

GENERAL NOTES

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2011 AND THE PROJECT SPECIAL PROVISIONS.

ALL WORK IN AND AROUND CREEKS, DITCHES, OR IRRIGATION CANALS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 107 AND 108 OF THE PROJECT SPECIFICATIONS. REFER TO THESE SECTIONS FOR CONTROL OF WATER AND CONSTRUCTION LIMITATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

ALL LONGITUDINAL AND TRANSVERSE DIMENSIONS ARE MEASURED HORIZONTALLY AND DO NOT INCLUDE ANY CORRECTIONS FOR GRADE.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 (1-800-922-1987) AT LEAST 3 DAYS (2 DAYS NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH CDOT STANDARD PLAN NO. M-206-1.

ALL ACRONYMS AND ABBREVIATIONS ARE CONSISTENT WITH CDOT STANDARD PLAN NO. M-100-2, UNLESS NOTED OTHERWISE.

GEOTECHNICAL INFORMATION AND RECOMMENDATIONS CAN BE FOUND IN THE DRAFT FINAL GEOTECHNICAL INVESTIGATION REPORT, 1602 GOLD RUN TO SALINA JUNCTION, BOULDER, COLORADO, DATED APRIL 12, 2016.

REINFORCED CONCRETE NOTES

A CUT STONE VENEER FINISH WILL BE REQUIRED, AS SHOWN ON THE PLANS, ON EXPOSED CONCRETE SURFACES. THESE FINISHES ARE TO BE SELECTED FROM TEST PANELS PROVIDED BY THE CONTRACTOR.

THE FINAL FINISH FOR THE SURFACES OF CURBS SHALL BE CLASS 2. ALL OTHER EXPOSED CONCRETE SURFACES SHALL RECEIVE A CLASS 1 FINAL FINISH TO ONE FOOT BELOW FINISHED GRADE, UNLESS NOTED OTHERWISE.

EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 INCH, UNLESS NOTED OTHERWISE.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

ANY CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS MAY BE CONSTRUCTED ONLY IF APPROVED IN WRITING BY THE ENGINEER.

ROUGHENED CONSTRUCTION JOINTS REQUIRE THE CONCRETE SURFACE TO BE EVENLY ROUGHENED TO A MINIMUM AMPLITUDE OF 1/4 INCH.

CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS PLACED.

GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED. ⊕ DENOTES NON-COATED REINFORCING.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER OR LESS THAN 3" OF LATERAL COVER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B OR D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR NON-COATED REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR NON-COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER OR LESS THAN 3" OF LATERAL COVER.

BAR SIZE	#4 ⊕	#5 ⊕	#6 ⊕	#7 ⊕	#8 ⊕	#9 ⊕	#10 ⊕	#11 ⊕
SPLICE LENGTH FOR CLASS B OR D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20% FOR 3 BAR BUNDLES AND 33% FOR 4 BAR BUNDLES.

INDEX OF DRAWINGS

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19	SOIL NAIL WALL EXCAVATION AND BACKFILL

RETAINING WALL DESCRIPTIONS

RETAINING WALL 1:

- ANCHORED WALL (GROUND NAIL WALL)
- GOLD RUN ROAD LT.

RETAINING WALL 2:

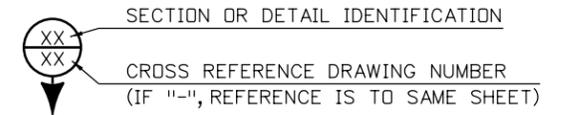
- CANTILEVER NON-GRAVITY WALL (SOLDIER PILE WALL)
- GOLD RUN ROAD RT.

RETAINING WALL 3:

- CANTILEVER NON-GRAVITY WALL (SOLDIER PILE WALL)
- GOLD RUN ROAD RT.

RETAINING WALL 4:

- CANTILEVER NON-GRAVITY WALL (SOLDIER PILE WALL)
- GOLD RUN ROAD RT.



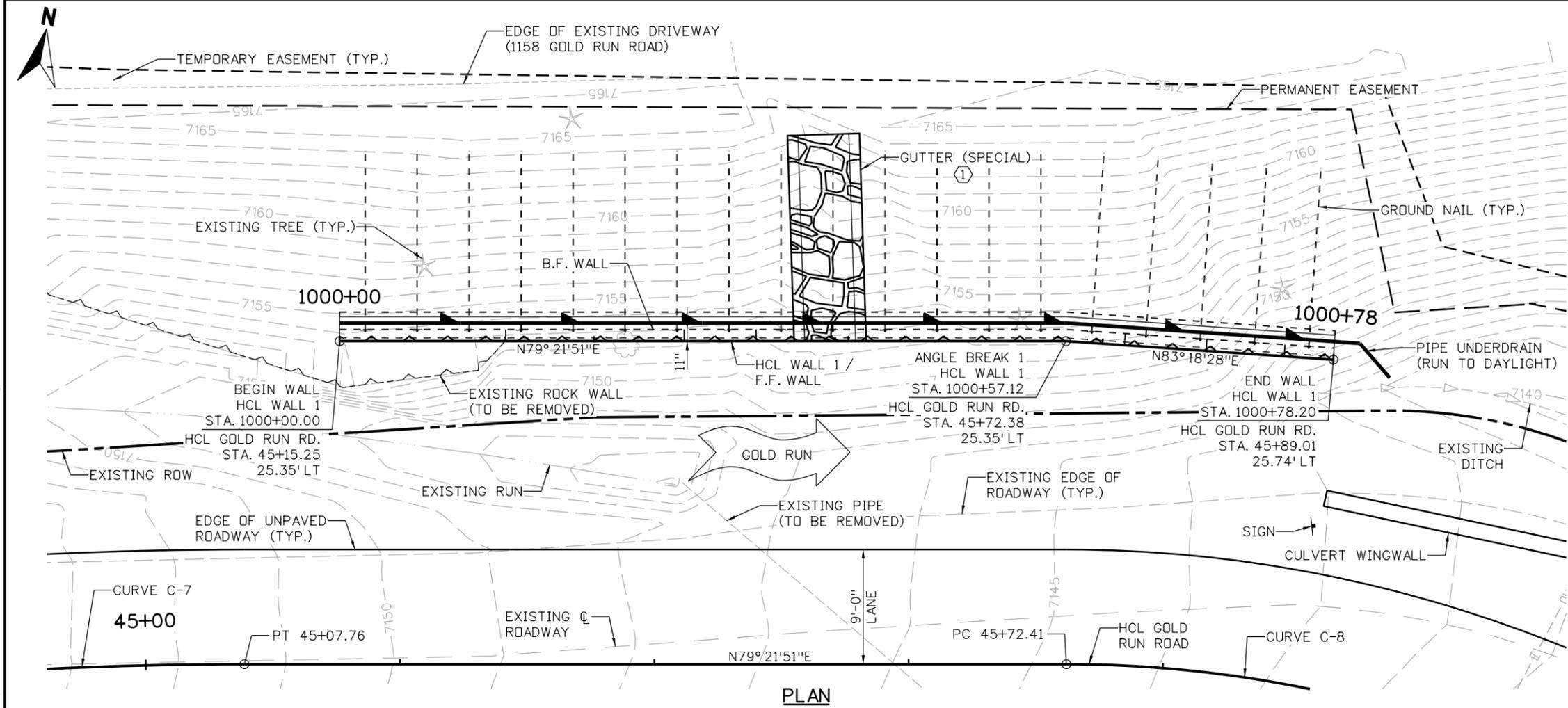
SUMMARY OF APPROXIMATE QUANTITIES

ITEM	DESCRIPTION	UNIT	RETAINING WALL 1	RETAINING WALL 2	RETAINING WALL 3	RETAINING WALL 4	TOTALS
206	STRUCTURE EXCAVATION	CY	27	32	16	107	182
206	STRUCTURE BACKFILL (CLASS 2)	CY	12	14	7	51	84
503	DRILLED CAISSON (24 INCH)	LF		168	75	331	574
504	GROUND NAIL (15 FOOT)	EA	35				35
502	STRUCTURAL STEEL	LB		12,405	5,388	29,406	47,199
601	CONCRETE CLASS D (WALL)	CY		14.1	6.2	42.2	62.5
601	CUT STONE VENEER	SF	694	715	306	1,948	3,663
602	REINFORCING STEEL	LB	2,872				2,872
602	REINFORCING STEEL (EPOXY COATED)	LB		2,107	922	6,320	9,349
641	SHOTCRETE	SY	86				86

90% SET	CALL UTILITY NOTIFICATION CENTER OF COLORADO CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES	REVISIONS:	NO.	DATE	REVISION DESCRIPTION:	BOULDER COUNTY TRANSPORTATION DEPARTMENT ENGINEERING DIVISION Michael Baker INTERNATIONAL	DESIGNED:	CAD:	CHECKED:	DATE:	GOLD RUN ROAD GENERAL INFORMATION PROJECT NO: 4043.SEPT12C38 SHEET NO: 166
							DLT	BMT		4/15/2016	

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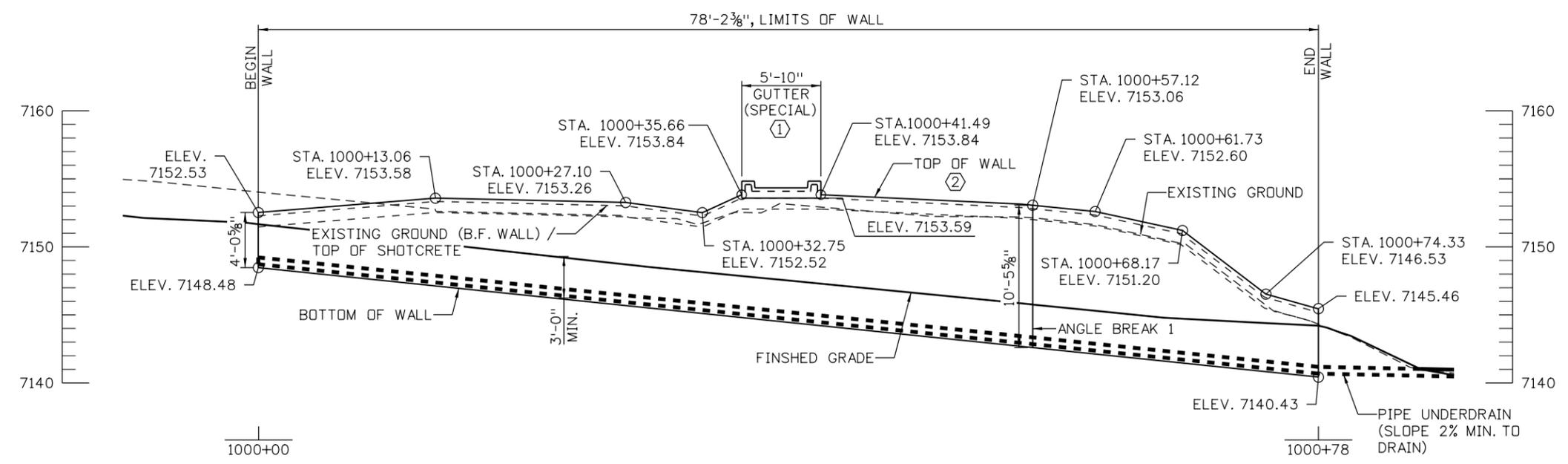
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PLAN

- NOTES:**
- FOR FINISHED GRADING, REMOVAL OF PIPE, GUTTER (SPECIAL), AND WINGWALL DETAILS, REFER TO DRAINAGE PLANS.
 - FOR REMOVALS, UTILITY, AND GUARDRAIL INFORMATION, REFER TO ROADWAY PLANS.
 - FOR ROADWAY GEOMETRICS AND SIGN DETAILS, REFER TO ROADWAY PLANS.
 - GROUND NAILS ARE GENERICALLY SHOWN. SEE GROUND NAIL LAYOUT FOR ACTUAL LOCATIONS.

- KEYNOTES:**
- FIELD FIT TO EXISTING GUTTER.
 - TOP OF WALL IS DEFINED AS THE 3" ABOVE EXISTING GROUND AT B.F. WALL. SEE TYPICAL SECTION FOR DETAILS.



ELEVATION

TAKEN AT HCL WALL 1 / F.F. WALL



90% SET

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	DATE	REVISION DESCRIPTION:

BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
Michael Baker INTERNATIONAL

GOLD RUN ROAD
RETAINING WALL 1
GENERAL LAYOUT (1 OF 2)

DESIGNED: **DLT** CAD: **BMT** CHECKED: DATE: **4/15/2016**

PROJECT NO: 4043.SEPT12C38 SHEET NO: 167

DESIGN DATA

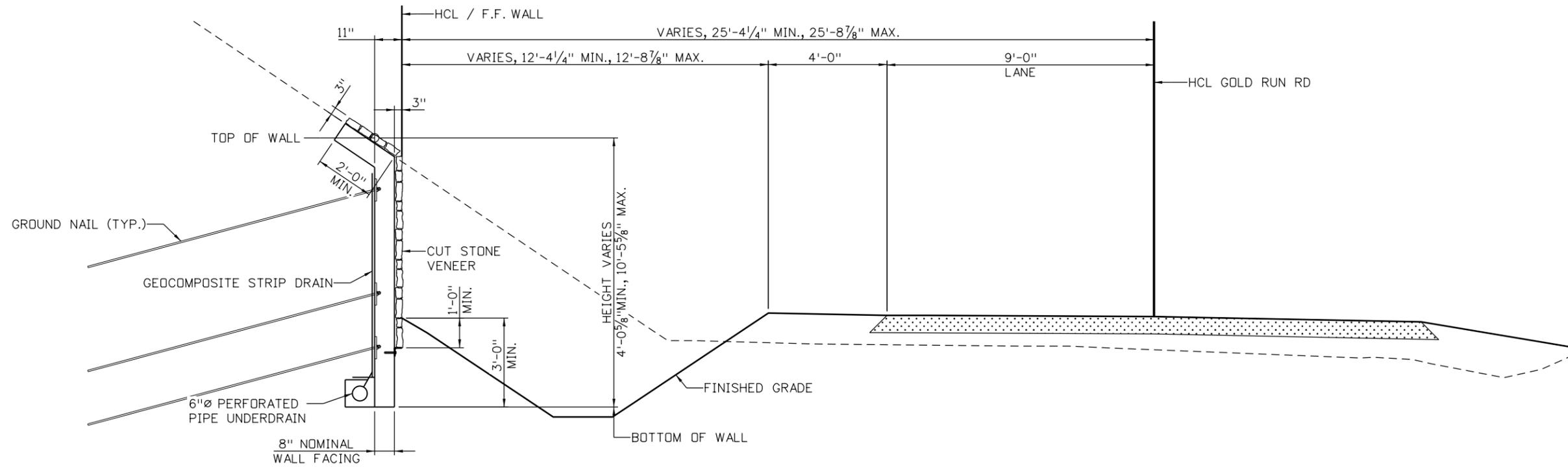
SEISMIC ZONE 1

REINFORCED CONCRETE:
 CONCRETE CLASS SHOTCRETE : $f'_c = 4,500$ PSI
 REINFORCING STEEL: $f_y = 60,000$ PSI
 WELDED WIRE FABRIC: $f_y = 65,000$ PSI
 SEVERITY OF SULFATE EXPOSURE: CLASS 0

SOIL PROPERTIES:
 IN-SITU SOIL:
 SOIL UNIT WEIGHT: 145 PCF
 SOIL COHESION: 5,000 PSF
 SOIL FRICTION ANGLE: 38°

NOTES

- FOR ARCHITECTURAL DETAILS, REFER TO CUT STONE VENEER DETAILS SHEET.
- THE CONTRACTOR SHALL NOT DISTURB THE EXISTING GROUND CONDITIONS EXCEPT AS NECESSARY TO INSTALL THE WALL FOUNDATION AND COMPLETE FINISHED GRADING.



TYPICAL SECTION
 LOOKING AHEAD STATION



90% SET



CALL UTILITY NOTIFICATION CENTER OF COLORADO
 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	DATE	REVISION DESCRIPTION:



BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
Michael Baker INTERNATIONAL

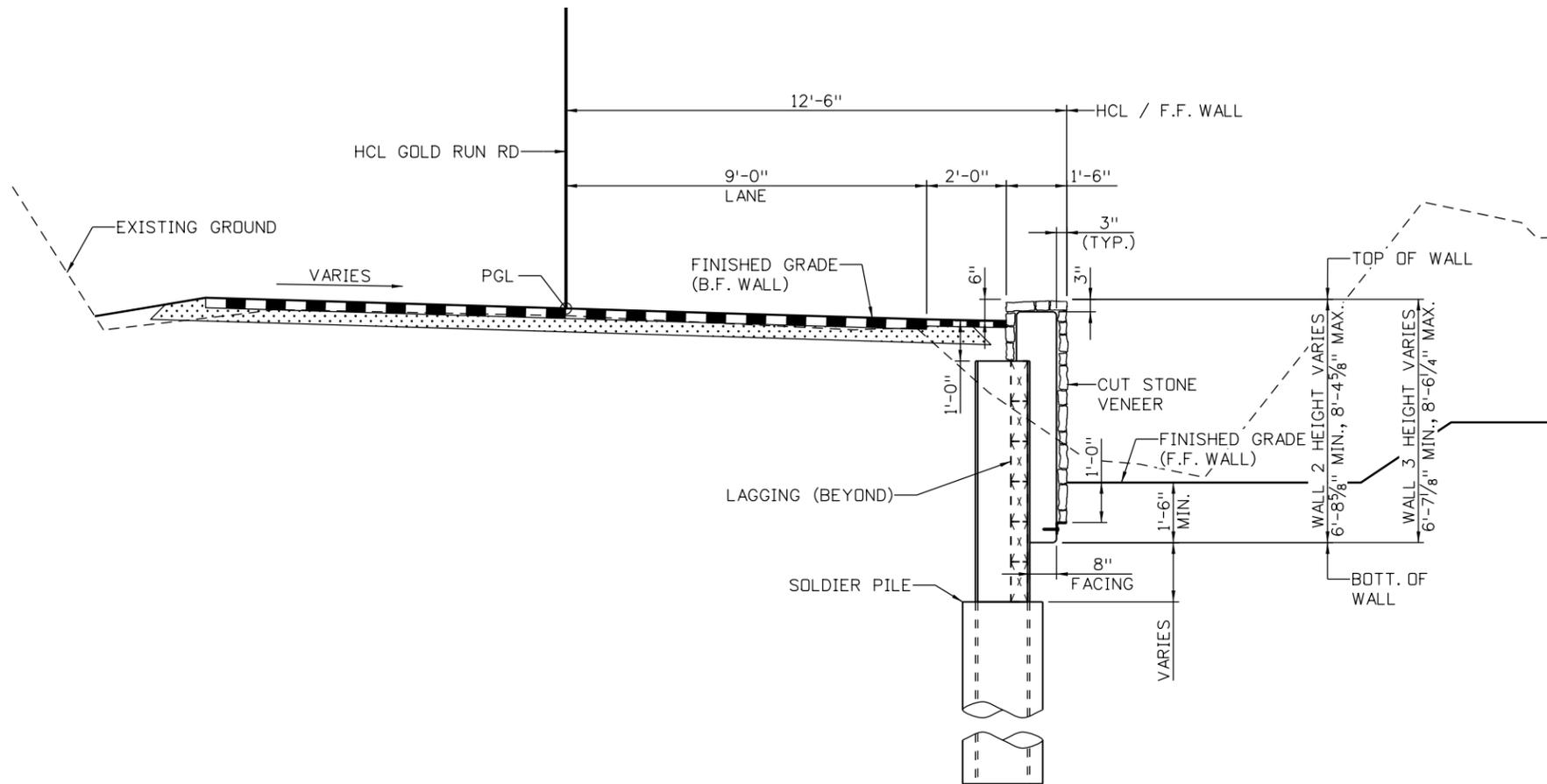
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GOLD RUN ROAD
RETAINING WALL 1
GENERAL LAYOUT (2 OF 2)

PROJECT NO: 4043.SEPT12C38 SHEET NO: 168

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WALL 2 & 3 TYPICAL SECTION
 WALL 2 SHOWN, WALL 3 SIMILAR
 LOOKING AHEAD STATION
 TAKEN AT ϕ SOLDIER PILE

DESIGN DATA

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SIXTH EDITION WITH INTERIMS THROUGH 2012
 DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
 LIVE LOAD: HL-93 (DESIGN TRUCK OR DESIGN TANDEM, AND DESIGN LANE LOAD)
 SEISMIC ZONE 1
 REINFORCED CONCRETE:

CLASS D CONCRETE: $f'_c = 4,500$ PSI
 REINFORCING STEEL: $f_y = 60,000$ PSI
 SEVERITY OF SULFATE EXPOSURE: CLASS 0
 CAISSON CONCRETE:
 CLASS BZ CONCRETE: $f'_c = 4,000$ PSI
 SEVERITY OF SULFATE EXPOSURE: CLASS 0
 STRUCTURAL STEEL:
 AASHTO M270 (ASTM A992) GRADE 50: $f_y = 50,000$ PSI

SOIL PROPERTIES:

ABOVE BOTTOM OF WALL:
 SOIL UNIT WEIGHT: 120 PCF
 SOIL FRICTION ANGLE: 32°
 ACTIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL BACKSLOPE: 0.238
 BELOW BOTTOM OF WALL:
 SOIL UNIT WEIGHT: 135 PCF
 SOIL FRICTION ANGLE: 38°
 ACTIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL BACKSLOPE: 0.283
 PASSIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL FORESLOPE: 1.290

NOTES

- FOR CUT STONE VENEER DETAILS, REFER TO ARCHITECTURAL DETAILS SHEET.
- THE CONTRACTOR SHALL NOT DISTURB THE EXISTING GROUND CONDITIONS EXCEPT AS NECESSARY TO INSTALL THE WALL FOUNDATION AND COMPLETE FINISHED GRADING.



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CALL UTILITY NOTIFICATION CENTER OF COLORADO

 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

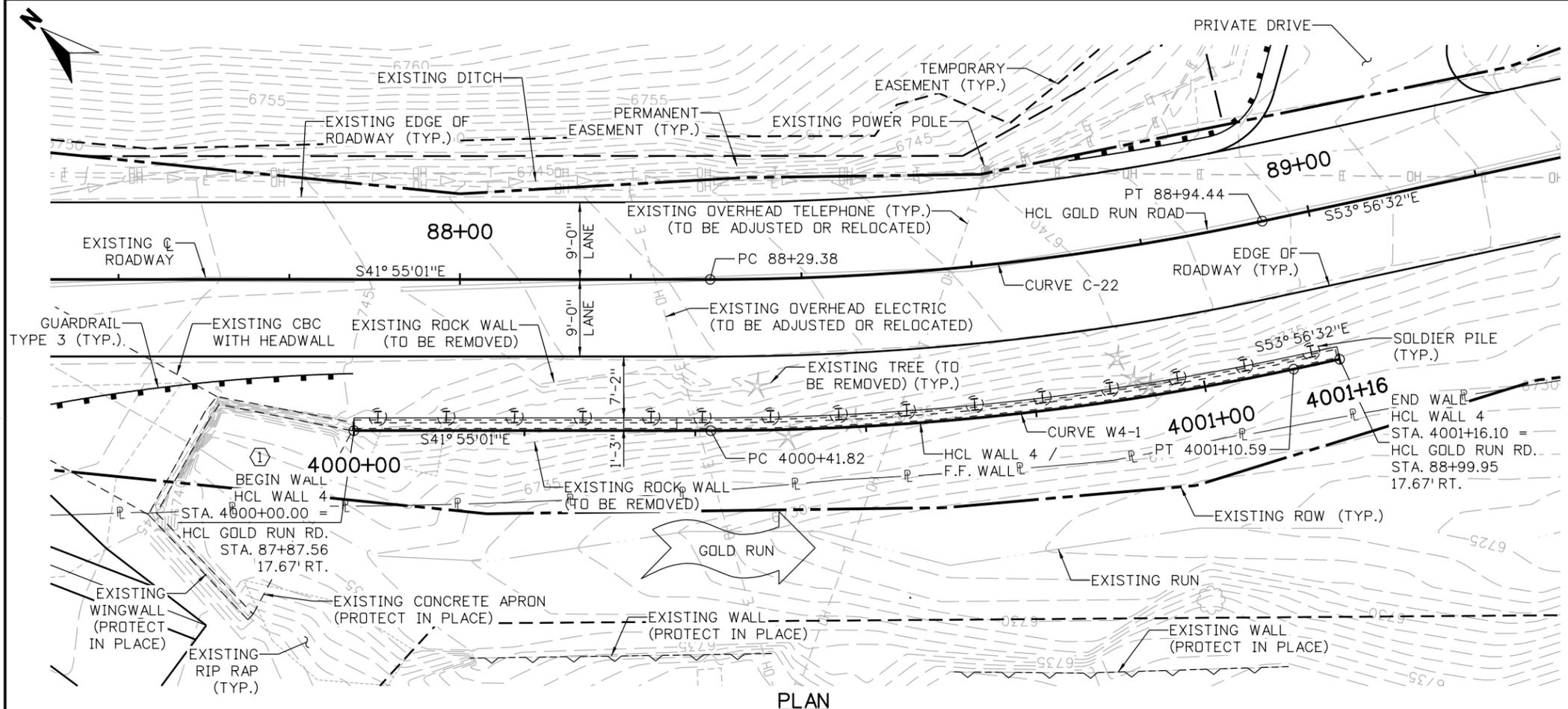
REVISIONS:	NO.	DATE	REVISION DESCRIPTION:

BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION

 DESIGNED: DLT CAD: BMT CHECKED: DATE: 4/15/2016

GOLD RUN ROAD
RETAINING WALL 2
GENERAL LAYOUT (2 OF 2)
 PROJECT NO: 4043.SEPT12C38 SHEET NO: 170

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PLAN

NOTES:

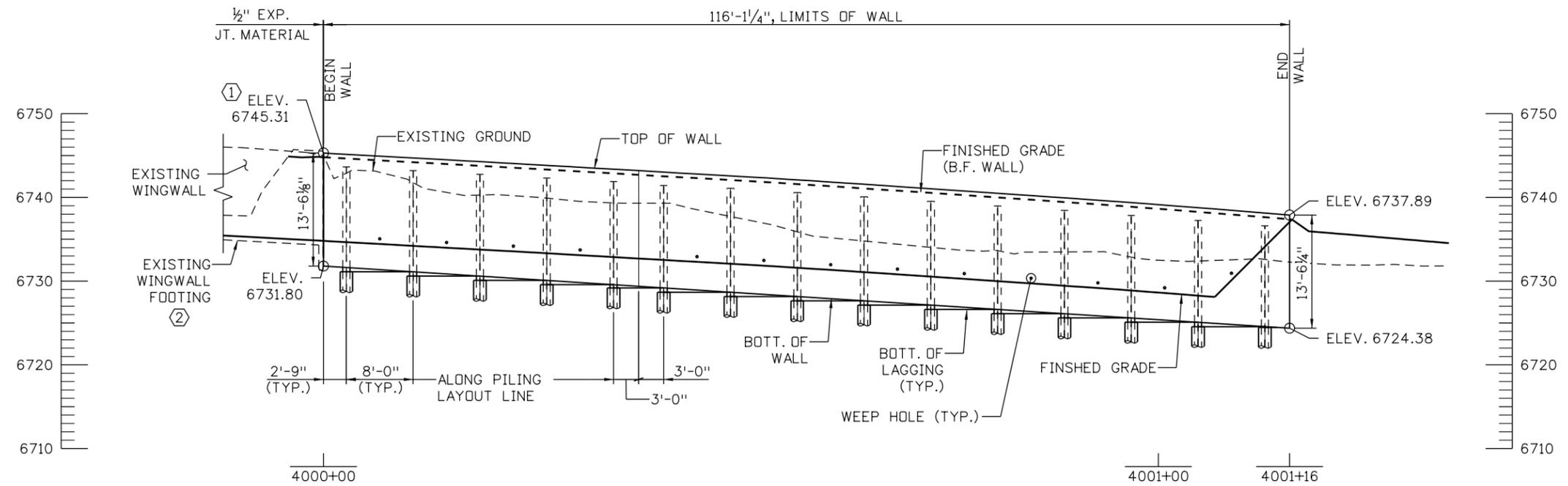
1. FOR FINISHED GRADING, REFER TO DRAINAGE PLANS.
2. FOR REMOVALS, UTILITY, GUARDRAIL INFORMATION, AND ROADWAY GEOMETRICS, REFER TO ROADWAY PLANS.
3. TOP OF BEDROCK IS AT APPROXIMATE ELEVATION 6737.5.
4. EXISTING HANDRAIL NOT SHOWN BUT SHALL BE REMOVED.

KEYNOTES:

- ① THE CONTRACTOR SHALL VERIFY THE LOCATION FOR THE END OF EXISTING WINGWALL AND ADJUST THE BEGIN WALL TO MATCH INTO THE EXISTING CONDITIONS.
- ② THE FOUNDATION TYPE AND LIMITS FOR THE EXISTING STRUCTURE IS NOT KNOWN.

CURVE W4-1 DATA

$\Delta = 12^\circ 01' 32''$ LT.
 $R = 327.67'$
 $L = 68.77'$
 $T = 34.51'$
 $PI 4000+76.33$
 $N 262178.73$
 $E 35949.61$



ELEVATION
TAKEN AT HCL WALL 4 / F.F. WALL



90% SET

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	DATE	REVISION DESCRIPTION:

BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION

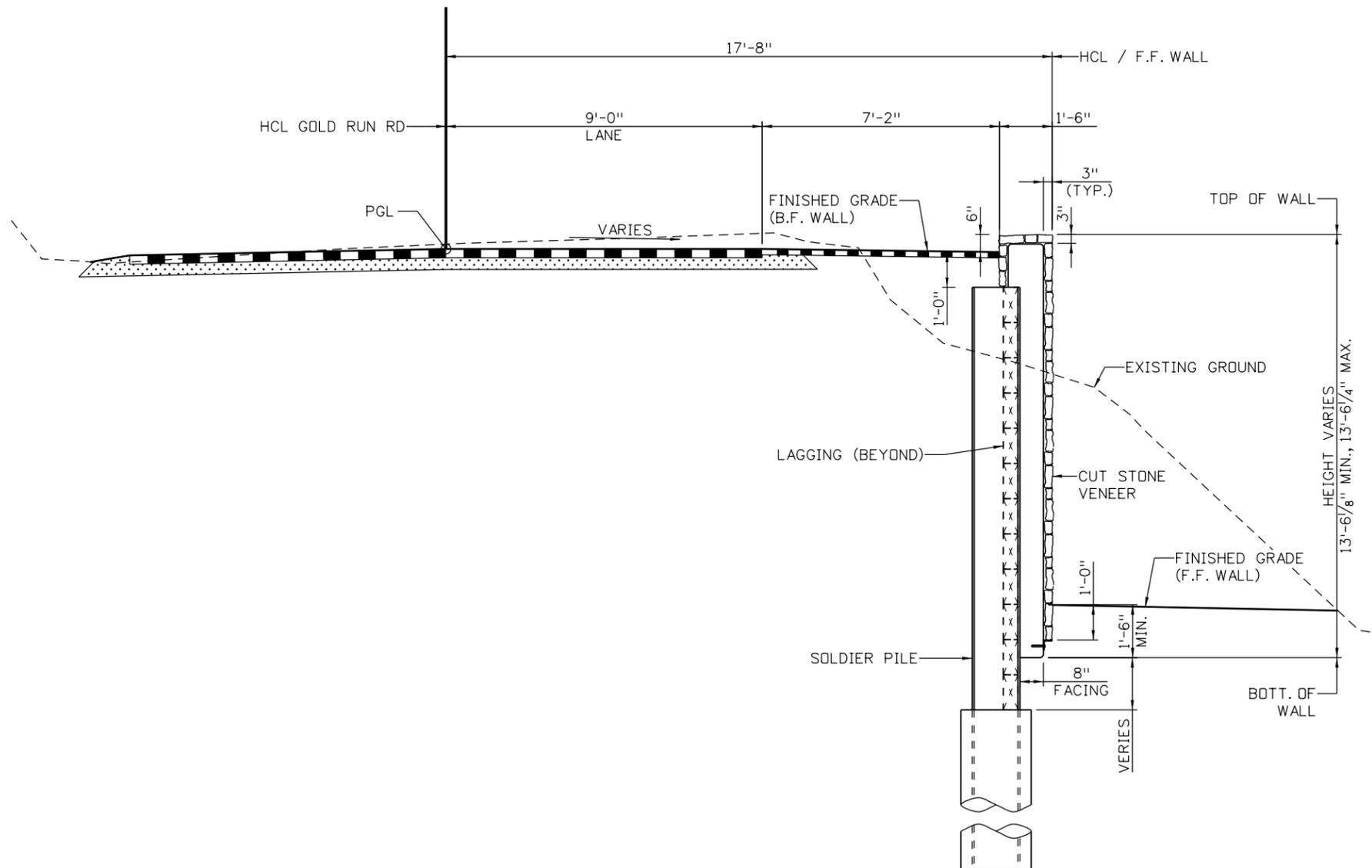
 Michael Baker INTERNATIONAL

GOLD RUN ROAD
RETAINING WALL 4
GENERAL LAYOUT (1 OF 2)

DESIGNED: **DLT** CAD: **BMT** CHECKED: DATE: **4/15/2016**

PROJECT NO: 4043.SEPT12C38 SHEET NO: 172

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WALL 4 TYPICAL SECTION
 LOOKING AHEAD STATION
 TAKEN AT \odot SOLDIER PILE

DESIGN DATA:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SIXTH EDITION WITH INTERIMS THROUGH 2012
 DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
 LIVE LOAD: HL-93 (DESIGN TRUCK OR DESIGN TANDEM, AND DESIGN LANE LOAD)
 SEISMIC ZONE 1
 REINFORCED CONCRETE:

CLASS D CONCRETE: $f'_c = 4,500$ PSI
 REINFORCING STEEL: $f_y = 60,000$ PSI
 SEVERITY OF SULFATE EXPOSURE: CLASS 0
 CAISSON CONCRETE:
 CLASS BZ CONCRETE: $f'_c = 4,000$ PSI
 SEVERITY OF SULFATE EXPOSURE: CLASS 0
 STRUCTURAL STEEL:
 AASHTO M270 (ASTM A992) GRADE 50: $f_y = 50,000$ PSI

SOIL PROPERTIES:

ABOVE BOTTOM OF WALL:
 SOIL UNIT WEIGHT: 120 PCF
 SOIL FRICTION ANGLE: 32°
 ACTIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL BACKSLOPE: 0.238
 BELOW BOTTOM OF WALL:
 SOIL UNIT WEIGHT: 135 PCF
 SOIL FRICTION ANGLE: 38°
 ACTIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL BACKSLOPE: 0.283
 PASSIVE HORIZONTAL PRESSURE COEFFICIENT WITH LEVEL FORESLOPE: 1.290

NOTES:

- FOR FINISHED GRADING REFER TO DRAINAGE PLANS.
- FOR CUT STONE VENEER DETAILS, REFER TO ARCHITECTURAL DETAILS SHEET.
- THE CONTRACTOR SHALL NOT DISTURB THE EXISTING GROUND CONDITIONS EXCEPT AS NECESSARY TO INSTALL THE WALL FOUNDATION AND COMPLETE FINISHED GRADING.



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CALL UTILITY NOTIFICATION CENTER OF COLORADO
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REVISIONS:	NO.	DATE	REVISION DESCRIPTION:

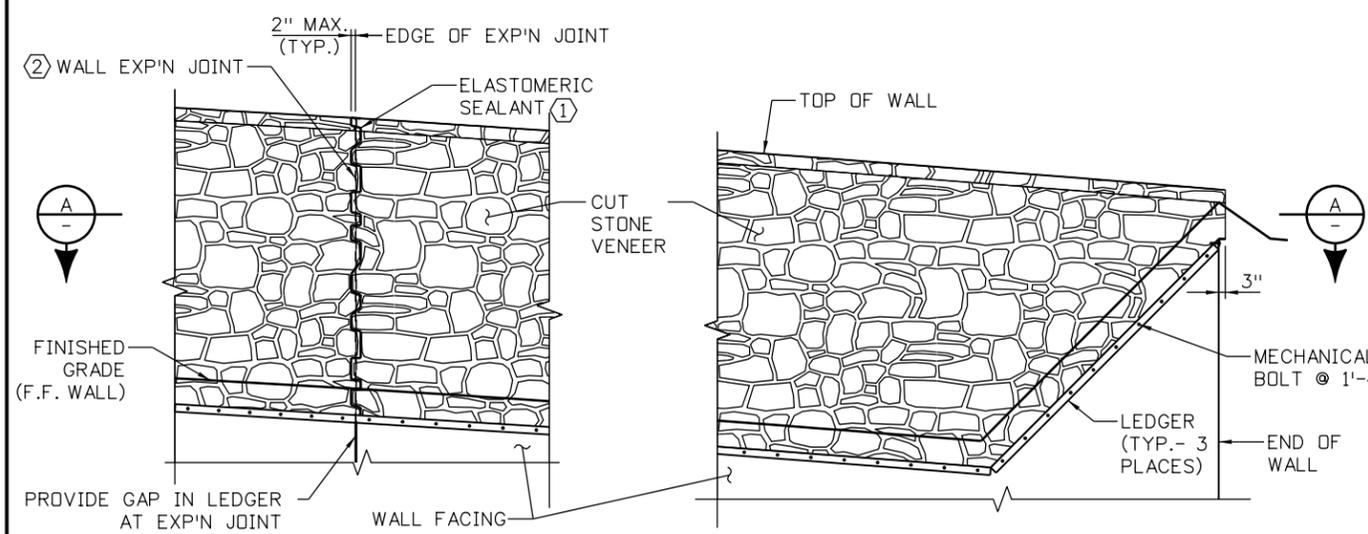


BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
Michael Baker INTERNATIONAL

DESIGNED:	CAD:	CHECKED:	DATE:
DLT	BMT		4/15/2016

GOLD RUN ROAD
RETAINING WALL 4
GENERAL LAYOUT (2 OF 2)
 PROJECT NO: 4043.SEPT12C38 SHEET NO: 173

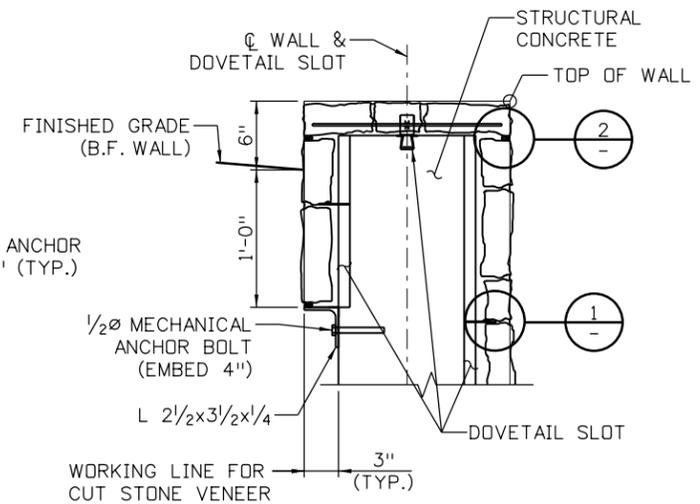
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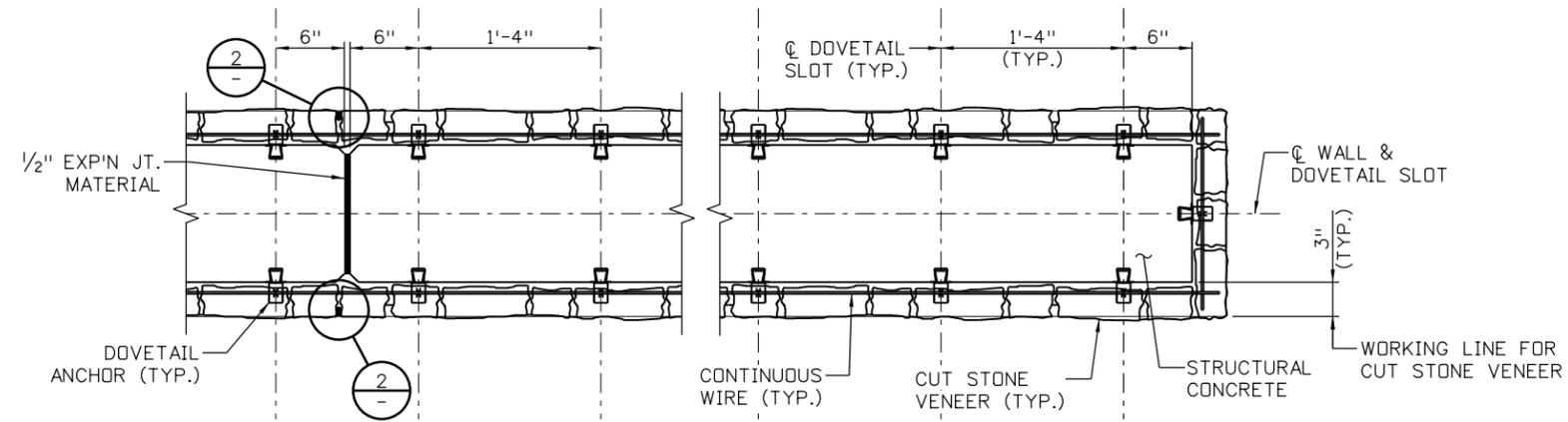
AT EXPANSION JOINT
SEE GENERAL LAYOUT FOR LOCATION

AT END OF WALL

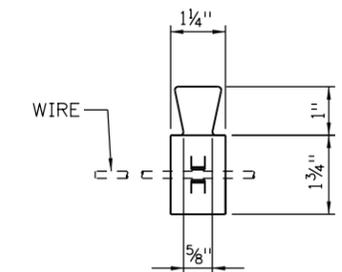
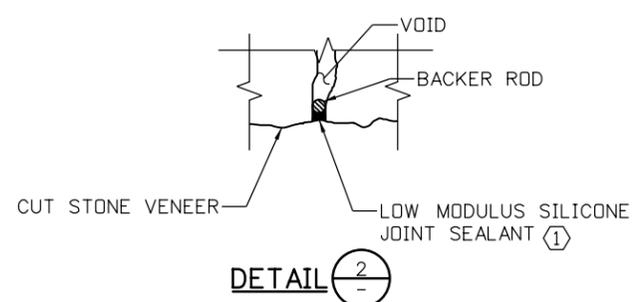
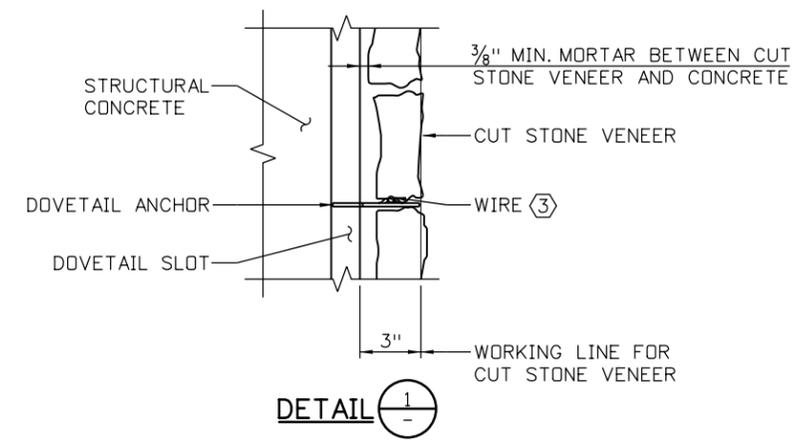
TYPICAL ELEVATION



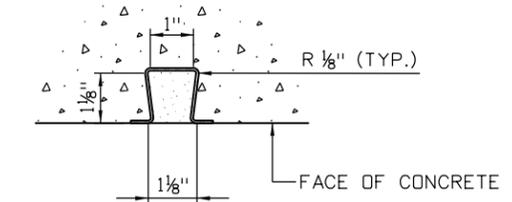
CUT STONE VENEER TYPICAL SECTION
WALL 1 VENEER LIMITS DO NOT EXTEND TO B.F. WALL



SECTION A



DOVETAIL ANCHOR AND WIRE



DOVETAIL SLOT

ANCHORAGE DETAIL
PLAN VIEW

NOTES:

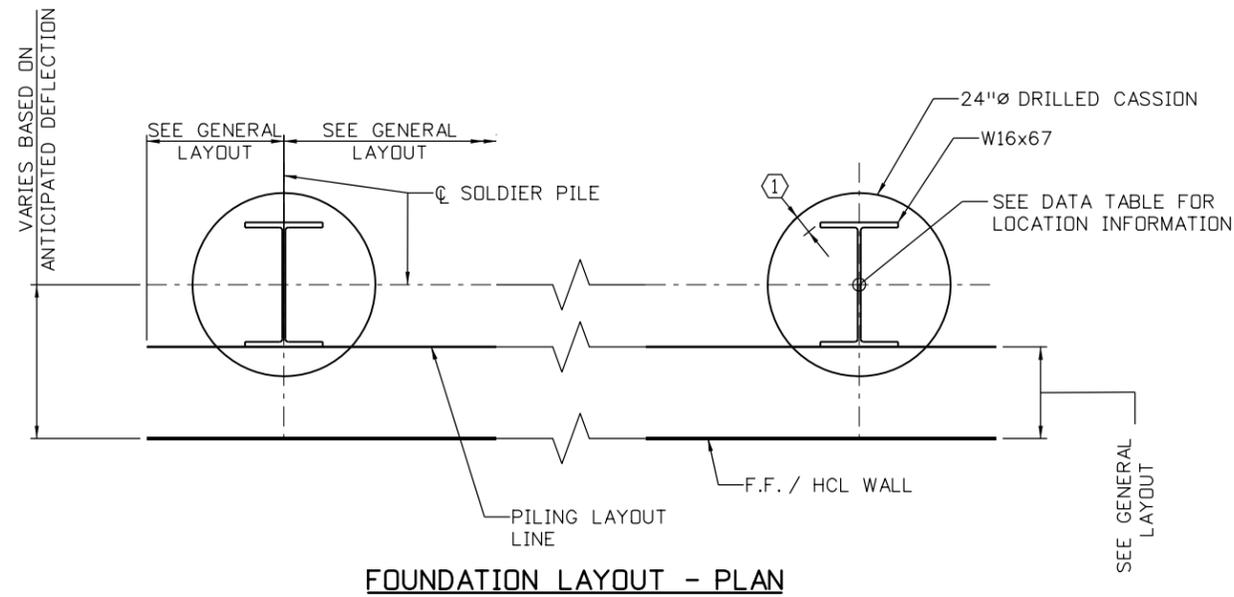
- CUT STONE VENEER SHALL BE DAKOTA TOP ROCK AS SUPPLIED BY ELDORADO STONE OR APPROVED EQUAL AND PLACED A RANDOM PATTERN.
- DOVETAIL SLOTS SHALL BE TYPE 305 AS MANUFACTURED BY HOHMANN & BARNARD, INC., OR APPROVED EQUAL. THEY SHALL BE 22 GAGE HOT-DIPPED GALVANIZED STEEL, AND HAVE A THROAT OPENING WIDTH OF 5/8".
- THE DOVETAIL ANCHORS SHALL BE 303 SV - SEISMIC-NOTCH AS MANUFACTURED BY HOHMANN & BARNARD, INC., OR AN APPROVED EQUAL. MATERIAL FOR DOVETAIL ANCHORS SHALL BE 3/32" THICK HOT-DIPPED GALVANIZED STEEL.
- WIRE SHALL BE 9 GAGE PLAIN COLD-DRAWN STEEL WIRE CONFORMING TO ASTM A82. WIRE SHALL BE MILL GALVANIZED CONFORMING TO ASTM A153.
- CONCRETE SURFACES SHALL BE PREPARED IN ACCORDANCE WITH SUPPLIER'S RECOMMENDATION PRIOR TO INSTALLATION OF CUT STONE VENEER.
- MORTAR JOINTS SHALL BE 1/2" MAXIMUM THICKNESS UNLESS SHOWN OTHERWISE.
- ALL WORK NECESSARY FOR THE INSTALLATION OF CUT STONE VENEER, INCLUDING SURFACE PREPARATION, DOVETAIL SLOTS, WIRE TIES, STONE, CAP STONE, MORTAR AND MISC. HARDWARE, SHALL BE INCLUDED IN ITEM 601 CUT STONE VENEER.
- CUT STONE VENEER SHALL BE ANCHORED TO THE WALL CONCRETE BY MEANS OF WIRE TIES PLACED IN DOVETAIL SLOTS, AS SHOWN. ALTERNATIVE METHODS OF ANCHORING THE STONE VENEER MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- REINFORCING STEEL IN STRUCTURAL CONCRETE NOT SHOWN.
- VENEER LIMITS EXTEND TO 1'-0" MINIMUM BELOW FINISHED GRADE ON ALL EXPOSED CONCRETE SURFACES.

KEYNOTES:

- TOOL SEALANT TO A ROUNDED SURFACE AND THE REQUIRED DIMENSIONS SHOWN. COLOR TO MATCH MORTAR JOINTS.
- VENEER PATTERN SHALL NOT BE BROKEN WITH A VERTICAL JOINT AT WALL EXPANSION JOINT. PROVIDE EXPANSION JOINT IN VENEER FOLLOWING GROUT LINE AS SHOWN.
- FIELD BEND WIRE SO THAT TAILS ARE EMBEDDED IN THE MIDDLE OF MORTAR BED. 1" MIN. CLR. FROM STRUCTURAL CONCRETE.

90% SET	<p>CALL UTILITY NOTIFICATION CENTER OF COLORADO CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES</p>	NO.	DATE	REVISION DESCRIPTION:	<p>BOULDER COUNTY TRANSPORTATION DEPARTMENT ENGINEERING DIVISION</p>	DESIGNED:	CAD:	CHECKED:	DATE:	<p>GOLD RUN ROAD CUT STONE VENEER DETAILS</p>
						<p>Michael Baker INTERNATIONAL</p>	DLT	BMT		

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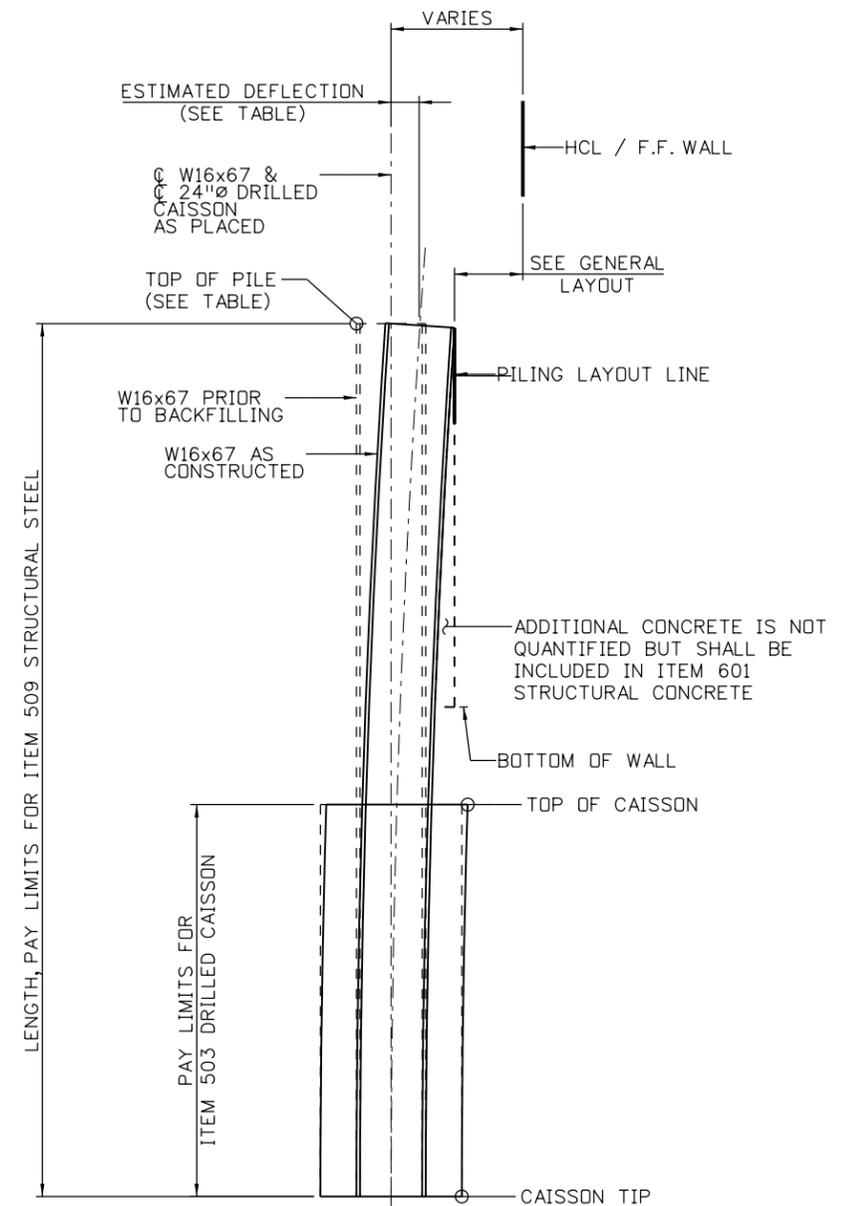
FOUNDATION LAYOUT - PLAN

NOTES

1. ORIENT ϕ PILING WEB PERPENDICULAR TO F.F. WALL AS SHOWN.
2. TEMPORARY CASING MAY BE REQUIRED TO PREVENT CAVING OF GRANULAR SOILS AND/OR TO REDUCE TO INTRUSION OF GROUND WATER. TEMPORARY CASING AND DEWATERING SHALL BE INCLUDED IN ITEM 503 DRILLED CAISSON.
3. DRILLED CAISSON CONCRETE SHALL BE CONCRETE CLASS BZ.

KEYNOTES

- ① 1/2" MINIMUM CLEAR.



SOLDIER PILE DETAIL
N.T.S.

90% SET	<p style="font-size: 8px; margin: 0;">CALL UTILITY NOTIFICATION CENTER OF COLORADO CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES</p>	REVISIONS:	NO.	DATE	REVISION DESCRIPTION:	<p style="font-size: 8px; margin: 0;">BOULDER COUNTY TRANSPORTATION DEPARTMENT ENGINEERING DIVISION</p> <p style="font-size: 8px; margin: 0;">Michael Baker INTERNATIONAL</p>	DESIGNED:	CAD:	CHECKED:	DATE:	<p style="font-size: 8px; margin: 0;">GOLD RUN ROAD SOLDIER PILE WALL DETAILS (1 OF 3)</p> <p style="font-size: 8px; margin: 0;">PROJECT NO: 4043.SEPT12C38 SHEET NO: 175</p>
							DLT	BMT		4/15/2016	

WALL 2 SOLDIER PILE DATA TABLE

DRILLED CAISSON NUMBER	NORTHING	EASTING	WALL HCL		GOLD RUN RD. HCL		ESTIMATED TOP OF WALL DEFLECTION (1)	EST. C CAISSON PLACEMENT OFFSET FROM WALL HCL	EXISTING GROUND ELEVATION AT C CAISSON	TOP OF WALL ELEVATION	BOTTOM OF WALL ELEVATION	WALL HEIGHT ("H")	PILE CUTOFF ELEVATION	TOP OF CAISSON ELEVATION	MIN. CAISSON LENGTH	CAISSON MIN. TIP ELEVATION
			STATION AT C CAISSON	PLAN OFFSET AT C CAISSON	STATION AT C CAISSON	PLAN OFFSET AT C CAISSON										
DC 1	263,365.11	34,786.95	2000+02.13	1.60 FT. LT.	70+47.19	10.90 FT. LT.	0.03 FT	1.63 FT. LT.	6893.25	6895.06	6888.32	6.74 FT.	6893.56	6887.63	14.00 FT.	6873.63
DC 2	263,362.99	34,794.70	2000+10.08	1.60 FT. LT.	70+55.82	10.90 FT. LT.	0.03 FT	1.63 FT. LT.	6891.86	6894.48	6887.63	6.85 FT.	6892.98	6886.94	14.00 FT.	6872.94
DC 3	263,360.46	34,802.32	2000+18.03	1.60 FT. LT.	70+64.44	10.90 FT. LT.	0.03 FT	1.63 FT. LT.	6891.25	6893.93	6886.94	6.99 FT.	6892.43	6886.25	14.00 FT.	6872.25
DC 4	263,357.52	34,809.80	2000+25.98	1.60 FT. LT.	70+73.07	10.90 FT. LT.	0.04 FT	1.63 FT. LT.	6890.82	6893.41	6886.25	7.16 FT.	6891.91	6885.56	14.00 FT.	6871.56
DC 5	263,354.18	34,817.11	2000+33.93	1.60 FT. LT.	70+81.69	10.90 FT. LT.	0.04 FT	1.63 FT. LT.	6890.53	6892.91	6885.56	7.35 FT.	6891.41	6884.86	14.00 FT.	6870.86
DC 6	263,350.46	34,824.23	2000+41.89	1.60 FT. LT.	70+90.16	10.90 FT. LT.	0.04 FT	1.63 FT. LT.	6889.96	6892.43	6884.86	7.57 FT.	6890.93	6884.17	14.00 FT.	6870.17
DC 7	263,346.65	34,831.26	2000+49.89	1.60 FT. LT.	70+98.16	10.90 FT. LT.	0.04 FT	1.64 FT. LT.	6889.94	6892.00	6884.17	7.83 FT.	6890.50	6883.48	14.00 FT.	6869.48
DC 8	263,342.84	34,838.30	2000+57.90	1.60 FT. LT.	71+06.16	10.90 FT. LT.	0.04 FT	1.64 FT. LT.	6890.11	6891.60	6883.48	8.13 FT.	6890.10	6882.78	14.00 FT.	6868.78
DC 9	263,338.66	34,845.19	2000+65.80	1.60 FT. LT.	71+15.34	10.90 FT. LT.	0.04 FT	1.64 FT. LT.	6890.82	6891.10	6882.78	8.32 FT.	6889.60	6882.61	14.00 FT.	6868.61

WALL 3 SOLDIER PILE DATA TABLE

DRILLED CAISSON NUMBER	NORTHING	EASTING	WALL HCL		GOLD RUN RD. HCL		ESTIMATED TOP OF WALL DEFLECTION (1)	EST. C CAISSON PLACEMENT OFFSET FROM WALL HCL	EXISTING GROUND ELEVATION AT C CAISSON	TOP OF WALL ELEVATION	BOTTOM OF WALL ELEVATION	WALL HEIGHT ("H")	PILE CUTOFF ELEVATION	TOP OF CAISSON ELEVATION	MIN. CAISSON LENGTH	CAISSON MIN. TIP ELEVATION
			STATION AT C CAISSON	PLAN OFFSET AT C CAISSON	STATION AT C CAISSON	PLAN OFFSET AT C CAISSON										
DC 1	263,796.30	53,662.78	3000+02.12	1.60 FT. LT.	71+76.16	10.90 FT. LT.	0.04 FT	1.64 FT. LT.	6886.57	6888.62	6880.23	8.39 FT.	6887.12	6880.23	14.00 FT.	6866.23
DC 2	263,790.47	53,657.32	3000+10.05	1.60 FT. LT.	71+85.16	10.90 FT. LT.	0.04 FT	1.64 FT. LT.	6885.62	6888.16	6880.23	7.93 FT.	6886.66	6880.23	14.00 FT.	6866.23
DC 3	263,784.54	53,651.97	3000+18.05	1.60 FT. LT.	71+93.16	10.90 FT. LT.	0.04 FT	1.63 FT. LT.	6886.21	6887.57	6880.23	7.34 FT.	6886.07	6880.23	14.00 FT.	6866.23
DC 4	263,778.52	53,646.72	3000+26.05	1.60 FT. LT.	72+01.16	10.90 FT. LT.	0.03 FT	1.63 FT. LT.	6885.74	6886.98	6880.23	6.75 FT.	6885.48	6880.23	14.00 FT.	6866.23

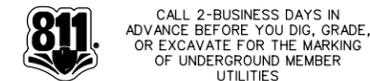
WALL 4 SOLDIER PILE DATA TABLE

DRILLED CAISSON NUMBER	NORTHING	EASTING	WALL HCL		GOLD RUN RD. HCL		ESTIMATED TOP OF WALL DEFLECTION (1)	EST. C CAISSON PLACEMENT OFFSET FROM WALL HCL	EXISTING GROUND ELEVATION AT C CAISSON	TOP OF WALL ELEVATION	BOTTOM OF WALL ELEVATION	WALL HEIGHT ("H")	PILE CUTOFF ELEVATION	TOP OF CAISSON ELEVATION	MIN. CAISSON LENGTH	CAISSON MIN. TIP ELEVATION
			STATION AT C CAISSON	PLAN OFFSET AT C CAISSON	STATION AT C CAISSON	PLAN OFFSET AT C CAISSON										
DC 1	262,234.49	35,901.69	4000+02.83	1.60 FT. LT.	87+90.39	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6743.73	6745.15	6731.63	13.52 FT.	6743.65	6731.11	16.50 FT.	6714.61
DC 2	262,228.54	35,907.03	4000+10.83	1.60 FT. LT.	87+98.39	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6742.03	6744.71	6731.11	13.60 FT.	6743.21	6730.60	16.50 FT.	6714.10
DC 3	262,222.59	35,912.38	4000+18.83	1.60 FT. LT.	88+06.39	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6740.54	6744.28	6730.60	13.68 FT.	6742.78	6730.09	16.50 FT.	6713.59
DC 4	262,216.63	35,917.72	4000+26.83	1.60 FT. LT.	88+14.39	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6740.17	6743.83	6730.09	13.74 FT.	6742.33	6729.57	16.50 FT.	6713.07
DC 5	262,210.68	35,923.07	4000+34.83	1.60 FT. LT.	88+22.39	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6739.46	6743.37	6729.57	13.80 FT.	6741.87	6729.19	16.50 FT.	6712.69
DC 6	262,206.22	35,927.08	4000+40.83	1.60 FT. LT.	88+28.39	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6739.40	6743.03	6729.19	13.84 FT.	6741.53	6728.67	16.50 FT.	6712.17
DC 7	262,200.32	35,932.47	4000+48.85	1.60 FT. LT.	88+36.03	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6738.36	6742.58	6728.67	13.90 FT.	6741.08	6728.16	16.50 FT.	6711.66
DC 8	262,194.57	35,938.00	4000+56.87	1.60 FT. LT.	88+43.62	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6736.53	6742.10	6728.16	13.94 FT.	6740.60	6727.65	16.50 FT.	6711.15
DC 9	262,188.95	35,943.67	4000+64.89	1.60 FT. LT.	88+51.21	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6735.54	6741.57	6727.65	13.93 FT.	6740.07	6727.13	16.50 FT.	6710.63
DC 10	262,183.47	35,949.47	4000+72.92	1.60 FT. LT.	88+58.80	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6734.82	6741.04	6727.13	13.91 FT.	6739.54	6726.62	16.50 FT.	6710.12
DC 11	262,178.13	35,955.41	4000+80.94	1.60 FT. LT.	88+66.39	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6734.36	6740.50	6726.62	13.88 FT.	6739.00	6726.11	16.50 FT.	6709.61
DC 12	262,172.94	35,961.48	4000+88.96	1.60 FT. LT.	88+73.98	16.07 FT. LT.	0.07 FT	1.67 FT. LT.	6734.40	6739.95	6726.11	13.84 FT.	6738.45	6725.59	16.50 FT.	6709.09
DC 13	262,167.90	35,967.67	4000+96.98	1.60 FT. LT.	88+81.57	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6733.35	6739.38	6725.59	13.79 FT.	6737.88	6725.08	16.50 FT.	6708.58
DC 14	262,163.02	35,973.98	4001+05.01	1.60 FT. LT.	88+89.16	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6733.17	6738.77	6725.08	13.69 FT.	6737.27	6724.57	16.50 FT.	6708.07
DC 15	262,158.28	35,980.41	4001+13.02	1.60 FT. LT.	88+96.88	16.07 FT. LT.	0.07 FT	1.66 FT. LT.	6733.19	6738.14	6724.57	13.57 FT.	6736.64	6724.38	16.50 FT.	6707.88

KEYNOTES:

(1) ESTIMATED DEFLECTION = 0.5% "H". ESTIMATED DEFLECTIONS ARE APPROXIMATE AND MAY VARY DEPENDING ON BACKFILL EQUIPMENT AND PROCEDURE.

90% SET



REVISIONS:	NO.	DATE	REVISION DESCRIPTION:



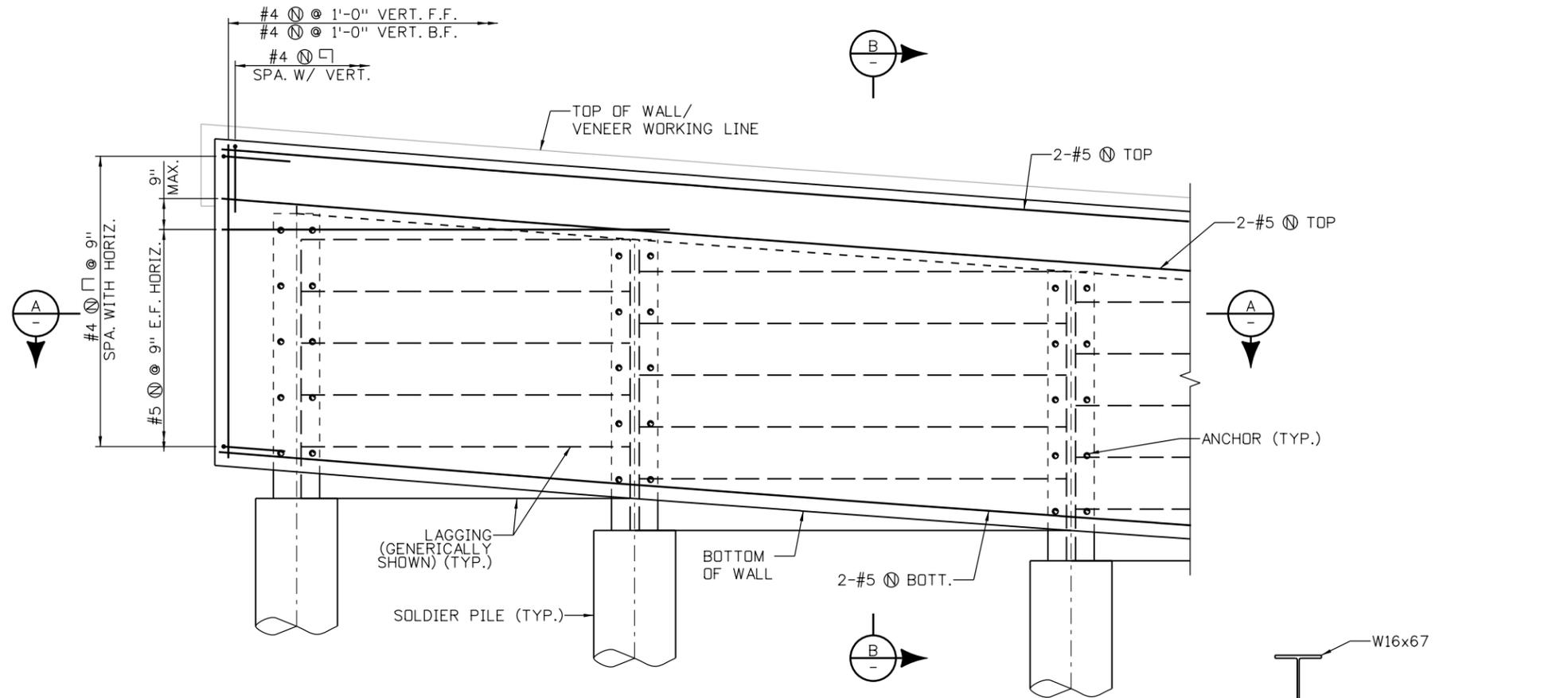
BOULDER COUNTY TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
Michael Baker INTERNATIONAL

DESIGNED: DLT	CAD: BMT	CHECKED:	DATE: 4/15/2016
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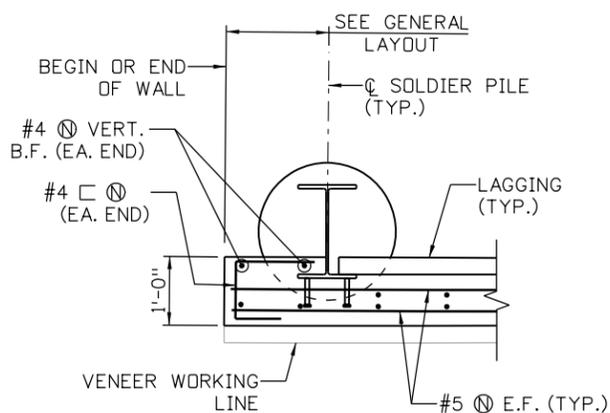
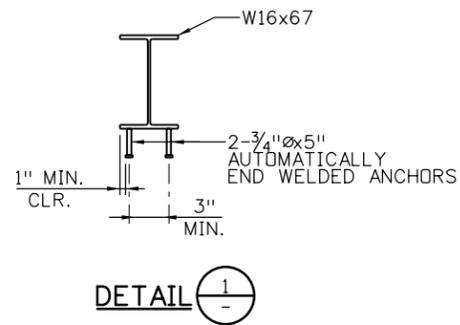
GOLD RUN ROAD SOLDIER PILE WALL DETAILS (2 OF 3)
 PROJECT NO: 4043.SEPT12C38 SHEET NO: 176

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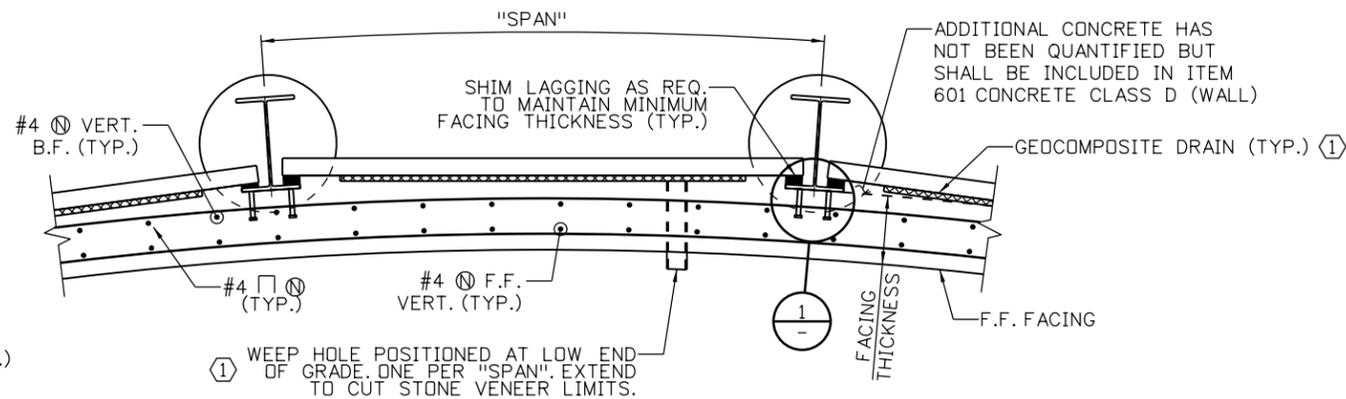
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TYPICAL PARTIAL ELEVATION
DRAINAGE NOT SHOWN



SECTION A-A



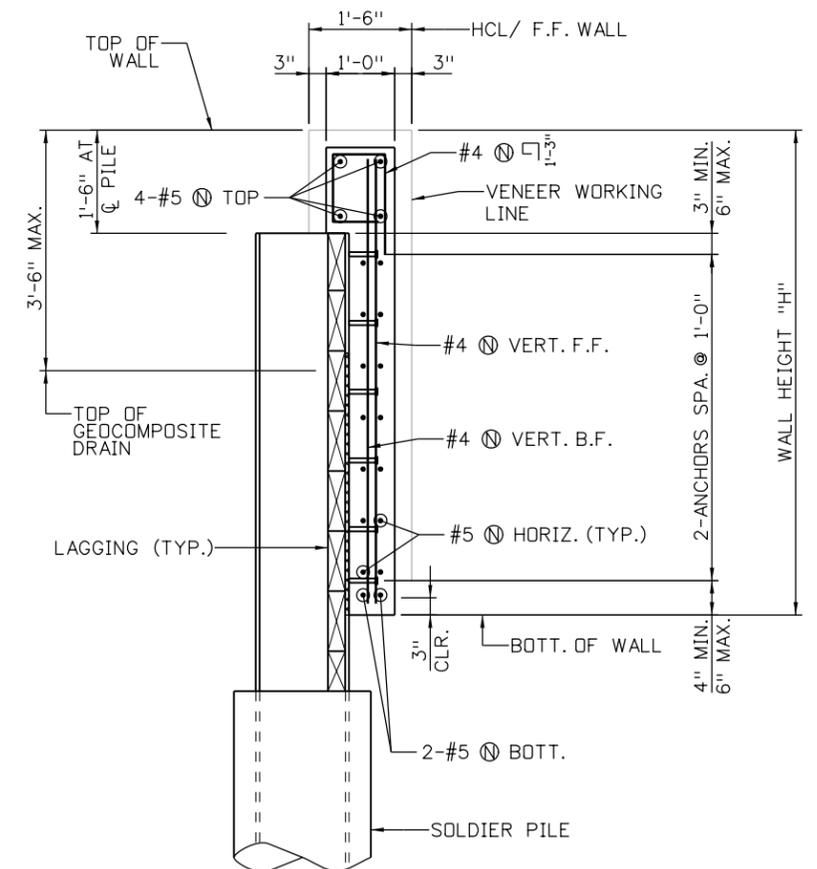
SECTION B-B

NOTES

1. FACING CONCRETE SHALL BE CONCRETE CLASS D (WALL).
2. WEEP HOLES SHALL BE 3 INCH DIAMETER SCHEDULE 40 PVC PIPE POSITIONED 6 INCHES CLEAR ABOVE FINISHED GRADE (F.F. WALL). PROVIDE 1 INCH CLEAR TO REINFORCING.
3. GEOCOMPOSITE SHALL BE SECURED TO PREVENT MOVEMENT DURING OPERATIONS.
4. ALL ELEMENTS ASSOCIATED WITH LAGGING, GEOCOMPOSITE DRAIN, AND WEEP HOLES SHALL BE INCLUDED IN ITEM 601 CONCRETE CLASS D (WALL).
5. THE CONTRACTOR SHALL DESIGN LAGGING TO SPAN BETWEEN SOLDIER PILES. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS AND WORKING DRAWINGS SEALED BY THE CONTRACTOR'S ENGINEER FOR INFORMATION ONLY 10 DAYS BEFORE THE START OF WORK.
6. FOR ARCHITECTURAL DETAILS AND ASSOCIATED EMBEDDED ELEMENTS, REFER TO CUT STONE VENEER SHEETS.
7. F.F. WALL SHALL BE PLUMB. SEE SOLDIER PILE DETAIL FOR ADDITIONAL CONCRETE QUANTITIES NOT SHOWN.

KEYNOTES

- ① DRAINAGE NOT REQUIRED WHERE WALL HEIGHT "H" IS LESS THAN 6'-0".



TYPICAL SECTION B-B
WEEP HOLES NOT SHOWN

90% SET

CALL UTILITY NOTIFICATION CENTER OF COLORADO
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES



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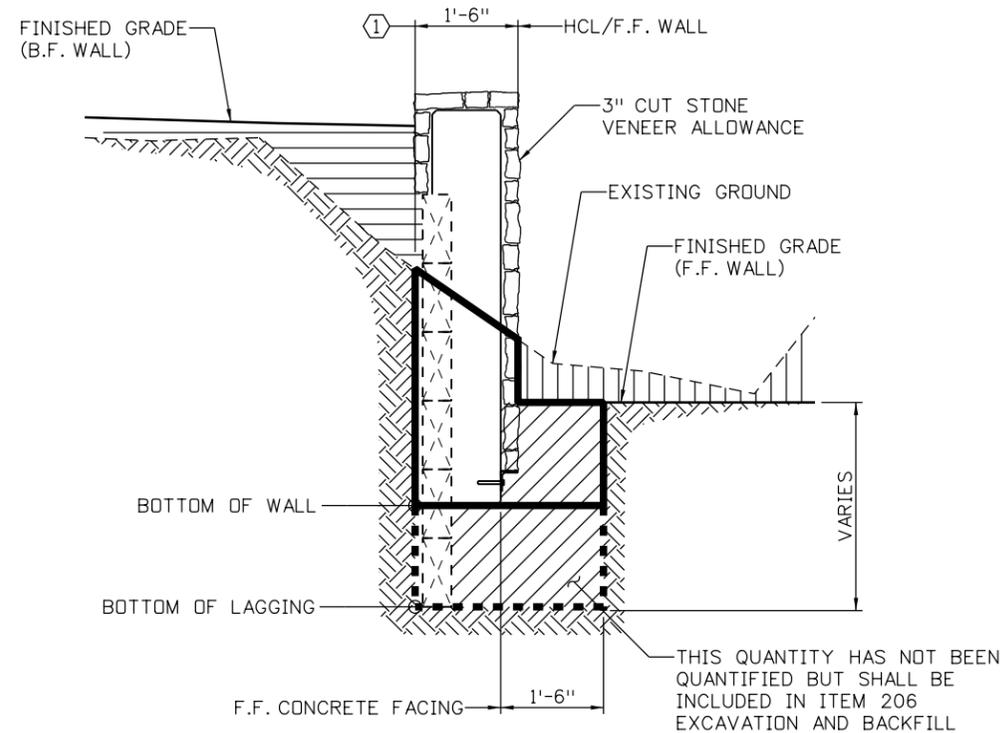


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ENGINEERING DIVISION
Michael Baker INTERNATIONAL

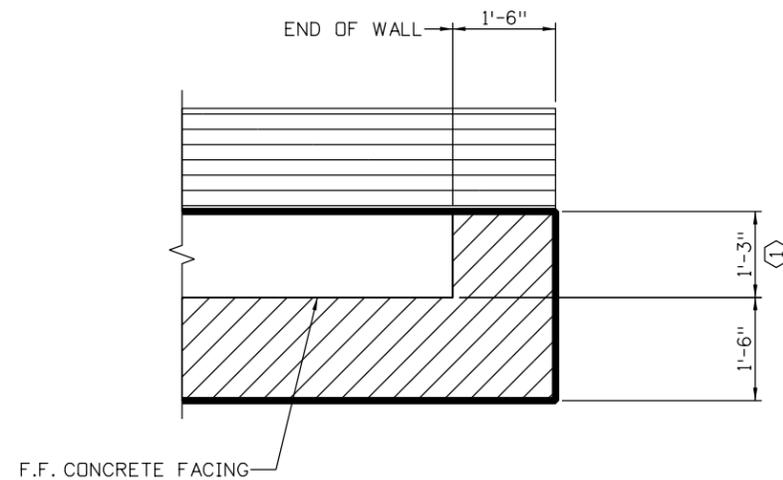
DESIGNED: DLT	CAD: BMT	CHECKED:	DATE: 4/15/2016
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GOLD RUN ROAD
SOLDIER PILE WALL DETAILS
(3 OF 3)
PROJECT NO: 4043.SEPT12C38 SHEET NO: 177

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TYPICAL SECTION BETWEEN CAISSONS



END OF RETAINING WALL DETAIL - PLAN

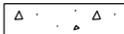
NOTES:

1. THIS SHEET GIVES THE MINIMUM EXTENT OF EARTHWORK. THE CONTRACTOR MAY ELECT TO EXTEND THE STRUCTURE EXCAVATION AND STRUCTURE BACKFILL BEYOND THE LIMITS SHOWN. ANY ADDITIONAL EXCAVATION BEHIND THE WALL SHALL BE BACKFILLED WITH STRUCTURE BACKFILL (CLASS 1). ANY ADDITIONAL EXCAVATION IN FRONT OF THE WALL SHALL BE BACKFILLED WITH STRUCTURE BACKFILL (CLASS 2). ANY ADDITIONAL EXCAVATION OR BACKFILL BEYOND THE LIMITS SHOWN ON THIS SHEET WILL BE BOURNE BY THE CONTRACTOR AND WILL NOT BE MEASURED OR PAID FOR.
2. EXCAVATION AND BACKFILL IN THE DRILLED HOLE OF THE CAISSON SHALL NOT BE PAID FOR SEPERATELY BUT INCLUDED IN ITEM 503 DRILLED CAISSON.
3. FOR DRAINAGE DETAILS, SEE SOLDIER PILE WALL DETAILS.

KEYNOTES:

- ① DIMENSION SHOWN IS USED FOR QUANTITY PURPOSES ONLY AND APPLIES FROM BEGINNING TO END OF WALL.

LEGEND:

-  PAY LIMITS OF STRUCTURE EXCAVATION
-  LIMITS OF STRUCTURE BACKFILL (CLASS 2)
-  SEE ROADWAY PLANS
-  LIMITS OF UNCLASSIFIED EXCAVATION (INCLUDED WITH ROADWAY PLANS)
-  CONCRETE
-  EARTH

90% SET	 <p>CALL UTILITY NOTIFICATION CENTER OF COLORADO CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES</p>	NO.	DATE	REVISION DESCRIPTION:	 <p>BOULDER COUNTY TRANSPORTATION DEPARTMENT ENGINEERING DIVISION</p> <p>Michael Baker INTERNATIONAL</p>	DESIGNED:	CAD:	CHECKED:	DATE:	<p>GOLD RUN ROAD SOLDIER PILE WALL EXCAVATION AND BACKFILL</p> <p>PROJECT NO: 4043.SEPT12C38 SHEET NO: 178</p>
						DLT	BMT	4/15/2016		

Mike Waiz 10-4-2017 AM 10:42:07 \\V:\PCF\WAP\Bkr.mbakercorp.com\p\prod\Documents\Projects\Boulder\Office\Boulder_County_Emergency_Transportation\102\05_Design\01_Geotech\Gold Run GNW Notes.dgn

1.0 GENERAL NOTES

- 1.1 EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH M-206-1.
- 1.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF STRUCTURES, INCLUDING EXCAVATIONS, DURING CONSTRUCTION.
- 1.3 EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.
- 1.4 ALL REINFORCING STEEL SHALL BE EPOXY-COATED UNLESS OTHERWISE NOTED. (N) DENOTES NON-COATED REINFORCING STEEL.

2.0 DESIGN DATA

- 2.1 THE SOIL NAIL WALL HAS BEEN DESIGNED IN GENERAL ACCORDANCE WITH PROCEDURES CONTAINED IN THE FHWA "MANUAL FOR DESIGN AND CONSTRUCTION MONITORING OF SOIL NAIL WALLS", REPORT NO. FHWA-SA-96-069R, USING ALLOWABLE STRESS DESIGN.
- 2.2 REINFORCED CONCRETE:
CLASS D CONCRETE: $f' = 4,500$ psi
REINFORCING STEEL: $f_y = 60,000$ psi
- 2.3 THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B AND CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

- 2.4 WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE. 2.5 THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS B AND CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS SHALL BE INCREASED BY 20 PERCENT FOR 3 BAR BUNDLES AND 33 PERCENT FOR 4 BAR BUNDLES. THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE FROM DATA PROVIDED BY MICHAEL BAKER CORP. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

3.0 SOIL NAIL WALLS

- 3.1 SOIL NAILS - GRADE 75 THREADBAR OR EQUIVALENT IN ACCORDANCE WITH ASTM A615 AND EPOXY COATED IN ACCORDANCE WITH ASTM A775 AND ENCAPSULATED IN CORRUGATED PLASTIC.
 $F_y = 75,000$ PSI
- 3.2 GROUT - GROUT MAY BE NEAT-CEMENT OR WITH SAND, WITH TYPE II CEMENT IN ACCORDANCE WITH ASTM C150. WATER-CEMENT RATIO SHOULD BE BETWEEN 0.4 AND 0.6 AND SHOULD DEVELOP THE FOLLOWING STRENGTHS AT THE SPECIFIED CURE PERIODS.
 $F'c = 1,500$ PSI MINIMUM 3 DAY
 $F'c = 3,000$ PSI MINIMUM 7 DAY
- 3.3 END HARDWARE - NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH SOIL NAIL MANUFACTURER'S RECOMMENDATIONS. BEARING PLATE SHALL BE IN ACCORDANCE WITH ASTM A36, GRADE 36. EPOXY-COATED BEARING PLATE, NUTS AND WASHERS TO BE EPOXY-COATED AS SHOWN ON THE PLANS.
- 3.4 SHOTCRETE - SHOTCRETE MIX SHALL CONSIST OF TYPE II CEMENT IN ACCORDANCE WITH ASTM C150, POTABLE WATER AND NORMAL WEIGHT AGGREGATE IN ACCORDANCE WITH ASTM C33. ADMIXTURES, IF USED, SHOULD BE NON-CORROSIVE TO STEEL. AT SOME LOCATIONS GROUND MAY BE HIGHLY CORROSIVE AND TYPE II CEMENT WITH 20% OF TYPE F FLYASH MAY BE REQUIRED. CONTRACTOR MAY SUBMIT AN ALTERNATIVE IN SUCH SITUATIONS FOR APPROVAL PRIOR TO INSTALLATION.
 $F'c = 4,500$ PSI (28-DAY STRENGTH)
- 3.5 UNLESS OTHERWISE NOTED ON THE PLANS, MINIMUM COVER OF SHOTCRETE REINFORCEMENT AND NAIL END HARDWARE SHOULD BE AS FOLLOWS:
FACE EXPOSED TO WEATHER - 2"
FACE EXPOSED TO SOIL - 3"
- 3.6 WELDED WIRE MESH SHALL BE IN ACCORDANCE WITH ASTM A185.
 $F_y = 65,000$ PSI
- 3.7 WALERS AND VERTICAL BEARING BARS SHALL BE IN ACCORDANCE WITH ASTM A615.
 $F_y = 60,000$ PSI.
- 3.8 CENTRALIZERS SHOULD BE PLASTIC AND ATTACHED TO THE NAILS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- 3.9 STRIP DRAINS CONSIST OF 12" WIDE DIMPLED CORES WRAPPED IN GEOTEXTILE.

4.0 SOIL NAIL WALL CONSTRUCTION SEQUENCE

- 4.1 EXCAVATE/INSTALL ONE LIFT AT A TIME TO A MAXIMUM DEPTH OF SIX (6) FEET. BOULDERS, COBBLES AND/OR BEDROCK MAY BE ENCOUNTERED AT ANY DEPTH OF THE EXCAVATION OR DRILLING. IN THE EVENT CUT HAS ALREADY BEEN EXCAVATED, EXCAVATION DEPTH REQUIREMENTS DO NOT APPLY. IF SLOUGHING GROUND CONDITIONS ARE ENCOUNTERED, SOIL NAILS MAY BE DRILLED AND INSTALLED THROUGH A TEMPORARY STABILIZING BERM AND/OR PLACEMENT OF A SACRIFICIAL REINFORCED SHOTCRETE FLASH COAT MAY BE USED TO TEMPORARILY STABILIZE EXCAVATION PRIOR TO DRILLING SOIL NAILS. CARE SHOULD BE TAKEN DURING INSTALLATION THAT NO GROUND IS LOST FROM BEHIND THE EXISTING SHOTCRETE.

- 4.2 INSTALL SOIL NAILS AT THE SPACINGS AND TO THE LENGTHS SHOWN ON THE PLANS. THE TOP ROW OF SOIL NAILS SHALL BE WITHIN 2.0 FEET OF THE TOP OF THE WALL. THE BOTTOM ROW OF NAILS SHALL BE WITHIN 2 FEET OF THE BOTTOM OF THE WALL. THE TOLERANCE FOR SOIL NAIL LOCATIONS SHALL BE 6 INCHES. TREMIE THE GROUT FROM THE BOTTOM OF THE HOLE UP. INJECTION BARS SHALL BE INSTALLED USING FINAL GROUT TO FLUSH DRILL HOLE WITH CONSTANT GROUT RETURN DURING INSTALLATION.
- 4.3 INSTALL STRIP DRAINS, WELDED WIRE MESH, WALERS AND VERTICAL BEARING BARS AS SHOWN ON THE PLANS. USE PLASTIC CHAIRS TO HOLD THE WELDED WIRE MESH AWAY FROM THE SOIL AS NECESSARY.
- 4.4 INSTALL SHOTCRETE TO THE MINIMUM THICKNESS SHOWN ON THE PLANS AND TO ATTAIN THE MINIMUM COVERAGE'S SPECIFIED HEREIN. GIVE SPECIAL ATTENTION TO FILLING THE VOID IN THE BORE HOLE ABOVE THE GROUT LINE UP TO THE SHOTCRETE LINE. COLD WEATHER PROTECTION MEASURES MAY BE NECESSARY.
- 4.5 INSTALL THE SOIL NAIL END HARDWARE AFTER THE INITIAL LAYER OF SHOTCRETE HAS BEEN INSTALLED. WHILE THE SHOTCRETE IS STILL WET, EMBED THE PLATE INTO THE SHOTCRETE SURFACE UNTIL THERE IS NO VOID BEHIND THE PLATE. HAND TIGHTEN THE NUT. APPLY ADDITIONAL SHOTCRETE LAYER TO ATTAIN MINIMUM COVERAGE FOR THE SOIL NAIL AND END HARDWARE AS INDICATED IN THESE NOTES.
- 4.6 ONCE THE GROUT AND SHOTCRETE OF THE CURRENT LIFT HAVE ATTAINED 50% OF THEIR SPECIFIC STRENGTHS, REPEAT CONSTRUCTION SEQUENCE TO THE BOTTOM OF THE WALL.

5.0 SOIL NAIL WALL DESIGN PARAMETERS

- 5.1 THE FOLLOWING STRENGTH PARAMETERS WERE ASSUMED FOR THE SUBSOILS BASED ON ESTIMATED VALUES FOR FIELD STRENGTH DATA. NO GEOTECHNICAL INVESTIGATION OR BORING DATA ARE AVAILABLE. FOR THIS REASON ALL OF THE SLOPES EVALUATED DURING SOIL NAIL WALL DESIGN ANALYSIS CONSIDERED A FULL VERTICAL HEIGHT OF SOIL ABOVE THE PROVIDED BEDROCK ELEVATION RATHER THAN A SOIL COVER THAT TAPERS UPSLOPE.

	ϕ (DEG)	c (PSF)	γ (PCF)	Q_{all} (lb/ft)
CLAYEY SAND/GRAVEL	32	25	120	1130

- 5.2 NO GROUNDWATER TABLE WAS ASSUMED.
- 5.3 FACTORS OF SAFETY
BEARING CAPACITY - $FS = 2.5$
OVERTURNING - $ECCENTRICITY < B/6$
GLOBAL STABILITY - $FS = 1.35$
PULLOUT - $FS = 2.0$
TENDON YIELD REDUCTION FACTOR - $\gamma = 0.55$
FACING FLEXURE FACTOR - $f = 0.67$
FACING PUNCHING FACTOR - $f = 0.67$

ϕ ANGLE OF INTERNAL FRICTION
c COHESION
 γ UNIT WEIGHT
 Q_{all} DESIGN SHEAR RESISTANCE BOND STRESS (ALLOWABLE)

6.0 SOIL NAIL WALL SPECIAL NOTES

- 6.1 THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SLOPE STABILITY ABOVE AND BELOW THE SOIL NAIL WALL DURING CONSTRUCTION.
- 6.2 THE CONTRACTORS ARE RESPONSIBLE FOR FIELD LOCATING ALL NEARBY UTILITIES. CONFLICTING UTILITIES MAY REQUIRE SOIL NAIL WALL REDESIGN, AT ENGINEER'S DISCRETION.
- 6.3 ANALYSIS PERFORMED AND PLANS PROVIDED DO NOT ADDRESS THE STABILITY OF THE ENTIRE NATURAL SLOPE. THE AREAS ANALYZED ARE IN THE IMMEDIATE AREA OF THE SOIL NAIL WALL.
- 6.3 THE BOND STRENGTHS (Q) SHOWN ON THE PLANS ARE THE MINIMUM ASSUMED FOR DESIGN.
- 6.4 SOIL NAIL LENGTHS SHOWN ON THE PLANS ARE THE MINIMUM LENGTHS REQUIRED.
- 6.5 PRIOR TO BEGINNING EXCAVATION FOR THE SOIL NAIL WALL, THE CONTRACTOR SHALL:
 - 6.5.1 SURVEY THE LAYOUT LINE AND TOP OF WALL LINE.
 - 6.5.2 CONFIRM THE LINES, GRADES, AND EXCAVATION LIMITS SHOWN ON THE PLANS.
 - 6.5.3 THE CONTRACTOR SHALL MODIFY THE PLAN WALL PROFILES USING THE FIELD SURVEY INFORMATION AND SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL.
 - 6.5.4 YEH AND ASSOCIATES IS NOT RESPONSIBLE FOR QUALITY CONTROL, QUALITY ASSURANCE, CHANGED CONDITIONS, PROBLEMS RESULTING FROM IMPROPER CONSTRUCTION TECHNIQUES, OR CONSTRUCTION SITE SAFETY.
 - 6.5.5 YEH AND ASSOCIATES IS NOT RESPONSIBLE FOR WALL LAYOUT OR WALL DIMENSIONS.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987 or 811

CALL 3-BUSINESS DAYS (NOT INCLUDING INITIAL DAY OF CONTACT) IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

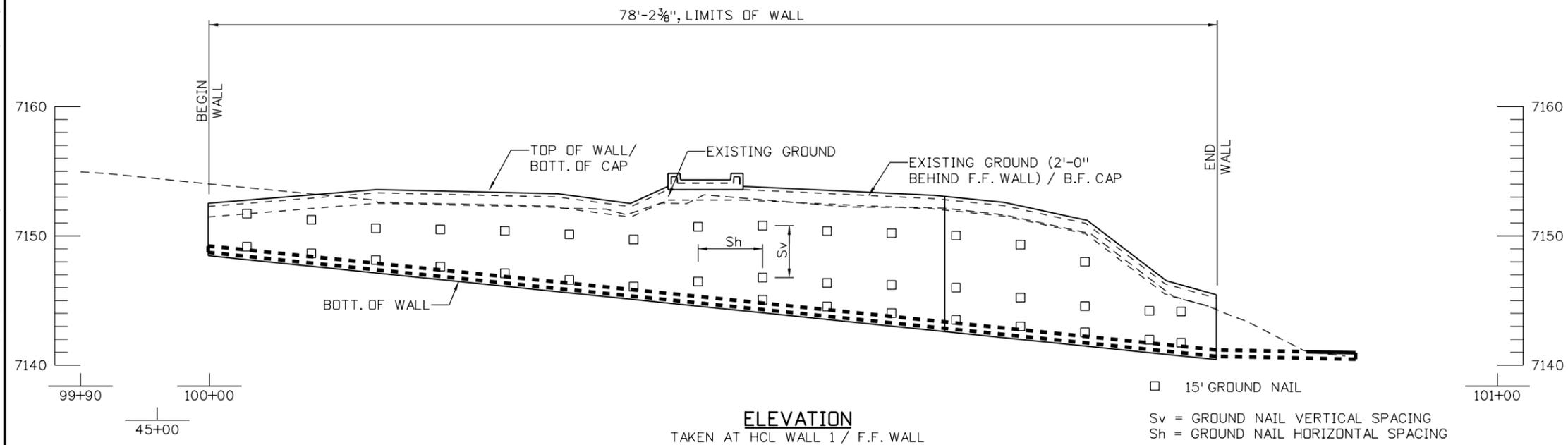
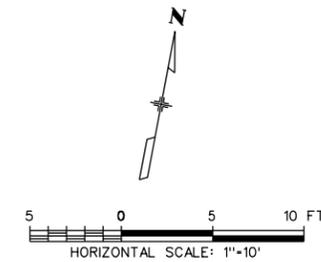
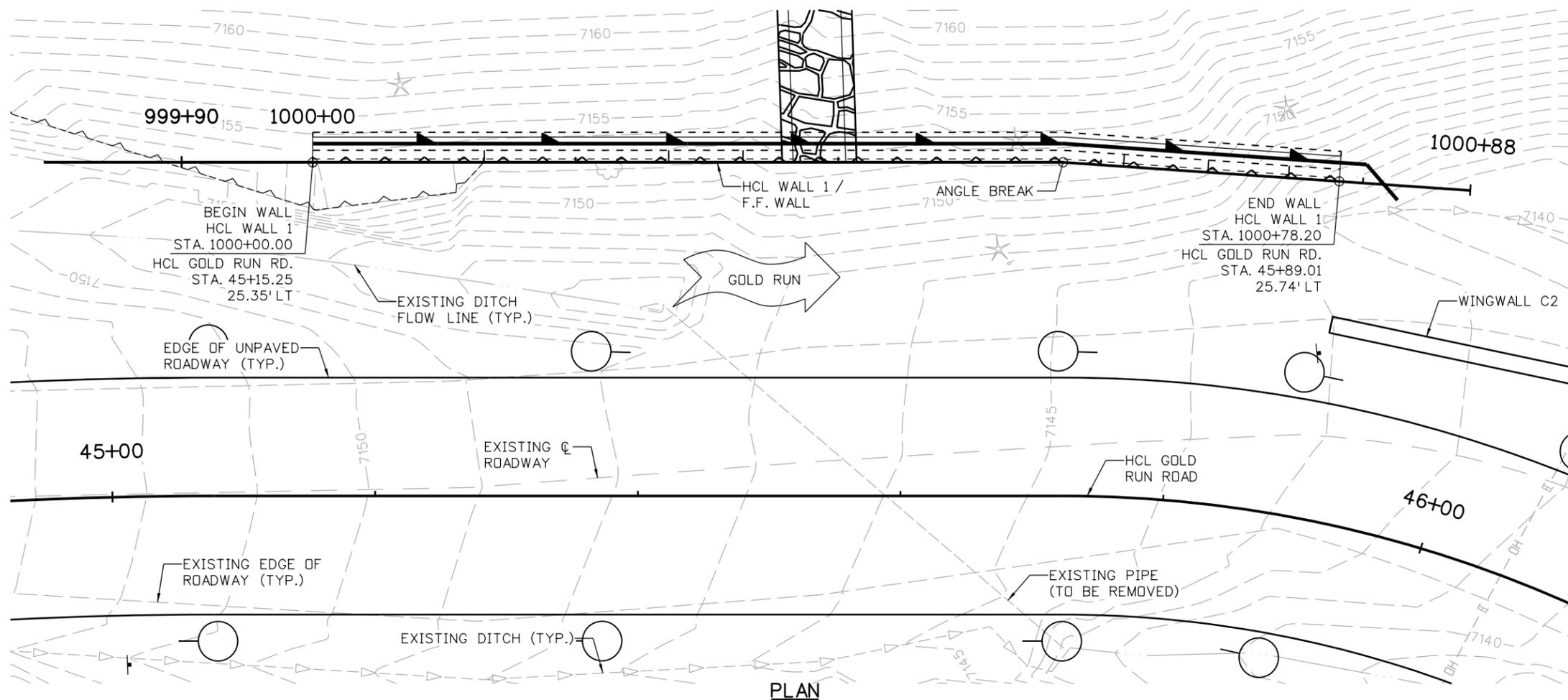
Know what's below.
Call before you dig.



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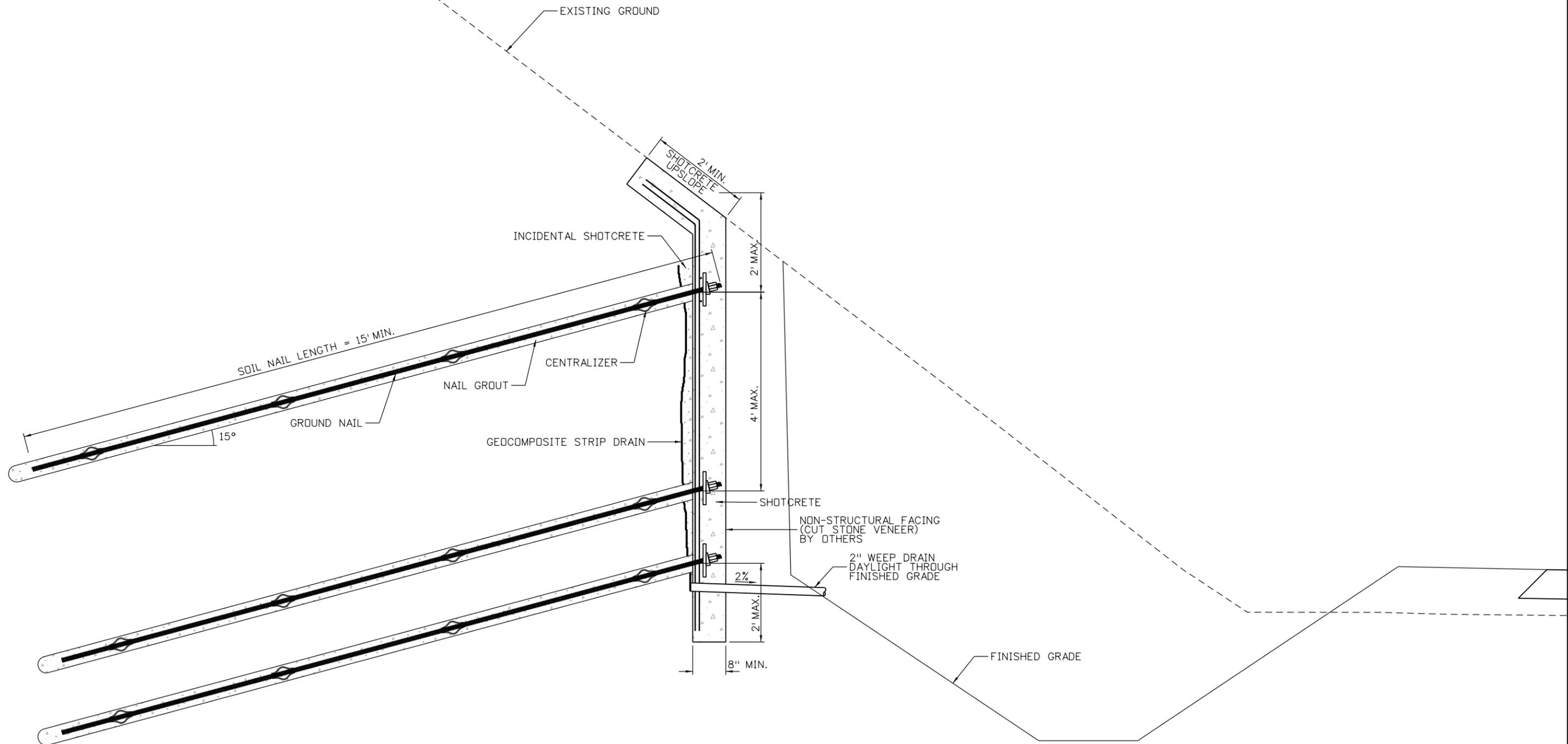
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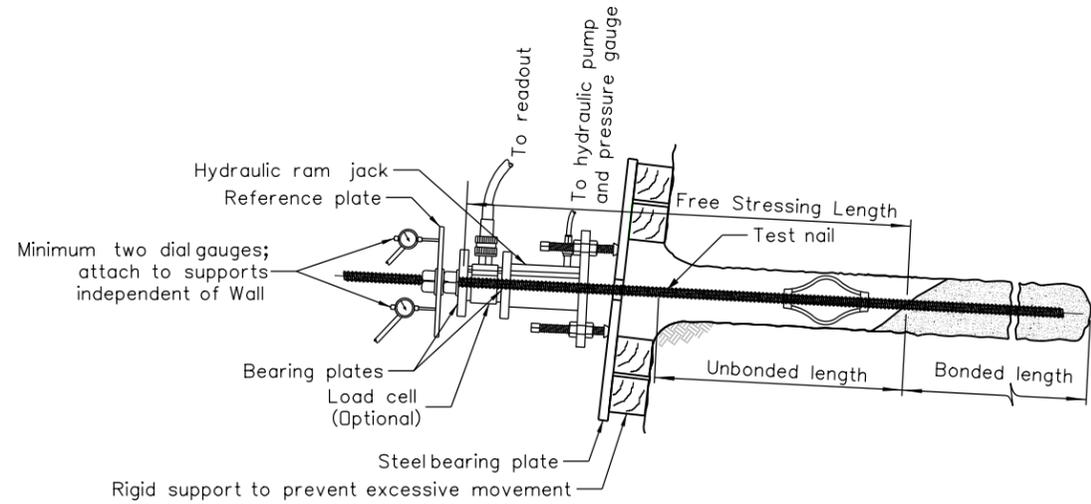


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DESIGNED:	CAD:	CHECKED:	DATE:
SCS	MJW		4/15/2016

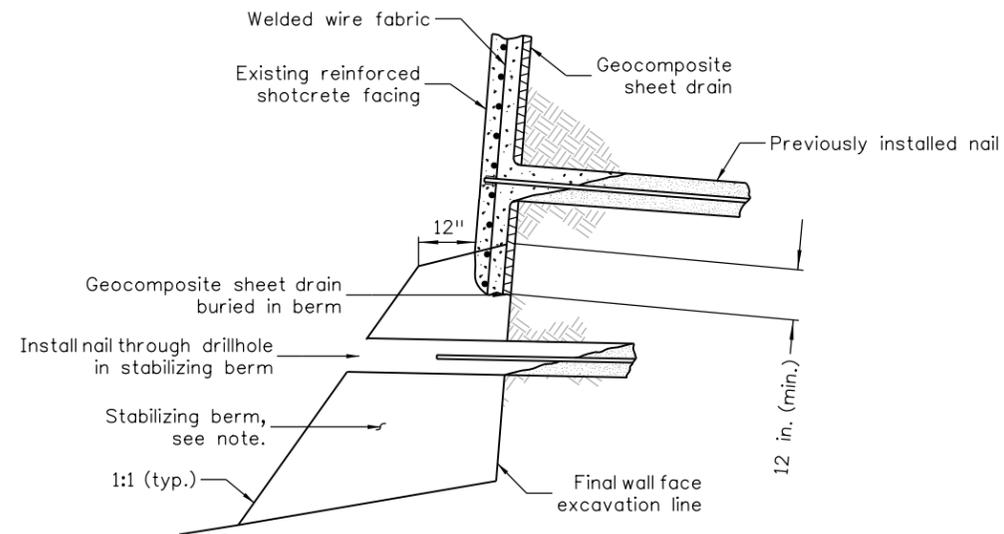
Mike Waiz 10:43:38 AM p:\p\1\DCPWAPP1.bkr.mbakercorp.com\p\prod\Documents\Projects\Lakewood\Office\Boulder_County_Emergency_Transportation\T02\05_Design\01_Geotech\Gold Run_GNW_Testing and Const.dgn



TYPICAL GROUND NAIL TEST SETUP

GROUND NAIL TESTING NOTES:

1. See specifications for verification and proof test nail requirements,
2. Required ground nail allowable pullout resistance:
As shown on plans
3. The test support system (eg. cribbing, chairs, bearing plates, etc.) shall be sufficient to complete the test without excessive deflection or bearing failure.
4. A minimum of 2 verification tests are required for ground nail Walls. Additional verification tests may be required by the Engineer if ground conditions or construction methods change.
5. A minimum of 5% of the ground nails shall be proof-tested.

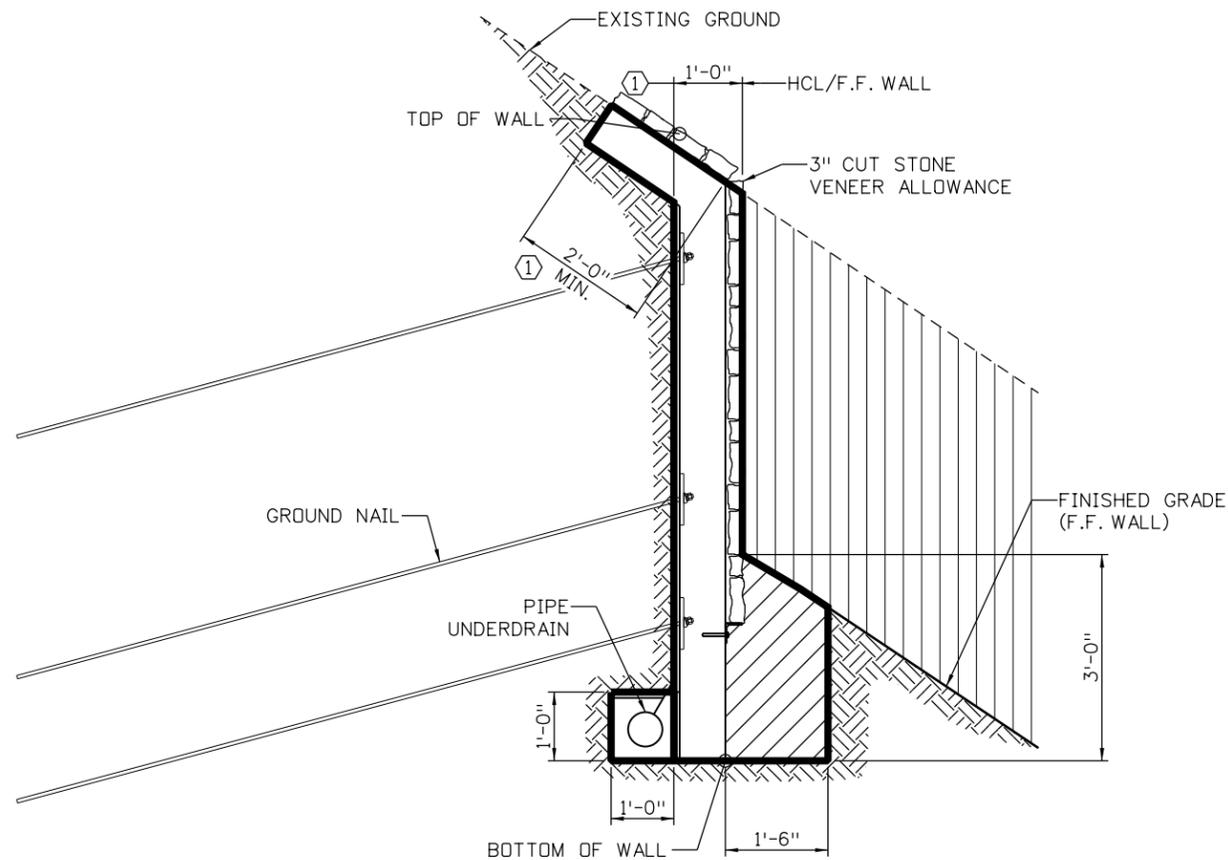


NAIL INSTALLATION THROUGH TEMPORARY STABILIZING BERM
(USE IN CASE OF SLOUGHING GROUND)

Note:
Excavate stabilizing berm to final wall face excavation line for shotcrete placement. Contractor shall carefully excavate stabilizing berm to avoid hitting ground nails buried in the berm.

REVISIONS:	NO.	DATE	REVISION DESCRIPTION:

brett.terrell 3:34:20 PM p:\DCPWAPP\lbr.mbakercorp.com\pwwprod\Documents\Projects\Lakewood\Office\Boulder\County_Emergency_Transportation\T02\08_Sheet_Files\06_Structures\06N\138368_WALL_14.dgn



TYPICAL SECTION

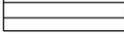
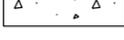
NOTES:

1. THIS SHEET GIVES THE MINIMUM EXTENT OF EARTHWORK. THE CONTRACTOR MAY ELECT TO EXTEND THE STRUCTURE EXCAVATION AND STRUCTURE BACKFILL BEYOND THE LIMITS SHOWN. ANY ADDITIONAL EXCAVATION BEHIND THE WALL SHALL BE BACKFILLED WITH STRUCTURE BACKFILL (CLASS 1). ANY ADDITIONAL EXCAVATION IN FRONT OF THE WALL SHALL BE BACKFILLED WITH STRUCTURE BACKFILL (CLASS 2). ANY ADDITIONAL EXCAVATION OR BACKFILL BEYOND THE LIMITS SHOWN ON THIS SHEET WILL BE BOURNE BY THE CONTRACTOR AND WILL NOT BE MEASURED OR PAID FOR.
2. FOR DRAINAGE DETAILS, SEE SOIL NAIL WALL DETAILS.

KEYNOTES:

- (1) DIMENSION SHOWN IS USED FOR QUANTITY PURPOSES ONLY AND APPLIES FROM BEGINNING TO END OF WALL.

LEGEND:

-  PAY LIMITS OF STRUCTURE EXCAVATION
-  LIMITS OF STRUCTURE BACKFILL (CLASS 2)
-  SEE ROADWAY PLANS
-  LIMITS OF UNCLASSIFIED EXCAVATION (INCLUDED WITH ROADWAY PLANS)
-  CONCRETE
-  EARTH

90% SET	 <p>CALL UTILITY NOTIFICATION CENTER OF COLORADO CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES</p>	NO.	DATE	REVISION DESCRIPTION:	 <p>BOULDER COUNTY TRANSPORTATION DEPARTMENT ENGINEERING DIVISION</p> <p>Michael Baker INTERNATIONAL</p>	DESIGNED:	CAD:	CHECKED:	DATE:	<p>GOLD RUN ROAD GROUND NAIL WALL EXCAVATION AND BACKFILL</p> <p>PROJECT NO: 4043.SEPT12C38 SHEET NO: 184</p>
						DLT	BMT		4/15/2016	