

DROP STRUCTURE TABULATION

INDEX			ITEM NO.	CONTRACT ITEM	UNIT	GSB	
BOOK	PAGE	SHEET				PLAN	AS CONST.
			206	FILTER MATERIAL (CLASS A)	CY	107	
			206	STRUCTURE EXCAVATION	CY	130	
			206	STRUCTURE BACKFILL (CLASS 1)	CY	118	
			207	TOPSOIL	CY	956	
			501	STEEL SHEET PILING (TYPE II)	SF	9010	
			506	RIPRAP (12 INCH)	CY	51	
			506	SOIL RIPRAP (12 INCH)	CY	3290	
			506	24 INCH GROUTED BOULDERS	CY	458	
			601	CONCRETE CLASS D (BOX CULVERT)	CY	26	
			602	REINFORCING STEEL	LB	2250	
			602	REINFORCING STEEL (EPOXY COATED)	LB	717	
			603	48 INCH REINFORCED CONCRETE PIPE (CIP)	LF	186	
			603	48 INCH REINFORCED CONCRETE END SECTION	EA	1	
			603	10X3 FOOT CONCRETE BOX CULVERT (PRECAST)	LF	90	
			604	INLET TYPE D (10 FOOT)	EA	1	
			604	INLET SPECIAL	EA	1	
			619	8 INCH PLASTIC PIPE	LF	267	

NOTES:

- 24 INCH GROUTED BOULDERS SHALL BE PAID FOR AS GROUTED RIPRAP (24 INCH).
- SEE CBMP PLANS FOR TABULATION OF EROSION CONTROL ITEMS.
- FOR UNCLASSIFIED EXCAVATION SEE EARTHWORK SUMMARY. COST OF EXCAVATION FOR ALL GROUTED RIPRAP AND SOIL RIPRAP IS INCLUDED IN THE COST OF THE BID ITEM.
- DROP STRUCTURE TABULATION QUANTITIES HAVE BEEN CARRIED FORWARD TO THE SUMMARY OF APPROXIMATE QUANTITIES SHEETS.
- 10X3 FOOT CONCRETE BOX CULVERT (PRECAST) QUANTITY SHOW IS FOR DUAL BOX CULVERTS AT CHEROKEE TRAIL.

STORM DRAINAGE INFRASTRUCTURE NOTES

- ALL STORM DRAINAGE IMPROVEMENTS ARE SUBJECT TO COMPLIANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, M & S STANDARDS, AND ALL STANDARD SPECIAL PROVISIONS CURRENTLY USED BY CDOT, WITH THE MODIFICATIONS SET FORTH IN THE TOWN OF PARKER'S STORM DRAINAGE AND ENVIRONMENTAL CRITERIA MANUAL (SDECM), AS AMENDED.
- THE CONTRACTOR SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8 CRS), THE "PROTECTION OF FISHING STREAMS" TITLE 33, ARTICLE 5, CRS), THE "CLEAN WATER ACT" (33 USC 1344), "CHERRY CREEK RESERVOIR CONTROL REGULATION NO. 72" (5 CCR 1002-72), THE REGULATION PROMULGATED, CERTIFICATION OR PERMITS ISSUES, AND THE REQUIREMENTS PRESENTED IN THE SDECM REVISION TO SECTION 107 AND THE CONSTRUCTION BMP PLAN. IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND WATER QUALITY CONTROL LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, OR STATE AGENCIES, THE MORE RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- INSPECTIONS: CONSTRUCTION SHALL NOT BEGIN UNTIL A GRADING PERMIT HAS BEEN ISSUED FOR THE PROJECT. THE CONTRACTOR SHALL NOTIFY THE TOWN OF PARKER ENGINEERING DEPARTMENT (PUBLIC WORKS) TO SCHEDULE INSPECTIONS A MINIMUM OF 48 HOURS PRIOR THE CONSTRUCTION OF ALL DRAINAGE INFRASTRUCTURE (STORM SEWERS, INLETS, MANHOLES, ENERGY DISSIPATORS, RIPRAP, GROUTED BOULDERS, DETENTION POND OUTLET STRUCTURES, FOREBAYS, TRICKLE CHANNELS, ETC). FAILURE TO NOTIFY THE ENGINEERING DEPARTMENT FOR INSPECTIONS MAY RESULT IN NON-ACCEPTANCE OF THE INFRASTRUCTURE BY THE TOWN. URBAN DRAINAGE AND FLOOD CONTROL DISTRICT MUST ALSO BE NOTIFIED IN A SIMILAR MANNER FOR ALL MAINTENANCE ELIGIBLE DRAINAGE INFRASTRUCTURES (CONSULT WITH STORMWATER ENGINEERING DIVISION).
- STRUCTURAL BACKFILL (CDOT CLASS 1) SHALL BE COMPACTED TO CONFORM TO CDOT STANDARD SPECIFICATION 203.03. STRUCTURAL BACKFILL (CDOT CLASS 2) SHALL CONFORM TO CDOT STANDARD SPECIFICATION 203.07. AT THE CONTRACTOR'S OPTION, STRUCTURAL BACKFILL (SQUEEGEE) MEETING THE GRADATION REQUIREMENTS CONTAINED IN REVISION OF SECTION 206 OF THE CDOT STANDARD SPECIFICATIONS AS PRESENTED IN THE SDECM, MAY BE SUBSTITUTED FOR STRUCTURE BACKFILL (CLASS 1) OR CLASS 2) FOR BACKFILLING OF CULVERT PIPES, STORM SEWER PIPES, MANHOLES AND INLET STRUCTURES; HOWEVER, THE TOP 2 FEET BELOW SUBGRADE ELEVATION SHALL BE THE REQUIRED EMBANKMENT MATERIAL.
- ALL EXCAVATIONS SHALL MEET OSHA REQUIREMENTS.
- TESTING: PROBATIONARY ACCEPTANCE OF STORM DRAINAGE IMPROVEMENTS WILL BE CONTINGENT UPON SATISFACTORY TESTING RESULTS. IN ALL CASES WHERE TESTS INDICATE COMPACTION LESS THAN THAT REQUIRED BY TOWN SPECIFICATIONS, ADDITIONAL COMPACTION AND TESTS WILL BE REQUIRED UNTIL THE SPECIFICATIONS ARE MET. FREQUENCY OF TESTING WILL BE AS FOLLOWS:
 1 TEST FOR SUBGRADE AND 1 TEST FOR BACKFILL AT EVERY ABOVE GROUND APPURTENANCE (MANHOLES, INLETS, ETC)
 1 TEST EVERY 200 LF OF MAINLINE TRENCH EVERY 1 FOOT OF BACKFILL LIFT AND WITHIN 1 FOOT FROM ALL STRUCTURES.

- ALLOWABLE STORM SEWER CONDUIT MATERIAL WITHIN THE TOWN OF PARKER SHALL BE LIMITED TO REINFORCED CONCRETE PIPE (RCP) CONFORMING TO CDOT STANDARD SPECIFICATION 706.02.
- ALL RCP JOINTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C443. RUBBER GASKETS SHALL BE USED ON ALL PIPE JOINTS CONFORMING TO ASTM C443. ALL RCP SECTIONS SHALL BE JOINED IN SUCH A MANNER THAT THE ENDS ARE FULLY ENTERED AND THE INNER SURFACES ARE REASONABLE FLUSH. AVERAGE JOINT GAP THAT EXCEEDS 1/2 INCH SHALL BE FILLED WITH AN APPROVED FLEXIBLE PLASTIC SEALANT.
- JOINT RESTRAINTS AND TOE-WALLS, CONFORMING TO CDOT M&S STANDARD PLAN NO. M-601-11 SHALL BE USED ON ALL RCP FLARED END SECTION OUTFALLS.
- EPOXY COATED REBAR SHALL BE USED AS REINFORCING STEEL ON ALL STORM INLETS AND STRUCTURES. REFERENCE CDOT M&S STANDARD PLAN NO. M-604-10, 11, 12, AND 13.
- CDOT CLASS D CONCRETE SHALL BE USED FOR ALL CONCRETE DRAINAGE STRUCTURES.
- PRE-CAST INLETS AND MANHOLE BASES SHALL NOT BE USED WITHIN THE TOWN OF PARKER RIGHT-OF-WAY, WITH THE EXCEPTION OF CDOT TYPE C AND D INLETS.
- TWO- (2) MANHOLE ACCESS POINTS ARE REQUIRED ON ALL TYPE "R" CURB INLETS GREATER THAN OR EQUAL TO TEN (10) FEET IN LENGTH AS PRESENTED IN CDOT M&S STANDARD PLAN NO. M-604-12.
- ALL GROUTING (BOULDERS, RIPRAP) SHALL BE IN ACCORDANCE WITH THE REVISION OF SECTION 506 OF THE CDOT STANDARD SPECIFICATIONS AS PRESENTED IN THE SDECM.
- ALL BOULDERS AND RIPRAP SHALL BE SELECTED AND PLACED IN ACCORDANCE WITH THE REVISION OF SECTION 506 OF THE CDOT STANDARD SPECIFICATIONS AS PRESENTED IN THE SDECM.
- CONTRACTOR SHALL REFER TO THE TOWN OF PARKER'S CONSTRUCTION BEST MANAGEMENT PRACTICES DETAILS AND NOTES FOR ALL REQUIREMENTS RELATING TO RE-VEGETATION, SEDIMENT AND EROSION CONTROL REQUIREMENTS FOR CONSTRUCTION ACTIVITIES.
- PIPE BELLS SHALL NOT BE CAST INTO MANHOLE BASES OR INLETS.

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Print Date: 8/14/2017 7:16:00 AM		Sheet Revisions				As Constructed		BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE TABULATION		Project No./Code	
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 6300 South Syracuse Way, Suite 600 Centennial, CO 80111 tel 303.721.1440 fax 303.721.0832						Void:		Detailer:	KLT	Numbers	
								Subset:	Drainage	Sheets:	DD-01 of 19
										Sheet Number	64

HAPPY CANYON CREEK DROP STRUCTURE NO. 1 STEEL SHEET PILE CUTOFF WALL POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
W1	27804.35	94876.28	5772.18	SHEET PILE CUTOFF WALL – FINISHED GRADE EL.
W2	27868.05	94779.67	5766.32	SHEET PILE CUTOFF WALL – FINISHED GRADE EL.
W3	27906.48	94753.03	5766.46	SHEET PILE CUTOFF WALL – FINISHED GRADE EL.
W4	27969.48	94765.25	5775.67	SHEET PILE CUTOFF WALL – FINISHED GRADE EL.

HAPPY CANYON CREEK DROP STRUCTURE NO. 2 STEEL SHEET PILE CUTOFF WALL POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
W1	27675.42	94283.50	5777.39	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W2	27745.88	94255.72	5769.99	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W3	27770.71	94252.88	5769.21	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W4	27834.84	94262.40	5776.14	CONCRETE CUTOFF WALL – FINISHED GRADE EL.

HAPPY CANYON CREEK DROP STRUCTURE NO. 3 STEEL SHEET PILE CUTOFF WALL POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
W1	27522.92	93938.45	5781.00	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W2	27627.16	93827.68	5772.57	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W3	27648.54	93814.47	5772.41	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W4	27680.82	93804.64	5781.00	CONCRETE CUTOFF WALL – FINISHED GRADE EL.

HAPPY CANYON CREEK DROP STRUCTURE NO. 4 STEEL SHEET PILE CUTOFF WALL POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
W1	27224.37	93849.23	5785.98	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W2	27201.63	93834.88	5777.63	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W3	27174.38	93805.42	5777.06	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W4	27143.34	93746.45	5778.26	CONCRETE CUTOFF WALL – FINISHED GRADE EL.
W5	27143.34	93579.99	5784.32	CONCRETE CUTOFF WALL – FINISHED GRADE EL.

HAPPY CANYON CREEK DROP STRUCTURE CHANNEL REVETMENT SOIL RIPRAP (12 INCH) POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CR1	27384.46	93620.98	5776.96	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR2	27409.72	93613.85	5776.89	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR3	27455.43	93616.23	5776.93	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR4	27504.52	93635.29	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR5	27521.43	93646.91	5777.11	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR6	27547.94	93676.17	5776.07	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR7	27561.71	93693.16	5776.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR8	27566.68	93697.18	5776.04	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR9	27669.93	93800.97	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR10	27681.39	93814.88	5776.99	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR11	27699.52	93838.94	5776.86	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR12	27713.46	93854.66	5777.09	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR13	27724.95	93872.92	5776.90	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR14	27732.94	93886.34	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR15	27743.41	93902.84	5777.05	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR16	27754.96	93929.13	5776.62	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR17	27765.52	93944.63	5775.94	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR18	27769.88	93961.99	5775.77	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR19	27781.73	93978.73	5775.97	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR20	27782.09	94006.03	5775.95	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
CR21	27787.18	94029.84	5776.06	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.

HAPPY CANYON CREEK DROP STRUCTURE GRADING POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
G1	27872.10	94962.88	5779.00	FINISHED GRADE
G2	27823.77	94932.12	5779.00	FINISHED GRADE
G3	27808.04	94890.63	5779.00	FINISHED GRADE
G4	27766.29	94809.24	5779.00	FINISHED GRADE
G5	27745.18	94744.70	5779.00	FINISHED GRADE


HAPPY CANYON CREEK DROP STRUCTURE SOIL RIPRAP (12 INCH) POINT DATA

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
SR1	27769.57	94610.05	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR2	27835.00	94932.41	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR3	27801.00	94604.71	5765.86	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR4	27800.24	94631.57	5767.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR5	27797.05	94661.68	5769.72	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR6	27804.21	94763.47	5770.47	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR7	27862.90	94848.01	5766.25	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR8	27885.55	94800.95	5765.45	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR9	27876.75	94787.82	5765.88	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR10	27864.82	94785.47	5766.43	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR11	27871.26	94540.03	5768.10	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR12	27892.28	94575.67	5770.18	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR13	27920.57	94605.87	5772.85	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR14	27943.91	94626.32	5774.63	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR15	27967.25	94646.78	5775.74	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR16	27912.28	94510.88	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR17	27925.40	94519.82	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR18	27937.13	94566.79	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR19	27941.73	94573.15	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR20	27962.64	94597.85	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR21	27970.79	94607.21	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR22	27995.66	94624.88	5777.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR23	27980.39	94661.70	5776.11	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR24	27988.53	94666.66	5776.90	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR25	27956.85	94747.12	5773.49	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR26	27965.72	94770.00	5773.56	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR27	27950.72	94782.27	5766.42	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR28	27950.92	94822.32	5764.33	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR29	27942.21	94828.37	5763.57	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR30	27923.33	94841.50	5764.91	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR31	27904.97	94854.26	5765.01	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR32	27881.83	94903.47	5766.84	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.

SR35	27821.75	94260.96	5774.00	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR36	27816.88	94288.38	5772.05	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR37	27814.22	94331.33	5770.01	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR38	27821.34	94373.78	5769.37	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.
SR39	27831.26	94408.21	5769.24	LIMITS OF SOIL RIPRAP (12 INCH) – FINISHED GRADE EL.

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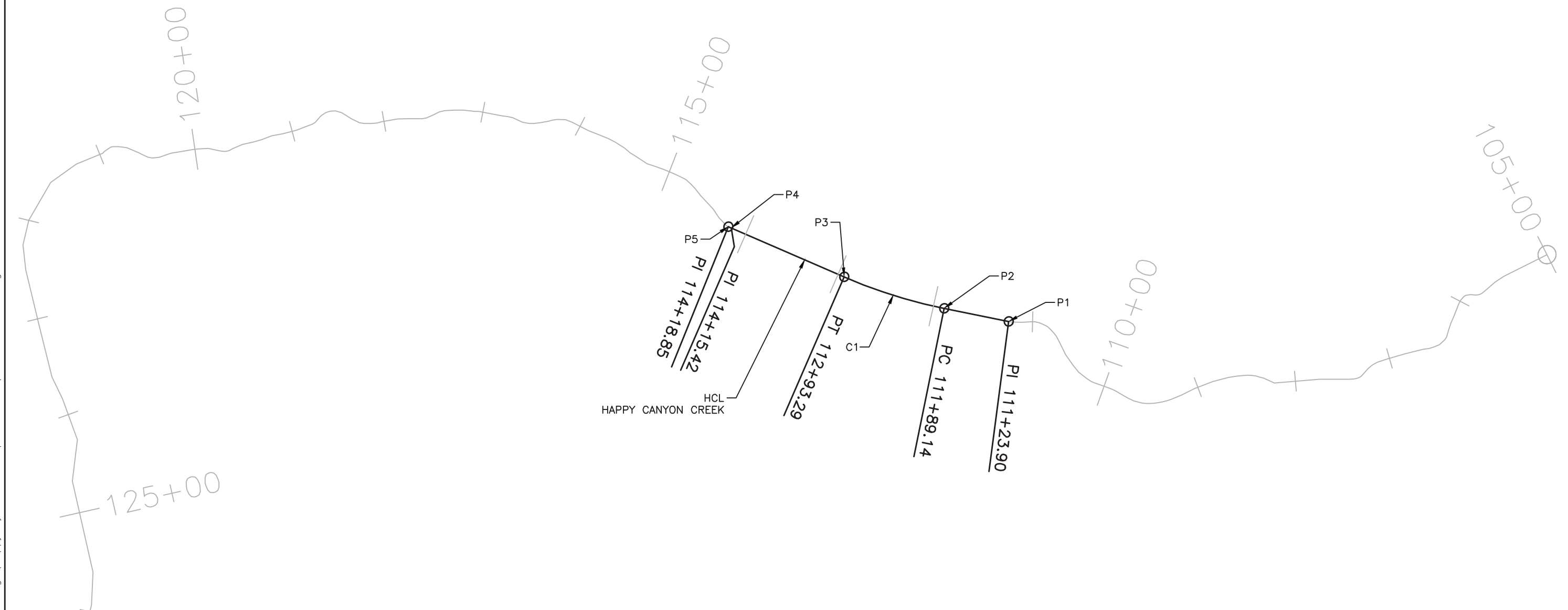
Sheet Revisions		
Date	Comments	Initials



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As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE POINT DATA DETAIL		Project No./Code
No Revisions:	Designer: CDT	Structure Numbers	Sheet Number 65
Revised:	Detailer: KLT		
Void:	Subset: Drainage	Sheets: DD-02 of 19	

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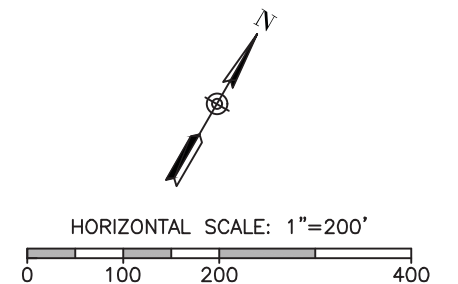


COORDINATE DATA

POINT	STATION	BEARING	NORTHING	EASTING
P1	PI 111+23.90		27812.91	94517.55
P2	PC 111+89.14	S71° 31' 51.06"W	27792.24	94455.67
P3	PT 112+93.29	C1	27769.74	94354.17
P4	PI 114+15.42	S83° 27' 55.88"W	27755.84	94232.84
P5	PI 114+18.85	S82° 04' 13.05"W	27755.40	94229.71

CURVE DATA

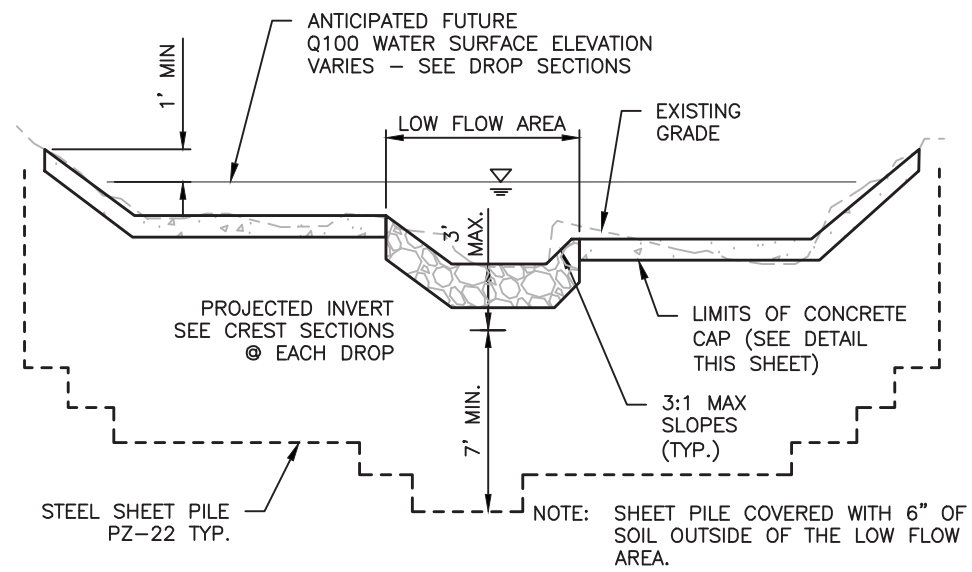
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	11° 56' 4.83"	500	104.15	52.26



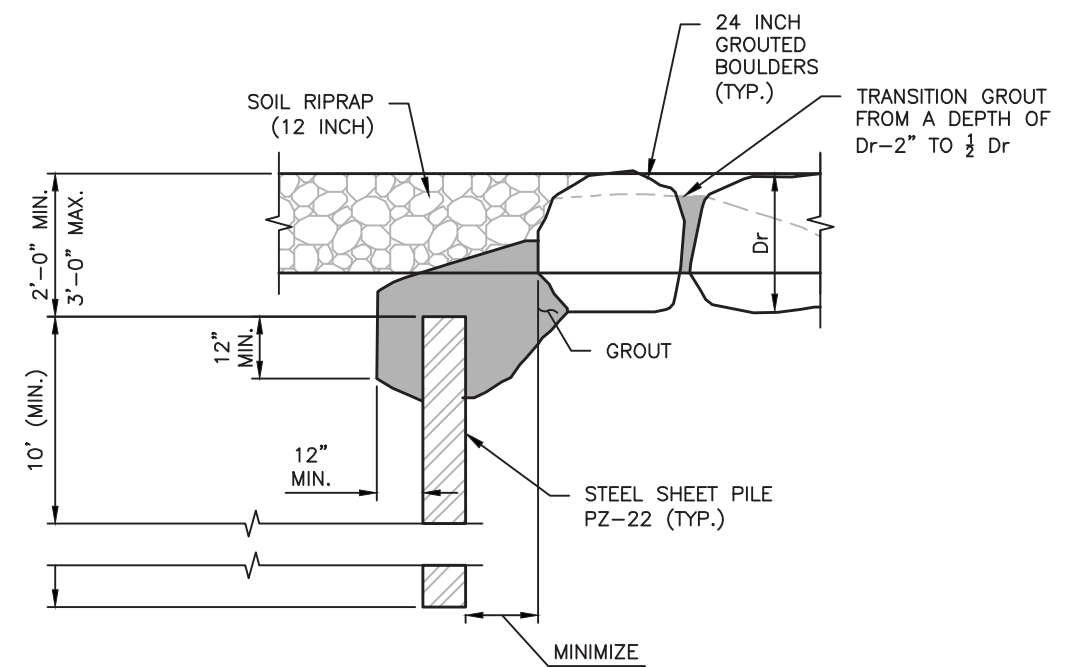
Print Date: 8/14/2017 7:16:14 AM File Name: H115360-01DROP03Geom.dwg Horizontal Scale: 1"=100' Vertical Scale: N.T.S.	Sheet Revisions <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:5%;">(R-X)</th> <th style="width:15%;">Date</th> <th style="width:40%;">Comments</th> <th style="width:20%;">Initials</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	(R-X)	Date	Comments	Initials													<p style="font-size: 8px; margin-top: 5px;"> 8009 E. Arapahoe Court, Suite 110, Denver, CO 80112 ph:303.708.0800 fx:303.708.0400 mmanhard.com Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers Construction Managers • Environmental Scientists • Landscape Architects • Planners </p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">As Constructed</td> <td colspan="2" style="text-align: center;">BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE HCL GEOMETRY LAYOUT</td> <td style="width:20%;">Project No./Code</td> </tr> <tr> <td>No Revisions:</td> <td>Designer: CDT</td> <td>Structure Numbers</td> <td> </td> </tr> <tr> <td>Revised:</td> <td>Detailer: KLT</td> <td>Sheets: DD-03 of 19</td> <td>Sheet Number 66</td> </tr> <tr> <td>Void:</td> <td>Subset: Drainage</td> <td> </td> <td> </td> </tr> </table>	As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE HCL GEOMETRY LAYOUT		Project No./Code	No Revisions:	Designer: CDT	Structure Numbers		Revised:	Detailer: KLT	Sheets: DD-03 of 19	Sheet Number 66	Void:	Subset: Drainage		
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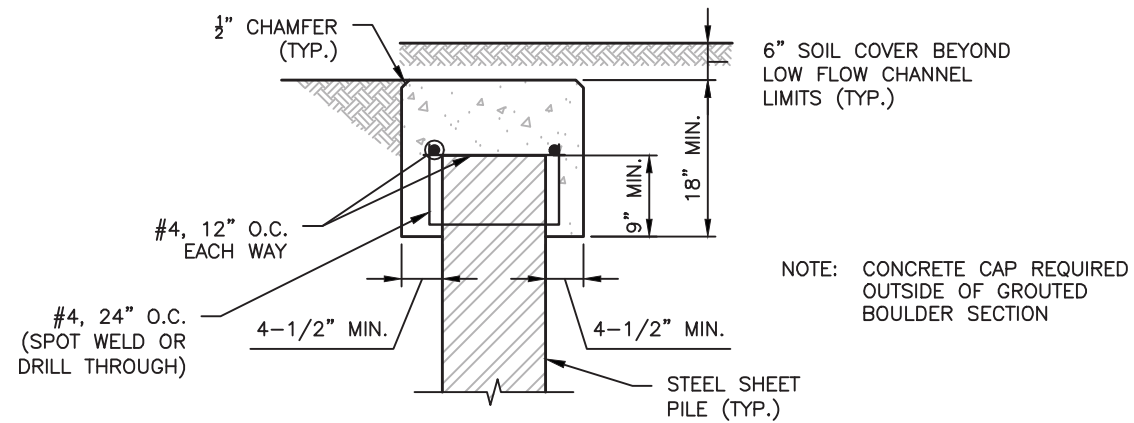
Know what's below.
Call before you dig.



SHEET PILE TYPICAL SECTION
N.T.S.



SHEET PILE CUTOFF CONNECTION (GROUTED BOULDER)
N.T.S.



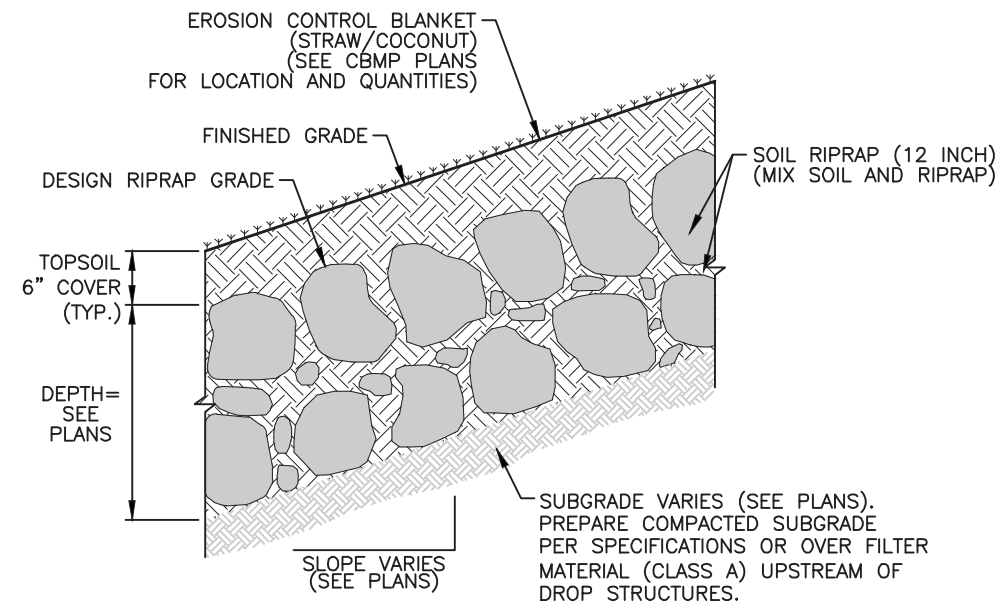
CONCRETE SHEET PILE CAP DETAIL
N.T.S.

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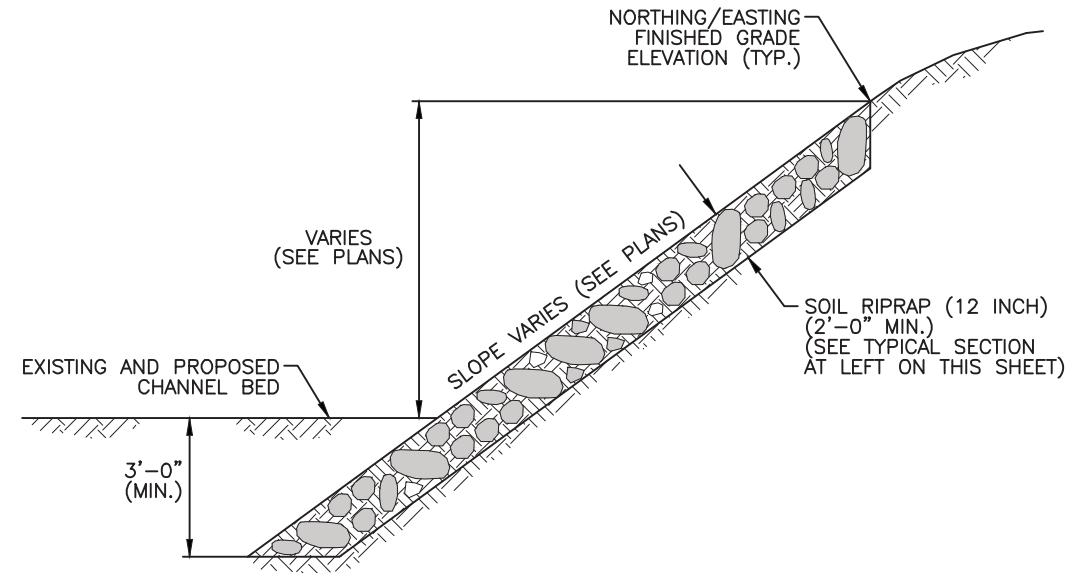
Print Date: 8/14/2017 7:16:20 AM		Sheet Revisions			<p>9009 E. Arapahoe Court, Suite 110, Denver, CO 80112 ph:303.708.0800 fx:303.708.0400 manhard.com Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers Construction Managers • Environmental Scientists • Landscape Architects • Planners</p>	As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE SHEET PILE DETAILS		Project No./Code
File Name: H115360-01DROP04Sheet Pile Det.dwg		Date	Comments	Initials		No Revisions:	Designer: CDT	Structure	
Horizontal Scale: N.T.S. Vertical Scale: N.T.S.						Revised:	Detailer: KLT	Numbers	
<p>6300 South Syracuse Way, Suite 600 Centennial, CO 80111 tel 303.721.1440 fax 303.721.0832</p>				Void:	Subset: Drainage	Sheets: DD-04 of 19	Sheet Number 67		



Know what's below.
Call before you dig.



SOIL RIPRAP (12 INCH)
TYPICAL SECTION
N.T.S.



SOIL RIPRAP (12 INCH)
CHANNEL BANKS
TYPICAL SECTION
N.T.S.

SOIL RIPRAP (12 INCH) NOTES:

- (1) SOIL RIPRAP DETAILS ARE APPLICABLE TO SLOPED AREAS REFER TO THE SITE PLAN FOR ACTUAL LOCATION AND LIMITS.
- (2) MIX UNIFORMLY 70% RIPRAP BY VOLUME WITH 30% OF APPROVED SOIL BY VOLUME FROM THE ENGINEER PRIOR TO PLACEMENT.
- (3) PLACE STONE-SOIL MIX TO RESULT IN SECURELY INTERLOCKED ROCK AT THE DESIGN THICKNESS AND GRADE COMPACT AND LEVEL TO ELIMINATE ALL VOIDS AND ROCKS PROJECTING ABOVE DESIGN RIPRAP TOP GRADE.
- (4) CRIMP MULCH AS CALLED FOR IN THE CBMP PLANS AND SPECIFICATIONS.

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Print Date: 8/14/2017 7:16:26 AM		<table border="1"> <thead> <tr> <th colspan="4">Sheet Revisions</th> </tr> <tr> <th>(R-X)</th> <th>Date</th> <th>Comments</th> <th>Initials</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			Sheet Revisions				(R-X)	Date	Comments	Initials													As Constructed		BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DETAILS		Project No./Code	
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(R-X)	Date	Comments	Initials																											
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6300 South Syracuse Way, Suite 600 Centennial, CO 80111 tel 303.721.1440 fax 303.721.0832		8009 E. Arapahoe Court, Suite 110, Denver, CO 80112 ph: 303.708.0800 fx: 303.708.0400 manhard.com Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers Construction Managers • Environmental Scientists • Landscape Architects • Planners		Revised:		Designer: CDT		Structure Numbers																						
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						Subset: Drainage		Sheets: DD-05 of 19																						
								Sheet Number 68																						



Know what's below.
Call before you dig.

GROUT NOTES

BOULDER PLACEMENT NOTES:

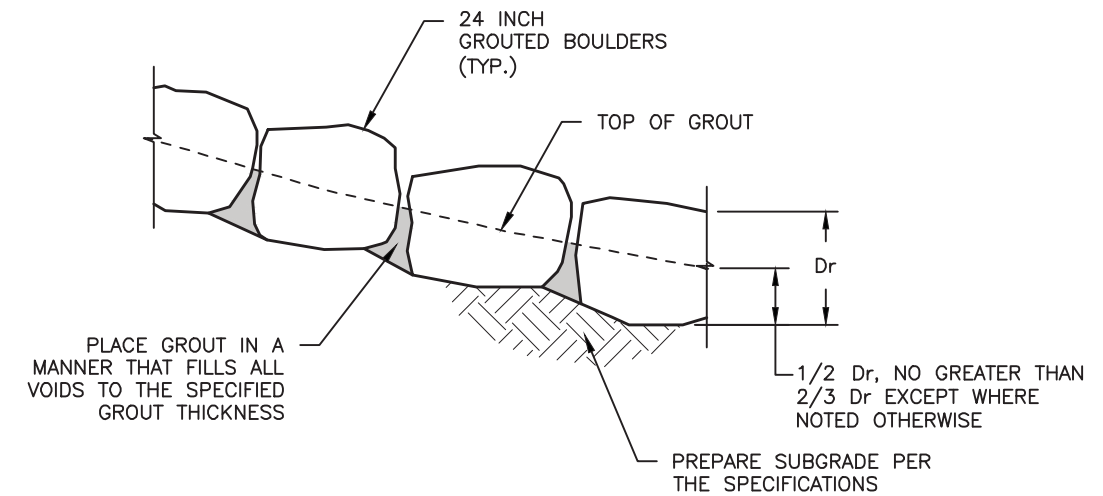
1. PLACE BOULDERS WITH THE REQUIRED BOULDER HEIGHT VERTICAL. PLACE BOULDERS AS TIGHTLY TOGETHER AS POSSIBLE (WITHOUT TOUCHING) WHILE PROVIDING ENOUGH ROOM BETWEEN THEM TO THOROUGHLY VIBRATE THE GROUT AND TO ENSURE NO GAPS IN THE GROUT. THE SMALL DIMENSION OF A 2X4 CAN BE USED AS A GUIDE TO CHECK MINIMUM SPACING.
2. BEFORE GROUTING, CLEAN ALL DIRT AND MATERIAL FROM ROCK THAT COULD PREVENT THE GROUT FROM BINDING TO THE ROCK. KEEP BOULDERS FROM TOUCHING. AVOID SLIDING BOULDERS AGAINST SUBGRADE TO PROPERLY POSITION.

MATERIAL SPECIFICATIONS:

1. ALL GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 3200 PSI.
2. ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.
3. A MAXIMUM OF 25% TYPE F FLY ASH MAY BE SUBSTITUTED FOR THE PORTLAND CEMENT.
4. THE AGGREGATE SHALL BE COMPRISED OF 70% NATURAL SAND (FINES) AND 30% 3/8-INCH ROCK (COARSE).
5. THE GROUT SLUMP SHALL BE BETWEEN 4-INCHES TO 6-INCHES.
6. AIR ENTRAINMENT SHALL BE BETWEEN 5.5% AND 7.5%.
7. TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.
8. COLOR ADDITIVE IN REQUIRED AMOUNTS SHALL BE USED WHEN SO SPECIFIED BY CONTRACT.

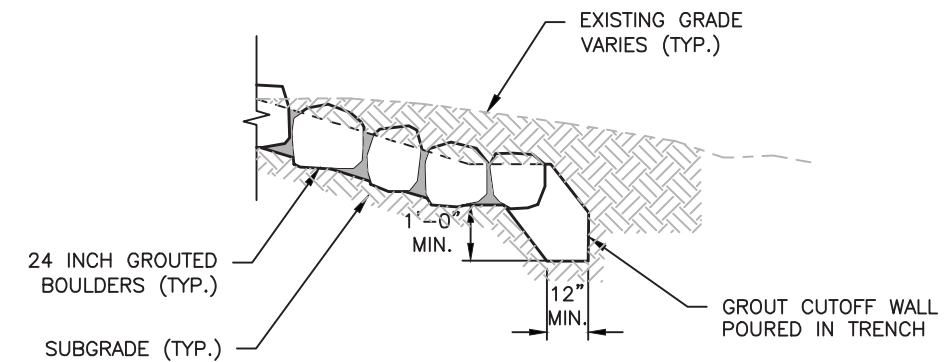
GROUT PLACEMENT SPECIFICATIONS:

1. SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.
2. GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) GROUT PUMP USING A 2-INCH DIAMETER (MAXIMUM) NOZZLE.
3. FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS THE GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.
4. ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH A BROOM FINISH.
5. AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED AND FREE OF GROUT.
6. ALL FINISHED GROUT SURFACES SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C309.



GROUTED BOULDER PLACEMENT DETAIL

N.T.S.



STRUCTURE EDGE WALL DETAIL

N.T.S.

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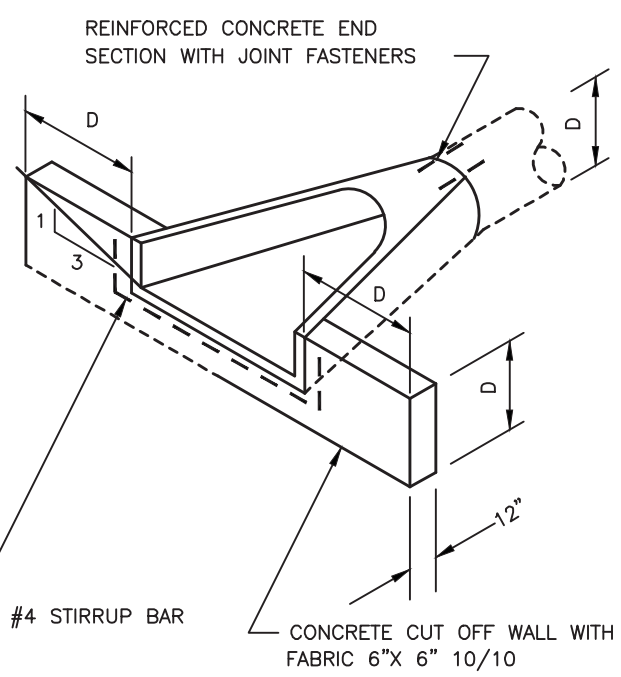
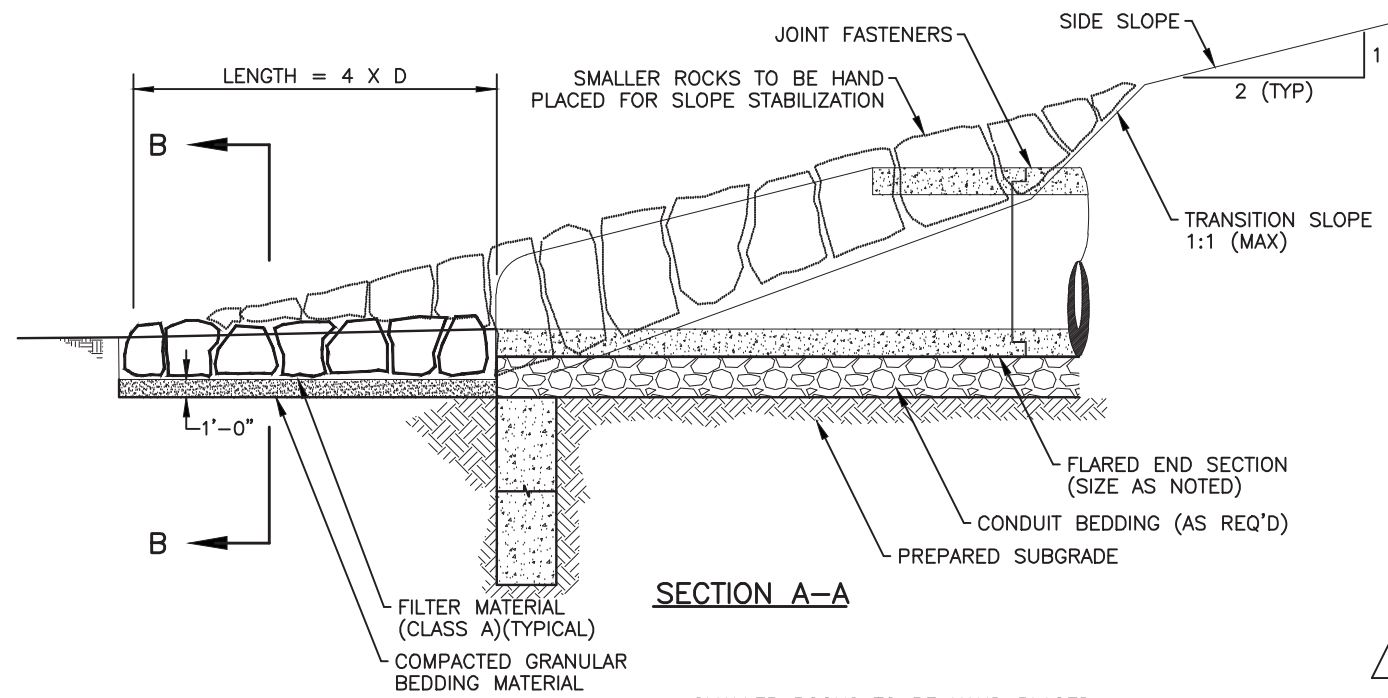
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As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DETAIL		Project No./Code
No Revisions:	Designer: CDT	Structure Numbers	
Revised:	Detailer: KLT		
Void:	Subset: Drainage	Sheets: DD-06 of 19	Sheet Number 69

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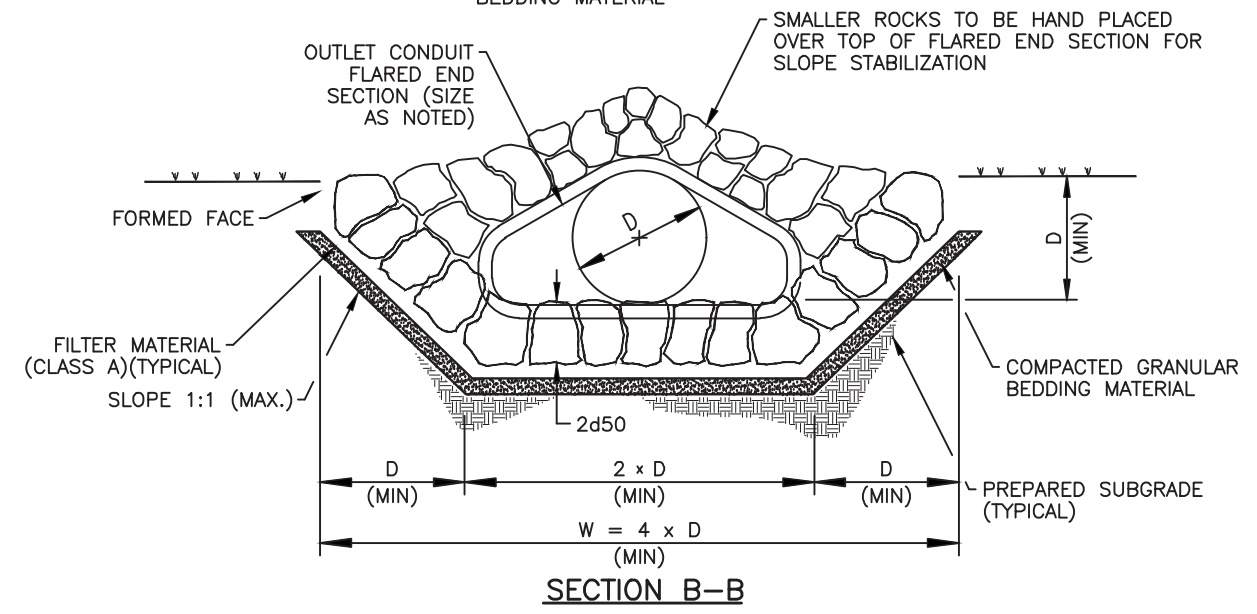
ID NO.	DIMENSIONS					QUANTITIES	
	D (in)	W (ft)	L (ft)	RIPRAP TYPE	d50 (in)	RIPRAP (12 INCH) (CY)	FILTER MATERIAL (CLASS A) (CY)
A1	48	16	16	M	12	19	9

TABULATION OF RIPRAP AND GEOTEXTILE MATERIAL AT CULVERT INLETS & OUTLETS

NOTES:
1. THESE QUANTITIES HAVE BEEN CARRIED FORWARD TO THE DROP STRUCTURE TABULATION.

CONCRETE TOEWALL AND END SECTION FOR REINFORCED CONCRETE PIPE

- NOTES:
- D= INSIDE DIAMETER OF REINFORCED CONCRETE PIPE.
 - CONCRETE FOR THE TOEWALL SHALL BE CONCRETE CLASS D (WALL)
 - EACH REINFORCED CONCRETE END SECTION SHALL BE CONNECTED TO THE REINFORCED CONCRETE PIPE WITH CONCRETE PIPE JOINT FASTENERS (2-EACH). CONCRETE PIPE JOINT FASTENERS SHALL BE INCLUDED IN THE COST OF THE REINFORCED CONCRETE END SECTION.
 - ALL CONCRETE, REINFORCING, CONNECTIONS, STRUCTURE EXCAVATION, AND EXTRA WORK REQUIRED TO CONSTRUCT THE CONCRETE TOEWALL SHALL BE PAID FOR AS CONCRETE CLASS D (WALL).
 - ALL REINFORCED CONCRETE PIPE EXTENSIONS SHALL HAVE A CONCRETE COLLAR AND SHALL BE INCLUDED IN THE COST OF THE REINFORCED CONCRETE PIPE.
 - REMOVED RIPRAP MAY BE UTILIZED FOR RIPRAP (12 INCH) UNLESS DIRECTED OTHERWISE BY THE ENGINEER.



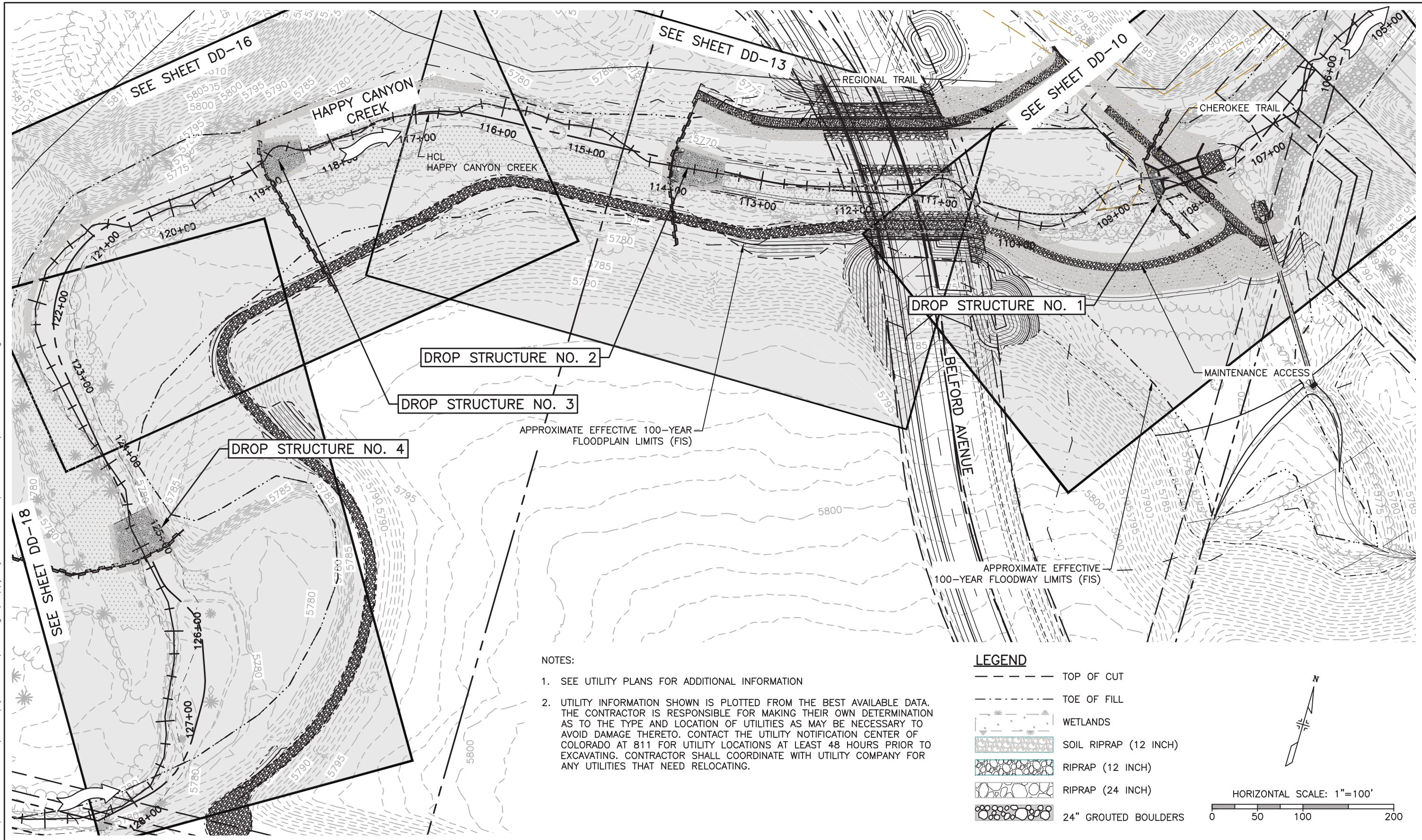
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Void:	Subset:	Drainage	Sheets:	DD-07 of 19
				Sheet Number 70

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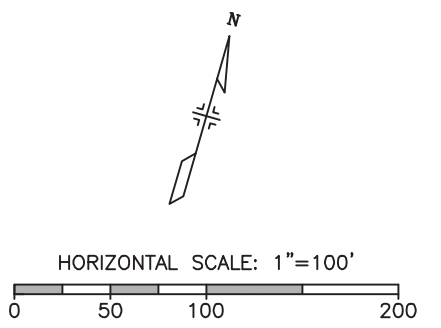


NOTES:

1. SEE UTILITY PLANS FOR ADDITIONAL INFORMATION
2. UTILITY INFORMATION SHOWN IS PLOTTED FROM THE BEST AVAILABLE DATA. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 FOR UTILITY LOCATIONS AT LEAST 48 HOURS PRIOR TO EXCAVATING. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR ANY UTILITIES THAT NEED RELOCATING.

LEGEND

- TOP OF CUT
- TOE OF FILL
- [Symbol] WETLANDS
- [Symbol] SOIL RIPRAP (12 INCH)
- [Symbol] RIPRAP (12 INCH)
- [Symbol] RIPRAP (24 INCH)
- [Symbol] 24" GROUTED BOULDERS



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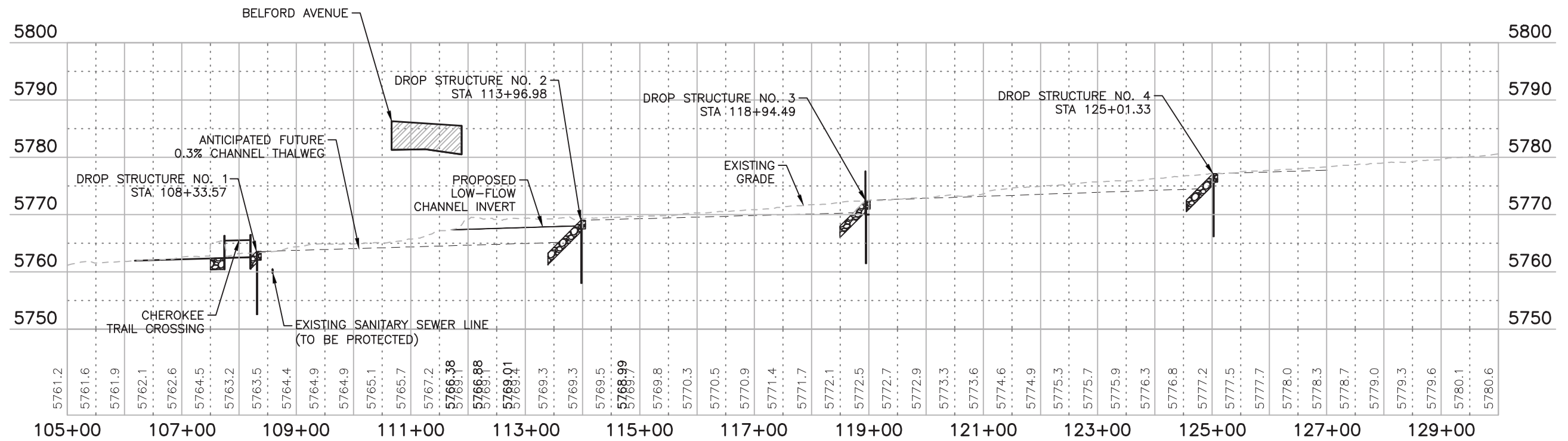
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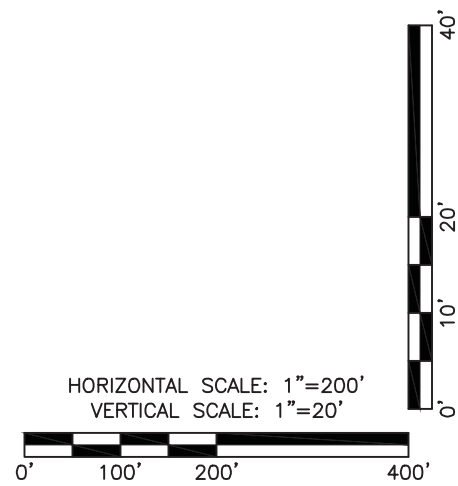
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Revised:	Detailer: KLT		
Void:	Subset: Drainage	Sheets: DD-08 of 19	Sheet Number 71

NOTES

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- SEE UTILITY PLANS FOR ADDITIONAL INFORMATION.



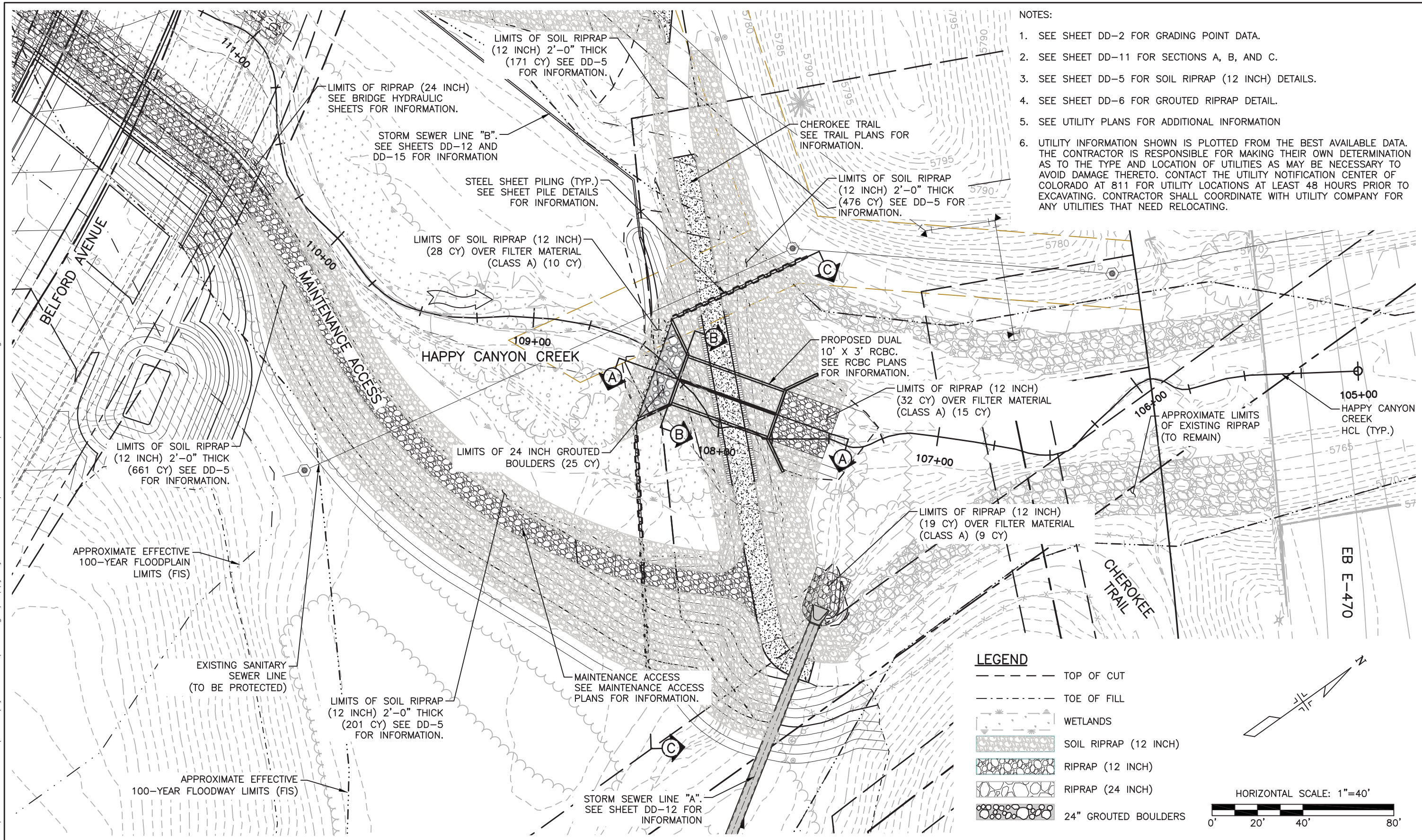
HAPPY CANYON CREEK PROFILE



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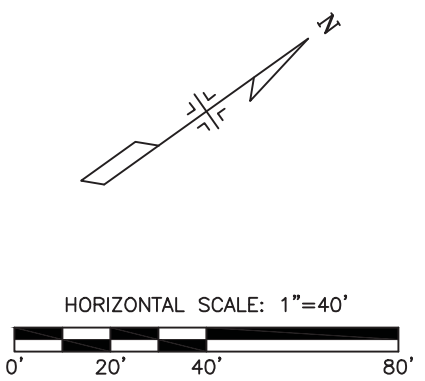
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- NOTES:
1. SEE SHEET DD-2 FOR GRADING POINT DATA.
 2. SEE SHEET DD-11 FOR SECTIONS A, B, AND C.
 3. SEE SHEET DD-5 FOR SOIL RIPRAP (12 INCH) DETAILS.
 4. SEE SHEET DD-6 FOR GROUTED RIPRAP DETAIL.
 5. SEE UTILITY PLANS FOR ADDITIONAL INFORMATION
 6. UTILITY INFORMATION SHOWN IS PLOTTED FROM THE BEST AVAILABLE DATA. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 FOR UTILITY LOCATIONS AT LEAST 48 HOURS PRIOR TO EXCAVATING. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR ANY UTILITIES THAT NEED RELOCATING.

LEGEND

- TOP OF CUT
- TOE OF FILL
- WETLANDS
- SOIL RIPRAP (12 INCH)
- RIPRAP (12 INCH)
- RIPRAP (24 INCH)
- 24" GROUTED BOULDERS



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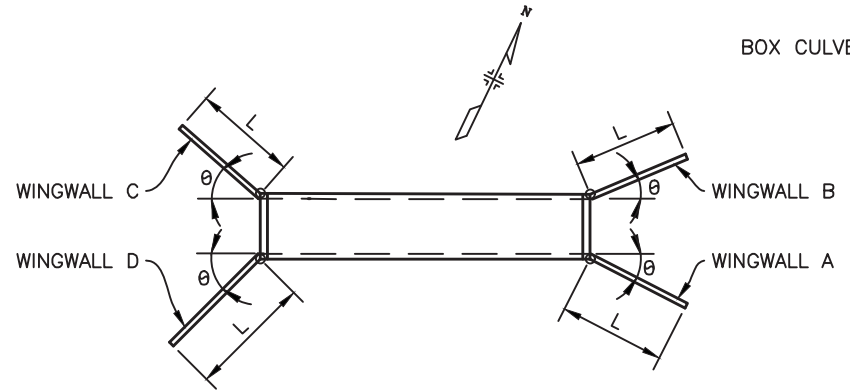
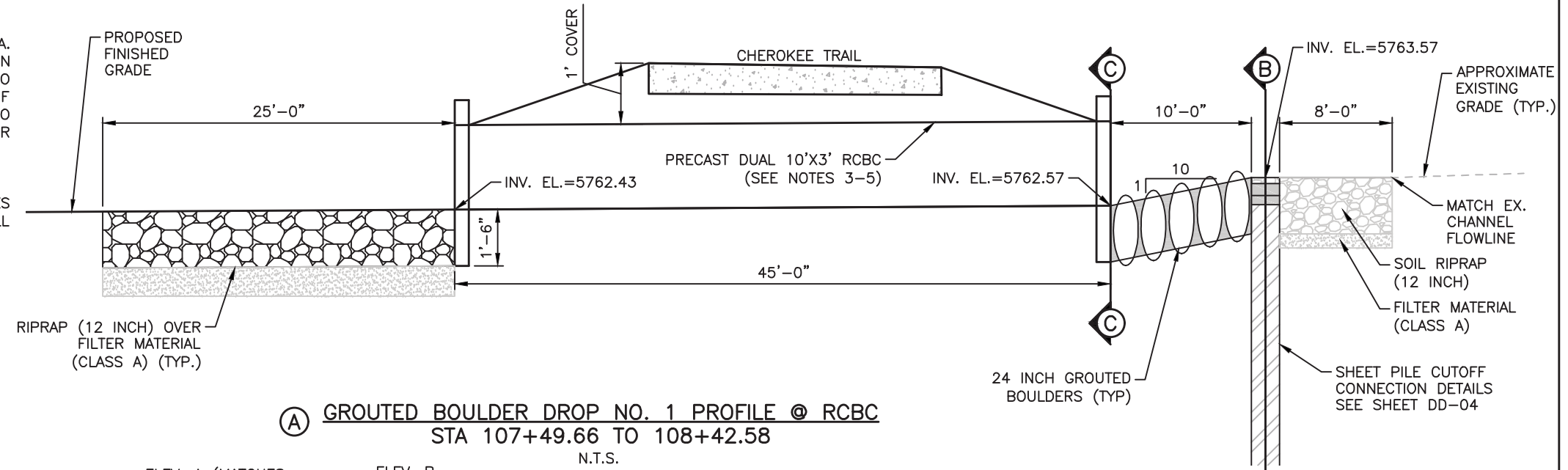
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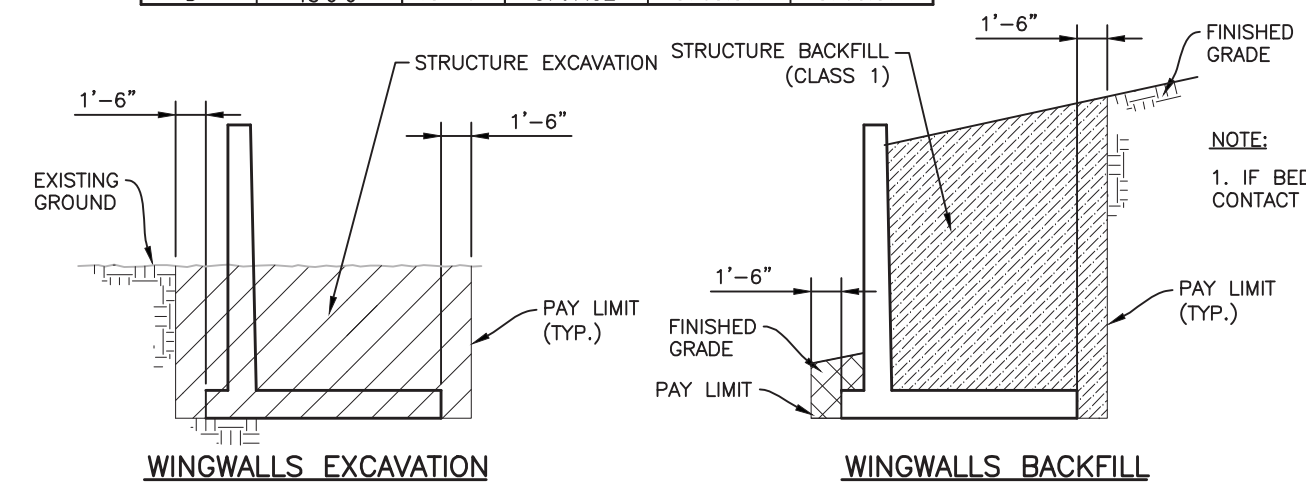
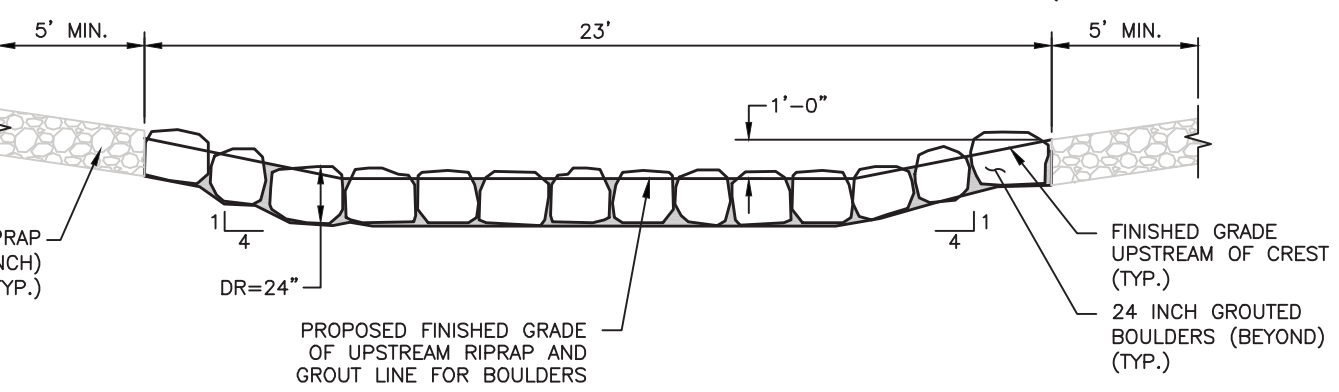
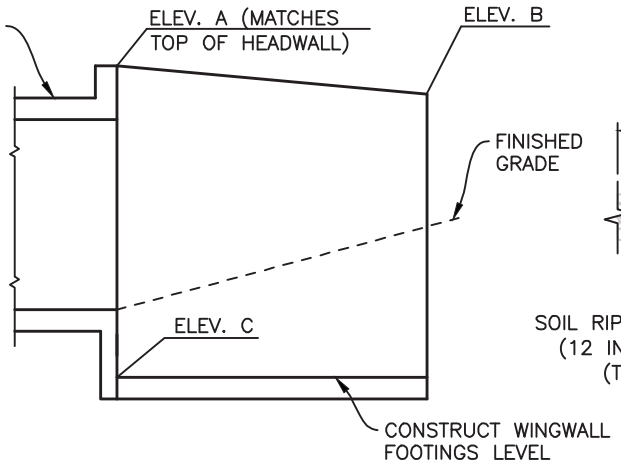
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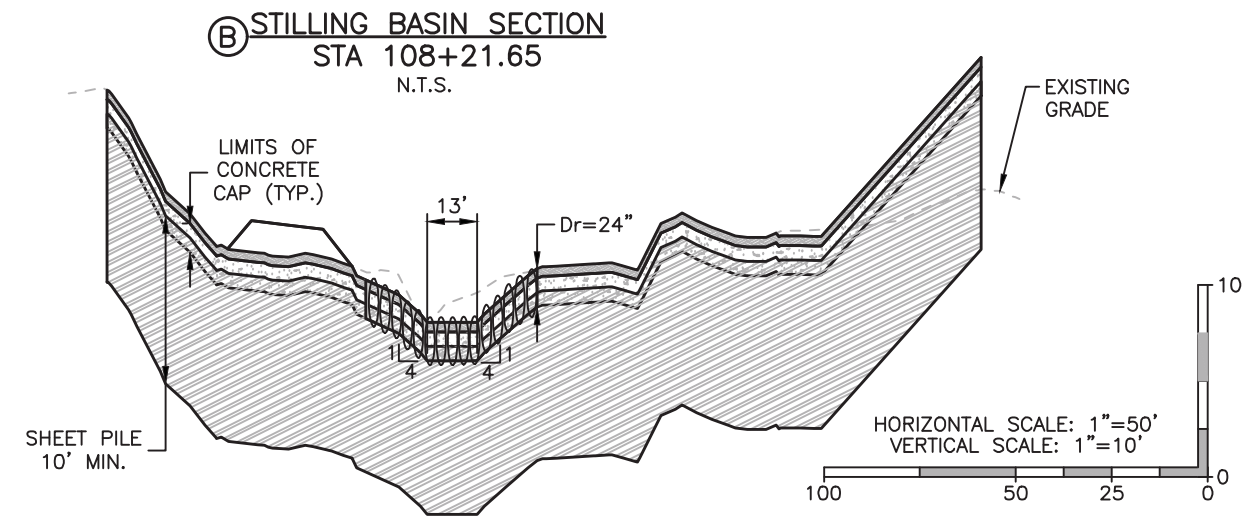
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2. SEE UTILITY PLANS FOR ADDITIONAL INFORMATION.
3. PRECAST BOX CULVERT MUST CONFORM TO CDOT M-STANDARDS M-603-2.
4. FOR CAST-IN-PLACE END SECTIONS, USE M-601-2 FOR WALL THICKNESSES AND REINFORCEMENT SIZE AND SPACINGS WITH S=10 FT, R=6 FT, AND FILL HEIGHT = 0-5 FT.
5. FOR WINGWALLS, USE M-601-20.



WINGWALL	θ	L	ELEV. A	ELEV. B	ELEV. C
A	45°0'0"	15'-6"	5767.18	5763.43	5760.43
B	45°0'0"	15'-6"	5767.18	5763.43	5760.43
C	45°0'0"	15'-6"	5767.32	5763.57	5760.57
D	45°0'0"	15'-6"	5767.32	5763.57	5760.57



NOTE:
1. IF BEDROCK IS ENCOUNTERED, CONTACT ENGINEER PRIOR TO PROCEEDING.



HAPPY CANYON CREEK HYDRAULICS

Q100= 8,303 C.F.S
Q100 VELOCITY = 6.21 F.P.S
FROUDE No.=0.33
FOR INFO ONLY

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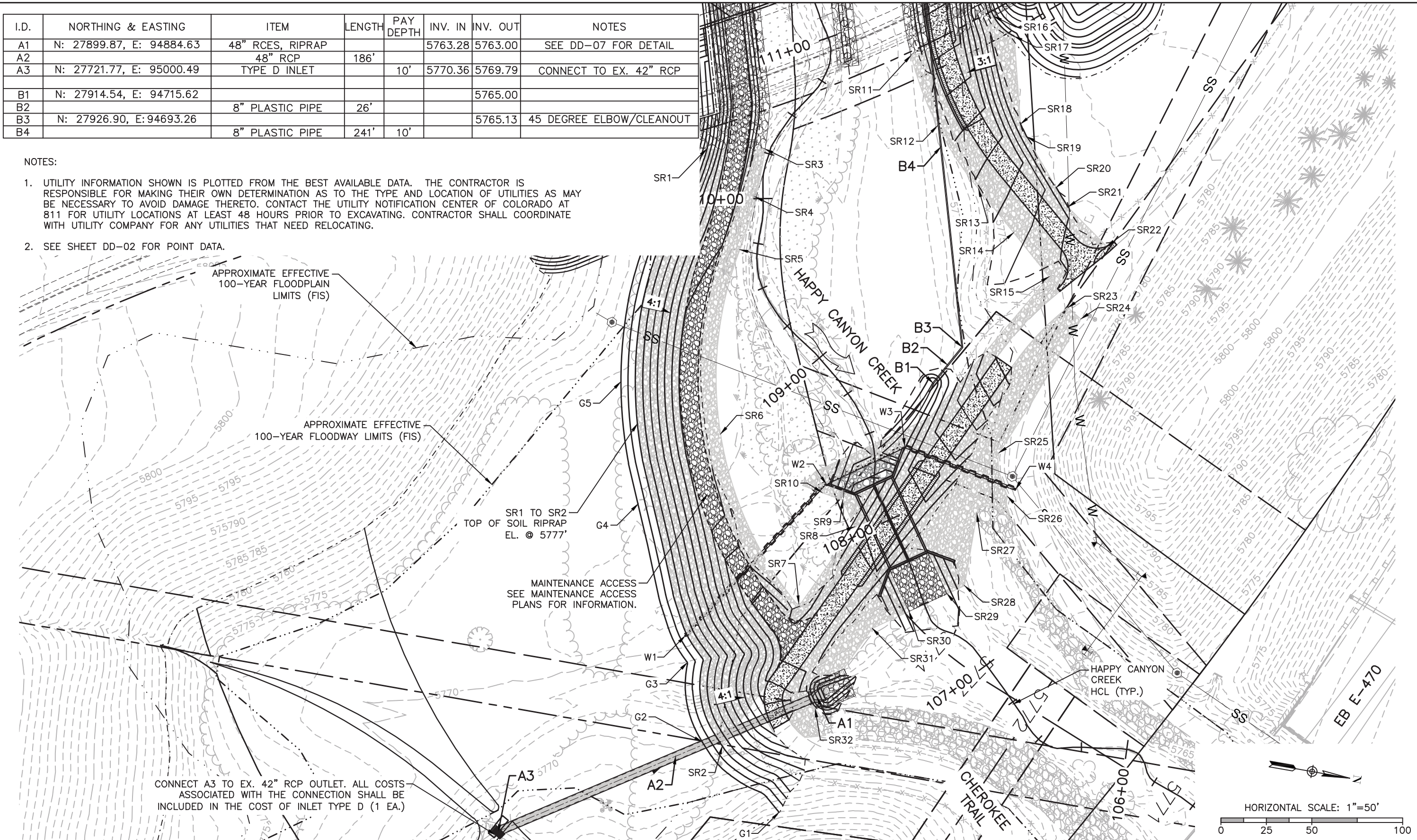
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tel 303.721.1440
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I.D.	NORTHING & EASTING	ITEM	LENGTH	PAY DEPTH	INV. IN	INV. OUT	NOTES
A1	N: 27899.87, E: 94884.63	48" RCES, RIPRAP			5763.28	5763.00	SEE DD-07 FOR DETAIL
A2		48" RCP	186'				
A3	N: 27721.77, E: 95000.49	TYPE D INLET		10'	5770.36	5769.79	CONNECT TO EX. 42" RCP
B1	N: 27914.54, E: 94715.62					5765.00	
B2		8" PLASTIC PIPE	26'				
B3	N: 27926.90, E: 94693.26					5765.13	45 DEGREE ELBOW/CLEANOUT
B4		8" PLASTIC PIPE	241'	10'			

NOTES:

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- SEE SHEET DD-02 FOR POINT DATA.



CONNECT A3 TO EX. 42" RCP OUTLET. ALL COSTS ASSOCIATED WITH THE CONNECTION SHALL BE INCLUDED IN THE COST OF INLET TYPE D (1 EA.)

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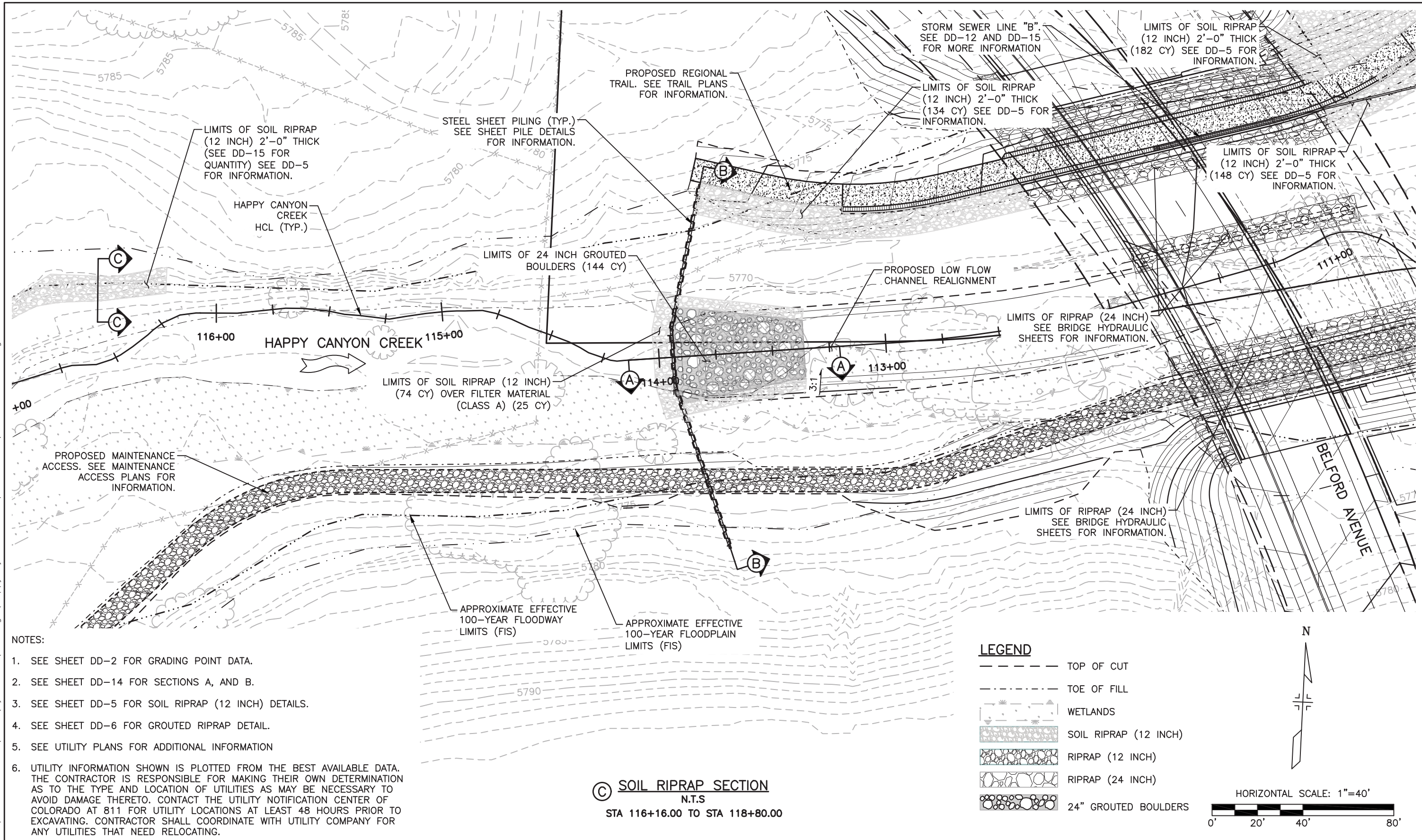
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As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 1 GRADING DETAIL		Project No./Code
No Revisions:	Designer:	CDT	
Revised:	Detailer:	KLT	
Void:	Subset:	Drainage	
Structure Numbers		Sheets:	DD-12 of 19
Sheet Number			75

I:\115360-01 - Compark at Belford\CADD\Hydraulics\Drawings\Happy Cyn Creek Drop Structure\ - Scott.Dankenbring

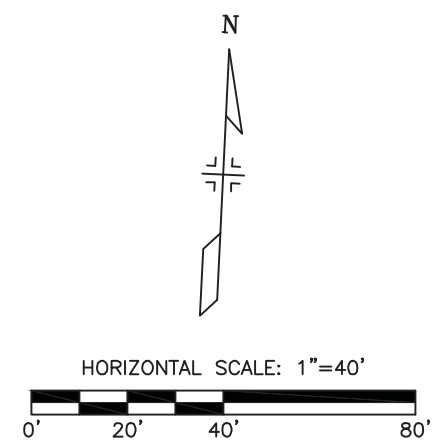


NOTES:

- SEE SHEET DD-2 FOR GRADING POINT DATA.
- SEE SHEET DD-14 FOR SECTIONS A, AND B.
- SEE SHEET DD-5 FOR SOIL RIPRAP (12 INCH) DETAILS.
- SEE SHEET DD-6 FOR GROUTED RIPRAP DETAIL.
- SEE UTILITY PLANS FOR ADDITIONAL INFORMATION
- UTILITY INFORMATION SHOWN IS PLOTTED FROM THE BEST AVAILABLE DATA. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 FOR UTILITY LOCATIONS AT LEAST 48 HOURS PRIOR TO EXCAVATING. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR ANY UTILITIES THAT NEED RELOCATING.

SOIL RIPRAP SECTION
N.T.S.
STA 116+16.00 TO STA 118+80.00

- LEGEND**
- TOP OF CUT
 - TOE OF FILL
 - WETLANDS
 - SOIL RIPRAP (12 INCH)
 - RIPRAP (12 INCH)
 - RIPRAP (24 INCH)
 - 24" GROUTED BOULDERS



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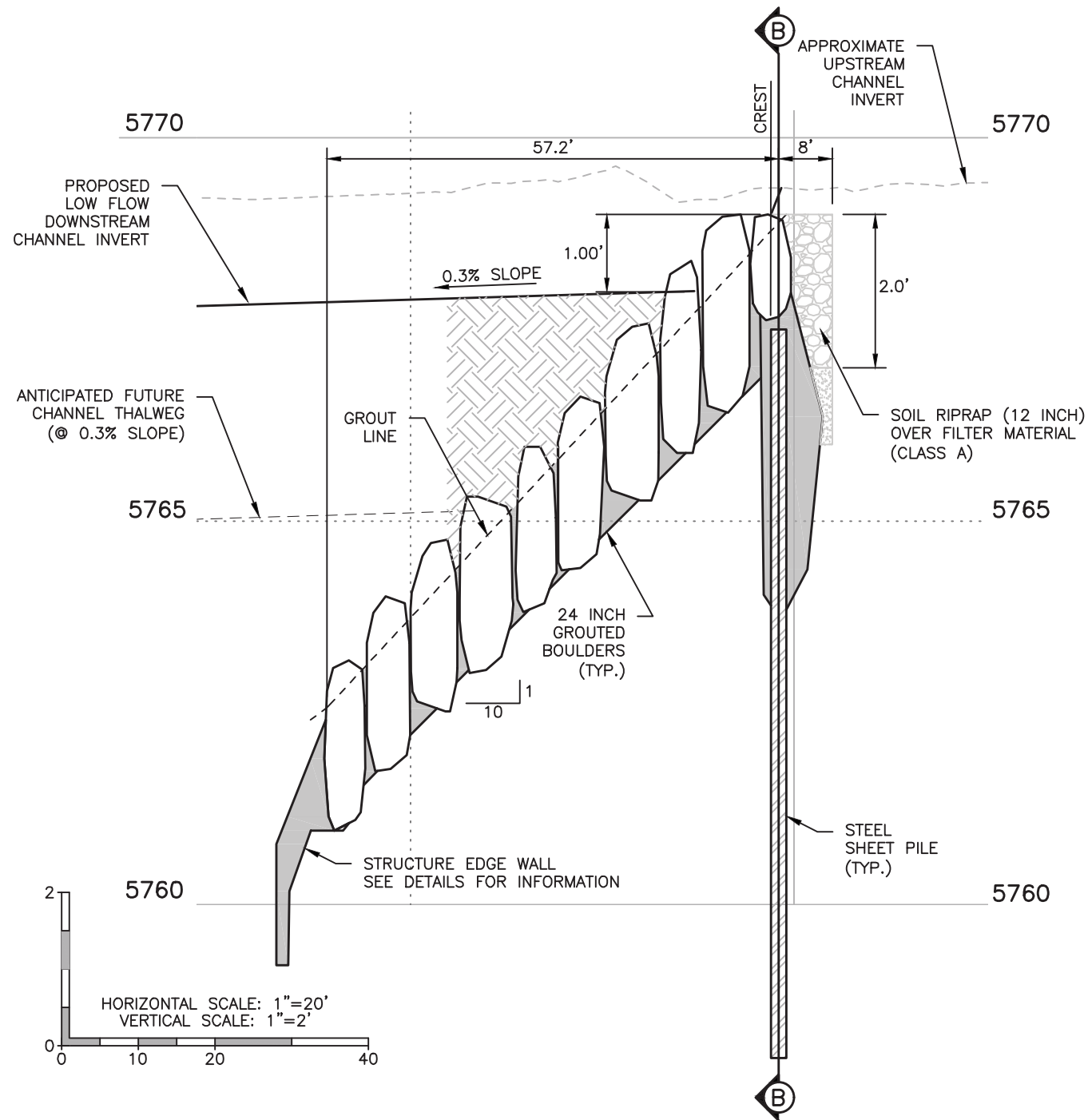
Sheet Revisions			
(R-X)	Date	Comments	Initials



As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 2 PLAN			Project No./Code
No Revisions:	Designer:	CDT	Structure	
Revised:	Detailer:	KLT	Numbers	
Void:	Subset:	Drainage	Sheets:	DD-13 of 19
				Sheet Number 76

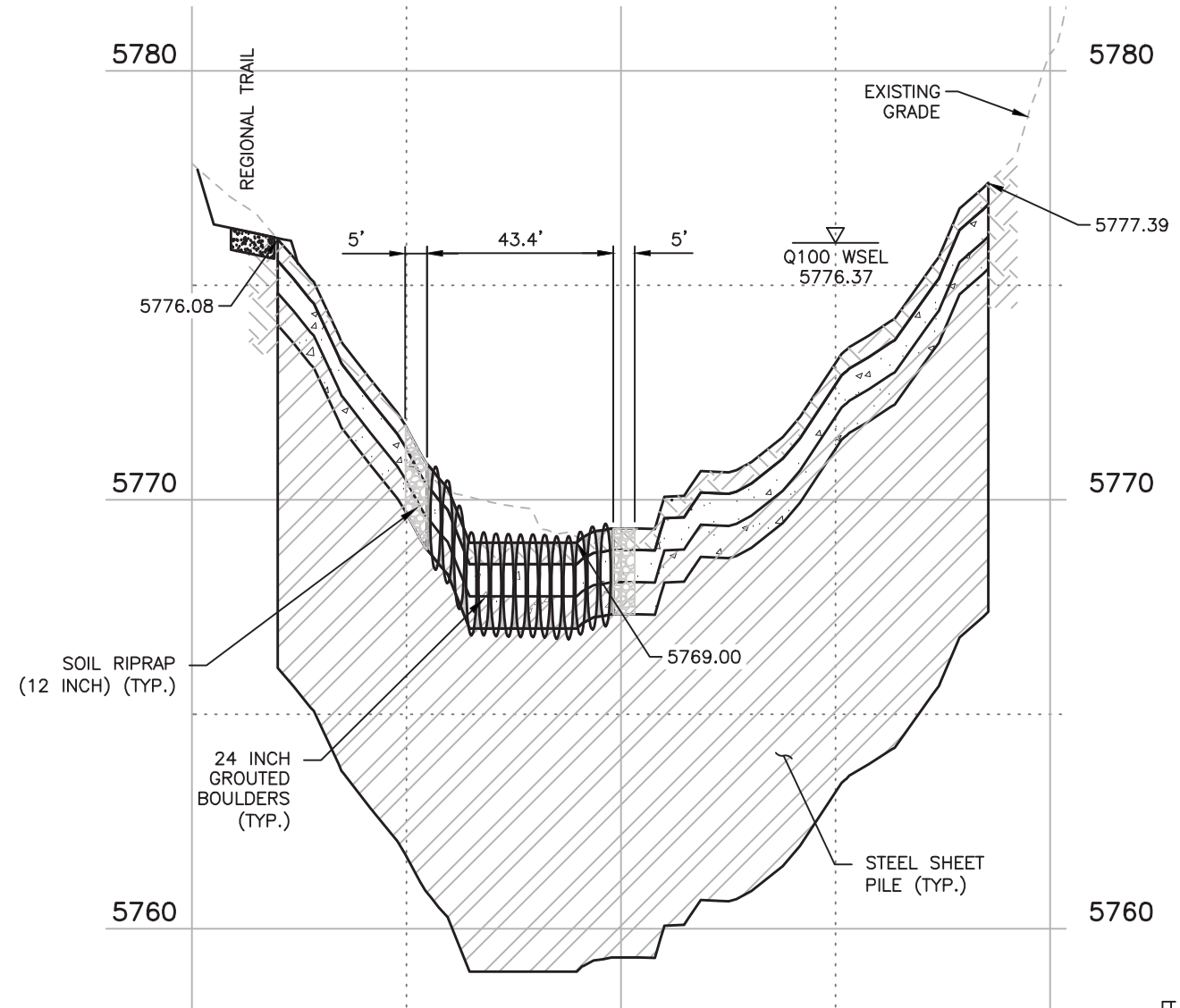
NOTES

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- SEE UTILITY PLANS FOR ADDITIONAL INFORMATION.



(A) GROUTED BOULDER DROP NO. 2 PROFILE
STA 113+39.80 TO 114+04.98

DROP STRUCTURE NO. 2



(B) CREST SECTION
STATION 113+96.98

HAPPY CANYON CREEK HYDRAULICS
 Q100= 8,303 C.F.S
 Q100 VELOCITY = 14.17 F.P.S
 FROUDE No.=0.93
 FOR INFO ONLY

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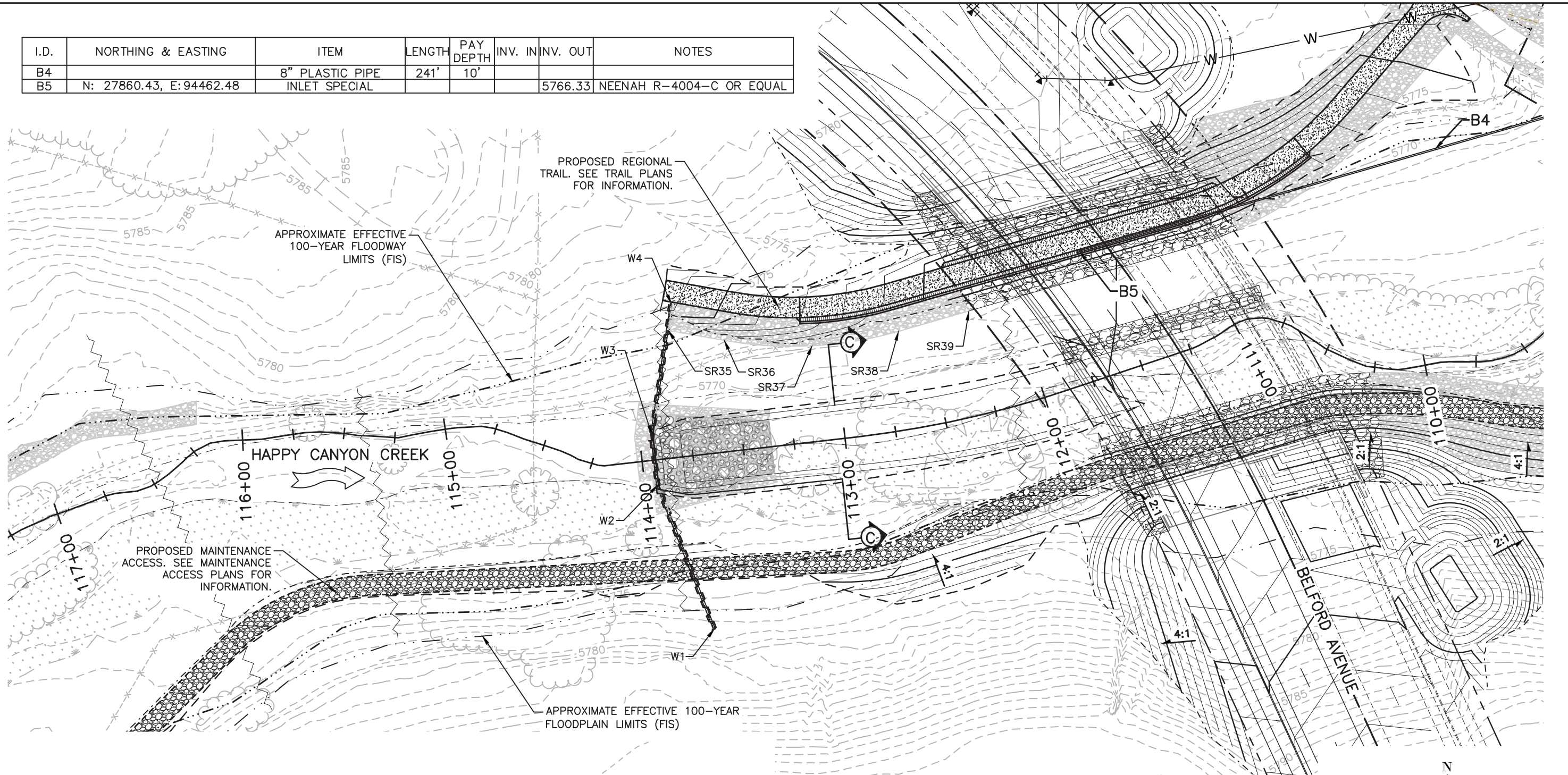
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 Centennial, CO 80111
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 fax 303.721.0832

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As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 2 PROFILE/DETAILS		Project No./Code
No Revisions:	Designer: CDT	Structure Numbers	
Revised:	Detailer: KLT		
Void:	Subset: Drainage	Sheets: DD-14 of 19	Sheet Number 77

I.D.	NORTHING & EASTING	ITEM	LENGTH	PAY DEPTH	INV. IN	INV. OUT	NOTES
B4		8" PLASTIC PIPE	241'	10'			
B5	N: 27860.43, E:94462.48	INLET SPECIAL				5766.33	NEENAH R-4004-C OR EQUAL



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Sheet Revisions			
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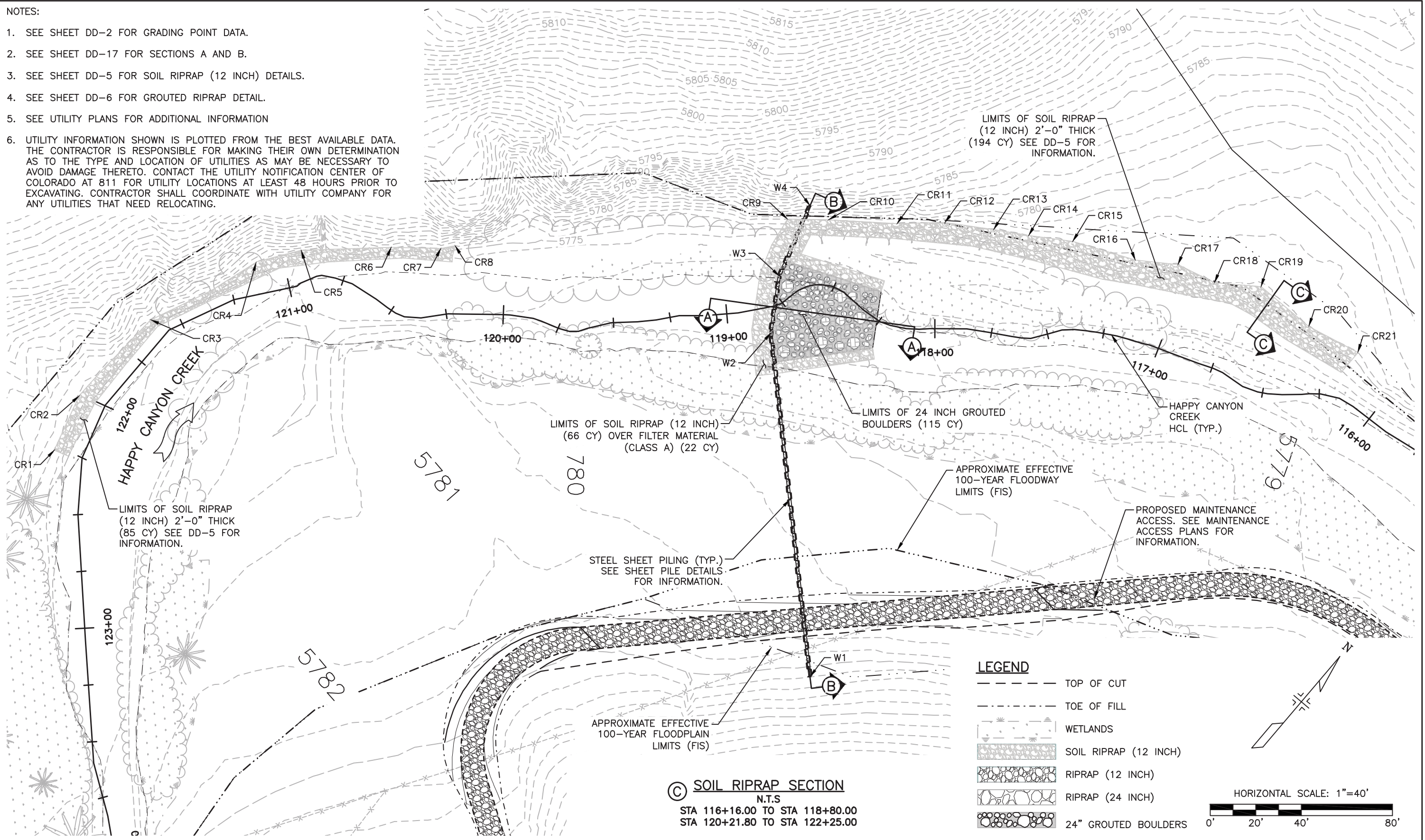


As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 2 GRADING DETAIL		Project No./Code
No Revisions:	Designer:	CDT	
Revised:	Detailer:	KLT	
Void:	Subset:	Drainage	
Structure Numbers		Sheets: DD-15 of 19	Sheet Number 78

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NOTES:

1. SEE SHEET DD-2 FOR GRADING POINT DATA.
2. SEE SHEET DD-17 FOR SECTIONS A AND B.
3. SEE SHEET DD-5 FOR SOIL RIPRAP (12 INCH) DETAILS.
4. SEE SHEET DD-6 FOR GROUTED RIPRAP DETAIL.
5. SEE UTILITY PLANS FOR ADDITIONAL INFORMATION
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© SOIL RIPRAP SECTION
N.T.S.
STA 116+16.00 TO STA 118+80.00
STA 120+21.80 TO STA 122+25.00

LEGEND

- TOP OF CUT
 - - - - - TOE OF FILL
 - [Wetland symbol] WETLANDS
 - [Soil Riprap symbol] SOIL RIPRAP (12 INCH)
 - [Riprap symbol] RIPRAP (12 INCH)
 - [Riprap symbol] RIPRAP (24 INCH)
 - [Grouted Boulder symbol] 24" GROUTED BOULDERS
- HORIZONTAL SCALE: 1"=40'

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Sheet Revisions			
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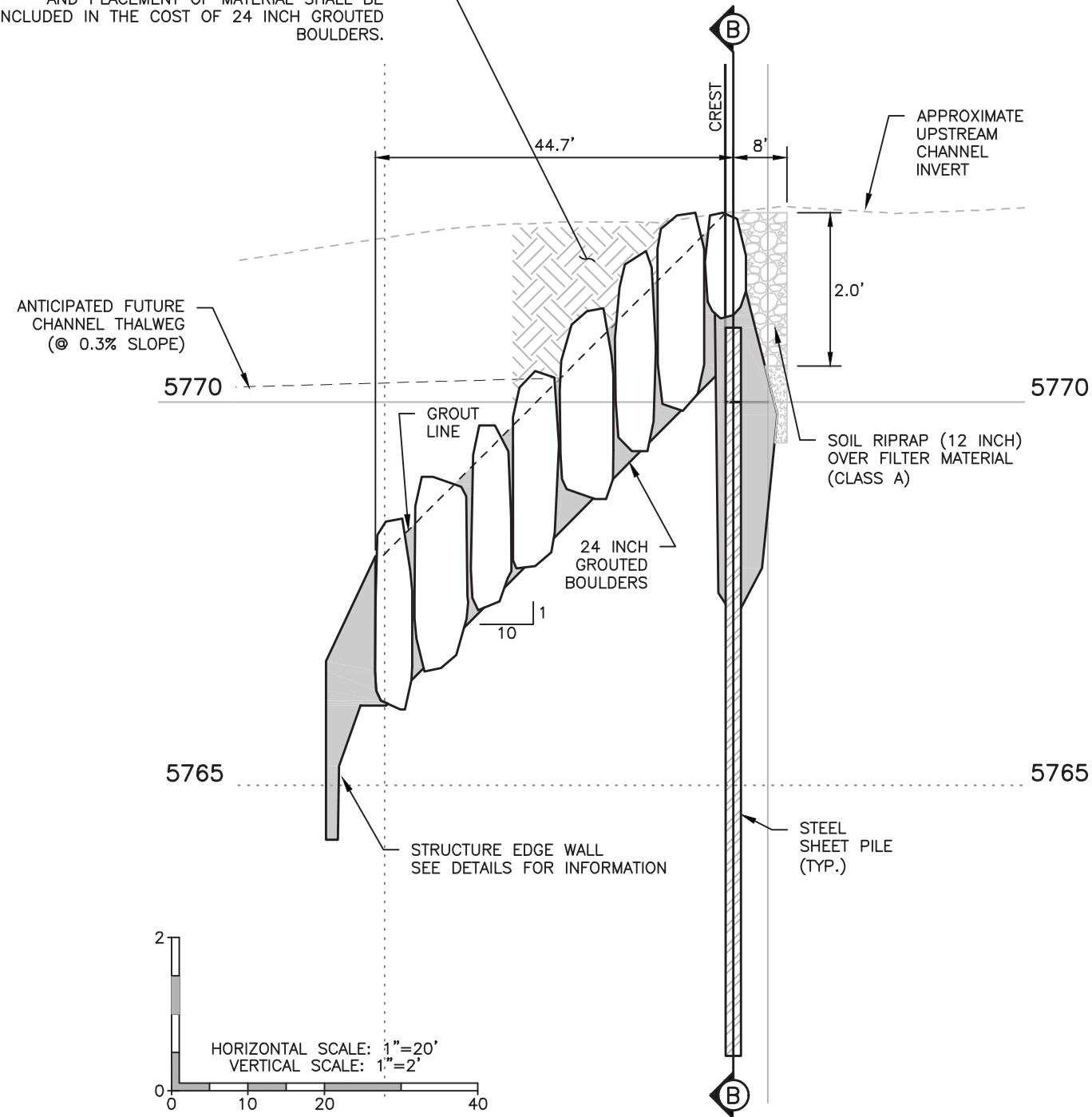
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As Constructed	BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 3 PLAN			Project No./Code
No Revisions:	Designer:	CDT	Structure	
Revised:	Detailer:	KLT	Numbers	
Void:	Subset:	Drainage	Sheets:	DD-16 of 19
				Sheet Number 79

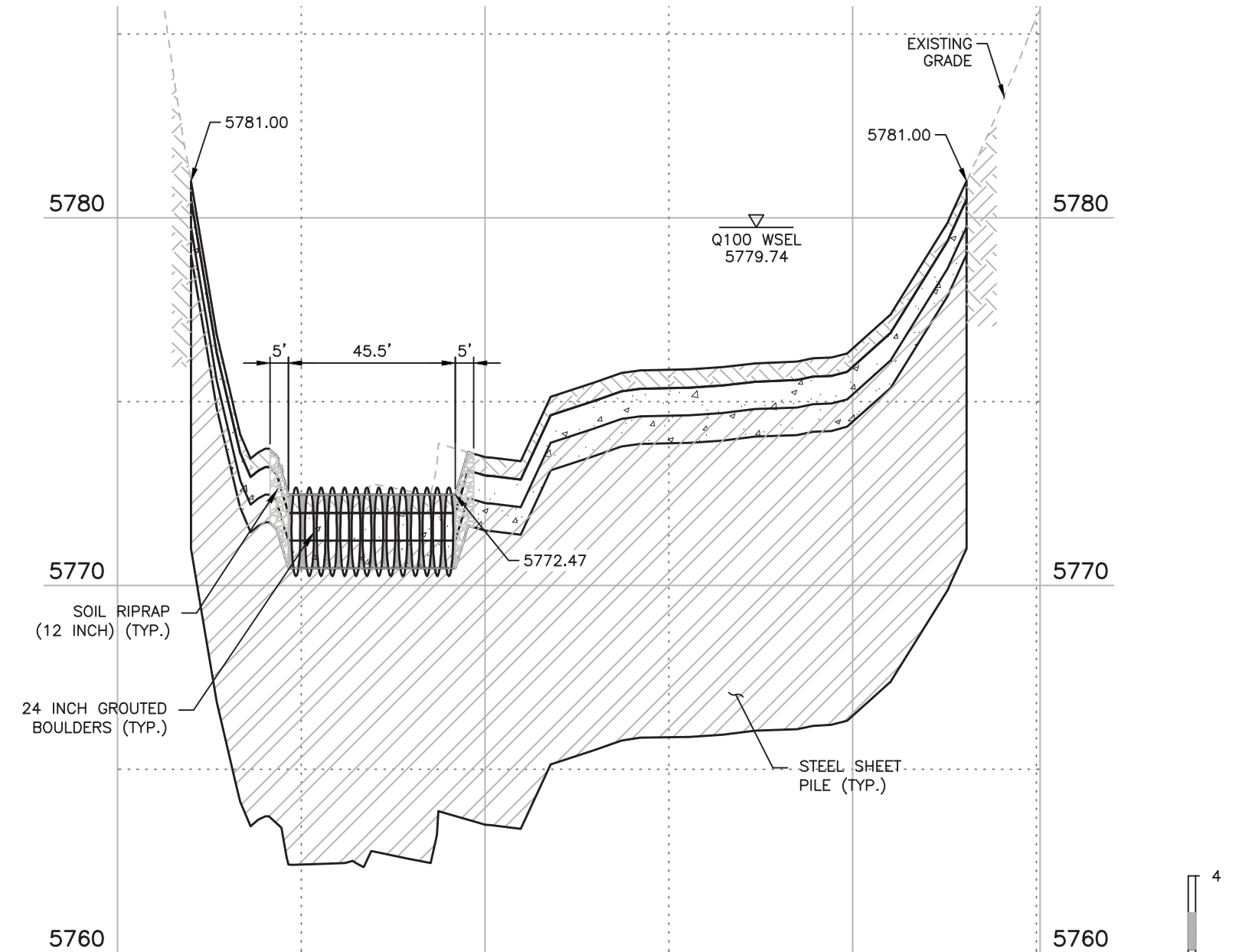
NOTES

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- SEE UTILITY PLANS FOR ADDITIONAL INFORMATION.

MATERIAL SHALL BE EXCAVATED FOR 24 INCH GROUTED BOULDERS AND STOCKPILED. STOCKPILED MATERIAL SHALL BE REAPPLIED AFTER DROP STRUCTURE IS CONSTRUCTED. ALL EXCAVATION, DEWATERING, STOCKPILING, AND PLACEMENT OF MATERIAL SHALL BE INCLUDED IN THE COST OF 24 INCH GROUTED BOULDERS.



(A) GROUTED BOULDER DROP NO. 3 PROFILE
STA 118+49.81 TO 119+02.49



(B) CREST SECTION
STATION 118+94.49

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'

HAPPY CANYON CREEK HYDRAULICS

Q100= 8,303 C.F.S
Q100 VELOCITY = 11.93 F.P.S
FROUDE No.=0.79
FOR INFO ONLY

DROP STRUCTURE NO. 3

Print Date: 8/14/2017 7:30:49 AM
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No Revisions:	Designer: CDT	Structure Numbers	
Revised:	Detailer: KLT		
Void:	Subset: Drainage	Sheets: DD-17 of 19	Sheet Number 80

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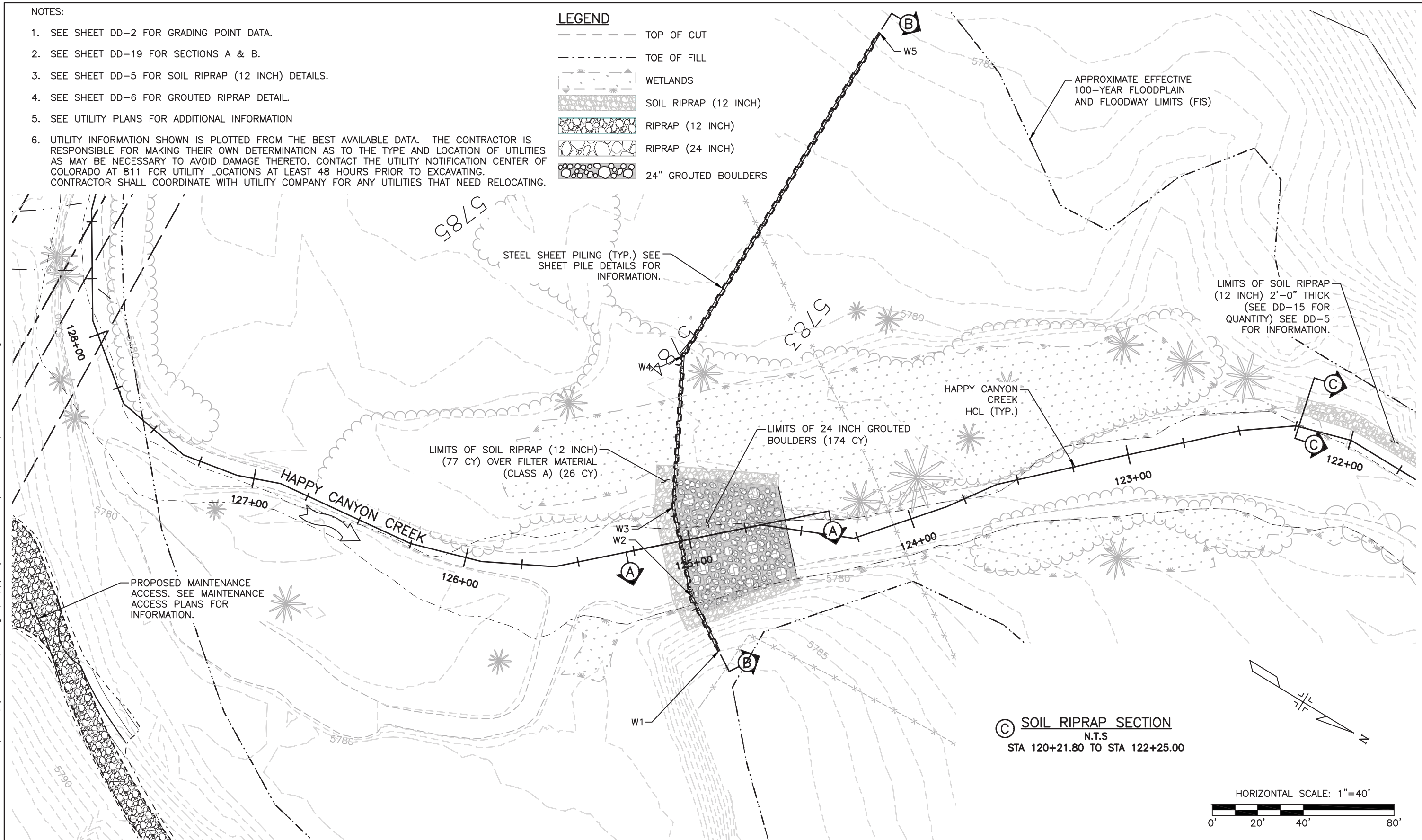
NOTES:

1. SEE SHEET DD-2 FOR GRADING POINT DATA.
2. SEE SHEET DD-19 FOR SECTIONS A & B.
3. SEE SHEET DD-5 FOR SOIL RIPRAP (12 INCH) DETAILS.
4. SEE SHEET DD-6 FOR GROUTED RIPRAP DETAIL.
5. SEE UTILITY PLANS FOR ADDITIONAL INFORMATION
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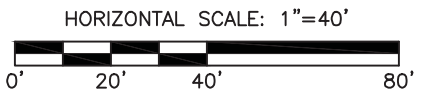
LEGEND

- TOP OF CUT
- - - - - TOE OF FILL
- [Symbol] WETLANDS
- [Symbol] SOIL RIPRAP (12 INCH)
- [Symbol] RIPRAP (12 INCH)
- [Symbol] RIPRAP (24 INCH)
- [Symbol] 24" GROUTED BOULDERS

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© **SOIL RIPRAP SECTION**
N.T.S
STA 120+21.80 TO STA 122+25.00



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Sheet Revisions			
(R-X)	Date	Comments	Initials

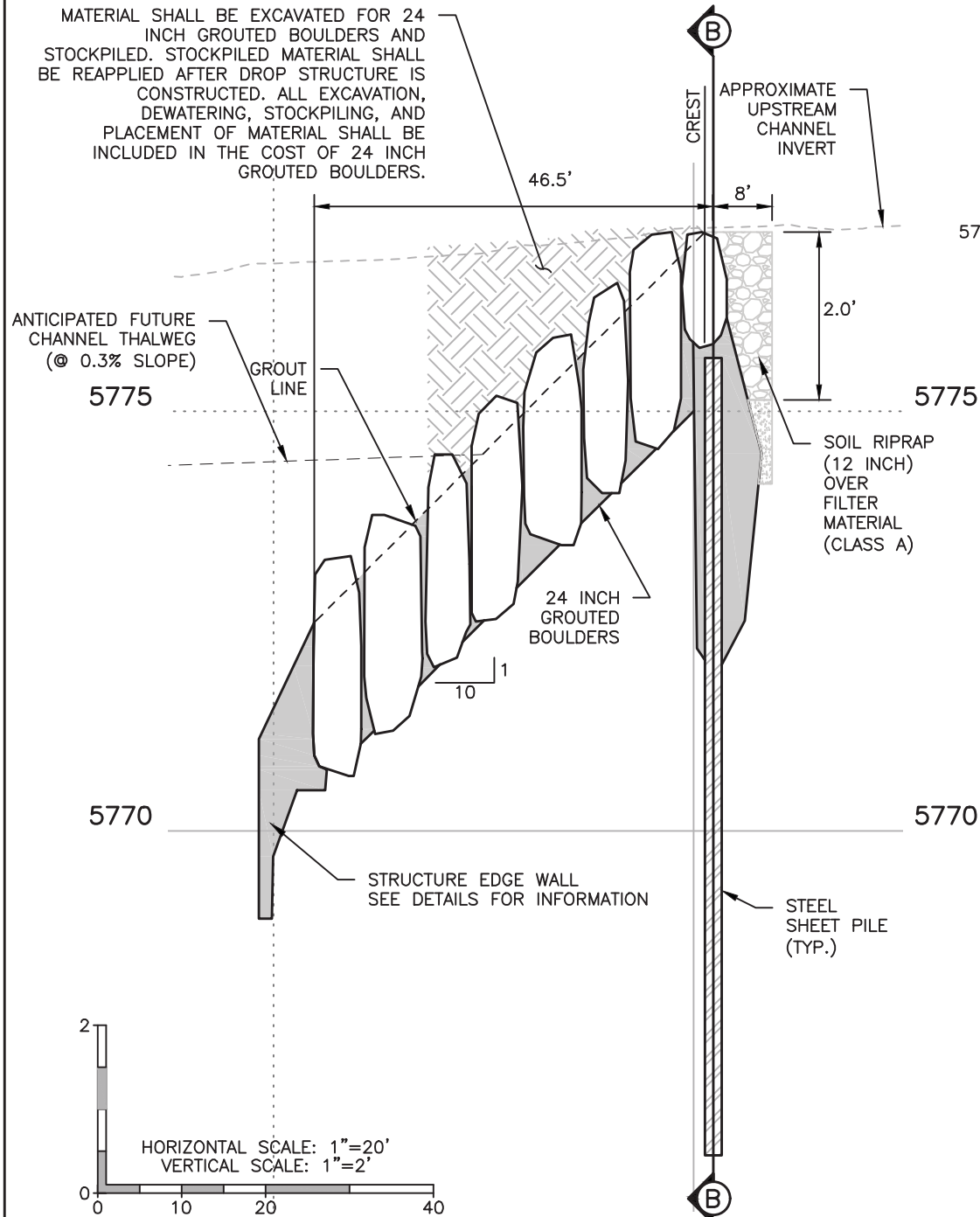


As Constructed	No Revisions:			BELFORD-HAPPY CANYON CREEK HAPPY CANYON CREEK DROP STRUCTURE DROP NO. 4 PLAN	Project No./Code	
	Revised:	Designer: CDT	Structure Numbers			
	Void:	Detailer: KLT	Sheets: DD-18 of 19		Sheet Number 81	
		Subset: Drainage				

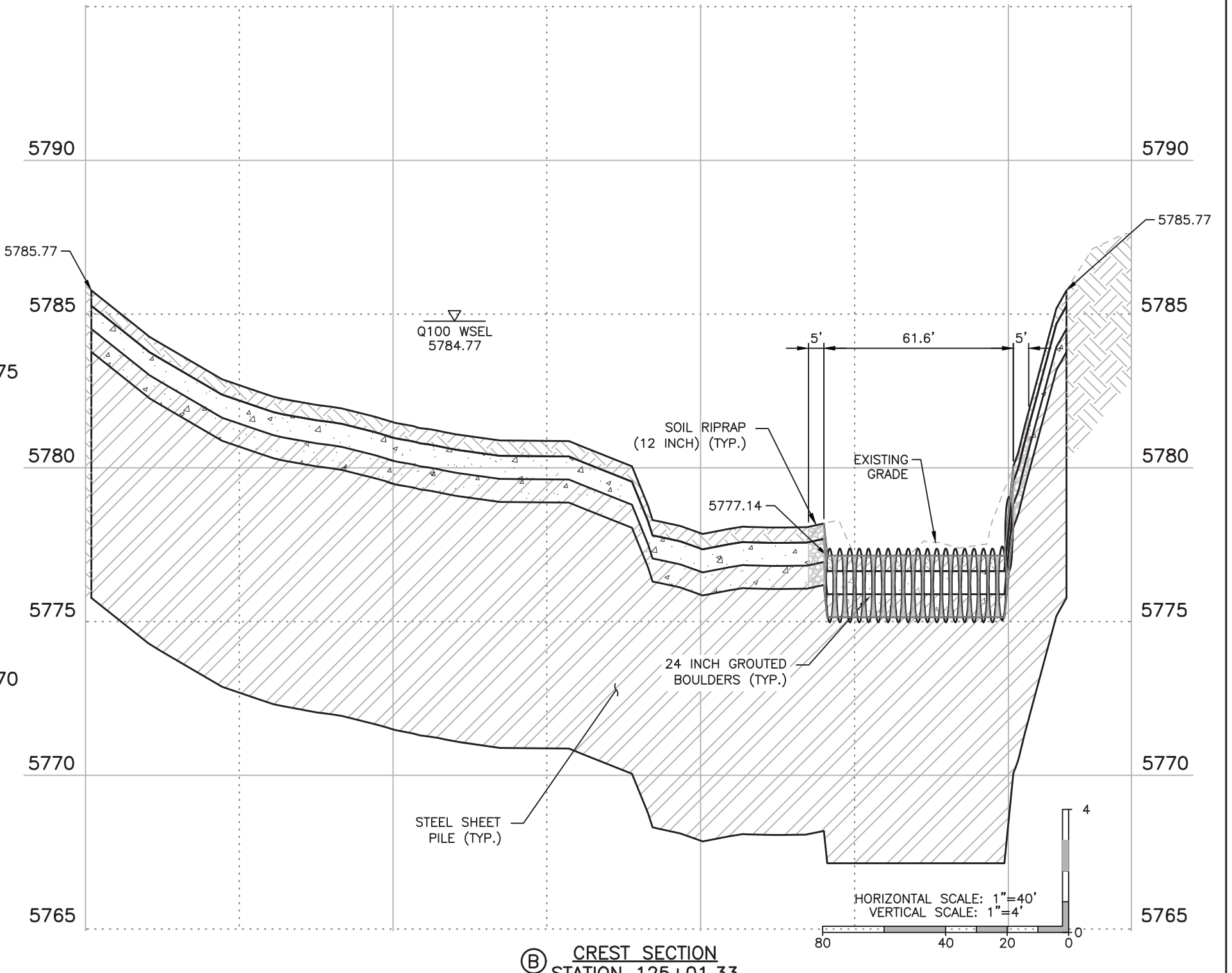
NOTES

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(A) GROUTED BOULDER DROP NO. 4 PROFILE
STA 124+54.81 TO 125+09.33



(B) CREST SECTION
STATION 125+01.33

DROP STRUCTURE NO. 4

HAPPY CANYON CREEK HYDRAULICS
 Q100= 8,303 C.F.S
 Q100 VELOCITY = 8.97 F.P.S
 FROUDE No.=0.58
 FOR INFO ONLY

Print Date: 8/14/2017 7:33:27 AM

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Sheet Revisions

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No Revisions:

Revised:

Void:

**BELFORD-HAPPY CANYON CREEK
HAPPY CANYON CREEK DROP STRUCTURE
DROP NO. 4 PROFILE/DETAILS**

Designer: CDT
 Detailer: KLT
 Subset: Drainage

Structure Numbers
 Sheets: DD-19 of 19

Project No./Code

Sheet Number 82

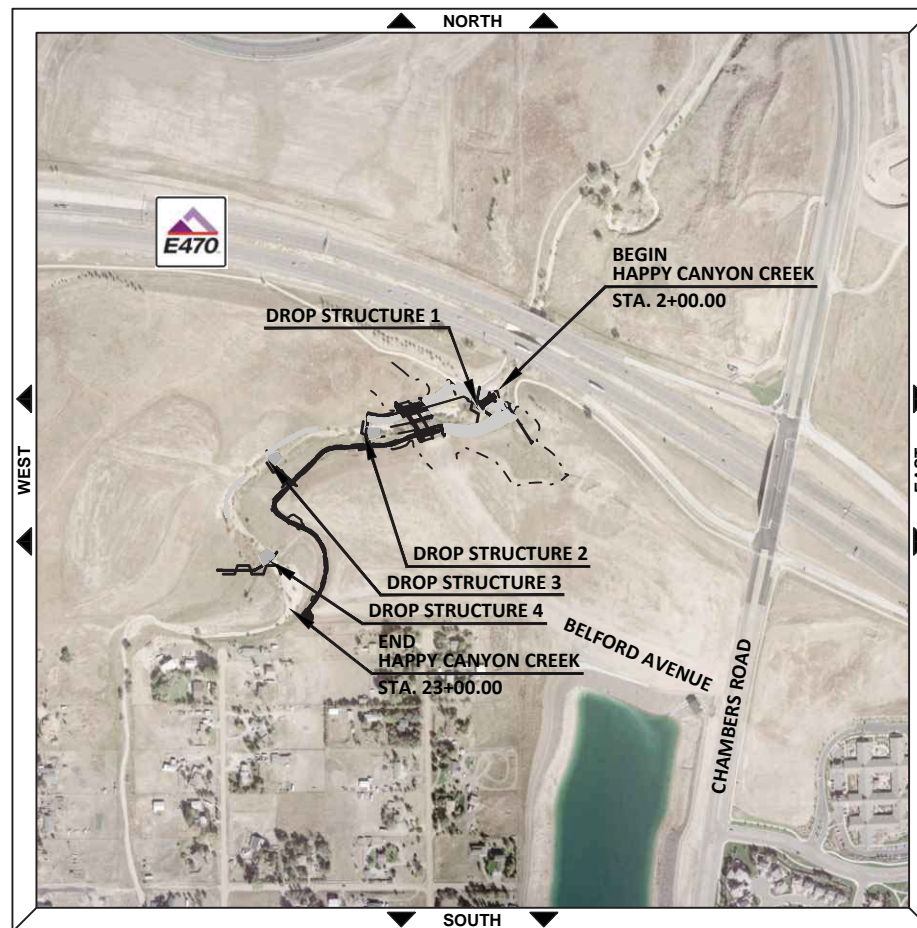
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F.O.R PLANS
CONSTRUCTION BEST MANAGEMENT PRACTICES
BELFORD AVENUE BRIDGE AND HAPPY CANYON CREEK
TOWN OF PARKER, COUNTY OF DOUGLAS, STATE OF COLORADO

SCALE OF ORIGINAL DRAWINGS

ON PLAN 1" = 80'



INDEX OF SHEETS

SHEET NO.	SUBSET SHEETS	DESCRIPTION
61	EL-1	CBMP TITLE SHEET
62	ET-1	TABULATION OF EROSION CONTROL QUANTITIES
63	EI-1	INITIAL CBMP PLAN
64	EN-1	INTERIM CBMP PLAN
65	EF-1	FINAL CBMP PLAN

TOWN OF PARKER APPROVALS

THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWNS STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGNED, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATION. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

THIS REVIEW DOES NOT CONSTITUTE APPROVAL OF ANY PRIVATE ON-SITE IMPROVEMENTS WHICH MAY BE SHOWN. CONSTRUCTION CANNOT COMMENCE UNTIL ALL REQUIRED DRAINAGE/TRAFFIC REPORT(S), FINAL DEVELOPMENT PLAN(S), SPECIAL REVIEW(S), GRADING PERMIT, AND/OR OTHER PERMITS ARE COMPLETE, APPROVED AND ON FILE WITH THE TOWN OF PARKER.

TOWN OF PARKER, PUBLIC WORKS DIRECTOR	DATE
TOWN OF PARKER, PUBLIC WORKS MANAGER – STORMWATER	DATE
TOWN OF PARKER, PUBLIC WORKS MANAGER – TRANSPORTATION	DATE

BASIS OF BEARING:

THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 6 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN BEING MONUMENTED AS SHOWN HEREON HAVING A BEARING OF NORTH 00°29'49" WEST, AS DETERMINED BY GPS OBSERVATION FROM NGS CONTROL POINTS IN THE COLORADO CENTRAL ZONE, STATE PLAN COORDINATE SYSTEM, TOWN OF PARKER, COUNTY OF DOUGLAS, STATE OF COLORADO.

BENCHMARKS: (COMPARK SOUTH)

SOURCE BENCHMARKS:
 DOUGLAS COUNTY BM 1.115010
 A DOUGLAS COUNTY GIS MONUMENT SET IN CONCRETE LOCATED APPROXIMATELY 130 FEET SOUTHWESTERLY OF THE CENTERLINE OF CHAMBERS ROAD AND 95 FEET NORTHWESTERLY OF THE CENTERLINE OF COMPARK BOULEVARD.
 ELEVATION = 5752.84 (NAVD 88)

SITE BENCHMARKS:
 A NO. 5 REBAR WITH 2" ALUMINUM CAP STAMPED "LS 28286, 2001" FOUND AT THE SOUTHWEST CORNER OF SECTION 6, T6S, R66W LOCATED ON THE WEST LINE OF FIRST STREET APPROXIMATELY 1000 FEET NORTH OF ELM AVENUE.
 ELEVATION = 5845.51

A 2.5" IRON PIPE WITH 3.25" ALUMINUM CAP STAMPED "PLS 12405, 1997" FOUND AT THE SOUTHEAST CORNER OF SECTION 6, T6S, R66W LOCATED APPROXIMATELY 960 FEET NORTH OF THE CENTERLINE OF AVENTERRA PARKWAY AND APPROXIMATELY 1050 FEET WEST OF THE CENTERLINE OF CHAMBERS ROAD.
 ELEVATION = 5808.06

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 Construction Managers • Environmental Scientists • Landscape Architects • Planners

As Constructed	BELFORD-HAPPY CANYON CREEK CBMP TITLE SHEET		Project No./Code
No Revisions:			
Revised:	Designer: CDT	Structure Numbers	
Void:	Detailer: KLT		
	Subset: EROSION	Sheets: EL-1 of 1	Sheet Number 83

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TABULATION OF EROSION CONTROL QUANTITIES

DRAWING NUMBER	CHECK DAM (CD)	*CONCRETE WASHOUT STRUCTURE (CWA)	*VEHICLE TRACKING CONTROL (VTC)	*STABILIZED STAGING AREA (SSA)	SEEDING (NATIVE) (SMC)	MULCHING (WEED FREE STRAW) (SMC)	*CULVERT PROTECTION (CP)	DEWATERING (D)	*SEDIMENT CONTROL LOG (12 INCH) (SCL)	EROSION CONTROL BLANKET (STRAW/COCONUT) (ECB)	DIVERSION DITCH (DD)	CONSTRUCTION FENCE (CF)	SILT FENCE (SF)	#NLET PROTECTION AREA INLETS NOT IN PAVEMENT (IPAN)	##ROUGH CUT STREET CONTROL (RCSC)	TEMPORARY SEDIMENT BASIN (TSB)	TEMPORARY STREAM CONTROL (TSC)
	LF	EACH	EACH	SY	ACRE	ACRE	LF	LS	LF	SY	LF	LF	LF	EA	LF	EA	EA
INITIAL (EI-1)	275	2	2	2300			40		1680		312	8275	440				4
INTERIM (EN-1)							60	1	1760					1	480	2	
FINAL (EF-1)					5.8	5.8				1795							
PROJECT TOTALS	275	2	2	2300	5.8	5.8	100	1	3440	1795	312	8275	440	1	480	2	4

1. THESE QUANTITIES HAVE BEEN TAKEN FORWARD TO THE SUMMARY OF APPROXIMATE QUANTITIES.
 2. FOR DETAILS, SEE CBMP STANDARD NOTES AND DETAILS.
 3. CHECK DAMS ARE NOT TO BE REMOVED UNLESS DIRECTED BY THE PROJECT ENGINEER.
 4. MULCH TACKIFIER IS REQUIRED AND IS INCLUDED IN THE COST OF MULCHING.
 5. SEE CBMP SHEETS FOR ADDITIONAL PLACEMENT INFORMATION.
 6. LOCATION OF STOCKPILES, INCLUDING TOPSOIL, IMPORTED AGGREGATES, EXCESS MATERIALS, STORAGE AND STAGING AREAS FOR EQUIPMENT FUEL, LUBRICANT, CHEMICAL (AND OTHER MATERIALS), WASTE STORAGE, BORROW AND DISPOSAL AREAS SHALL BE LOCATED PRIOR TO CONSTRUCTION WITH IN THE DEFINED LIMITS OF CONSTRUCTION BY THE PROJECT ENGINEER.
- * THESE ITEMS SHALL BE PAID FOR AS PLACE AND REMOVE.
 # THESE ITEMS SHALL BE PAID FOR AS INLET PROTECTION (EACH).
 ## ROUGH CUT STREET CONTROL SHALL BE PAID FOR AS AGGREGATE BAG (LF)

ADDITIONAL SEDIMENT/EROSION CONTROL:

IT IS ESTIMATED THAT BLADING (120 HORSEPOWER), DOZING (100 HORSEPOWER), COMBINATION LOADER (125 HORSEPOWER) AND/OR BACKHOE (75 HORSEPOWER) AND/OR LABORER MAY BE REQUIRED FOR MISCELLANEOUS EROSION CONTROL WORK AS DIRECTED BY THE ENGINEER. WORK SHALL BE PAID FOR AS 208 SEDIMENT REMOVAL AND DISPOSAL (40 HRS). EROSION CONTROL MANAGEMENT WILL BE REQUIRED FOR THIS PROJECT AND SHALL BE PAID FOR AS 208 EROSION CONTROL MANAGEMENT (30 DAYS).

WATER CONTROL NOTES – TEMPORARY STREAM CONTROL

1. THE CONTRACTOR SHALL DEVELOP AND SUBMIT A WATER CONTROL PLAN TO THE TOWN OF PARKER FOR REVIEW AND APPROVAL TWO WEEKS PRIOR TO BEGINNING CONSTRUCTION. WATER CONTROL INCLUDES CHANNEL BASE FLOW, STORMWATER RUNOFF, AND GROUNDWATER. THE CONTRACTOR'S WATER CONTROL PLAN SHALL INCLUDE ALL MEANS AND METHODS NECESSARY IN CONVEYING WATER THROUGH AND FROM THE PROJECT SITE SO THAT THE WATER QUALITY OR PROPERTY DOWNSTREAM OF THE PROJECT LIMITS ARE NOT IMPACTED NEGATIVELY FROM THE PROJECT'S CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR'S MEANS AND METHODS INCLUDED IN THE CONTRACTOR'S APPROVED WATER CONTROL PLAN MAY INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING: PLASTIC LINED DIVERSION DITCHES, TEMPORARY PIPING, HOSES, CUTOFF WALLS, CHECK DAMS, PUMPS, GENERATORS, SOUND PROOFING, TEMPORARY POWER, SHEET PILE, SHORING, SEDIMENT TRAPS, SEDIMENT BASINS, FILTER BAGS, REINFORCED ROCK BERMS, STREAM CROSSINGS, RIPRAP PADS, RIPRAP, CRUSHED ROCK AND ANY OTHER WATER CONTROL MEASURES NECESSARY AND APPROVED BY THE TOWN OF PARKER.
3. GIVEN THE NATURE OF THE PROJECT SITE'S TERRAIN AND SCOPE OF WORK, THE CONTRACTOR'S WATER CONTROL PLAN AND PROPOSAL SHALL ACCOUNT FOR THE NEED TO RELOCATE WATER CONTROL MEASURES AS NEEDED BASED ON THE CONTRACTOR'S ACTUAL CONSTRUCTION SEQUENCE AND SELECTED MEANS AND METHODS.
4. WATER QUALITY SHALL BE ONE OF THE CONTRACTOR'S PRIMARY CONCERNS. THE CONTRACTOR'S IMPLEMENTED WATER CONTROL PLAN WILL BE INSPECTED DAILY. IF FOR ANY REASON THE CONTRACTOR'S IMPLEMENTED WATER CONTROL PLAN NEEDS CORRECTIVE ACTION OR IF THE CONTRACTOR IS DIRECTED BY THE TOWN OF PARKER OR THE OWNER'S REPRESENTATIVE TO MAKE REPAIRS, THE CONTRACTOR SHALL MAKE SUCH CORRECTIONS IMMEDIATELY.
5. THE APPROXIMATE 2-YR DISCHARGE FOR HAPPY CANYON CREEK IS 309 CFS. THE AVERAGE BASE FLOW RATE IS UNKNOWN. THE ESTIMATED AVERAGE BASE FLOW RATE IS APPROXIMATELY 1 CFS.
6. ALL STREAM DIVERSION DITCHES NEED TO BE PLASTIC LINED AT A MINIMUM AS DIRECTED BY THE TOWN OF PARKER.
7. ALL TEMPORARY STREAM CROSSINGS SHALL BE COMPLETELY RIPRAP REINFORCED AND HAVE PLASTIC LINING UNDER THE RIPRAP. THE CONTRACTOR'S SELECTED STREAM CROSSING SHALL ACCOMMODATE PASSAGE FOR BASE FLOWS AND AT NO TIME SHALL CONTRACTORS' EQUIPMENT HAVE DIRECT CONTACT WITH ANY STREAM FLOW.
8. ALL INCIDENTAL WATER CONTROL ITEMS SHALL BE PAID FOR AS TEMPORARY STREAM CROSSING (EA).

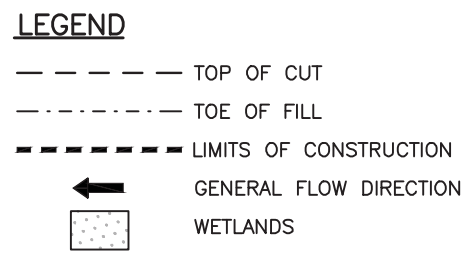
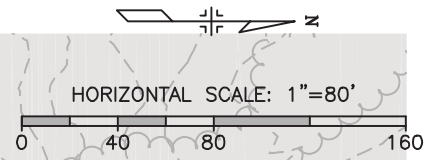
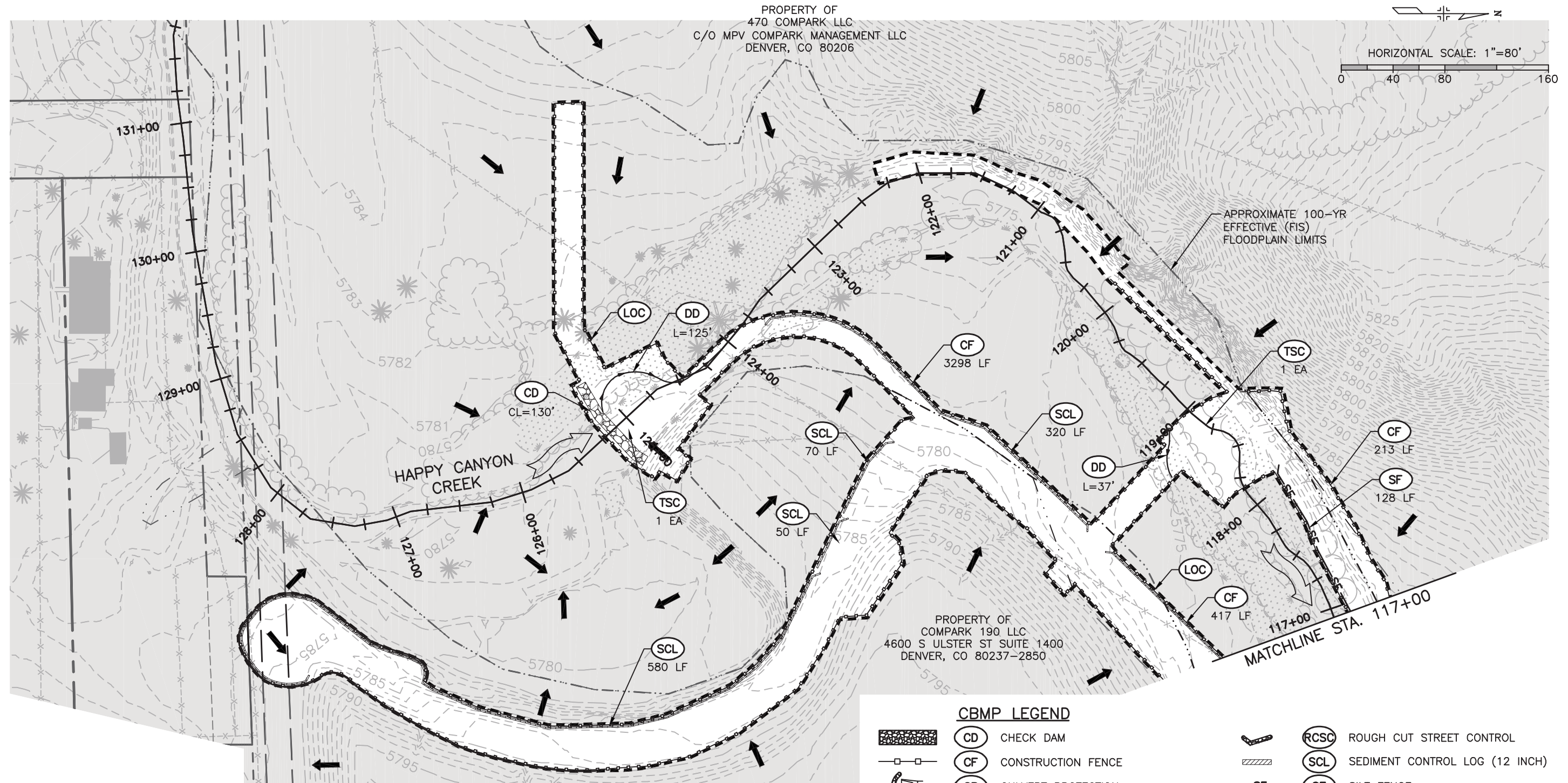
CBMP LEGEND

	(CD) CHECK DAM
	(CF) CONSTRUCTION FENCE
	(CP) CULVERT PROTECTION
	(CWA) CONCRETE WASHOUT AREA
	(D) DEWATERING
	(DD) DIVERSION DITCH
	(ECB) EROSION CONTROL BLANKET (STRAW/COCONUT)
	(IPAN) INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT
	(RCSC) ROUGH CUT STREET CONTROL
	(SCL) SEDIMENT CONTROL LOG (12 INCH)
	(SF) SILT FENCE
	(SMC) SEEDING MULCHING AND CRIMPING
	(SSA) STABILIZED STAGING AREA
	(TSB) TEMPORARY SEDIMENT BASIN
	(TSC) TEMPORARY STREAM CONTROL
	(VTC) VEHICLE TRACKING CONTROL

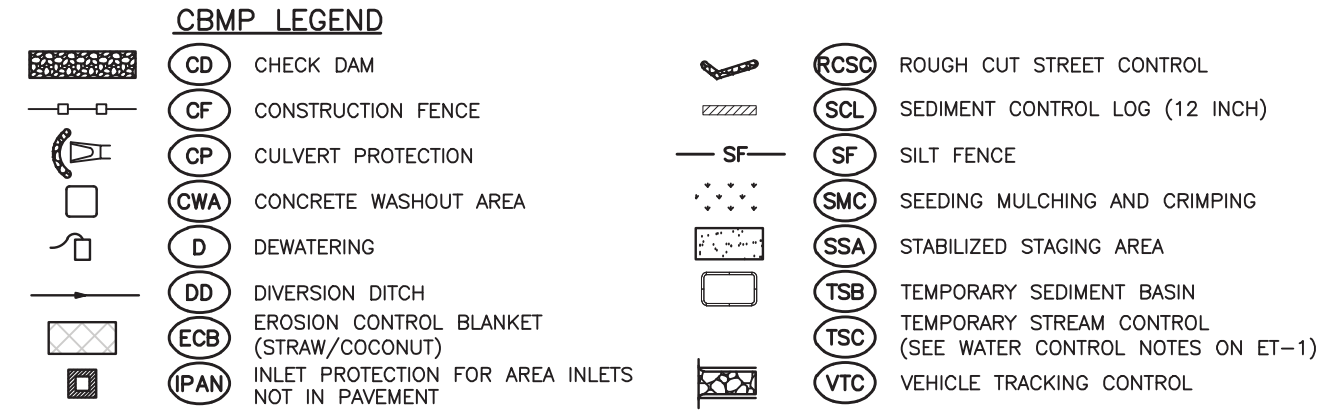
I:\115360-01 - Compark at Belford\CADD\Erosion\Drawings\Happy Cyn Creek Drop Structure\ Scott.Dankenbring

Print Date: 8/14/2017 7:34:54 AM	Sheet Revisions			<p>3009 E. Arapahoe Court, Suite 110, Denver, CO 80112 ph:303.708.0800 fx:303.708.0400 manhard.com Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers Construction Managers • Environmental Scientists • Landscape Architects • Planners</p>	As Constructed	BELFORD-HAPPY CANYON CREEK TABULATION OF EROSION CONTROL QUANTITIES		Project No./Code	
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Horizontal Scale: NTS Vertical Scale: NTS						Revised:	Designer: CDT	Structure Numbers	
						Void:	Detailer: KLT		
6300 South Syracuse Way, Suite 600 Centennial, CO 80111 tel 303.721.1440 fax 303.721.0832						Subset: EROSION	Sheets: ET-1 of 1	Sheet Number 84	

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- NOTES:**
- TEMPORARY CONSTRUCTION EASEMENTS SHALL NOT BE CLEARED AND GRUBBED UNLESS IT IS REQUIRED IN ORDER TO CONSTRUCT THE ROADWAY SECTION. THE CONTRACTOR SHALL USE PARTICULAR CARE TO MINIMIZE DAMAGE TO PLANTINGS WITHIN THE PROPERTY.
 - ALL DIRTY STREETS, CURBS, GUTTER, SIDEWALKS, LITTER AND OTHER CONSTRUCTION TRASH/DEBRIS, ETC. MUST BE THOROUGHLY CLEANED THROUGHOUT THE DAY AS THESE AREAS BECOME SOILED. NO EXCEPTIONS WILL BE MADE.



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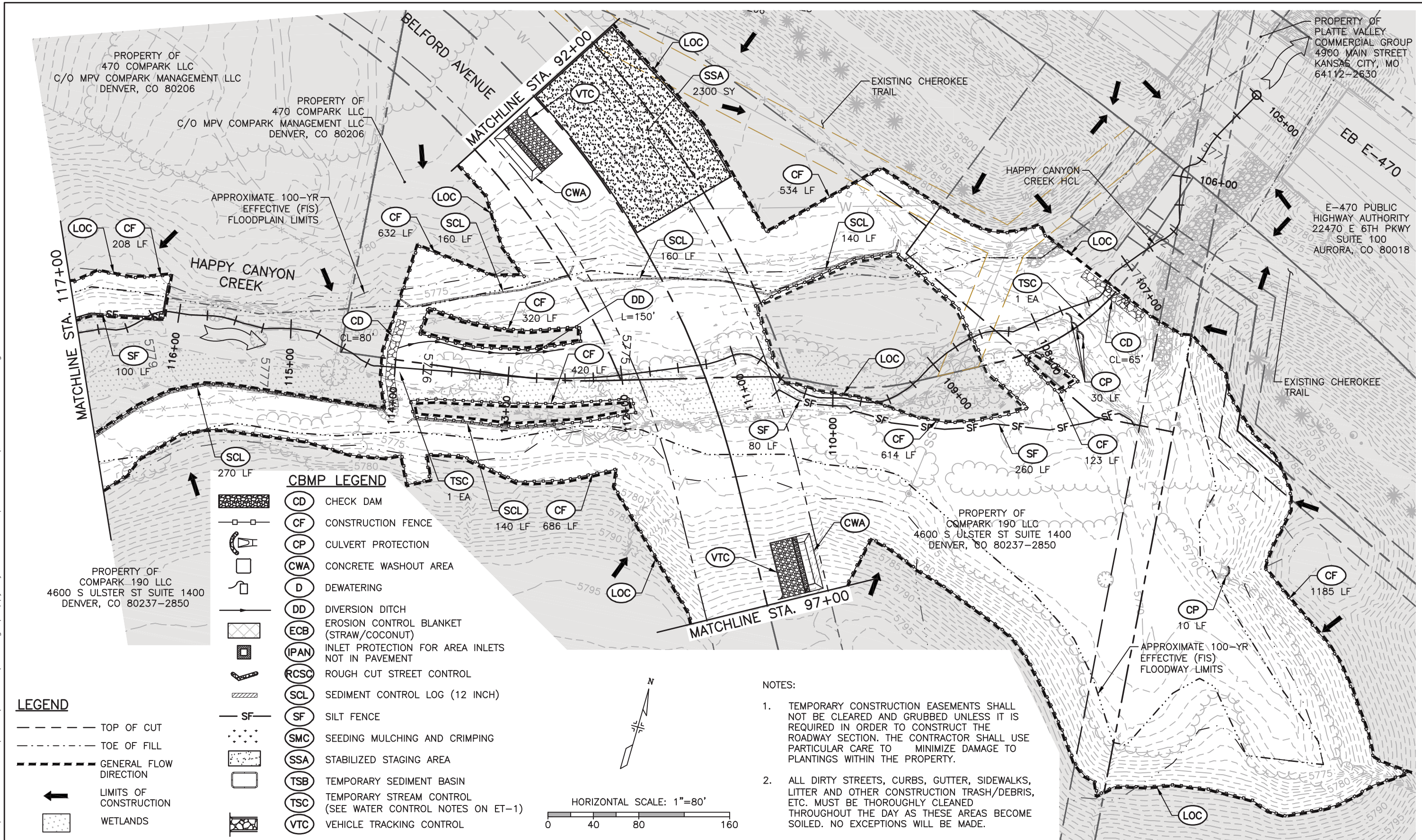
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	Revised:	Designer: CDT			Structure Numbers
	Void:	Detailer: KLT			Sheets: El-1 of 2
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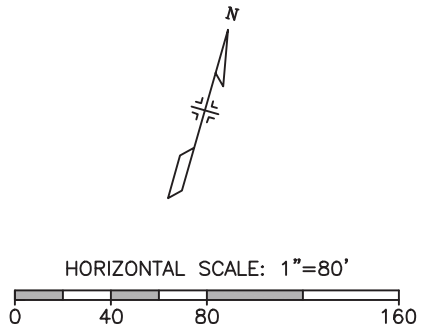
CBMP LEGEND

	CD CHECK DAM
	CF CONSTRUCTION FENCE
	CP CULVERT PROTECTION
	CWA CONCRETE WASHOUT AREA
	D DEWATERING
	DD DIVERSION DITCH
	ECB EROSION CONTROL BLANKET (STRAW/COCONUT)
	IPAN INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT
	RCSC ROUGH CUT STREET CONTROL
	SCL SEDIMENT CONTROL LOG (12 INCH)
	SF SILT FENCE
	SMC SEEDING MULCHING AND CRIMPING
	SSA STABILIZED STAGING AREA
	TSB TEMPORARY SEDIMENT BASIN
	TSC TEMPORARY STREAM CONTROL (SEE WATER CONTROL NOTES ON ET-1)
	VTC VEHICLE TRACKING CONTROL

LEGEND

	TOP OF CUT
	TOE OF FILL
	GENERAL FLOW DIRECTION
	LIMITS OF CONSTRUCTION
	WETLANDS

- NOTES:**
- TEMPORARY CONSTRUCTION EASEMENTS SHALL NOT BE CLEARED AND GRUBBED UNLESS IT IS REQUIRED IN ORDER TO CONSTRUCT THE ROADWAY SECTION. THE CONTRACTOR SHALL USE PARTICULAR CARE TO MINIMIZE DAMAGE TO PLANTINGS WITHIN THE PROPERTY.
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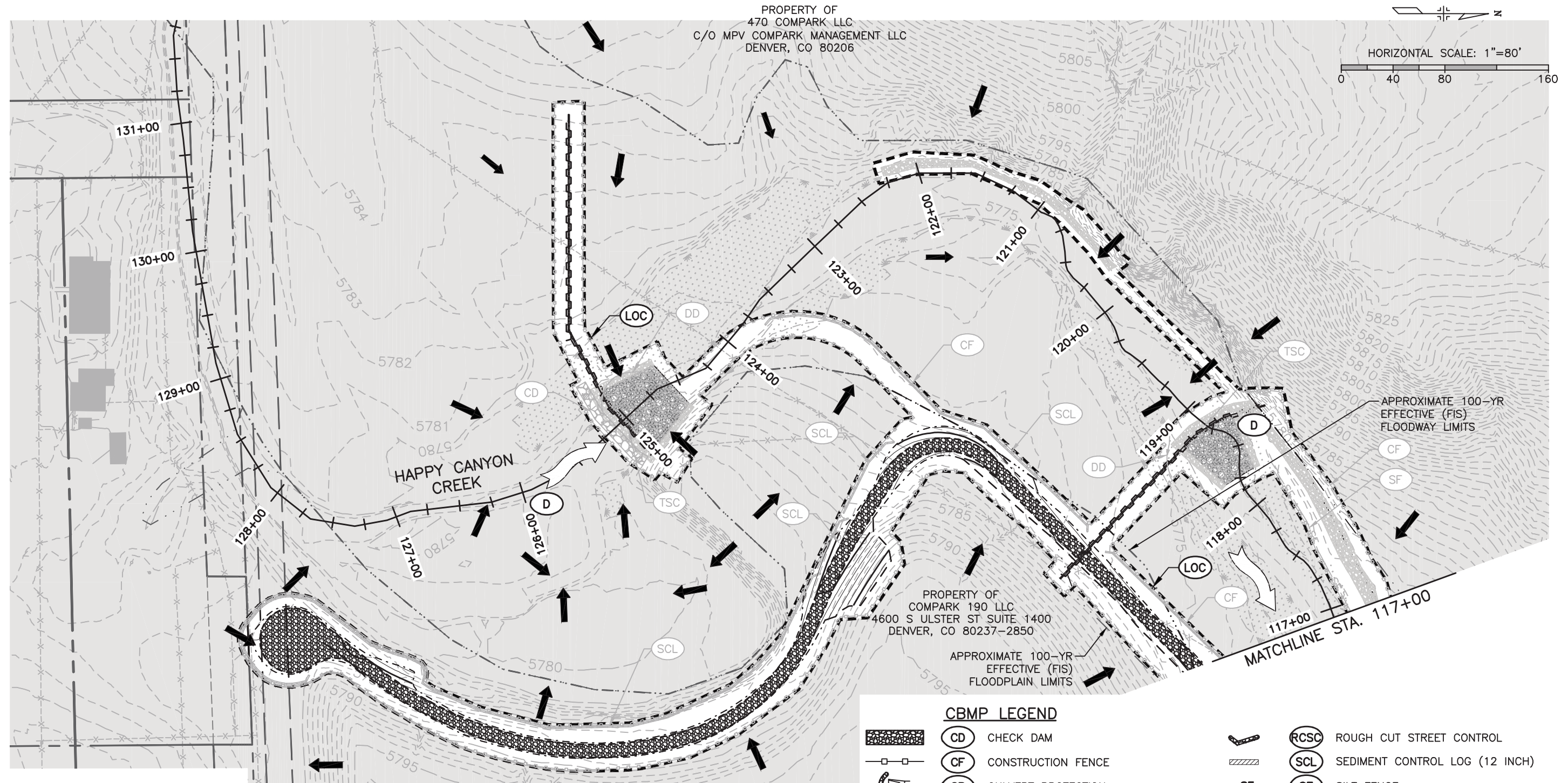
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	Revised:	Designer: CDT	Structure Numbers	Sheet Number 86	
	Void:	Detailer: KLT	Sheets: El-2 of 2		

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LEGEND

- TOP OF CUT
- - - TOE OF FILL
- - - LIMITS OF CONSTRUCTION
- ← GENERAL FLOW DIRECTION
- WETLANDS

- NOTES:**
- TEMPORARY CONSTRUCTION EASEMENTS SHALL NOT BE CLEARED AND GRUBBED UNLESS IT IS REQUIRED IN ORDER TO CONSTRUCT THE ROADWAY SECTION. THE CONTRACTOR SHALL USE PARTICULAR CARE TO MINIMIZE DAMAGE TO PLANTINGS WITHIN THE PROPERTY.
 - * EROSION CONTROL ITEMS INSTALLED IN THE INITIAL EROSION CONTROL PLAN SHALL REMAIN IN PLACE FOR INTERIM PHASES OF CONSTRUCTION AND SHALL BE REMOVED, MODIFIED OR REPLACED AT THE DIRECTION OF THE PROJECT ENGINEER. THESE ITEMS SHALL BE PAID FOR AS PLACE AND REMOVE.

CBMP LEGEND

	CD CHECK DAM		RCSC ROUGH CUT STREET CONTROL
	CF CONSTRUCTION FENCE		SCL SEDIMENT CONTROL LOG (12 INCH)
	CP CULVERT PROTECTION		SF SILT FENCE
	CWA CONCRETE WASHOUT AREA		SMC SEEDING MULCHING AND CRIMPING
	D DEWATERING		SSA STABILIZED STAGING AREA
	DD DIVERSION DITCH		TSB TEMPORARY SEDIMENT BASIN
	ECB EROSION CONTROL BLANKET (STRAW/COCONUT)		TSC TEMPORARY STREAM CONTROL (SEE WATER CONTROL NOTES SHEET ET-1)
	IPAN INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT		VTC VEHICLE TRACKING CONTROL

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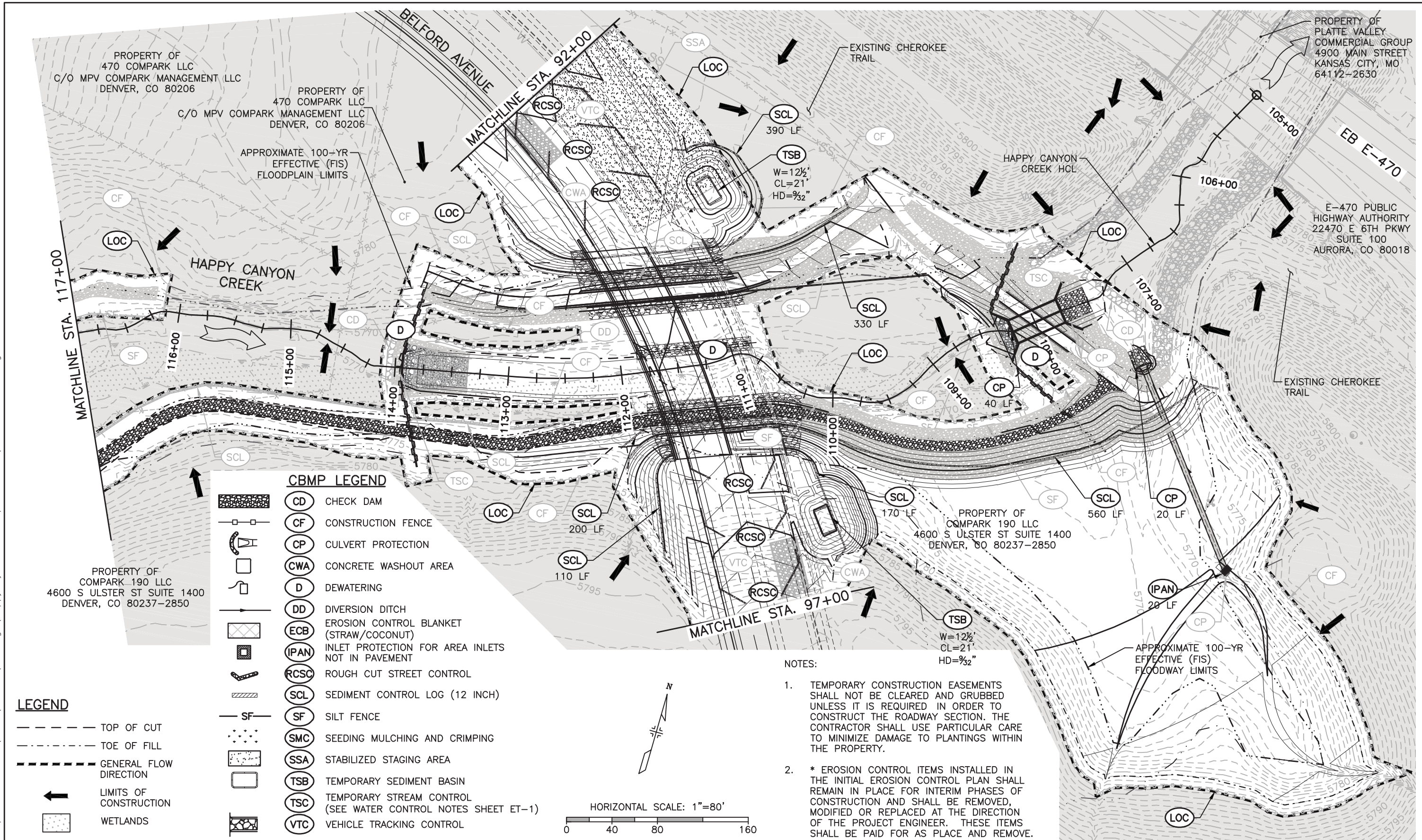
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	Revised:	Designer: CDT	Structure Numbers		
	Void:	Detailer: KLT	Sheets: EN-1 of 2	Sheet Number 87	

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CBMP LEGEND

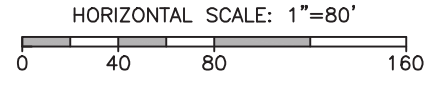
- CD CHECK DAM
- CF CONSTRUCTION FENCE
- CP CULVERT PROTECTION
- CWA CONCRETE WASHOUT AREA
- D DEWATERING
- DD DIVERSION DITCH
- ECB EROSION CONTROL BLANKET (STRAW/COCONUT)
- IPAN INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT
- RCSC ROUGH CUT STREET CONTROL
- SCL SEDIMENT CONTROL LOG (12 INCH)
- SF SILT FENCE
- SMC SEEDING MULCHING AND CRIMPING
- SSA STABILIZED STAGING AREA
- TSB TEMPORARY SEDIMENT BASIN
- TSC TEMPORARY STREAM CONTROL (SEE WATER CONTROL NOTES SHEET ET-1)
- VTC VEHICLE TRACKING CONTROL

LEGEND

- TOP OF CUT
- TOE OF FILL
- GENERAL FLOW DIRECTION
- LIMITS OF CONSTRUCTION
- WETLANDS

NOTES:

1. TEMPORARY CONSTRUCTION EASEMENTS SHALL NOT BE CLEARED AND GRUBBED UNLESS IT IS REQUIRED IN ORDER TO CONSTRUCT THE ROADWAY SECTION. THE CONTRACTOR SHALL USE PARTICULAR CARE TO MINIMIZE DAMAGE TO PLANTINGS WITHIN THE PROPERTY.
2. * EROSION CONTROL ITEMS INSTALLED IN THE INITIAL EROSION CONTROL PLAN SHALL REMAIN IN PLACE FOR INTERIM PHASES OF CONSTRUCTION AND SHALL BE REMOVED, MODIFIED OR REPLACED AT THE DIRECTION OF THE PROJECT ENGINEER. THESE ITEMS SHALL BE PAID FOR AS PLACE AND REMOVE.



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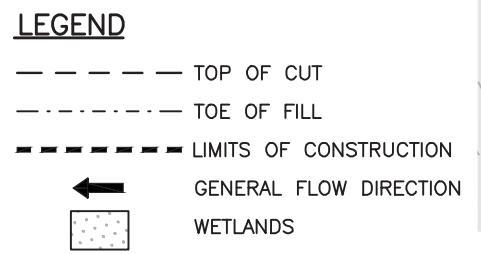
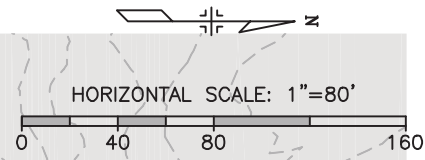
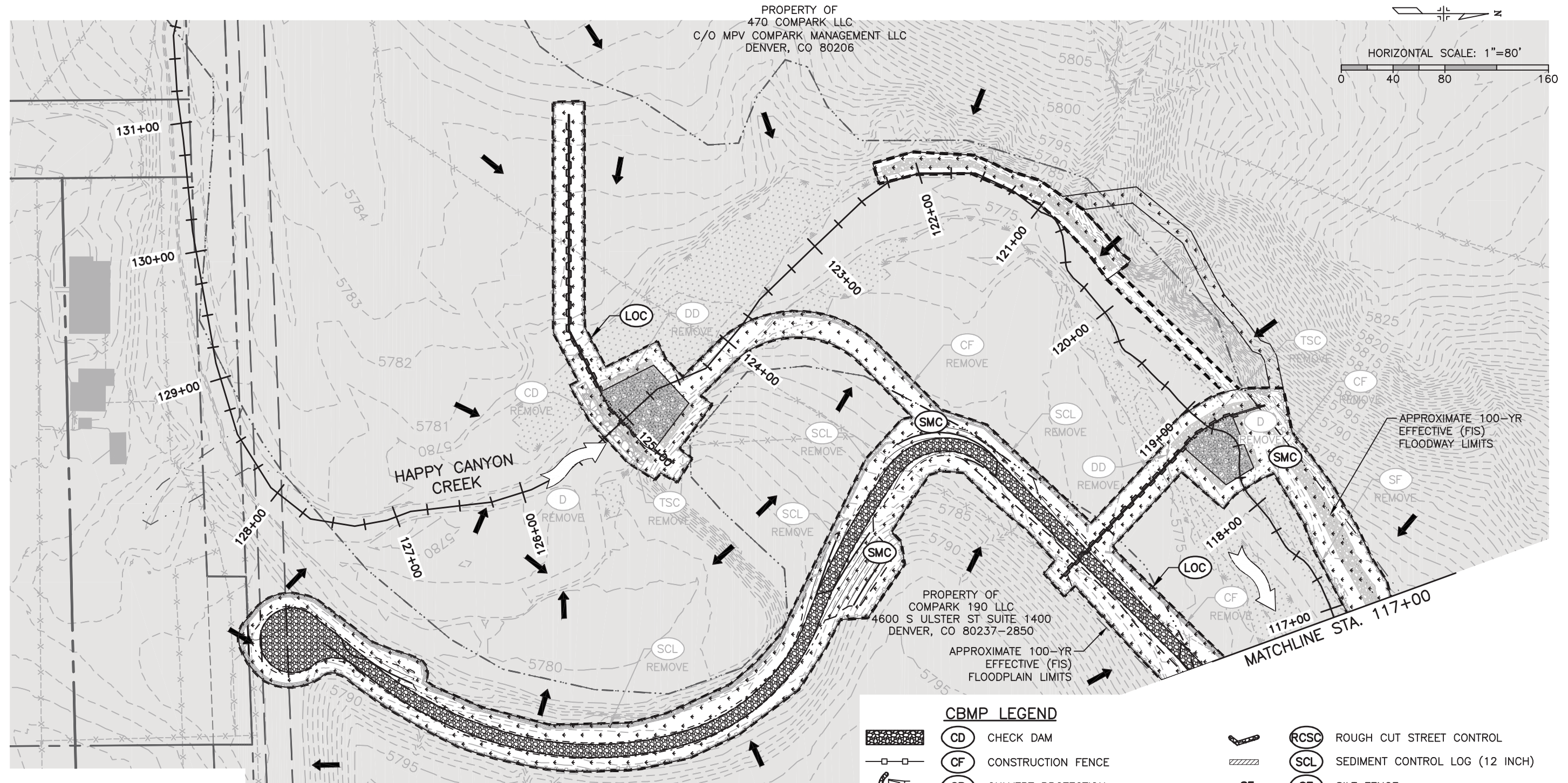
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No Revisions:		Designer:	CDT	
Revised:		Detailer:	KLT	
Void:		Subset:	Erosion	
		Structure Numbers:		Sheet Number
		Sheets:	EN-2 of 2	88

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NOTES:

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CBMP LEGEND

[Hatched Box]	(CD) CHECK DAM	[V-shaped Box]	(RCSC) ROUGH CUT STREET CONTROL
[Dashed Box]	(CF) CONSTRUCTION FENCE	[Diagonal Lines Box]	(SCL) SEDIMENT CONTROL LOG (12 INCH)
[Curved Box]	(CP) CULVERT PROTECTION	[Horizontal Line]	(SF) SILT FENCE
[Square Box]	(CWA) CONCRETE WASHOUT AREA	[Dotted Box]	(SMC) SEEDING MULCHING AND CRIMPING
[Square with Arrow]	(D) DEWATERING	[Stippled Box]	(SSA) STABILIZED STAGING AREA
[Square with Dotted]	(DD) DIVERSION DITCH	[Rectangular Box]	(TSB) TEMPORARY SEDIMENT BASIN
[Square with X]	(ECB) EROSION CONTROL BLANKET (STRAW/COCONUT)	[Rectangular with Dotted]	(TSC) TEMPORARY STREAM CONTROL (SEE WATER CONTROL NOTES SHEET ET-1)
[Square with Diagonal]	(IPAN) INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT	[Rectangular with X]	(VTC) VEHICLE TRACKING CONTROL

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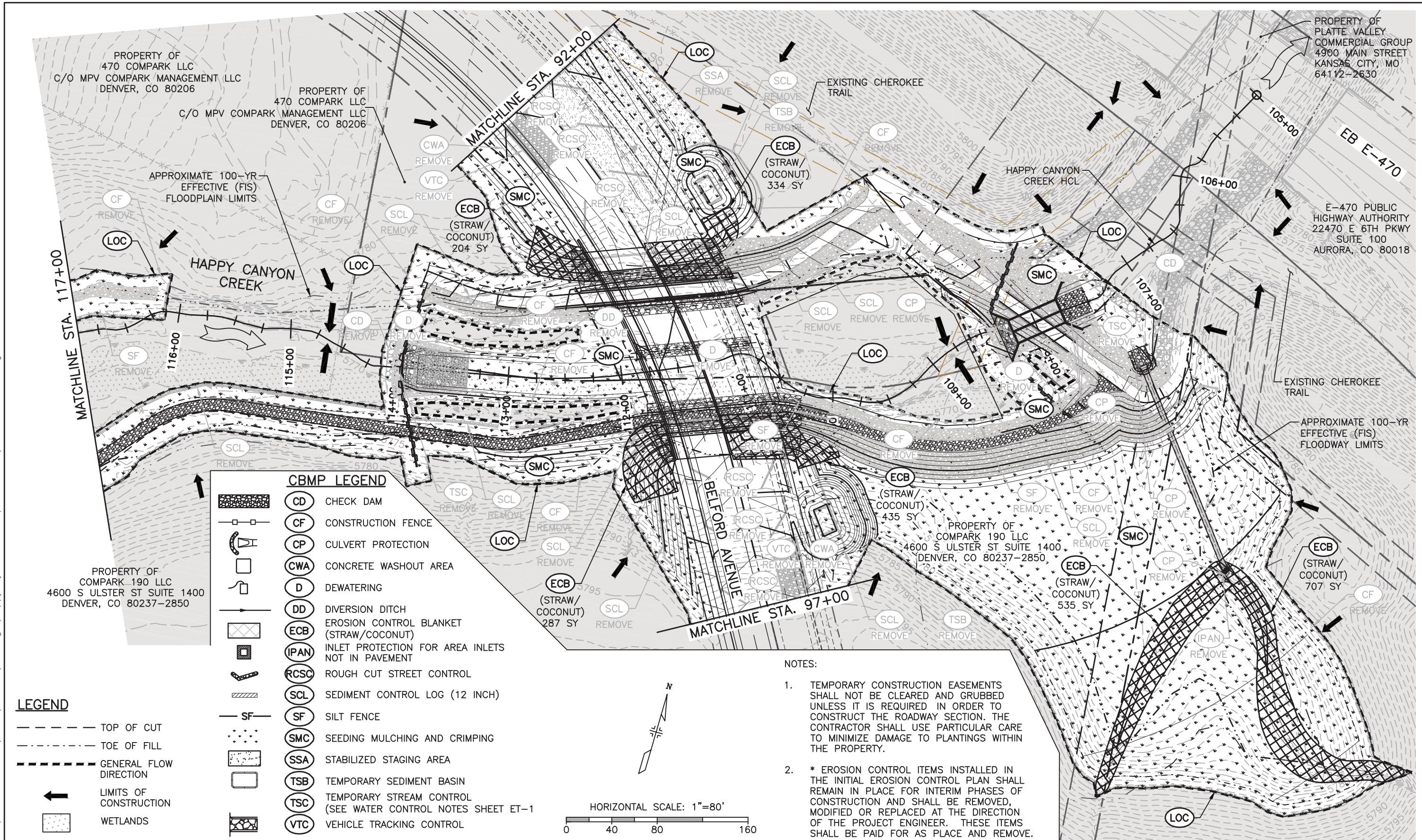
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	Revised:	Designer: CDT	Structure Numbers	Sheet Number 89	
	Void:	Detailer: KLT	Sheets: EF-1 of 2		

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CBMP LEGEND

	CD	CHECK DAM
	CF	CONSTRUCTION FENCE
	CP	CULVERT PROTECTION
	CWA	CONCRETE WASHOUT AREA
	D	DEWATERING
	DD	DIVERSION DITCH
	ECB	EROSION CONTROL BLANKET (STRAW/COCONUT)
	IPAN	INLET PROTECTION FOR AREA INLETS NOT IN PAVEMENT
	RCSC	ROUGH CUT STREET CONTROL
	SCL	SEDIMENT CONTROL LOG (12 INCH)
	SF	SILT FENCE
	SMC	SEEDING MULCHING AND CRIMPING
	SSA	STABILIZED STAGING AREA
	TSB	TEMPORARY SEDIMENT BASIN
	TSC	TEMPORARY STREAM CONTROL (SEE WATER CONTROL NOTES SHEET ET-1)
	VTC	VEHICLE TRACKING CONTROL

LEGEND

	TOP OF CUT
	TOE OF FILL
	GENERAL FLOW DIRECTION
	LIMITS OF CONSTRUCTION
	WETLANDS

NOTES:

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