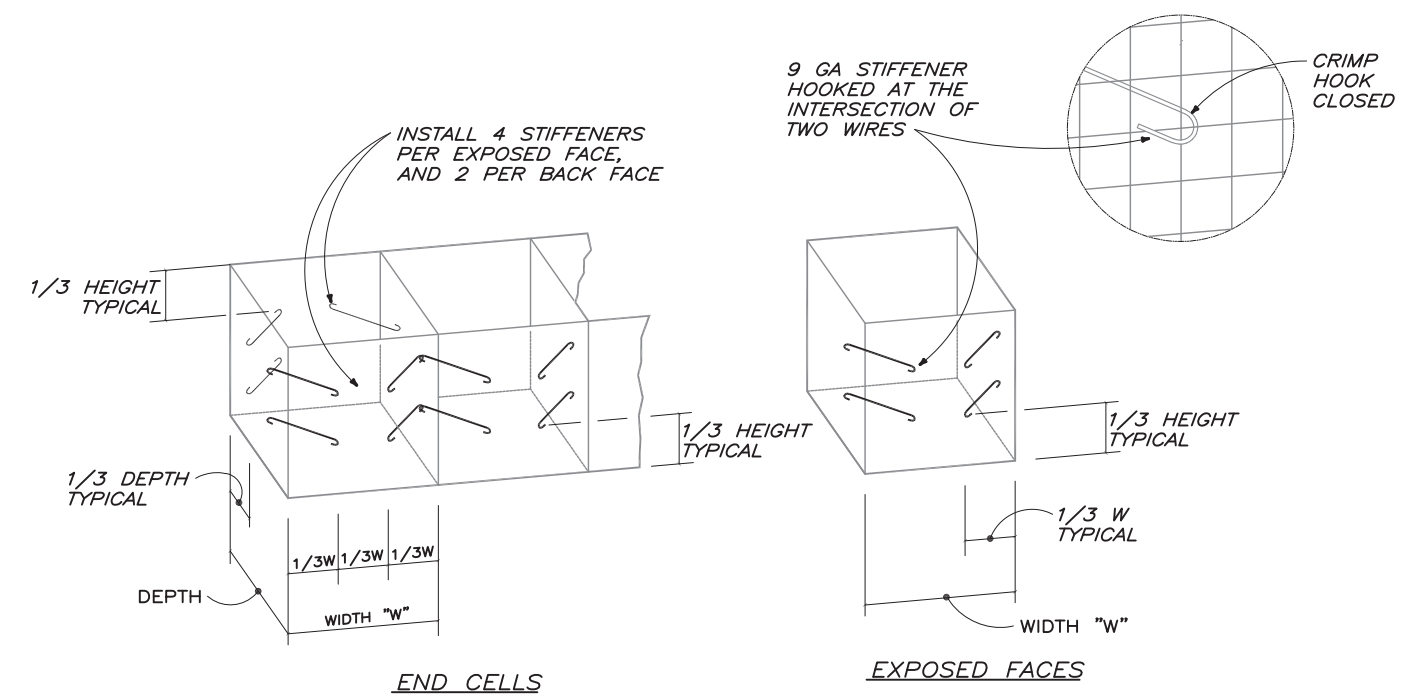


TYPICAL GABION  
 NOT TO SCALE



**REINFORCEMENT LENGTH DETAIL**  
 NOT TO SCALE

C  
5



WHERE HEIGHT OF GABION IS 2' OR LESS, INSTALL 2 STIFFENERS PER FACE  
 WHERE HEIGHT IS 12", NO STIFFENERS REQUIRED

STIFFENER DETAILS  
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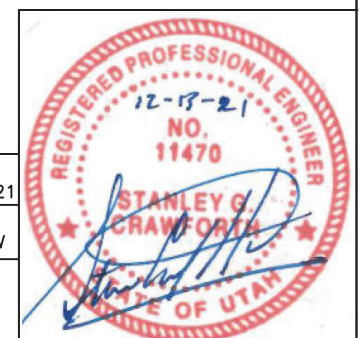
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| DETAILS                            |                       |
|------------------------------------|-----------------------|
| ENERGY SOLUTIONS                   | DWG DATE: 15 DEC 2021 |
| CLIVE FACILITY                     | HRW NO.: 210614AW     |
| RAILCAR DUMPING BUILDING           | SHEET 7               |
| ENERGY SOLUTIONS TOOELE COUNTY, UT | OF 8                  |



**STEP 1**  
PLACE THE FIRST COURSE OF SOIL REINFORCEMENT MATS ON PREPARED FOUNDATION.

**STEP 2**  
PLACE THE BACKING MAT AGAINST THE INSIDE FACE OF THE SOIL REINFORCEMENT MAT. CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP TRANSVERSE WIRE ON THE SOIL REINFORCEMENT MAT.

PLACE CONTINUOUS MIRAGRID AND FILTER FABRIC AS SHOWN.

PLACE AND COMPACT BACKFILL LEAVING VOID IN FACE PER PROJECT PLANS

**STEP 3**  
BRING THE MIRAGRID AND FILTER FABRIC OVER THE FRONT AND TOP OF THE BACKFILL AS SHOWN. PLACE SPECIAL FILLING IN THE FACE OF THE WALL PER PROJECT PLANS. LEAVE A VOID AS SHOWN.

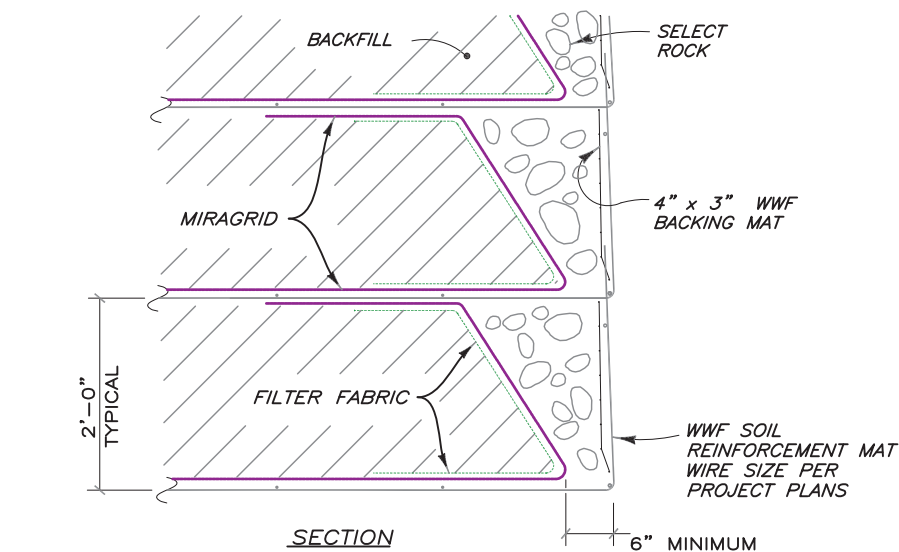
**STEP 4**  
HOOK THE BOTTOM TRANSVERSE WIRE OF THE BACKING MAT OVER THE VERTICAL PRONGS ON THE LOWER MAT. ROTATE THE BACKING MAT TO VERTICAL AND CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP WIRE ON THE SOIL REINFORCEMENT MAT.

**STEP 5**  
INSTALL MIRAGRID AND FILTER FABRIC AS IN STEPS 1 AND 2. PLACE AND COMPACT THE BACKFILL AND ROCK TO THE BASE ELEVATION OF THE NEXT MAT. REPEAT STEPS 2 THROUGH 5 TO THE TOP LIFT.

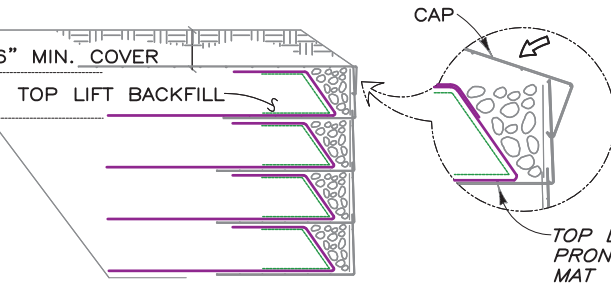
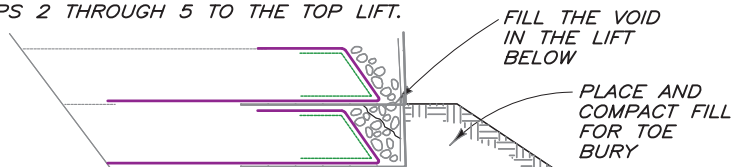
**STEP 6: TOP LIFT**  
PLACE THE TOP LIFT PRONGLESS MAT AND BACKING MAT. PLACE AND COMPACT BACKFILL AND ROCK OR SOIL IN THE TOP LIFT. PLACE FINAL LAYER OF MIRAGRID, OVERLAPPING PER PROJECT PLANS. HOOK THE CAP OVER THE MIDDLE TRANSVERSE WIRE ON THE PRONGLESS MAT, AND ROTATE INTO PLACE. PLACE AND COMPACT COVER OVER TOP MAT TO 1'-6" MINIMUM DEPTH.

**CONSTRUCTION SEQUENCE**

NOT TO SCALE

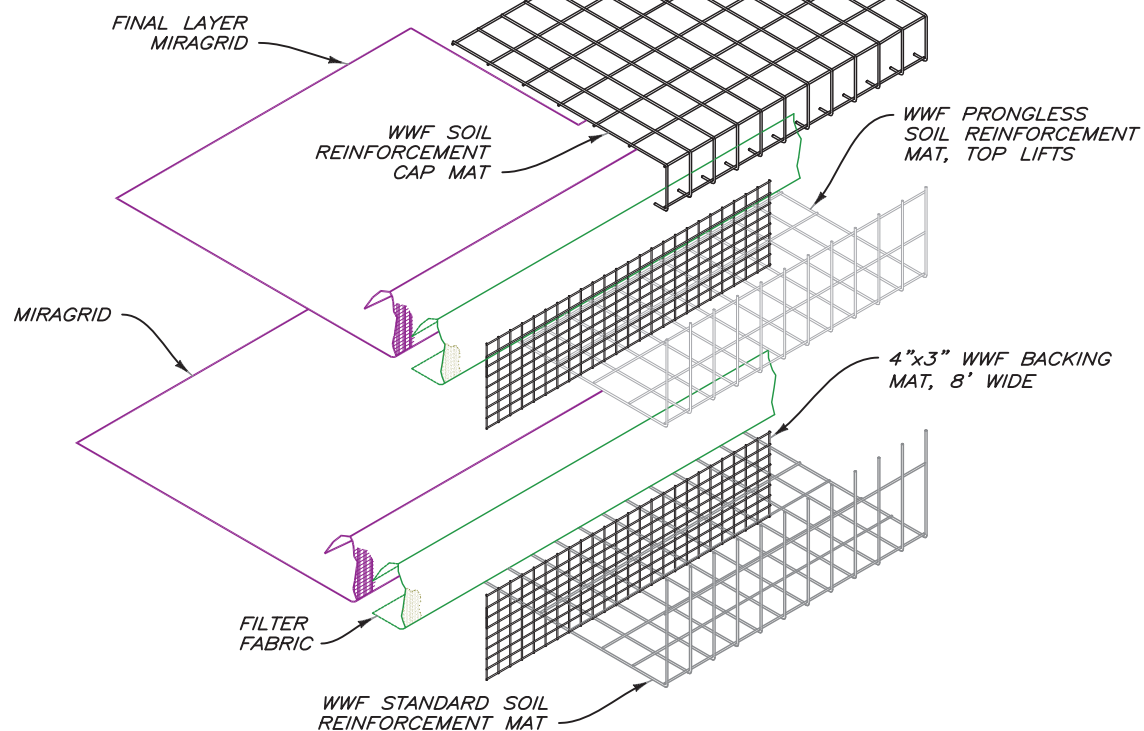


**SECTION WALL FACE DETAIL**  
NOT TO SCALE

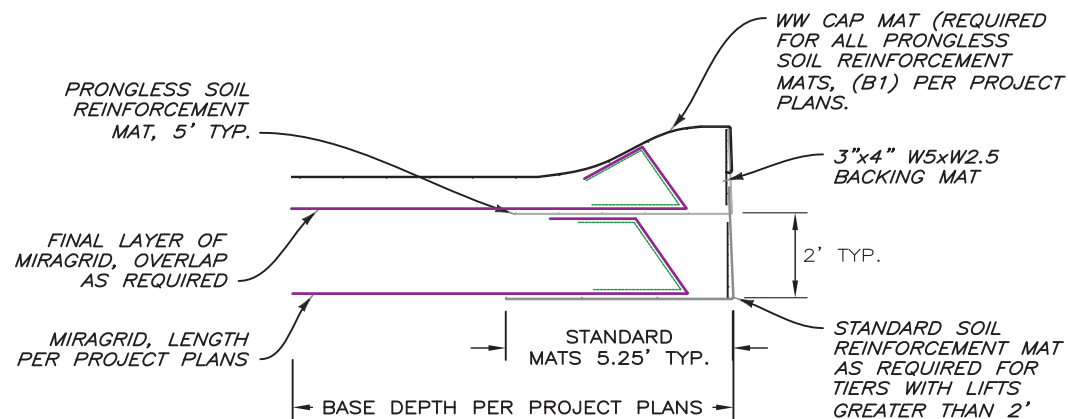


**STEP 6: TOP LIFT**

PLACE THE TOP LIFT PRONGLESS MAT AND BACKING MAT. PLACE AND COMPACT BACKFILL AND ROCK OR SOIL IN THE TOP LIFT. PLACE FINAL LAYER OF MIRAGRID, OVERLAPPING PER PROJECT PLANS. HOOK THE CAP OVER THE MIDDLE TRANSVERSE WIRE ON THE PRONGLESS MAT, AND ROTATE INTO PLACE. PLACE AND COMPACT COVER OVER TOP MAT TO 1'-6" MINIMUM DEPTH.



**WALL COMPONENTS**  
NOT TO SCALE



**WIRE FACED MIRAGRID WALL DETAILS**  
NOT TO SCALE

03574 - Energy Solutions - I - PREPARED 12.15.2021.dwg

12/15/2021 5:17 PM

| REV. | DATE       | BY  | DESCRIPTION             | CADD:        |
|------|------------|-----|-------------------------|--------------|
| 0    | 11/23/2021 | RGV | ISSUED FOR REVIEW       | RGV          |
| 1    | 12/15/2021 | RGV | ISSUED FOR CONSTRUCTION | RGV          |
|      |            |     |                         | CHECKED: SGC |

**HILFIKER RETAINING WALLS**

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**AMERICAN GEO TECHNICS**

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Boise, ID 83714  
(208) 658-8700  
Fax: (208) 658-8703

| DETAILS & SEQUENCE   |                   |
|--|-------------------|
| ENERGY SOLUTIONS<br>CLIVE FACILITY<br>RAILCAR DUMPING BUILDING |                   |
| ENERGY SOLUTIONS   | TOOELE COUNTY, UT |

|           |             |
|-----------|-------------|
| DWG DATE: | 15 DEC 2021 |
| HRW NO.:  | 210614AW    |
| SHEET     | 8           |
| OF        | 8           |

