PoDI / NHS	
FHWA PROJECT OF DIVISION INTEREST (PoDI)?	■ NO □ YES
NATIONAL HIGHWAY SYSTEM?	■ NO □ YES

Related Projects:
P. E. UNDER PROJECT:
Project Number XXXXXXXXX
Project Code: ER 119A-065

R.O.W. Projects:
R.O.W. Project Description
20978 & 20258

BOUNDER COUNTY

CONSTRUCTION BID PLANS OF PROPOSED
FEDERAL AID PROJECT NO. STU C070-043
BOULDER CANYON TRAIL EXTENSION

CONSTRUCTION PROJECT CODE NO. 19888

F.O.R.
NOVEMBER, 2016

TABULATION OF LENGTH & DESIGN DATA

STATION	BOULDER CANYON TRAIL	
	FEET	MILES
BEGIN PROJECT STU C070-043 = STA. 102+50.00 SH 119 M.P. 38.36 END PROJECT STU C070-043 = STA. 139+52.71 SH 119 M.P. 38.94	3702.71	0.70
PROJECT LENGTH	**3702.71**	**0.70**

DESIGN DATA	SH 119	Boulder Canyon Trail
DESIGN SPEED	45 MPH	16 MPH TYPICAL 20 MPH - GRADES > 4%
POSTED SPEED	40 MPH	15 MPH
MAXIMUM GRADE	5.00%	5% PAVED TRAIL 3% UNPAVED TRAIL
MINIMUM GRADE	0.50%	0.50%
MINIMUM S.S.D. HORIZONTAL	360 FT.	100 FT.
MINIMUM S.S.D. VERTICAL	360 FT.	100 FT.
CLEAR ZONE (TANGENT)	20 FT.	5 FT.

PROJECT LOCATION MAP

0' ½ MILE 1 MILE 2 MILES

INDEX OF SHEETS

Print Date: 11/17/2016
File Name: 19888DES_Title.dgn
Horiz. Scale: 1:1 Vert. Scale:

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

Contract Information	
Contractor:	
Resident Engineer:	
Project Engineer:	
PROJECT STARTED: / /	ACCEPTED: / /
Comments:	

Project No./Code	
STU C070-043	
19888	
Sheet Number	1

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PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER
M-100-1		STANDARD SYMBOLS (3 SHEETS)	1-3
M-100-2		ACRONYMS AND ABBREVIATIONS (4 SHEETS)	4-7
M-203-1	■	APPROACH ROADS (REVISED ON JULY 08, 2013)	~~8~~
M-203-2		DITCH TYPES	9
M-203-11		SUPERELEVATION CROWNED AND DIVIDED HIGHWAYS (3 SHEETS)	10-12
M-203-12		SUPERELEVATION STREETS (2 SHEETS)	13-14
M-206-1		EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS)	15-16
M-206-2		EXCAVATION AND BACKFILL FOR BRIDGES (2 SHEETS)	17-18
M-208-1	■	TEMPORARY EROSION CONTROL (11 SHEETS) (REVISED ON MARCH 29, 2016)	~~19-30~~
M-210-1		MAILBOX SUPPORTS (2 SHEETS)	31-32
M-214-1		PLANTING DETAILS	33
M-216-1	■	SOIL RETENTION COVERING (2 SHEETS) (NEW ON JULY 16, 2015)	
M-412-1	□	CONCRETE PAVEMENT JOINTS (5 SHEETS) (REVISED ON JULY 24, 2012)	~~34-38~~
M-510-1		STRUCTURAL PLATE PIPE H-20 LOADING	39
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M-601-2	□	DOUBLE CONCRETE BOX CULVERT (2 SHEETS) (REVISED ON NOVEMBER 25, 2015)	~~42-43~~
M-601-3	□	TRIPLE CONCRETE BOX CULVERT (2 SHEETS) (REVISED ON NOVEMBER 25, 2015)	~~44-45~~
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M-603-1	■	METAL PIPE (4 SHEETS). (REVISED ON OCTOBER 02, 2014)	~~50-53~~
M-603-2	■	REINFORCED CONCRETE PIPE. (REVISED ON OCTOBER 02, 2014)	~~54~~
M-603-3		PRECAST CONCRETE BOX CULVERT	55
M-603-4	□	CORRUGATED POLYETHYLENE PIPE (AASHTO M294) (REVISED ON OCT. 02, 2014).	~~56~~
M-603-5	■	POLYVINYL CHLORIDE (PVC) PIPE (AASHTO M304). (REVISED ON OCT. 02, 2014).	~~57~~
M-603-6	□	STEEL REINFORCED POLYETHYLENE RIBBED PIPE (AASHTO MP 20) (NEW ON APRIL 30, 2015)	
M-603-10		CONCRETE AND METAL END SECTIONS (2 SHEETS)	58-59
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M-604-20		MANHOLES (3 SHEETS)	65-67
M-604-25		VANE GRATE INLET (5 SHEETS)	68-72
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M-606-1	□	GUARDRAIL TYPE 3 W-BEAM (20 SHEETS) (REVISED ON OCTOBER 27, 2014)	~~74-92~~
M-606-1	■	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES (20 SHEETS) (REVISED ON DECEMBER 29, 2015)	
M-606-13	■	GUARDRAIL TYPE 7 F-SHAPE BARRIER (4 SHEETS) (REVISED ON AUGUST 30, 2013)	~~93-96~~
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PLAN NUMBER	NEW OR REVISED	M STANDARD TITLE	PAGE NUMBER
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M-609-1	■	CURBS, GUTTERS, AND SIDEWALKS (4 SHEETS) (REVISED ON JULY 24, 2012).	~~126-129~~
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COLORADO
DEPARTMENT OF TRANSPORTATION

M&S STANDARDS PLANS LIST

July 04, 2012

Revised on June 24, 2016

ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

NEW OR REVISED STANDARD PLAN SHEETS APPLICABLE TO THIS PROJECT, INDICATED BY A MARKED BOX ■, WILL BE ATTACHED TO THE PLANS.

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S-614-2	■	CLASS I SIGNS (REVISED ON JUNE 24, 2016).	~~160~~
S-614-3		CLASS II SIGNS	161
S-614-4	□	CLASS III SIGNS (3 SHEETS) (REVISED ON DECEMBER 17, 2014)	~~162-164~~
S-614-5		BREAK-AWAY SIGN SUPPORT DETAILS FOR GROUND SIGNS (2 SHEETS)	165-166
S-614-6	□	CONCRETE FOOTINGS AND SIGN ISLANDS FOR CLASS III SIGNS (2 SHEETS) (REVISED ON SEPTEMBER 16, 2013)	~~167-168~~
S-614-8	□	TUBULAR STEEL SIGN SUPPORT DETAILS (6 SHEETS) (REVISED ON OCTOBER 23, 2014)	~~169-173~~
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S-614-40	□	TYPICAL TRAFFIC SIGNAL INSTALLATION DETAILS (5 SHEETS) (REVISED ON JUNE 17, 2016)	~~184-188~~
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S-614-41	□	TEMPORARY SPAN WIRE SIGNALS (REVISED ON APRIL 2, 2015)	~~193~~
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S-614-50	□	STATIC SIGN MONOTUBE STRUCTURES (12 SHEETS) (REVISED ON JUNE 17, 2016)	~~208-219~~
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S-627-1	■	PAVEMENT MARKINGS (5 SHEETS) (REVISED ON JUNE 10, 2014).	~~234-238~~
S-630-1	■	TRAFFIC CONTROLS FOR HIGHWAY CONSTRUCTION (24 SHEETS) (REVISED ON JUNE 23, 2016)	~~239-258~~
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S-630-3		FLASHING BEACON (PORTABLE) DETAILS	260
S-630-4		STEEL SIGN SUPPORT (TEMPORARY) INSTALLATION. DETAILS (2 SHEETS)	261-262
S-630-5	□	PORTABLE RUMBLE STRIPS (TEMPORARY) (2 SHEETS) (REVISED ON AUGUST 13, 2015)	~~263-264~~
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Know what's **below** **Call** before you dig.

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Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

STANDARD PLANS LIST

Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	GENERAL	Subset Sheets:	

Project No./Code	
STU C070-043	
19888	
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GENERAL NOTES:

1. THE COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION DATED 2011, THE BOULDER COUNTY MULTIMODAL TRANSPORTATION STANDARDS DATED 2012, ALONG WITH PROJECT SPECIAL PROVISIONS AND STANDARD SPECIAL PROVISIONS, CONTROL CONSTRUCTION OF THIS PROJECT.

2. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION ON SITE AT ALL TIMES ONE (1) STAMPED FOR CONSTRUCTION COPY OF THE PLANS AND SPECIFICATIONS WHICH HAVE BEEN APPROVED BY THE COUNTY, AND ONE COPY OF THE CDOT M&S STANDARDS (INCLUDING LATEST REVISIONS)

3. IN ACCORDANCE WITH SECTION 630.10 OF THE STANDARD SPECIFICATIONS, THIS PROJECT IS CLASSIFIED AS A SIGNIFICANT PROJECT.

4. THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ANY PROBLEM IN CONFORMING TO THE APPROVED PLANS FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO ITS CONSTRUCTION.

5. FOR PLAN QUANTITIES OF PAVEMENT MATERIALS, THE FOLLOWING RATES OF APPLICATIONS WERE USED:
   - AGGREGATE BASE COURSE @ 133 LBS. PER CU. FT.
   - HOT MIX ASPHALT @ 110 LBS. PER SQ. YD./INCH
   - TACK COAT DILUTED EMULSIFIED ASPHALT (SLOW-SETTING) @ 0.1 GALS. PER SQ. YD. (DILUTED)

6. A TACK COAT OF EMULSIFIED ASPHALT (SLOW SETTING) IS TO BE APPLIED TO IMPROVE BOND AT THE FOLLOWING LOCATIONS:
   - BEFORE PLACING NEW PAVEMENT OVER EXISTING PAVEMENT
   - ALONG THE FACE OF ALL CURBS, GUTTERS, MANHOLES, ADJACENT EXISTING PAVEMENT, AND OTHER SURFACES AGAINST WHICH ASPHALT WILL BE PLACED
   - BETWEEN PAVEMENT COURSES WHEN ORDERED BY THE ENGINEER.

7. TACK COAT (DILUTED) FOR THIS PROJECT SHALL BE ONE PART EMULSIFIED ASPHALT (SLOW SETTING) AND ONE PART WATER.

8. THE CONTRACTOR SHALL SUBMIT A PAVING SCHEDULE TO THE ENGINEER AT LEAST 5 WORKING DAYS PRIOR TO THE PRE-PAVING CONFERENCE. PAVING SHALL NOT BEGIN UNTIL THE SCHEDULE HAS BEEN ACCEPTED IN WRITING BY THE ENGINEER.

9. PRIOR TO PLACING HOT MIX ASPHALT PAVEMENT, THE PAVED SURFACE SHALL BE SWEPT AND CLEANED. THIS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE HOT MIX ASPHALT PAVEMENT ITEMS.

10. ANY LAYER OF HOT MIX ASPHALT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.

11. WHERE NEW PAVEMENT IS TO ABUT EXISTING PAVEMENT, THE EXISTING PAVEMENT SHALL BE REMOVED TO A NEAT VERTICAL LINE USING A CUTTING SAW OR OTHER METHOD AS APPROVED BY THE ENGINEER. SAW CUTTING ASPHALT SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF REMOVAL OF ASPHALT MAT.

12. PRIOR TO PAVING, THE PAVEMENT SUBGRADE SHALL BE PROOF ROLLED WITH A PNEUMATIC TIRED VEHICLE LOADED TO AT LEAST 18 KIPS PER AXLE. AREAS WHICH DEFORM EXCESSIVELY UNDER THE WHEEL LOADS, AS DETERMINED BY THE ENGINEER, SHALL BE REMOVED AND REPLACED PRIOR TO PAVING. IT IS ESTIMATED THAT **20 HOURS OF ITEM 203-01100 PROOFROLLING** WILL BE REQUIRED.

13. SULFATE EXPOSURE FOR CONCRETE ON THIS PROJECT IS CLASS 0. SEE SPECIFICATION SECTION 601, STRUCTURAL CONCRETE, AND THE PROJECT GEOTECHNICAL REPORT.

14. WATER SHALL BE USED AS A DUST PALLIATIVE WHERE REQUIRED. THE CONTRACTOR SHALL PROVIDE A WATER TRUCK ON-SITE FOR DUST CONTROL. LOCATIONS SHALL BE AS DIRECTED BY THE ENGINEER. WATER SHALL NOT BE PAID FOR SEPARATELY.

15. DEPTH OF MOISTURE-DENSITY CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
   - FULL DEPTH OF ALL EMBANKMENTS
   - FULL DEPTH FOR AGGREGATE BASE COURSE
   - 6 INCHES FOR BASES OF CUTS AND FILLS

16. EXCAVATION REQUIRED FOR COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED AS SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.

17. THE TYPES OF COMPACTION FOR THIS PROJECT SHALL BE T-99 FOR FINE GRAIN SOILS AND T-180 FOR AGGREGATE BASE COURSE.

18. THE CONTRACTOR SHALL KEEP THE WORK AREA DRY OF STANDING WATER AND SHALL KEEP THE EXCAVATION AREAS FREE FROM STORM RUN-OFF.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCEPTANCE AND CONTROL OF ALL SURFACE AND SUBSURFACE DRAINAGE AND GROUNDWATER ENTERING THE PROJECT AREA. THE CONTRACTOR SHALL KEEP THE WORK AREA DRY OF STANDING WATER AND SHALL KEEP THE EXCAVATION AREAS FREE FROM STORM RUN-OFF. REPAIR OF DAMAGES RESULTING FROM RUNOFF IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE INCLUDED IN THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A DEWATERING PERMING FROM THE STATE.

20. THE CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE SHOWN ON THE PLANS. ANY DISTURBANCE BEYOND THESE LIMITS SHALL BE RESTORED TO ORIGINAL CONDITION BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. CONSTRUCTION ACTIVITIES IN ADDITION TO NORMAL CONSTRUCTION PROCEDURE SHALL INCLUDE THE PARKING OF VEHICLES OR EQUIPMENT, DISPOSAL OF LITTER, AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS.

21. ANY DAMAGE TO PRESENT HIGHWAY FACILITIES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AND PRIOR TO CONTINUING OTHER WORK. ANY MUD OR OTHER MATERIAL TRACKED OR OTHERWISE DEPOSITED ON THE ROADWAY AND SIDEWALK SHALL BE REMOVED DAILY OR AS ORDERED BY THE INSPECTOR.

22. THE CONTRACTOR SHALL NOT PARK EQUIPMENT OVERNIGHT WITHIN THE CLEAR ZONE LIMITS WITHOUT APPROVED TRAFFIC CONTROL DEVICES IN PLACE.

23. CONTRACTOR IS RESPONSIBLE FOR DETERMINING AND OBTAINING A SUITABLE STAGING AREA.

24. PRIVATE DRIVEWAYS AND PARKING LOTS SHALL NOT BE USED AS TURNAROUNDS UNLESS WRITTEN PERMISSION IS OBTAINED FROM THE APPROPRIATE LAND OWNER.

25. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ACCESS TO PUBLIC STREETS AND TO PUBLIC AND PRIVATE PROPERTY ADJOINING THE PROJECT. THE CONTRACTOR WILL NOT BE ALLOWED TO SHUT OFF ACCESS TO ANY PROPERTY AND MUST COORDINATE THE WORK WITH THE PROPERTY OWNERS. FIELD FACILITY ACCESS AREAS SHALL BE PROVIDED WITH AN ALL-WEATHER SURFACE AND PLACED WITHIN THE PROJECT LIMITS UNLESS OTHERWISE APPROVED BY THE ENGINEER. THIS WORK SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

26. ALL EXISTING SURVEY MONUMENTATION DESIGNATED TO REMAIN SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS. ANY MONUMENTS DISTURBED BY THE CONTRACTOR THAT ARE NOT DESIGNATED FOR RELOCATION, SHALL BE RESET AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR AND ENGINEER SHALL NOTE THOSE MONUMENTS IN THE FIELD PRIOR TO CONSTRUCTION.

27. UNLESS OTHERWISE SPECIFIED IN THE PLANS, ALL WASTE MATERIALS GENERATED WITHIN THE PROJECT LIMITS SHALL BE REMOVED FROM THE PROJECT AND DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A DISPOSAL SITE AND REQUIRED PERMITS FOR ALL UNUSABLE MATERIALS.

28. IT IS ESTIMATED THAT THE FOLLOWING ITEMS WILL BE REQUIRED:

ITEM NO. 201-00000 CLEARING AND GRUBBING	**1 (LUMP SUM)**
ITEM NO. 240-00000 WILDLIFE BIOLOGIST	**16 (HOURS)**
ITEM NO. 240-00010 REMOVAL OF NESTS	**8 (HOURS)**
ITEM NO. 240-00020 NETTING	**100 (SQUARE YARDS)**
ITEM NO. 620-00020 SANITARY FACILITY	**1 (EACH)**
ITEM NO. 625-00000 CONSTRUCTION SURVEYING	**1 (LUMP SUM)**
ITEM NO. 626-00000 MOBILIZATION	**1 (LUMP SUM)**
ITEM NO. 620-00002 FIELD OFFICE (CLASS 2)	**1 (EACH)**
ITEM NO. 620-00012 FIELD LABORATORY (CLASS 2)	**1 (EACH)**

MAINTENANCE OF THE SANITARY FACILITY SHALL INCLUDE CLEANING AT LEAST TWICE A WEEK.

NOTE: ALL ITEMS LISTED AND DESCRIBED HEREIN AS REQUIRED FOR THE COMPLETION OF THE PROJECT SHALL BE PLACED AS DIRECTED BY THE PROJECT ENGINEER.

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Drawing File Name: 19888DES_Gen Notes.dgn	Date:	Comments	Init.
Horiz. Scale: 1:1 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	GENERAL NOTES			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
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29. PRIOR TO THE PERMANENT INCORPORATION OF STEEL OR IRON PRODUCTS INTO THE PROJECT, THE CONTRACTOR SHALL FURNISH TO THE PROJECT ENGINEER A WRITTEN STATEMENT SIGNED BY THE CONTRACTOR (SEE EXAMPLES IN THE FIELD MATERIALS MANUAL) THAT THE CERTIFICATIONS REQUIRED BY THE BUY AMERICA SPECIFICATION ARE ON FILE AND THE STEEL OR IRON PRODUCTS ARE IN COMPLIANCE WITH THE BUY AMERICA SPECIFICATION.

UTILITY GENERAL NOTES:

UTILITY LINES AS SHOWN ON THE PLAN SHEETS ARE PLOTTED FROM THE BEST AVAILABLE INFORMATION. (ASCE STANDARD QUALITY LEVEL C) THE CONTRACTOR'S ATTENTION IS DIRECTED TO SUBSECTION 105.11 OF THE STANDARD SPECIFICATIONS CONCERNING UTILITIES.

THE CONTRACTOR SHALL COMPLY WITH ARTICLE 1.5 OF TITLE 9, CRS ("EXCAVATION REQUIREMENTS") WHEN EXCAVATING OR GRADING IS PLANNED IN THE AREA OF UNDERGROUND UTILITY FACILITIES. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITIES AT LEAST TWO (2) BUSINESS DAYS, NOT INCLUDING THE ACTUAL DAY OF NOTICE, PRIOR TO COMMENCING SUCH OPERATIONS. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT PHONE NO. 1-800-922-1987, TO HAVE LOCATIONS OF UNCC REGISTERED LINES MARKED BY MEMBER COMPANIES. ALL OTHER UNDERGROUND FACILITIES SHALL BE LOCATED BY CONTACTING THE RESPECTIVE OWNER. UTILITY SERVICE LATERALS SHALL ALSO BE LOCATED PRIOR TO BEGINNING EXCAVATION OR GRADING.

KNOWN UTILITIES ARE:

CDOT	STORM SEWER
CENTURY LINK	TELEPHONE/FIBER OPTIC
CITY OF BOULDER	WATER SUPPLY
XCEL ENERGY	ELECTRIC DISTRIBUTION

SEE THE UTILITY SPECIFICATION FOR CONTACT INFORMATION.

1. THE CONTRACTOR ASSUMES RESPONSIBILITY FOR THE PROTECTION OF ALL UTILITIES DURING THE WORK. REPAIR OF DAMAGE TO EXISTING UTILITIES DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. PRIOR TO ANY EXCAVATION, CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811 AT LEAST TWO WORKING DAYS PRIOR TO DIGGING.
2. THE INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. SOME UTILITIES MAY HAVE BEEN ADDED OR RELOCATED PRIOR TO CONSTRUCTION. ALSO, SERVICES TO INDIVIDUAL RESIDENCES, PLACES OF BUSINESS, AND OTHER PRIVATELY-OWNED UTILITY LINES ARE NORMALLY NOT SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL LOCATIONS OF EXISTING STRUCTURES AND UTILITIES SHOWN ON THE DRAWINGS AND TO ASCERTAIN WHETHER ANY OTHER STRUCTURES AND UTILITIES MAY EXIST. EVERY REASONABLE MEANS SHALL BE USED, INCLUDING FIELD LOCATION OF THE UTILITY USING WHATEVER PROSPECTING MEANS ARE NECESSARY.
3. PROSPECTING FOR EXISTING UTILITIES WILL BE PAID FOR AS POTHOLING. USE OF THE TERM "POTHOLING" SHALL NOT BE CONSTRUED TO IMPLY ANY PARTICULAR METHOD OF PROSPECTING. IT IS ESTIMATED THAT **40 HOURS OF ITEM 203-01597 POTHOLING** WILL BE NEEDED AS PART OF THIS PROJECT. POTHOLING OF AN AREA SHALL TAKE PLACE AT LEAST 10 DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION OPERATIONS IN THAT AREA. HOURS APPROVED FOR PAYMENT UNDER THIS PAY ITEM SHALL BE AT THE DISCRETION OF THE ENGINEER.
4. THE CONTRACTOR SHALL LOCATE AND POTHOLE ALL POTENTIAL CONFLICTS BETWEEN EXISTING BURIED UTILITY FACILITIES AND THE PROPOSED CONSTRUCTION AS SHOWN ON THE PLANS OR BY FIELD LOCATION MARKINGS. IF CONFLICTS EXIST, MODIFY PROPOSED CONSTRUCTION PLANS TO AVOID ALL EXISTING BURIED UTILITY FACILITIES.
5. THE CONTRACTOR SHALL VERIFY AND DOCUMENT THE CONDITION OF EXISTING UTILITIES (VISIBLE FACILITIES) WITH THE ENGINEER AND REPRESENTATIVES FROM THE UTILITY COMPANIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. WITH NOTIFICATION OF THE RESPECTIVE OWNER, ADJUST RIMS OF ALL MANHOLES, CLEANOUTS, VALVE BOXES AND SURVEY MONUMENTS TO FINISH GRADE AND PATCH AFTER FINAL LIFT PAVING.
7. THE CONTRACTOR SHALL SUBMIT AN XCEL ENERGY BUILDER'S CALL LINE APPLICATION FOR EVERY XCEL ENERGY WORK ELEMENT THAT IS TO BE COORDINATED WITH THE PROJECT. THE REQUEST IS TO BE PROCESSED THROUGH XCEL ENERGY-BUILDER'S CALL LINE AT 1-800-628-2121.
8. THE CONTRACTOR SHALL REFER TO THE UTILITY SPECIFICATION AND UTILITY PLANS FOR COORDINATION REQUIRED FOR UTILITY RELOCATIONS.

SIGNING, STRIPING AND PAVEMENT MARKING NOTES:

1. SIGN POSTS SHALL BE 2" X 2" X 10' (14 GAUGE) GALVANIZED PERFORATED SQUARE STEEL TUBING.
2. SIGN POST BASES SHALL BE 2 ¼" X 2 ¼" (12 GAUGE, 2' IN LENGTH) GALVANIZED PERFORATED SQUARE STEEL TUBING.
3. BASES SHALL BE INCLUDED IN THE COST FOR SIGN POSTS. TOP OF BASES SHALL BE 3" ± ABOVE FINISHED GRADE. THE SIGN POST SHALL BE INSTALLED 4" INTO THE BASE AND BOLTED BOTH WAYS.
4. SIGN POST LOCATIONS SHALL BE APPROVED BY THE ENGINEER AND ROAD MAINTENANCE SIGN SHOP REPRESENTATIVE PRIOR TO INSTALLATION.
5. THICKNESS OF ALL SIGN PANELS SHALL BE 0.100"
6. FINAL PAVEMENT STRIPING SHALL BE EPOXY PER CDOT STANDARD SPECIFICATIONS.
7. ALL PAVEMENT MARKING SYMBOLS SHALL BE WHITE, PREFORMED THERMOPLASTIC, "PREMARK" OR EQUIVALENT.
8. PAVEMENT MARKING ARROWS SHALL BE ELONGATED.
9. PAVEMENT MARKINGS FOR BIKE LANES SHALL BE PER MUTCD FIG 9C-3 B WITH HELMETED BICYCLE SYMBOL.
10. PREFORMED THERMOPLASTIC INSTALLATION ON CONCRETE SHALL HAVE THE CONCRETE CURE REMOVED PRIOR TO INSTALLATION OR A BONDING AGENT APPLIED TO THE CONCRETE BEFORE INSTALLATION. INSTALLATION SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS.

ENVIRONMENTAL GENERAL NOTES:

1. REMOVAL OF TREES AND SHRUBS SHALL BE CONDUCTED BETWEEN SEPTEMBER 1 AND FEBRUARY 15 TO AVOID IMPACTS TO ACTIVE BIRD NESTS. IF THE DESIGNATED TREES OR SHRUBS CANNOT BE REMOVED PRIOR TO FEBRUARY 16, THE TREES AND SHRUBS SHALL BE SURVEYED FOR ACTIVE NESTS BY AN EXPERIENCED BIOLOGIST BEFORE REMOVAL. IF ACTIVE NESTS ARE LOCATED, WORK ZONE BUFFERS MUST BE PROVIDED AROUND ACTIVE NESTS PER CURRENT USFWS AND CPW GUIDELINES. THESE SURVEY AND BUFFER REQUIREMENTS FOR MIGRATORY BIRD NESTS DO NOT APPLY IF THE VEGETATION REMOVAL WORK IS CONDUCTED OUTSIDE OF THE FEBRUARY 16 TO AUGUST 31 MIGRATORY BIRD SEASON.

811 Know what's **below** **Call** before you dig.

Print Date: 11/16/2016
Drawing File Name: 19888DES_Gen Notes.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

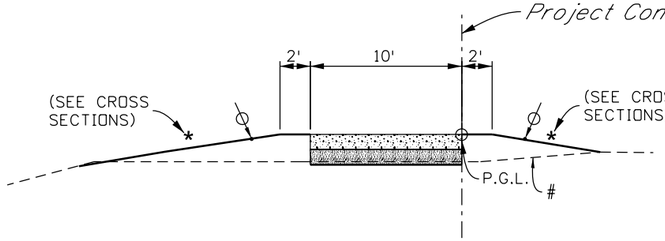
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
GENERAL NOTES

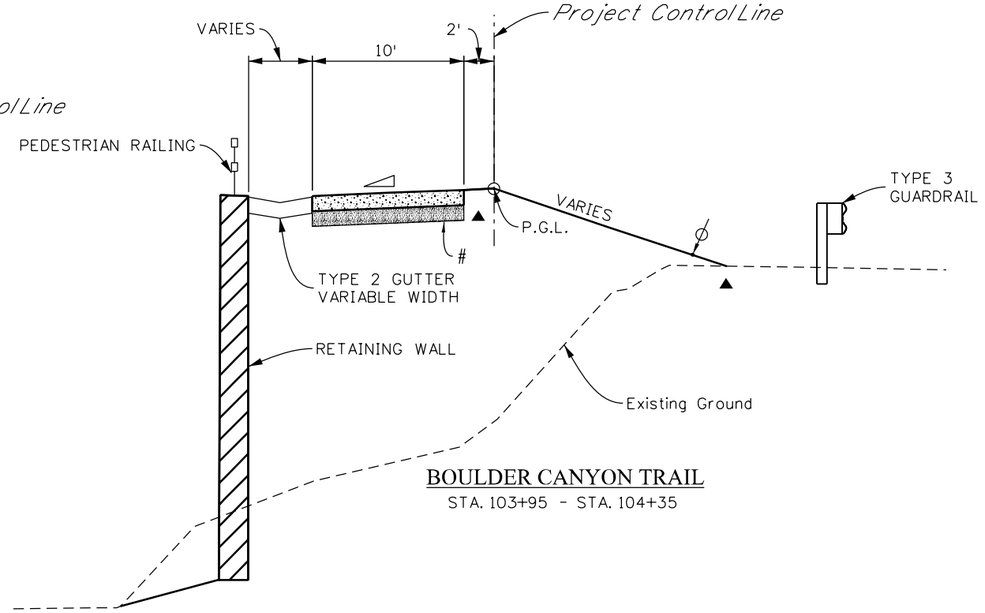
Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	GENERAL	Subset Sheets:	2 of 2

Project No./Code
STU C070-043
19888
Sheet Number 4



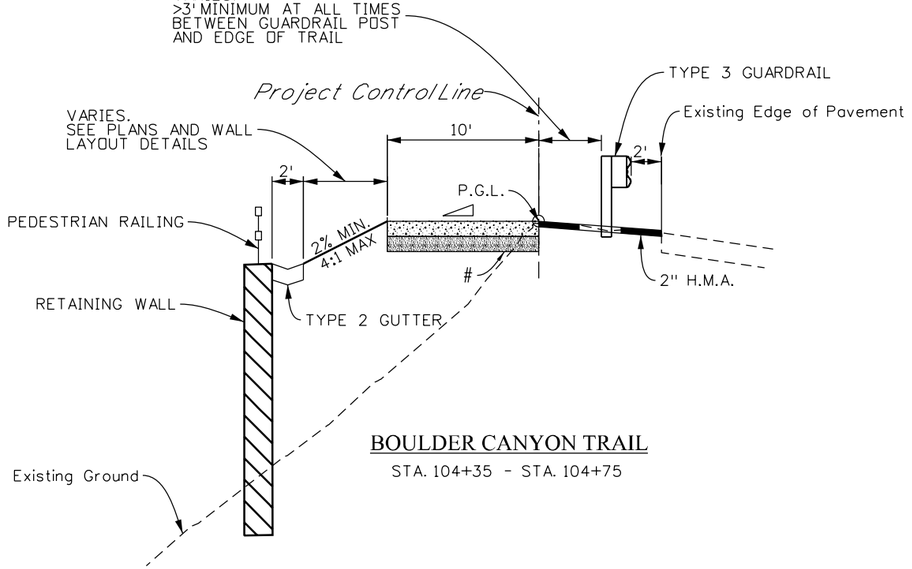
BOULDER CANYON TRAIL

STA. 102+50 - STA. 103+22
STA. 114+35 - STA. 116+20
STA. 116+90 - STA. 120+49



BOULDER CANYON TRAIL

STA. 103+95 - STA. 104+35



BOULDER CANYON TRAIL

STA. 104+35 - STA. 104+75

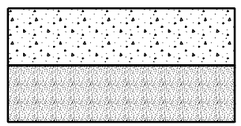
TYPICAL SECTION NOTES

1. P.G.L. PROFILE GRADE LINE
2. ⌀ THE CONTRACTOR WILL BE REQUIRED TO PLACE 4 INCHES OF TOPSOIL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.
3. ▲ BREAKPOINTS IN SLOPES SHALL BE ROUNDED DURING CONSTRUCTION FOR A PLEASING APPEARANCE.
4. SEE TRAIL PLANS FOR LOCATION OF CONTROL LINE.
5. 2% TRAIL CROSS SLOPE (MAXIMUM, TYPICAL).SEE TRAIL PROFILE SHEETS FOR SLOPE DIRECTION TRANSITION AND LOCATIONS.
6. # DEPTH OF SCARIFICATION AND MOISTURE-DENSITY CONTROL AT BASES OF CUTS AND FILLS SHALL BE 6 INCHES MINIMUM.
7. * SLOPE VARIES IN SOME LOCATIONS, SEE CROSS SECTIONS.
8. ◇ DESIRABLE WIDTH. WIDTH MAY BE REDUCED IN CONSTRAINED AREAS.
9. ■ APPROXIMATE THICKNESS (MINIMUM)
10. PAVEMENT SHOWN ON EACH TYPICAL SECTION ARE REPRESENTATIVE OF A GENERAL CONDITION ONLY. SEE PAVEMENT SECTIONS SHOWN BELOW AND TRAIL PLAN SHEETS FOR EXACT STATION RANGES AND LOCATIONS OF THE DIFFERENT PAVEMENTS.

- 2" H.M.A. GRADING (S)(75)(PG58-28)
- 3.5" H.M.A. GRADING (S)(75)(PG 58-28)
- 6" AGGREGATE BASE COURSE CLASS 6

FULL DEPTH WIDENING - IN FRONT OF TYPE 7 BARRIERS AND ABOVE UNDERPASS.

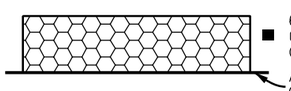
ROADWAY PAVEMENT SECTION - SH 119



- 6" CONCRETE BIKEWAY
- 6" AGGREGATE BASE COURSE CLASS 6

PAVED SECTION

APPLIES STA. 102+50 - STA. 110+10
STA. 116+35 - STA. 136+90



- 6" CRUSHER FINES (PAID FOR AS AGGREGATE BASE COURSE SPECIAL)
- AASHTO M288 CLASS 3 GEOTEXTILE WEED BARRIER. (WEED BARRIER SHALL NOT BE MEASURED AND PAID FOR SEPERATELY BUT SHALL BE INCLUDED IN THE BID COST OF AGGREGATE BASE COURSE (SPECIAL))

UNPAVED SECTION

APPLIES STA. 110+10 - STA. 116+35
STA. 136+90- STA. 139+53

PATH PAVEMENT SECTION

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Horiz. Scale: 1:10 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

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No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
TYPICAL SECTIONS

Designer: SDB
Detailer: CZC
Sheet Subset: TYPICAL
Structure Numbers:
Subset Sheets: 1 of 6

Project No./Code
STU C070-043
19888
Sheet Number 5

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TYPICAL SECTION NOTES

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5. 2% TRAIL CROSS SLOPE (MAXIMUM, TYPICAL). SEE TRAIL PROFILE SHEETS FOR SLOPE DIRECTION TRANSITION AND LOCATIONS.
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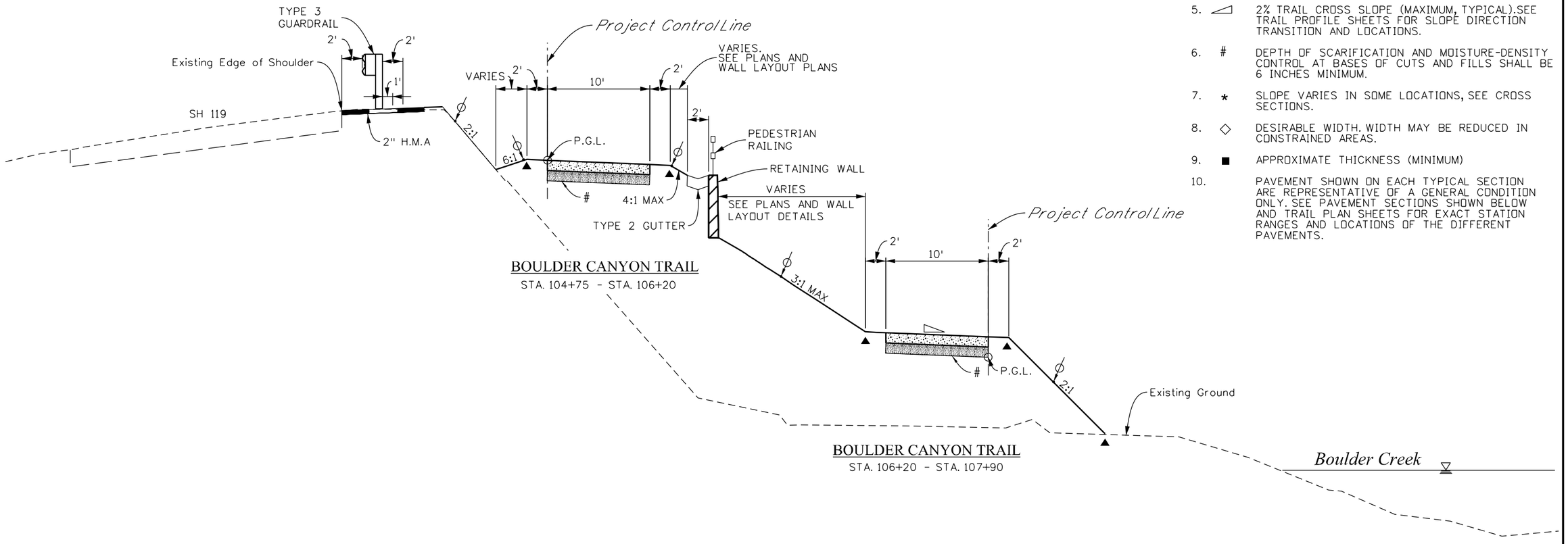

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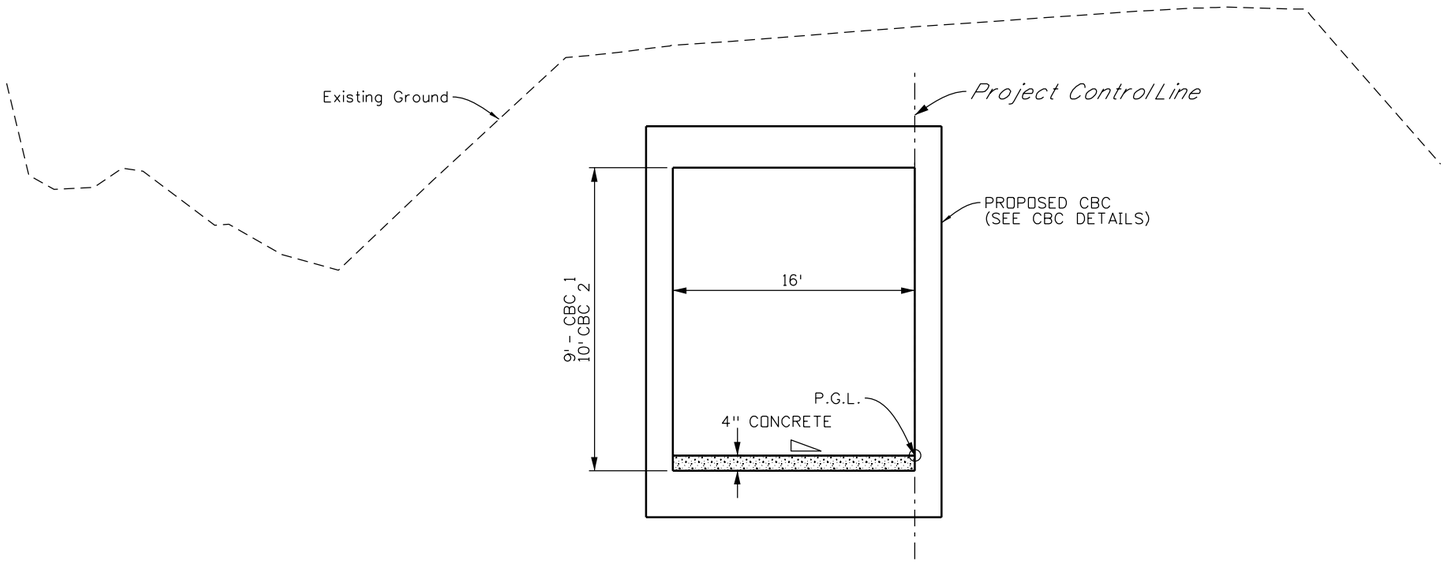
MULLER ENGINEERING COMPANY							

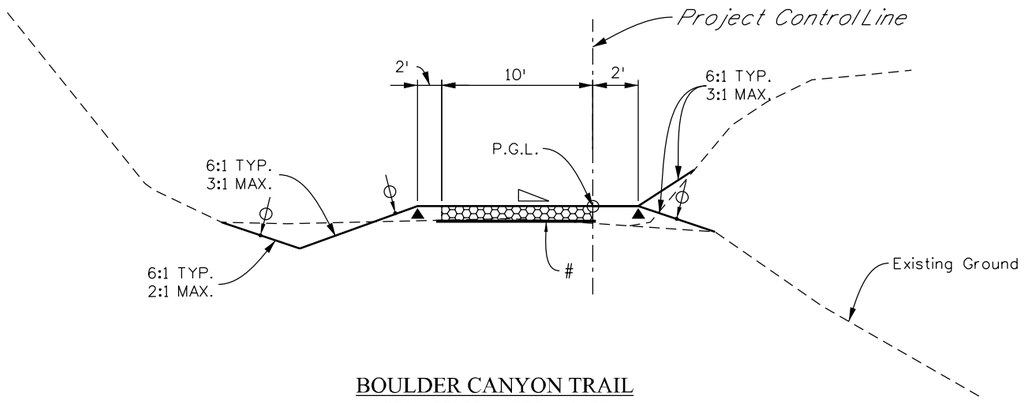
Region 4

Boulder County



BOULDER CANYON TRAIL CONCRETE BOX CULVERT (CBC)

STA. 107+90 - STA. 108+65 - CBC 1
STA. 134+29 - STA. 135+51 - CBC 2



BOULDER CANYON TRAIL

STA. 108+65 - STA. 114+35
STA. 116+20 - STA. 116+90

TYPICAL SECTION NOTES

1. P.G.L. PROFILE GRADE LINE
2. ϕ THE CONTRACTOR WILL BE REQUIRED TO PLACE 4 INCHES OF TOPSOIL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.
3. ▲ BREAKPOINTS IN SLOPES SHALL BE ROUNDED DURING CONSTRUCTION FOR A PLEASING APPEARANCE.
4. SEE TRAIL PLANS FOR LOCATION OF CONTROL LINE.
5. ◿ 2% TRAIL CROSS SLOPE (MAXIMUM, TYPICAL).SEE TRAIL PROFILE SHEETS FOR SLOPE DIRECTION TRANSITION AND LOCATIONS.
6. # DEPTH OF SCARIFICATION AND MOISTURE-DENSITY CONTROL AT BASES OF CUTS AND FILLS SHALL BE 6 INCHES MINIMUM.
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8. ◇ DESIRABLE WIDTH. WIDTH MAY BE REDUCED IN CONSTRAINED AREAS.
9. ■ APPROXIMATE THICKNESS (MINIMUM)
10. PAVEMENT SHOWN ON EACH TYPICAL SECTION ARE REPRESENTATIVE OF A GENERAL CONDITION ONLY. SEE PAVEMENT SECTIONS SHOWN BELOW AND TRAIL PLAN SHEETS FOR EXACT STATION RANGES AND LOCATIONS OF THE DIFFERENT PAVEMENTS.

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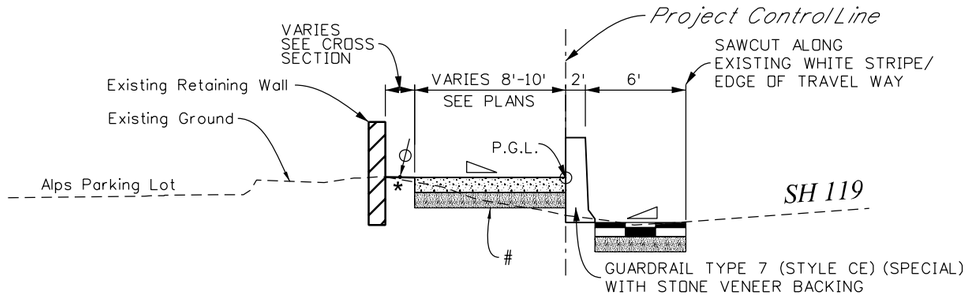
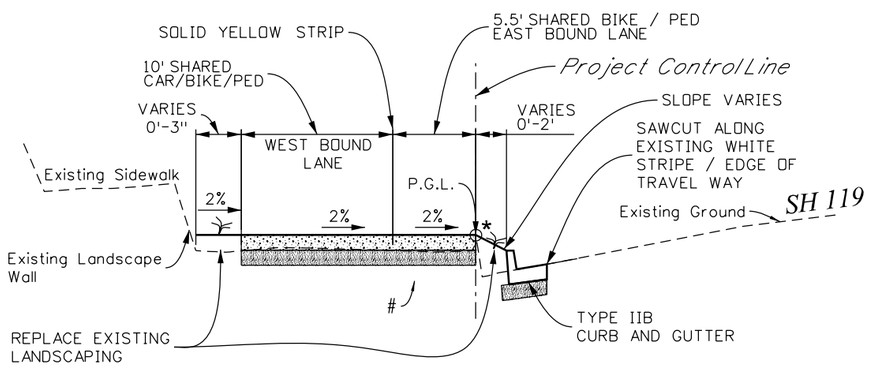
Drawing File Name: 19888DES_Typical Sections.dgn		Date:	Comments	Init.	No Revisions:	TYPICAL SECTIONS	STU C070-043
Horiz. Scale: 1:10 Vert. Scale: As Noted					Revised:	Designer: SDB / Structure Numbers	19888
Unit Information Unit Leader Initials						Detailer: CZC	
MULLER ENGINEERING COMPANY					Void:	Sheet Subset: TYPICAL / Subset Sheets: 3 of 6	Sheet Number 7

Region 4



BOULDER CANYON TRAIL

STA. 120+49 - 124+91



BOULDER CANYON TRAIL

STA. 125+33 - STA. 129+37

NOTE:
CONTRACTOR IS TO SAWCUT ALONG EXISTING WHITE STRIPE AND INSTALL CURB AND GUTTER SUCH THAT THE PANLINE OF THE GUTTER MATCHES THE EXISTING GRADE OF SH 119. THE SHARED ALPS INN DRIVEWAY / TRAIL TO BE CONSTRUCTED AT A FINISHED GRADE OF 2% FROM THE PROFILE GRADE LINE (P.G.L.). THE SLOPE IN BETWEEN THE BACK OF CURB AND EDGE OF DRIVEWAY / TRAIL IS VARIABLE, FROM APPROXIMATELY 2% TO 5:1.

TYPICAL SECTION NOTES

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5. 2% TRAIL CROSS SLOPE (MAXIMUM, TYPICAL). SEE TRAIL PROFILE SHEETS FOR SLOPE DIRECTION TRANSITION AND LOCATIONS.
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8. ◇ DESIRABLE WIDTH. WIDTH MAY BE REDUCED IN CONSTRAINED AREAS.
9. ■ APPROXIMATE THICKNESS (MINIMUM)
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Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed
No Revisions:
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BOULDER CANYON TRAIL EXTENSION
TYPICAL SECTIONS

Designer: SDB
Detailer: CZC
Sheet Subset: TYPICAL
Structure Numbers:
Subset Sheets: 4 of 6

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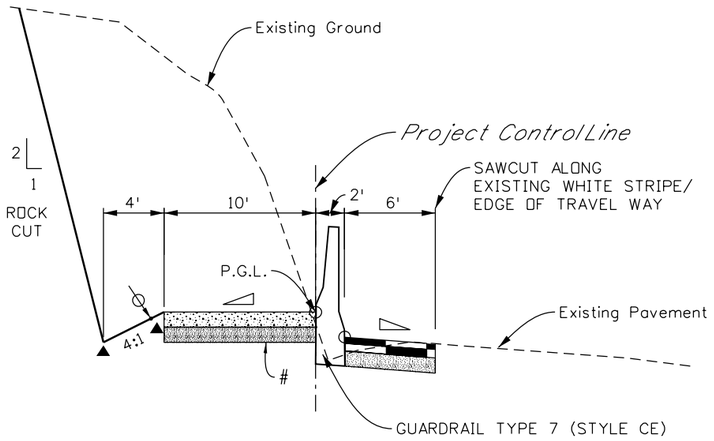
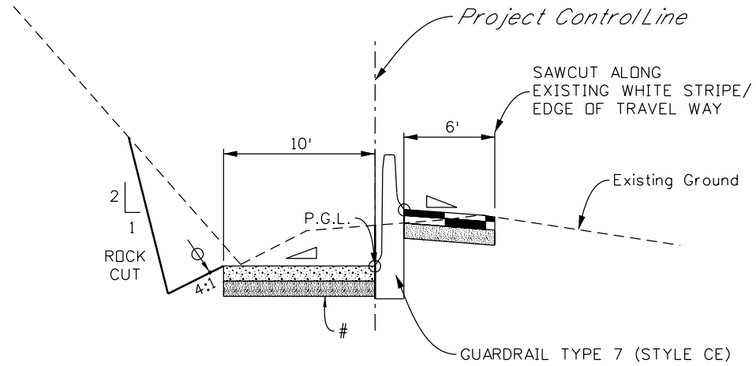
19888
Sheet Number 8



BOULDER CANYON TRAIL
STA. 129+37 - STA. 130+82



BOULDER CANYON TRAIL
STA. 130+82 - STA. 131+00

TYPICAL SECTION NOTES

1. P.G.L. PROFILE GRADE LINE
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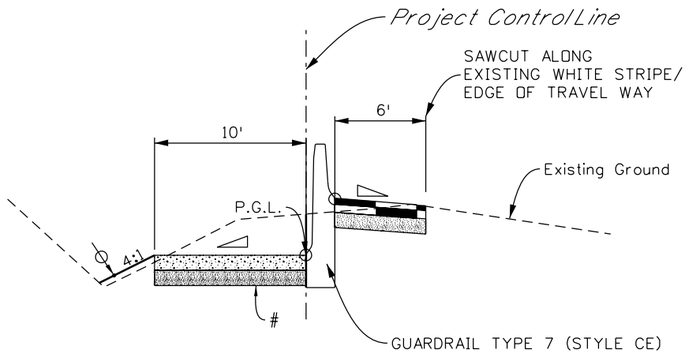
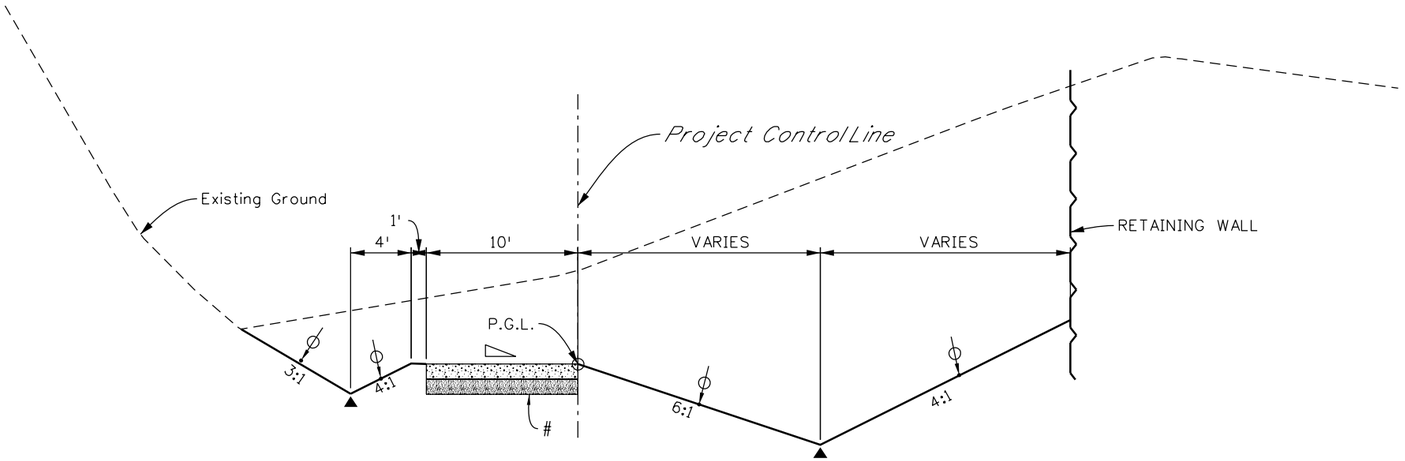


BOULDER CANYON TRAIL
STA. 131+00 - STA. 131+75



BOULDER CANYON TRAIL
STA. 131+75 - STA. 134+00

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Horiz. Scale: 1:10	Vert. Scale: As Noted					Revised:	Designer: SDB / Detailer: CZC / Sheet Subset: TYPICAL
Unit Information	Unit Leader Initials					Void:	Structure Numbers / Subset Sheets: 5 of 6
MULLER ENGINEERING COMPANY							

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STU C070-043
19888
Sheet Number 9

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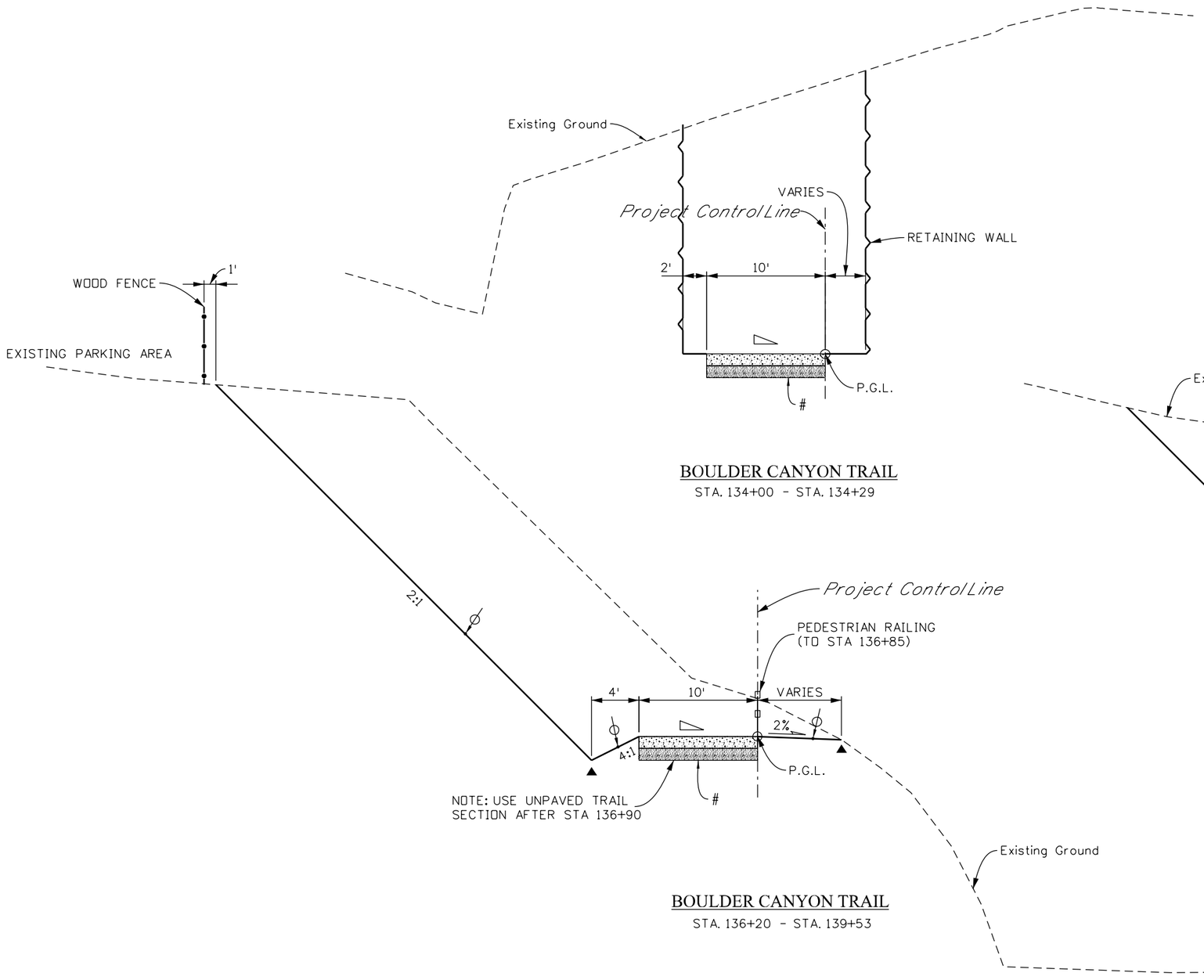
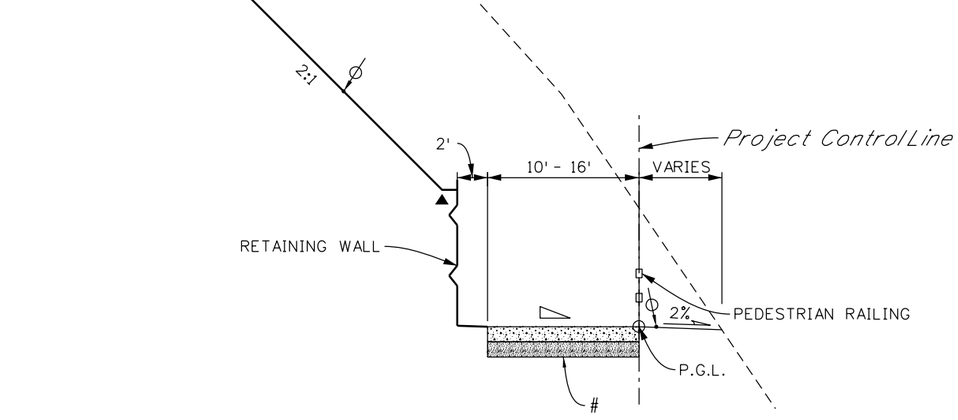


BOULDER CANYON TRAIL
STA. 134+00 - STA. 134+29

BOULDER CANYON TRAIL
STA. 136+20 - STA. 139+53



BOULDER CANYON TRAIL
STA. 135+51 - STA. 136+20

TYPICAL SECTION NOTES

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Print Date: 11/16/2016
Drawing File Name: 19888DES_TypicalSections.dgn
Horiz. Scale: 1:10 Vert. Scale: As Noted
Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION
TYPICAL SECTIONS

Designer:	SDB	Structure Numbers	
Detailer:	CZC		
Sheet Subset:	TYPICAL	Subset Sheets:	6 of 6

Project No./Code	
STU C070-043	
19888	
Sheet Number	10

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Colorado Department of Transportation
1420 2nd Street
Greeley, CO 80631
Phone: 970-350-2161 FAX: 970-350-2223
Region 4 MDG

Sheet Revisions		
Date	Description	Initials

Sheet Revisions		
Date	Description	Initials

Sheet Revisions		
Date	Description	Initials

Project Control Diagram			
Title Sheet			
Project Number: ER 119A-065			
Project Location: SH 119A Boulder Canyon			
Project Code:	Last Mod. Date	Subset	Sheet No.
20258	06-16-15	3.01 of 3.02	3.01

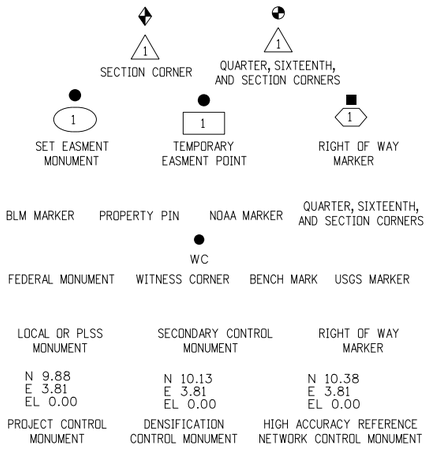
DEPARTMENT OF TRANSPORTATION
STATE OF COLORADO

PROJECT CONTROL DIAGRAM

State Highway 119 MP 38.95 to 40.84
Sections 26, 27, 34, 35, 36
Township 1 North, Range 71 West
of the 6th Principal Meridian
County of Boulder

SHEET NO. INDEX OF SHEETS

3.01	Title Sheet
3.02	Coordinate Tables



Note: For a complete listing of symbololgy used within this set of plans, please refer to the M-100-1 Standard Symbols of the Colorado Department of Transportation M&S Standards Publication dated July 2012. Existing features are shown as screened weight (gray scale). Proposed or new features are shown as full weight without screening.

Typical Control Monument Cap
Not to Scale

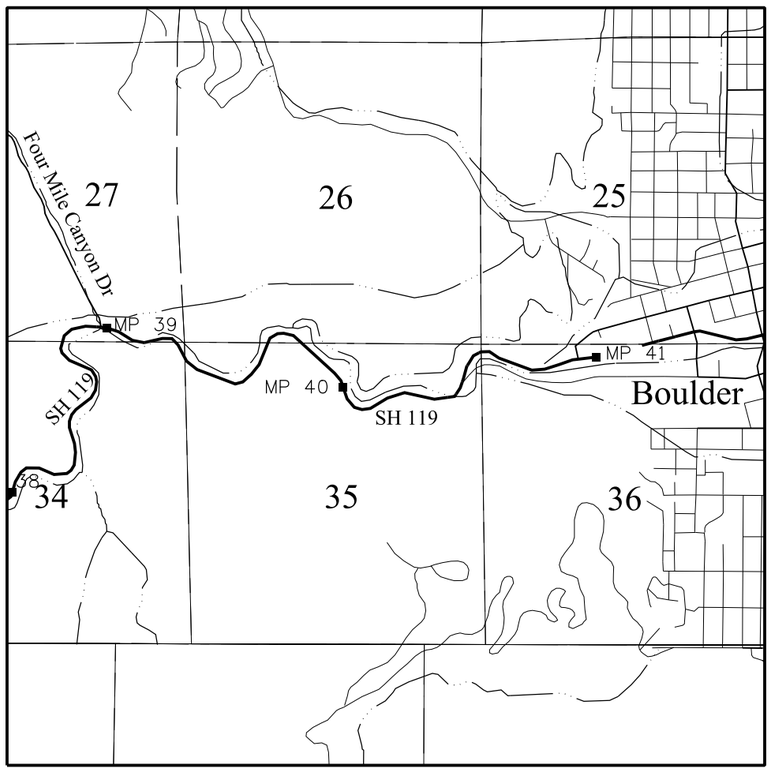
▲ CM-MP - Control Point Monuments set by CDOT. They are CDOT Type 2 monuments, a 3¼" dia. aluminum control monument cap (as shown) on a 3' x ¾" dia. aluminum security rod on a 3' x ¾" dia. smooth aluminum rod.

General Notes:

1. This Project Control Diagram is not a boundary survey of the adjoining property and is prepared for the Colorado Department of Transportation purposes only.

2. This plan set is subject to change and may not be the most current set. It is the user's responsibility to verify with CDOT that this set is the most current. The information contained on the attached drawing is not valid unless this copy bears an original signature of the Professional Land Surveyor hereon named.

3. Refer to the M-629-1 Survey Monuments of the Standard Plans dated July, 2012 found in The Colorado Department of Transportation, M & S Standards for typical survey monument descriptions.



PROJECT LOCATION MAP

0' 0.5mi 1mi

Basis of Bearings: Bearings used in the calculations of coordinates are based on a grid bearing of S 48° 29'19" W from the Control Monument "CM 3974" (CDOT Type 2 Monument, MP 39.74), Section 26, Township 1 North, Range 71 West, Sixth P.M. and the Control Monument "CM 3991" (CDOT Type 2 Monument, MP 39.91), Section 35, Township 1 North, Range 71 West, Sixth P.M. as obtained from a Global Positioning System (GPS) survey based on the National Spatial Reference System (NSRS).

Basis of Elevations: Project elevations are GPS derived, using GEOID 12A, based on a NAVD 88 elevation of 1679.110m on NGS Benchmark "B 322 RESET" (Stamped "B 322 RESET 1955" NGS bench mark disk set in top of concrete monument).

COORDINATE DATUM: Project coordinates are modified Colorado State Plane North Zone NAD 83(2011) coordinates. The project seed point (CM 3969) coordinates are: Northing = 380520.658m, Easting = 930314.320m, and Elevation = 1701.747m. The ground scale factor used to modify the coordinates is 1.00030119695015. Project Coordinates are truncated by 350,000m in the Northing and 900,000m in the Easting.

To get from Project to State Plane coordinates: convert project coordinates to metric, add the truncation, subtract the seed point northing and easting, divide by the ground scale factor, then add the seed point northing and easting.

NOTICE: According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

SURVEYOR STATEMENT (PROJECT CONTROL DIAGRAM)

I, Lee K Groves, a professional land surveyor licensed in the State of Colorado, do hereby state to the Colorado Department of Transportation this Project Control Diagram was prepared and the field survey it represents was performed under my responsible charge and, based upon my knowledge, information and belief is in accordance with applicable standards of practice defined by Colorado Department of Transportation publications. This statement is not a guaranty or warranty, either expressed or implied.

PLS No. 34169

Colorado Department of Transportation
1420 2nd Street
Greeley, CO 80631
Phone: 970-350-2161 FAX: 970-350-2223
Region 4 MDG

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Date	Description	Initials

Project Control Diagram
Coordinate Tables

Project Number: ER 119A-065
Project Location: SH 119A Boulder Canyon

Project Code:	Last Mod. Date	Subset	Sheet No.
20258	06-16-15	3.02 of 3.02	3.02

CHARN GEODETIC COORDINATE TABLE

(adjusted field data) (meters)

NAME	COORDINATES NAD 83(2011)		ELLIPS.	MAPPING	SCALE	NAD 83(2011) ZONE 0501		DESCRIPTION
	LATITUDE	LONGITUDE	HEIGHT	ANGLE		NORTHING	EASTING	
B322 RESET	40°04'47.97652" N	105°16'55.00193" W	1663.576	0°08'27"	0.999961264	387725.123	932999.902	NGS Bench Mark Disk in concrete post
BILLINGSLEY	40°00'22.22420" N	105°20'55.72917" W	1876.842	0°05'52"	0.999965907	379516.913	927310.605	NGS Horizontal Control Disk in rock outcrop

GEODETIC COORDINATE TABLE

(adjusted field data) (meters)

NAME	COORDINATES NAD 83(2011)		ELLIPS.	MAPPING	SCALE	NAD 83(2011) ZONE 0501		DESCRIPTION
	LATITUDE	LONGITUDE	HEIGHT	ANGLE		NORTHING	EASTING	
CM 3895	40°00'55.56179" N	105°19'27.41851" W	1735.791	0°06'49"	0.999965234	380548.968	929403.078	CDOT Type 2 Monument (MP 38.95)
CM 3907	40°00'52.25449" N	105°19'20.15141" W	1731.142	0°06'53"	0.999965300	380447.308	929575.617	CDOT Type 2 Monument (MP 39.07)
CM 3919	40°00'53.50022" N	105°19'12.58534" W	1727.252	0°06'58"	0.999965275	380486.090	929754.965	CDOT Type 2 Monument (MP 39.19)
CM 3951	40°00'46.49291" N	105°18'55.43852" W	1711.321	0°07'09"	0.999965415	380270.807	930162.043	CDOT Type 2 Monument (MP 39.51)
CM 3969	40°00'54.58355" N	105°18'48.99534" W	1701.747	0°07'14"	0.999965253	380520.658	930314.320	CDOT Type 2 Monument (MP 39.69)
CM 3974	40°00'54.18345" N	105°18'45.08649" W	1699.027	0°07'16"	0.999965261	380508.513	930407.042	CDOT Type 2 Monument (MP 39.74)
CM 3991	40°00'48.61169" N	105°18'36.93430" W	1688.484	0°07'21"	0.999965372	380337.081	930600.734	CDOT Type 2 Monument (MP 39.91)
CM 4043	40°00'44.01916" N	105°18'08.15974" W	1654.696	0°07'40"	0.999965464	380196.929	931283.438	CDOT Type 2 Monument (MP 40.43)
CM 4071	40°00'48.71385" N	105°17'55.83857" W	1643.232	0°07'48"	0.999965370	380342.380	931575.311	CDOT Type 2 Monument (MP 40.71)
CM 4084	40°00'48.36558" N	105°17'47.20853" W	1641.573	0°07'53"	0.999965377	380332.105	931779.997	CDOT Type 2 Monument (MP 40.84)

PROJECT COORDINATE SUMMARY TABLE (feet)

NAME	PROJECT COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING	(NAVD 88)	
CM 3895	100226.100	96465.698	5744.473	CDOT Type 2 Monument (MP 38.95)
CM 3907	99892.471	97031.939	5729.290	CDOT Type 2 Monument (MP 39.07)
CM 3919	100019.747	97620.529	5716.600	CDOT Type 2 Monument (MP 39.19)
CM 3951	99313.227	98956.487	5664.493	CDOT Type 2 Monument (MP 39.51)
CM 3969	100133.191	99456.231	5633.154	CDOT Type 2 Monument (MP 39.69)
CM 3974	100093.335	99760.529	5624.268	CDOT Type 2 Monument (MP 39.74)
CM 3991	99530.724	100396.192	5589.755	CDOT Type 2 Monument (MP 39.91)
CM 4043	99070.773	102636.703	5479.179	CDOT Type 2 Monument (MP 40.43)
CM 4071	99548.114	103594.578	5441.698	CDOT Type 2 Monument (MP 40.71)
CM 4084	99514.396	104266.320	5436.338	CDOT Type 2 Monument (MP 40.84)

SUMMARY OF APPROXIMATE QUANTITIES

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			201-00000	CLEARING AND GRUBBING	L S	1												1	
			202-00010	REMOVAL OF TREE	EACH	66												66	
			202-00019	REMOVAL OF INLET	EACH	1												1	
			202-00020	REMOVAL OF CONCRETE BOX CULVERT	EACH	1												1	
			202-00035	REMOVAL OF PIPE	LF	105												105	
			202-00155	REMOVAL OF WALL	LF	80												80	
			202-00201	REMOVAL OF CURB	LF	346												346	
			202-00202	REMOVAL OF GUTTER	LF	18												18	
			202-00207	REMOVAL OF BRICK PAVERS	SY	70												70	
			202-00220	REMOVAL OF ASPHALT MAT	SY	1,051												1,051	
			202-00821	REMOVAL OF SIGN PANEL	EACH	1												1	
			202-01000	REMOVAL OF FENCE	LF	98												98	
			202-01130	REMOVAL OF GUARDRAIL TYPE 3	LF	212												212	
			202-01300	REMOVAL OF END ANCHORAGE	EA	1												1	
			202-04001	PLUG CULVERT	EACH	1												1	
			203-00010	UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	CY	5,530												5,530	
			203-00100	MUCK EXCAVATION	CY	100												100	
			203-00400	ROCK EXCAVATION	CY	2,620												2,620	
			203-01100	PROOFROLLING	HOUR	20												20	
			203-01510	BACKHOE	HOUR	60												60	
			203-01594	COMBINATION LOADER	HOUR	60												60	
			203-01597	POTHOLING	HOUR	40												40	
			203-02330	LABORER	HOUR	60												60	
			206-00000	STRUCTURE EXCAVATION	CY	2,905												2,905	
			206-00065	STRUCTURE BACKFILL (FLOW-FILL)	CY	775												775	
			206-00100	STRUCTURE BACKFILL (CLASS 1)	CY	1,255												1,255	
			206-00360	MECHANICAL REINFORCEMENT OF SOIL	CY	140												140	
			206-00510	FILTER MATERIAL (CLASS A)	CY	335												335	
			206-01781	SHORING (AREA 1)	LS	1												1	
			206-01782	SHORING (AREA 2)	LS	1												1	
			206-01783	SHORING (AREA 3)	LS	1												1	
			206-01784	SHORING (AREA 4)	LS	1												1	
			206-01785	SHORING (AREA 5)	LS	1												1	
			207-00205	TOPSOIL	CY	1,000												1,000	
			207-00210	STOCKPILE TOPSOIL	CY	1,000												1,000	
			208-00002	EROSION LOG TYPE 1 (12 INCH)	LF	3,360												3,360	

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BOULDER CANYON TRAIL EXTENSION
SUMMARY OF APPROXIMATE QUANTITIES

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SUMMARY OF APPROXIMATE QUANTITIES

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			208-00035	AGGREGATE BAG	LF	64												64	
			208-00045	CONCRETE WASHOUT STRUCTURE	EACH	4												4	
			208-00052	STORM DRAIN INLET PROTECTION (TYPE II)	EACH	1												1	
			208-00056	STORM INLET DRAIN PROTECTION (TYPE III)	EACH	2												2	
			208-00070	VEHICLE TRACKING PAD	EACH	4												4	
			208-00103	REMOVAL AND DISPOSAL OF SEDIMENT (LABOR)	HOUR	40												40	
			208-00105	REMOVAL AND DISPOSAL OF SEDIMENT (EQUIPMENT)	HOUR	40												40	
			208-00106	SWEEPING (SEDIMENT REMOVAL)	HOUR	40												40	
			208-00107	REMOVAL OF TRASH	HOUR	30												30	
			208-00207	EROSION CONTROL MANAGEMENT	DAY	180												180	
			210-00050	RESET FIRE HYDRANT	EACH	1												1	
			210-00810	RESET GROUND SIGN	EACH	1												1	
			210-02500	RELAY SPRINKLER SYSTEM	LS	1												1	
			210-04020	MODIFY INLET	EACH	2												2	
			211-01115	ROCK REINFORCEMENT NUMBER 10	LF	375												375	
			212-00006	SEEDING (NATIVE)	ACRE	1.81												1.81	
			212-00009	SEEDING (TEMPORARY)	ACRE	0.53												0.53	
			213-00002	MULCHING (WEED FREE HAY)	ACRE	1.29												1.29	
			213-00061	MULCH TACKIFIER	LB	258												258	
			214-00000	LANDSCAPE MAINTENANCE	LS	1												1	
			216-00201	SOIL RETENTION BLANKET (STRAW/COCONUT) (BIODEGRADABLE CLASS 1	SY	2,501												2,501	
			240-00000	WILDLIFE BIOLOGIST	HOUR	16												16	
			240-00010	REMOVAL OF NESTS	HOUR	8												8	
			240-00020	NETTING	SY	100												100	
			304-06000	AGGREGATE BASE COURSE (CLASS 6)	TON	1,369												1,369	
			304-09014	AGGREGATE BASE COURSE (SPECIAL)	TON	333												333	
			403-00720	HOT MIX ASPHALT (PATCHING) (ASPHALT)	TON	263												263	
			403-33721	HOT MIX ASPHALT (GRADING S) (75) (PG 58-28)	TON	249												249	
			411-10255	EMULSIFIED ASPHALT (SLOW-SETTING)	GAL	42												42	
			420-00113	GEOTEXTILE (DRAINAGE) (CLASS 2)	SY	1,285												1,285	
			420-00114	GEOTEXTILE (DRAINAGE) (CLASS 3)	SY	35												35	
			502-00100	DRILLING HOLE TO FACILITATE PILE DRIVING	LF	30												30	
			502-00140	BLAST HOLE TO FACILITATE PILE DRIVING	LF	60												60	
			502-00460	PILE TIP	EA	6												6	
			502-11274	STEEL PILING (HP 12X74)	LF	136												136	
			504-04430	REINFORCED CONCRETE FACING	SF	495												495	

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BOULDER CANYON TRAIL EXTENSION
SUMMARY OF APPROXIMATE QUANTITIES

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			504-06100	GROUND NAIL WALL	SF	1,474												1,474	
			506-00212	RIPRAP (12 INCH)	CY	54												54	
			506-00424	SOIL RIPRAP (24 INCH)	CY	1,023												1,023	
			514-00200	PEDESTRIAN RAILING (STEEL)	LF	601												601	
			601-03000	CONCRETE CLASS D	CY	27												27	
			601-03040	CONCRETE CLASS D (BRIDGE)	CY	44												44	
			601-03050	CONCRETE CLASS D (WALL)	CY	386												386	
			601-13001	STRUCTURAL CONCRETE STAIN (SPECIAL)	SY	5												5	
			601-40005	CUT STONE VENEER	SF	4,666												4,666	
			601-40400	STRUCTURAL CONCRETE STAIN	SY	72												72	
			601-XXXXX	CONCRETE (CLASS G)	CY	40												40	
			602-00000	REINFORCING STEEL	LB	63,940												63,940	
			603-01185	18 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	365												365	
			603-01245	24 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	96												96	
			603-01305	30 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	19												19	
			603-01365	36 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	22												22	
			603-01425	42 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	32												32	
			603-01485	48 INCH REINFORCED CONCRETE PIPE (COMPLETE IN PLACE)	LF	247												247	
			603-05018	18 INCH REINFORCED CONCRETE END SECTION	EACH	3												3	
			603-05024	24 INCH REINFORCED CONCRETE END SECTION	EACH	1												1	
			603-05030	30 INCH REINFORCED CONCRETE END SECTION	EACH	1												1	
			603-05036	36 INCH REINFORCED CONCRETE END SECTION	EACH	1												1	
			603-05042	42 INCH REINFORCED CONCRETE END SECTION	EACH	2												2	
			603-05048	48 INCH REINFORCED CONCRETE END SECTION	EACH	1												1	
			603-50006	6 INCH PLASTIC PIPE	LF	156												156	
			603-71609	16X9 FOOT CONCRETE BOX CULVERT (PRECAST)	LF	72												72	
			603-71610	16x10 FOOT CONCRETE BOX CULVERT (PRECAST)	LF	120												120	
			604-00305	INLET TYPE C (5 FOOT)	EACH	7												7	
			604-00310	INLET TYPE C (10 FOOT)	EACH	1												1	
			604-00505	INLET TYPE D (5 FOOT)	EACH	1												1	
			604-13005	INLET TYPE 13 (5 FOOT)	EACH	2												2	
			604-16005	INLET TYPE 16 (5 FOOT)	EACH	1												1	
			604-19000	INLET (SPECIAL)	EACH	1												1	
			604-25005	VANE GRATE INLET (5 FOOT)	EACH	1												1	
			604-25010	VANE GRATE INLET (10 FOOT)	EACH	1												1	
			604-30010	MANHOLE SLAB BASE (10 FOOT)	EACH	2												2	

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BOULDER CANYON TRAIL EXTENSION
SUMMARY OF APPROXIMATE QUANTITIES

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			604-30015	MANHOLE SLAB BASE (15 FOOT)	EACH	3												3	
			605-00040	4 INCH PERFORATED PIPE UNDERDRAIN	LF	69												69	
			605-00060	6 INCH PERFORATED PIPE UNDERDRAIN	LF	223												223	
			605-83002	GEOCOMPOSITE DRAIN WITH PIPE	SY	445												445	
			605-84000	SUBSURFACE DRAIN OUTLET	LF	99												99	
			606-00301	GUARDRAIL TYPE 3 (6-3 POST SPACING)	LF	743.75												743.75	
			606-00710	GUARDRAIL TYPE 7 (STYLE CA)	LF	269												269	
			606-00740	GUARDRAIL TYPE 7 (STYLE CE)	LF	236												236	
			606-00741	GUARDRAIL TYPE 7 (STYLE CE) (SPECIAL)	LF	490												490	
			606-01370	TRANSITION TYPE 3G	EACH	1												1	
			606-01385	TRANSITION TYPE 3J	EACH	1												1	
			606-02003	END ANCHORAGE (NONFLARED)	EACH	1												1	
			606-02005	END ANCHORAGE (FLARED)	EACH	4												4	
			607-01000	FENCE BARBED WIRE WITH METAL POSTS	LF	74												74	
			607-11460	FENCE WOOD RAIL	LF	285												285	
			607-11525	FENCE (PLASTIC)	LF	2,000												2,000	
			608-00026	CONCRETE BIKEWAY (6 INCH)	SY	2,884												2,884	
			609-21020	CURB AND GUTTER TYPE 2 (SECTION II-B)	LF	305												305	
			609-24002	GUTTER TYPE 2 (2 FOOT)	LF	129												129	
			609-24100	GUTTER TYPE 2 (VARIABLE)	LF	41												41	
			614-00011	SIGN PANEL (CLASS I)	SF	54												54	
			614-00216	STEEL SIGN POST (2X2 INCH TUBING)	LF	180												180	
			614-00218	STEEL SIGN POST (2.25X2.25 INCH TUBING)	LF	54												54	
			614-01512	STEEL SIGN SUPPORT (2-INCH ROUND) (POST)	LF	10												10	
			614-01522	STEEL SIGN SUPPORT (2-INCH ROUND) (SOCKET)	EACH	1												1	
			614-85001	IMPACT ATTENUATOR	EACH	1												1	
			619-30320	4 INCH GALVANIZED PIPE	LF	14												14	
			620-00002	FIELD OFFICE (CLASS 2)	EACH	1												1	
			620-00012	FIELD LABORATORY (CLASS 2)	EACH	1												1	
			620-00020	SANITARY FACILITY	EACH	1												1	
			621-00425	DETOUR (CBC 1)	LS	1												1	
			621-00425	DETOUR (CBC 2)	LS	1												1	
			625-00000	CONSTRUCTION SURVEYING	L S	1												1	
			626-00000	MOBILIZATION	L S	1												1	
			627-00008	MODIFIED EPOXY PAVEMENT MARKING	GAL	4.41												4.41	
			627-00011	PAVEMENT MARKING PAINT (WATERBORNE) (TEMPORARY)	GAL	15												15	

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BOULDER CANYON TRAIL EXTENSION
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SUMMARY OF APPROXIMATE QUANTITIES

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			627-01010	PREFORMED PLASTIC PAVEMENT MARKING (TYPE I)(INLAID)	SF	160.13												160.13	
			628-00070	BRIDGE GIRDER AND DECK UNIT (70 FEET TO 75 FEET)	EACH	1												1	
			630-00000	FLAGGING	HOUR	500												500	
			630-00003	UNIFORMED TRAFFIC CONTROL	HOUR	16												16	
			630-00007	TRAFFIC CONTROL INSPECTION	DAY	51												51	
			630-00012	TRAFFIC CONTROL MANAGEMENT	DAY	129												129	
			630-80341	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	EACH	40												40	
			630-80342	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	EACH	12												12	
			630-80350	VERTICAL PANEL	EACH	150												150	
			630-80355	PORTABLE MESSAGE SIGN PANEL	EACH	2												2	
			630-80360	DRUM CHANNELIZING DEVICE	EACH	100												100	
			630-80364	DRUM CHANNELIZING DEVICE (WITH LIGHT) (STEADY BURN)	EACH	20												20	
			630-80370	CONCRETE BARRIER (TEMPORARY)	LF	2,000												2,000	
			630-85010	IMPACT ATTENUATOR (TEMPORARY)	EACH	6												6	
			630-86810	TRAFFIC SIGNAL (TEMPORARY)	EACH	2												2	
			641-10000	SHOTCRETE	SY	164												164	
			700-70010	F/A MINOR CONTRACT REVISIONS	FA	1												1	
			700-70011	F/A PARTNERING	FA	1												1	
			700-70016	F/A FUEL COST ADJUSTMENT	FA	1												1	
			700-70021	F/A ON-THE-JOB TRAINEE	HOUR	600												600	
			700-70100	F/A RELOCATE UTILITIES	FA	1												1	
			700-70380	F/A EROSION CONTROL	FA	1												1	

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Drawing File Name: 19888DES_SAQ.dgn
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Sheet Revisions		
Date:	Comments	Init.

Region 4

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BOULDER CANYON TRAIL EXTENSION
SUMMARY OF APPROXIMATE QUANTITIES

Designer: SDB
Detailer: CLJ
Sheet Subset: SAQ
Structure Numbers:
Subset Sheets: 5 of 5

Project No./Code
STU C070-043
19888
Sheet Number 17

SUMMARY OF EARTHWORK QUANTITIES

	CUBIC YARDS
UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	
BOULDER CANYON TRAIL EXTENSION (FROM CROSS-SECTIONS)	5,530
TOTAL FOR PAY QUANTITY	**5,530**
STRUCTURE BACKFILL (FLOW-FILL) (FROM STRUCTURES TAB)	**775**
STRUCTURE BACKFILL (CLASS 1) (FROM STRUCTURES TAB)	**1,255**
STRUCTURE EXCAVATION (FROM STRUCTURES TAB)	**2,905**
ROCK EXCAVATION (FROM CROSS SECTIONS)	**2,620**
MUCK EXCAVATION (AS NEEDED)	**100**

FOR INFORMATION ONLY

	CUBIC YARDS
EMBANKMENT MATERIAL (COMPLETE IN PLACE)	
BOULDER CANYON TRAIL EXTENSION (FROM CROSS-SECTIONS)	3,230
TOTAL	**3,230**
STRUCTURE BACKFILL (CLASS 1) (FROM DRAINAGE TAB)	1,558
STRUCTURE EXCAVATION	
FROM STRUCTURES TAB	2,905
FROM DRAINAGE TAB	2,904
TOTAL	**5,809**

EARTHWORK QUANTITIES BALANCE:	**CUBIC YARDS**
EMBANKMENT MATERIAL (COMPACTION FACTOR = 1.15)	3,715
UNCLASSIFIED EXCAVATION + STRUCTURE EXCAVATION + ROCK EXCAVATION	13,959
EXCESS MATERIAL	**10,244**

NOTES:

1. UNCLASSIFIED EXCAVATION VOLUMES INCLUDE THE EXISTING PAVEMENT.
2. ROADWAY QUANTITIES BALANCE DOES NOT REFLECT THE EARTHWORK REQUIRED IN EACH CONSTRUCTION PHASE. THE PROJECT MAY REQUIRE ADDITIONAL EMBANKMENT OR EXCAVATION PER PHASE. THE COST OF ADDITIONAL EMBANKMENT, EXCAVATION, HAULING, AND HANDLING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE ORIGINAL PLAN QUANTITIES.
3. THE BID COST OF MUCK EXCAVACTION PER CUBIC YARD SHALL INCLUDE REMOVAL OF MUCK AND BACKFILL WITH SUITABLE EMBANKMENT MATERIAL.

Know what's **below** **Call** before you dig.

Print Date: 11/16/2016
Drawing File Name: 19888DES_Tab_Earthwork.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
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Sheet Revisions		
Date:	Comments	Init.

Region 4

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BOULDER CANYON TRAIL EXTENSION
TABULATION OF EARTHWORK

Designer: SDB
Detailer: SDB
Sheet Subset: TAB
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 18

TABULATION OF REMOVALS, RESETS AND ADJUSTMENTS

STATION	SIDE	REMOVAL OF TREE	REMOVAL OF CONCRETE BOX CULVERT	REMOVAL OF WALL	REMOVAL OF BRICK PAVERS	RESET FIRE HYDRANT	RELAY SPRINKLER SYSTEM	MODIFY INLET	COMMENTS
		EA	EA	LF	SY	EA	L S	EA	
103+00 TO 103+50	LT	3							
104+75 TO 105+75	LT	7							
108+25	RT			40					REMOVAL OF WING WALLS FROM OLD CBC
108+25	LT		1						REMOVAL OF OLD CBC
109+75 TO 110+25	RT	3							
111+00	LT	1							
112+00 TO 116+00	BOTH	20							
114+20	MIDDLE					1			
116+00 TO 117+00	RT	2							
120+47 TO 120+87	LT			40					EXISTING WALL BY ALPS INN
120+48 TO 125+33	LT						1		IN FRONT OF ALPS INN WALL
124+30	LT	1							
125+33 TO 125+81	LT				70				REMOVAL OF PAVERS IN FRONT OF ALPS
128+40	LT							1	
128+80	LT							1	
133+00 TO 133+50	BOTH	3							
135+50 TO 137+00	MIDDLE	22							
138+00 TO 139+00	LT	3							
139+20	RT	1							
PROJECT TOTALS		**66**	**1**	**80**	**70**	**1**	**1**	**2**	

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Drawing File Name: 19888DES_Tab_Removals.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

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BOULDER CANYON TRAIL EXTENSION
TABULATION OF REMOVALS, RESETS AND ADJUSTMENTS

Designer: CZC
Detailer: CZC
Sheet Subset: TAB
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 19

TABULATION OF SURFACING QUANTITIES

STATION	REMOVAL OF ASPHALT MAT	HOT MIX ASPHALT (PATCHING) (ASPHALT)[1]	HOT MIX ASPHALT (GRADING S) (75) (PG 58-28)		EMULSIFIED ASPHALT (SLOW SETTING)	CONCRETE BIKEWAY (6 INCH)	AGGREGATE BASE COURSE (CLASS 6)	AGGREGATE BASE COURSE (SPECIAL)	COMMENTS
			BOTTOM 3.5"	TOP 2.0"					
	SY	TON	TON	TON	GAL	SY	TON	TON	
SH 119 EB		21							EASTBOUND GUARDRAIL AT CBC 1
SH 119 WB		30							WESTBOUND GUARDRAIL AT CBC 1
SH 119 EB		17							EASTBOUND GUARDRAIL AT CBC 2
SH 119 WB	68	80					79		WB GUARDRAIL (Type 7) AT ROCK CUT TO CBC 2
SH 119 CBC 1	286		55	32	15		86		SH 119 SURFACING FOR CBC 1 CONSTRUCTION
SH 119 CBC 2	492		95	55	25		148		SH 119 SURFACING FOR CBC 2 CONSTRUCTION
102+50 TO 110+10						713	214		
110+10 TO 116+35								209	
116+35 TO 124+95						854	256		
120+83 TO 125+33	114	102					101		TYPE 7 GUARDRAIL AT ALPS
125+33 TO 128+37	91						26		STONE CURB REMOVAL & TYPE IIB C&G INSTALL
125+33 TO 136+90						1,317	394		
136+90 TO 139+52								108	
SUBTOTAL	1,051	250	150	87	40	2,884	1,304	317	
5% FOR IRREGULARITIES		13	8	4	2		65	16	
SUB TOTALS	**1,051**	**263**	**158**	**91**	**42**	**2,884**	**1,369**	**333**	
PROJECT TOTALS	**1,051**	**263**	**158**	**91**	**42**	**2,884**	**1,369**	**333**	

NOTES:

1. SEE PLAN SHEETS FOR H.M.A. (PATCHING) AREAS. H.M.A. (PATCHING) FOR TYPE 3 GUARDRAIL AREAS SHALL BE A MINIMUM OF 2 INCHES H.M.A. (GRADING S) (75) (PG 58-28). H.M.A. (PATCHING) FOR TYPE 7 GUARDRAIL AREAS SHALL MATCH THE FULL DEPTH PAVEMENT SECTION SHOWN ON THE TYPICAL SECTIONS.

Know what's **below** **Call** before you dig.

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CDOT Region 4

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BOULDER CANYON TRAIL EXTENSION
TABULATION OF SURFACING QUANTITIES

Designer:	CZC	Structure Numbers	
Detailer:	CZC		
Sheet Subset:	TAB	Subset Sheets:	1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 20

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TABULATION OF CONCRETE ITEMS

STATION	SIDE	REMOVAL OF CURB	REMOVAL OF GUTTER	STRUCTURAL CONCRETE STAIN (SPECIAL)	CURB AND GUTTER TYPE 2 (SECTION II-B)	GUTTER TYPE 2 (VARIABLE)	GUTTER TYPE 2 (2 FT.)	COMMENTS
		LF	LF	SF	LF	LF	LF	
103+95 TO 104+59	LT					41		ON TOP OF WALL 3
104+59 TO 105+69	LT						111	ON TOP OF WALL 5
124+51 TO 124+91	RT	41						
125+32	LT		18				18	
125+33 TO 128+37	RT	305						
125+33 TO 128+37	RT				305			
120+87	LT			5				STAINING EDGE OF SHORTENED WALL
PROJECT TOTALS		**346**	**18**	**5**	**305**	**41**	**129**	

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Drawing File Name: 19888DES_Tab_Concrete.dgn		Date:	Comments	Init.	No Revisions:	TABULATION OF CONCRETE ITEMS	STU C070-043
Horiz. Scale: 1:1 Vert. Scale: As Noted					Revised:	Designer: CZC / Structure Numbers	19888
Unit Information Unit Leader Initials						Detailer: CZC	
MULLER ENGINEERING COMPANY					Void:	Sheet Subset: TAB / Subset Sheets: 1 of 1	Sheet Number 21

Region 4

Boulder County

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TABULATION OF GUARDRAIL

STATION	SIDE	REMOVAL OF GUARDRAIL TYPE 3	REMOVAL OF END ANCHORAGE	GUARDRAIL TYPE 3 (6-3 POST SPACING)	GUARDRAIL TYPE 7 (STYLE CE) (SPECIAL)	GUARDRAIL TYPE 7 (STYLE CE)	GUARDRAIL TYPE 7 (STYLE CA)	TRANSITION TYPE 3G	TRANSITION TYPE 3J	END ANCHORAGE (NONFLARED)	END ANCHORAGE (FLARED)	IMPACT ATTENUATOR	COMMENTS
		LF	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	
SH 119	EB			206.25					1		1		Eastbound SH 119 at Chapman Drive
SH 119	WB			243.75							2		Westbound SH 119 at Chapman Drive
120+48 125+33	RT				490								Use Colored Concrete as directed See special detail with Stone Veneer
129+38	RT											1	
129+38 TO 131+74	RT					236							Use Colored Concrete as directed
131+74 TO 134+68	RT						269						Use Colored Concrete as directed
132+48	RT		1										Westbound SH 119 at CBC 2
132+48 TO 134+83	RT	212											
133+36 TO 136+33	RT TO LT			293.75						1	1		Eastbound SH 119 at CBC 2
134+68	RT							1					Westbound SH 119 Tie Type 7 to Existing
135+49 TO 136+85	RT												
PROJECT TOTALS		**212**	**1**	**743.75**	**490**	**236**	**269**	**1**	**1**	**1**	**4**	**1**	

NOTES:

1. ALL GUARDRAIL TYPE 3 SHALL BE GALVANIZED. REFLECTOR TABS SHALL BE PROVIDED AND PLACED.
2. USE STEEL POSTS FOR ALL NEW GUARDRAIL, EXCEPT AS REQUIRED FOR END ANCHORAGES. GUARDRAIL POSTS SHALL BE GALVANIZED.

TABULATION OF FENCING

STATION	SIDE	REMOVAL OF FENCE	FENCE BARBED WIRE WITH METAL POSTS	FENCE WOOD RAIL
		LF	LF	LF
117+27 TO 118+44	BOTH	98		
117+27 TO 118+44	BOTH		74	
136+31 TO 139+00	LT			285
PROJECT TOTALS		**98**	**74**	**285**

NOTES:

1. IT IS ESTIMATED THAT 6 END POSTS AND 2 CORNER AND LINE BRACE POSTS WILL BE REQUIRED.
2. SEE STANDARD PLAN M-607-01 FOR ADDITIONAL DETAILS.
3. METAL LINE POSTS AND METAL CORNER AND LINE BRACE POSTS WILL BE REQUIRED ON THIS PROJECT.
4. WIRE TIES WILL BE REQUIRED ON EACH WIRE AT EACH METAL POST.

Know what's **below** **Call** before you dig.

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Drawing File Name: 19888DES_Tab_Guardrails.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions

Date:	Comments	Init.

Region 4

Boulder County

As Constructed
No Revisions:
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BOULDER CANYON TRAIL EXTENSION
TABULATION OF GUARDRAIL AND FENCING

Designer: CZC Structure Numbers
Detailer: CZC
Sheet Subset: TAB Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 22

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TO ESTABLISH GEOMETRIC CONTROL FOR THE CONSTRUCTION OF THIS PROJECT, THE DEPARTMENT HAS PROVIDED THE FOLLOWING INFORMATION:

	Format *
■ Horizontal Control	Plan Sheets
■ Vertical Control	Plan Sheets
■ Trail Alignment	Plan Sheets
□ Original Terrain Data	
□ Other:	

* Specify the information format, ie., plan sheet, computer disk, computer printout, or other. The information marked is either contained on the plans or is available from the Engineer.

TYPE OF PROJECT

- □ Landscaping
- □ Signalization
- □ Safety Improvement
- □ Asphalt Overlay
- □ Concrete Overlay
- □ Minor Widening
- □ Major Reconstruction
- □ New Roadway Construction
- □ Bridge Replacement
- □ Bridge Widening
- ■ New Bridge
- ■ Other: Bike and Ped Trail; New Underpasses

SURVEY WORK TO BE PERFORMED BY OTHERS: _____

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 625:

- ___ ■ Establish and Maintain Project Centerline or Engineer Approved Offset Line(s)
- ___ ■ Verification and Maintenance of Horizontal and Vertical Control
- ___ □ Verify or Determine existing grades and alignments
- ___ □ Verify or Determine existing topography
- ___ ■ Clearing and Grubbing Limits (Section 201)
- ___ ■ Removal Limits (Section 202)
- ___ ■ Reset Items (Section 210)
- ___ ■ Excavation and Embankment (Section 203)
  - ___ ■ Excavation
    - ___ ■ Unclassified
    - ___ □ Stripping
    - ___ □ Muck
    - ___ □ Rock
    - ___ □ Borrow
    - ___ □ Other: _____
    - ___ □ Potholing
  - ___ ■ Embankment
  - ___ ■ Site Grading
  - ___ □ Erosion Control (Perm)
  - ___ □ Other: _____
  - ___ □ As Staked Earthwork Quantities (See General Notes)

	Slope Staking (Y/N)	Grid (Y/N)	Grade Stakes	Special Interval
Excavation	Y	-	Y	50 FT
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
Embankment	Y	-	Y	50 FT
	Y	-	Y	-
	-	-	-	-
	-	-	-	-

- ___ □ Landscaping
  - ___ □ Top Soil (Section 207)
  - ___ □ Seeding (Section 212)
  - ___ □ Mulching (Section 213)
  - ___ □ Planting (Section 214)
  - ___ □ Herbicide (Section 217)
  - ___ □ Other: _____
- ___ □ Erosion Control (Section 208)
  - ___ □ Seeding (Temp)
  - ___ □ Silt Fence
  - ___ □ Erosion Bales
  - ___ □ Erosion Logs
  - ___ □ Riprap (Temp)
  - ___ □ Other: _____
- ___ ■ Roadway Bases
  - ___ □ Untreated Subgrade
  - ___ □ Treated Subgrade
  - ___ ■ Aggregate Base Course (Section 304)
  - ___ □ Reconditioning
  - ___ □ PMBB - Plant Mix Bituminous Base
  - ___ □ Other: _____

	Grid (Y/N)	Grade (Y/N)	Special Interval	Special Offset
Roadway Bases	-	-	-	-
	-	-	-	-
	-	-	50 FT	-
	-	-	-	-
	-	-	-	-
	-	-	-	-

- ___ ■ Pavements
  - ___ ■ HMA - Hot Mix Asphalt (Section 403)
  - ___ □ Concrete (Section 412)
  - ___ □ Heating & Scarifying Treatment
  - ___ □ Prime Coat, Tack Coat & Rejuvenating Agent (Section 407)
  - ___ □ Seal Coat or Chip Seal (Section 409)
  - ___ □ Other: _____

	Grid (Y/N)	Special Interval	Special Offset
Pavements	-	50 FT	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

	Tangent Interval	Curve Interval	Special Offset
Curb & Gutter	-	-	-

- ___ ■ Roadway Elements
  - ___ ■ Curb and Gutter (Section 609)
  - ___ ■ Drop inlets - alignment and grades (Section 604)
  - ___ ■ Retaining Walls
  - ___ ■ Guard Rail (Section 606)
  - ___ ■ Sidewalk (Section 608)
  - ___ □ Overlay Stationing
  - ___ □ Other: _____

	Left Interval	Center Interval	Right Interval
Stationing	-	-	-

- ___ ■ Riprap (Perm) (Section 506)
- ___ □ Slope and Ditch Paving (Section 507)
- ___ ■ Minor Structures
  - ___ ■ Structure Excavation limits (Section 206)
  - ___ ■ Culverts (Section 603)
  - ___ □ Culverts w/ Headwalls and Wingwalls (Section 601)
  - ___ □ Concrete Box Culverts w/ Headwalls and Wingwalls
  - ___ ■ Pipes (Section 603)
    - ___ □ Sanitary Sewer
    - ___ ■ Storm Sewer
    - ___ □ Water
    - ___ □ Irrigation
    - ___ ■ Miscellaneous
  - ___ ■ Manholes (Section 604)
  - ___ ■ Inlets (Section 604)
  - ___ □ Other: _____
- ___ ■ Major Structures - Overhead Signs (Section 614), Concrete Box Culverts, Bridges - and all other structures assigned a structure number
  - ___ ■ Structure Excavation limits (Section 206)
  - ___ ■ Concrete Box Culverts (Section 603) w/ Headwalls and Wingwalls (Section 601)
  - ___ ■ Piling locations and cut off elevations (Section 502)
  - ___ □ Caisson locations and elevations (Section 503)
  - ___ ■ Footing locations, alignment, and elevations
  - ___ ■ Abutment/Pier locations, alignment, and elevations
  - ___ ■ Wingwall skew angles/offsets
  - ___ ■ Structural concrete form locations
  - ___ □ Substructure As-constructed survey required for Bridges (Subsection 601 .12) and Overhead signs (S-614-50)
  - ___ □ Bridge expansion joint(s) alignment and grade (longitudinal and transverse)
  - ___ □ Deck grades at Girder 10th or "n" th point locations and elevations
  - ___ □ Slope and Ditch Paving (Section 507)
  - ___ ■ Other: Retaining Walls, Pedestrian Bridge
- ___ ■ Fencing (Section 607)
  - ___ □ Temporary
  - ___ ■ Permanent
  - ___ □ Sound Barrier
  - ___ □ Other: _____
- ___ ■ Delineators (Section 612)
  - ___ □ Temporary
  - ___ ■ Permanent
- ___ □ Lighting (Section 613) and Traffic Control Devices (Permanent) (Section 614)
  - ___ □ Signal pole locations and elevations
  - ___ □ Light pole locations and elevations
  - ___ □ Sign locations
  - ___ □ Field verify sign post locations, elevations, and lengths before fabrication.
  - ___ □ Other: _____
- ___ ■ Pavement Marking (Section 627)
  - ___ ■ Striping (Temp)
  - ___ ■ Striping (Perm)
  - ___ ■ Symbols
  - ___ □ Other: _____
- ___ □ Temporary Lighting and Construction Traffic Control Devices (Section 630)
  - ___ □ Signal pole locations and elevations (Temp)
  - ___ □ Light pole locations and elevations (Temp)
  - ___ □ Sign Locations (Temp)
  - ___ □ Other: _____
- ___ ■ Easements (Temp Staking by P.L.S. Only)
- ___ ■ Right of Way (Temp Staking by P.L.S. Only)

WORK PERFORMED BY THE CONTRACTOR'S SURVEYOR UNDER SECTION 629:

- ___ □ Monumentation (Section 629)
  - ___ □ Control
  - ___ □ Right of Way
  - ___ □ Land corners, Aliquot corners
  - ___ □ Easements
  - ___ □ Reference the specified existing monuments:** _____
  - ___ □ Replace the specified existing monuments: ** _____
  - ___ □ Locate monuments. It is estimated ___ hours are required.

NOTE: All 629 items shall include adequate research, calculations, and evaluations of evidence for monuments to be set.

** A Tabulation of Survey Monuments may be provided on the plans.

GENERAL NOTES:

1. Unless indicated otherwise on this Survey Tabulation Sheet, all survey work and staking intervals shall be done in accordance with the latest edition of the CDOT Survey Manual.
2. Adequate information for establishing lines, grades, and locations for all work items have been specified on the plans. Any additional information required to stake the item or element shall be generated by the Contractor's surveyor.
3. The Contractor's surveyor shall provide an estimate of the man-hours necessary to complete the work items indicated on this sheet. A copy of this sheet, with the estimated man-hours written on the blank line to the left of the specified items, shall be submitted with the Survey Schedule to the Engineer 14 days prior to the Presurvey Conference - Construction Survey.
4. Stakes and Monuments which are damaged or destroyed by the progress of construction shall be replaced by the Contractor at no additional cost to the Department.
5. The Contractor shall furnish an As Staked earthwork quantity to the Engineer prior to completion of twenty percent (20%) of the planned earthwork in any phase as per the CDOT Survey Manual. A printed copy of the As Staked earthwork data and a computer disk in the specified format shall be submitted to the Engineer. The Contractor shall field verify original ground cross sections at a maximum 500 feet intervals.
6. Prior to beginning work on any subsequent operation, such as placing base course or paving, the Contractor shall certify in writing to the Engineer that the final grade is within specified tolerance.
7. The Contractor's surveyor shall perform all field surveying and calculations necessary to tie plan grades into field grades.
8. The Contractor shall coordinate construction staking on the project with any utility work.
9. Fieldbooks shall contain daily records of points set and or measurements observed. The information recorded shall contain: date, crew members' names, point no., description, staking information, and sketches. If the survey information is collected electronically, information recorded shall be provided to the Project Engineer in a hard copy format that is intuitive, clear and related to the supplemental information recorded in the field books. All linear surveys, such as slope stakes and blue tops, shall have the station and offset information related to the measured information. Non-linear surveys such as structures staking shall have sketches relating electronic information, such as point numbers, to the sketch.
10. The Contractor's surveyor shall submit the following fieldbooks to the Engineer:
    - ■ Horizontal Control (Primary & Secondary)
    - ■ Vertical Control (i.e. Benchmarks)
    - □ Property Pin Ties
    - ■ Horizontal Alignment
    - ■ Grading
    - ■ Slope Staking
    - ■ Minor Structures
    - ■ Major Structures
    - □ One fieldbook for each work category shown on this sheet
    - □ Other Fieldbook(s): _____

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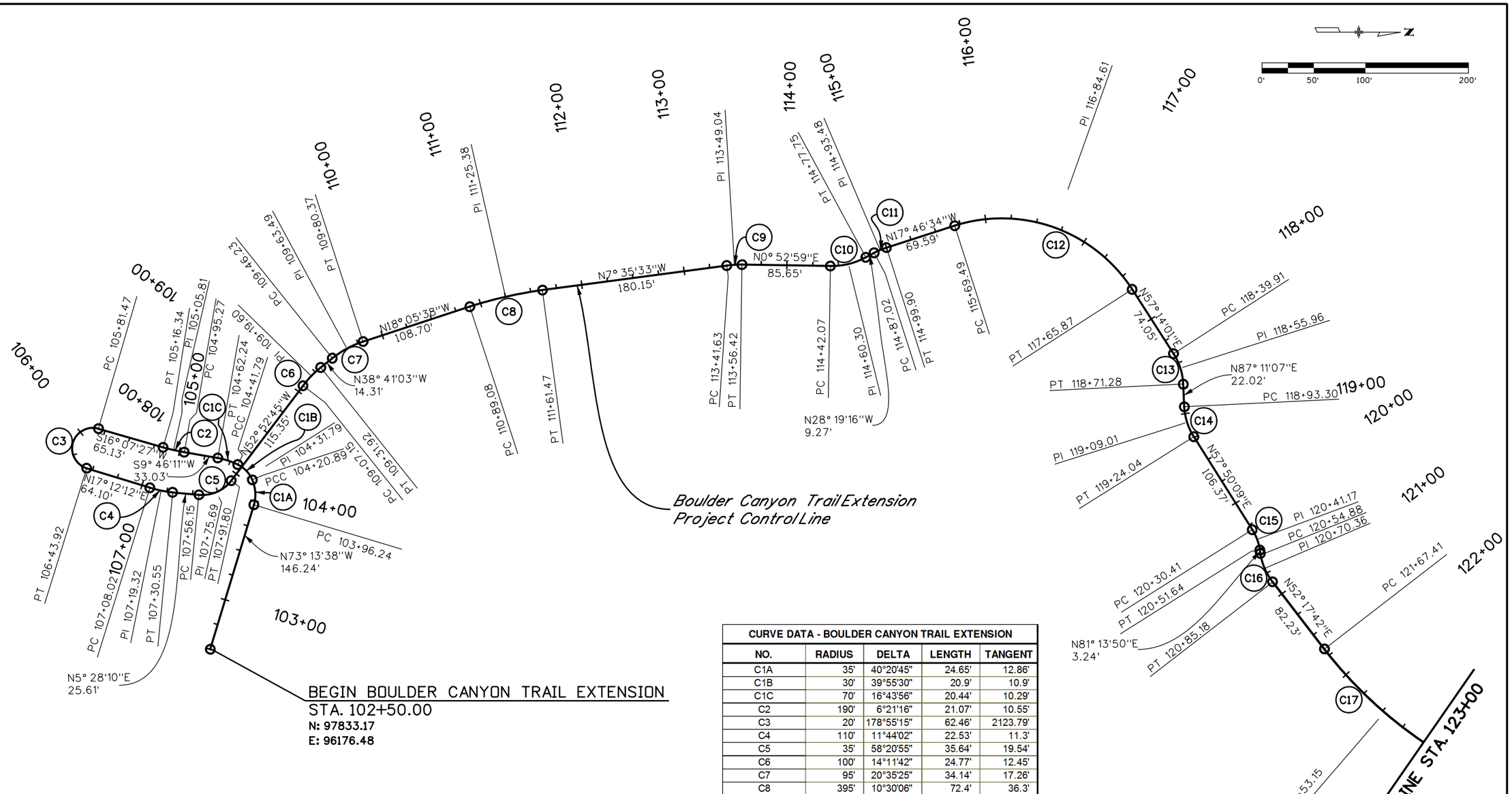
Horiz. Scale: 1:1 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SURVEY TABULATION			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: REW			Sheet Number 23
	Sheet Subset: SURVEY	Subset Sheets:	1 of 1	



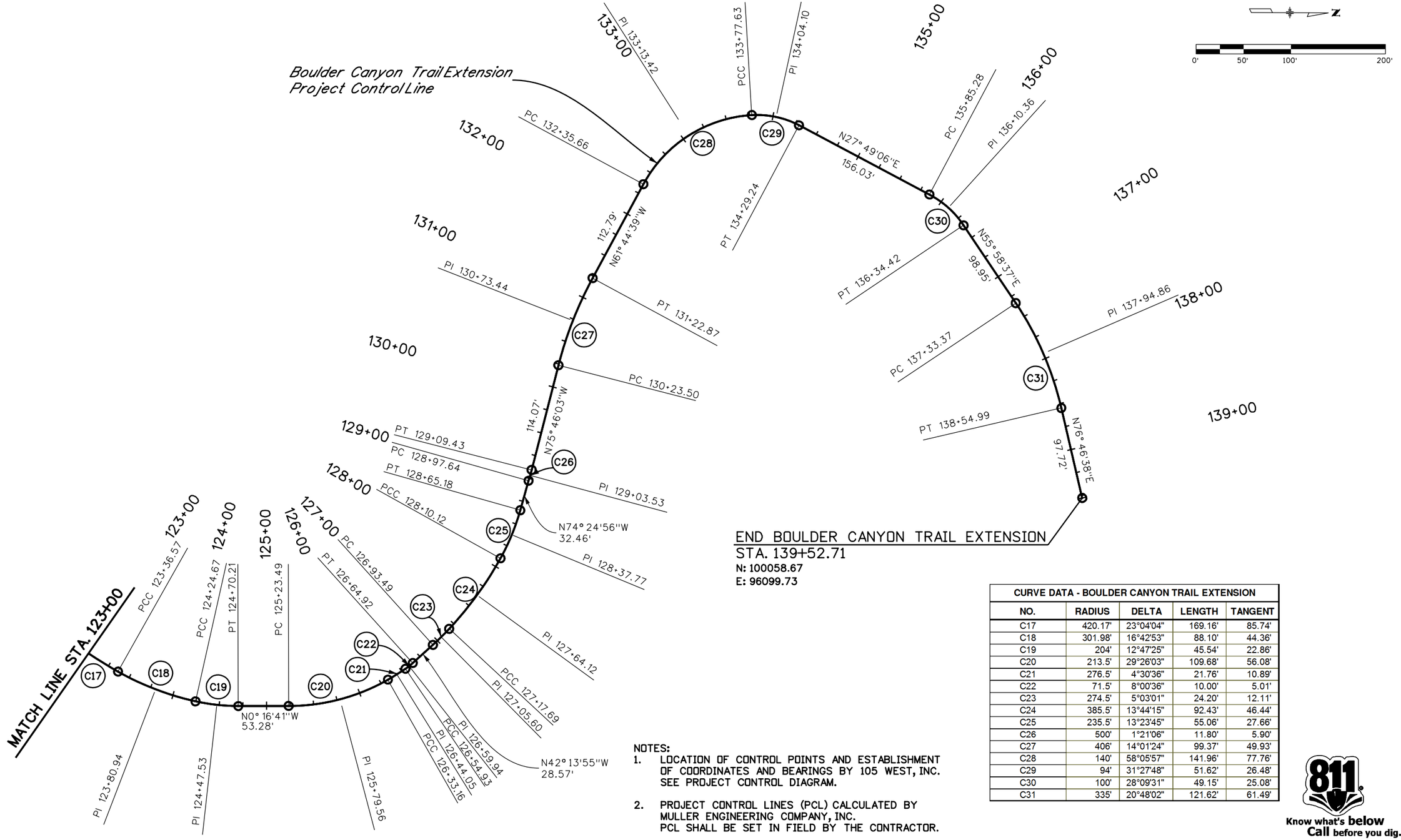
CURVE DATA - BOULDER CANYON TRAIL EXTENSION				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1A	35'	40°20'45"	24.65'	12.86'
C1B	30'	39°55'30"	20.9'	10.9'
C1C	70'	16°43'56"	20.44'	10.29'
C2	190'	6°21'16"	21.07'	10.55'
C3	20'	178°55'15"	62.46'	2123.79'
C4	110'	11°44'02"	22.53'	11.3'
C5	35'	58°20'55"	35.64'	19.54'
C6	100'	14°11'42"	24.77'	12.45'
C7	95'	20°35'25"	34.14'	17.26'
C8	395'	10°30'06"	72.4'	36.3'
C9	100'	8°28'32"	14.79'	7.41'
C10	70'	29°12'15"	35.68'	18.24'
C11	70'	10°32'42"	12.88'	6.46'
C12	150'	75°00'35"	196.38'	115.12'
C13	60'	29°57'05"	31.37'	16.05'
C14	60'	29°20'57"	30.73'	15.71'
C15	52'	23°23'41"	21.23'	10.77'
C16	60'	28°56'08"	30.3'	15.48'
C17	420.17'	23°04'04"	169.16'	85.74'

NOTES:
1. LOCATION OF CONTROL POINTS AND ESTABLISHMENT OF COORDINATES AND BEARINGS BY 105 WEST, INC. SEE PROJECT CONTROL DIAGRAM.
2. PROJECT CONTROL LINES (PCL) CALCULATED BY MULLER ENGINEERING COMPANY, INC. PCL SHALL BE SET IN FIELD BY THE CONTRACTOR.

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888DES_Geometry01.dgn	Date:	Comments	Init.
Horiz. Scale: 1:100 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	GEOMETRY PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: GEOMETRY	Subset Sheets: 1 of 2		Sheet Number 24



END BOULDER CANYON TRAIL EXTENSION
STA. 139+52.71
N: 100058.67
E: 96099.73

CURVE DATA - BOULDER CANYON TRAIL EXTENSION				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C17	420.17'	23°04'04"	169.16'	85.74'
C18	301.98'	16°42'53"	88.10'	44.36'
C19	204'	12°47'25"	45.54'	22.86'
C20	213.5'	29°26'03"	109.68'	56.08'
C21	276.5'	4°30'36"	21.76'	10.89'
C22	71.5'	8°00'36"	10.00'	5.01'
C23	274.5'	5°03'01"	24.20'	12.11'
C24	385.5'	13°44'15"	92.43'	46.44'
C25	235.5'	13°23'45"	55.06'	27.66'
C26	500'	1°21'06"	11.80'	5.90'
C27	406'	14°01'24"	99.37'	49.93'
C28	140'	58°05'57"	141.96'	77.76'
C29	94'	31°27'48"	51.62'	26.48'
C30	100'	28°09'31"	49.15'	25.08'
C31	335'	20°48'02"	121.62'	61.49'

NOTES:
1. LOCATION OF CONTROL POINTS AND ESTABLISHMENT OF COORDINATES AND BEARINGS BY 105 WEST, INC. SEE PROJECT CONTROL DIAGRAM.
2. PROJECT CONTROL LINES (PCL) CALCULATED BY MULLER ENGINEERING COMPANY, INC. PCL SHALL BE SET IN FIELD BY THE CONTRACTOR.

Know what's **below** **Call** before you dig.

zadkison 3:22:20 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Design\Drawings\19888DES_Geometry02.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT V8i BW.tbl

Print Date: 11/16/2016			
Drawing File Name: 19888DES_Geometry02.dgn			
Horiz. Scale: 1:100	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

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Sheet Revisions

Date:	Comments	Init.

Region 4

Boulder County

As Constructed

No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

GEOMETRY PLAN

Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	GEOMETRY	Subset Sheets:	2 of 2

Project No./Code	
STU C070-043	
19888	
Sheet Number	25

STA. 105+90.57
55.00' RT.
N: 97706.31
E: 95908.10
BEGIN TYPE 3 GUARDRAIL

DO NOT DISTURB EXISTING WATER LINE

PROPOSED 100-YR FLOODPLAIN

PROPOSED 10-YR FLOODPLAIN

SOIL RIPRAP (24-INCH) WITH 6" FILTER MATERIAL (CLASS A), THICKNESS= 4', 640 CY

LIMIT OF FILL (TYP.)

BEGIN TYPE 3 GUARDRAIL

END ANCHORAGE (FLARED)

STA. 105+90.00
17.00' RT.
BEGIN SOIL RIPRAP

Existing Edge of Pavement

3' MIN. FROM BACK OF GUARDRAIL POST TO EDGE OF TRAIL

STA. 104+81.26
41.05' RT.
N: 97828.69
E: 95947.50
BEGIN TYPE 3 GUARDRAIL

15' (APPROX.)

INSTALL TYPE 2 GUTTER ALONG BACK OF WALL (SEE TYPICAL SECTIONS)

City of Boulder

LIMIT OF CUT (TYP.)

PROPOSED PERMANENT TRAIL EASEMENT

10' CRUSHER FINES TRAIL

DRAINAGE DITCH

REMOVE EXISTING C.B.C. AND HEADWALLS / WINGWALLS

24" City of Boulder

MATCH LINE STA. 111+00

WALL 6

WALL 7

PH-4 TOR A

Wetlands (Typ.)

END ANCHORAGE (FLARED)

16'x9' TRAIL UNDERPASS - "C.B.C. 1"

R= 35'

TYPE 3J TRANSITION

INSTALL TYPE 2 GUTTER (VARIABLE) BETWEEN EDGE OF TRAIL AND BACK OF WALL (SEE TYPICAL SECTIONS).

WALL 5

WALL 3

WALL 4

WALL 1

WALL 2

SOIL RIPRAP (24-INCH) WITH 6" FILTER MATERIAL (CLASS A), THICKNESS= 4', 150 CY

Boulder Canyon Trail Extension
Project Control Line

SH 119

STA. 110+42.00
86.68' RT.
N: 98066.76
E: 95941.66
END TYPE 3 GUARDRAIL

Existing CDOT ROW

STA. 103+88.00
24.92' RT.
N: 97896.85
E: 96051.54
TIE TO EXISTING TYPE 3 BRIDGE RAIL

PEDESTRIAN BRIDGE "CHAPMAN BRIDGE"

Boulder Creek

Chapman Drive

PROPOSED 10-YR FLOODPLAIN

PROPOSED 100-YR FLOODPLAIN

BEGIN PROJECT
STA. 102+50.00
N: 97833.17
E: 96176.48

PROPOSED PERMANENT TRAIL EASEMENT

City of Boulder

LEGEND

- CONCRETE TRAIL
- CRUSHER FINES TRAIL
- H.M.A. PATCHING - 2" H.M.A. FOR TYPE 3 GUARDRAIL
- H.M.A. PATCHING - FULL DEPTH PAVEMENT FOR WIDENING IN FRONT OF TYPE 7 BARRIER
- FULL DEPTH PAVEMENT ABOVE CUTS FOR UNDERPASS CONSTRUCTION

KEY MAP

StevenB 3:31:08 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Design\Drawings\19888DES_Trail Plan01.dgn
11/17/2016 CDOT-PDFHighQuality_V8i.pltcfg CDOT V8i CLR-UTIL.tbl

Print Date: 11/17/2016
Drawing File Name: 19888DES_Trail Plan01.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions

Date:	Comments	Init.

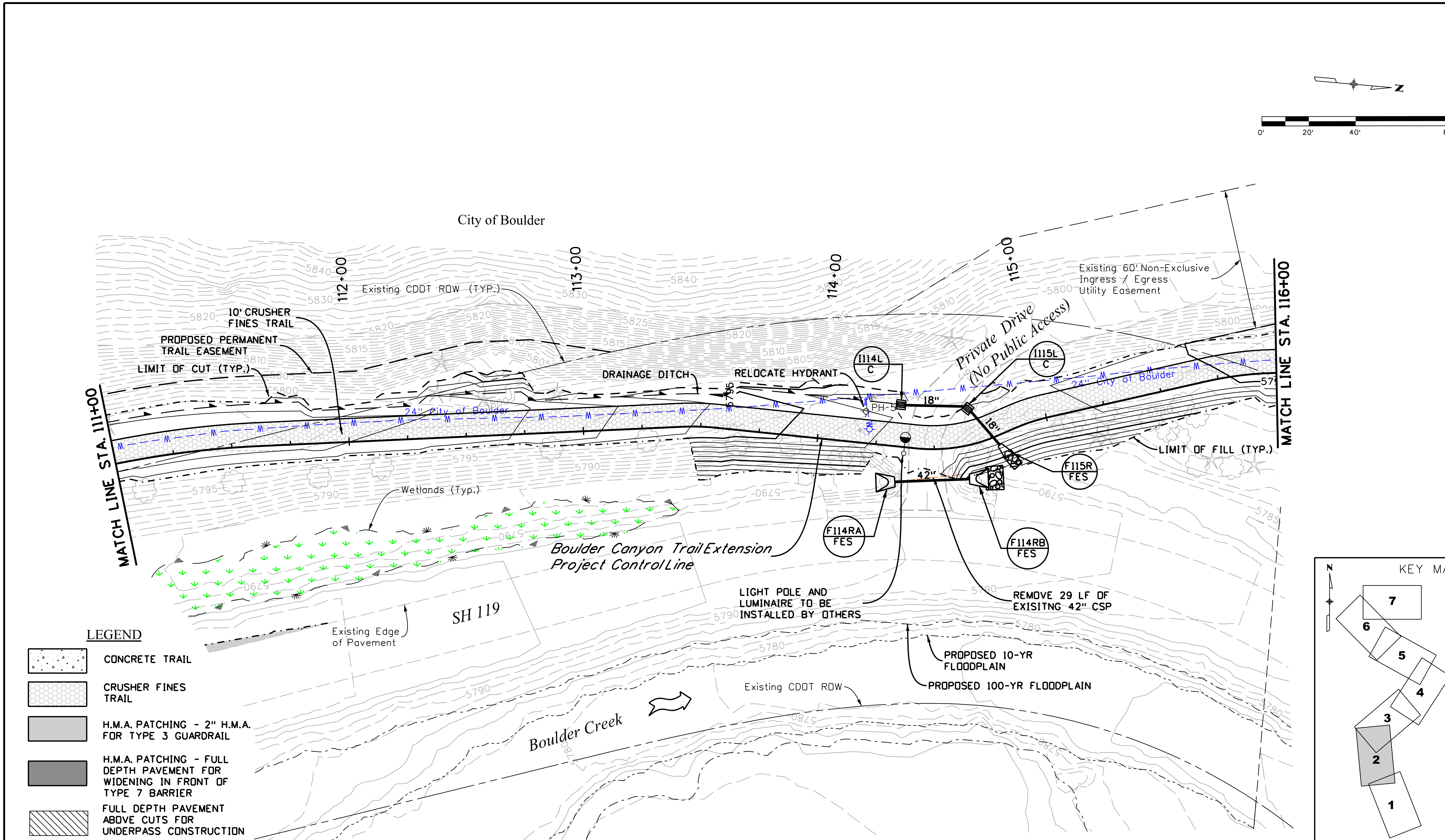
Region 4

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
TRAIL PLAN

Designer: SDB
Detailer: ZDA
Sheet Subset: PLAN
Structure Numbers:
Subset Sheets: 1 of 7

Project No./Code
STU C070-043
19888
Sheet Number 26



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Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

CDOT Region 4

Boulder County

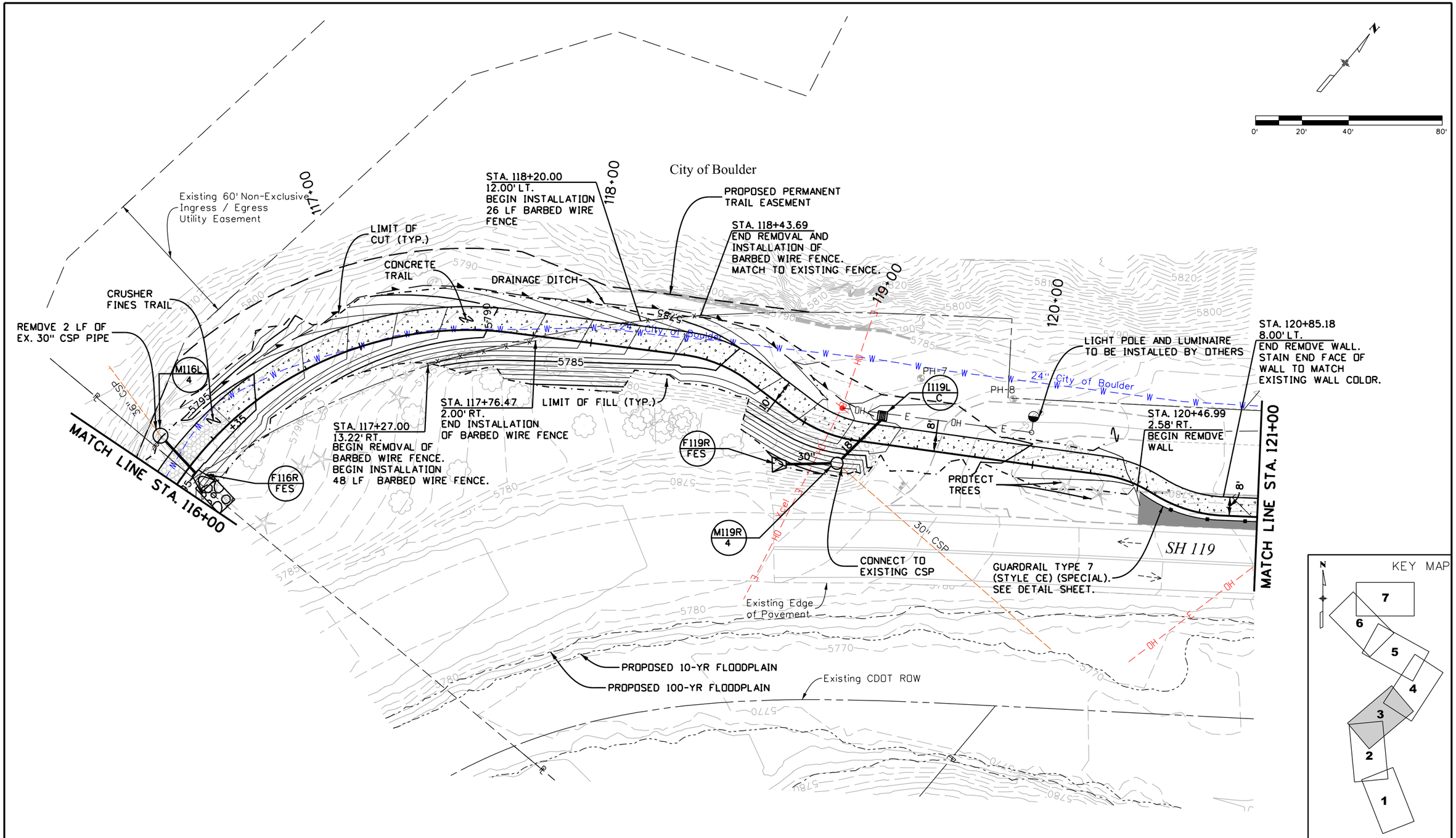
As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

TRAIL PLAN

Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	PLAN	Subset Sheets:	2 of 7

Project No./Code
STU C070-043
19888
Sheet Number 27



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Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	TRAIL PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			Sheet Number 28
	Sheet Subset: PLAN	Subset Sheets:	3 of 7	

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11/17/2016 CDOT-PDFHighQuality_V8i.pltcfg CDOT V8i CLR-UTIL.tbl

Alps Boulder Canyon Inn
(Vanderhart Real Estate, LLC)

0' 20' 40' 80'

MATCH LINE STA. 121+00

MATCH LINE STA. 126+00

POWER POLE TO BE RELOCATED AND LUMINAIRE INSTALLED BY OTHERS

Existing CDOT ROW

Existing 25' Waterline Easement

12 LF 6" PLASTIC PIPE - CONNECT TO EX. PIPE

9 LF 6" PLASTIC PIPE - CONNECT TO EX. PIPE

STA. 122+35.12
8.00' LT.

STA. 122+48.00
10.00' LT.

TIE TRAIL TO EXISTING PARKING LOT GRADE

STA. 124+90.50
0.00'
END REMOVAL OF CURB

STA. 125+33.32
0.00'
BEGIN BIKEWAY

STA. 124+50.72
10.00' LT
BEGIN REMOVAL OF CURB

1124L
C

Grv Line

REMOVE EXISTING DRAINAGE PAN. INSTALL 18 LF TYPE II GUTTER

Existing Edge of Pavement

GUARDRAIL TYPE 7 (STYLE CE) (SPECIAL). SEE DETAIL SHEET.

REMOVE 11 LF OF EXISTING 24" CSP

CONNECT TO EXISTING CSP

24" CSP

1124R
VGS

CONCRETE TRAIL

SH 119

Existing CDOT ROW

Boulder Canyon Trail Extension
Project Control Line

Boulder Creek

PROPOSED 10-YR FLOODPLAIN

PROPOSED 100-YR FLOODPLAIN

LEGEND

- CONCRETE TRAIL
- CRUSHER FINES TRAIL
- H.M.A. PATCHING - 2" H.M.A. FOR TYPE 3 GUARDRAIL
- H.M.A. PATCHING - FULL DEPTH PAVEMENT FOR WIDENING IN FRONT OF TYPE 7 BARRIER
- FULL DEPTH PAVEMENT ABOVE CUTS FOR UNDERPASS CONSTRUCTION

KEY MAP

7 6 5 4 3 2 1

Print Date: 11/17/2016			
Drawing File Name: 19888DES_TrailPlan04.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

TRAIL PLAN

Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	PLAN	Subset Sheets:	4 of 7

Project No./Code	
STU C070-043	
19888	
Sheet Number	29

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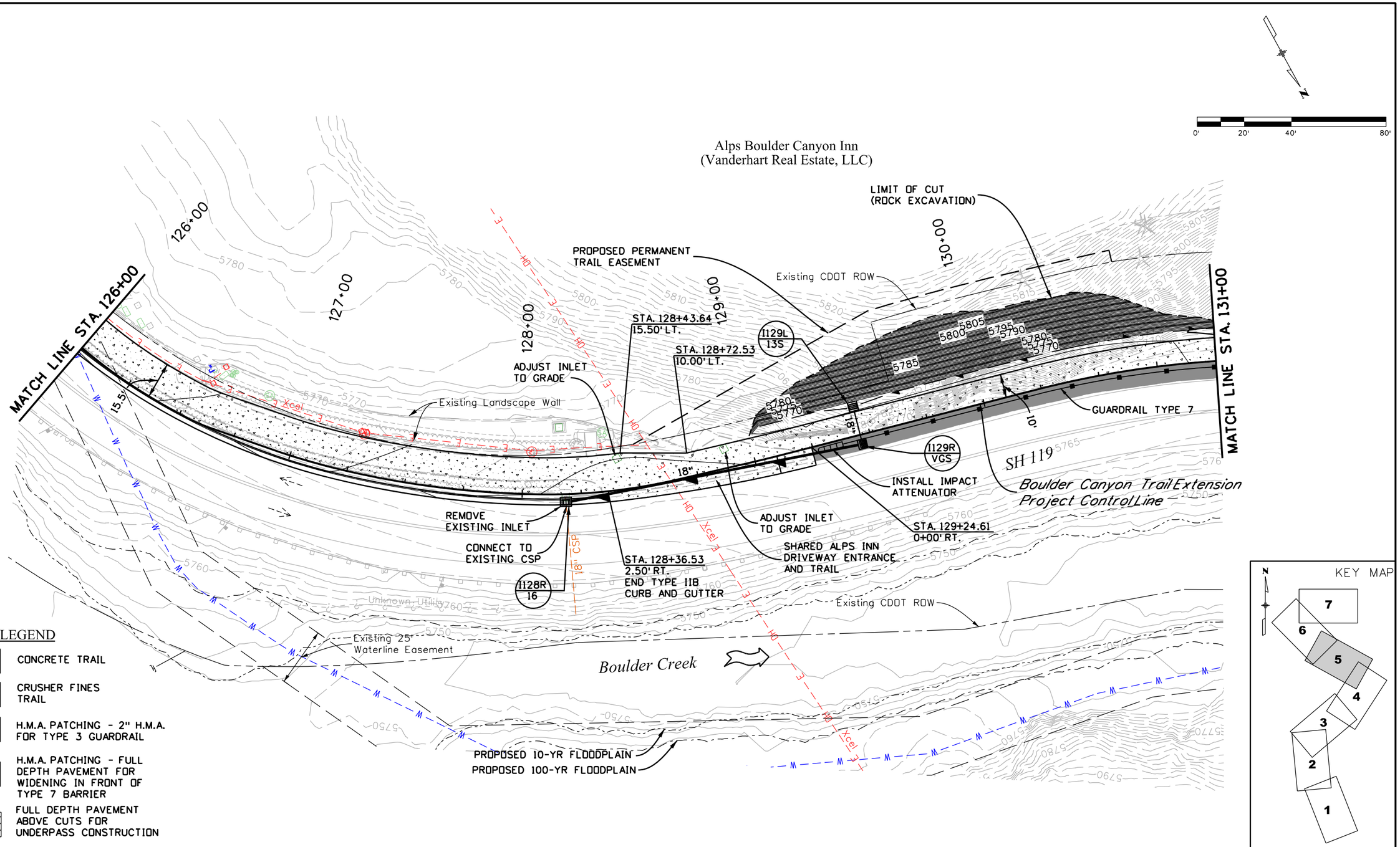

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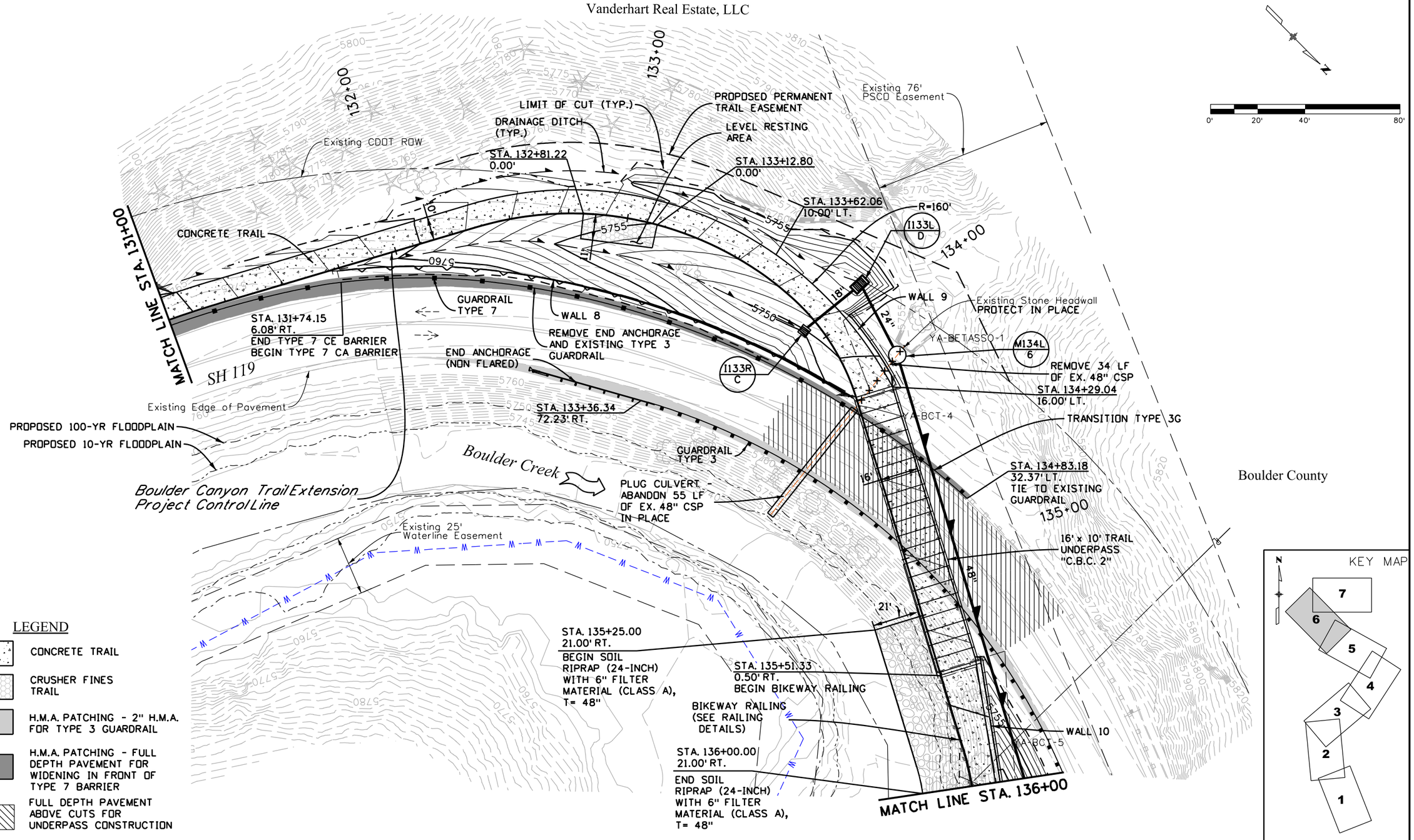
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	TRAIL PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			Sheet Number 30
	Sheet Subset: PLAN	Subset Sheets: 5 of 7		

Vanderhart Real Estate, LLC



Boulder County

LEGEND

- CONCRETE TRAIL
- CRUSHER FINES TRAIL
- H.M.A. PATCHING - 2" H.M.A. FOR TYPE 3 GUARDRAIL
- H.M.A. PATCHING - FULL DEPTH PAVEMENT FOR WIDENING IN FRONT OF TYPE 7 BARRIER
- FULL DEPTH PAVEMENT ABOVE CUTS FOR UNDERPASS CONSTRUCTION

KEY MAP

Print Date: 11/17/2016	Sheet Revisions		
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Horiz. Scale: 1:40 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

CDOT Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	TRAIL PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			
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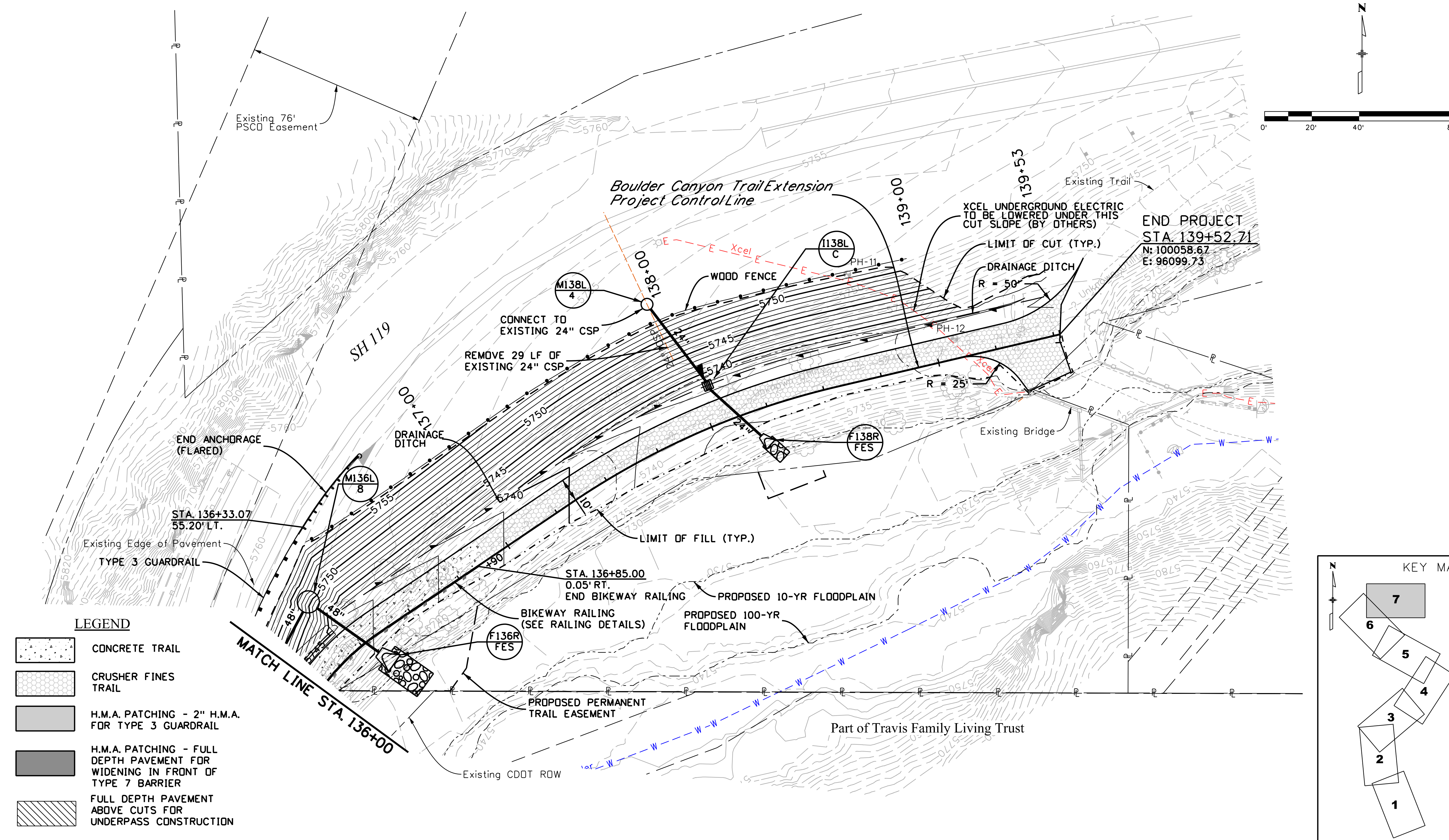

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Unit Information	Unit Leader Initials		
MULLER ENGINEERING COMPANY			

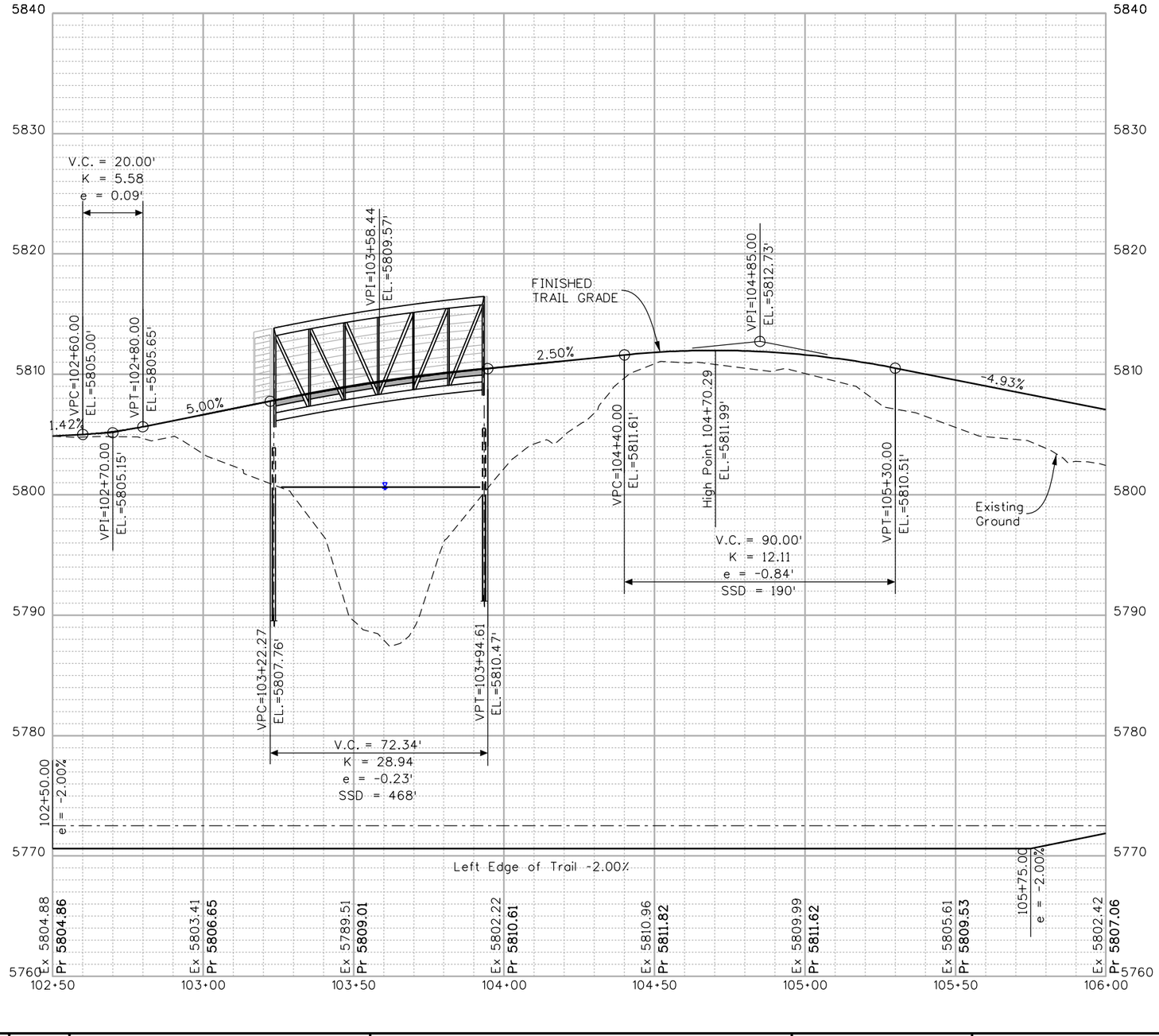
Sheet Revisions

Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION	Project No./Code
No Revisions:	TRAIL PLAN	STU C070-043
Revised:	Designer: SDB / Detailer: ZDA / Structure Numbers	19888
Void:	Sheet Subset: PLAN / Subset Sheets: 7 of 7	Sheet Number 32



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Drawing File Name: 19888DES_Profile.dgn		Date:	Comments	Init.	No Revisions:
Horiz. Scale: 1:40 Vert. Scale: As Noted					Revised:
Unit Information Unit Leader Initials					Void:
MULLER ENGINEERING COMPANY					

Region 4

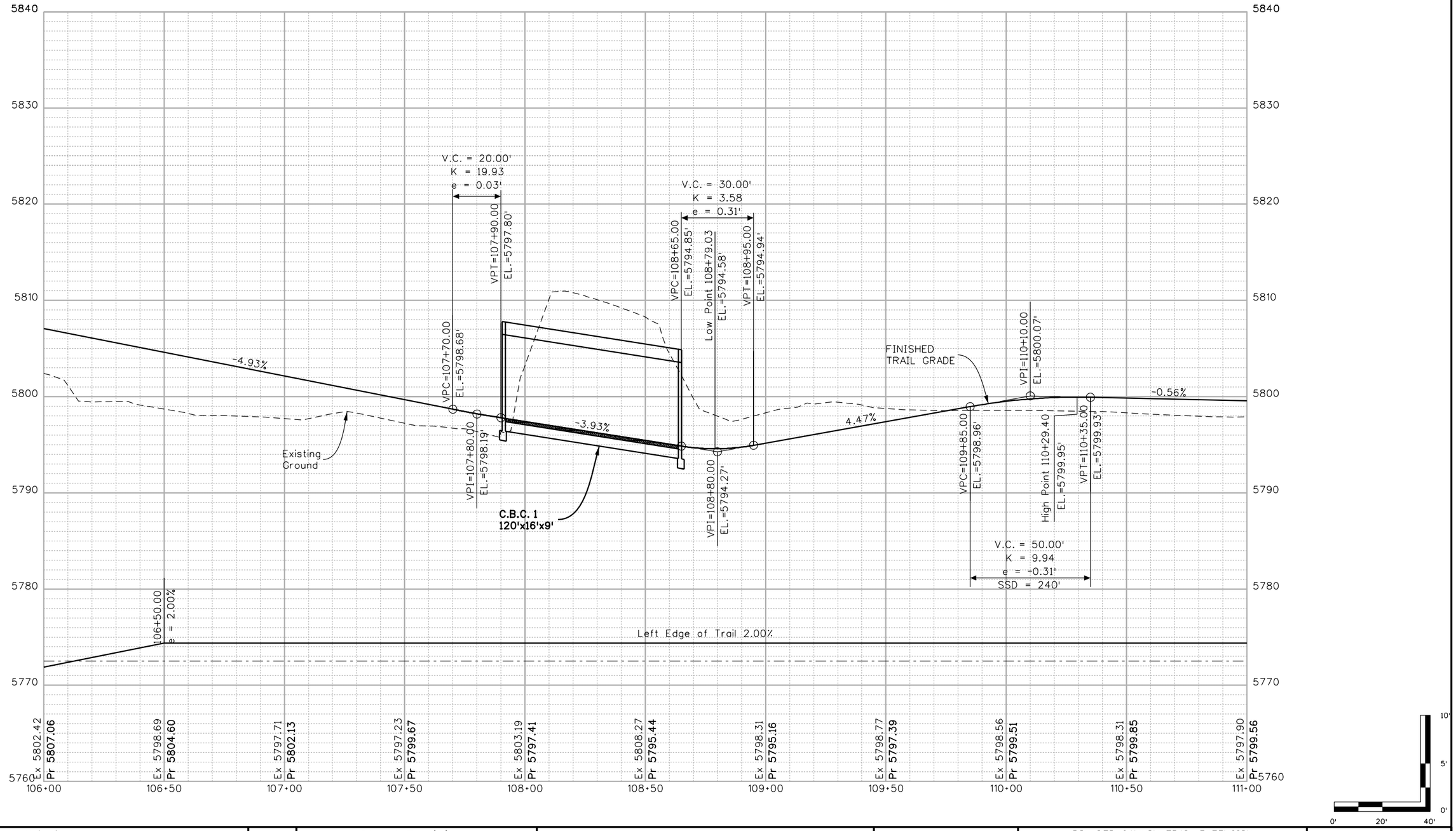
Boulder County

BOULDER CANYON TRAIL EXTENSION

TRAIL PROFILE
STA. 102+50 TO STA. 106+00

Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	PROFILE	Subset Sheets:	1 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	33



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Drawing File Name: 19888DES_Profile.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed

No Revisions:

Revised:

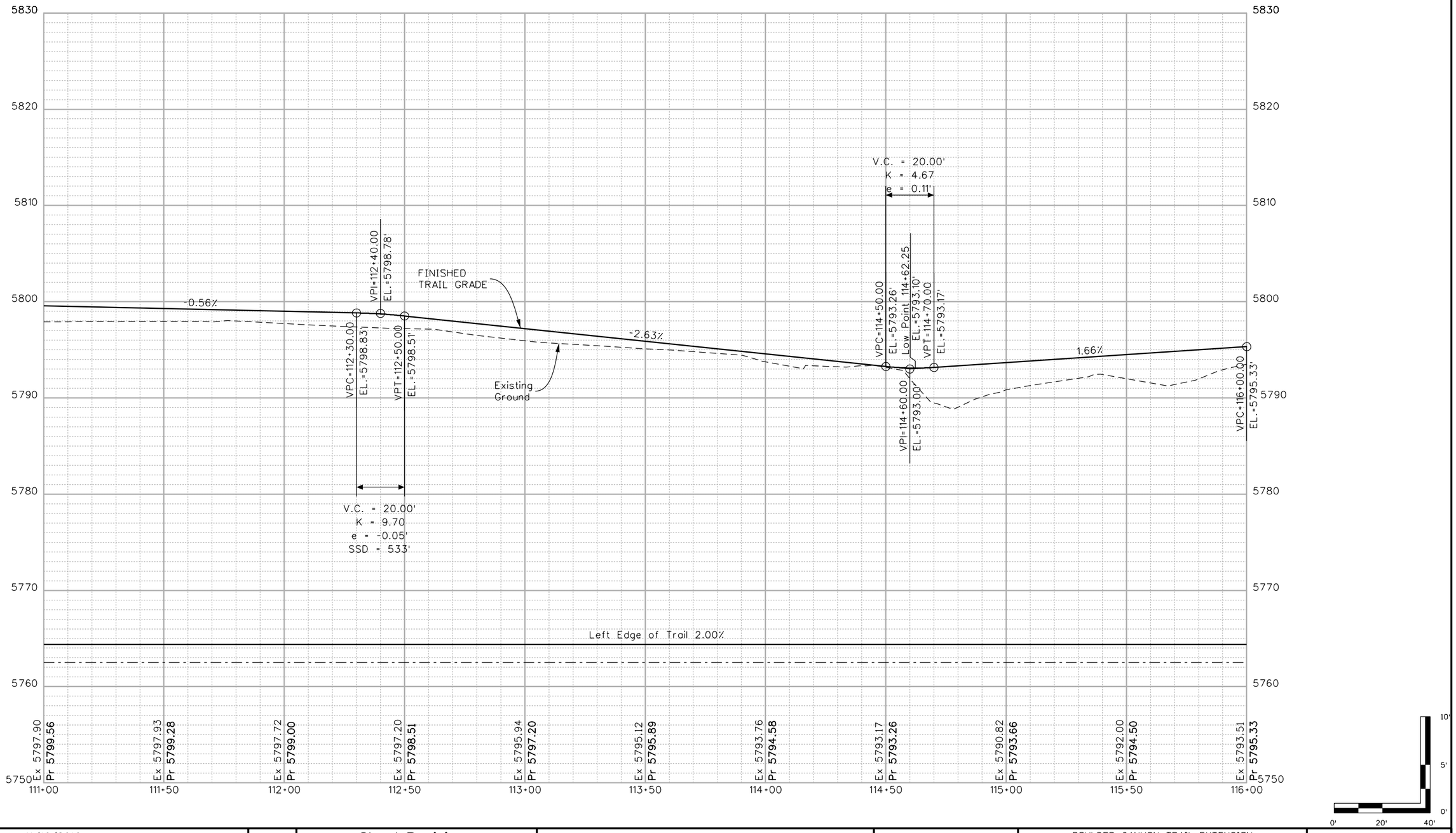
Void:

BOULDER CANYON TRAIL EXTENSION

TRAIL PROFILE
STA. 106+00 TO STA. 111+00

Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	PROFILE	Subset Sheets:	2 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	34



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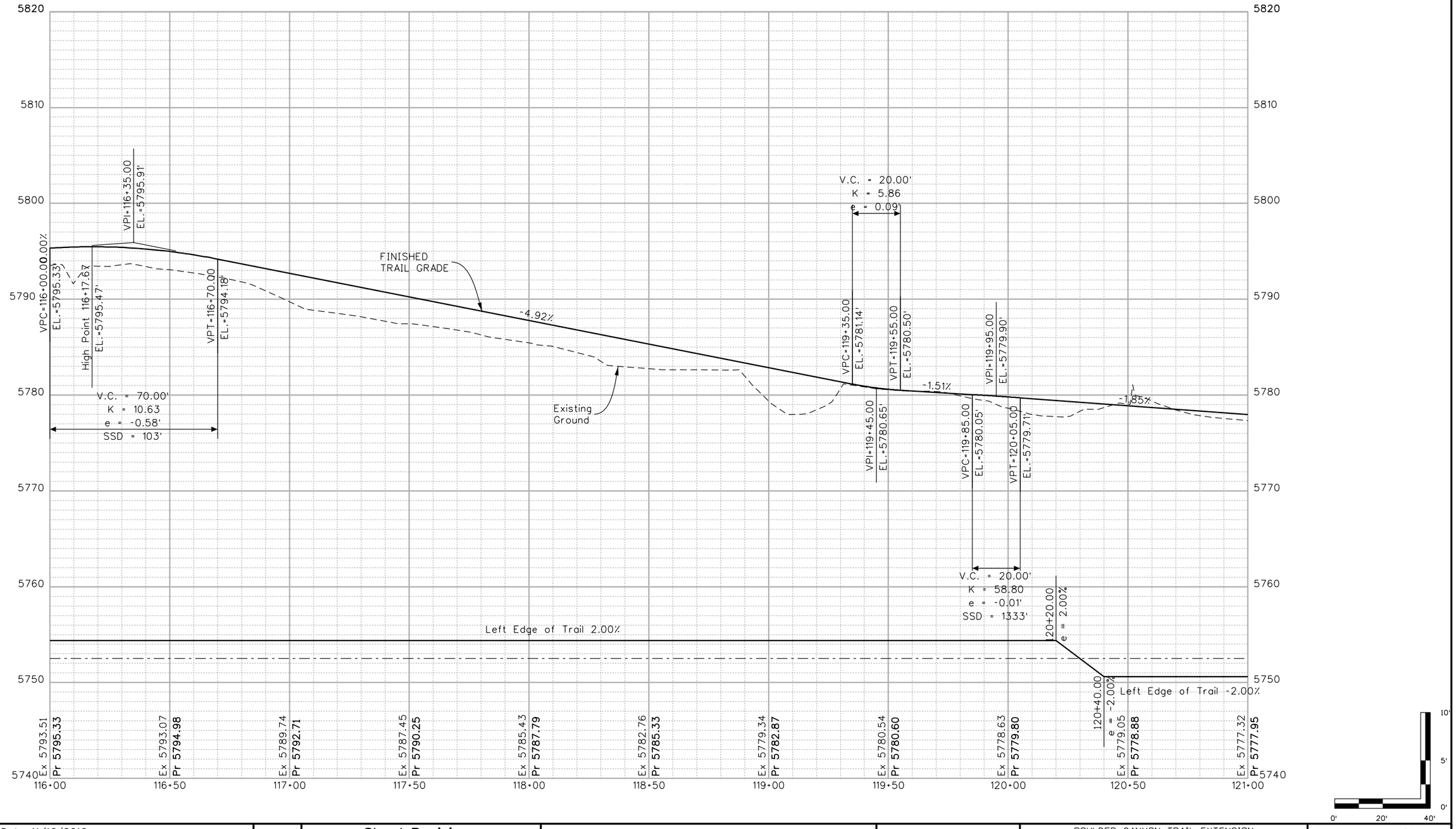
Print Date: 11/16/2016		Sheet Revisions			As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888DES_Profile.dgn		Date:	Comments	Init.	No Revisions:	TRAIL PROFILE
Horiz. Scale: 1:40 Vert. Scale: As Noted					Revised:	STA. 111+00 TO STA. 116+00
Unit Information Unit Leader Initials					Void:	Designer: SDB / Detailer: REW / Sheet Subset: PROFILE / Structure Numbers / Subset Sheets: 3 of 8
MULLER ENGINEERING COMPANY	0000				Region 4	Project No./Code: STU C070-043 / 19888 / Sheet Number 35



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Print Date: 11/16/2016	
Drawing File Name: 19888DES_Profile.dgn	
Horiz. Scale: 1:40	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

MULLER ENGINEERING COMPANY

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed

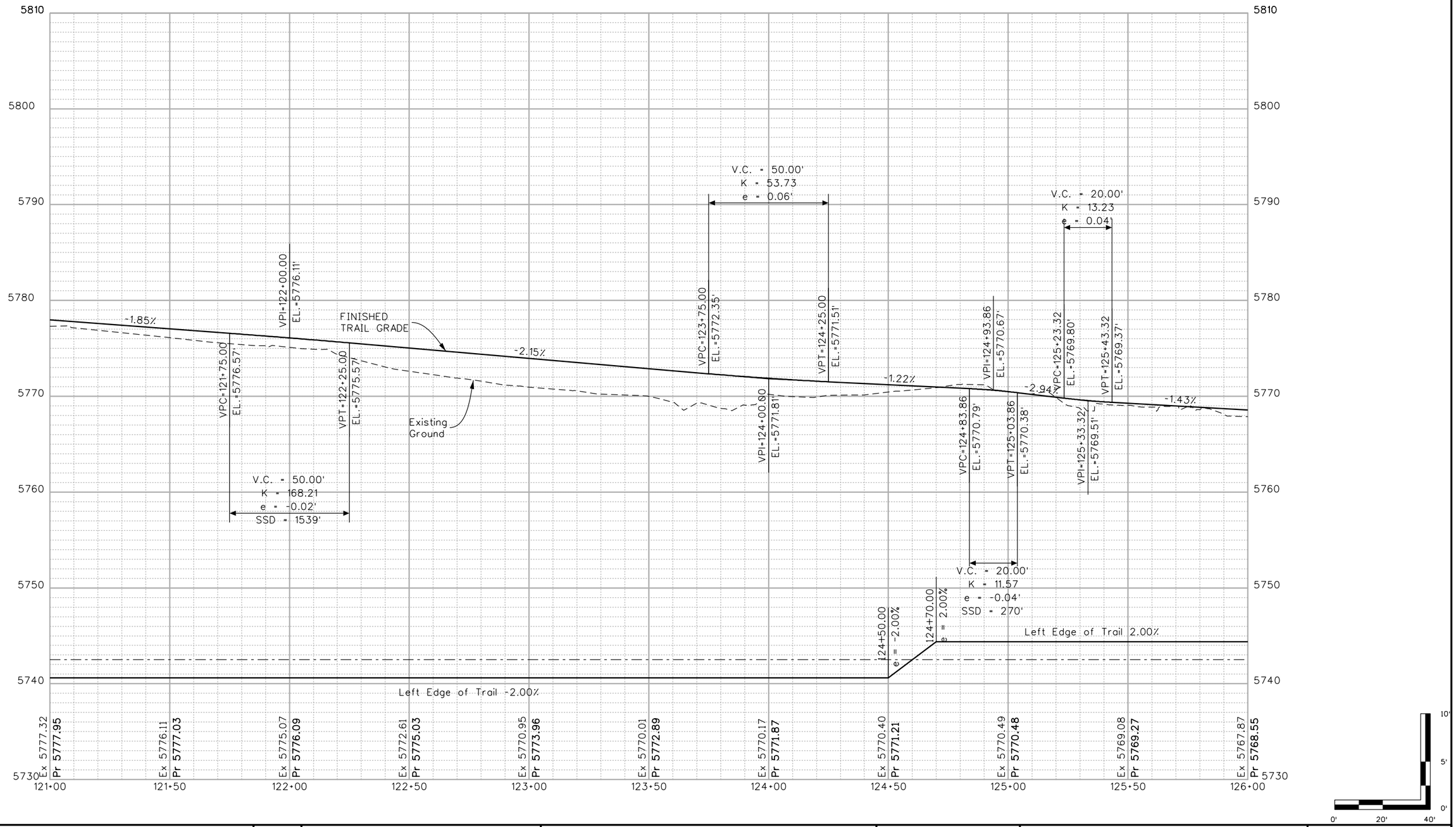
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

TRAIL PROFILE
STA. 116+00 TO STA. 121+00

Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	PROFILE	Subset Sheets:	4 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	36



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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/16/2016			
Drawing File Name: 19888DES_Profile.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

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Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

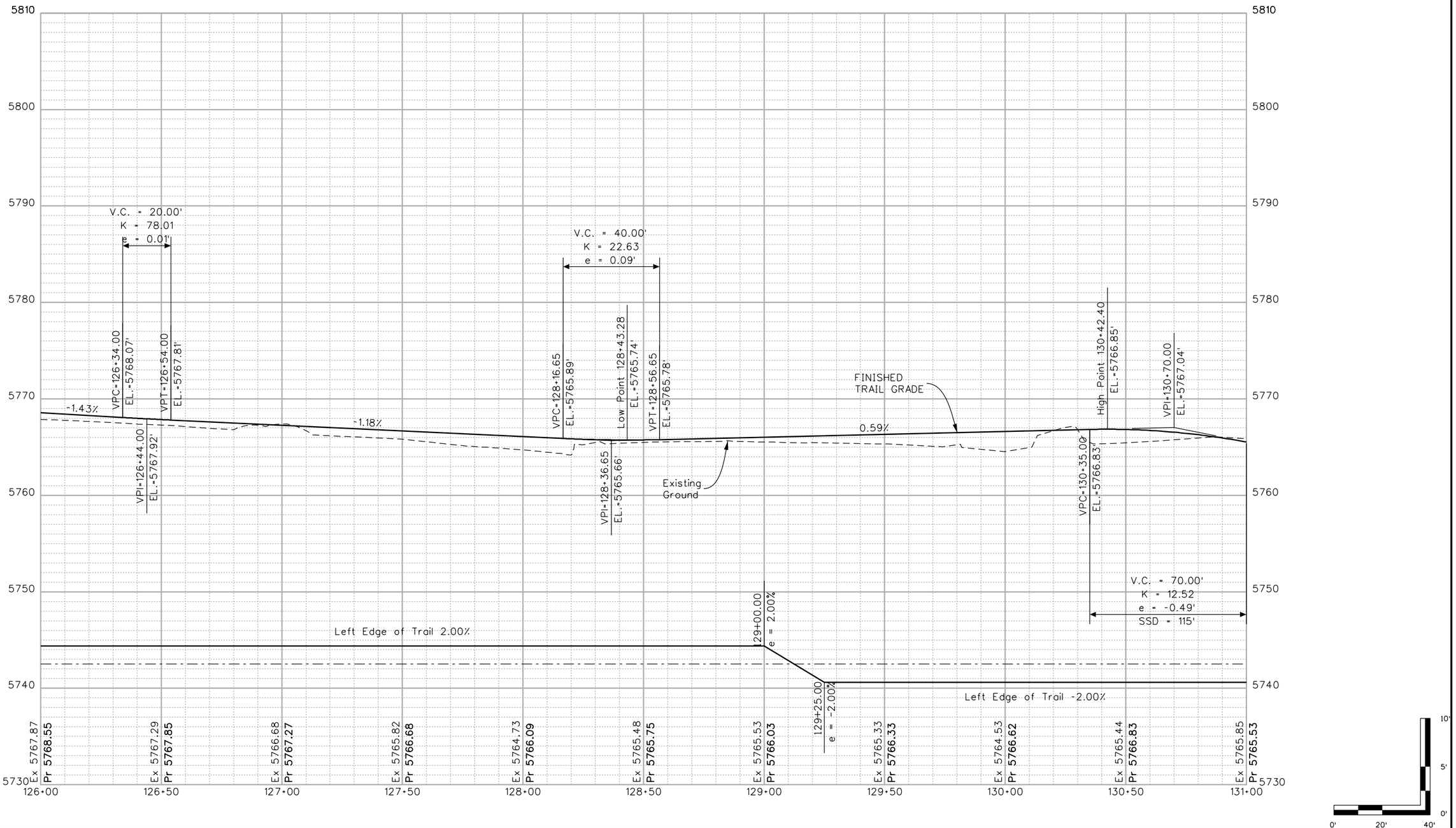
As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

TRAIL PROFILE
STA. 121+00 TO STA. 126+00

Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	PROFILE	Subset Sheets:	5 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	37



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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/16/2016			
Drawing File Name: 19888DES_Profile.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

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Sheet Revisions

Date:	Comments	Init.

Region 4

Boulder County

As Constructed

No Revisions:

Revised:

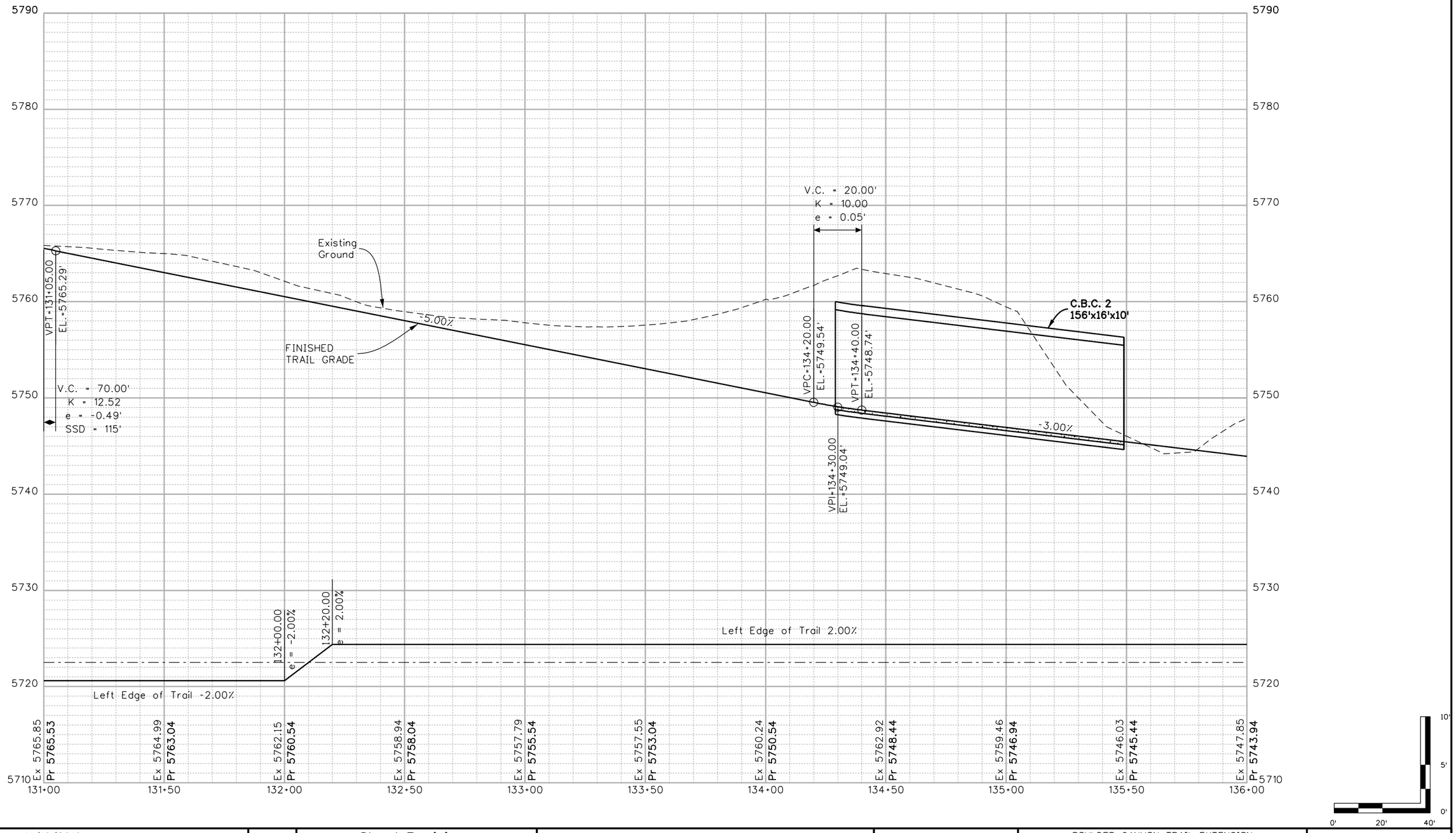
Void:

BOULDER CANYON TRAIL EXTENSION

TRAIL PROFILE
STA. 126+00 TO STA. 131+00

Designer:	SDB	Structure Numbers	
Detailer:	CZC		
Sheet Subset:	PROFILE	Subset Sheets:	6 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	38



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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/16/2016
Drawing File Name: 19888DES_Profile.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

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Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

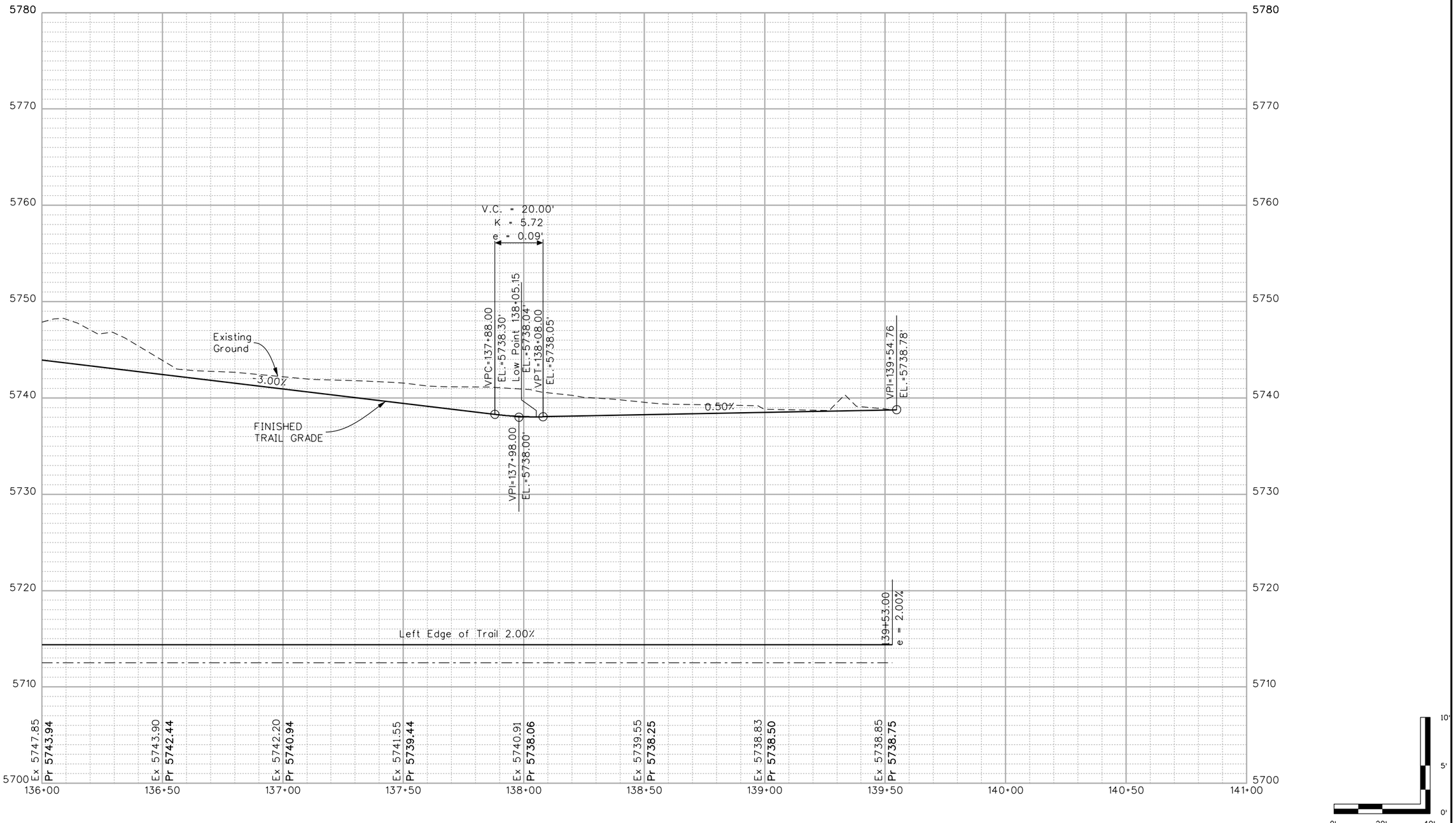
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
TRAIL PROFILE
STA. 131+00 TO STA. 136+00

Designer: SDB
Detailer: CZC
Sheet Subset: PROFILE
Structure Numbers:
Subset Sheets: 7 of 8

Project No./Code
STU C070-043
19888
Sheet Number 39



zadkison 3:24:14 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Design\Drawings\19888DES_Profile.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/16/2016			
Drawing File Name: 19888DES_Profile.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		
MULLER ENGINEERING COMPANY			

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Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

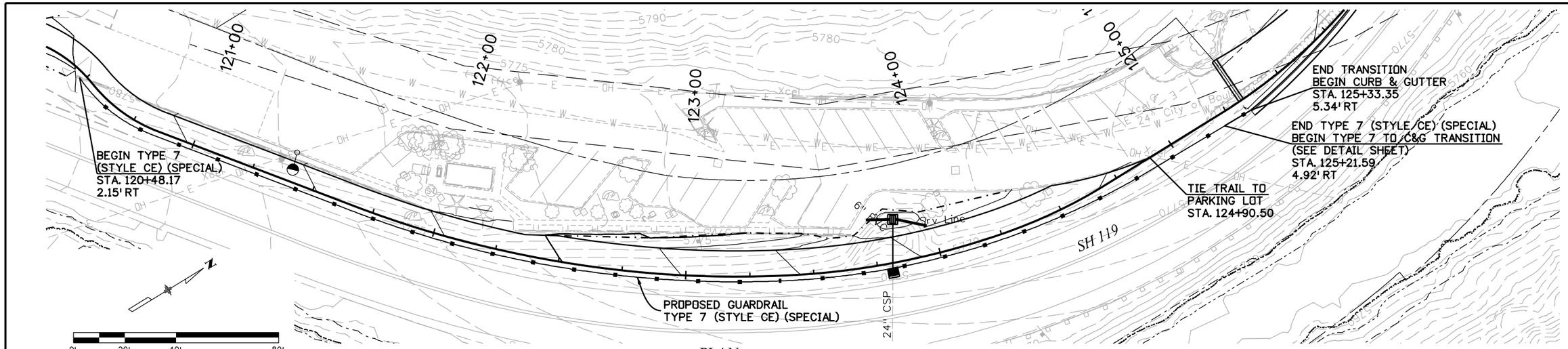
Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

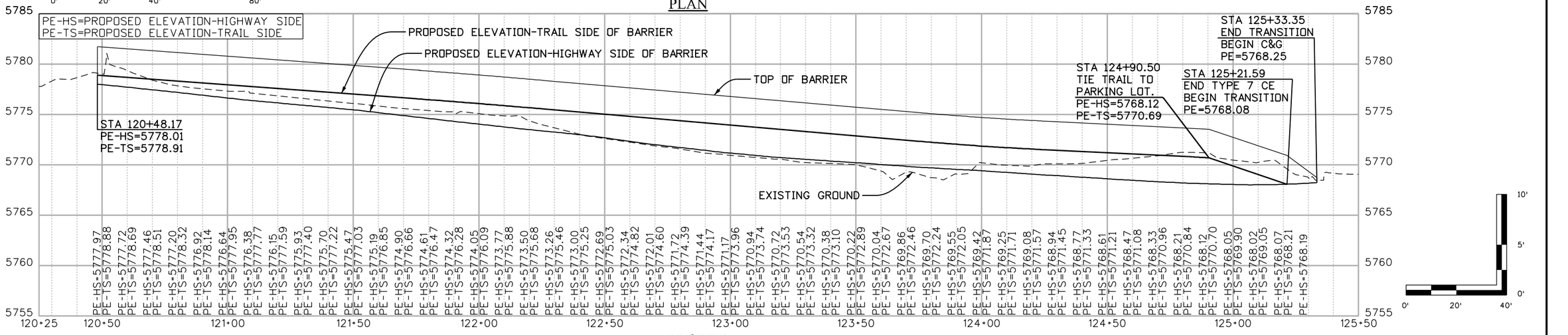
BOULDER CANYON TRAIL EXTENSION
TRAIL PROFILE
STA. 136+00 TO STA. 141+00

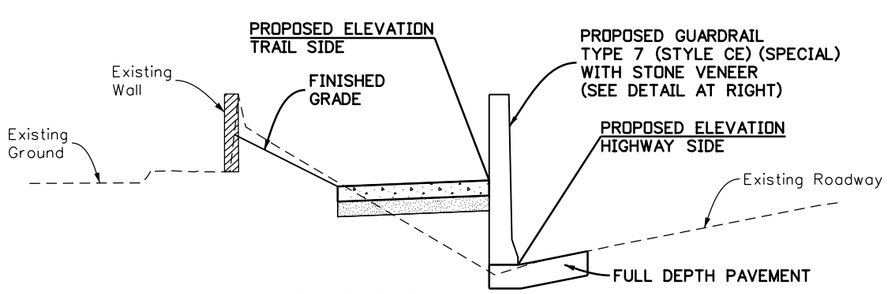
Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	PROFILE	Subset Sheets:	8 of 8

Project No./Code	
STU C070-043	
19888	
Sheet Number	40



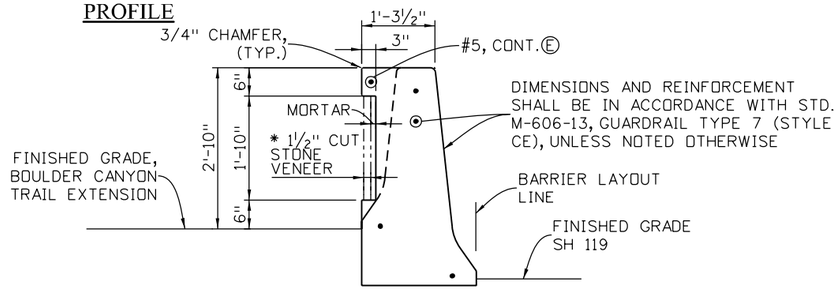
PLAN





TYPICAL SECTION

STA. 120+48.78 TO STA. 124+90.50



PROFILE

GUARDRAIL TYPE 7 (STYLE CE)(SPECIAL)

NOTES:

1. BARRIER SHOWN ON THIS SHEET IS TO BE PAID FOR AS GUARDRAIL TYPE 7 (STYLE CE) (SPECIAL) AND CONSTRUCTED PER THE DETAIL ON THIS SHEET.
2. BARRIER SHALL BE CONSTRUCTED WITH INTEGRAL COLORED CONCRETE. COLOR SHALL BE AS DIRECTED BY THE ENGINEER TO MATCH THE EXISTING ALPS INN WALL.

* SEE "ARCHITECTURAL TREATMENTS" NOTES, SHT B1 FOR CUT STONE VENEER INFORMATION.

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888DES_Type 7 Detail01.dgn	Date:	Comments	Init.
Horiz. Scale: 1:40 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

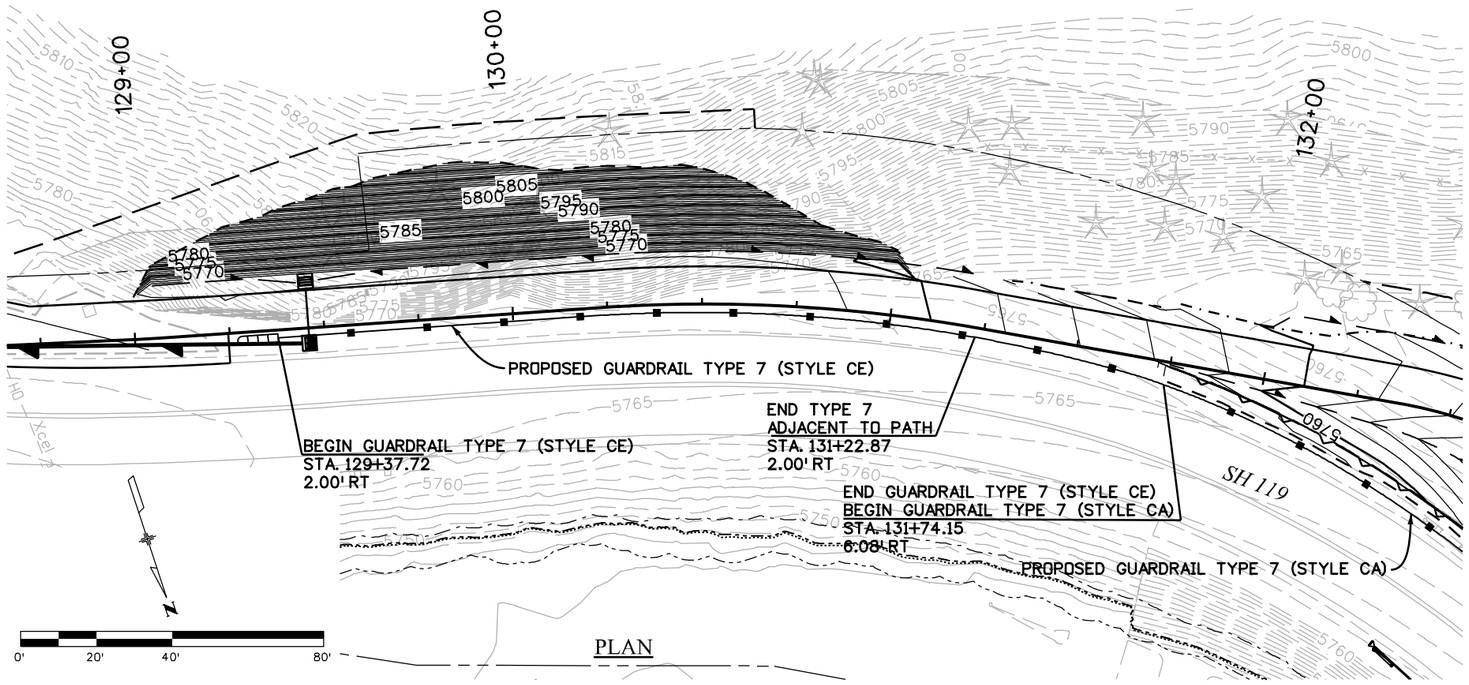
As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

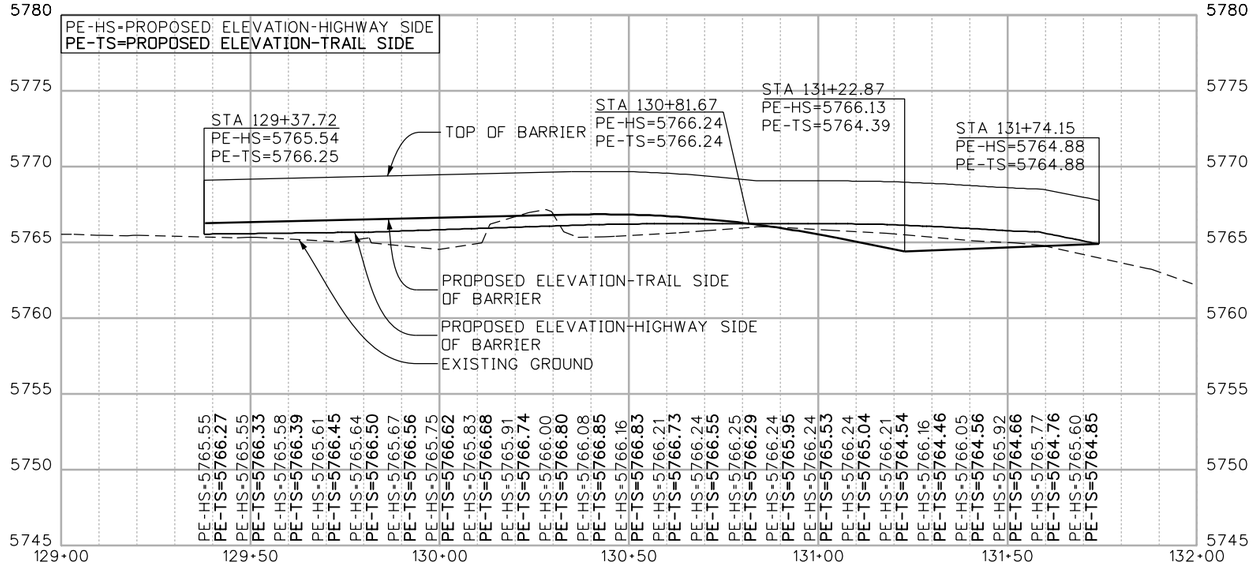
TYPE 7 GUARDRAIL DETAIL
STA. 120+48.78 TO STA. 125+33.35

Designer:	CZC	Structure Numbers	
Detailer:	CZC		
Sheet Subset:	DET	Subset Sheets:	1 of 2

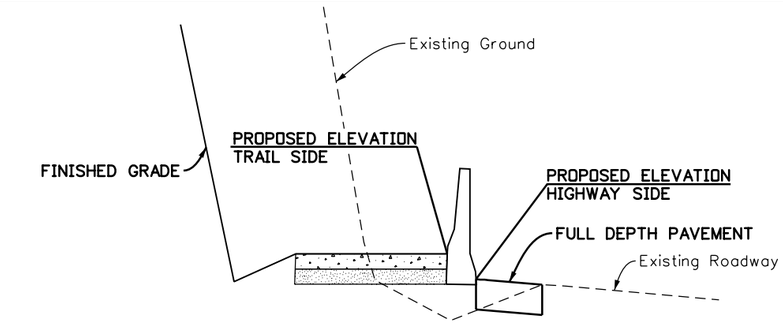
Project No./Code	
STU C070-043	
19888	
Sheet Number	41



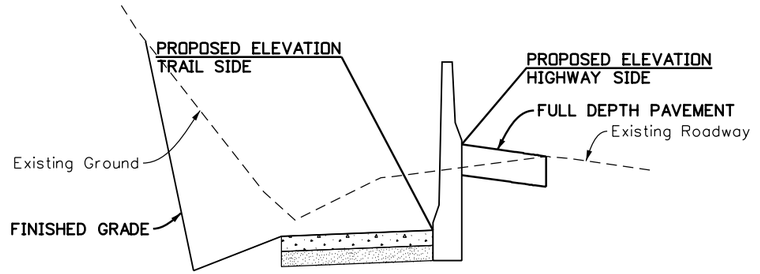
PLAN



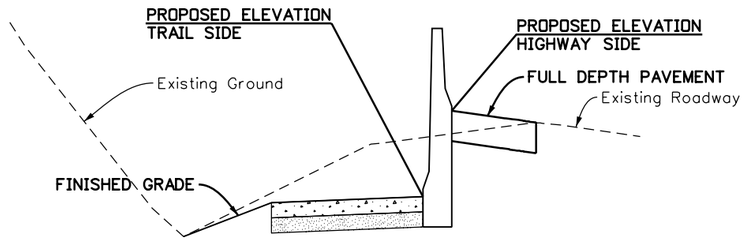
PROFILE



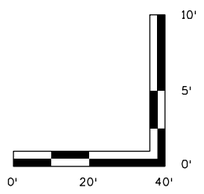
TYPICAL SECTION
TRAIL ABOVE HIGHWAY WITH ROCK CUT
STA. 129+37.72 TO STA. 130+81.67



TYPICAL SECTION
TRAIL BELOW HIGHWAY WITH ROCK CUT
STA. 130+81.67 TO STA. 131+00



TYPICAL SECTION
TRAIL BELOW HIGHWAY
STA. 131+00 TO STA. 131+74.15



NOTES:
1. BARRIER SHOWN ON THIS SHEET IS TO BE PAID FOR AS GUARDRAIL TYPE 7 (STYLE CE) AND CONSTRUCTED PER M-606-13.
2. BARRIER SHALL BE CONSTRUCTED WITH INTEGRAL COLORED CONCRETE. COLOR SHALL BE AS DIRECTED BY THE ENGINEER TO MATCH THE EXISTING ALPS INN WALL.

Print Date: 11/16/2016
Drawing File Name: 19888DES_Type 7 Detail 02.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions

Date:	Comments	Init.

Region 4

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
TYPE 7 GUARDRAIL DETAIL
STA. 129+37.72 TO STA. 131+74.15

Designer:	CZC	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	DET	Subset Sheets:	2 of 2

Project No./Code: STU C070-043
19888
Sheet Number 42

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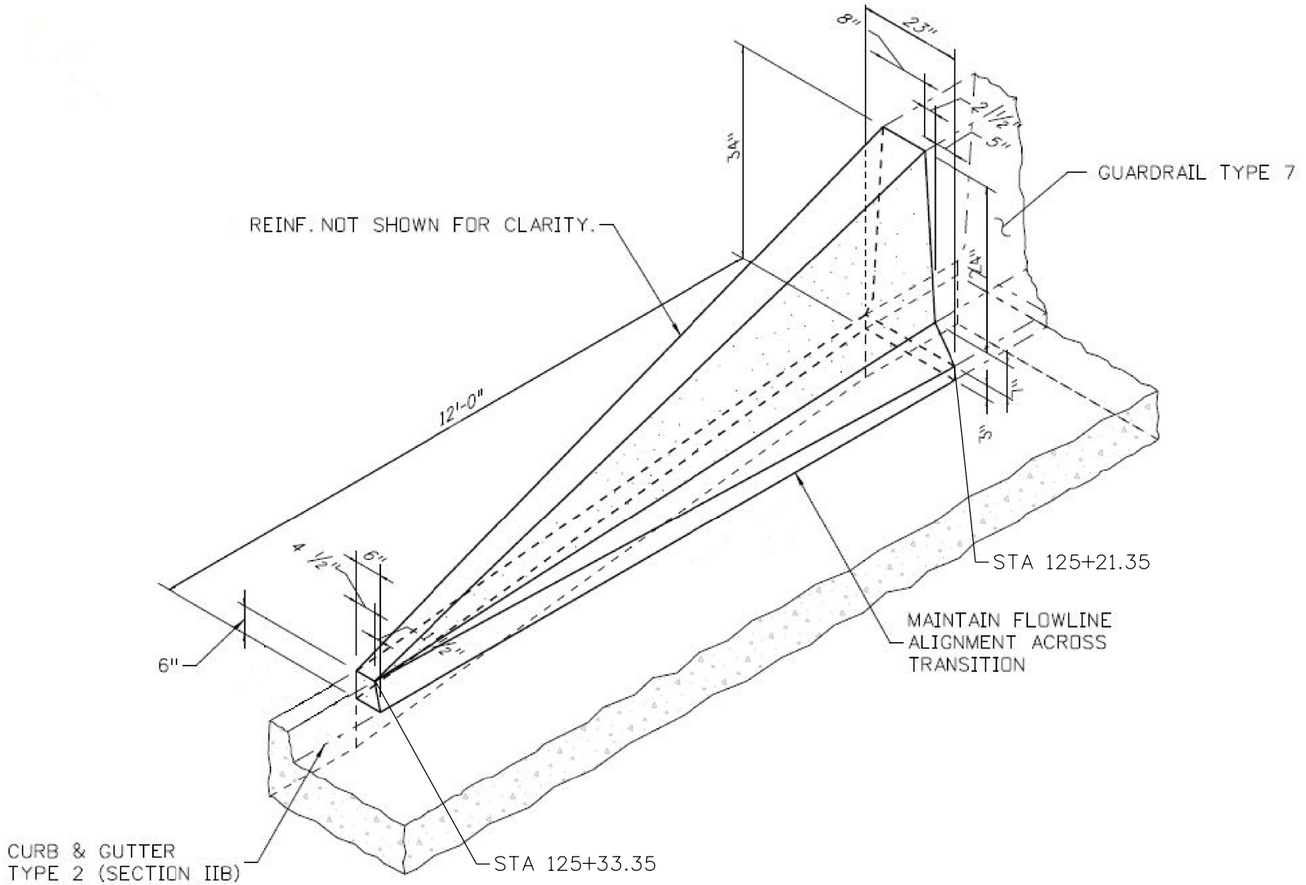


GUARDRAIL TYPE 7 TRANSITION

NOTES:

1. TRANSITION SHALL BE PAID FOR AS LF OF GUARDRAIL TYPE 7 (STYLE CE) (SPECIAL)
2. COLORED CONCRETE SHALL BE USED FOR THE TRANSITION AND SHALL MATCH THE COLORING USED ON THE REMAINDER OF THE TYPE 7 SECTION. NO STONE VENEER SHALL BE PLACED ON THE TRANSITION.

Print Date: 11/17/2016		Sheet Revisions				As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888DES_Guardrail Transition Detail.dgn		Date:	Comments	Init.		No Revisions:	TYPE 7 TRANSITION DETAIL
Horiz. Scale: 1:1 Vert. Scale: As Noted					Region 4	Revised:	Designer: CZC / Detailer: CZC / Sheet Subset: DETAIL / Structure Numbers / Subset Sheets: 1 of 1
Unit Information Unit Leader Initials					Boulder County	Void:	Project No./Code: STU C070-043 / 19888 / Sheet Number 43
MULLER ENGINEERING COMPANY							

UTILITY POTHOLE INFORMATION LOG

Pothole Date	Test Hole Number	Utility Type / Description	Alignment	Station	Offset (Ft.)	Surface Elevation	Depth to Top Feet (Inches)	Outside Diameter Feet (Inches)	Depth to Bottom Feet (Inches)	Utility Top Elevation	Utility Bottom Elevation	X Coordinate (EASTING)	Y Coordinate (NORTHING)	Comments / Remarks
08/04/16	PH-1	Water	Boulder Canyon Trail	106+01.34	40.97' RT.	5808.15	1.00 (12)	2.00 (24)	3.00 (36)	5807.15	5805.15	95935.82	97679.44	
07/30/16	PH-4B	Water	Boulder Canyon Trail	109+23.09	11.82 RT.	5800.28	5.50 (66)	1.33 (16)	6.83 (82)	5794.78	5793.45	95917.85	97941.75	
07/30/16	PH-5	Water	Boulder Canyon Trail	114+21.5	19.31 LT.	5794.35	2.00 (24)	1.33 (16)	3.33 (40)	5792.35	5791.02	95785.60	98413.77	
07/30/16	PH-6	Water	Boulder Canyon Trail	116+11.75	6.87 LT.	5792.73	4.50 (54)	1.33 (16)	5.83 (70)	5788.23	5786.90	95752.20	98595.93	
07/30/16	PH-7	Water	Boulder Canyon Trail	119+47.5	30.23 LT.	5781.60	1.92 (23)	1.33 (16)	3.25 (39)	5779.68	5778.35	95974.38	98824.38	
07/30/16	PH-8	Water	Boulder Canyon Trail	119+87.93	26.91 LT.	5780.36	1.50 (18)	1.33 (16)	2.83 (34)	5778.86	5777.53	96010.38	98843.09	
07/30/16	PH-9	Unknown	Boulder Canyon Trail	Approx. 136+25.	Approx. 0.00 On Alg.	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	N/A	N/A	Unknown utility not found. Unable to confirm any utility crossings in that area
07/30/16	PH-10	Unknown	Boulder Canyon Trail	Approx. 138+00.	Approx. 0.00 On Alg.	N/A	Unknown	Unknown	Unknown	Unknown	Unknown	N/A	N/A	Unknown utility not found. Unable to confirm any utility crossings in that area
07/30/16	PH-11	Electric	Boulder Canyon Trail	138+70.92	45.34 LT.	5751.60	2.83 (34)	0.08 (1)	2.92 (35)	5748.77	5748.68	96009.74	100084.11	
07/30/16	PH-12	Electric	Boulder Canyon Trail	139+08.84	8.29 LT.	5739.18	2.75 (33)	0.08 (1)	2.83 (34)	5736.43	5736.35	96055.13	100056.71	
08/04/16	PH-13	Water	4-Mile Canyon			5748.30	Unknown	Unknown	Unknown	Unknown	Unknown	96191.81	100230.68	Water Line not Found
08/08/16	PH-13.1	Water	4-Mile Canyon			5733.37	3.33 (40)	0.08 (1)	3.42 (41)	5730.04	5729.95	96240.08	100248.73	
08/08/16	PH-13.2	Water	4-Mile Canyon			5733.73	3.83 (46)	0.08 (1)	3.92 (47)	5729.90	5729.81	96242.38	100251.38	
08/04/16	PH-16	Water	Boulder Canyon Trail	106+04.96	130.95 RT.	5810.87	1.92 (23)	2.00 (24)	3.92 (47)	5808.95	5806.95	95887.32	97601.68	
08/04/16	PH-17	Water	Boulder Canyon Trail	106+05.67 RT.	91.4 66'	5802.11	2.00 (24)	2.00 (24)	4.00 (48)	5800.11	5798.11	95915.27	97630.05	

Print Date: 11/16/2016
Drawing File Name: 19888UTIL_Pothole Log.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
UTILITY POTHOLE TABULATION (FOR INFORMATION ONLY)

Designer: CZC
Detailer: CZC
Sheet Subset: UTIL TAB
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 44

STRUCTURAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", COLORADO DEPARTMENT OF TRANSPORATION, 2011 EDITION, AS MODIFIED BY THE PROJECT SPECIAL PROVISIONS AND THESE PLANS.

2. REFER TO REVISION OF SECTION 628 "PREFABRICATED STEEL BRIDGE" FOR SPECIFICATIONS AND REQUIREMENTS FOR THE PREFABRICATED STEEL BRIDGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH PREFABRICATED BRIDGE MANUFACTURER AND VERIFYING ALL DIMENSIONS SHOWN ON THE PLAN INCLUDING ABUTMENT SEATS AND LOCATION AND DIMENSIONS OF ANCHOR BOLTS PRIOR TO THE CONSTRUCTION OF THE BRIDGE ABUTMENTS.

3. EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION SHALL BE IN ACCORDANCE WITH M-206-1 FOR CAST-IN-PLACE RETAINING WALLS. STRUCTURE BACKFILL SHALL MEET THE REQUIREMENTS FOR STRUCTURE BACKFILL (CLASS 1) UNLESS NOTED OTHERWISE.

4. STRUCTURE BACKFILL FOR THE ABUTMENT AND WINGS SHALL BE MECHANICALLY STABILIZED SOIL IN ACCORDANCE WITH THE EXCAVATION AND BACKFILL DETAILS.

5. THE SOILS AND FOUNDATION INVESTIGATION FOR THIS PROJECT WAS PERFORMED BY YEH AND ASSOCIATES, INC. THE SUBSURFACE CONDITIONS AND RECOMMENDATIONS FOR THE STRUCTURE PROJECT ARE CONTAINED IN A REPORT DATED AUGUST 22, 2016, JOB NUMBER 215-177.

6. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL BE PRESENT TO OBSERVE THE FOUNDATION EXCAVATION PRIOR TO PLACEMENT OF SUBGRADE STABILIZATION.

7. EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

8. COVERAGE FROM THE FACE OF CONCRETE TO THE FACE OF REINFORCEMENT SHALL BE 2 INCHES, UNLESS NOTED OTHERWISE.

9. ALL REINFORCING STEEL SHALL BE BLACK REINFORCING UNLESS OTHERWISE NOTED.

10. (E) DENOTES EPOXY COATED REINFORCING STEEL.

11. THE FOLLOWING TABLE GIVES THE MINIMUM CLASS C 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.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-7"	2'-0"	2'-4"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

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

13. THE FOLLOWING TABLE GIVES THE MINIMUM CLASS C 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 D CONCRETE	1'-5"	1'-9"	2'-1"	2'-6"	3'-3"	4'-1"	5'-2"	6'-4"

14. ALL CONCRETE SHALL BE CLASS D, f'_c = 4,500 psi.

15. STRUCTURAL CONCRETE SHALL CONFORM TO CEMENTITIOUS MATERIALS REQUIREMENT CLASS 0, CORRESPONDING TO SULFATE RESISTANCE CLASS 0.

16. EXPOSED OUTSIDE CORNERS SHALL RECIEVE A ¾" CHAMFER, UNLESS NOTED OTHERWISE.

17. BACKFILL OF STRUCTURES SHALL BE IN ACCORDANCE WITH "PHASING NOTES" LOCATED ON THE EXCAVATION AND BACKFILL DETAILS SHEET. IN NO CASE SHALL STRUCTURES BE BACKFILLED UNTIL ALL MEMBERS HAVE REACHED 80-PERCENT OF DESIGN STRENGTH.

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

STRUCTURAL NOTES CONT.:

19. PERMANENT STEEL DECK FORMS ARE ALLOWED.

20. 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 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

DESIGN DATA:

AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, 2" EDITION (2016 INTERIM)

AASHTO LRFD BRIDGE SPECIFICATIONS, 7" EDITION (2016 INTERIM)

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN

LIVE LOAD: VEHICLE LOAD: 10,000 LBS (H-5) OR PEDESTRIAN LOAD: 90 PSF

DEAD LOAD: SELF-WT AND WEIGHT OF SOIL OVERBURDEN (WHERE APPLICABLE)

SOIL PARAMETERS:

UNIT WEIGHT: 135 PCF

EQUIV. FLUID PRESSURES: 38 PCF (ACTIVE)
60 PCF (AT-REST)

ALLOWABLE BEARING PRESSURE: 2500 x B' x (1-tan(W))'

REINFORCED CONCRETE:

CDOT CLASS D: f'_c = 4,500 PSI

REINFORCING STEEL: f_y = 60,000 PSI

STEEL PILING:

AASHTO M270 (ASTM A572) GRADE 50 (F_y = 50,000 PSI)

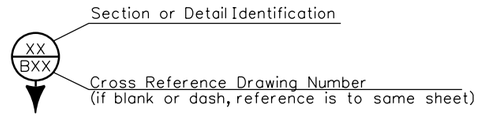
REACTIONS AT BEARINGS (USED IN SUBSTRUCTURE DESIGN)

DEAD LOAD: 12.9 KIPS/BEARING x 4

LIVE LOAD: 15.7 KIPS/BEARING x 4

ABBREVIATIONS

EF = EACH FACE	TO = TOP OF
TOW = TOP OF WALL	BF = BACK FACE
BO = BOTTOM OF	BRG = BEARING
FF = FRONT FACE	OC = ON CENTER



SHEET LIST:

STEEL PILING NOTES:

1. ALL PILES ARE HP12x74.

2. REINFORCING PILE TIP (SEE DETAIL) REQUIRED FOR ALL PILES.

3. PILES ARE ALL END BEARING AND SHALL BE DRIVEN TO REFUSAL.

4. IT IS ANTICIPATED THAT PRE-DRILLING AND BLASTING WILL BE REQUIRED TO FACILITATE PILE DRIVING, SEE DETAIL SHT. B7.

5. WAVE EQUATION ANALYSIS IS REQUIRED FOR THIS PROJECT TO VERIFY THE SUITABILITY OF THE DRIVING HAMMER. THE CONTRACTOR SHALL PERFORM THE ANALYSIS PRIOR TO THE START OF CONSTRUCTION. THE RESULTS OF THE ANALYSIS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

6. THE CONTRACTOR SHALL CONDUCT A PILE DRIVING ANALYSIS (PDA) ON A MINIMUM OF ONE PILE AT EACH ABUTMENT.

7. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL BE PRESESENT DURING THE START OF EACH PILE DRIVING.

8. IN ACCORDANCE WITH SECTION 502, THE GEOTECHNICAL ENGINEER SHALL DEVELOP VIRTUAL REFUSAL CRITIERA DURING CONSTRUCTION USING THE RESULTS OF THE PDA.

ARCHITECTURAL TREATMENT

1. THE SELECTION OF STONE VENEER TYPE AND MANUFACTURER SHALL BE BY THE OWNER. THE CONTRACTOR SHALL PROVIDE VENEER SAMPLES AND MOCKUPS AS REQUIRED BY THE PROJECT SPECIAL PROVISIONS. THE MAXIMUM THICKNESS OF VENEER SHALL BE 1½". VENEER SHALL BE ATTACHED BY MEANS OF ADHESIVE MORTAR IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS. PAYMENT FOR ALL WORK SHALL BE MADE UNDER (601) CUT STONE VENEER.

2. EXPOSED CONCRETE NOT RECEIVING VENEER SHALL BE GIVEN A CLASS 2 RUBBED FINISH (INCLUDED IN THE COST OF THE CONCRETE (CLASS D.)

811 Know what's **below** **Call** before you dig.

Design: Designed By | INITIAL | DATE | Checked By
Detail: Detailed By | INITIAL | DATE | Checked By
Quantities: Quantities By | INITIAL | DATE | Checked By

zadkison 3:24:46 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_GeneralNotes.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016			
Drawing File Name: 19888BRG_GeneralNotes.dgn			
Horiz. Scale: 1:1	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION
PEDESTRIAN BRIDGE GENERAL NOTES

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B1 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	45

Summary of Quantities

BOULDER CANYON TRAIL EXTENSION

ITEM NO.	DESCRIPTION	UNIT	PED BRIDGE	CBC 1	CBC 2	TOTAL
206-00000	Structure Excavation	CY	85	1005	1815	2905
206-00065	Structure Backfill (Flow-Fill)	CY		360	415	775
206-00100	Structure Backfill (Class 1)	CY	140	685	430	1255
206-00360	Mechanical Reinforcement of Soil	CY	140			140
206-00510	Filter Material (Class A)	CY		75	125	200
206-01781	Shoring (Area 1)	L S		1		1
206-01782	Shoring (Area 2)	L S		1		1
206-01783	Shoring (Area 3)	L S			1	1
206-01784	Shoring (Area 4)	L S			1	1
206-01785	Shoring (Area 5)	L S			1	1
420-00113	Geotextile (Drainage) (Class 2)	SY		485	755	1240
420-00114	Geotextile (Drainage) (Class 3)	SY			35	35
502-00100	Drilling Hole to Facilitate Pile Driving	LF	30			30
502-00140	Blast Hole to Facilitate Pile Driving	LF	60			60
502-00460	Pile Tip	EACH	6			6
502-11274	Steel Piling (HP 12x74)	LF	136			136
504-04430	Reinforced Concrete Facing	SF			495	495
514-00200	Pedestrian Railing (Steel)	LF	60	207	334	601
601-03000	Concrete Class D	CY			21	21
601-03040	Concrete Class D (Bridge)	CY	44			44
601-03050	Concrete Class D (Wall)	CY	24	197	165	386
601-40005	Cut Stone Veneer	SF	574	1122	1496	3192
601-40400	Structural Concrete Stain	SY		36	36	72
601-XXXXX	Concrete (Class G)	CY		15	25	40
602-00000	Reinforcing Steel	LB	8135	29970	24700	62805
603-50006	6 Inch Plastic Pipe	LF		138		138
603-71609	16x9 Foot Concrete Box Culvert (Precast)	LF		72		72
603-71610	16x10 Foot Concrete Box Culvert (Precast)	LF			120	120
604-19000	Inlet Special	EACH		1		1
605-00040	4 Inch Perforated Pipe Underdrain	LF			69	69
605-83002	Geocomposite Drain with Pipe	SY		183	262	445
605-84000	Subsurface Drain Outlet	LF		55	44	99
619-30320	4 Inch Galvanized Pipe	LF			14	14
628-00070	Bridge Girder and Deck Unit (70 Feet to 75 Feet)	EACH	1			1

NOTES:

■ INCLUDES 12 CY TRAIL APPROACH SLAB

▲ INCLUDES 2790 lbs OF TRAIL REINFORCEMENT

● INCLUDES 136 LF BIKEWAY MOUNTED PEDESTRIAN RAILING

Know what's **below** **Call** before you dig.

Design | INITIAL | DATE | Designed By | Checked By
Detail | INITIAL | DATE | Detailed By | Checked By
Quantities | INITIAL | DATE | Quantities By | Checked By

zadkison 3:24:53 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_Summary of Quantities.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016
Drawing File Name: 19888BRG_Summary of Quantities.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions

Date:	Comments	Init.

Region 4

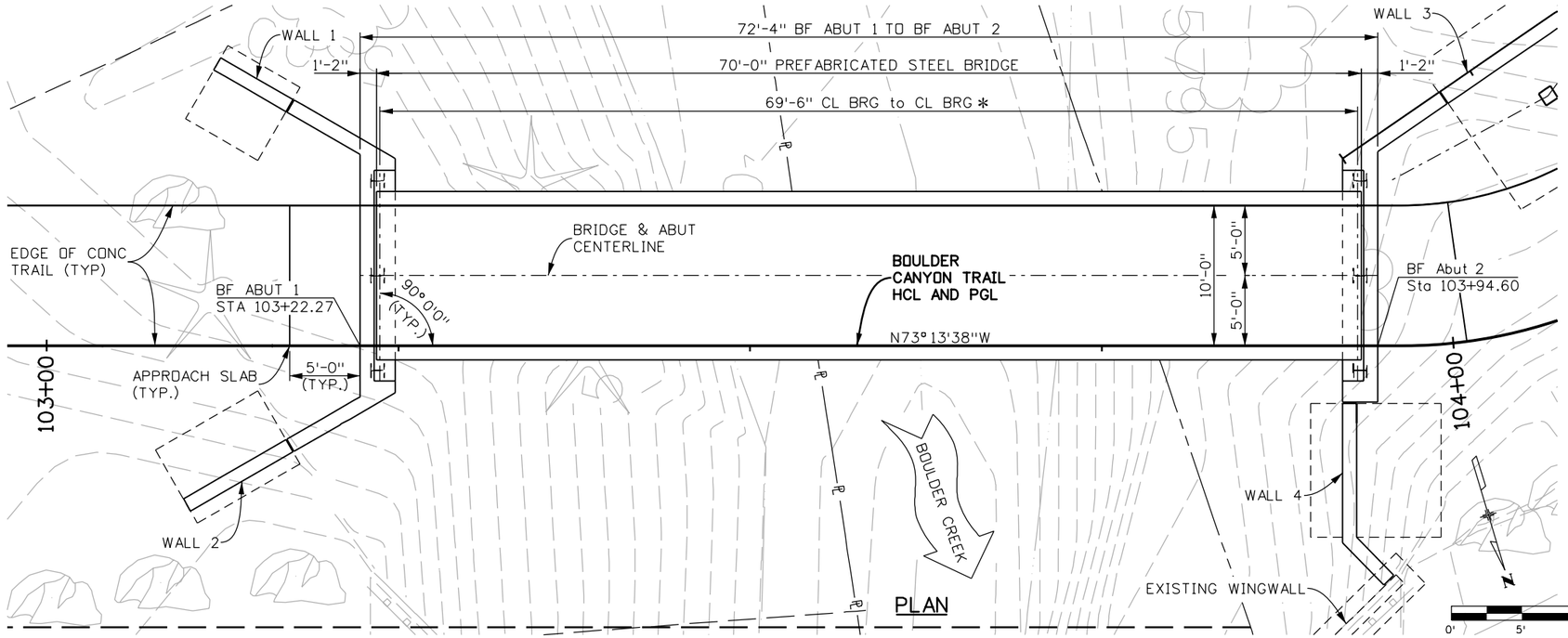
Boulder County

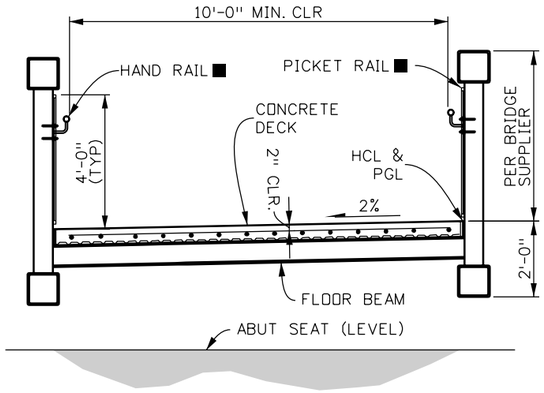
As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
SUMMARY OF QUANTITIES

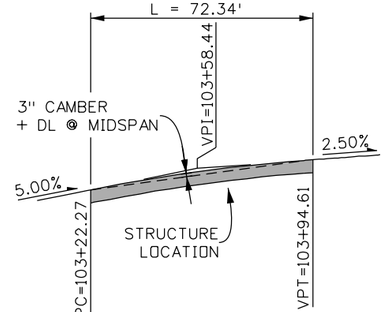
Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B2 of B25

Project No./Code
STU C070-043
19888
Sheet Number 46

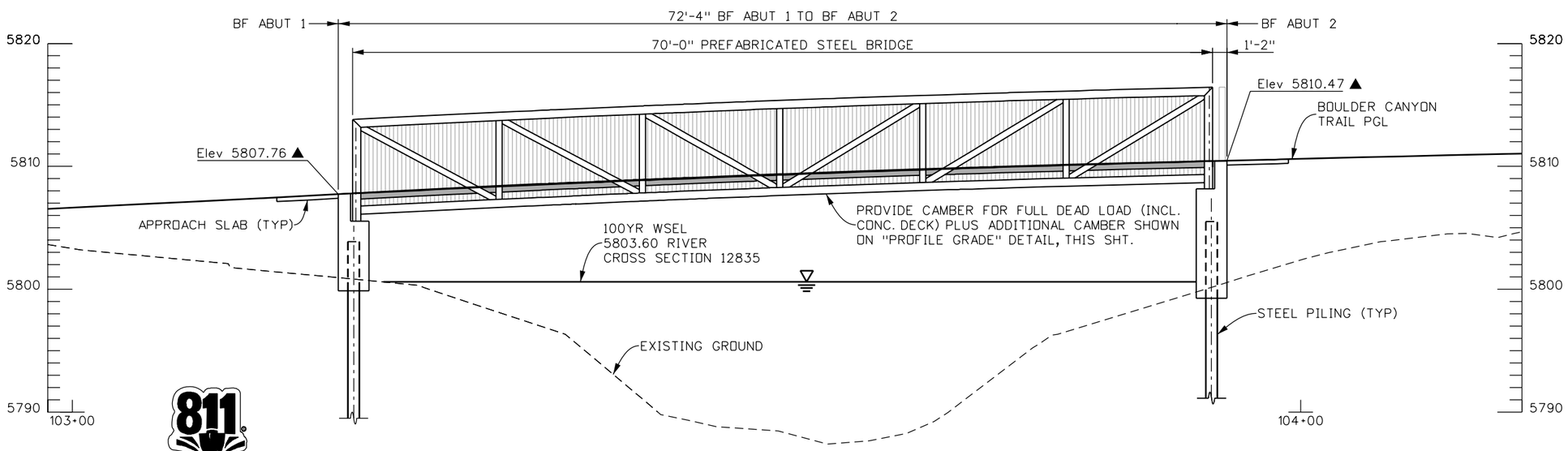




TYPICAL SECTION
N.T.S.



PROFILE GRADE



ELEVATION

Know what's **below** **Call** before you dig.

NOTES:

▲ FINISHED GRADE ELEVATION AT PROFILE GRADE LINE.

* REFER TO BRIDGE SHOP DRAWINGS FOR DIMENSIONS. CROSS-REFERENCE AND VERIFY DIMENSIONS PRIOR TO CONSTRUCTION.

■ SEE SHT B24 FOR PEDESTRIAN BRIDGE STEEL RAILING DETAIL

1. TRUSSES AND RAILING SHOWN ON THIS SHEET ARE A GENERAL REPRESENTATION ONLY. REFERENCE PROJECT SPECIFICATIONS, SECTION 628 FOR BRIDGE REQUIREMENTS.
2. SEE TRAIL GEOMETRY AND TRAIL PROFILE SHEETS FOR HCL AND PGL INFORMATION.
3. SEE SHT. B4 FOR RIPRAP DETAILS AT ABUTMENTS.

Design	INITIAL	DATE
Designed By		
Checked By		

Detail	INITIAL	DATE
Detailed By		
Checked By		

Quantities	INITIAL	DATE
Quantities By		
Checked By		

zadkison 11/16/2016 3:25:01 PM d:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge Drawings\19888BRG_Bridge Gen Layout.dgn
CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016
Drawing File Name: 19888BRG_Bridge Gen Layout.dgn
Horiz. Scale: 1:10 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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Sheet Revisions		
Date:	Comments	Init.

Region 4

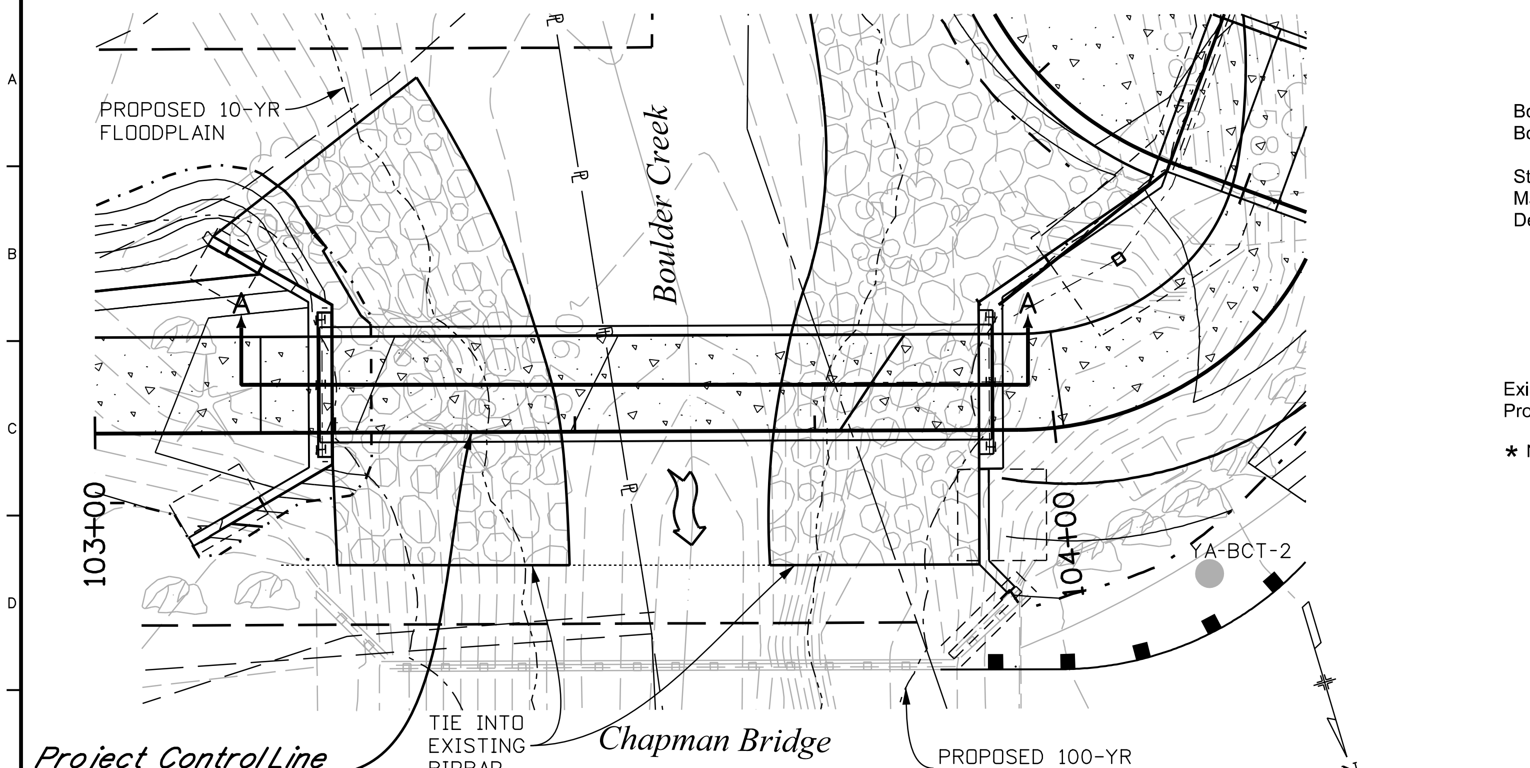
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
PEDESTRIAN BRIDGE GENERAL LAYOUT

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B3 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	47



PLAN

CHANNEL DESCRIPTION

Bottom Material - Cohesive☐ Non Cohesive ■
Bottom Material Size - Clay ☐ Silt☐ Sand ■ Gravel ■
Cobbles ■ Other ________
Stream Form - Straight☐ Meandering☐ Braided ☐
Mannings "n" for Design - Channel 0.05 Overbank 0.045-0.072
Debris - Brush ■ Trees/Logs ■ Ice ■ Other ________

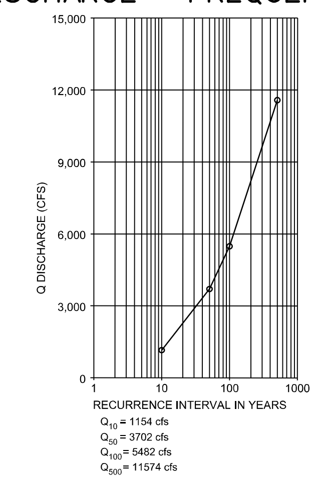
COMPARISON OF HYDRAULICS

100 YR DISCHARGE = 5482 cfs (DESIGN)

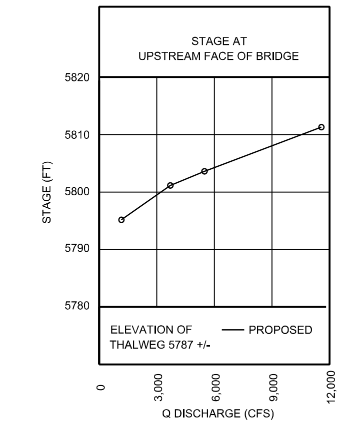
	VELOCITY	FREEBOARD *	HEAD LOSS
Existing Condition	N/A ft/s	N/A	N/A
Proposed (bridge)	11.16 ft/s	2.66'	0.67'

* NOTE: FREEBOARD VALUES SHOWN ARE THE ACTUAL FREEBOARD VALUES PROVIDED (NOT MINIMUM REQ'D) MEASURED AT 75' UPSTREAM BRIDGE FACE. (MINIMUM REQ'D = 1.33')

BOULDER CREEK DISCHARGE - FREQUENCY

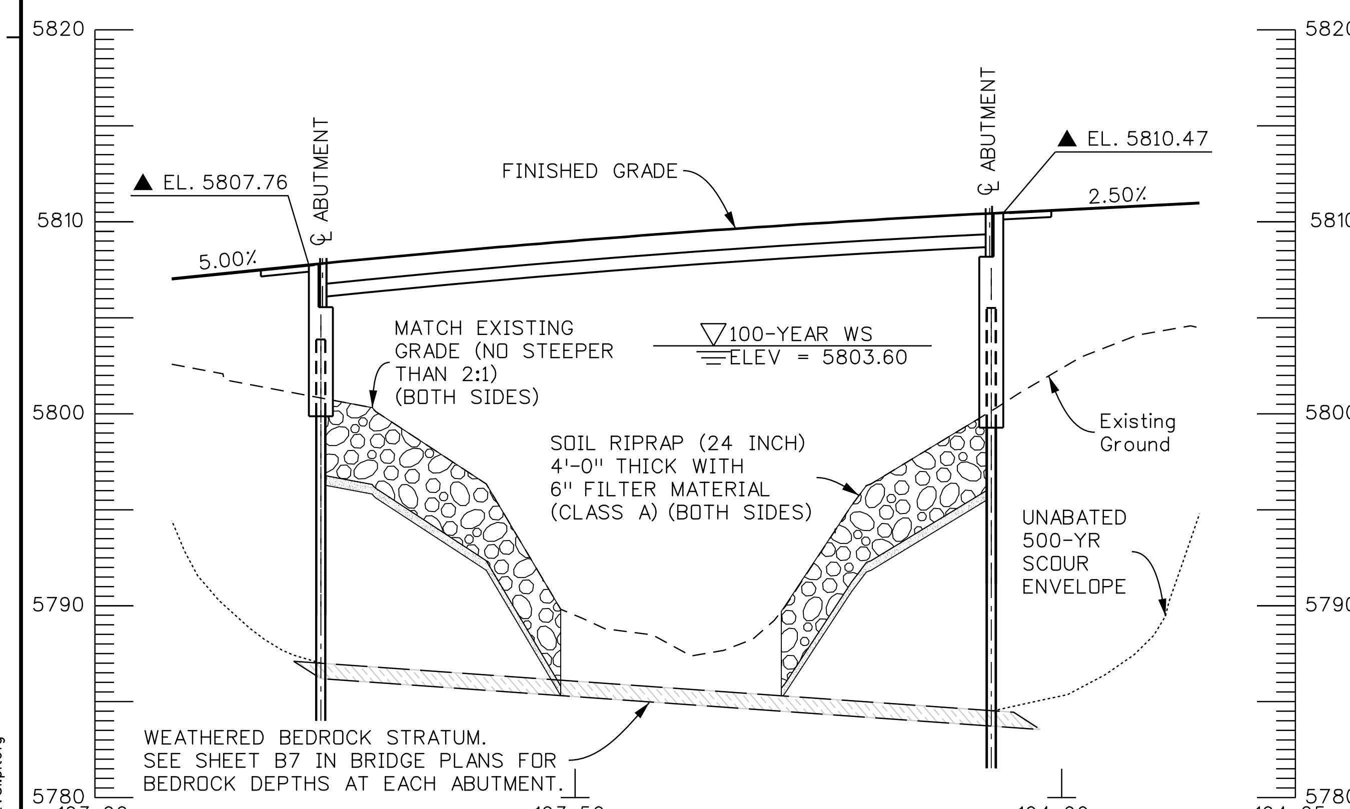


STAGE - DISCHARGE



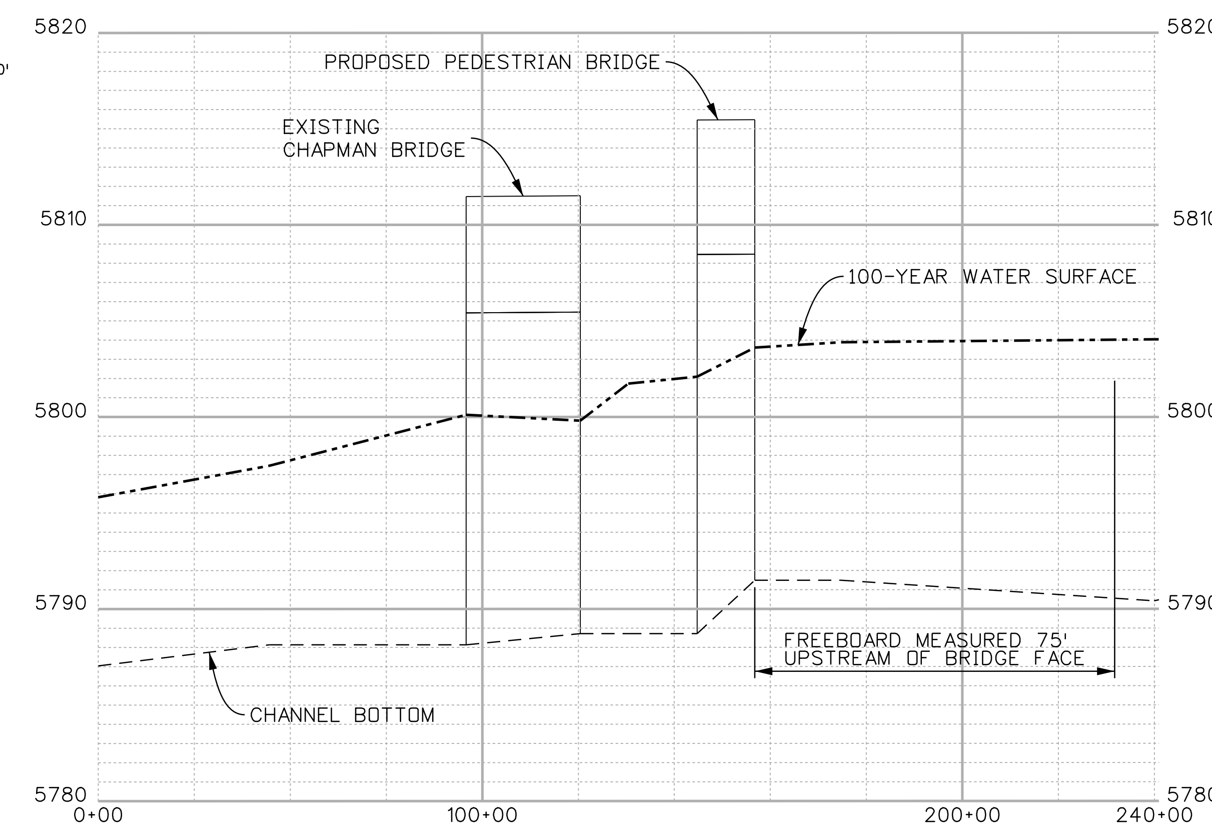
HYDRAULIC INFORMATION

D.A. = ___ SQ. MILES	$Q_{(100)}$ = 5,482 cfs	$Q_{(500)}$ = 11,574 cfs
OHW = ___ FT (DEPTH)	$WSEL_{(100)}$=5803.60 FT	$WSEL_{(500)}$ = 5811.27 FT
	$V_{(100)}$ = 11.16 FPS (IN BRIDGE)	$V_{(500)}$ = 8.35 FPS (IN BRIDGE)



SECTION A-A

(TAKEN AT HORIZONTAL CONTROL LINE)
ELEVATION SHOWN AT PROFILE GRADE LINE



HYDRAULIC PROFILE

SCALE: HORIZ 1" = 40'
VERT 1" = 10'

811 Know what's below Call before you dig.

Print Date: 11/17/2016		
Drawing File Name: 19888BRG_Hydraulics.dgn		
Horiz. Scale: 1:20	Vert. Scale: As Noted	
Unit Information	Unit Leader Initials	

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Sheet Revisions

Date:	Comments	Init.

CDOT CO Region 4

Boulder County

As Constructed
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Revised:
Void:

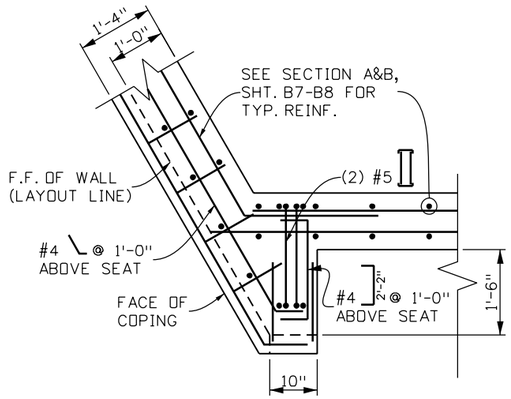
BOULDER CANYON TRAIL EXTENSION
BRIDGE HYDRAULICS

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B4 of B25

Project No./Code
STU C070-043
19888
Sheet Number 48

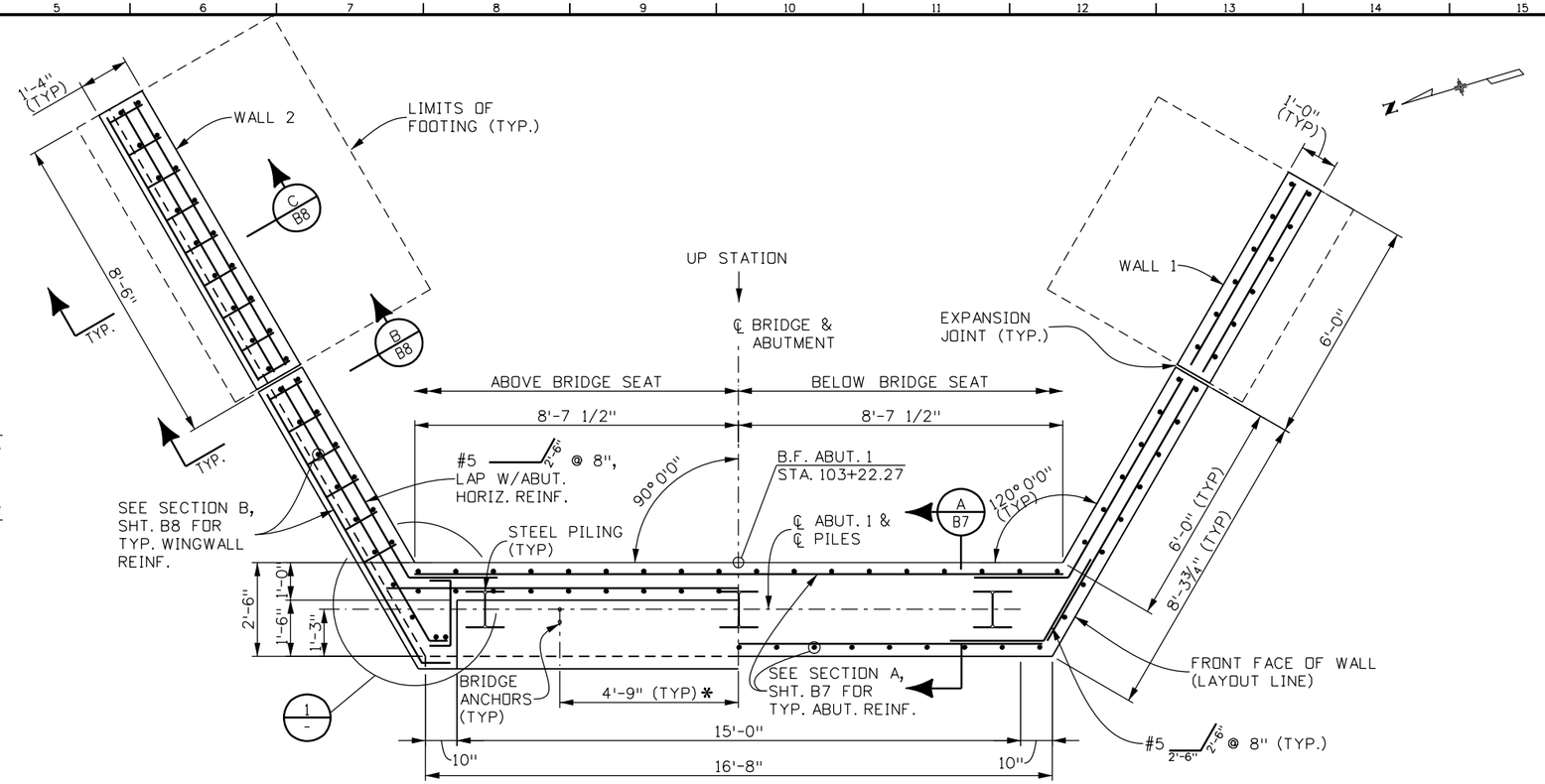
Design			Detail			Quantities		
Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
Checked By			Checked By			Checked By		

StevenB 3:51:11 PM C:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888 Bridge Drawings\19888BRG_Hydraulics.dgn
11/17/2016 CDOT-PDFHighQuality_V8i.pltcfg



ABUTMENT DETAIL (1/-) (1/B6)

(LT WING SHOWN, RT WING IS SAME, OPPOSITE HAND)
SCALE: 3/8" = 1'-0"



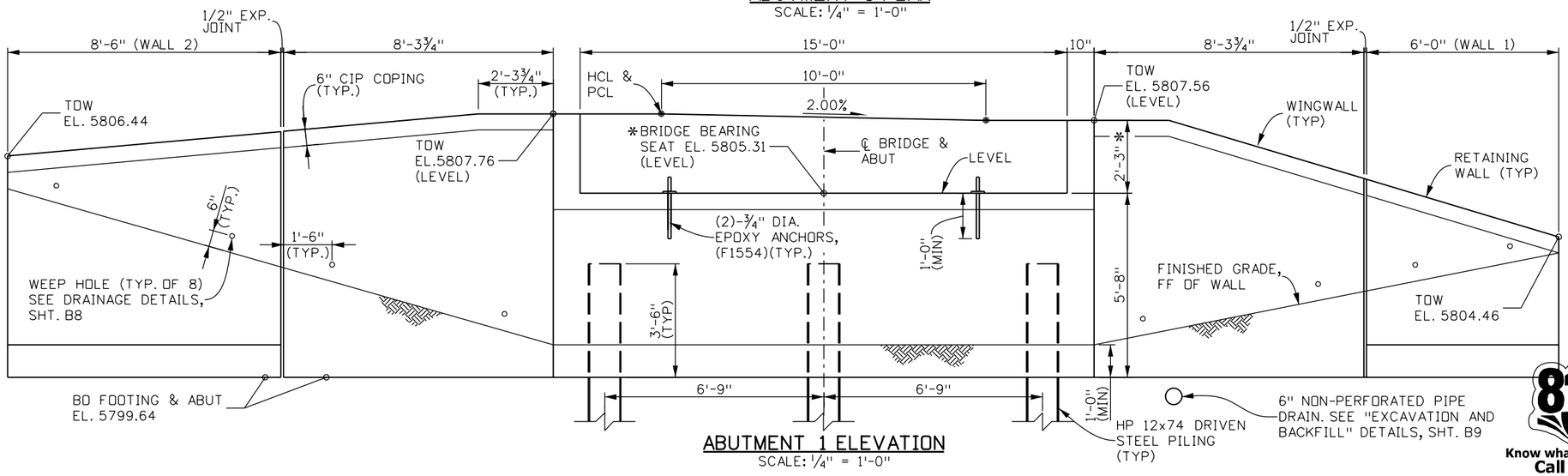
ABUTMENT 1 PLAN

SCALE: 1/4" = 1'-0"

NOTES:

* REFER TO BRIDGE SHOP DRAWINGS FOR DIMENSIONS, CROSS REFERENCE AND VERIFY PRIOR TO CONSTRUCTION.

1. SEE SHT. B4 FOR RIPRAP DETAILS AND ABUTMENT GRADING.
2. SEE SHT. B10-B11 FOR RAILING AND ARCHITECTURAL TREATMENTS.
3. SEE SHT. B9 FOR EXCAVATION AND BACKFILL REQUIREMENTS.



ABUTMENT 1 ELEVATION

SCALE: 1/4" = 1'-0"

Know what's **below** **Call** before you dig.

Design			Detail			Quantities		
Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
Checked By			Checked By			Checked By		

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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888BRG_Bridge Abut 1.dgn	Date:	Comments	Init.
Horiz. Scale: 1:1 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

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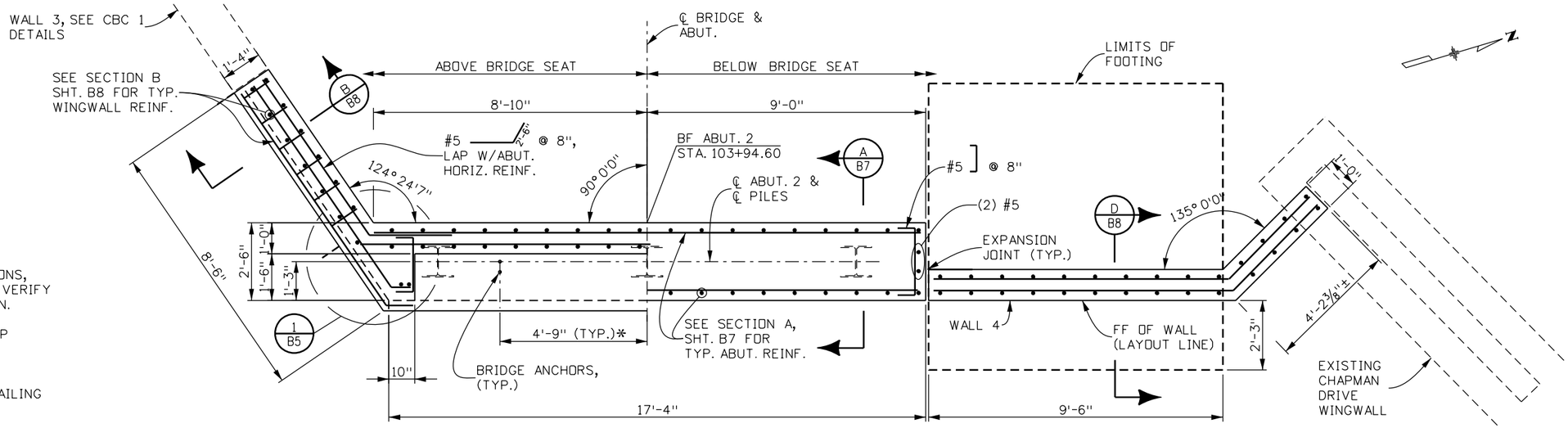
Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	PEDESTRIAN BRIDGE ABUTMENT 1 DETAILS			STU C070-043
Revised:	Designer: ASP	Structure Numbers		19888
Void:	Detailer: LJLJ			Sheet Number 49
	Sheet Subset: BRIDGE	Subset Sheets: B5 of B25		



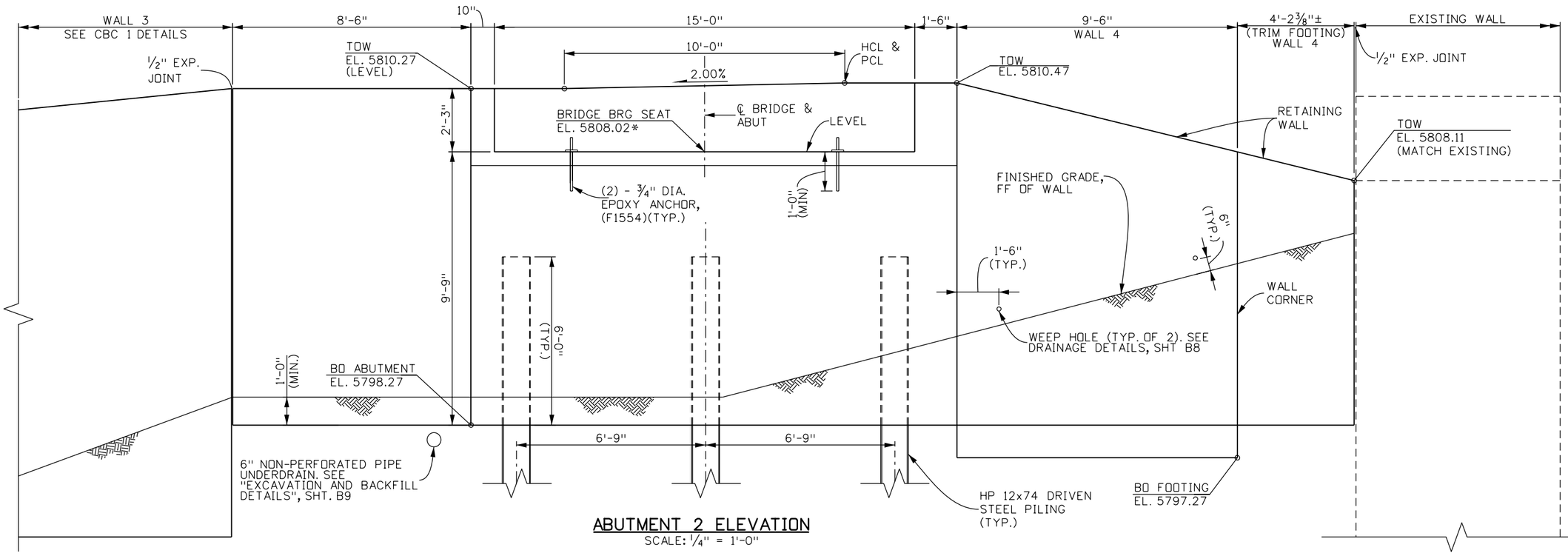
NOTES:

* REFER TO BRIDGE SHOP DRAWINGS FOR DIMENSIONS, CROSS REFERENCE AND VERIFY PRIOR TO CONSTRUCTION.

1. SEE SHT. B4 FOR RIPRAP DETAILS AND ABUTMENT GRADING.
2. SEE SHT. B10-B11 FOR RAILING AND ARCHITECTURAL TREATMENTS.
3. SEE SHT. B9 FOR EXCAVATION AND BACKFILL REQUIREMENTS.

ABUTMENT 2 PLAN

SCALE: 1/4" = 1'-0"



ABUTMENT 2 ELEVATION

SCALE: 1/4" = 1'-0"

Design	INITIAL	DATE	Detail	INITIAL	DATE	Quantities	INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		

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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date:	11/16/2016
Drawing File Name:	19888BRG_Bridge Abut 2.dgn
Horiz. Scale:	1:1
Vert. Scale:	As Noted
Unit Information	Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

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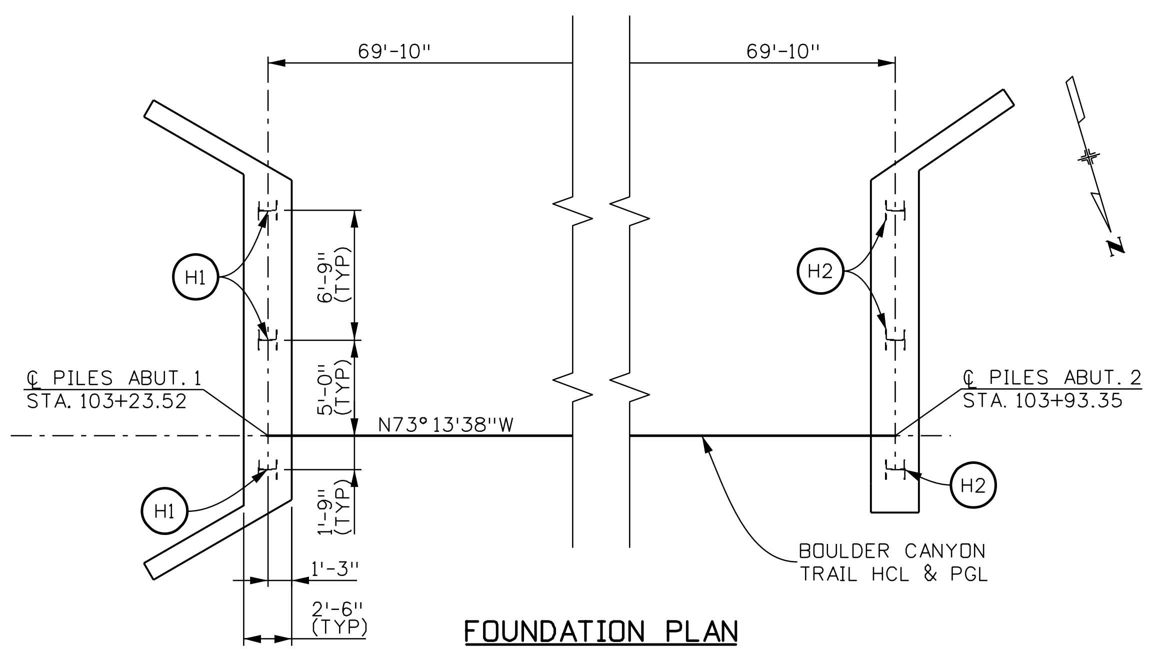
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

PEDESTRIAN BRIDGE ABUTMENT 2 DETAILS

Designer:	JDM	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B6 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	50

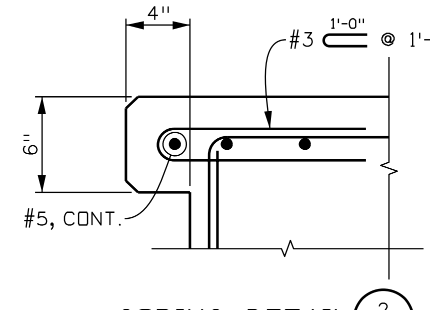


FOUNDATION PLAN

SCALE: 1" = 10'-0"

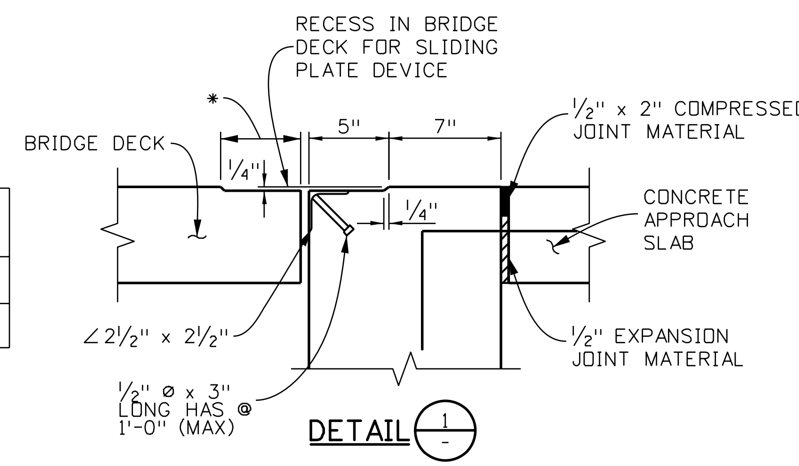
PILE SCHEDULE

PILE	SIZE	ESTIMATED BEDROCK ELEV.	ESTIMATED TIP ELEVATION	TOP OF PILE ELEVATION	DESIGN WORKING LOAD (KIP)
H1	HP 12x74	5787.00	5784.00	5803.14	40.0
H2	HP 12x74	5782.00	5779.00	5804.27	66.0



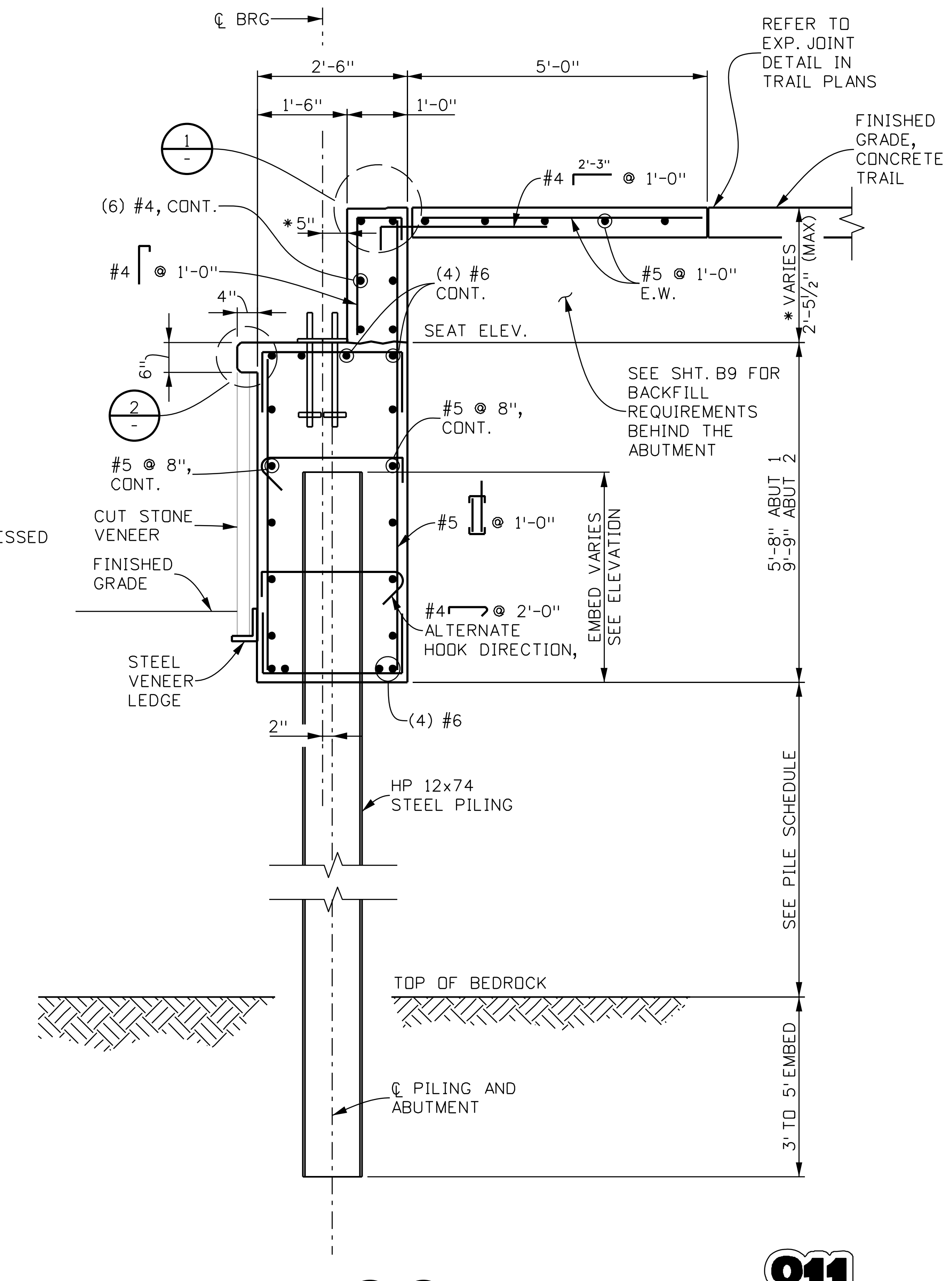
COPING DETAIL (2) B8, B22-B23

SCALE: 1" = 1'-0"



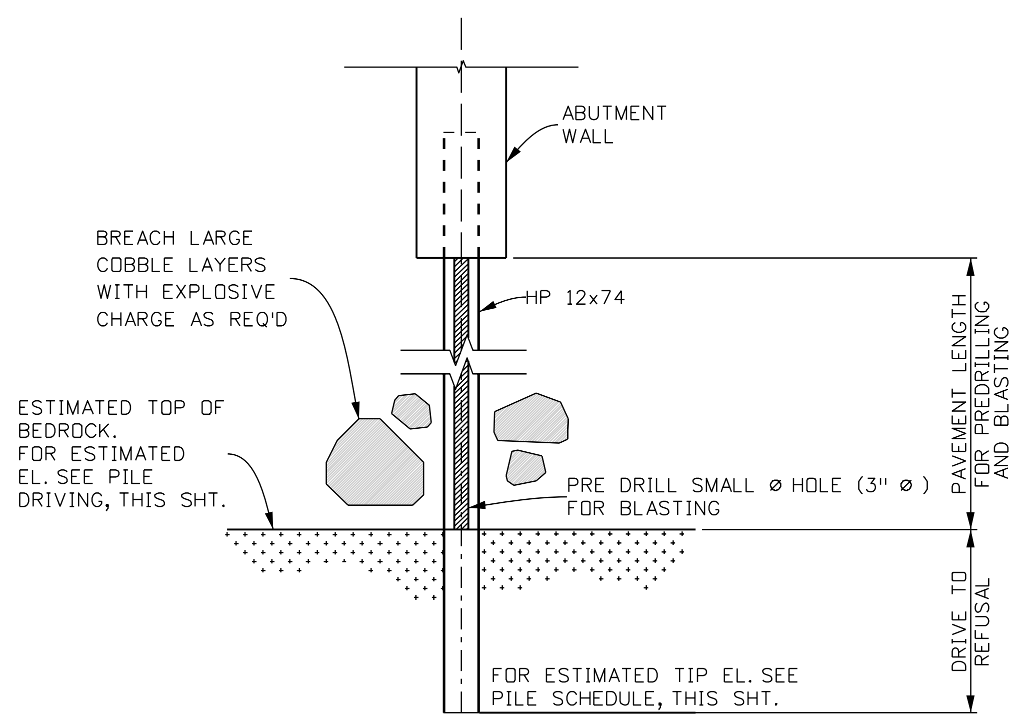
DETAIL (1)

* REFER TO BRIDGE SHOP DRAWINGS FOR DIMENSIONS, CROSS REFERENCE AND VERIFY PRIOR TO CONSTRUCTION

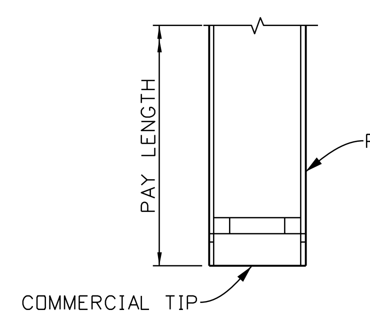


SECTION (A/B5) (A/B6)

SCALE: 3/8" = 1'-0"



PILING PRE-DRILLING AND BLASTING DETAIL



REINFORCING PILE TIP

ATTACH REINFORCING TIP PER MANUFACTURER'S INSTRUCTIONS

811 Know what's below Call before you dig.

Print Date: 11/16/2016
Drawing File Name: 19888BRG_Bridge Abut Det 01.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT CO Region 4

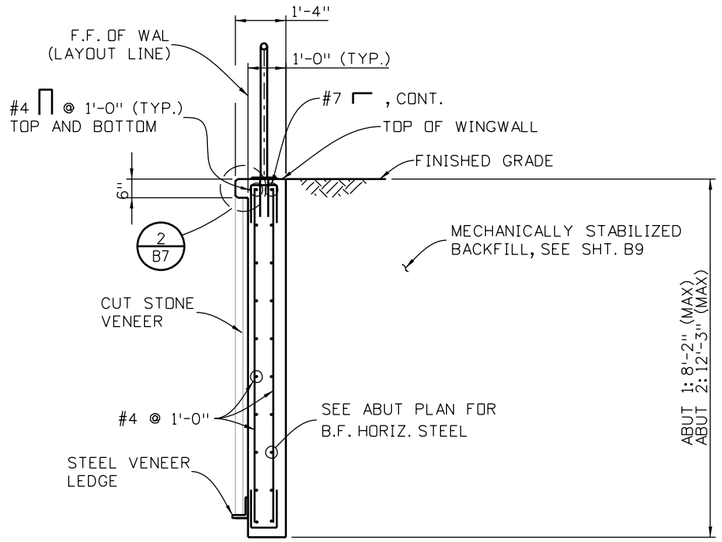
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
PEDESTRIAN BRIDGE
ABUTMENT DETAILS (1 OF 2)
Designer: ASP
Detailer: LJLJ
Structure Numbers
Sheet Subset: BRIDGE Subset Sheets: B7 of B25

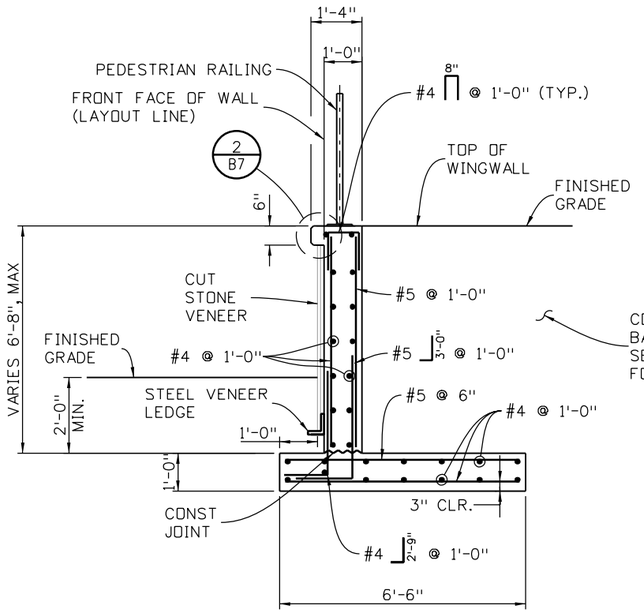
Project No./Code
STU C070-043
19888
Sheet Number 51

Design / Detail / Quantities — Designed By, Checked By, INITIAL, DATE
zadkison 5:25:51 PM U:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888 Bridge\Drawings\19888BRG_Bridge Abut Det 01.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg



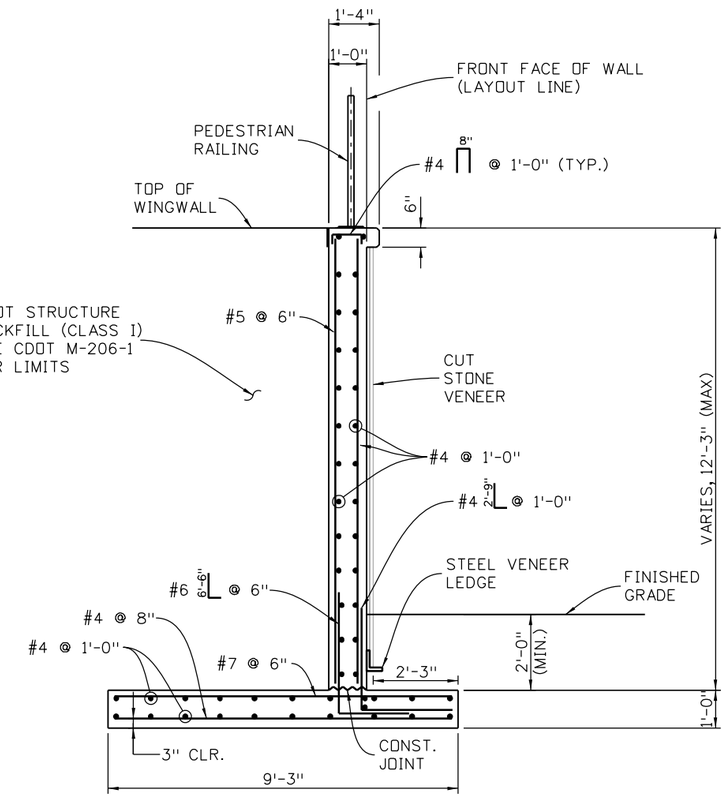
TYPICAL WINGWALL SECTION (B/B5, B/B6)

SCALE: 1/4" = 1'-0"



TYPICAL WALLS 1&2 SECTION (C/B5)

SCALE: 1/4" = 1'-0"

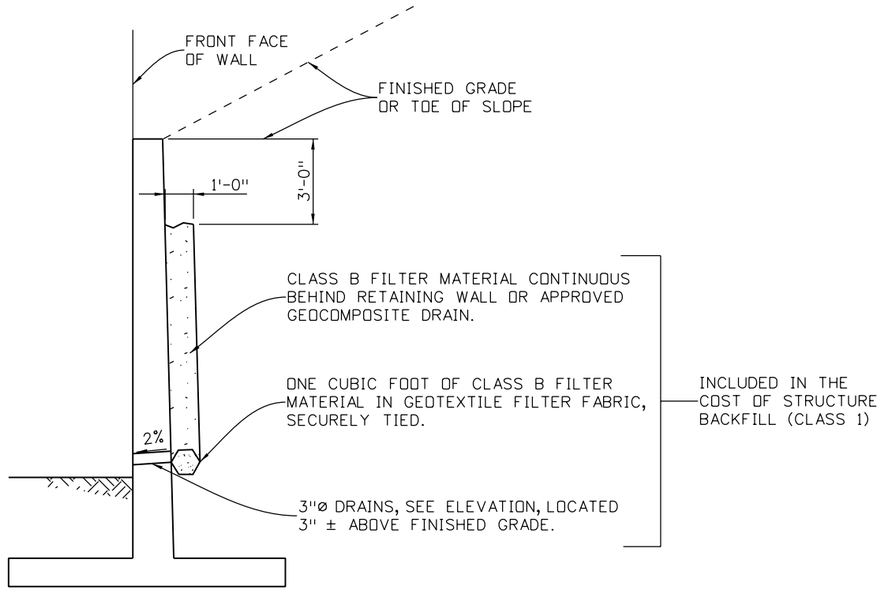


WALL 4 SECTION (D/B6)

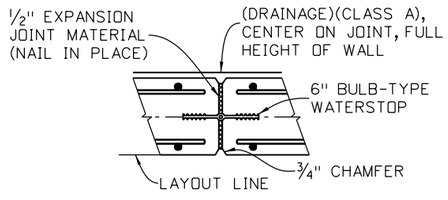
SCALE: 1/4" = 1'-0"

NOTES:

1. HORIZONTAL STEEL IN FOOTING AND STEM SHALL BE MADE CONTINUOUS AT ALL BENDS.



DRAINAGE DETAIL



EXPANSION JOINT

NOTES:

1. ALL ITEMS REQUIRED TO INSTALL EXPANSION JOINT PER THIS DETAIL WILL NOT BE MEASURED DIRECTLY BUT SHALL BE INCLUDED IN THE COST OF CONCRETE CLASS D.

Know what's **below** **Call** before you dig.

Design			Detail			Quantities		
Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
Checked By			Checked By			Checked By		

zadkison 3:25:38 PM 6\1\2015 P:\Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_Bridge Abut Det 02.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

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Drawing File Name: 19888BRG_Bridge Abut Det 02.dgn	
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

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Sheet Revisions		
Date:	Comments	Init.

Region 4

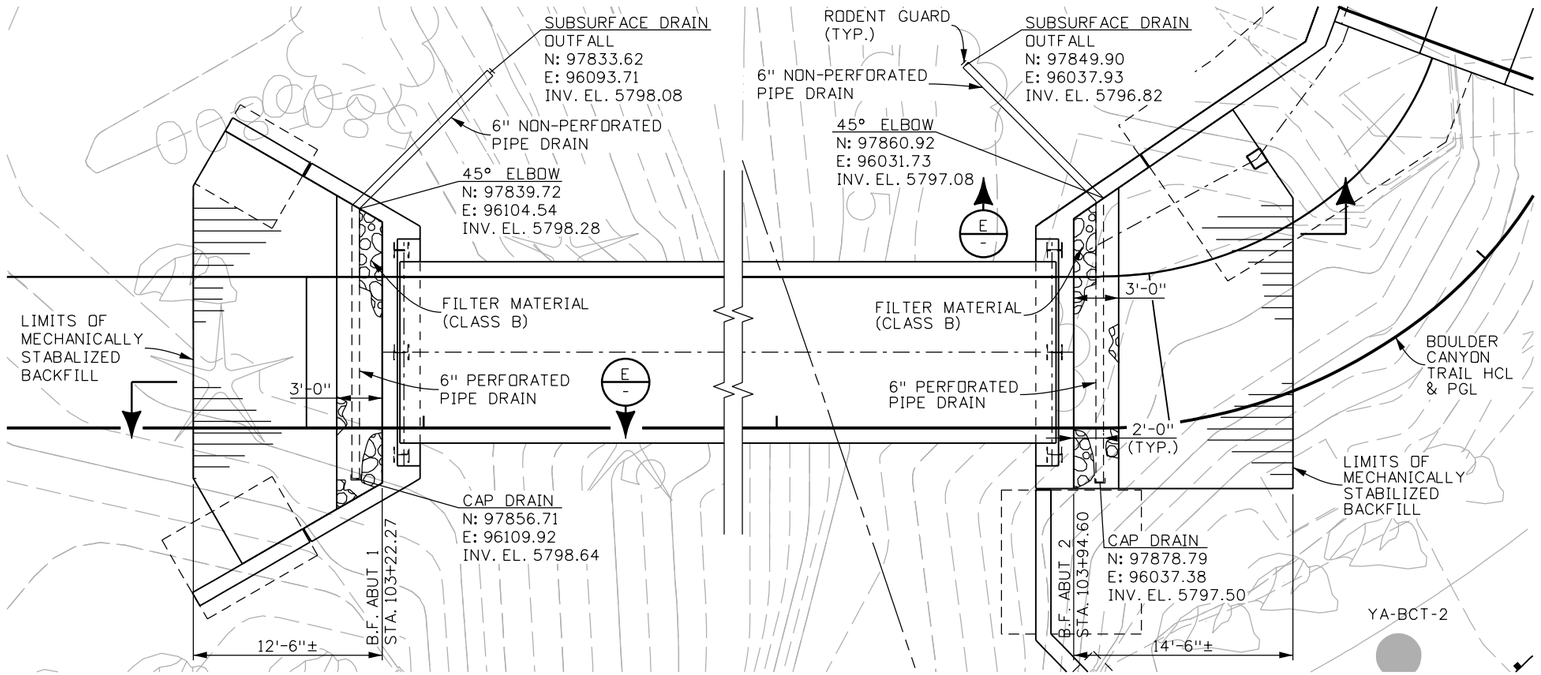
As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

PEDESTRIAN BRIDGE ABUTMENT DETAILS (2 OF 2)

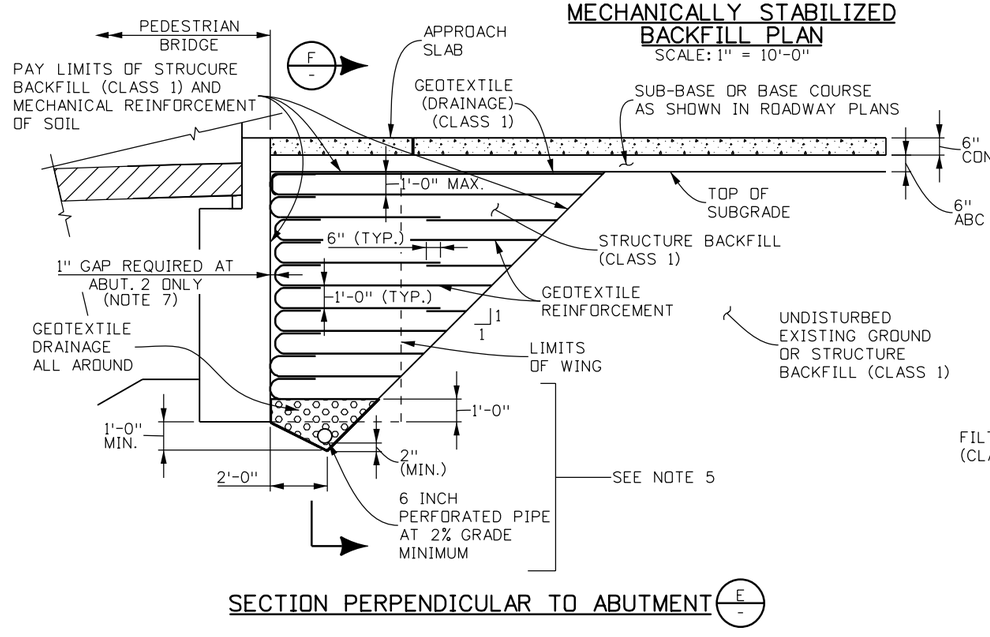
Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B8 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	52

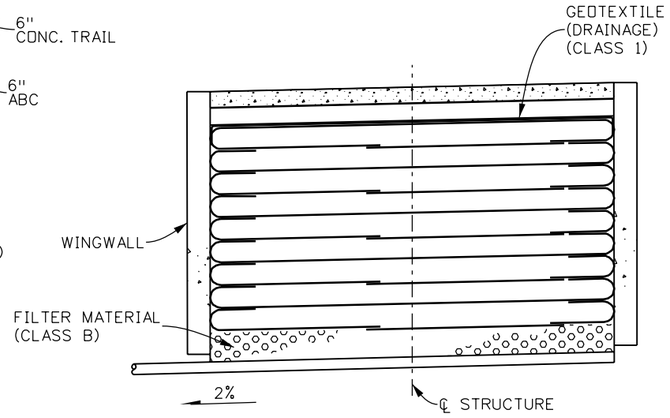


MECHANICALLY STABILIZED BACKFILL PLAN

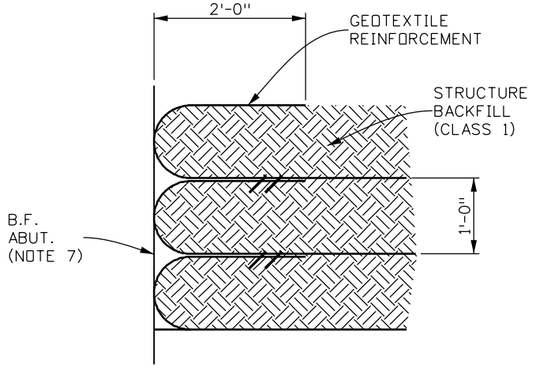
SCALE: 1" = 10'-0"



SECTION PERPENDICULAR TO ABUTMENT (E)



SECTION (F)



WRAP DETAIL

NOTES:

1. GEOTEXTILE REINFORCEMENT SHALL BE WOVEN FABRIC WITH A MINIMUM AVERAGE ROLL VALUE OF 2400 LB/FT BASED ON ASTM D4595.
2. GEOTEXTILE REINFORCEMENT SHALL BE PLACED BY ALTERNATING MACHINE DIRECTION (MD) WITH CROSS MACHINE DIRECTION (XD) FROM LAYER TO LAYER.
3. THE GEOTEXTILE REINFORCEMENT WRAP AT BACK FACE OF ABUTMENT SHALL BE PULLED BACK SLACK FREE WITH ITS END ANCHORED TO SOIL UNDERNEATH WITH STAPLES OR PINS.
4. MINIMUM SPLICE OF ALL GEOFABRIC SHALL CONSIST OF 6" OF OVERLAP.
5. PAYMENT FOR ALL WORK ITEMS SHOWN WILL BE MADE UNDER ITEM 206 MECHANICAL REINFORCEMENT OF SOIL (CY) AND ITEM 206 STRUCTURE BACKFILL (CLASS 1) (CY) AND SHALL INCLUDE THE COST FOR 6 INCH PERFORATED PIPE UNDERDRAIN AND SUBSURFACE DRAIN OUTLET (6"ø NON-PERFORATED PIPE).
6. INSTALLATION OF PIPE UNDERDRAIN AND SUBSURFACE DRAIN OUTLET WILL CONFORM TO THE CONSTRUCTION REQUIREMENTS OF SECTION 605.03 AND 605.06, RESPECTIVELY.
7. 1" GAP REQUIRED ABOVE THE BOTTOM 2 LAYERS AND TOP 2 LAYERS OF REINFORCED SOIL AT ABUT 2 ONLY.

CONSTRUCTION PHASING:

1. EXCAVATE FOR THE ABUTMENT, WINGWALLS, RETAINING WALLS, AND MECHANICALLY STABILIZED BACKFILL.

2A. CONSTRUCT PERFORATED PIPE UNDERDRAIN.

2B. CONSTRUCT PILE AND SPREAD FOUNDATIONS.

2C. CONSTRUCT ABUTMENT WALL TO SEAT ELEVATION. CONSTRUCT WINGWALLS AND RETAINING WALLS TO FINISHED GRADE.

3. BACKFILL ABUTMENT WALL, WINGWALLS, AND RETAINING WALLS AS INDICATED ON THE PLANS USING STRUCTURE BACKFILL (CLASS 1) AND MECHANICAL REINFORCEMENT OF SOIL. DURING BACKFILL OPERATIONS, MONITOR THE DEFLECTION OF THE ABUTMENT. NOTIFY THE ENGINEER IF THE ABUTMENT DEFLECTION EXCEEDS 0.5-IN.

4A. SET THE PREFABRICATED STEEL PEDESTRIAN BRIDGE AND SET THE EPOXY ANCHORS.

4B. CONSTRUCT THE BACKWALL OF THE ABUTMENT TO MATCH THE AS CONSTRUCTED DECK ELEVATION.

Know what's **below** **Call** before you dig.

Design			Detail			Quantities		
Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
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Print Date:	11/16/2016
Drawing File Name:	19888BRG_Backfill.dgn
Horiz. Scale:	1:1
Vert. Scale:	As Noted
Unit Information	Unit Leader Initials

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

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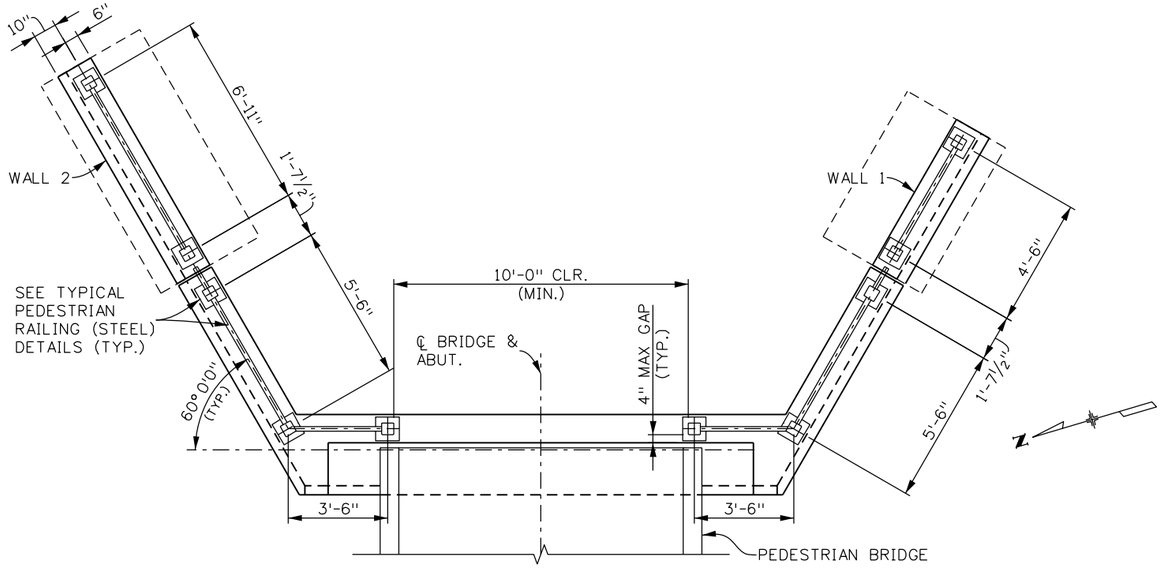
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

ABUTMENT EXCAVATION AND BACKFILL DETAILS

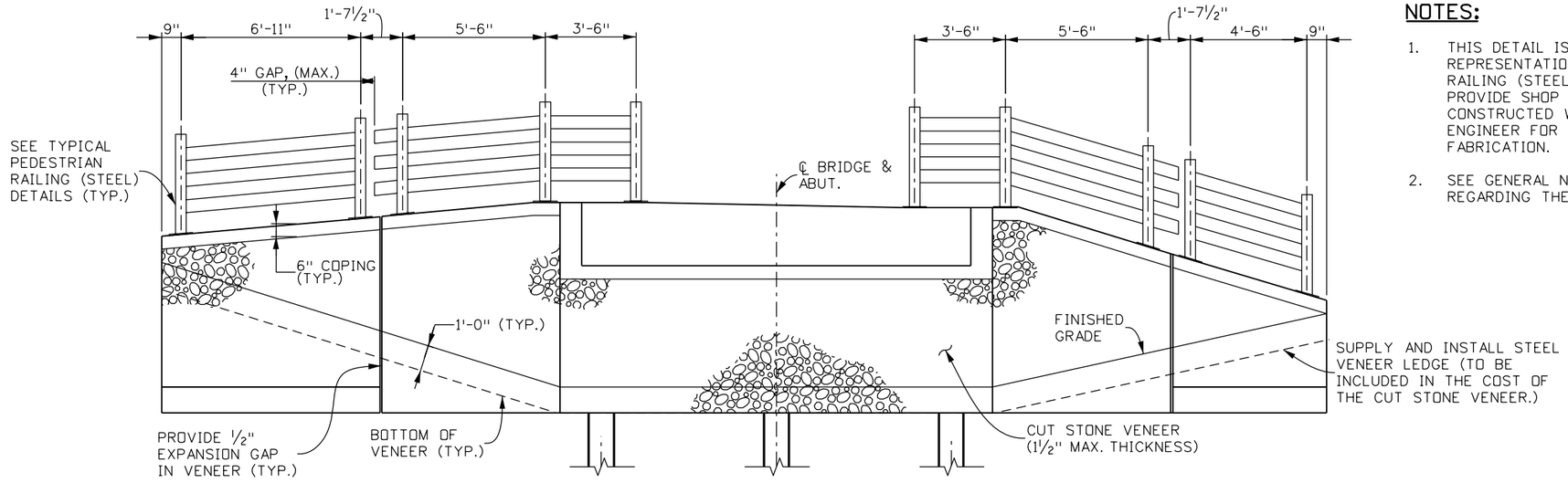
Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B9 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	53



ABUTMENT 1 RAILING PLAN

SCALE: 3/16" = 1'-0"



ABUTMENT 1 ARCHITECTURAL ELEVATION

SCALE: 3/16" = 1'-0"

NOTES:

1. THIS DETAIL IS A SCHEMATIC REPRESENTATION OF THE PEDESTRIAN RAILING (STEEL). THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS BASED ON AS CONSTRUCTED WALL DIMENSIONS TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION.
2. SEE GENERAL NOTES FOR INFORMATION REGARDING THE CUT STONE VENEER.

Know what's **below** **Call** before you dig.

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Designed By		
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Detail	INITIAL	DATE
Detailed By		
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Quantities	INITIAL	DATE
Quantities By		
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Print Date: 11/16/2016
Drawing File Name: 19888BRG_Arch Treat Abut 1.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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Date:	Comments	Init.

Region 4

Boulder County

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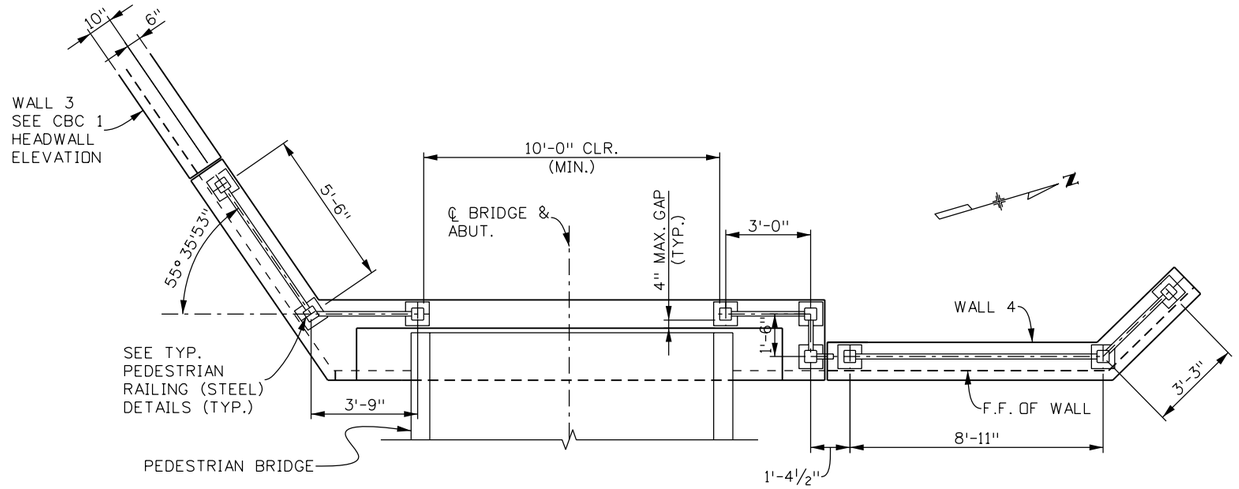
BOULDER CANYON TRAIL EXTENSION
ARCHITECTURAL TREATMENTS ABUTMENT 1

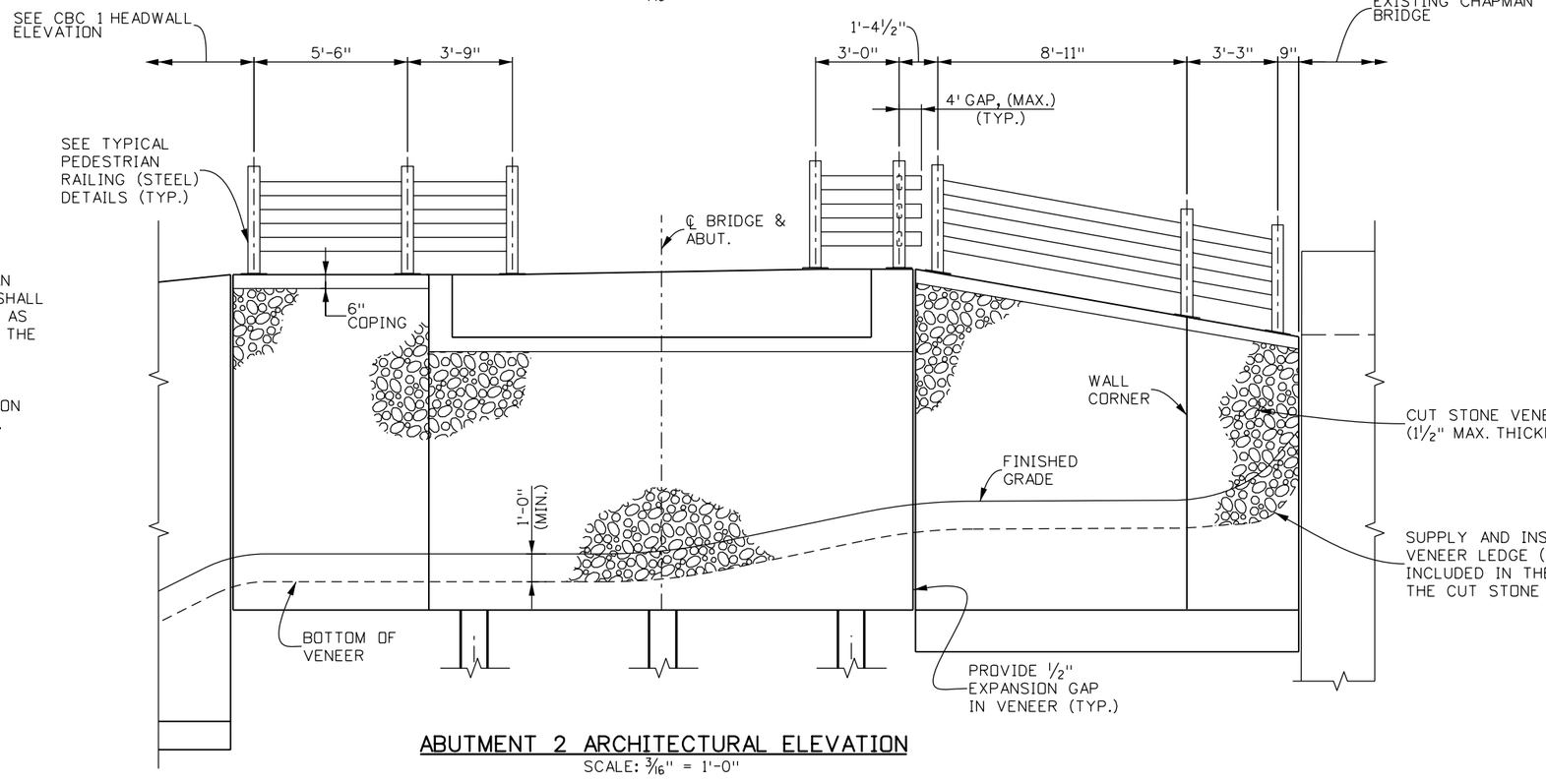
Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B10 of B25

Project No./Code
STU C070-043
19888
Sheet Number 54



ABUTMENT 2 RAILING PLAN

SCALE: $\frac{3}{16}$" = 1'-0"



ABUTMENT 2 ARCHITECTURAL ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"

NOTES:

1. THIS DETAIL IS A SCHEMATIC REPRESENTATION OF THE PEDESTRIAN RAILING (STEEL). THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS BASED ON AS CONSTRUCTED WALL DIMENSIONS TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION.
2. SEE GENERAL NOTES FOR INFORMATION REGARDING THE CUT STONE VENEER.

Design			Detail			Quantities		
	INITIAL	DATE		INITIAL	DATE		INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		

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Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials
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Date:	Comments	Init.

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No Revisions:
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BOULDER CANYON TRAIL EXTENSION
ARCHITECTURAL TREATMENTS
ABUTMENT 2

Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers
Subset Sheets: B11 of B25

Project No./Code
STU C070-043
19888
Sheet Number 55

STRUCTURAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", COLORADO DEPARTMENT OF TRANSPORATION, 2011 EDITION, AS MODIFIED BY THE PROJECT SPECIAL PROVISIONS AND THESE PLANS.

2. EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION SHALL BE IN ACCORDANCE WITH M-206-1 FOR RETAINING WALLS AND BOX CULVERTS. STRUCTURE BACKFILL SHALL MEET THE REQUIREMENTS FOR STRUCTURE BACKFILL (CLASS 1) UNLESS NOTED OTHERWISE.

3. THE SOILS AND FOUNDATION INVESTIGATION FOR THIS PROJECT WAS PERFORMED BY YEH AND ASSOCIATES, INC. THE SUBSURFACE CONDITIONS AND RECOMMENDATIONS FOR THE STRUCTURE PROJECT ARE CONTAINED IN A REPORT DATED AUGUST 22, 2016, JOB NUMBER 215-177.

4. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL BE PRESENT TO OBSERVE THE FOUNDATION EXCAVATION PRIOR TO PLACEMENT OF SUBGRADE STABILIZATION.

5. EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

6. COVERAGE FROM THE FACE OF CONCRETE TO THE FACE OF REINFORCEMENT SHALL BE 2 INCHES, UNLESS NOTED OTHERWISE.

7. ALL REINFORCING STEEL IN HEADWALL, RETAINING WALLS, AND CONCRETE FOOTING SHALL BE BLACK REINFORCING UNLESS OTHERWISE NOTED.

8. (E) DENOTES EPOXY COATED REINFORCING STEEL.

9. THE FOLLOWING TABLE GIVES THE MINIMUM CLASS C 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.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-7"	2'-0"	2'-4"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

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

11. THE FOLLOWING TABLE GIVES THE MINIMUM CLASS C 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 D CONCRETE	1'-5"	1'-9"	2'-1"	2'-6"	3'-3"	4'-1"	5'-2"	6'-4"

12. ALL CONCRETE IN HEADWALLS, RETAINING WALLS, AND CONCRETE PHASING SHALL BE CLASS D, f'_c = 4,500 psi.

13. 4" CONCRETE OVERLAY IN BOX CULVERTS SHALL BE CLASS G, f'_c = 4,500 psi.

14. STRUCTURAL CONCRETE SHALL CONFORM TO CEMENTITIOUS MATERIALS REQUIREMENT CLASS 0, CORRESPONDING TO SULFATE RESISTANCE CLASS 0.

15. THE HEADWALL AND WINGWALL FOOTINGS SHALL BE PLACED MONOLITHICALLY.

16. EXPOSED OUTSIDE CORNERS SHALL RECIEVE A ¾" CHAMFER, UNLESS NOTED OTHERWISE.

17. THE CONTRACTOR SHALL NOT BACKFILL STRUCTURES UNTIL TOP SLAB AND WALLS HAVE REACHED 80 PERCENT OF DESIGN STRENGTH.

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

19. 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 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

DESIGN DATA:

AASHTO LRFD BRIDGE SPECIFICATIONS, 7TH EDITION (2016 INTERIM)

DESIGN METHOD:	LOAD AND RESISTANCE FACTOR DESIGN
LIVE LOAD:	VEHICLE LOAD: AASHTO HL93 LIVE LOAD SURCHARGE: 2'-0" OF EARTH (WHERE APPLICABLE)
DEAD LOAD:	SELF-WT AND WEIGHT OF SOIL OVERBURDEN (WHERE APPLICABLE)

SOIL PARAMETERS:

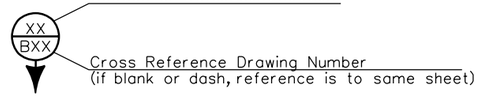
UNIT WEIGHT:	135 PCF
EQUIV. FLUID PRESSURES:	38 PCF (ACTIVE) 60 PCF (AT-REST)
WALL NOMINAL BEARING RESISTANCE:	$2500 \times B' \times (1-\tan(W))^2$
BOX NOMINAL BEARING RESISTANCE:	$70{,}000 \times (1-\tan(W))^2$

REINFORCED CONCRETE:

CDOT CLASS D:	f'_c = 4,500 PSI
REINFORCING STEEL:	f_y = 60,000 PSI

ABBREVIATIONS

EF = EACH FACE	TO = TOP OF
TOW = TOP OF WALL	BF = BACK FACE
BO = BOTTOM OF	BRG = BEARING
FF = FRONT FACE	OC = ON CENTER
POB = POINT OF BEGINNING	FG = FINISHED GRADE
POE = POINT OF ENDING	



SHEET LIST:

ARCHITECTURAL TREATMENT

1. THE SELECTION OF STONE VENEER TYPE AND MANUFACTURER SHALL BE BY THE OWNER. THE CONTRACTOR SHALL PROVIDE VENEER SAMPLES AND MOCKUPS AS REQUIRED BY THE PROJECT SPECIAL PROVISIONS. THE MAXIMUM THICKNESS OF VENEER SHALL BE 1½". VENEER SHALL BE ATTACHED BY MEANS OF ADHESIVE MORTAR IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS. PAYMENT FOR ALL WORK SHALL BE MADE UNDER (601) CUT STONE VENEER.

2. EXPOSED CONCRETE NOT RECEIVING VENEER SHALL BE GIVEN A CLASS 2 RUBBED FINISH (INCLUDED IN THE COST OF THE CONCRETE (CLASS D.)

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Quantities	INITIAL / DATE		
Quantities By			
Checked By			

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Drawing File Name: 19888BRG_Undercrossing General Notes.dgn	
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Unit Information	Unit Leader Initials

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Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed	
No Revisions:	
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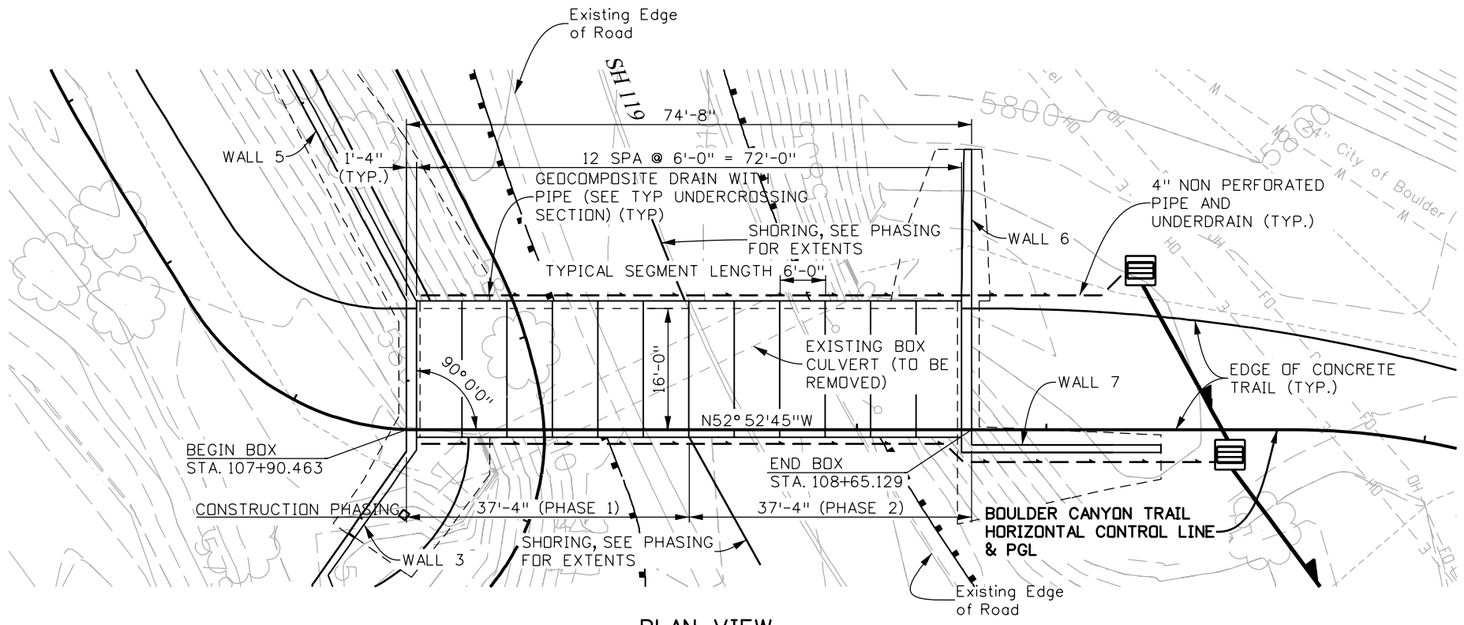
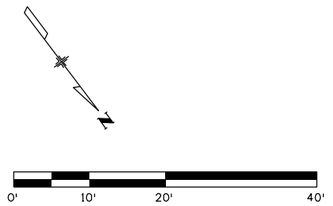
BOULDER CANYON TRAIL EXTENSION
UNDERCROSSING STRUCTURE GENERAL NOTES

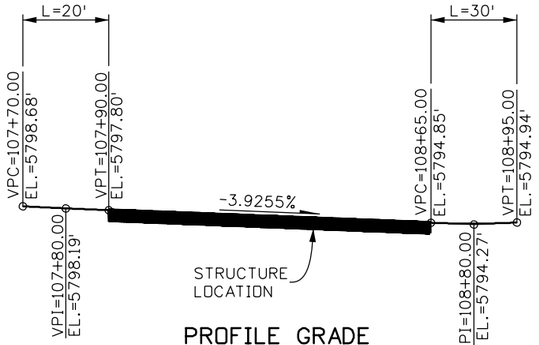
Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B12 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	56

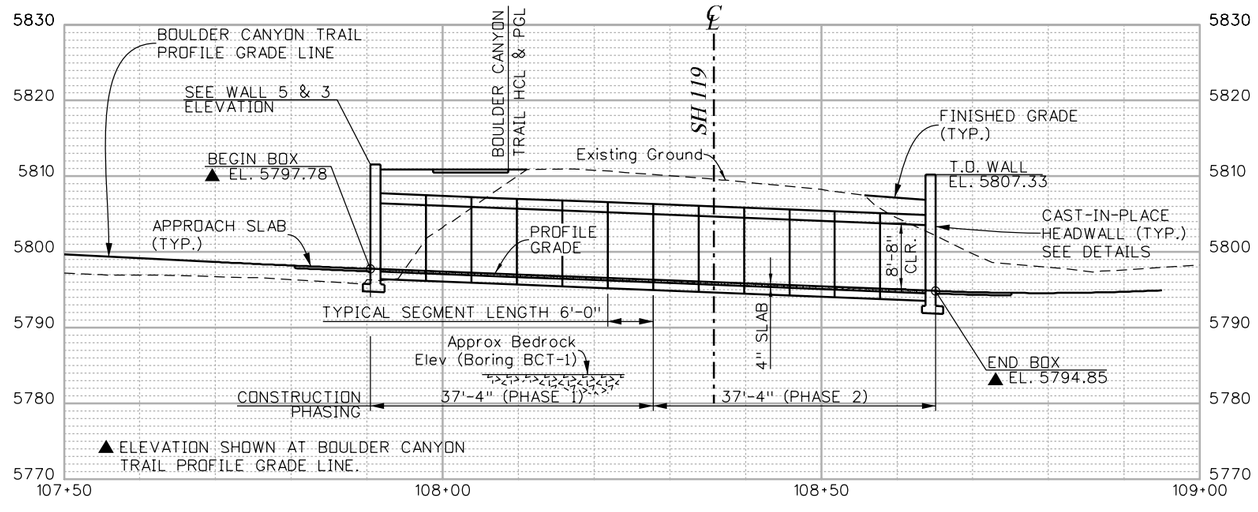


PLAN VIEW





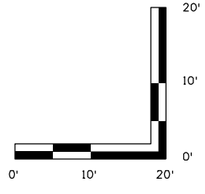
PROFILE GRADE
N.T.S.



LONGITUDINAL SECTION

NOTES:

1. FOR BOX DETAILS SEE TYPICAL UNDERCROSSING SECTION.
2. SEE PHASING PLANS FOR ROADWAY PHASING AND DETOUR REQUIREMENTS.
3. SEE TRAIL GEOMETRY AND TRAIL PROFILE SHEETS FOR HCL AND PGL INFORMATION.
4. DIMENSIONS ARE GIVEN IN THE HORIZONTAL DIMENSION AND INCLUDE NO CORRECTION FOR GRADE.
5. SEE "GUARDRAIL POST CONNECTION AT UNDERCROSSING TYPICAL PLAN", SHT B15 FOR INFORMATION REGARDING GUARDRAIL MOUNTING.



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Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
Checked By			Checked By			Checked By		

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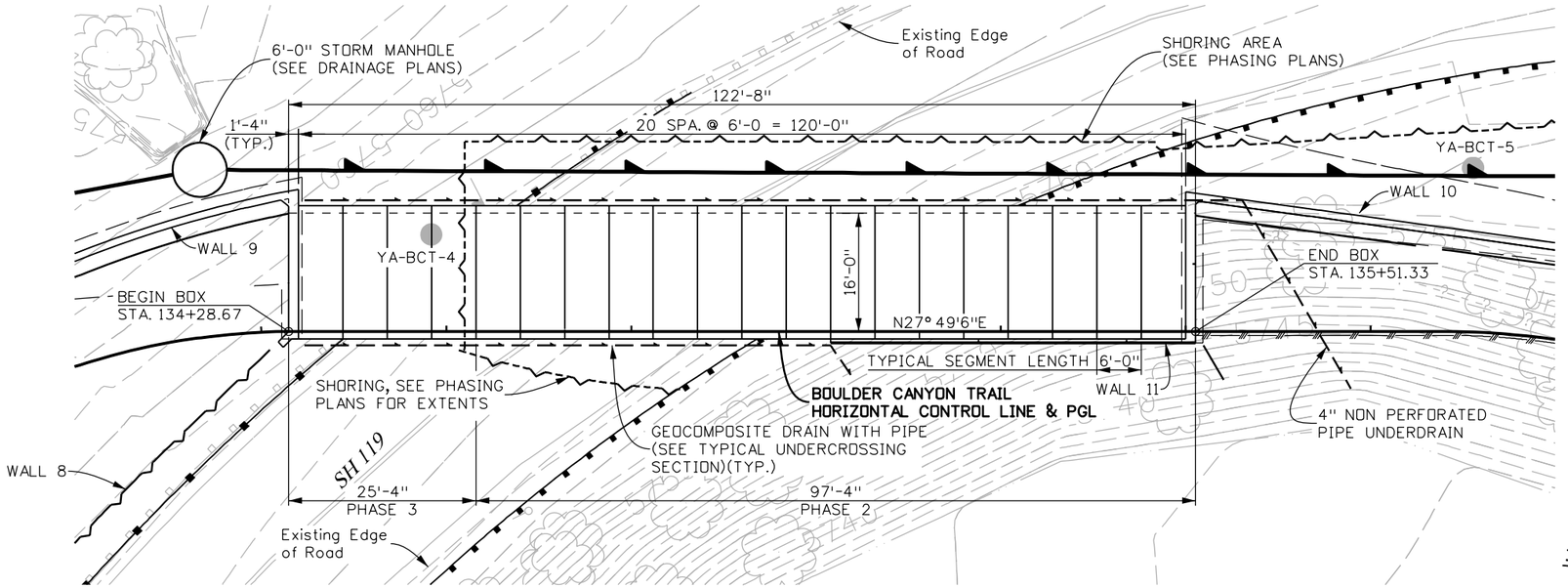
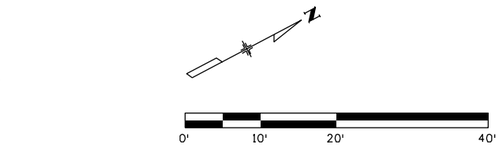
Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888BRG_Box Culvert 1_Gen Layout.dgn	Date:	Comments	Init.
Horiz. Scale: 1:20 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

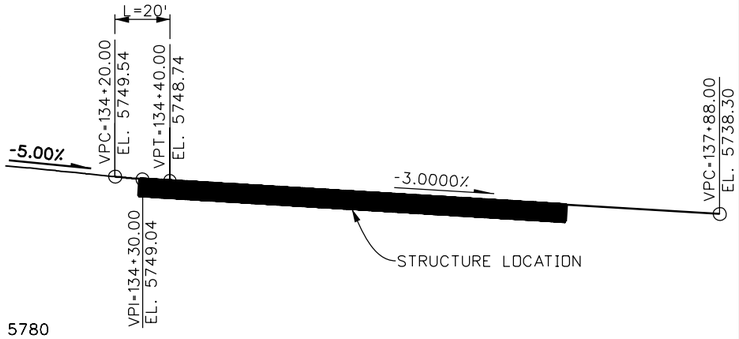
Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	BOX CULVERT 1 GENERAL LAYOUT			STU C070-043
Revised:	Designer: ASP	Structure Numbers		19888
Void:	Detailer: LJLJ			
	Sheet Subset: BRIDGE	Subset Sheets: B13 of B25		Sheet Number 57



PLAN VIEW





PROFILE GRADE
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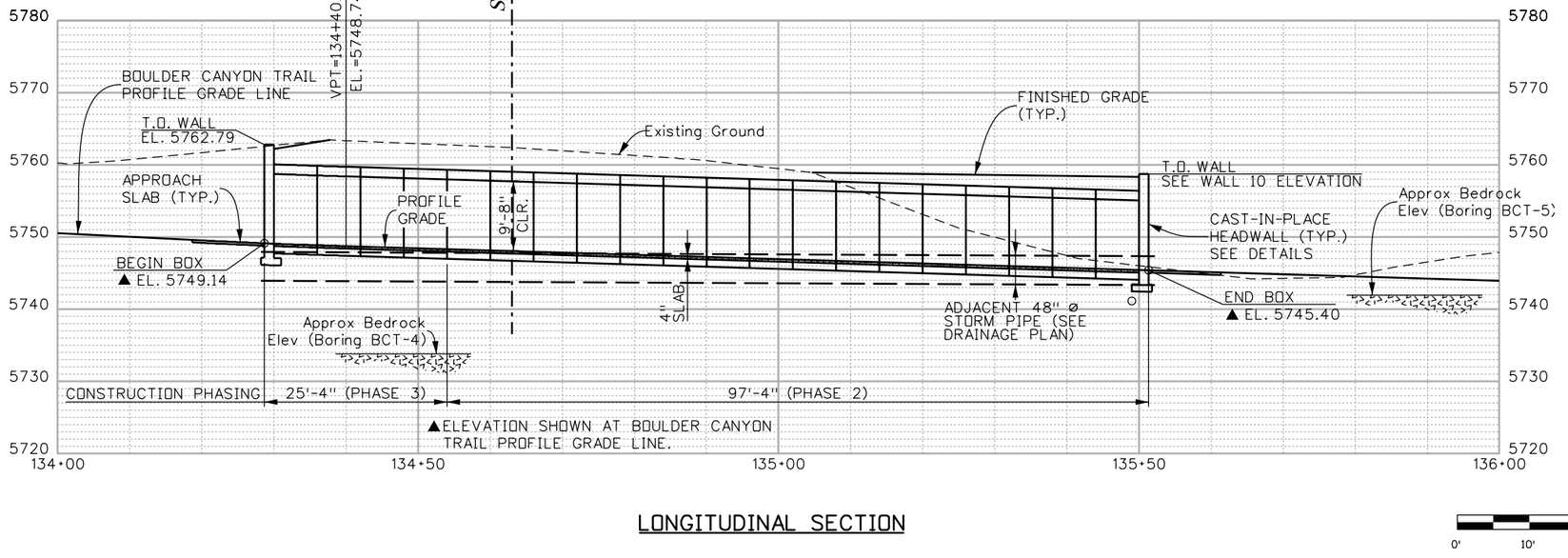
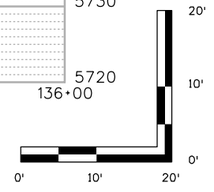


LONGITUDINAL SECTION



NOTES:

1. FOR BOX DETAILS SEE TYPICAL UNDERCROSSING SECTION.
2. SEE PHASING PLANS FOR ROADWAY PHASING AND DETOUR REQUIREMENTS.
3. SEE TRAIL GEOMETRY AND TRAIL PROFILE SHEETS FOR HCL AND PGL INFORMATION.
4. DIMENSIONS ARE GIVEN IN THE HORIZONTAL DIMENSION AND INCLUDE NO CORRECTION FOR GRADE.
5. SEE "GUARDRAIL POST CONNECTION AT UNDERCROSSING TYPICAL PLAN", SHT B15 FOR INFORMATION REGARDING GUARDRAIL MOUNTING.

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Designed By		
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Detail	INITIAL	DATE
Detailed By		
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Quantities	INITIAL	DATE
Quantities By		
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Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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Date:	Comments	Init.

Region 4

Boulder County

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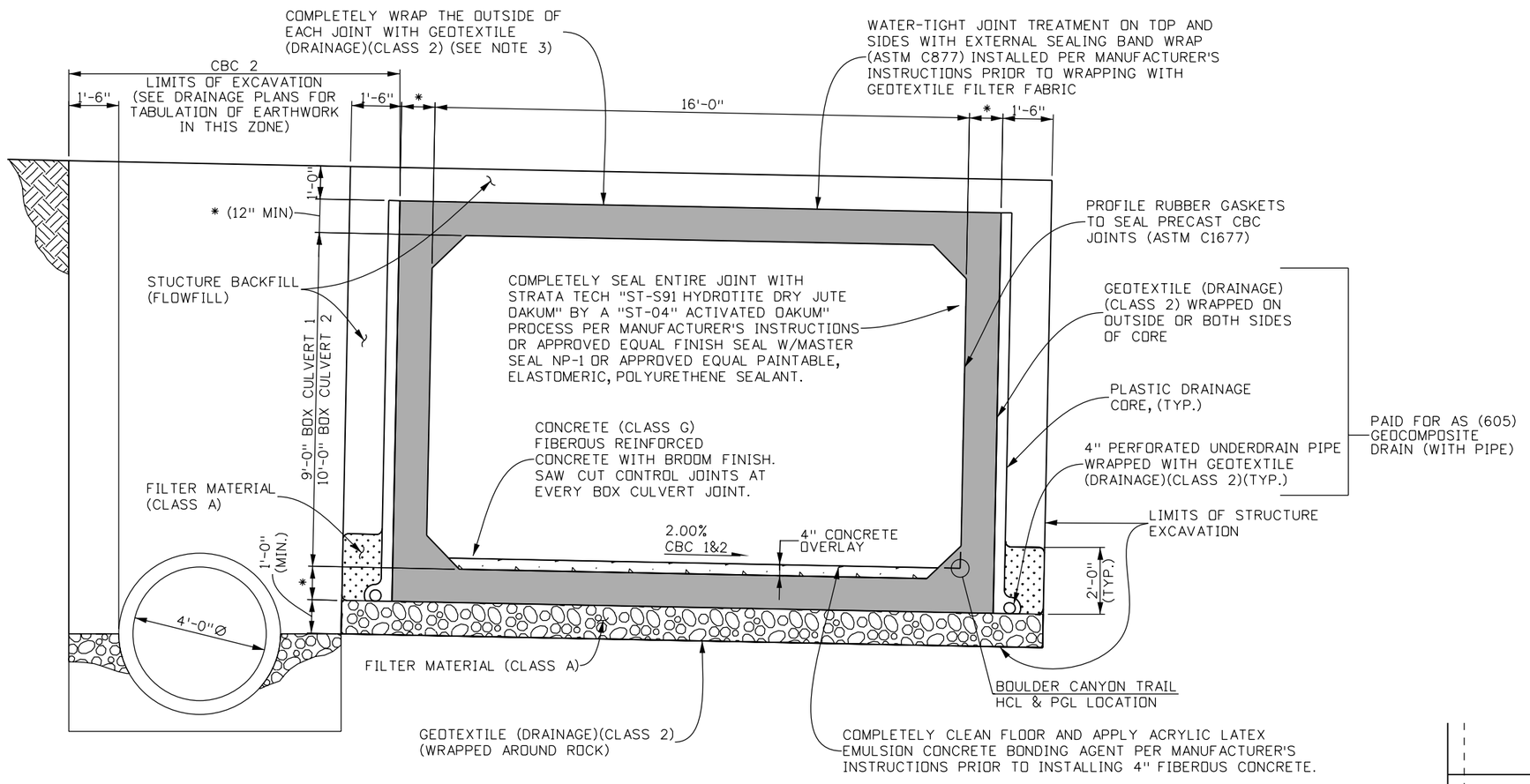
BOULDER CANYON TRAIL EXTENSION
BOX CULVERT 2
GENERAL LAYOUT

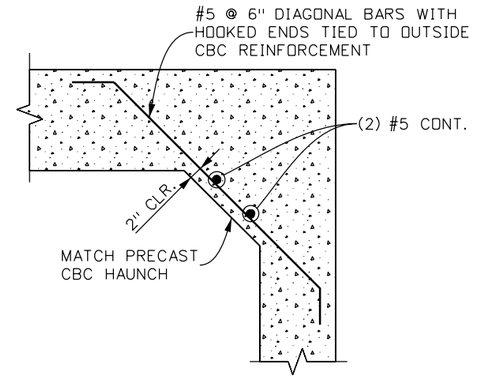
Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B14 of B25

Project No./Code
STU C070-043
19888
Sheet Number 58



PEDESTRIAN UNDERCROSSING TYPICAL SECTION

SCALE: 1/4" = 1'-0"



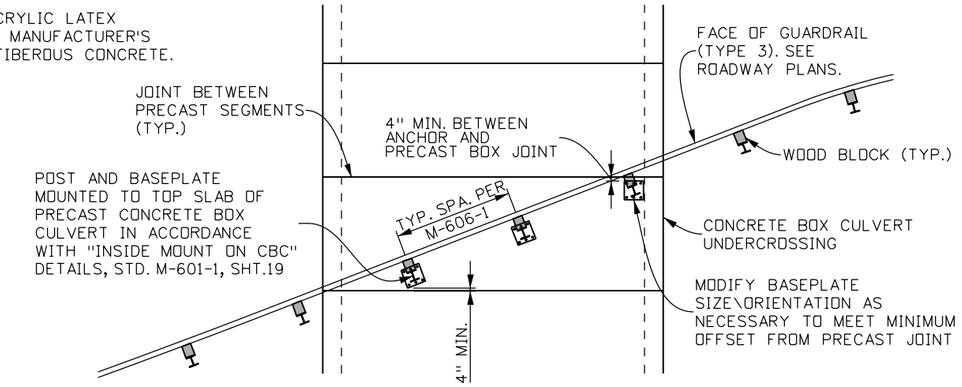
ADD'L REINFORCEMENT HAUNCH HEADWALL

SCALE: 1/2"= 1'-0"

INSTALLATION NOTES:

1. USE MECHANICAL PULLER TO MAKE THE JOINT TIGHTER AND UNIFORM.
2. JOINT OPENINGS AT THE OUTSIDE FACE SHALL NOT EXCEED 1-1/2 INCHES AT ANY LOCATION ALONG THE JOINT PERIMETER.
3. PROVIDE FABRIC WITH A MINIMUM WIDTH OF 2 FEET AND A LENGTH SUFFICIENT TO ENSURE A MINIMUM OVERLAP OF 24 INCHES. THE FILTER FABRIC MUST EXTEND A MINIMUM IF 12 INCHES BEYOND EACH SIDE OF THE JOINT. SECURE THE FABRIC TIGHTLY AGAINST THE BOX CULVERT SECTIONS WITH METAL OR PLASTIC STRAPPING. OTHER METHODS WHICH WILL HOLD THE FABRIC SECURELYAGAINST THE WALL OF THE CULVERT UNTIL THE BACKFILL IS PLACED AND COMPACTED, MAY BE USED WHEN APPROVED BY THE ENGINEER.
4. PAYMENT FOR WATERPROOFING, INCLUDING PROFILE GASKETS, JOINT TREATMENT, SEALANT, AND GEOTEXTILE SHALL BE INCLUDED IN THE LINEAL FOOT COST OF THE CONCRETE BOX CULVERT (PRECAST).

* THICKNESS BASED ON PRE-CAST DESIGN.



GUARDRAIL POST CONNECTION AT UNDERCROSSING TYPICAL PLAN

SCALE: 1/8" = 1'-0"

Design | INITIAL | DATE
Designed By | Checked By

Detail | INITIAL | DATE
Detailed By | Checked By

Quantities | INITIAL | DATE
Quantities By | Checked By

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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016	
Drawing File Name: 19888BRG_TypicalUndercrossing Section.dgn	
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

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Date:	Comments	Init.

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Boulder County

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Revised:	
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BOULDER CANYON TRAIL EXTENSION

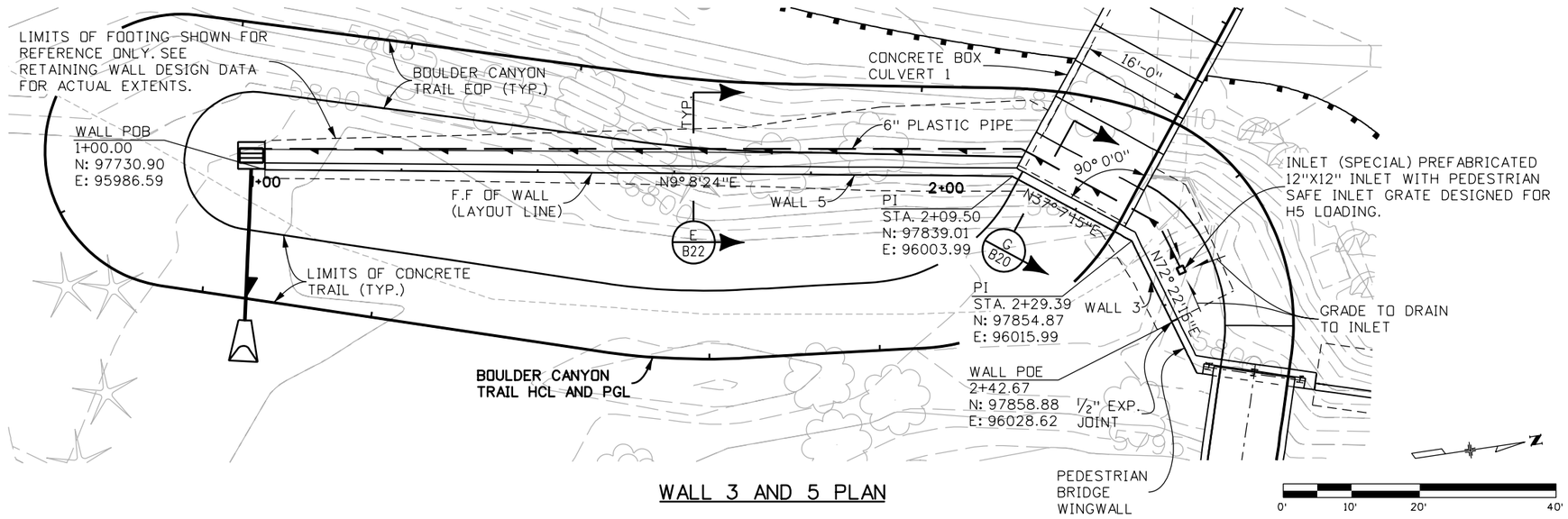
TYPICAL UNDERCROSSING SECTION

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B15 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	59

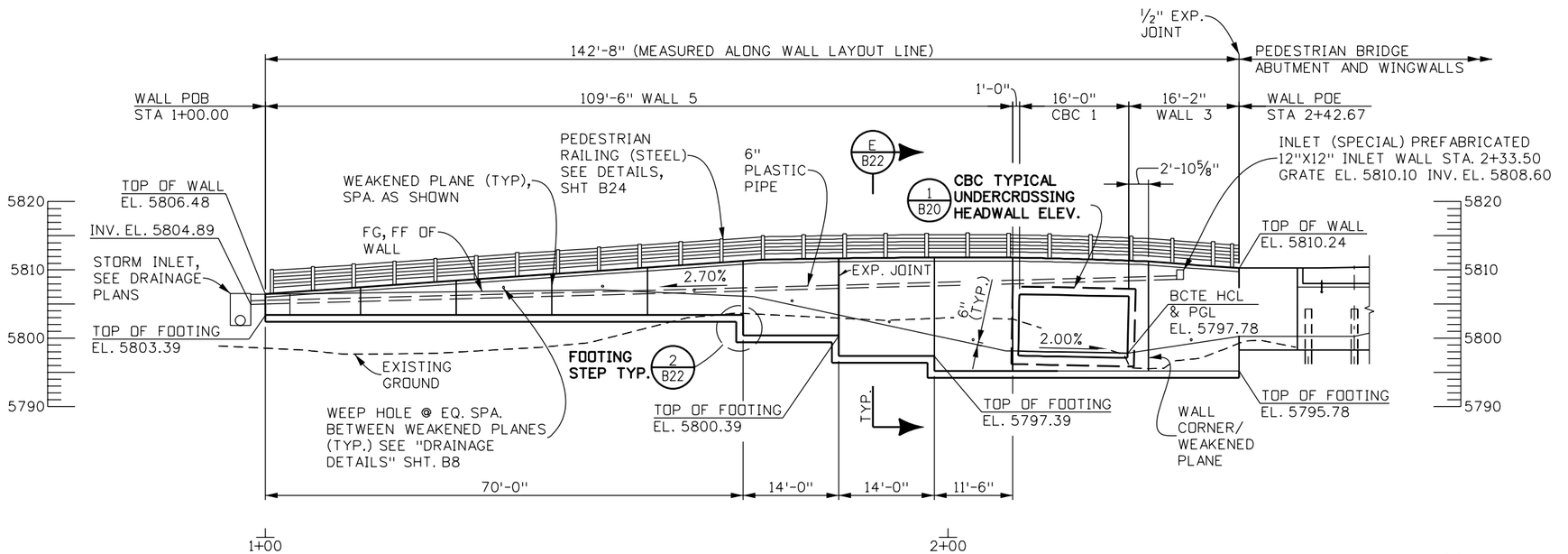
NOTES:

1. SEE TRAIL PLANS FOR TRAIL GEOMETRY.
2. SEE SHT. B22 FOR EXPANSION AND WEAKENED PLAN DETAILS
3. HORIZONTAL DIMENSIONS ARE MEASURED TO THE BOTTOM SLAB OF THE BOX CULVERT.



WALL 3 AND 5 PLAN

WALL 5 AND 3 VERTICAL CONTROL TABLE			
WALL STATION	NORTHING	EASTING	T.O.W. ELEVATION
1+00.00	97730.90	95986.59	5806.48
1+10.00	97740.77	95988.18	5807.17
1+20.00	97750.65	95989.77	5807.86
1+30.00	97760.52	95991.36	5808.55
1+40.00	97770.39	95992.95	5809.24
1+50.00	97780.26	95994.53	5809.93
1+60.00	97790.14	95996.12	5810.61
1+70.00	97800.01	95997.71	5811.30
1+80.00	97809.88	95999.30	5811.62
1+90.00	97819.76	96000.89	5811.75
2+00.00	97829.63	96002.48	5811.80
2+10.00	97839.41	96004.29	5811.75
2+20.00	97847.38	96010.32	5811.55
2+30.00	97855.05	96016.57	5811.17
2+40.00	97858.08	96026.10	5810.43
2+42.67	97858.89	96028.65	5810.24



WALL 3 AND 5 ELEVATION
(LOOKING UPSTATION)

Know what's **below** **Call** before you dig.

Design	INITIAL	DATE
Designed By		
Checked By		

Detail	INITIAL	DATE
Detailed By		
Checked By		

Quantities	INITIAL	DATE
Quantities By		
Checked By		

zadkison 3:26:46 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888 Bridge Drawings\19888BRG_CBC 1_Walls 3 and 5.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016
Drawing File Name: 19888BRG_CBC 1_Walls 3 and 5.dgn
Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

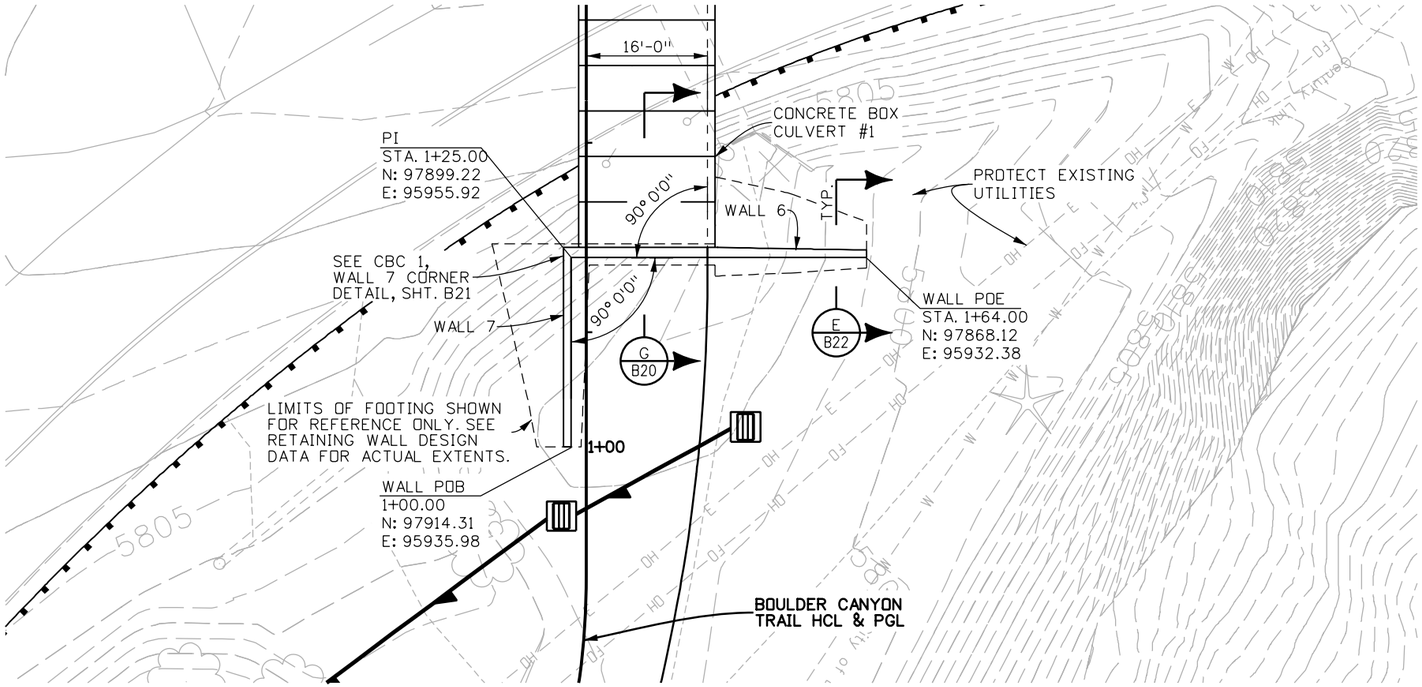
Boulder County

As Constructed
No Revisions:
Revised:
Void:

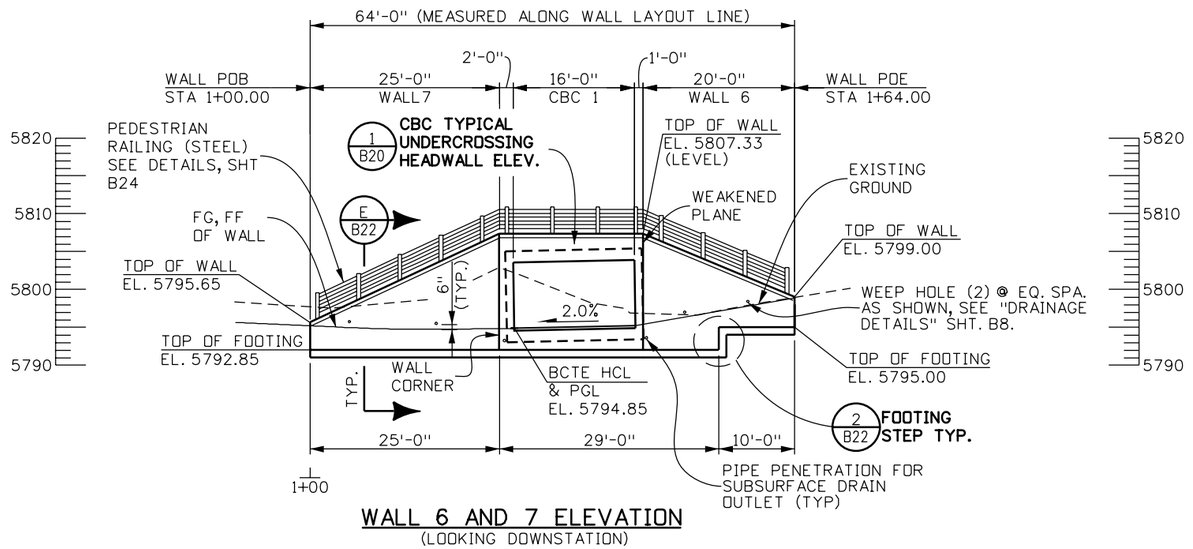
BOULDER CANYON TRAIL EXTENSION
WALLS 3 AND 5
GENERAL LAYOUT

Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B16 of B25

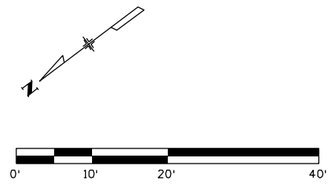
Project No./Code
STU C070-043
19888
Sheet Number 60



WALL 6 AND 7 PLAN



WALL 6 AND 7 ELEVATION
(LOOKING DOWNSTATION)



NOTES:

1. SEE TRAIL PLANS FOR TRAIL GEOMETRY.
2. SEE SHT. B22 FOR EXPANSION AND WEAKENED PLAN DETAILS
3. HORIZONTAL DIMENSIONS ARE MEASURED TO THE BOTTOM SLAB OF THE BOX CULVERT.

Know what's **below** **Call** before you dig.

Design	INITIAL	DATE	Detail	INITIAL	DATE	Quantities	INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		

zadkison 3:26:53 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_CBC 1_Walls 6 and 7.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016
Drawing File Name: 19888BRG_CBC 1_Walls 6 and 7.dgn
Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

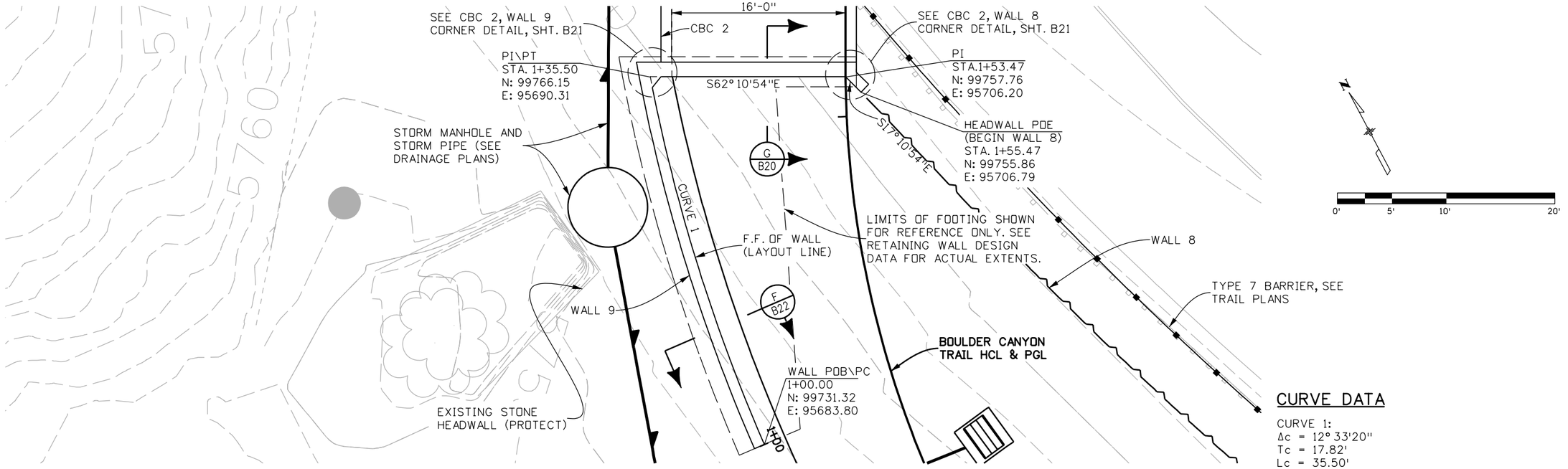
Region 4

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
WALLS 6 AND 7
GENERAL LAYOUT

Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B17 of B25

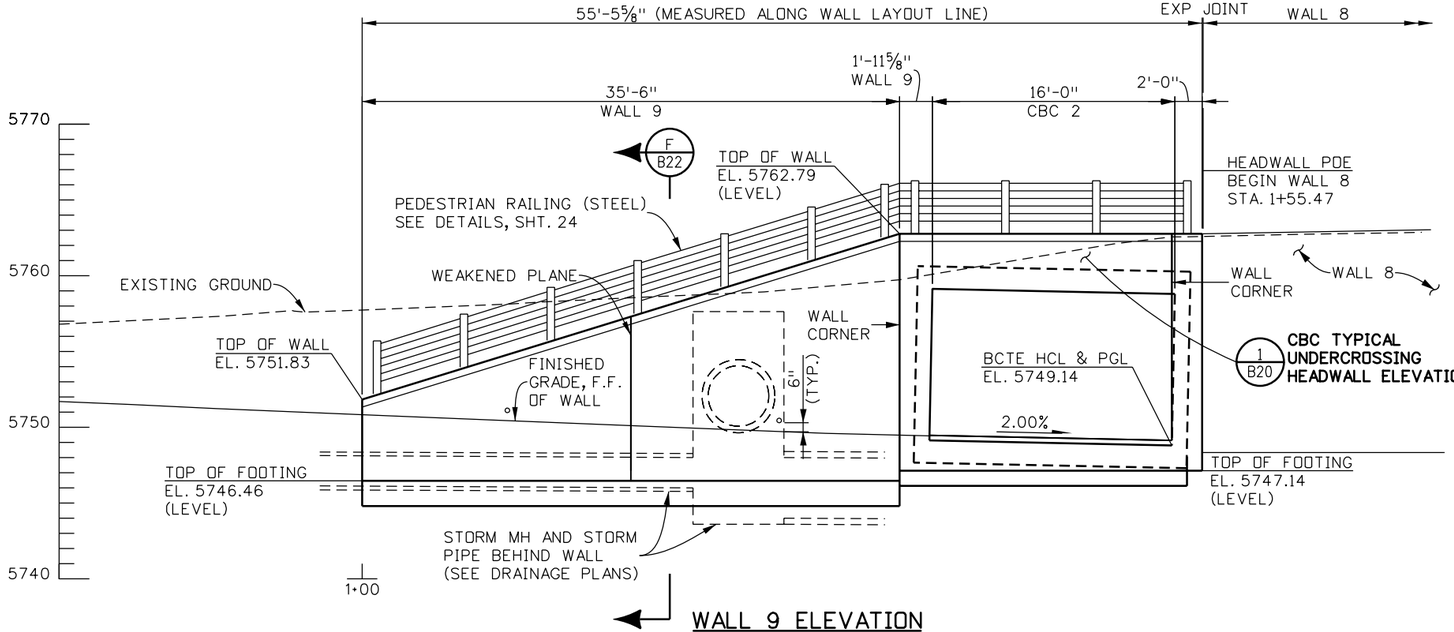
Project No./Code
STU C070-043
19888
Sheet Number 61



WALL 9 PLAN

CURVE DATA

CURVE 1:
Δc = 12° 33'20"
Tc = 17.82'
Lc = 35.50'
Rc = 162.0'



WALL 9 ELEVATION
(LOOKING UPSTATION)

NOTES:

1. SEE TRAIL PLANS FOR TRAIL GEOMETRY.
2. SEE SHT. B22 FOR EXPANSION AND WEAKENED PLAN DETAILS
3. HORIZONTAL DIMENSIONS ARE MEASURED TO THE BOTTOM SLAB OF THE BOX CULVERT.

811 Know what's **below** **Call** before you dig.

Design			Detail			Quantities		
	INITIAL	DATE		INITIAL	DATE		INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		

zadkison 12/7/201 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_CBC 2_Wall 9.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016	
Drawing File Name: 19888BRG_CBC 2_Wall 9.dgn	
Horiz. Scale: 1:10	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION
WALL 9 GENERAL LAYOUT

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B18 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	62

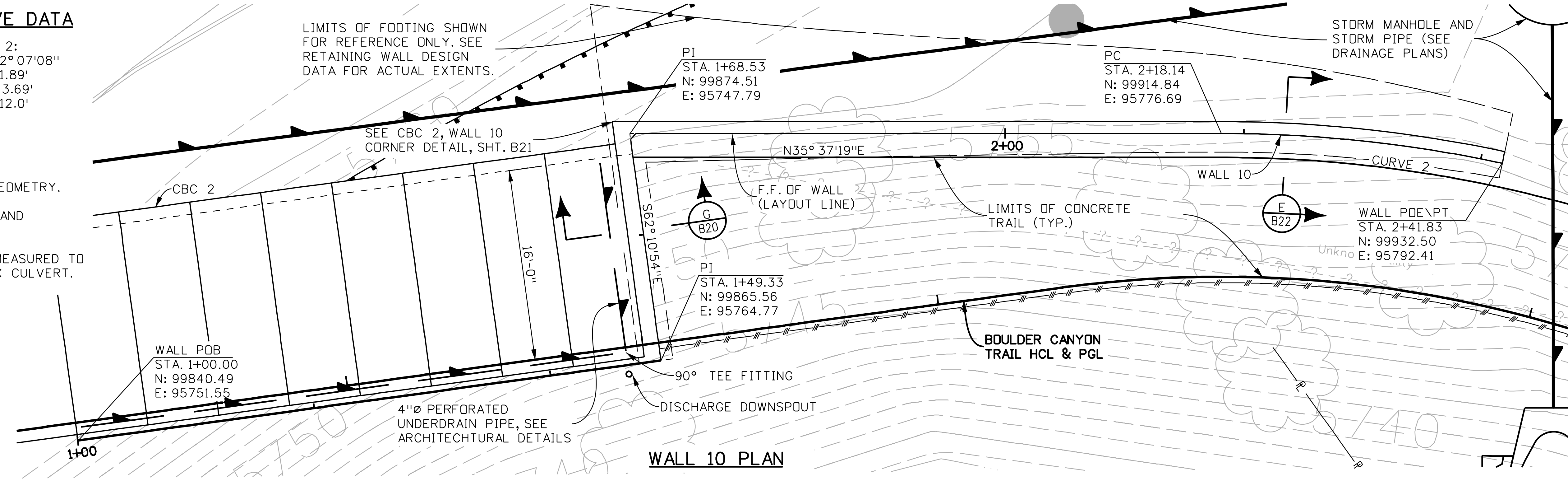
811
Know what's **below**
Call before you dig.

CURVE DATA

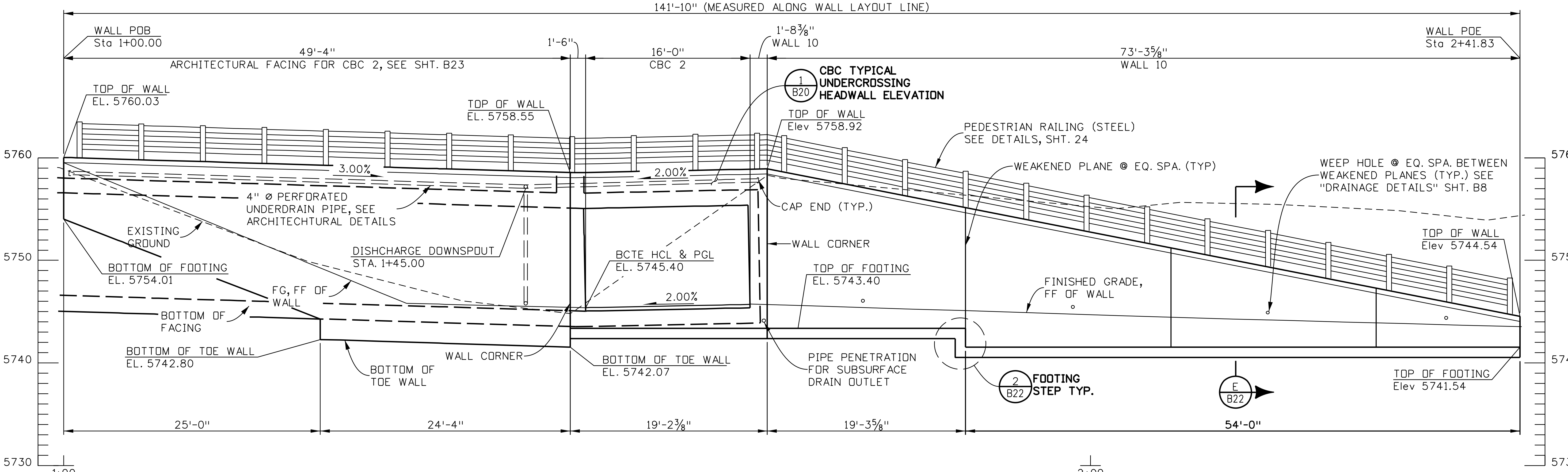
CURVE 2:
Δc = 12° 07'08"
Tc = 11.89'
Lc = 23.69'
Rc = 112.0'

NOTES:

1. SEE TRAIL PLANS FOR TRAIL GEOMETRY.
2. SEE SHT. B22 FOR EXPANSION AND WEAKENED PLAN DETAILS
3. HORIZONTAL DIMENSIONS ARE MEASURED TO THE BOTTOM SLAB OF THE BOX CULVERT.



WALL 10 PLAN



WALL 10 ELEVATION

(LOOKING DOWNSTATION)

Print Date: 11/16/2016
Drawing File Name: 19888BRG_CBC 2_Wall10.dgn
Horiz. Scale: 1:10 Vert. Scale: As Noted
Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT
CO
Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

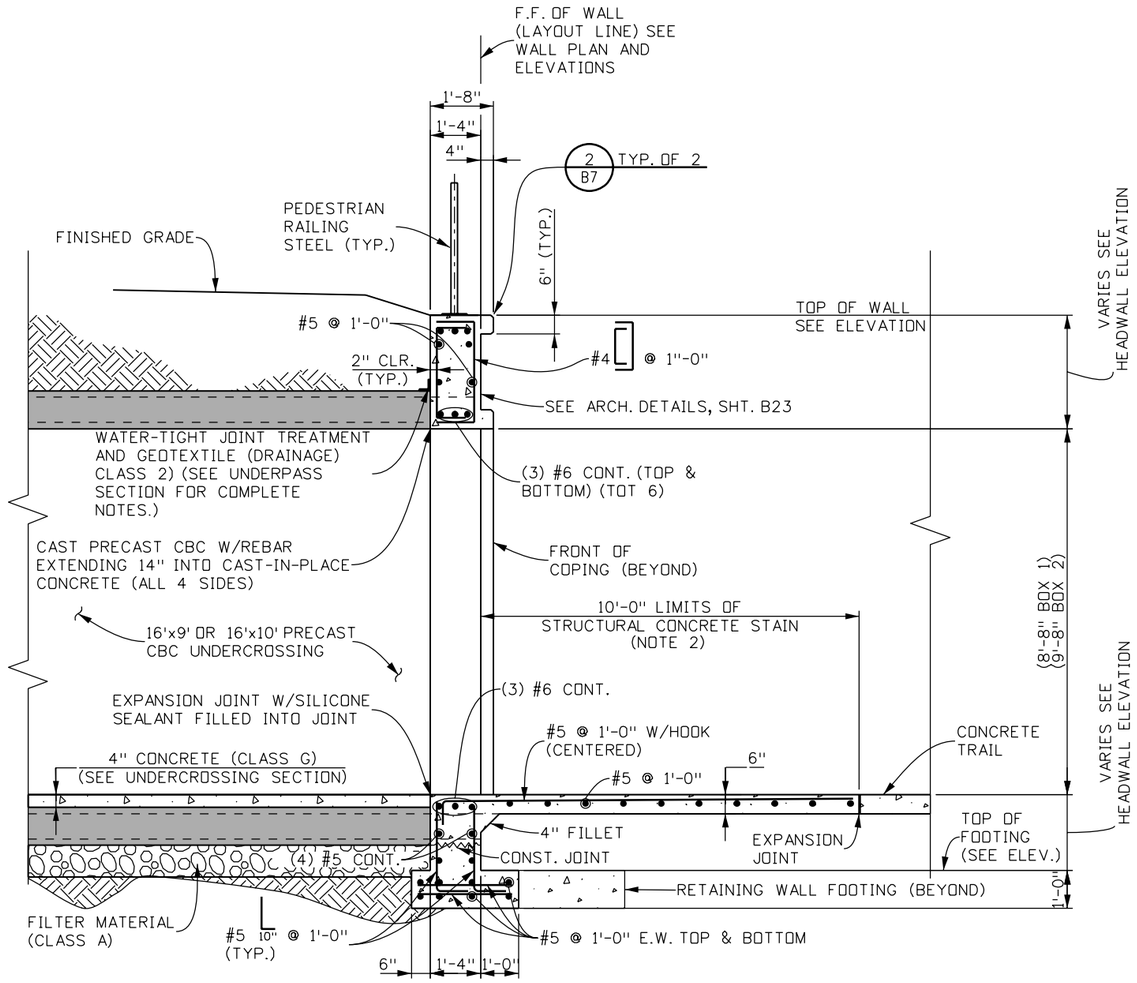
BOULDER CANYON TRAIL EXTENSION
WALL 10
GENERAL LAYOUT

Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers
Subset Sheets: B19 of B25

Project No./Code
STU C070-043
19888
Sheet Number 63

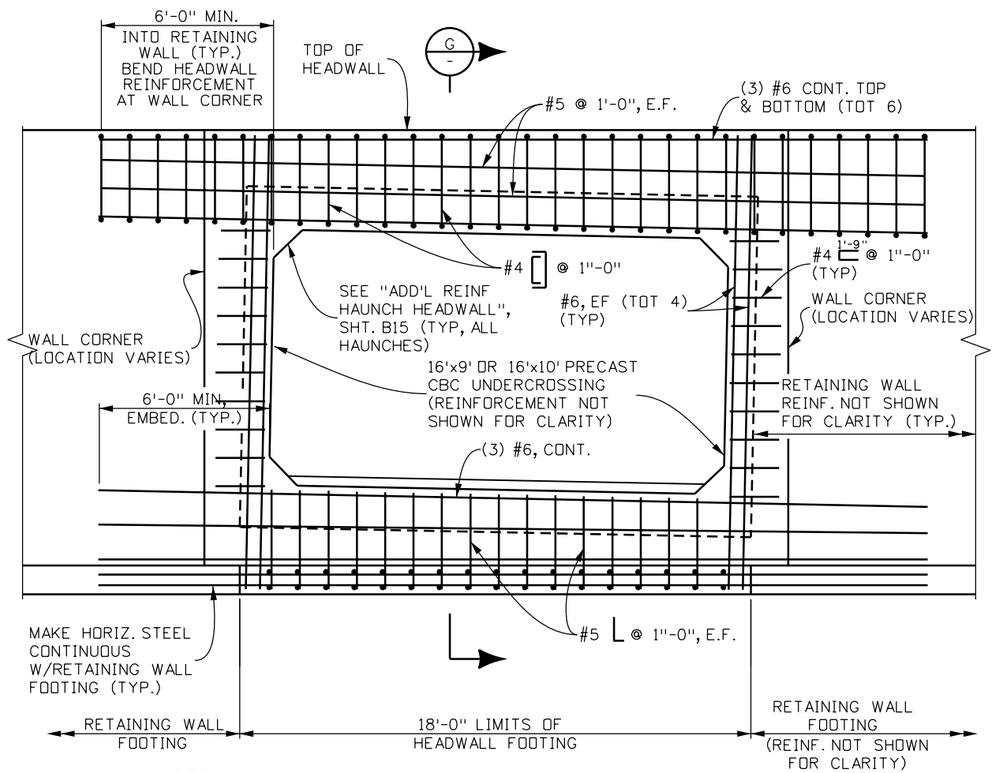
Larry 4:53:05 PM P:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_CBC 2_Wall10.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Design			Detail			Quantities		
	INITIAL	DATE		INITIAL	DATE		INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		



TYPICAL UNDERCROSSING HEADWALL SECTION G – / G B16-B19

SCALE: 1/4" = 1'-0"



NOTES:

1. STANDARD CONFIGURATION SHOWN. (APPLIES TO WALLS 3, 5, 6) SEE WALL CORNER DETAILS, SHEET B21 FOR NON STANDARD DETAILS.
2. STAIN COLOR SHALL BE AS DETERMINED BY THE OWNER.

CBC TYPICAL UNDERCROSSING HEADWALL ELEVATION 1 B16-B19

SCALE: 3/16" = 1'-0"

Know what's **below** **Call** before you dig.

Design			Detail			Quantities		
Designed By		INITIAL	Detailed By		INITIAL	Quantities By		INITIAL
Checked By		DATE	Checked By		DATE	Checked By		DATE

zadkison 3/27/16 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail extension - Boulder County\19888\Bridge\Drawings\19888BRG_CBC 11/16/2016 CDOT-DefaultPrinter_V8i.pltc1g

19888BRG_CBC 1_Headwall Details.dgn

Print Date: 11/16/2016
Drawing File Name: 19888BRG_CBC 1_Headwall Details.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

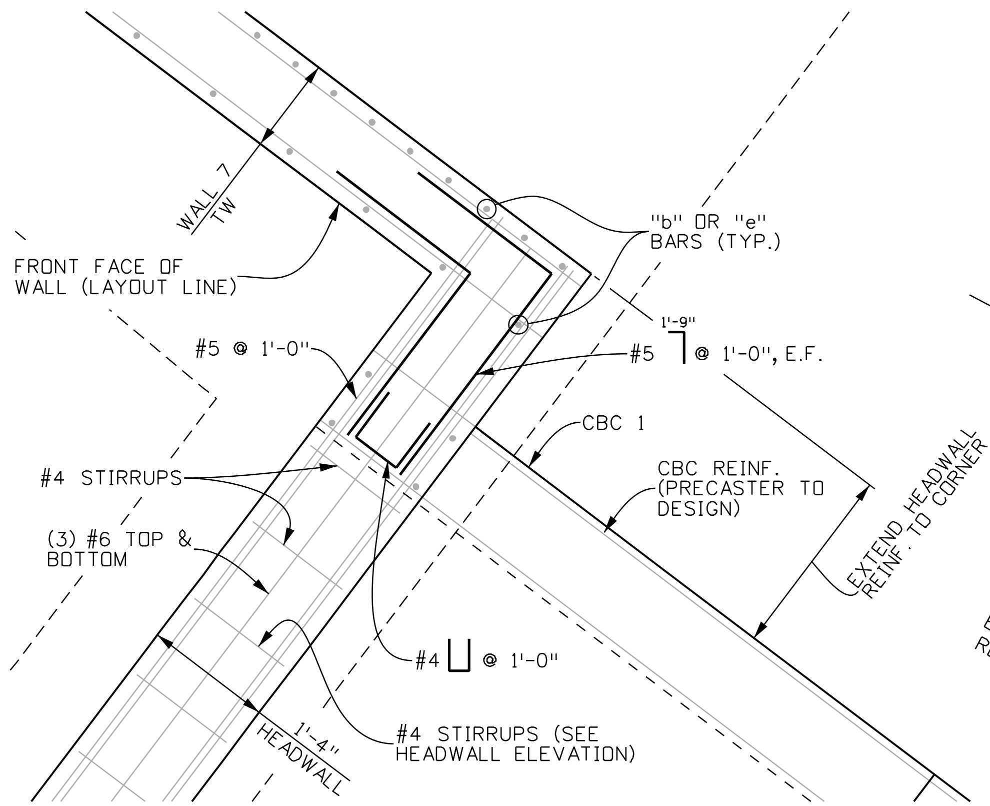
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
HEADWALL DETAILS (1 OF 2)

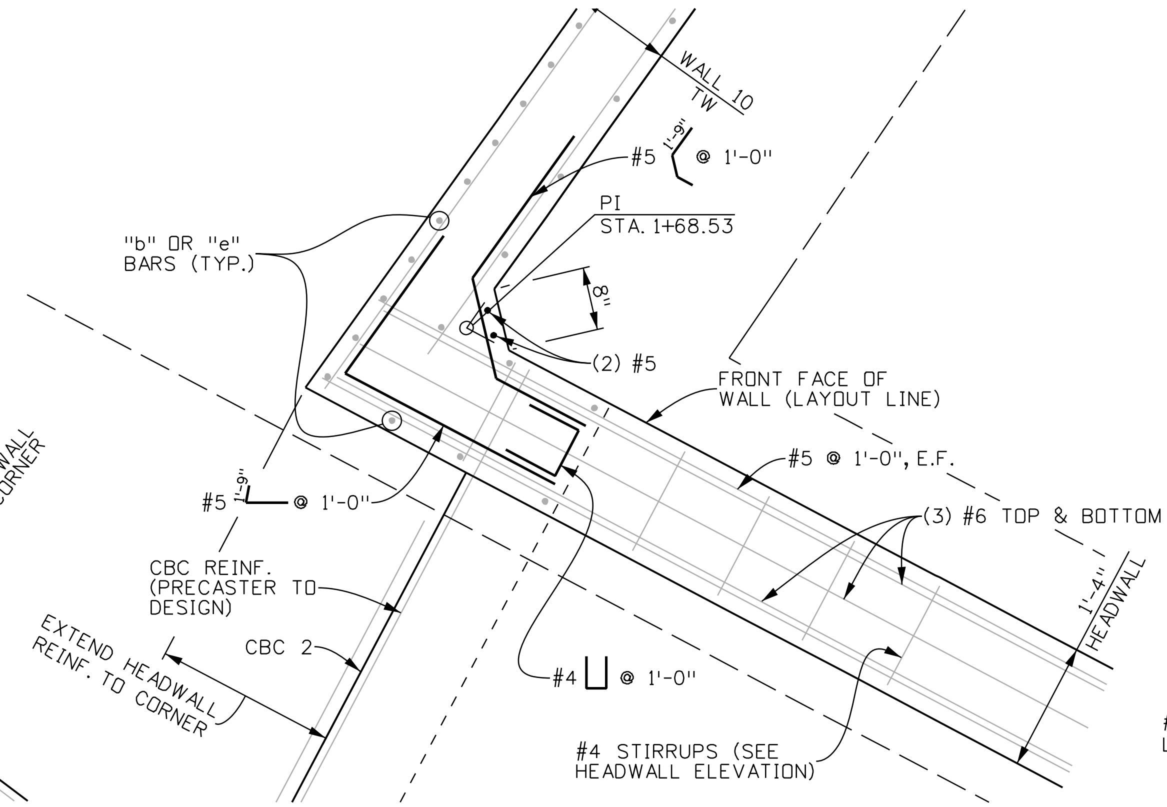
Designer:	JLS	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B20 of B25

Project No./Code
STU C070-043
19888
Sheet Number 64



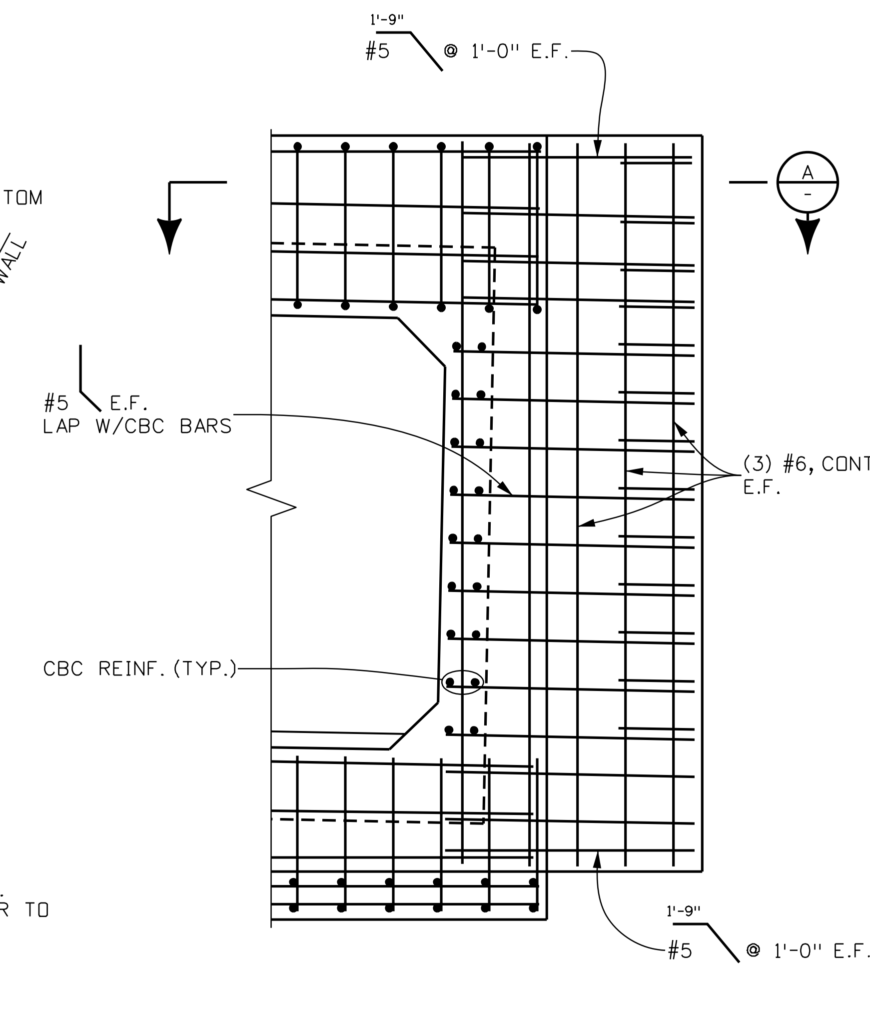
CORNER DETAIL CBC 1 WALL 6 & 7

SCALE: 1/2" = 1'-0"



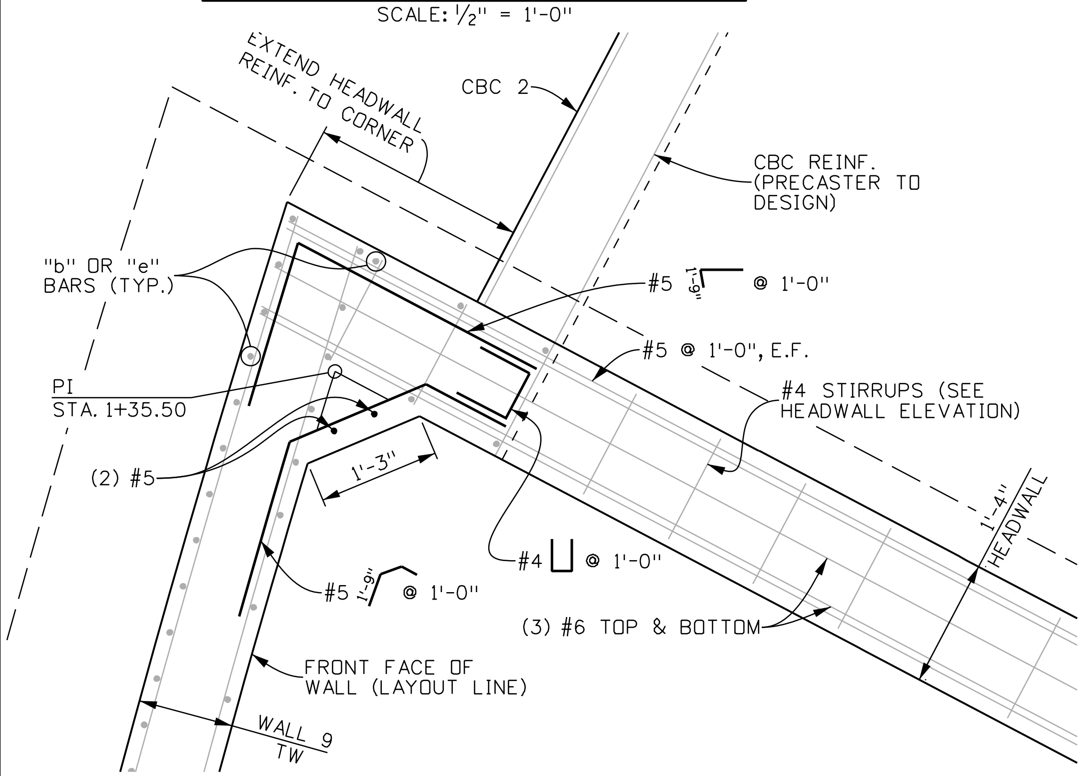
CORNER DETAIL CBC 2 WALL 10

SCALE: 1/2" = 1'-0"



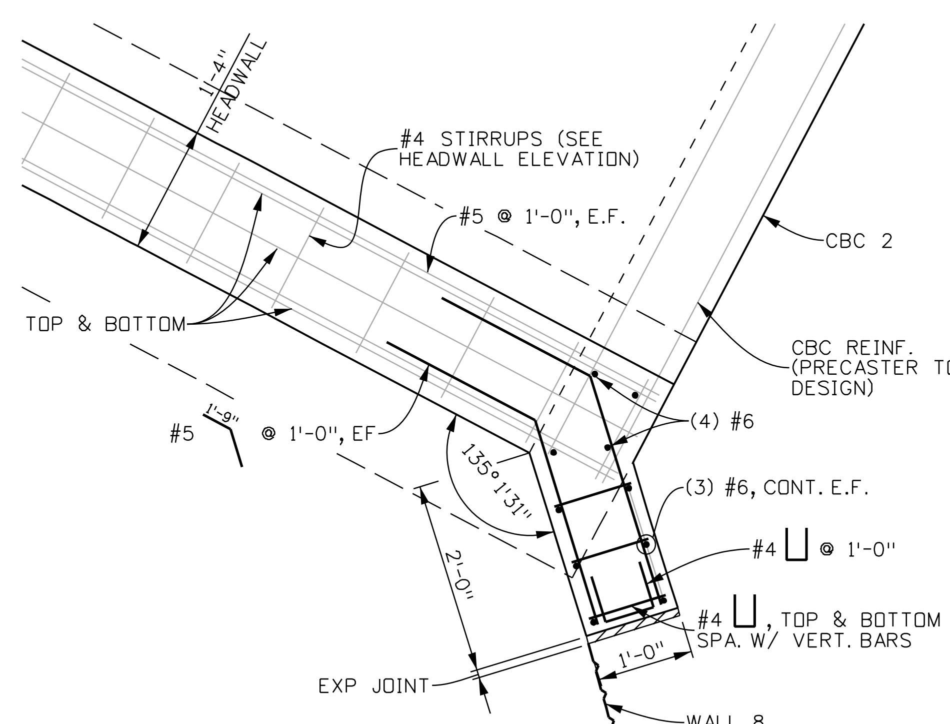
CBC 2 WALL 8 HEADWALL PARTIAL ELEVATION

SCALE: 3/16" = 1'-0"



CORNER DETAIL CBC 2 WALL 9

SCALE: 1/2" = 1'-0"



CORNER DETAIL CBC 2 WALL 8 (A/-)

SCALE: 1/2" = 1'-0"

Know what's **below**
Call before you dig.

Print Date: 11/16/2016	
Drawing File Name: 19888BRG_CBC 2_Headwall Details.dgn	
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION

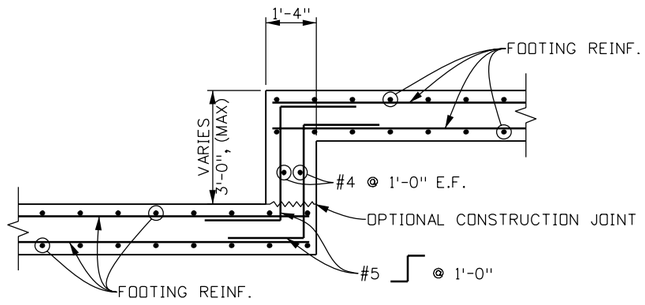
HEADWALL DETAILS (2 OF 2)

Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B21 of B25

Project No./Code
STU C070-043
19888
Sheet Number 65

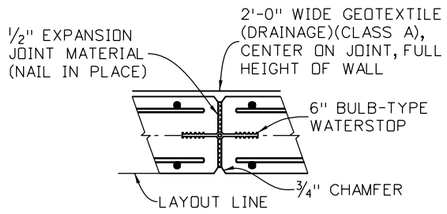
Design			Detail			Quantities		
Designed By / Checked By	INITIAL	DATE	Detailed By / Checked By	INITIAL	DATE	Quantities By / Checked By	INITIAL	DATE

zadkison 5:27:26 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_CBC 2_Headwall Details.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

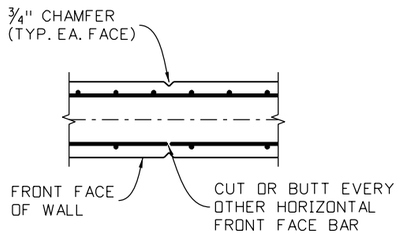


FOOTING STEP DETAIL (2 / B16-B19)

SEE RETAINING WALL ELEVATION FOR LOCATION

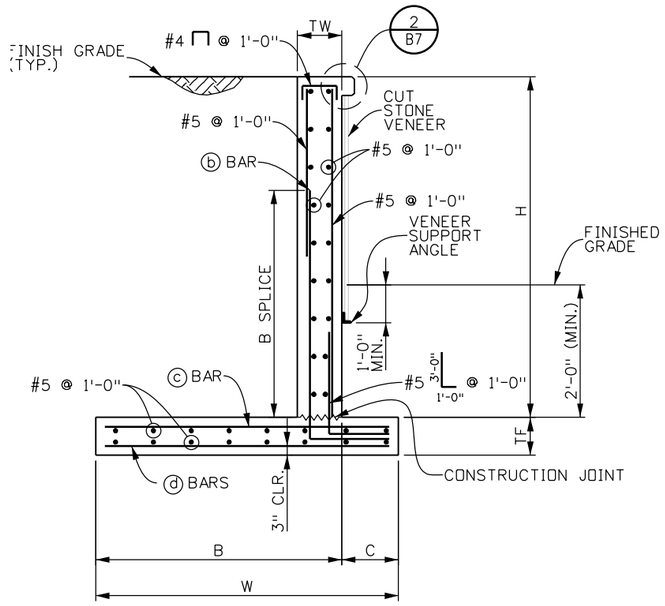


EXPANSION JOINT



WEAKENED PLANE

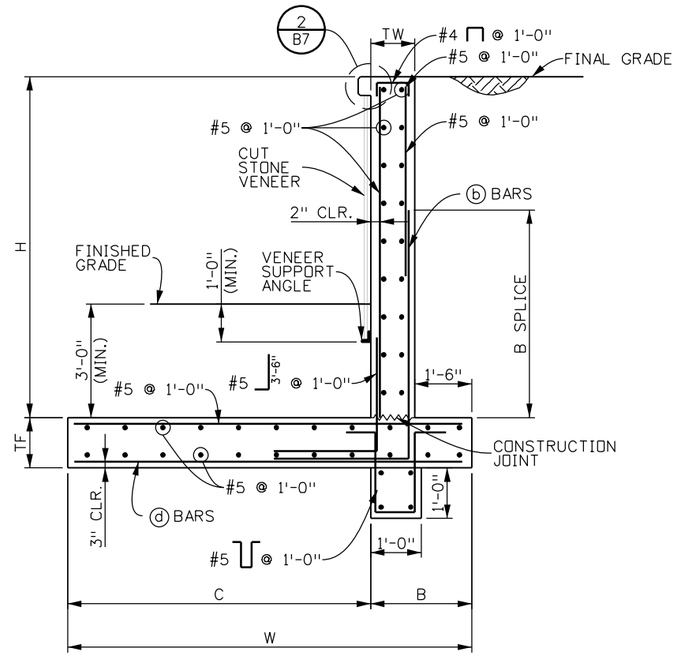
SEE RETAINING WALL ELEVATION FOR SPACING



RETAINING WALL TYPICAL SECTION (E / B16-B19)

SCALE: ¼" = 1'-0"

DESIGN DATA-REINFORCING STEEL-DIMENSIONS						
H	3'	6'	9'	12'	15'	17'
TW	1'-0"	1'-0"	1'-2"	1'-2"	1'-4"	1'-4"
W	5'-6"	7'-0"	9'-0"	11'-4"	13'-0"	13'-6"
C	1'-3"	1'-6"	1'-9"	2'-0"	2'-3"	2'-6"
B	4'-3"	5'-6"	7'-3"	9'-4"	10'-9"	11'-0"
TF	1'-0"	1'-0"	1'-2"	1'-2"	1'-4"	1'-4"
b BARS	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 6"	#5 @ 6"	#7 @ 6"	#8 @ 6"
c BARS	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 6"	#5 @ 6"	#7 @ 6"	#8 @ 6"
d BARS	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#6 @ 1'-0"	#6 @ 1'-0"
B Splice	1'-9"	1'-9"	4'-6"	5'-8"	8'-5"	11'-8"
Design Data applies to the specified height (H) or less.						



RETAINING WALL TYPICAL SECTION (F / B18)

SCALE: ¼" = 1'-0"

DESIGN DATA-REINFORCING STEEL-DIMENSIONS					
H	3'	6'	9'	12'	15'
TW	1'-0"	1'-2"	1'-2"	1'-4"	1'-4"
W	6'-6"	8'-8"	10'-8"	12'-10"	14'-10"
C	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
B	2'-6"	2'-8"	2'-8"	2'-10"	2'-10"
TF	1'-0"	1'-2"	1'-2"	1'-4"	1'-8"
b BARS	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#6 @ 1'-0"	#6 @ 6"
d BARS	#5 @ 1'-0"	#5 @ 6"	#6 @ 6"	#7 @ 6"	#8 @ 6"
B Splice	1'-9"	1'-9"	1'-9"	5'-8"	6'-7"
Design Data applies to the specified height (H) or less.					

RETAINING WALL NOTES:

1. ALL ITEMS REQUIRED TO INSTALL EXPANSION JOINT AND WEAKENED PLANE PER THIS DETAIL WILL NOT BE MEASURED DIRECTLY BUT SHALL BE INCLUDED IN THE COST OF CONCRETE CLASS D.
2. HORIZONTAL REINFORCEMENT IN THE FOOTING AND STEM SHALL BE MADE CONTINUOUS AT WALL CORNERS, UNLESS NOTED OTHERWISE.

Know what's **below** **Call** before you dig.

Design | Initial | Date | Designed By | Checked By
Detail | Initial | Date | Detailed By | Checked By
Quantities | Initial | Date | Quantities By | Checked By

zadkison 11/16/2016 8:27:34 PM d:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_Retaining Wall Details.dgn
CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016
Drawing File Name: 19888BRG_Retaining Wall Details.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

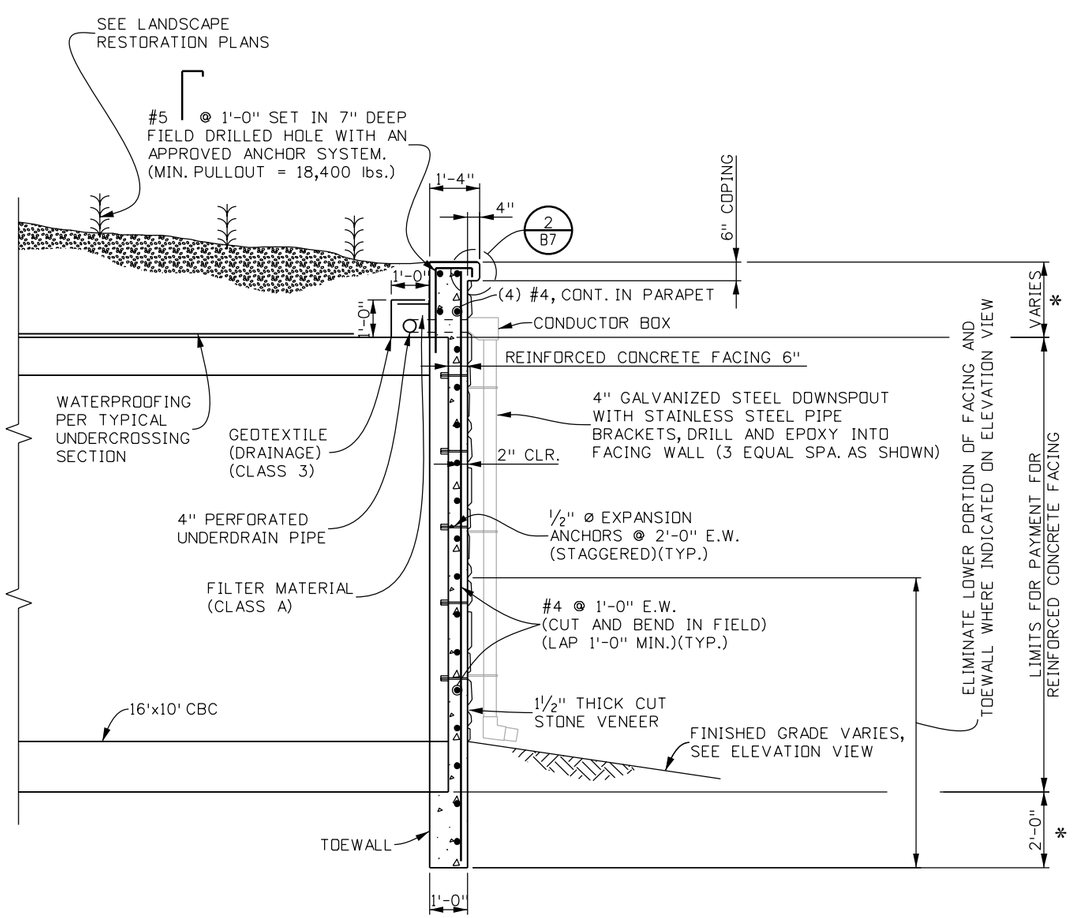
Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
RETAINING WALL DETAILS

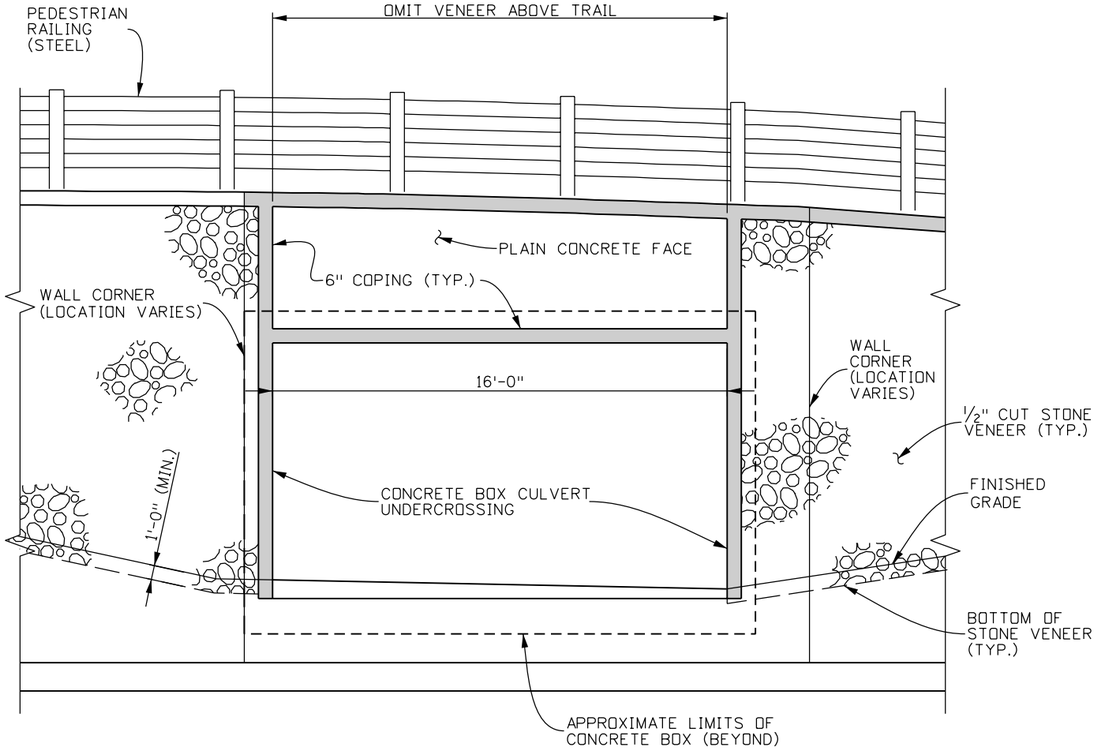
Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B22 of B25

Project No./Code
STU C070-043
19888
Sheet Number 66



ARCHITECTURAL DETAILS FOR CBC 2

SCALE: ¼" = 1'-0"



CBC HEADWALL TYPICAL ARCHITECHTURAL TREATMENTS

SCALE: ⅜" = 1'-0"

NOTES:

1. DISCHARGE DOWNSPOUT PIPE SHALL BE 4" ø GALVANIZED STEEL (ASTM A53, SCHEDULE 40)
2. GALVANIZED PIPE FITTINGS SHALL BE MALLEABLE IRON, SCH. 40.
3. PAYMENT FOR DOWNSPOUT, CONDUCTOR BOX, FITTING, SUPPORTS, AND ALL OTHER ASSOCIATED MATERIAL AND WORK SHALL BE PAID UNDER 619 "4 INCH GALVANIZED PIPE"
4. PAYMENT FOR EXPANSION ANCHORS, REINFORCEMENT, CONCRETE, AND ALL OTHER ASSOCIATED MATERIAL AND WORK SHALL BE PAID UNDER 504 "REINFORCED CONCRETE FACING."

* LIMITS OF PAYMENT FOR CONCRETE (CLASS D) AND REINFORCING STEEL

Know what's **below** **Call** before you dig.

Design	INITIAL	DATE	Detail	INITIAL	DATE	Quantities	INITIAL	DATE
Designed By			Detailed By			Quantities By		
Checked By			Checked By			Checked By		

zadkison 3:27:41 PM 01/2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Bridge\Drawings\19888BRG_Arch Treat CBC 1.dgn
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg

Print Date: 11/16/2016	
Drawing File Name: 19888BRG_Arch Treat CBC 1.dgn	
Horiz. Scale: 1:1	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

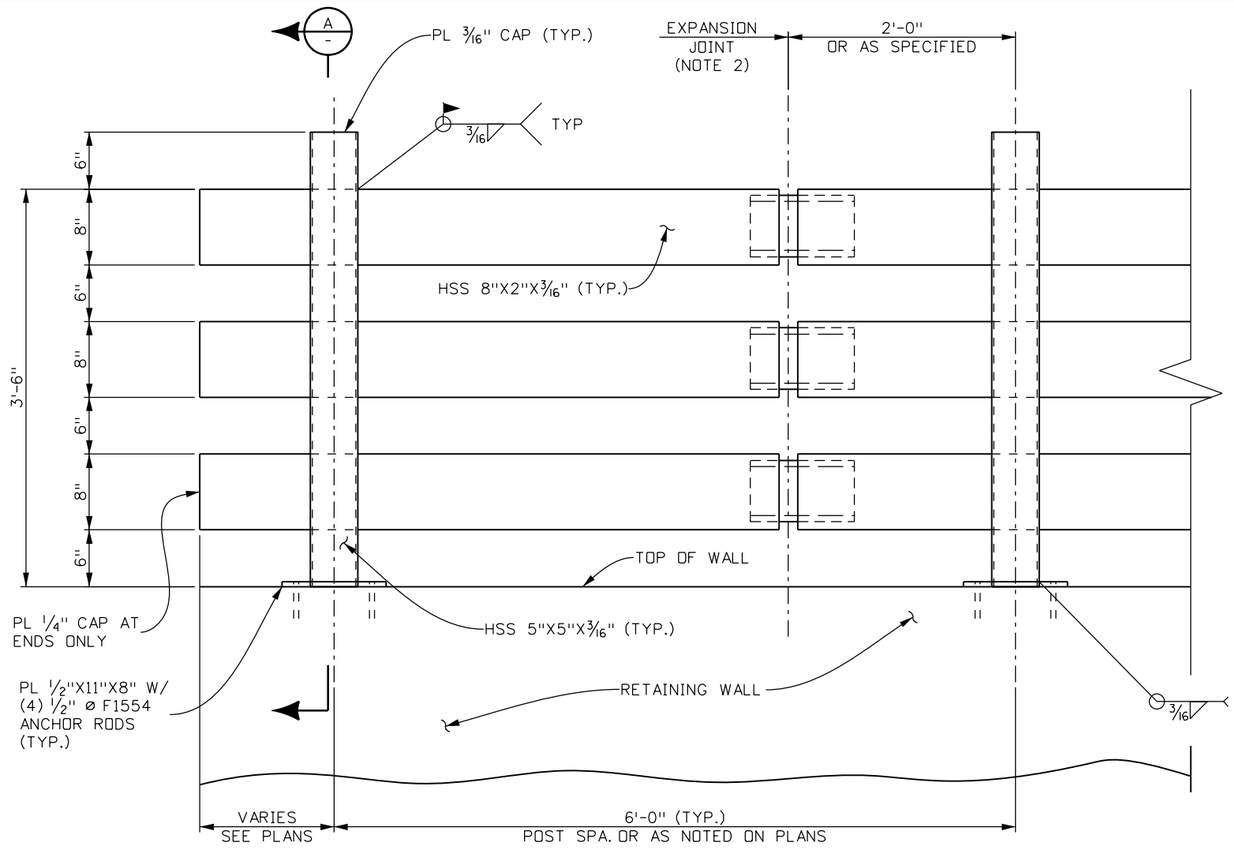
As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION

ARCHITECTURAL DETAILS

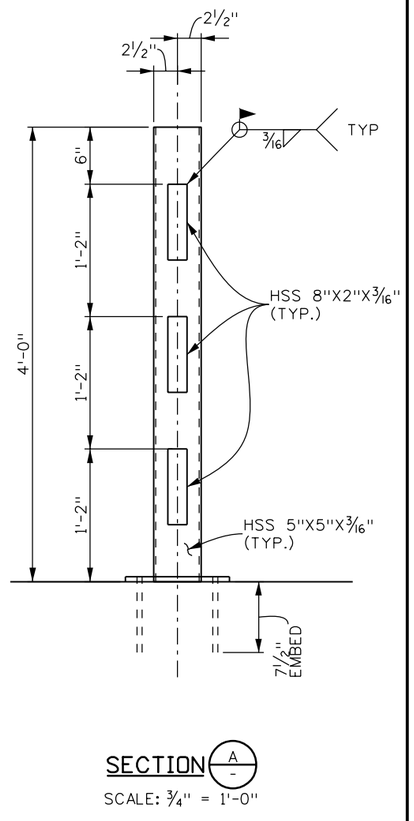
Designer:	ASP	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B23 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	67



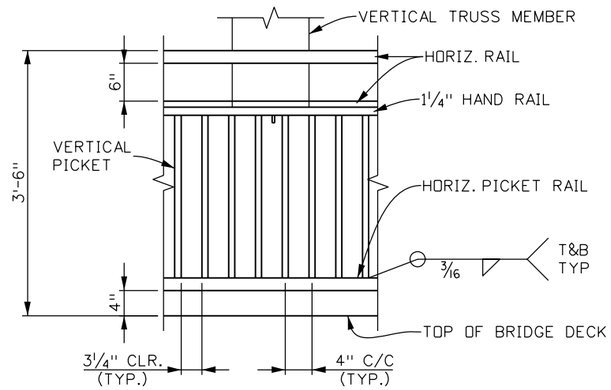
PEDESTRIAN RAILING (STEEL)

SCALE: 3/4" = 1'-0"



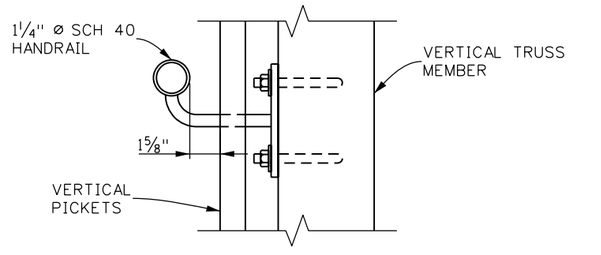
SECTION A

SCALE: 3/4" = 1'-0"



PEDESTRIAN BRIDGE STEEL RAILING DETAIL

(SEE SHT B3 FOR LOCATION)

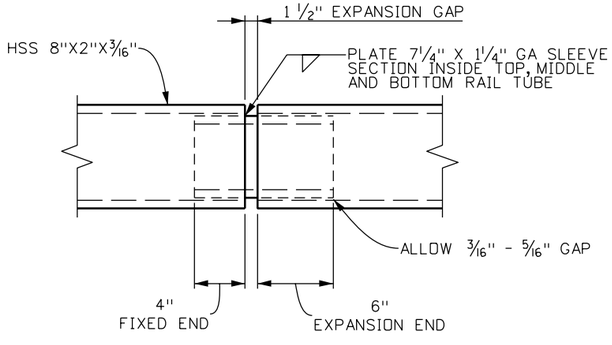


PEDESTRIAN BRIDGE HANDRAIL DETAIL

(SEE SHT. B3 FOR LOCATION)

NOTES:

1. ALL RECTANGULAR HSS RAILING SHALL CONFORM TO ASTM A-500 GRADE B. STEEL PLATES SHALL CONFORM TO ASTM A36.
2. EXPANSION JOINTS IN RAILING (SEE DETAIL) SHALL BE SPACED NO GREATER THAN 50 FEET APART.
3. ALL RAIL POSTS AND PICKETS SHALL BE SET IN A PLUMB POSITION.
4. FIELD VERIFY ALL MEASUREMENTS PRIOR TO FABRICATION OF RAILING.
5. TRAIL JOINTS SHALL BE LOCATED AT MIDPOINT BETWEEN RAILING POSTS.
6. ALL STEEL SHALL BE PAINTED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509 OF THE CDOT STANDARD SPECIFICATIONS. AT A MINIMUM, ALL SURFACES SHALL BE PAINTED WITH A TWO-COAT INORGANIC ZINC POLYURETHANE PAINT SYSTEM AS SPECIFIED IN SECTION 708.03, AND HAVE A MINIMUM DRY FILM THICKNESS OF 4.0 MILS. THE PAINT COLOR SHALL BE AS SPECIFIED BY THE OWNER. PRIMER AND PAINT SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
7. PAYMENT FOR STEEL PLATES AND TUBES, FABRICATION, EXPANSION JOINTS, ANCHORS, PAINTING AND ALL OTHER MATERIAL AND WORK SHALL BE INCLUDED IN 514 "PEDESTRIAN RAILING (STEEL)"
8. ANCHORS SHALL CONSIST OF A POST-INSTALLED, APPROVED ADHESIVE ANCHOR SYSTEM OF THE SIZE SPECIFIED IN THE PLANS. THE MINIMUM PULLOUT STRENGTH SHALL BE 4,000 psi/ANCHOR.



EXPANSION JOINT DETAIL

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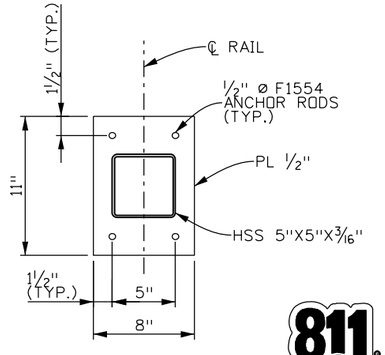

PLATE DETAIL

SCALE: 1" = 1'-0"

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Detail: Detailed By | INITIAL | DATE | Checked By
Quantities: Quantities By | INITIAL | DATE | Checked By

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Drawing File Name: 19888BRG_Pedestrian Railing.dgn			
Horiz. Scale: 1:1	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

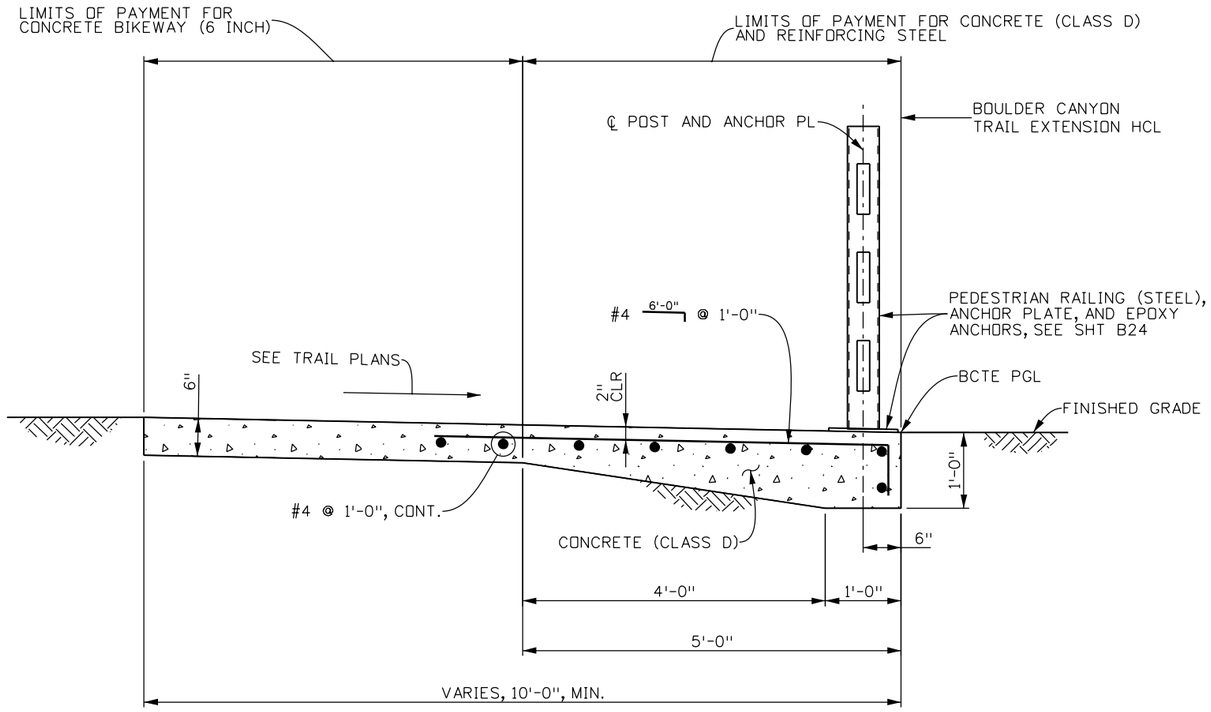
As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

PEDESTRIAN RAILING (STEEL) DETAILS (1 OF 2)

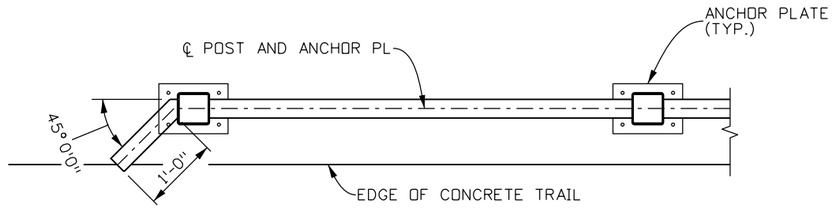
Designer:	JDM	Structure Numbers	
Detailer:	LJLJ		
Sheet Subset:	BRIDGE	Subset Sheets:	B24 of B25

Project No./Code	
STU C070-043	
19888	
Sheet Number	68



BIKEWAY MOUNTED PEDESTRIAN RAILING TYPICAL SECTION

SCALE: ½" = 1'-0"



PEDESTRIAN RAILING TERMINATION

(EACH END OF BIKEWAY MOUNTED RAIL, 2 LOCATIONS TOTAL)
SCALE: ½" = 1'-0"

NOTES:

1. LIMITS OF BIKEWAY MOUNTED PEDESTRIAN RAILING SHALL BE AS SHOWN ON THE TRAIL PLANS.
2. SEE TRAIL GEOMETRY AND TRAIL PROFILE SHEETS FOR HCL AND PGL INFORMATION.

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Design			Detail			Quantities		
Designed By	INITIAL	DATE	Detailed By	INITIAL	DATE	Quantities By	INITIAL	DATE
Checked By			Checked By			Checked By		

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Print Date: 11/16/2016
Drawing File Name: 19888BRG_Bikeway Ped Railing.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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Date:	Comments	Init.

CDOT Region 4

Boulder County

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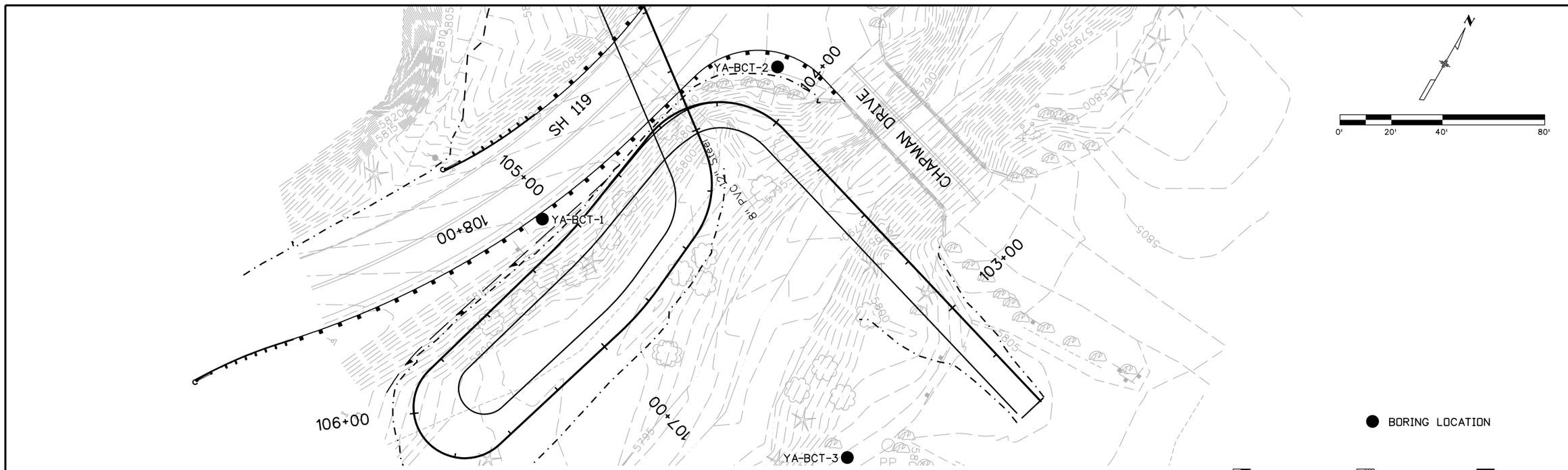
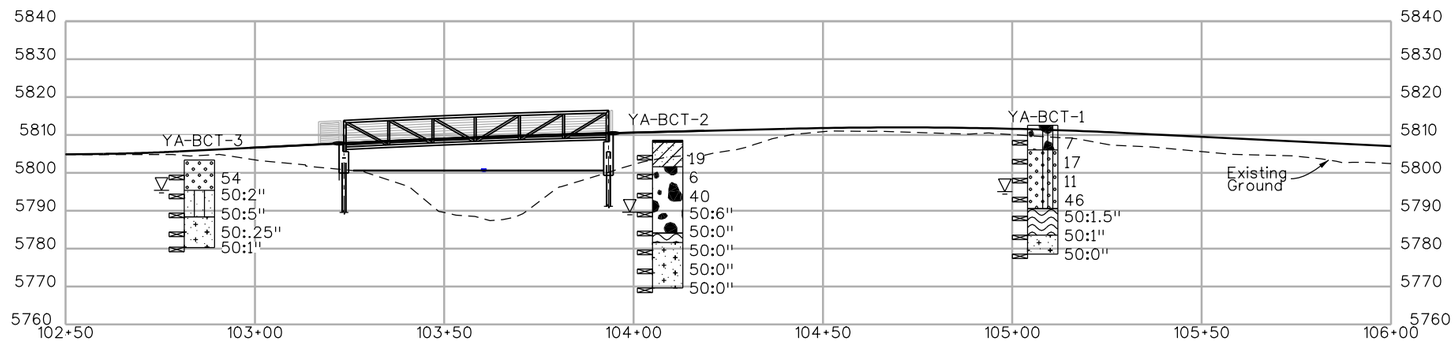
BOULDER CANYON TRAIL EXTENSION
PEDESTRIAN RAILING (STEEL) DETAILS (2 OF 2)

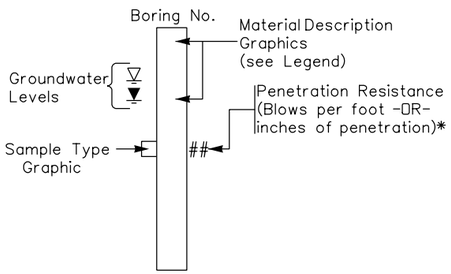
Designer: ASP
Detailer: LJLJ
Sheet Subset: BRIDGE
Structure Numbers:
Subset Sheets: B25 of B25

Project No./Code
STU C070-043
19888
Sheet Number 69





TYPICAL BOREHOLE LOG



*e.g. A value of 50/3 or 50:3 indicates that 50 blows were applied to the sampler, with a penetration of 3 inches.

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Drawing File Name: 19888 Engineering Geology01.dgn		Date:	Comments	Init.	No Revisions:	ENGINEERING GEOLOGY	STU C070-043
Horiz. Scale: 1:40 Vert. Scale: As Noted					Revised:	Designer: SEH / Structure Numbers	19888
Unit Information Unit Leader Initials					Void:	Detailer: MJW / Sheet Subset: / Subset Sheets:	Sheet Number 70
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Region 4

Boulder County

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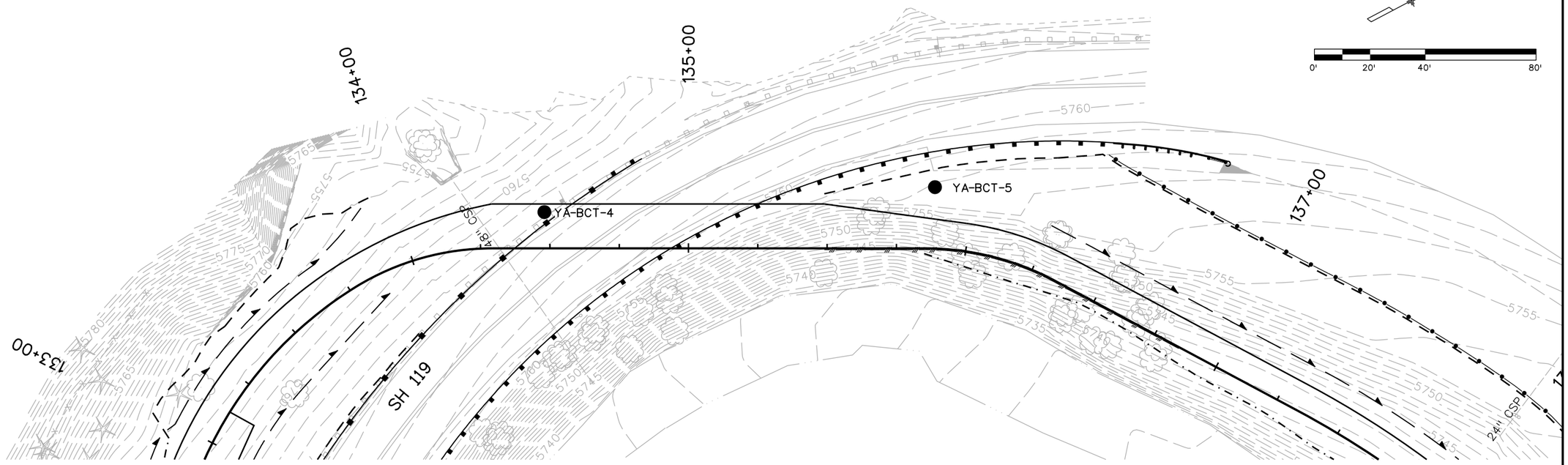


USCS Well-graded Gravel with Silt

USCS Well-graded Sand with Silt

Asphalt

USCS Clayey Sand

USCS Well-graded Gravel

USCS Well-graded Sand

USCS Silty Sand

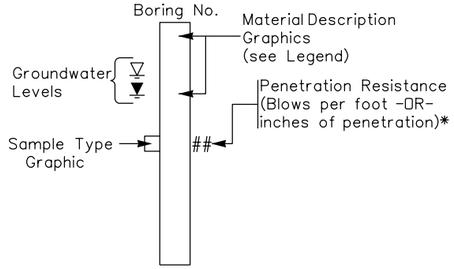
Fill with Sand as major soil

USCS Clayey Sand

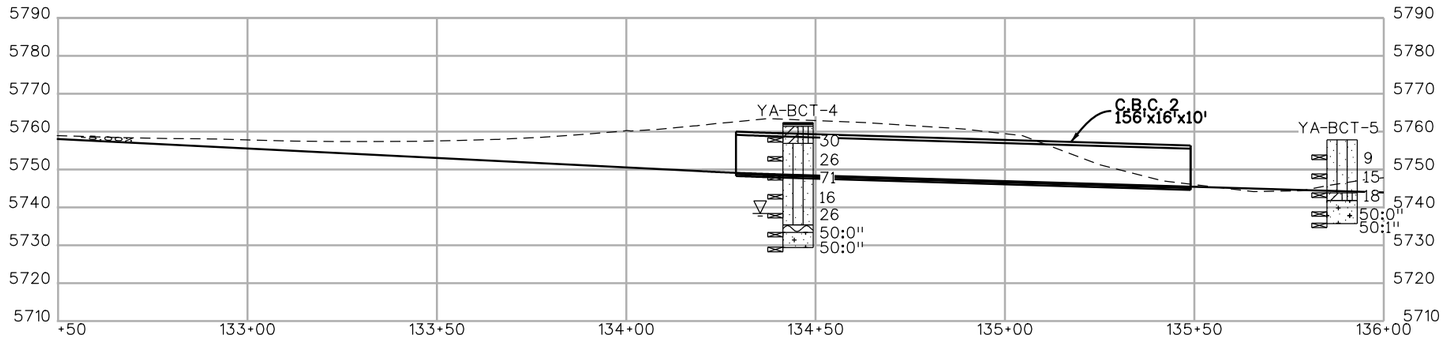
Weathered Bedrock

Granodiorite

TYPICAL BOREHOLE LOG



*e.g. A value of 50/3 or 50:3 indicates that 50 blows were applied to the sampler, with a penetration of 3 inches.



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Unit Information Unit Leader Initials			
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Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	ENGINEERING GEOLOGY			STU C070-043
Revised:	Designer: SEH	Structure Numbers		19888
Void:	Detailer: MJW			Sheet Number 71
	Sheet Subset:	Subset Sheets:		

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Ground Nail Wall	Item No.	Description	Unit	Est. Quantity
	504-06100	Ground Nailed Wall	SF	**1474**
	641-10000	Shotcrete	SY	**164**
	605-00060	6 Inch Perforated Pipe Underdrain	LF	**223**
	601-40005	Cut Stone Veneer	SF	**1474**
Coping	601-03000	Concrete Class D	CY	**6**
	602-00000	Reinforcing Steel	LB	**1135**
Rock Bolts	211-01115	Rock Reinforcement Number 10	LF	**375**

Print Date: 11/16/2016
Drawing File Name: 19888MAT_GED_TAB.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions

Date:	Comments	Init.

Region 4

As Constructed
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BOULDER CANYON TRAIL EXTENSION
TABULATION OF GROUND NAIL WALL AND ROCK BOLTING

Designer: SEH
Detailer:
Sheet Subset:
Structure Numbers
Subset Sheets:

Project No./Code
STU C070-043
19888
Sheet Number 72

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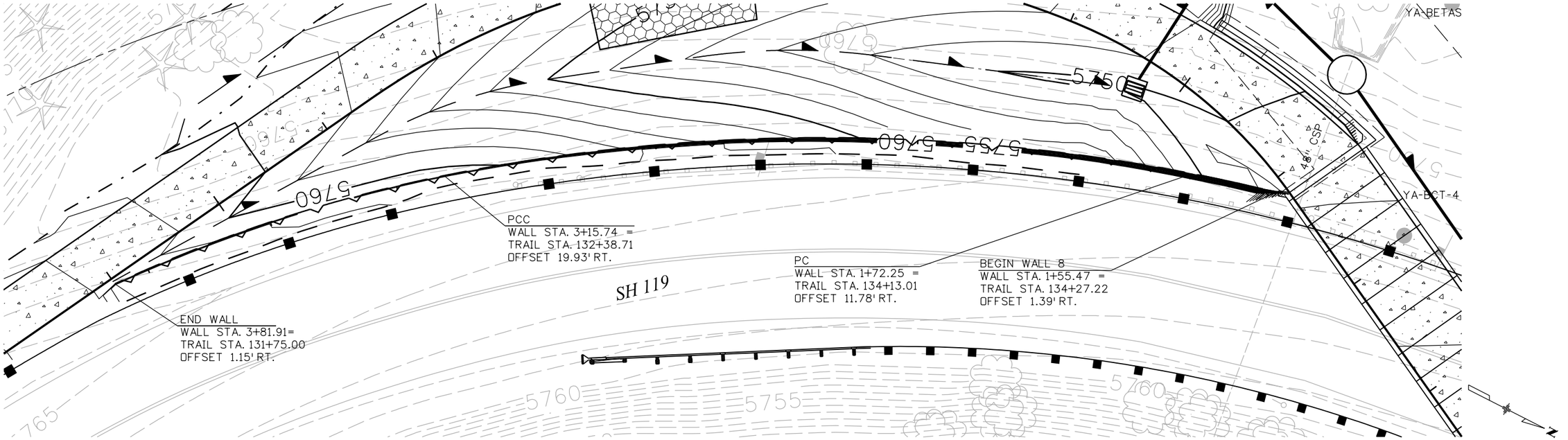
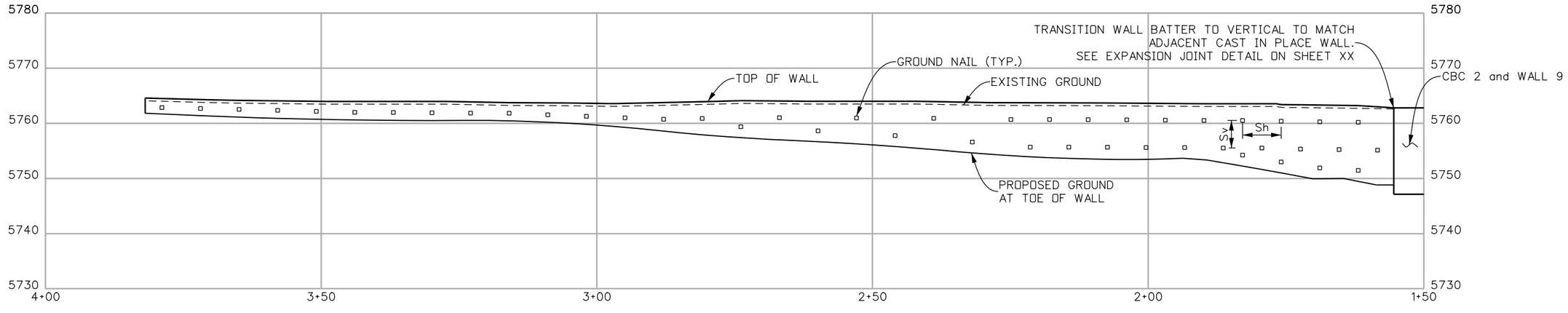


PLAN WALL 8



PROFILE WALL 8

▫ 9.5' Ground nail
Sh = 7'
Sv = 5'

Sh = Horizontal distance
Sv = Vertical distance

Print Date: 11/3/2016		Sheet Revisions			As Constructed
Drawing File Name: 19888BRG_CBC 2_Wall 8.dgn		Date:	Comments	Init.	No Revisions:
Horiz. Scale: 1:20 Vert. Scale: As Noted					Revised:
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CDOT Region 4 — Boulder County

BOULDER CANYON TRAIL EXTENSION
WALL 8
GROUND NAIL LAYOUT DIAGRAM

Designer:	SEH	Structure Numbers	
Detailer:	MJW		
Sheet Subset:		Subset Sheets:	

Project No./Code	
STU C070-043	
19888	
Sheet Number	73

1.0 GROUND NAIL WALLS

1.1 GROUND NAILS - GRADE 75 THREAD BAR OR EQUIVALENT IN ACCORDANCE WITH ASTM A615 AND EPOXY COATED IN ACCORDANCE WITH ASTM A775 AS SHOWN ON THE DRAWINGS.
FY=75,000 PSI

1.2 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 GROUT SHOULD DEVELOP THE FOLLOWING STRENGTHS AT THE SPECIFIED CURE PERIODS.
F'C=3,000 PSI MINIMUM 7 DAY

1.3 END HARDWARE - NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH GROUND NAIL MANUFACTURER'S RECOMMENDATIONS. BEARING PLATE SHALL BE IN ACCORDANCE WITH ASTM A36, GRADE 36.

1.4 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.
F'C=4,500 PSI (28-DAY STRENGTH)

1.5 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"

1.6 WELDED WIRE MESH SHALL BE IN ACCORDANCE WITH ASTM A185.
FY=60,000 PSI

1.7 WALERS AND VERTICAL BEARING BARS SHALL BE IN ACCORDANCE WITH ASTM A615.
FY=60,000 PSI

1.8 STRIP DRAINS CONSIST OF 12" WIDE DIMPLED CORES WRAPPED IN GEOTEXTILE. IN CONFORMANCE WITH CDOT REVISED SECTION 504.

1.9 CENTRALIZERS SHOULD BE PLASTIC AND ATTACHED TO THE NAILS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2.0 GROUND NAIL WALL CONSTRUCTION SEQUENCE

2.1 EXCAVATE ONE LIFT TO A MAXIMUM DEPTH OF FIVE (5) FEET. BOULDERS, COBBLES, AND/OR BEDROCK MAY BE ENCOUNTERED AT ANY DEPTH OF THE EXCAVATION OR DRILLING. WHERE EXCAVATION HAS ALREADY TAKEN PLACE FOR CBC OR ADJACENT CIP WALL CONSTRUCTION, BACKFILL THE VOID WITH CLASS 1 STRUCTURE BACKFILL OR STRUCTURE BACKFILL (FLOW-FILL), ACCORDING TO THE SPECIFICATIONS OF CDOT SECTION 206.03. IF SLOUGHING GROUND CONDITIONS ARE ENCOUNTERED, GROUND 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 THE EXCAVATION PRIOR TO DRILLING GROUND NAILS. CARE SHOULD BE TAKEN DURING EXCAVATION THAT NO GROUND IS LOST FROM BEHIND THE SHOTCRETE OF THE PRIOR LIFT.

2.2 INSTALL GROUND NAILS AT THE SPACINGS AND TO THE LENGTHS SHOWN ON THE PLANS. THE TOP ROW OF GROUND NAILS SHALL BE WITHIN 2.5 FEET OF THE TOP OF THE WALL. THE BOTTOM ROW OF NAILS SHALL BE WITHIN 3 FEET OF THE BOTTOM OF THE WALL. THE TOLERANCE FOR GROUND NAIL LOCATIONS SHALL BE 6 INCHES. TREMIE THE GROUT FROM THE BOTTOM OF THE HOLE UP.

2.3 INSTALL STRIP DRAINS, WELDED WIRE MESH, WALERS AND VERTICAL BEARING BARS AS SHOWN ON THE DRAWINGS. USE PLASTIC CHAIRS TO HOLD THE WELDED WIRE MESH AWAY FROM THE SOIL AS NECESSARY.

2.4 INSTALL SHOTCRETE TO THE MINIMUM THICKNESS SHOWN ON THE DRAWINGS AND TO ATTAIN THE MINIMUM COVERAGE'S SPECIFIED HEREIN. GIVE SPECIAL ATTENTION TO FILLING THE VOID IN THE BORE HOLE ABOVE THE GROUT LINE. COLD WEATHER PROTECTION MEASURES MAY BE NECESSARY.

2.5 INSTALL THE GROUND NAIL END HARDWARE AFTER THE 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 TO ATTAIN MINIMUM COVERAGE FOR THE GROUND NAIL AND END HARDWARE.

2.6 ONCE THE GROUT AND SHOTCRETE OF THE CURRENT LIFT HAVE ATTAINED 50% OF THEIR SPECIFIED STRENGTHS, REPEAT CONSTRUCTION SEQUENCE TO THE BOTTOM OF THE WALL.

2.7 AT THE BOTTOM LIFT, CONSTRUCT DRAINPIPE, FILTER MATERIAL, AND MANIFOLD GEOCOMPOSITE STRIP DRAINS AS SHOWN ON THE DRAWINGS.

3.0 GROUND NAIL WALL DESIGN PARAMETERS

3.1 THE FOLLOWING VALUES HAVE BEEN USED FOR DESIGN PARAMETERS:

	ϕ (DEG)	c (PSF)	γ (PCF)	Q_d (lb/ft)
ALLUVIAL/COLLUVIAL GRANULAR SOIL	36	500	120	790

ϕ ANGLE OF INTERNAL FRICTION
c COHESION
γ UNIT WEIGHT
Q_d DESIGN SHEAR RESISTANCE BOND STRESS (ALLOWABLE)

3.2 NO GROUNDWATER TABLE WAS ASSUMED.

3.3 FACTORS OF SAFETY

BEARING CAPACITY - FS=2.5
OVERTURNING - ECCENTRICITY<=B/6
GLOBAL STABILITY - FS=1.35
PULLOUT - FS=2.0
YIELD REDUCTION FACTOR - $\propto$y=0.55
FACING FLEXURE FACTOR - $\propto$f=0.67
FACING PUNCHING FACTOR - $\propto$f=0.67

5.0 GROUND NAIL WALL SPECIAL NOTES

5.1 THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SLOPE STABILITY ABOVE AND BELOW THE GROUND NAIL WALL DURING CONSTRUCTION.

5.2 THE CONTRACTORS ARE RESPONSIBLE FOR FIELD LOCATING ALL NEARBY UTILITIES. CONFLICTING UTILITIES MAY REQUIRE GROUND NAIL WALL REDESIGN, AT ENGINEER'S DISCRETION.

5.3 THE BOND STRENGTHS (Qd) SHOWN ON THE PLANS ARE THE MINIMUM ASSUMED FOR DESIGN.

5.4 GROUND NAIL LENGTHS SHOWN ON THE PLANS ARE THE MINIMUM LENGTHS REQUIRED.

5.5 PRIOR TO BEGINNING EXCAVATION FOR THE GROUND NAIL WALL, THE CONTRACTOR SHALL:

5.5.1 SURVEY THE LAYOUT LINE AND TOP OF WALL LINE.

5.5.2 CONFIRM THE LINES, GRADES, AND EXCAVATION LIMITS SHOWN ON THE PLANS.

5.5.3 THE CONTRACTOR SHALL MODIFY THE PLAN WALL PROFILES USING THE FIELD SURVEY INFORMATION AND SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL.

5.6 CUT STONE VENEER NOTES:
SEE SHEET B1 OF B24 FOR CUT STONE VENEER NOTES.

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Region 4

Boulder County

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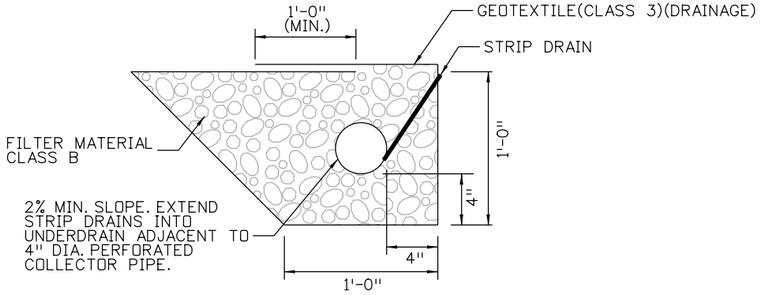
BOULDER CANYON TRAIL EXTENSION
GROUND NAIL WALL
GENERAL NOTES

Designer: SEH
Detailer: MJW
Sheet Subset:
Structure Numbers:
Subset Sheets:

Project No./Code
STU C070-043
19888
Sheet Number 74



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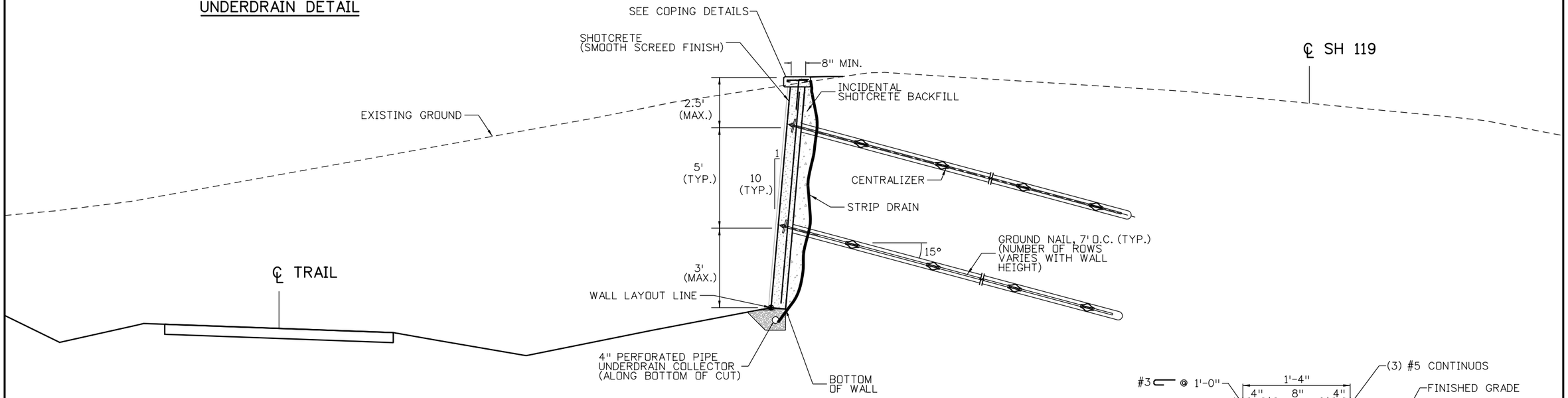
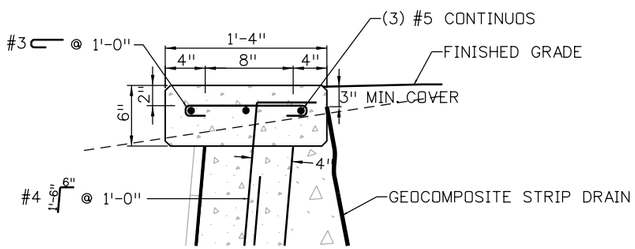




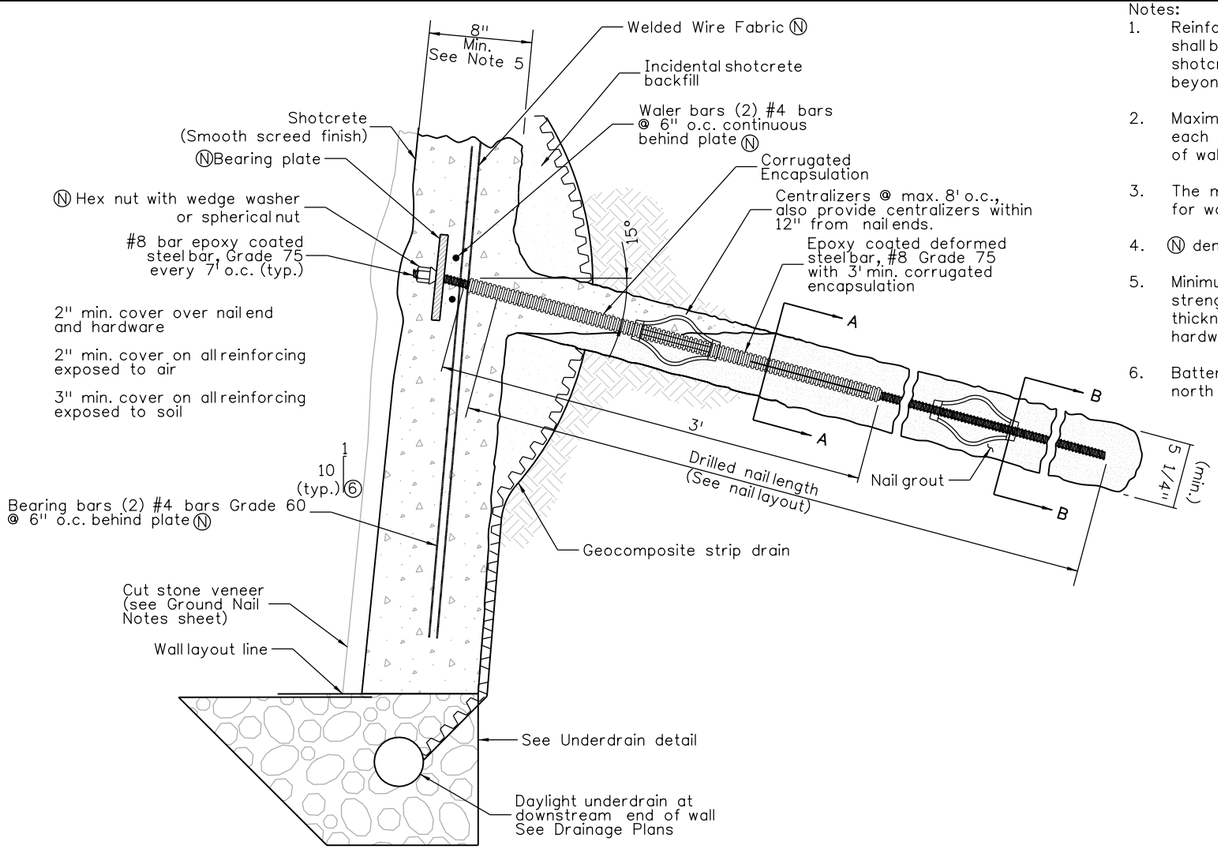
COPING DETAIL
NTS

GROUND NAIL WALL

Mike Walz 11:04:04 AM W:\2015 Projects\215-177 ES Boulder Canyon TrailExtension\7. Drawings\19888 TypicalSection01.dgn
11/2/2016 CDOT-PDFHighQuality_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/2/2016		Sheet Revisions			Region 4	As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888 TypicalSection01.dgn		Date:	Comments	Init.		No Revisions:	GROUND NAIL WALL TYPICAL SECTION
Horiz. Scale: 1:5 Vert. Scale: As Noted						Revised:	Designer: SEH Structure Numbers
Unit Information Unit Leader Initials						Void:	Detailer: MJW
Yeh and Associates, Inc. Consulting Engineers & Scientists							Sheet Subset: Subset Sheets:

Project No./Code
STU C070-043
19888
Sheet Number 75

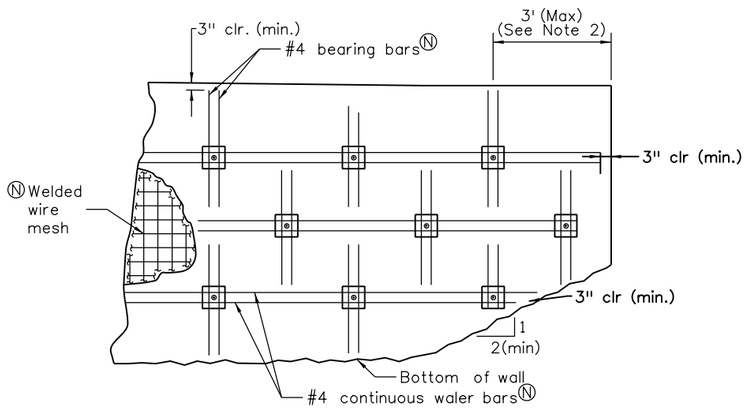


TYPICAL GROUND NAIL DETAIL

NTS

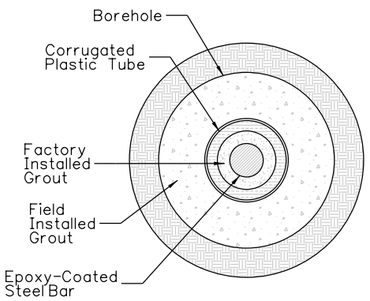
Notes:

1. Reinforcement of the shotcrete facing shall be installed throughout the entire shotcrete facing, including the facing beyond the ground nails.
2. Maximum edge distance of 3 ft for each row of ground nails at end of wall.
3. The minimum shotcrete thickness is 8 in. for wall face.
4. (N) denotes non-coated reinforcing steel.
5. Minimum shotcrete thickness for wall facing strength is 8 in., however minimum shotcrete thickness to provide coverage over end hardware as required may be more.
6. Batter to transition to zero (i.e. vertical) at north end of wall to match adjacent CIP wall.



TYPICAL SHOTCRETE FACING REINFORCEMENT - END OF WALL (NOTE 1)

NTS



GROUND NAIL CROSS SECTION A-A'

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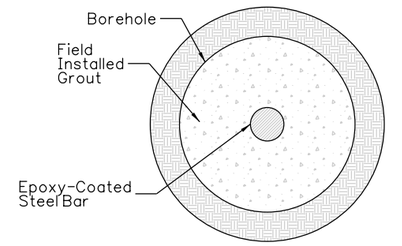

GROUND NAIL CROSS SECTION B-B'

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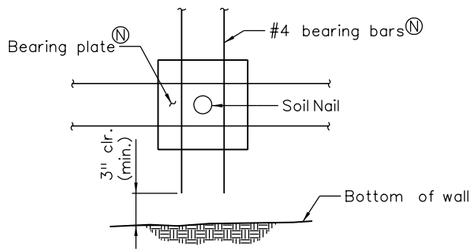
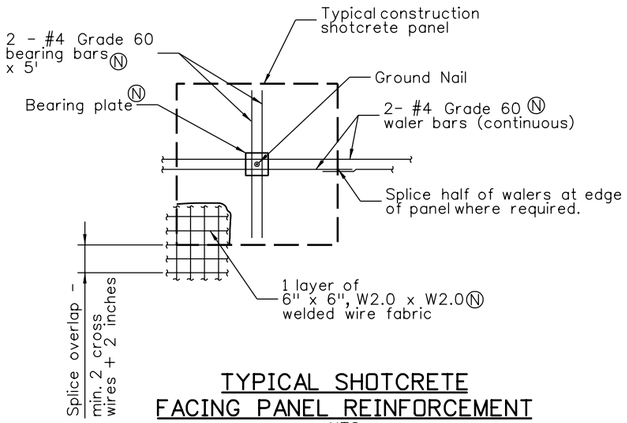


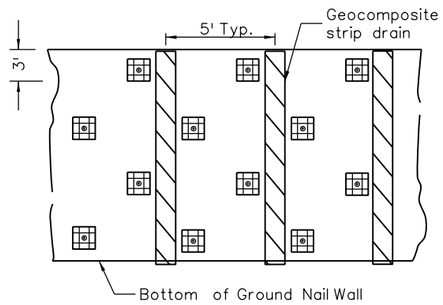
TYPICAL REINFORCEMENT BOTTOM ROW OF GROUND NAILS

NTS



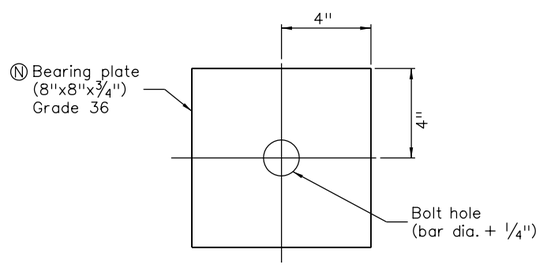
TYPICAL SHOTCRETE FACING PANEL REINFORCEMENT

NTS



TYPICAL STRIP DRAIN DETAIL

NTS



BEARING PLATE DETAIL

NTS

Print Date: 11/2/2016		Sheet Revisions				As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888GNW Details01.dgn		Date:	Comments	Init.		No Revisions:	GROUND NAIL WALL DETAILS
Horiz. Scale: 1:1 Vert. Scale: As Noted					Region 4	Revised:	Designer: SEH / Detailer: MJW / Sheet Subset:
Unit Information Unit Leader Initials						Void:	Structure Numbers: / Subset Sheets:
Yeh and Associates, Inc. Consulting Engineers & Scientists					Boulder County		

Project No./Code
STU C070-043
19888
Sheet Number 76

1.0 GENERAL NOTES FOR ROCK REINFORCEMENT

1.1 Rock Reinforcement (Number 10): Grade 150, 1 1/4" bar (ASTM A-722), bearing plate-keyhole 8"x8"x1/2" (A-36), beveled washers (ASTM A-536), hex nut (ASTM A-29). Keyhole plate shall allow for tensioning of anchors with two (2) grout tubes that will not be pinched by washer.

1.2 Contractor to verify quantities prior to ordering.

2.0 INSTALLATION CONSTRUCTION SEQUENCE

2.1 The Engineer will direct locations and orientations of the Rock Reinforcement (Number 10) in the field which may range from top of brow to roadway level.

2.2 Rock Reinforcement (Number 10) to be grouted in two phases to allow post tensioning of anchor. Second stage shall not be grouted until test results are accepted by Engineer.

2.3 Flowable non-shrink grout may be necessary behind plates and is to be included in the cost of the work. Grout shall be exterior grade with a minimim 7 day compressive strength greater than 5000 psi and a 28 day strength greater than 8000 psi. Product to be submitted to the Engineer for approval.

2.4 All components visible above ground after post tensioning and grouting shall be painted a color as approved by the Engineer. (See General Notes)

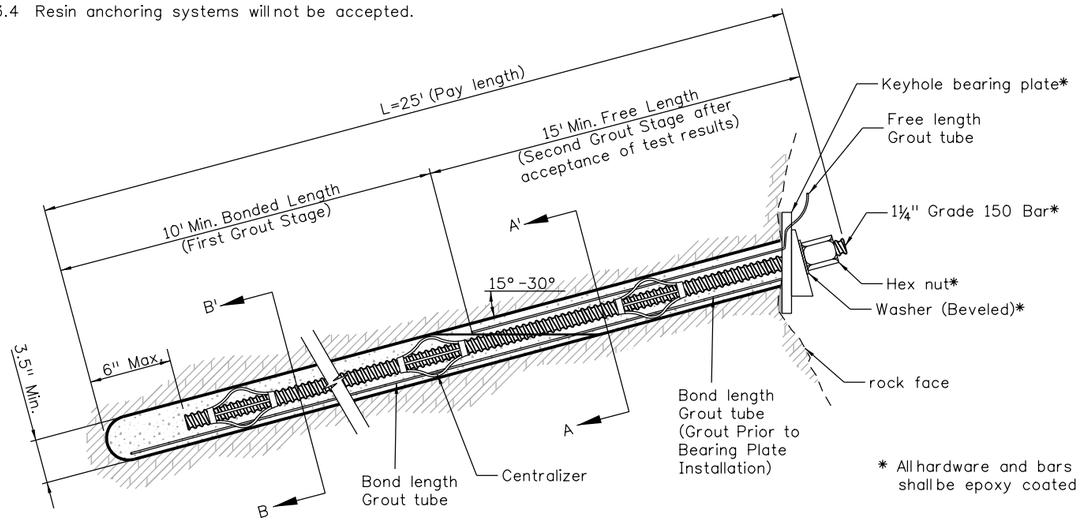
3.0 DESIGN ASSUMPTIONS

3.1 The design assumes the bond zone of the rock reinforcement will be in crystalline rock with an ultimate unit bond stress of 12 ksf.

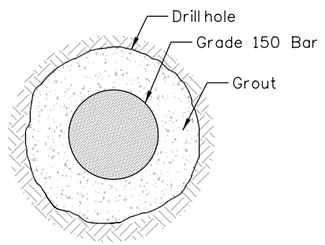
3.2 The Design Load (DL) for the Rock Reinforcement (Number 10) will be as directed by the Engineer, typically between 30 to 60 kips. All Rock Reinforcement (Number 10) will be proof tested.

3.3 A two stage grouting process is required for anchoring along the entire free length. Single stage grouting with a bond breaker will not be accepted.

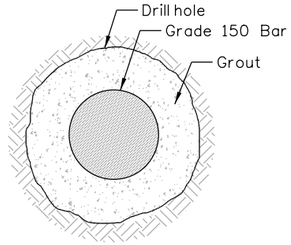
3.4 Resin anchoring systems will not be accepted.



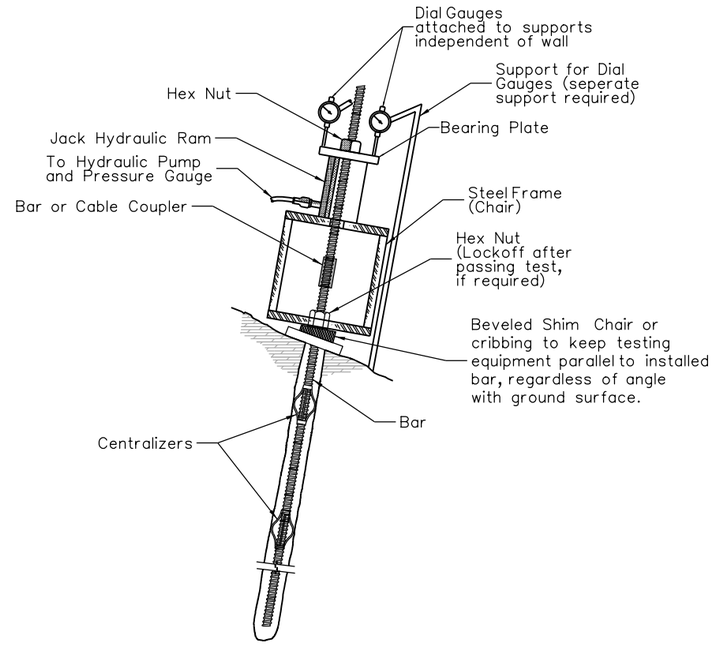
ROCK REINFORCEMENT (NUMBER 10)
NOT TO SCALE



FREE LENGTH
CROSS SECTION A-A'
NOT TO SCALE



BONDED LENGTH
CROSS SECTION B-B'
NOT TO SCALE



TYPICAL LOAD TESTING SETUP (BAR)
NOT TO SCALE

Mike Walz 11:04:07 AM W:\2015 Projects\215-177 ES Boulder Canyon Trail Extension\7. Drawings\19888 Rock Reinforcement.dgn
11/2/2016 CDOT-PDFHighQuality_V8i.pltcfg CDOT-PenTable.tbl

Print Date: 11/2/2016			
Drawing File Name: 19888 Rock Reinforcement.dgn			
Horiz. Scale: 1:1	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

Yeh and Associates, Inc.
Consulting Engineers & Scientists

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed	
No Revisions:	
Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

ROCK REINFORCEMENT (NUMBER 10)

Designer:	SEH	Structure Numbers	
Detailer:	MJW		
Sheet Subset:		Subset Sheets:	

Project No./Code	
STU C070-043	
19888	
Sheet Number	77

SUMMARY OF DRAINAGE STRUCTURE QUANTITIES

Structure Number / Identifier	202-00019	202-00035	202-04001	206-00510	420-00113	506-00212	506-00424	603-01185	603-01245	603-01305	603-01365	603-01425	603-01485	603-05018	603-05024	603-05030	603-05036	603-05042	603-05048	603-50006	604-00305	604-00310	604-00505	604-13005	604-16005	604-25005	604-25010	604-30010	604-30015	FIO	FIO	REMARKS
	REMOVAL OF INLET	REMOVAL OF PIPE	PLUG CULVERT	FILTER MATERIAL (CLASS A)	GEOTEXTILE (DRAINAGE) (CLASS 2)	RIPRAP (12 INCH)	SOIL RIPRAP (24 INCH)	REINFORCED CONCRETE PIPE (CIP)						REINFORCED CONCRETE END SECTION						6" PLASTIC PIPE	INLET TYPE C (5 FT)	INLET TYPE C (10 FT)	INLET TYPE D (5 FT)	INLET TYPE 13 (5 FOOT)	INLET TYPE 16 (5 FOOT)	VANE GRATE INLET (5 FOOT)	VANE GRATE INLET (10 FOOT)	MANHOLE SLAB BASE (10 FT)	MANHOLE SLAB BASE (15 FT)	STRUCTURE EXCAVATION	STRUCTURE BACKFILL (CLASS 1)	
								18 INCH	24 INCH	30 INCH	36 INCH	42 INCH	48 INCH	18 INCH	24 INCH	30 INCH	36 INCH	42 INCH	48 INCH														
	EA	LF	EA	CY	SY	CY	CY	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	CY	CY	
TRAIL																																
I106L								22						1										1						34	29	
I109L								25													1									23	20	
I109R					4	3		62						1							1									108	97	
I114L								26													1									21	18	
I115L					4	3		19						1							1									25	19	
F114RA		29			21	14						32						2												75	49	
M116L		2			16	10					22						1											1		62	37	CONNECT TO EXISTING CMP
I119L								25														1								33	30	
M119R																												1				CONNECT TO EXISTING CMP
F119R										19						1														22	19	
I124L		11						21												18	1									24	21	
I124R																											1					CONNECT TO EXISTING CMP
I129L								14																1						13	11	
I129R								125																		1				109	95	
I128R	1																								1							CONNECT TO EXISTING CMP
I133R								26													1									24	21	
I133L									29														1							59	53	
M134L		34	1										206																1	973	831	
M136L				5		19							41						1										1	120	68	
M138L		29							39																				1	110	102	CONNECT TO EXISTING CMP
I138L				1		5			28						1						1									49	37	
PED BRIDGE PROTECTION																																
WEST BANK				80			640																							640		INCLUDES TRAIL ARMORING
EAST BANK				20			150																							150		
CBC 2 PROTECTION																																
WEST BANK				29			233																							233		
PROJECT TOTALS	**1**	**105**	**1**	**135**	**45**	**54**	**1023**	**365**	**96**	**19**	**22**	**32**	**247**	**3**	**1**	**1**	**1**	**2**	**1**	**18**	**7**	**1**	**1**	**2**	**1**	**1**	**1**	**2**	**3**	**2904**	**1558**	

Print Date: 11/16/2016
Drawing File Name: 19888HYDR_Tab.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
TABULATION OF DRAINAGE QUANTITIES

Designer: MMM
Detailer: CLJ
Sheet Subset: DRN TABS
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 78

DRAINAGE GENERAL NOTES

1. THE MANUFACTURER'S JOINT TOLERANCE FOR ALL PIPE TYPES USED SHALL BE SUPPLIED TO THE ENGINEER. FOR DEFLECTIONS GREATER THAN THE MANUFACTURER'S TOLERANCE, A CONCRETE PIPE COLLAR SHALL BE USED PER THE STORM SEWER DETAIL SHEETS. CONCRETE PIPE COLLARS SHALL BE USED FOR EXISTING PIPE TO PROPOSED PIPE CONNECTIONS. THE "PIPE CONNECTION" DETAIL SHALL APPLY TO ALL PIPE CONNECTIONS TO PROPOSED PRECAST CONCRETE STRUCTURES AND EXISTING STRUCTURES. THE COST OF THE CONCRETE PIPE COLLAR SHALL BE INCLUDED IN THE COST OF THE WORK.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING PIPE SIZES, LENGTHS AND LOCATIONS PRIOR TO ORDERING AND DELIVERY OF THE PIPE MATERIAL TO THE SITE.

3. ALL CONCRETE FLARED END SECTIONS MUST BE INSTALLED WITH JOINT FASTENERS. IN ADDITION, JOINT FASTENERS SHALL BE INSTALLED ON ALL PIPE JOINTS WITHIN 15-FEET OF THE DOWNSTREAM END OF ALL CULVERTS. (INCLUDING END SECTION LENGTH, IF APPLICABLE).

4. ALL PIPE SHALL BE CLASS III REINFORCED CONCRETE PIPE PER CDOT STANDARD 601.04, CONFORMING TO ASTM C76, UNLESS OTHERWISE SPECIFIED.

5. OTHER UTILITIES MAY BE CROSSED OR OTHERWISE IMPACT STORM SEWER CONSTRUCTION. CONTRACTOR SHALL PROTECT EXISTING UTILITIES IN PLACE. UNLESS NOTED OTHERWISE, PROTECTION OF EXISTING UTILITIES, INCLUDING INCIDENTAL SHORING THAT IS NOT INCLUDED AS A PAY ITEM, WILL NOT BE MEASURED SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

6. RUBBER GASKETS SHALL BE USED FOR ALL RCP JOINTS IN ACCORDANCE WITH ASTM C443. THE COST OF ALL JOINT GASKETS, CRADLES, COLLARS AND PIPE CONNECTIONS FOR STORM SEWER CONSTRUCTION SHALL BE INCLUDED IN THE COST OF THE PIPE.

7. RIPRAP IS SHOWN ON THE DRAINAGE PLAN SHEETS, STRUCTURE PROFILES AND DRAINAGE DETAILS. GEOTEXTILE (DRAINAGE) (CLASS 2) SHALL BE USED BENEATH RIPRAP UNLESS SPECIFIED OTHERWISE.

8. THE TOP PORTION OF INLETS AND MANHOLES SHALL FIT THE LONGITUDINAL PROFILE SLOPE AND TYPICAL SECTION REQUIREMENTS. THE CONTRACTOR SHALL CROSS REFERENCE THIS INFORMATION PRIOR TO CONSTRUCTING INLETS AND MANHOLES TO FINAL GRADE.

9. STATION/OFFSET INFORMATION FOR MANHOLES (SLAB BASE AND BOX BASE) IS TO THE CENTER OF THE STRUCTURE.

10. TYPE C, D, & VANE GRATE INLETS AND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH CDOT M&S STANDARDS, JULY 2012 UNLESS NOTED OTHERWISE.

11. TYPE 13 COMBINATION INLETS SHALL BE CONSTRUCTED IN ACCORDANCE WITH BOULDER COUNTY STORM DRAINAGE CRITERIA STANDARD DETAILS, NOVEMBER 2013 UNLESS NOTED OTHERWISE. ALL TYPE 13 COMBINATION INLETS SHALL BE PAID FOR AS CDOT PAY ITEM INLET TYPE 16.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEWATERING AND DIVERSION INCLUDING, BUT NOT LIMITED TO, LIVE STREAM FLOW AND GROUNDWATER AND OBTAINING THE APPLICABLE DEWATERING PERMIT FOR CONSTRUCTION AT THE SITE. THIS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK. THE CONTRACTOR SHALL COMPLY WITH ALL PERMIT REQUIREMENTS.

13. DRAINAGE WORK SHALL BE PER BOULDER COUNTY STORM DRAINAGE CRITERIA STANDARD DETAILS, 2014 EDITION, UNLESS OTHERWISE MODIFIED BY THE PROJECT SPECIFICATIONS. PAY ITEM NAMES AND UNITS OF MEASUREMENT SHALL BE PER CDOT STANDARDS UNLESS NOTED OTHERWISE.

DRAINAGE LEGEND

- CONSTRUCTION LIMITS
- EXISTING FENCE
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FINISHED MAJOR CONTOURS
- FINISHED MINOR CONTOURS
- EXISTING SANITARY SEWER
- EXISTING WATER LINE
- EXISTING HIGH PRESSURE GAS LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING STORM SEWER
- EXISTING TELEPHONE LINE
- EXISTING TELEVISION LINE
- EXISTING FIBER OPTIC LINE
- EXISTING TRAFFIC ITS LINE
- EXISTING RIGHT OF WAY
- EXISTING DITCH
- EXISTING PROPERTY LINE
- EXISTING TREE
- UTILITY EASEMENT
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- RIGHT OF WAY
- PROPOSED LIMIT OF CUT
- PROPOSED LIMIT OF FILL
- PROPOSED SANITARY SEWER
- PROPOSED WATER LINE
- PROPOSED DRAINAGE SWALE
- PROPOSED STORM SEWER
- PROPOSED RIPRAP

DRAINAGE LEGEND, CONTINUED

STRUCTURE IDENTIFICATION	STRUCTURE TYPE
C	INLET TYPE C
CH	CHASE
D	INLET TYPE D
EX	EXISTING STRUCTURE (TYPE AS NOTED)
FES	FLARED END SECTION
MB	MANHOLE BOX BASE
MS	MANHOLE SLAB BASE (SPECIAL)
OS	OUTLET STRUCTURE
PC	PIPE CONNECTION
PE	PIPE END
RX	INLET TYPE R (X LENGTH)
VGS	INLET VANE GRATE (SINGLE)
VGD	INLET VANE GRATE (DOUBLE)
X	MANHOLE SLAB BASE (X DIAMETER)
13S	INLET TYPE 13 (SINGLE)
13D	INLET TYPE 13 (DOUBLE)
13T	INLET TYPE 13 (TRIPLE)
16S	INLET TYPE 16 (SINGLE)
16D	INLET TYPE 16 (DOUBLE)
16T	INLET TYPE 16 (TRIPLE)

STRUCTURE NUMBER

STRUCTURE IDENTIFICATION

Print Date: 11/16/2016
Drawing File Name: 19888HYDR_Gen Notes.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

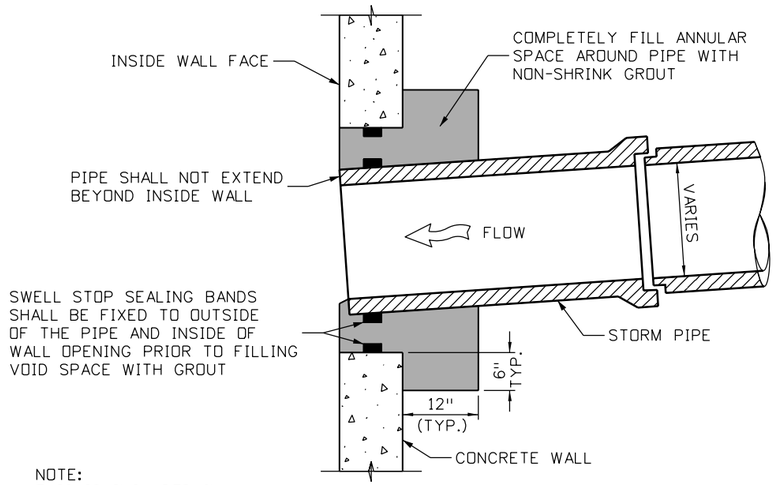
As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION

DRAINAGE GENERAL NOTES & LEGEND

Designer: MMM
Detailer: CLJ
Sheet Subset: DRN NOTES
Structure Numbers
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 79



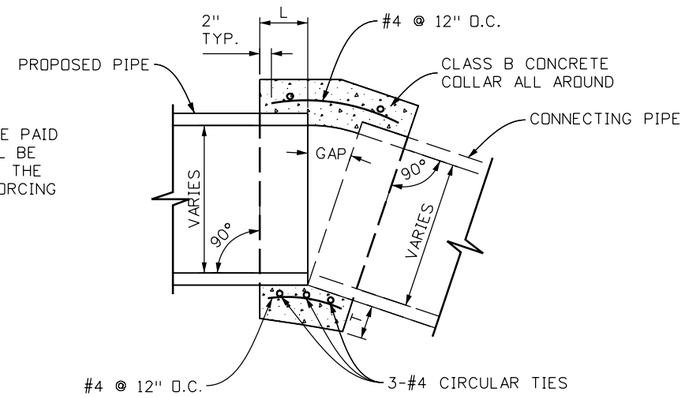
NOTE:
THIS IS INCLUDED IN THE COST OF PIPE.

PIPE CONNECTION DETAIL
(EXISTING AND PRECAST WALLS)
N.T.S.

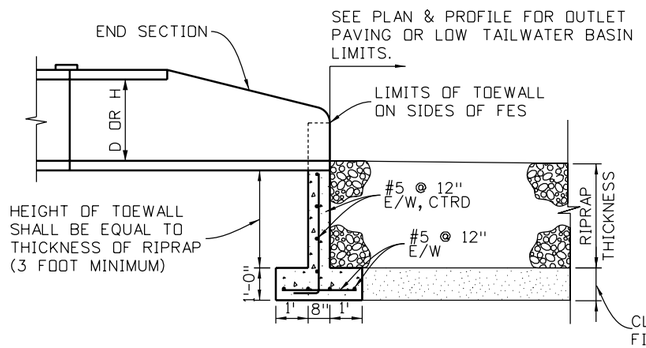
NOTE:

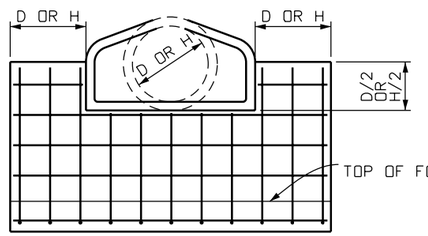
PIPE COLLARS WILL NOT BE PAID FOR SEPARATELY BUT WILL BE INCLUDED IN THE COST OF THE WORK. REBAR TO BE REINFORCING STEEL (EPOXY COATED).

PIPE SIZE	L	T
12"-24"	1.0'	6"
30"-42"	1.5'	8"
48"-60"	2.0'	11"
66"-78"	2.5'	12"
84"-96"	3.0'	13"
102"-114"	3.5'	14"



CONCRETE PIPE COLLAR
NOT TO SCALE





NOTES:

1. TOEWALL SHALL BE USED FOR ALL FLARED END SECTIONS 36" OR LARGER.
2. BACKFILL BOTH SIDES OF WALL EVENLY (WITHIN 1'-0" OF EACH OTHER).
3. JOINT FASTENERS SHALL BE INSTALLED ON ALL FLARED END SECTIONS.
4. TOEWALL, STRUCTURE EXCAVATION AND BACKFILL AND ALL ASSOCIATED WORK SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE END SECTION.

TOEWALL DETAIL
NOT TO SCALE

Print Date: 11/16/2016
Drawing File Name: 19888HYDR_Details01.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions

Date:	Comments	Init.

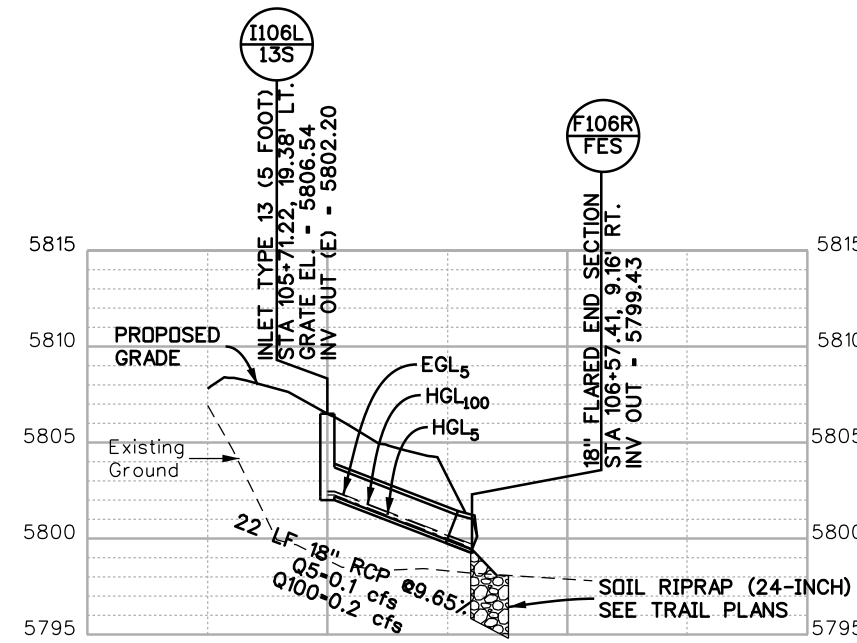
Region 4

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
DRAINAGE DETAILS

Designer: MMM
Detailer: CLJ
Sheet Subset: DRN DETAIL
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 80



I106L TO F106R

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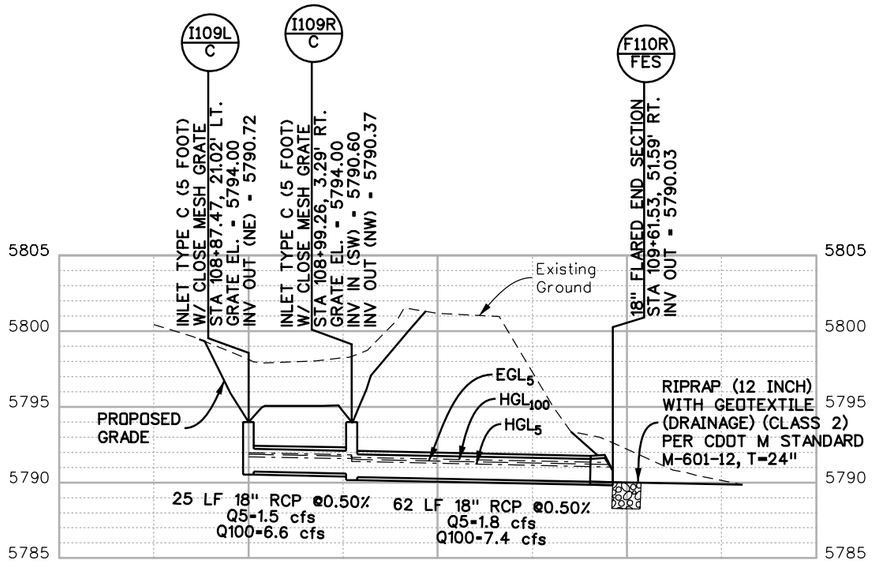
11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT-PenTable.tbl

0' 5' 10'
0' 20' 40'

811 Know what's below Call before you dig.

Print Date: 11/16/2016	Sheet Revisions		As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888HYDR_Profile 01.dgn	Date: / Comments / Init.		No Revisions:	STRUCTURE PROFILES
Horiz. Scale: 1:40 Vert. Scale: 1:10		CDOT Region 4	Revised:	Designer: CHH / Structure Numbers
Unit Information / Unit Leader Initials		Boulder County	Void:	Detailer: REW
MULLER ENGINEERING COMPANY				Sheet Subset: DRAINAGE / Subset Sheets: 1 of 7

Project No./Code
STU C070-043
19888



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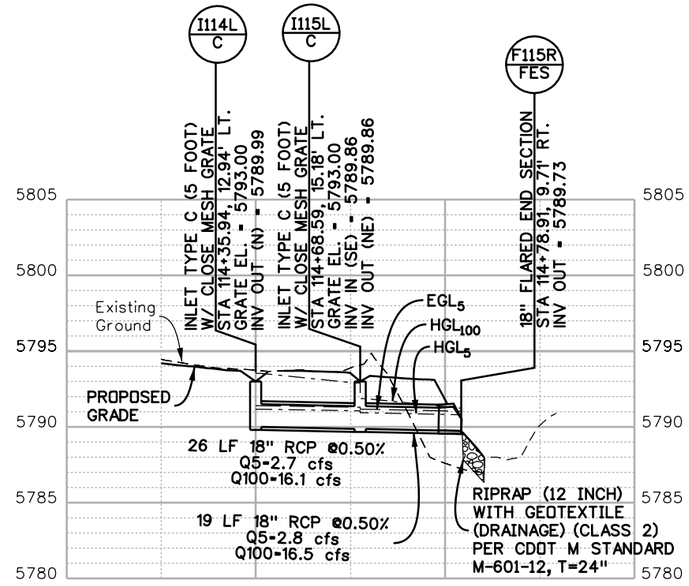

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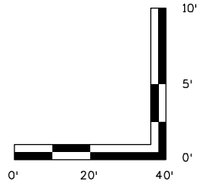

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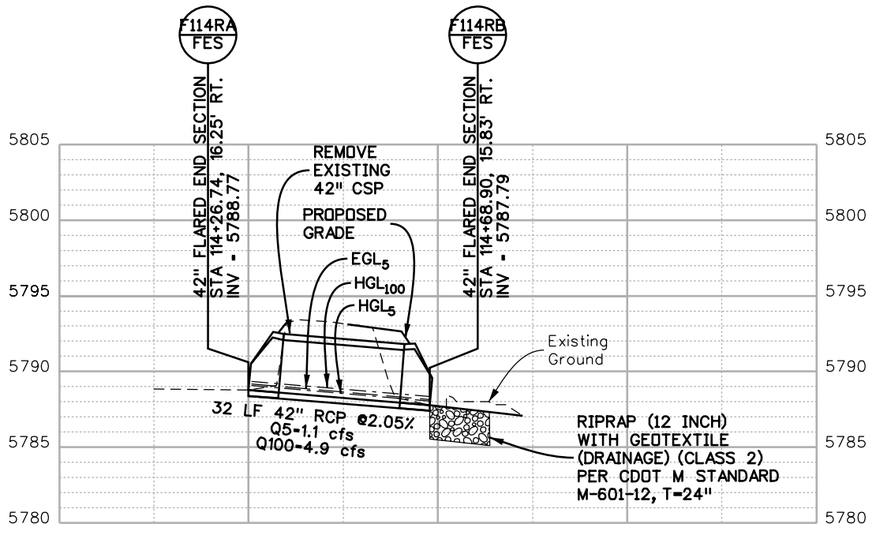
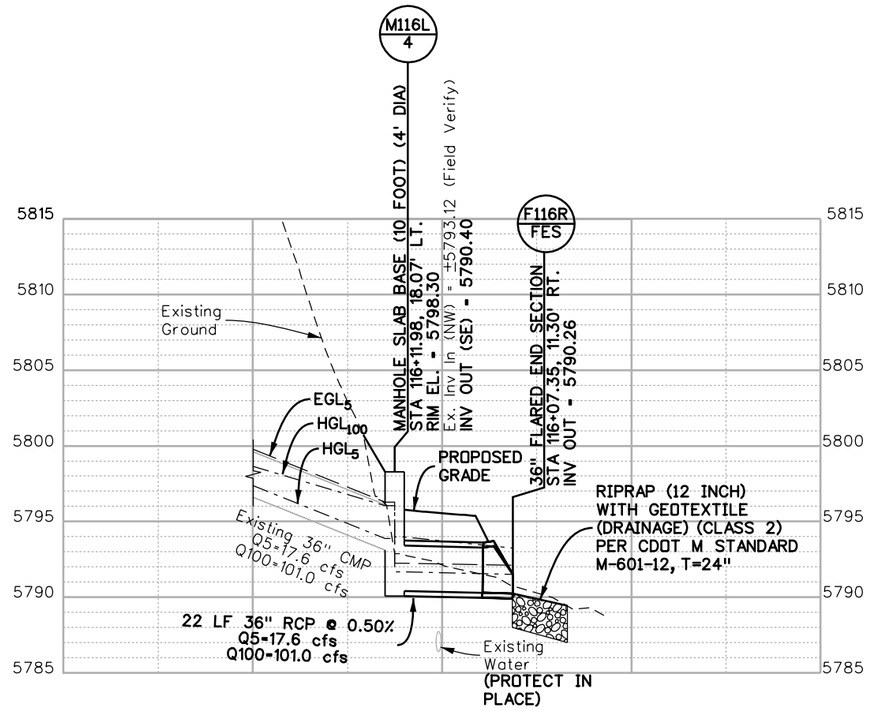
Unit Information Unit Leader Initials						Void:	Detailer: REW
MULLER ENGINEERING COMPANY							Sheet Subset: DRAINAGE Subset Sheets: 2 of 7

Project No./Code
STU C070-043
19888
Sheet Number 82



F114RA TO F114RB



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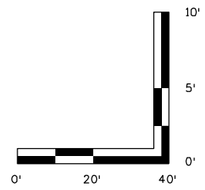

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Print Date: 11/16/2016		Sheet Revisions			Region 4	As Constructed	BOULDER CANYON TRAIL EXTENSION
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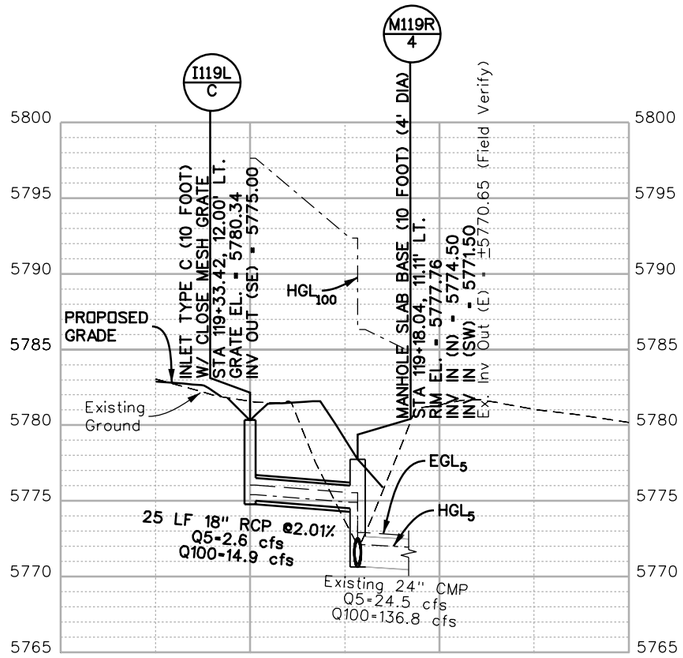
Horiz. Scale: 1:40	Vert. Scale: 1:10					Revised:	Designer: CHH / Detailer: REW / Sheet Subset: DRAINAGE
Unit Information	Unit Leader Initials					Void:	Structure Numbers: / Subset Sheets: 3 of 7
MULLER ENGINEERING COMPANY							Project No./Code: STU C070-043 / 19888 / Sheet Number 83



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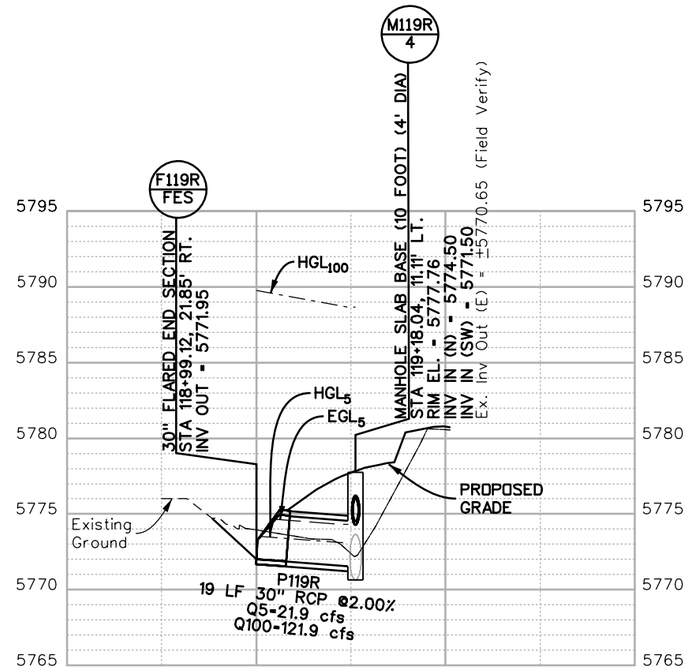

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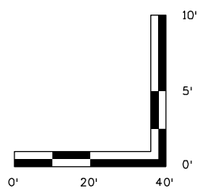

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Print Date: 11/16/2016		Sheet Revisions			Region 4	As Constructed	BOULDER CANYON TRAIL EXTENSION	Project No./Code
Drawing File Name: 19888HYDR_Profile 04.dgn		Date:	Comments	Init.		No Revisions:	STRUCTURE PROFILES	STU C070-043
Horiz. Scale: 1:40 Vert. Scale: 1:10						Revised:	Designer: CHH / Structure Numbers	19888
Unit Information Unit Leader Initials						Void:	Detailer: REW / Sheet Subset: DRAINAGE / Subset Sheets: 4 of 7	Sheet Number 84
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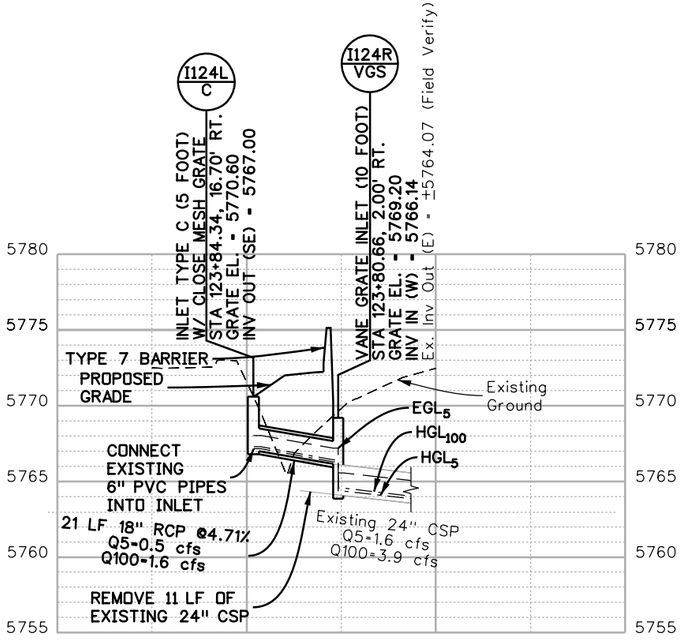

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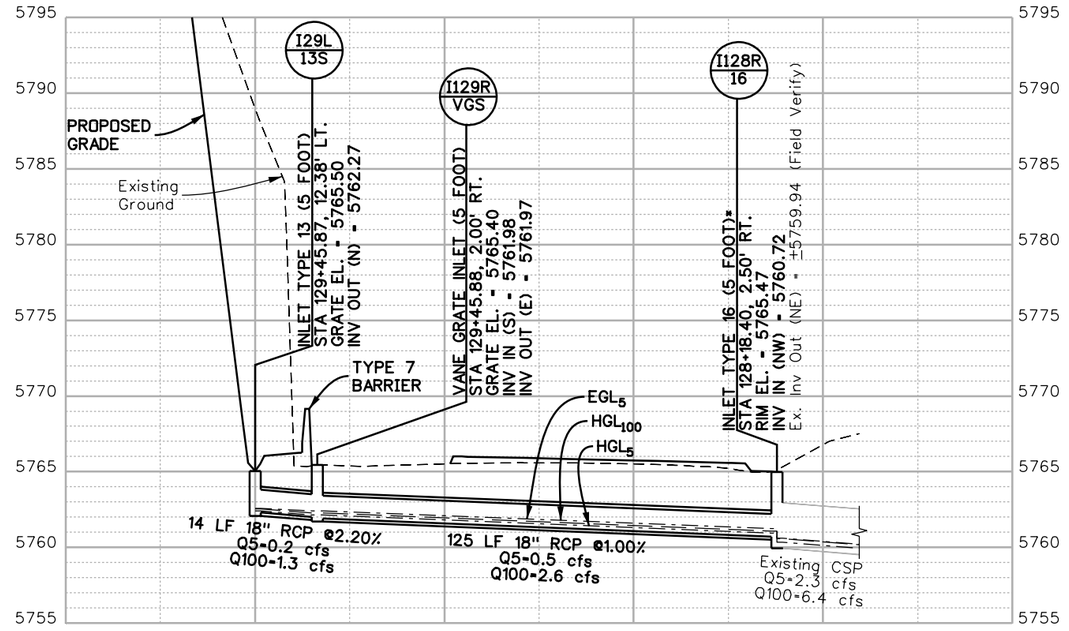
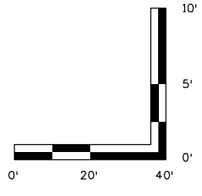


I129L TO I128R

*NOTE: INLET TYPE 16 (5 FOOT) TO BE CONSTRUCTED PER BOULDER COUNTY STANDARD DETAIL SD-4, COMBINATION INLET TYPE 13



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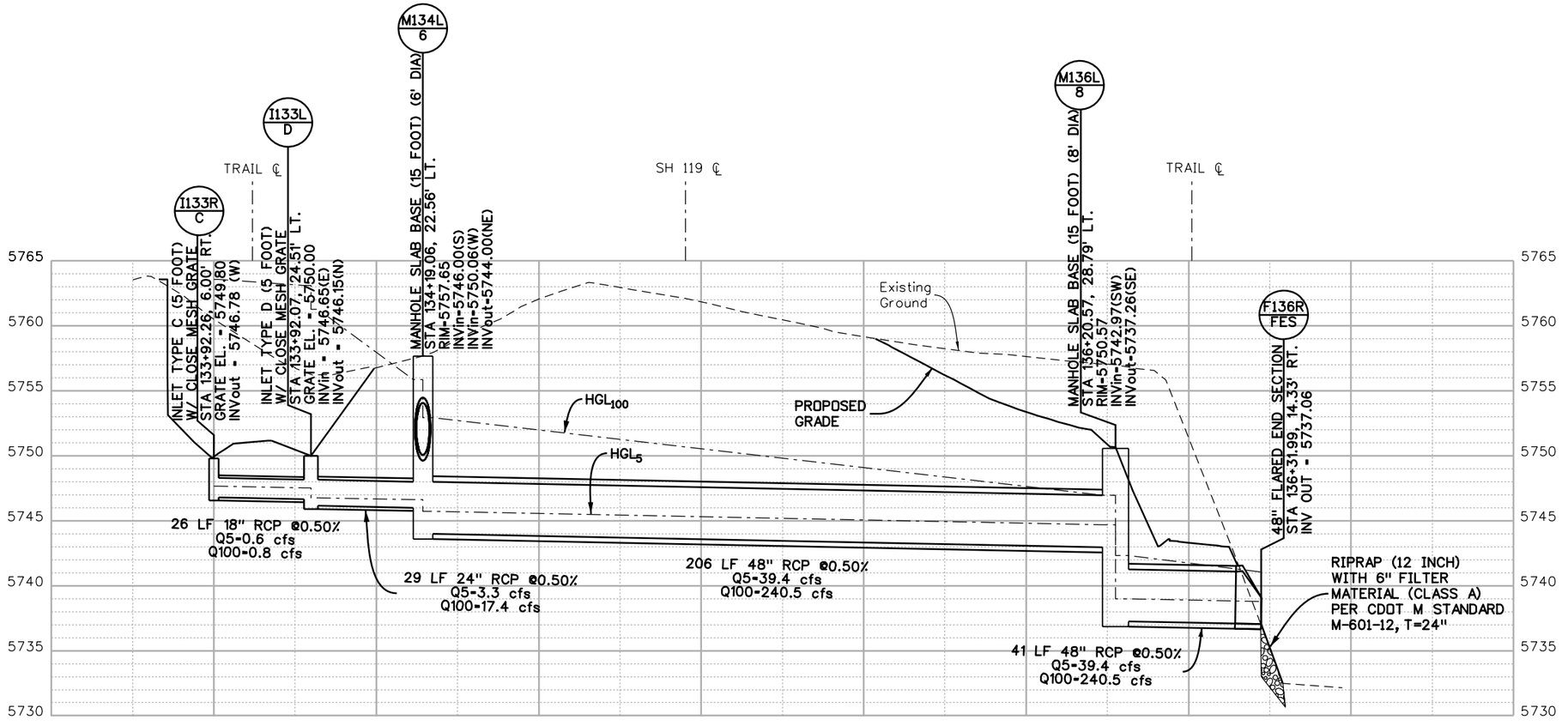
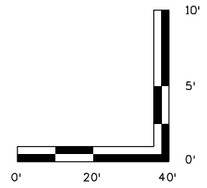


I133R TO F136R



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Drawing File Name: 19888HYDR_Profile 06.dgn		Date:	Comments	Init.	No Revisions:	STRUCTURE PROFILES	STU C070-043
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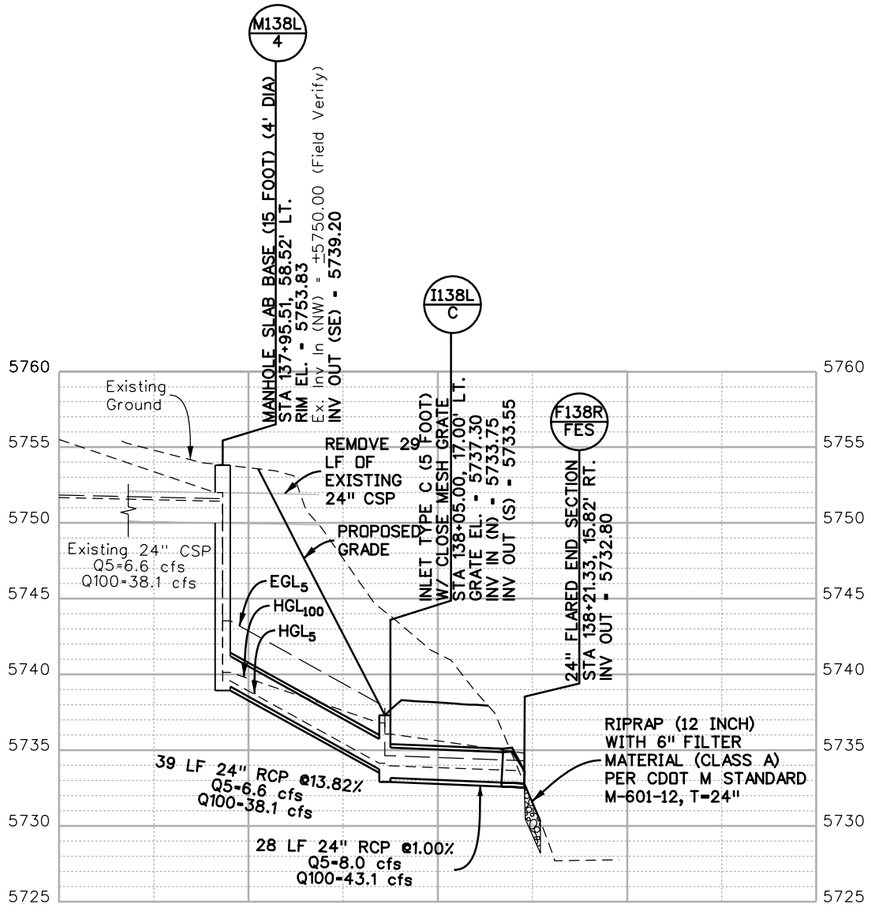
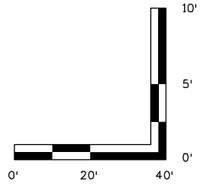


M138L TO F138R



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Drawing File Name: 19888HYDR_Profile 07.dgn		Date:	Comments	Init.		No Revisions:	STRUCTURE PROFILES	STU C070-043
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1. SITE DESCRIPTION

The Contractor shall comply with all CDOT contractual requirements and all requirements associated with the CDPS-SCP on this project. The SWMP Administrator shall update to reflect current project site conditions.

A. PROJECT SITE LOCATION: The project site is along SH 119 from approximately Chapman Drive to just west of Fourmile Canyon Drive. Specifically, the project area is in Sections 27 and 34, Township 1 North, Range 71 West of the 6th Principal Meridian in Boulder County, Colorado. The UTM coordinates of the approximate center of the project area are 472064mE, 4429043mN, Zone 13. The latitude/longitude of the project area is 0.011118°N and 105.327324°W.

B. PROJECT SITE DESCRIPTION: The proposed project consists of an extension of the Boulder Canyon Trail system from Fourmile Canyon Drive to Chapman Drive along the SH 119 corridor. The project includes construction of two concrete box culvert underpasses and a pedestrian bridge over Boulder Creek just upstream of the Chapman Drive Bridge. The trail will be crusher fines or concrete. Storm drains, cross culverts and pipe extensions will be installed as needed to maintain existing drainage patterns.

C. PROPOSED SEQUENCING FOR MAJOR CONSTRUCTION ACTIVITIES: Initial erosion control measures such as perimeter control, inlet protection, tree/landscape protection and sediment control will be installed prior to the start of clearing and grubbing. As construction of the trail, underpasses, pedestrian bridge, storm drain inlets and culverts are completed the appropriate erosion control measures will be installed. At substantial completion of project segments permanent stabilization measures will be installed. This includes permanent seeding, mulching and soil retention blanket.

D. ACRES OF DISTURBANCE:

1. Total area of construction site (LOC (PERMITTED AREA)): 7.87 acres
2. Total area of proposed disturbance (LDA): 3.75 acres
3. Total area of seeding: 1.87 acres
4. Total area of impervious surface: 2.71 acres
5. Total area of NEW impervious surface: 0.63 acres

E. EXISTING SOIL DATA: Per NRCS soil mapping the project area includes Fern Cliff-Allens Oark-Rock outcrop complex which has stony sandy loam to a depth of 20 inches below the soil surface and Juget-Rock outcrop complex which has variable soil profiles with very gravelly sandy loam, very gravelly loamy sand and very gravelly sand to a depth of 11 inches below the soil surface. Soils near the wetland areas were found to be silty loam, sandy loam, sandy clay or clay in the upper 14 inches.

F. EXISTING VEGETATION, INCLUDING PERCENT COVER:

During design the SWMP Administrator for Design in consultation with the Engineer will determine if the SWMP Administrator for Design or the SWMP Administrator will conduct the Vegetation Transects as outlined in Chapter 4.11.2 of the Erosion Control and Stormwater Quality Guide.

Pre-Construction Date of survey: _____ %Density: _____

Description of existing vegetation:

Map or table showing transect locations in SWMP notebook tab 17:

Post-Construction Date of survey: _____ %Density: _____

Description of existing vegetation: **Date of CDPS-SCP Closure:** _____

Map or table showing transect locations in SWMP notebook tab 17:

G. POTENTIAL POLLUTANTS SOURCES: See First Construction Activities under Potential Pollutant Sources. The SWMP Administrator shall prepare a list of all potential pollutants and their locations in accordance with subsection 107.25.

H. RECEIVING WATER:

1. Outfall locations: There are currently 5 outfalls within the project corridor ranging in size from 24" to 36" and discharging into Boulder Creek.
2. Names of receiving water(s) on site: Boulder Creek
3. Ultimate receiving water: South Platte River
4. Horizontal distance nearest water of the state is from project: 0 feet

I. NON-STORMWATER DISCHARGES:

ALLOWABLE:

1. Groundwater and stormwater dewatering: Discharges to the ground of water from construction dewatering activities may be authorized provided that:
   a. the source is groundwater and/or groundwater combined with stormwater that does not contain pollutants;
   b. the source and BMPs/Control Measures are identified in the SWMP;
   c. discharges do not leave the site as surface runoff or to surface waters;
   d. the Contractor shall protect all work areas and facilities from water at all times. Areas and facilities subject to flooding, regardless of the source of water, shall be promptly dewatered and restored at no cost to the owner. This shall include removal of any debris caused by flooding. Any dewatering shall be done in accordance with Subsection 107.25.

CONTAMINATED:

2. If discharges do not meet the above criteria, a separate CDPS permit shall be obtained by the Contractor from the CDPHE. See standard special provision 250 Hazardous Waste and Contaminated Water.

2. SITE MAP COMPONENTS:

Pre-construction – See SWMP Erosion Control Plans unless otherwise directed.

A. PROJECT CONSTRUCTION POTENTIAL SITE BOUNDARIES

B. ALL AREAS OF GROUND SURFACE DISTURBANCE

C. AREAS OF CUT AND FILL

D. LOCATION OF ALL STRUCTURAL BMPs/CONTROL MEASURES IDENTIFIED IN THE SWMP

E. LOCATION OF NON-STRUCTURAL BMPs/CONTROL MEASURES AS APPLICABLE IN THE SWMP

F. SPRINGS, STREAMS, WETLANDS AND OTHER SURFACE WATER

G. PROTECTION OF TREES, SHRUBS, CULTURAL RESOURCES AND MATURE VEGETATION - Refer to plan sheets

H. AREAS USED FOR STORING AND STOCKPILING OF MATERIALS, STAGING AREAS (field trailer, fueling, etc.) and BATCH PLANTS

3. SWMP ADMINSTRATORS:

A. SWMP ADMINISTRATOR FOR DESIGN:

Name/Title	Contact Information
Michelle M. Morgan, PE	Muller Engineering; 303-988-4939; mmorgan@mullereng.com

B. SWMP ADMINISTRATOR FOR CONSTRUCTION: (As defined in Subsection 208) The Contractor shall designate a SWMP Administrator for Construction upon ownership of the SWMP. The SWMP Administrator shall become the owner/operator and assume responsibility for all design changes to the SWMP implementation and maintenance in accordance to 208.03. The SWMP Administrator shall be responsible for implementing, maintaining and revising SWMP, including the title and contact information. The activities and responsibilities of the SWMP administrator shall address all aspects of the projects SWMP. (Update the information below for each new SWMP Administrator) (Copy of TECS Certification must also be included in the SWMP Notebook.)

Name/Title	Contact Information	Certification #	Start Date	Engineer Approval

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BOULDER CANYON TRAIL EXTENSION
STORMWATER MANAGEMENT PLANS

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C. EROSION CONTROL INSPECTOR: (As defined in Subsection 208) The Contractor may designate an Erosion Control Inspector. The Erosion Control Inspector shall complete duties in accordance with subsection 208.03 (c) (Copy of TECS Certification must also be included in the SWMP Notebook.)

Name/Title	Contact Information	Certification #	Start Date	Engineer Approval

4. STORMWATER MANAGEMENT CONTROLS FIRST CONSTRUCTION ACTIVITIES

THE CONTRACTOR SHALL PERFORM THE FOLLOWING:

A. POTENTIAL POLLUTANT SOURCES

Evaluate, identify, locate and describe all potential sources of pollutants at the site in accordance with Subsection 107.25, CDPS-SCP and place in the SWMP notebook. All BMPs/Control Measures related to potential pollutants shall be shown on the SWMP site map by the Contractor's SWMP Administrator.

B. OFFSITE DRAINAGE (RUN ON WATER)

1. Describe and record BMPs/Control Measures on the SWMP site map that have been implemented to address off site run-on water in accordance with subsection 208.03.

C. VEHICLE TRACKING PAD/VEHICLE TRACKING CONTROL

1. BMPs/Control Measures shall be implemented in accordance with subsection 208.04.

D. PERIMETER CONTROL

1. Perimeter control shall be established as the first item on the SWMP to prevent the potential for pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters.
2. Perimeter control may consist of vegetation buffers, berms, silt fence, erosion logs, existing landforms, or other BMPs/Control Measures as approved.
3. Perimeter control shall be in accordance with subsection 208.04.

5. DURING CONSTRUCTION

RESPONSIBILITIES OF THE SWMP ADMINISTRATOR DURING CONSTRUCTION

The SWMP should be considered a "living document" that is continuously reviewed and modified.

During construction, the following items shall be added, updated, or amended as needed by the SWMP Administrator in accordance with Section 208.

During construction, indicate how items that have not been addressed during design are being handled in construction. If items are covered in the template or other sections of the SWMP notebook indicate below what section the discussion takes place.

A. STOCKPILE MANAGEMENT: Shall be done in accordance with subsections 107.25 and 208.07.

B. CONCRETE WASHOUT: Concrete wash out water or waste from field laboratories and paving equipment shall be contained in accordance with subsection 208.05.

C. SAW CUTTING: Shall be done in accordance with subsections 107.25, 208.04, 208.05.

D. STREET CLEANING: Shall be done in accordance with subsection 208.04.

6. INSPECTIONS

A. Inspections shall be in accordance with subsection 208.03 (c).

7. BMP/CONTROL MEASURE MAINTENANCE

A. Maintenance shall be in accordance with subsection 208.04 (f).

8. RECORD KEEPING

A. Records shall be kept in accordance with subsection 208.03 (d).

9. INTERIM AND FINAL STABILIZATON

A. SEEDING PLAN

Soil preparation, soil conditioning or topsoil, seeding (native), mulching (weed free) and mulch tackifier will be required for an estimated 1.87 acres of disturbed area within the right-of-way limits which are not surfaced. The following types and rates shall be used:

COMMON NAME	BOTANICAL NAME	LBS. PLS PER ACRE
TOTAL		

B. SEEDING APPLICATION: Drill seed 0.25 inch to 0.5 inch into the soil. In small areas not accessible to a drill, hand broadcast or hydroseed at double the rate and rake 0.25 inch to 0.5 inch into the soil per subsection 212.

C. MULCHING APPLICATION: Apply a minimum of 2 tons of certified weed free hay or 2 1/2 tons of certified weed free straw per acre and in accordance with Section 213, and mechanically crimp it into the soil in combination with an organic mulch tackifier.

1. Prior to winter shutdown or the summer seeding window closure: Uncompleted slopes shall be mulched with 2 tons of mulching (weed free) per acre, mechanically crimped into the topsoil in combination with an organic mulch tackifier per subsections 208 and 213.

D. SPECIAL REQUIREMENTS:

1. Due to high failure rates, hydroseeding will not be allowed for permanent stabilization.

E. SOIL CONDITIONING AND FERTILIZER REQUIREMENTS: Minimum requirements for all disturbances to receive seeding (native).

Soil conditioner paid for as Item 212- Soil Conditioning (Acre)		
Biological nutrient organic based fertilizer (lbs/acre)*	Humate (lbs/acre)	Compost (cy/acre) **All areas <2:1**
300	200	65

*Biological nutrient shall not exceed 8-8-8 (N-P-K).

Humate based material shall be in accordance to Standard Special Provision 212 and compost shall be in accordance to Standard Special Provision 212.

F. SOIL RETENTION COVERING: On slopes and ditches requiring a blanket or turf reinforcement mat (trm), the blanket/trm shall be placed in lieu of mulch and mulch tackifier and placed after seeding (native). See SWMP site map for blanket/trm locations.

G. RESEEDING OPERATIONS/CORRECTIVE STABILIZATION

Prior to final acceptance.

1. All seeded areas shall be reviewed during the 14 day inspections by the SWMP Administrator and/or Erosion Control Inspector for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc. shall be re-graded, seeded, and have the designated mulching applied as necessary, at no additional cost to the project.
2. The Contractor shall maintain seeding/mulch/tackifier/blanket/TRM, mow to control weeds or apply herbicide to control weeds in the seeded areas until Partial Acceptance of the stormwater construction work.

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BOULDER CANYON TRAIL EXTENSION
STORMWATER MANAGEMENT PLANS

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10. PRIOR TO PROJECT FINAL ACCEPTANCE

A. Partial Acceptance shall be in accordance with subsection 107.25 (d), 208.10 and 214.04 at the Partial Acceptance of the project, it shall be determined by the SWMP Administrator and the Engineer which temporary BMPs/Control Measures shall remain until 70% revegetation is established or which shall be removed.

B. At the end of the project, all ditch checks shall either consist of temporary erosion logs (or equivalent) or permanent riprap.

C. All storm drains shall be cleaned prior to the Final Acceptance of the project. Work shall be included in 202 Clean Culvert.

11. NARRATIVES:

A. ADDITIONAL BMPS/CONTROL MEASURES AND NARRATIVES:
BMP/Control Measure details and narratives not covered by the SWMP or Standard Plan M-208, M-216 shall be added to the SWMP notebook by the SWMP Administrator

BMP Matrix:

1. M-Standards have been included along with standard BMP narratives. If a Non-Standard BMP will be used or the standard narrative does not apply, the SWMP Administrator shall write a Non-Standard BMP narrative, place an "X" in the column and complete a Non-Standard BMP Specification and Narrative for the SWMP notebook.
2. The SWMP Administrator shall place an "X" in the column In Use on Site when the BMP/Control Measure has been installed.
3. Place an "X" in the column BMP/Control Measure to be located by SWMP Administrator if the SWMP Administrator shall locate the BMP/Control Measure during construction. These BMP/Control Measures are not currently located on SWMP Plans but are anticipated to be used during construction (i.e. Vehicle Tracking Pad, Batch Plants, etc.). The SWMP Administrator shall locate these prior to or during construction and reflect on SWMP Map.
4. Place an "X" in the column Installation BMP/Control Measure Pre-Construction if the BMP/Control Measure is to be installed prior to construction activity.

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STRUCTURAL BMPs/Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

APPLICATION, BMP/CONTROL MEASURE	NARRATIVE	M-STANDARD/NON-STANDARD	IN USE ON SITE	BMP/CONTROL MEASURE TO BE LOCATED BY SWMP ADMINSTRATOR	INSTALLATION BMP/CONTROL MEASURE PRE-CONSTRUCTION	BMP/CONTROL MEASURE PHASING		
						FIRST/INITIAL CONSTRUCTION ACTIVITIES	INTERIM CONSTRUCTION ACTIVITIES	PERMANENT STABILIZATION
PROTECTION OF EXISTING WETLANDS *Fence (plastic) and erosion logs*	Fence (plastic) shall be placed in combination with erosion logs to prevent encroachment of construction traffic and sediment into state waters prior to start of construction disturbances. Fence (plastic) shall be placed adjacent to the wetlands; erosion logs shall be placed between the plastic fence and disturbance area. Logs shall be placed to direct flows away from or filter water running into wetlands from disturbance areas.					X	X	
PROTECTION OF EXISTING TREES/LANDSCAPING *Fence (plastic)*	Fence (plastic) shall be used in areas indicated in the plans to prevent encroachment of construction traffic and sediment for the protection of mature trees and/or existing landscaping prior to start of construction disturbances.			X	X	X	X	
CHECK DAM/DITCH CHECK *Erosion log, silt berm, silt dike, rock check dam*	Placed in ditches immediately upon completion of ditch grading to reduce velocity of runoff in ditch. For existing ditches, place prior to start of construction disturbances.	M-208				X	X	X
TYPE R AND TYPE 16 INLET PROTECTION *Storm drain inlet protection (Type 1,2 and 3)*	Placed prior to construction disturbances as detailed in M-208-1, to protect existing inlets or immediately upon completion of new inlets to prevent sediment from entering the inlet throughout construction.	M-208				X	X	X
CULVERT INLET/OUTLET PROTECTION *Erosion logs, aggregate bags*	Placed at mouth of culvert inlets and over top of culvert at inlet and outlet where disturbance may be occurring adjacent to pipe to prevent sediment laden water from entering pipe or drainage. Place prior to start of construction disturbances.	M-208			X	X	X	X
TYPE C, TYPE D AND TYPE 13 PROTECTION *Erosion logs, aggregate bags, erosion bales*	Placed around inlet grate or slope and ditch paving to prevent sediment from entering inlet. Place prior to start of construction disturbances.	M-208			X	X	X	X
STOCKPILE PROTECTION *Temporary berm, erosion logs, aggregate bags**	Placed within specified distance, in accordance with subsection 208.06, from toe to contain sediment around stockpile. *Aggregate bags are easily moved and replaced for access during the work day. Place prior to start of stock pile, increase control as stock pile increases size.	M-208		X			X	
TOE OF FILL PROTECTION *Erosion logs, temporary berm, silt fence, topsoil windrow**	Place prior to slope/embankment work to capture sediment and protect and delineate undisturbed areas. *Can be used to stockpile topsoil for salvage.	M-208				X	X	
PERIMETER CONTROL *Erosion logs, silt fence, temporary berm, topsoil windrow**	Placed prior to construction commencing to address potential run-on water from off site, and to divert around disturbed area. *Can be used to stockpile topsoil for salvage.	M-208			X	X	X	
SEDIMENT CONTROL/SLOPE CONTROL *Silt fence, erosion logs*	Placed on the contour of a slope to contain and slow down construction runoff. Place prior to start of construction disturbances.	M-208			X	X	X	
TEMPORARY SEDIMENT TRAP (SWMP Administrator *shall add locations to SWMP site maps)*	Used to capture sediment laden runoff from disturbed areas < 5 acres during construction. Place prior to start of construction disturbances.	M-208				X	X	
PERMANENT SEDIMENT BASIN *Extended detention basin or other Permanent Water Quality features*	Constructed early in project, prior to storm sewer/ditches to capture storm flow as a temporary sediment trap. Outlet structure shall be modified for contaminants of construction runoff a non-standard detail is needed.					X	X	

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STRUCTURAL BMPs/Control Measures (Continued)

APPLICATION, BMP/CONTROL MEASURE	NARRATIVE	M-STANDARD/NON-STANDARD	IN USE ON SITE	BMP/CONTROL MEASURE TO BE LOCATED BY SWMP ADMINSTRATOR	INSTALLATION BMP/CONTROL MEASURE PRE-CONSTRUCTION	BMP/CONTROL MEASURE PHASING		
						FIRST/INITIAL CONSTRUCTION ACTIVITIES	INTERIM CONSTRUCTION ACTIVITIES	PERMANENT STABILIZATION
EMBANKMENT PROTECTION OR TEMPORARY SLOPE DRAIN	Placed as a conduit or chute to drain runoff down slope and to prevent erosion of slope.	M-208					X	X
OUTLET PROTECTION Riprap, or approved other	Material placed as energy dissipater to prevent erosion at outlet structure.						X	X
CONCRETE WASHOUT In-ground or fabricated	Construction control, used for waste management of concrete and concrete equipment cleaning. Place prior to start of concrete activities.	M-208		X		X	X	
VEHICLE TRACKING PAD	Source control, placed to prevent tracking of sediment from disturbed area to offsite surface. Place prior to start of construction disturbances.	M-208		X		X	X	
SWEEPING	Source control, used to remove sediment tracked onto paved surfaces and to prevent sediment from entering drainage system. Sweep daily and at the end of the construction shift as needed. Kick brooms shall not be permitted.					X	X	
DEWATERING (Contractor is responsible for obtaining a permit from Colorado Department of Health and Environment.)	Shall be done in such a manner to prevent potential pollutants from entering state waters.			X		X	X	
*TEMPORARY STREAM CROSSING (*SWMP Administrator *shall add locations to SWMP site maps)*	Constructed over stream or drainage to prevent discharge of pollutants from construction equipment into water.					X	X	
CLEAN WATER DIVERSION	Placed to divert clean surface or ground water around disturbance area to prevent it from mixing with construction runoff.			X		X	X	
OTHER								

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NON-STRUCTURAL BMPs/Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:
Erosion control devices are used to limit the amount of soil loss on site.
Sediment control devices are designed to capture sediment on the project site.
Construction controls are BMPs/Control Measures related to construction access and staging.
BMP/Control Measure locations are indicated on the SWMP site map.

APPLICATION, BMP/CONTROL MEASURE	NARRATIVE	M-STANDARD	IN USE ON SITE	BMP/CONTROL MEASURE TO BE LOCATED BY SWMP ADMINSTRATOR	INSTALLATION BMP/CONTROL MEASURE PRE-CONSTRUCTION	BMP/CONTROL MEASURE PHASING		
						FIRST/INITIAL CONSTRUCTION ACTIVITIES	INTERIM CONSTRUCTION ACTIVITIES	PERMANENT STABILIZATION
VEGETATIVE BUFFER STRIP *Fence (plastic)*	Filter sediment laden runoff from disturbance area. Area to be identified on SWMP prior to construction starting.					X	X	X
LANDFORM *(*SWMP Administrator *shall add locations to SWMP site maps)*	Existing landforms may be used as a BMP/Control Measure if they prevent sediment from entering or leaving the disturbance area. If a landform directs flow of water to a concentrated outfall point, the outfall point shall be protected to prevent erosion. Area to be identified on SWMP prior to construction starting.					X	X	
TOPSOIL MANAGEMENT STOCKPILE/ SALVAGE *Windrow or stockpile*	Prior to embankment work commencing, existing topsoil shall be scraped to a depth of 4 inches, and placed in stockpiles or windrows. Upon completion of slope work/final grading (less 4 inches), topsoil shall be evenly distributed over embankment to a depth of 4 inches.			X		X	X	
SURFACE ROUGHENING / GRADING TECHNIQUES *Blading, Backhoe, Dozing, Combination Loader*	Temporary stabilization of disturbance and to minimize wind and erosion.						X	
SEEDING (TEMPORARY)	Temporary stabilization used for over wintering of disturbance or used to control erosion for areas scheduled for future construction.						X	
BONDED FIBER MATRIX/HYDRAULIC MULCH	Not to be used in areas of concentrated flows, i.e. ditch lines. To be used in combination with surface roughening for temporary stabilization of disturbed soils, when work is temporarily halted and as approved by the Engineer. May be used as surface cover for temporary topsoil stockpiles						X	
MULCH/MULCH TACKIFIER	Temporary or Final Stabilization placed as a surface cover for erosion control and or seeding establishment. To be installed as temporary surface cover when work is temporarily halted and as approved by the Engineer						X	X
SPRAY-ON MULCH BLANKET (Not to be used in areas of concentrated flows, i.e. ditch lines.)	Temporary or Final Stabilization placed as a surface cover for erosion control and or seeding establishment. To be installed as temporary surface cover when work is temporarily halted and as approved by the Engineer						X	X
SEEDING PERMANENT (NATIVE)	Final Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas.							X
SOIL RETENTION BLANKET (SRB)	Final Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas.	M-216					X	X
TURF REINFORCEMENT MAT (TRM)	Final Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas. Placed in channels or on slopes for erosion control, channel liner and seeding establishment.	M-216					X	X
OTHER								

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Drawing File Name: 19888SWMP_SWMP Notes.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

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Date:	Comments	Init.

Region 4

Boulder County

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BOULDER CANYON TRAIL EXTENSION
STORMWATER MANAGEMENT PLANS

Designer: MMM
Detailer: REW
Sheet Subset: SWMP
Structure Numbers:
Subset Sheets: 6 of 7

Project No./Code
STU C070-043
19888
Sheet Number 93

12. TABULATION OF STORMWATER QUANTITIES

A. BMP/Control Measure sediment removal and disposal shall be paid for as: 208 Removal and Disposal of Sediment (Equipment) and 208 Removal and Disposal of Sediment (Labor). All other BMP/Control Measure maintenance shall be included in the cost of the BMP/Control Measure.

B. It is estimated that 60 hours of labor, combination loader (90 horsepower) and/or backhoe (200 horsepower) may be required for miscellaneous erosion control work as directed by the Engineer. Work shall be paid for as: 203 Labor, 203 Combination Loader or 203 Backhoe.

C. Establishment of seeded areas shall be paid for as: Included in the price of the work. This shall include mowing, weed control, reseeding/mulch/tackifier.

Pay Item	Description	Pay Unit	Initial Const.	Interim Const.	Permanent Stabilization	*Total Quantity
203-01510	Backhoe	Hour		60		60
203-01594	Combination Loader	Hour		60		60
203-02330	Laborer	Hour		60		60
207-00205	Topsoil	CY			1000	1000
207-00210	Stockpile Topsoil	CY		1000		1000
208-00002	Erosion Log Type 1 (12 inch)	LF	2370	990		3360
208-00035	Aggregate Bag	LF		64		64
208-00045	Concrete Washout Structure	Each		4		4
208-00052	Storm Drain Inlet Protection (Type II)	Each		1		1
208-00056	Storm Drain Inlet Protection (Type III)	Each		2		2
208-00070	Vehicle Tracking Pad	Each		4		4
208-00103	Removal and Disposal of Sediment (Labor)	Hour		40		40
208-00105	Removal and Disposal of Sediment (Equipment)	Hour		40		40
208-00106	Sweeping (Sediment Removal)	Hour		40		40
208-00107	Removal of Trash	Hour		30		30
208-00207	Erosion Control Management (ECM)	Day		180		180
212-00006	Seeding (Native)	Acre			1.81	1.81
212-00009	Seeding (Temporary)	Acre		0.53		0.53
213-00002	Mulching (Weed Free Hay)	Acre			1.29	1.29
213-00061	Mulch Tackifier	LB			258	258
214-00000	Landscape Maintenance	LS			1	1
216-00201	Soil Retention Blanket (Straw/Coconut) (Biodegradable Class 1)	SY			2501	2501
607-11525	Fence (Plastic)	LF	1400	600		2000
700-70380	Erosion Control	FA		1		1

*It is anticipated that additional BMPs/Control Measures and BMP/Control Measure quantities not shown on the SWMP Site Maps shall be required on the project for unforeseen conditions and replacement of items that are beyond their useful service life, see subsection 208.03 and 208.04. **Quantities for all BMPs/Control Measures shown above are estimated, and have been increased for unforeseen conditions and normal BMP/Control Measure life expectancy.** Quantities shall be adjusted according to the conditions encountered in the field as directed and approved by the Engineer. Payment shall be for the actual work completed and material used.

13. BIOLOGIC IMPACT

A. ENVIRONMENTAL IMPACTS:

1. Wetland Impacts: NO
2. Stream Impacts: YES
3. Threatened and Endangered Species: None
4. If YES to any of the above items, are any permits required or additional actions needed (404, etc.): Floodplain permit

14. NOTES

A. Stormwater Management Plan (SWMP) information shown is based upon existing conditions. The Contractor is responsible for making determination as to the accuracy of BMP types and locations shown. The contracted Erosion Control Supervisor shall coordinate with the superintendent and engineer as to the appropriate BMPs and their locations and shall make the updates to the SWMP sheets as soon as the changes are known.

B. Contractor shall use construction fence and barriers around limits of work as necessary to keep pedestrians out of work area and construction vehicles within work area shown on plans. For the tabulation of stormwater quantities it was assumed that 2000 LF of Fence (Plastic) is needed.

C. Vehicle tracking pad and concrete washout area locations shall be determined by the Contractor and drawn on the plans. For the tabulation of stormwater quantities it was assumed that four vehicle tracking pads and four concrete washout areas are needed.

D. If stabilized staging area is used by the Contractor, the location shall be shown on the plans, with appropriate BMPs.

E. Inlet protection shall be installed on existing inlets at the start of construction. Protection for proposed inlets shall be installed once the inlet is in place.

F. Road shall be swept prior to striping to minimize the transport of sediment.

EROSION CONTOL LEGEND

AB	AGGREGATE BAG (8 LF EACH)
ELD	EROSION LOG TYPE 1 (12 INCH) DITCH CHECK DAM (20 LF EACH)
CW	CONCRETE WASHOUT STRUCTURE
EL	EROSION LOG TYPE 1 (12 INCH) PERIMETER CONTROL
ELI OR ELO	EROSION LOG TYPE (12 INCH) 1 CULVERT INLET/OUTLET PROTECTION
IP#	STORM DRAIN INLET PROTECTION (TYPE I, II OR III)
EL OR AB	STORM DRAIN (DROP) INLET PROTECTION EROSION LOG TYPE 1 (12 INCH) OR AGGREGATE BAG
LDA	LIMITS OF DISTURBANCE
LDC	LIMITS OF CONSTRUCTION
PF	PLASTIC FENCE
RC	ROCK CHECK DAM
SF	SILT FENCE
SM	SEEDING AND MULCHING

EROSION CONTOL LEGEND, CONTINUED

SRB	SOIL RETENTION BLANKET AND SEEDING
XXXX	EXISTING CONTOUR
XXXX	PROPOSED CONTOUR
	WETLANDS BOUNDARY
	EXISTING WETLANDS
	FLOW ARROW
	TOE OF FILL
	TOP OF CUT

PHASE — PHASE: INTIAL, INTERIM, AND/OR FINAL

XXX — BMP IDENTIFICATION

QTY — QUANTITY OF BMP

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BOULDER CANYON TRAIL EXTENSION
STORMWATER MANAGEMENT PLANS

Designer: MMM
Detailer: REW
Sheet Subset: SWMP
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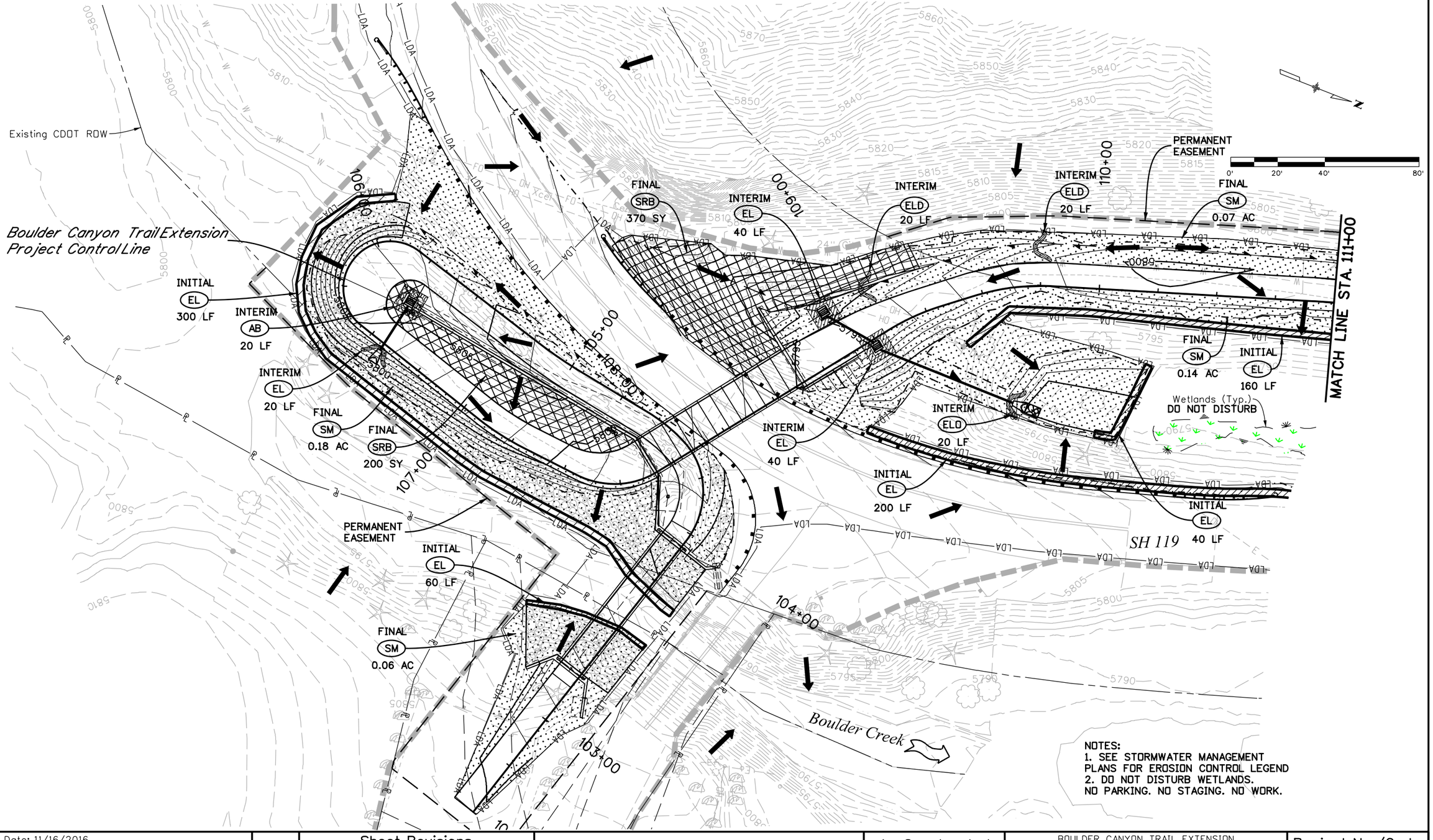

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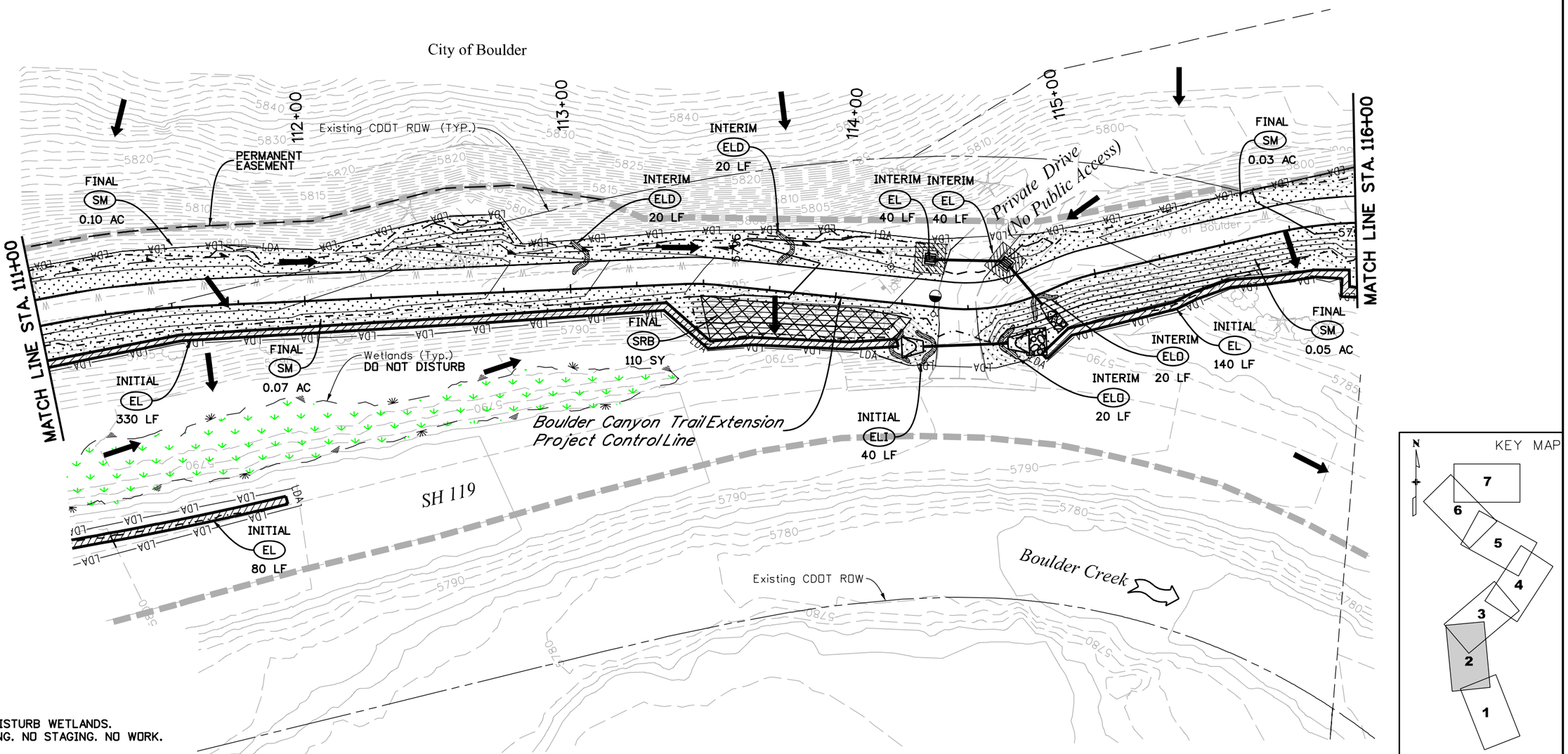
No Revisions:	EROSION CONTROL PLAN			STU C070-043
Revised:	Designer: MMM	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: EC	Subset Sheets: 1 of 7		Sheet Number 95



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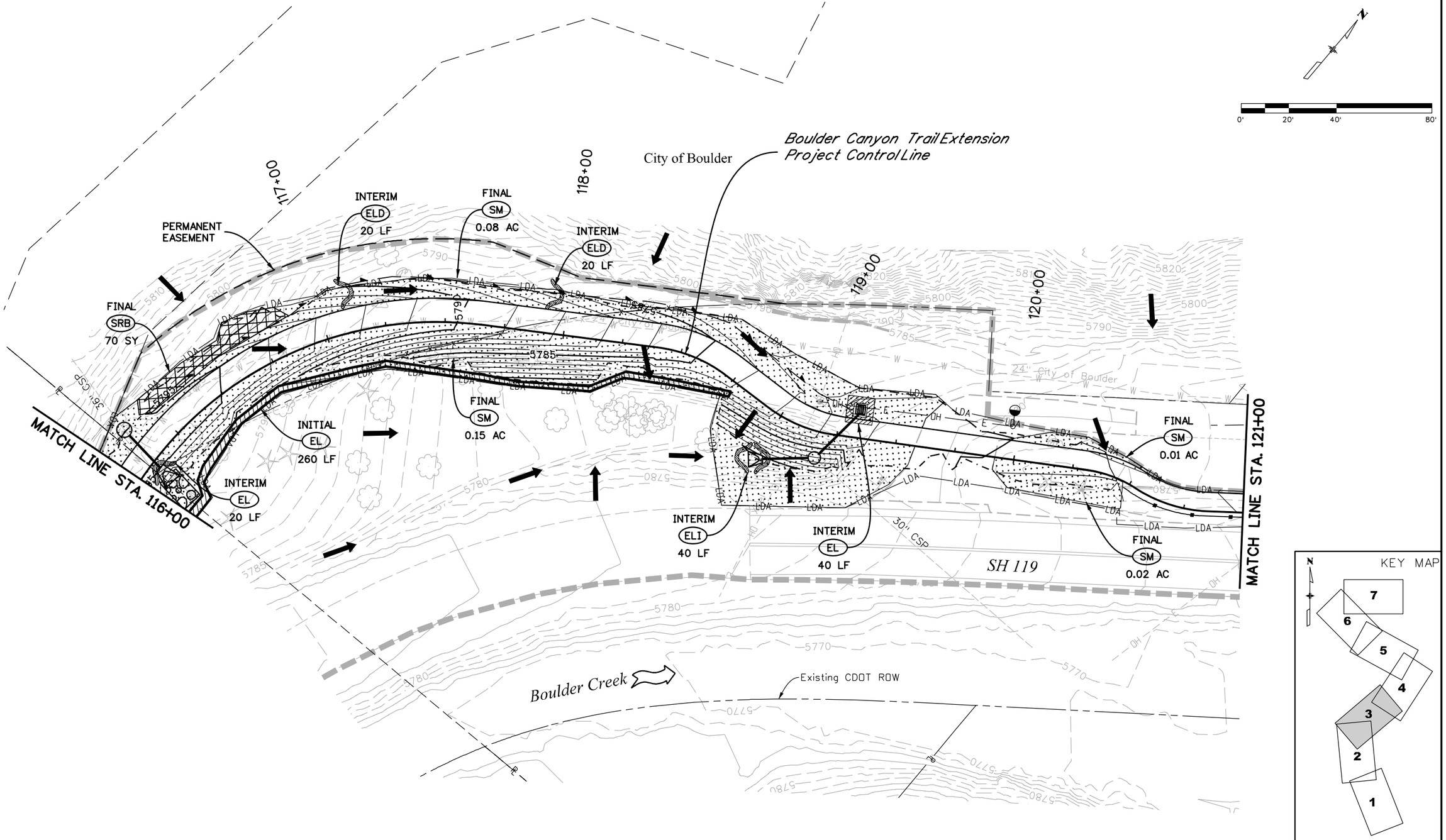
Revised:	Designer: MMM	Structure Numbers		19888
Void:	Detailer: ZDA			Sheet Number 96
	Sheet Subset: EC	Subset Sheets:	2 of 7	



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Horiz. Scale: 1:40 Vert. Scale: As Noted			
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BOULDER CANYON TRAIL EXTENSION

EROSION CONTROL PLAN

Designer:	MMM	Structure Numbers	
Detailer:	ZDA		
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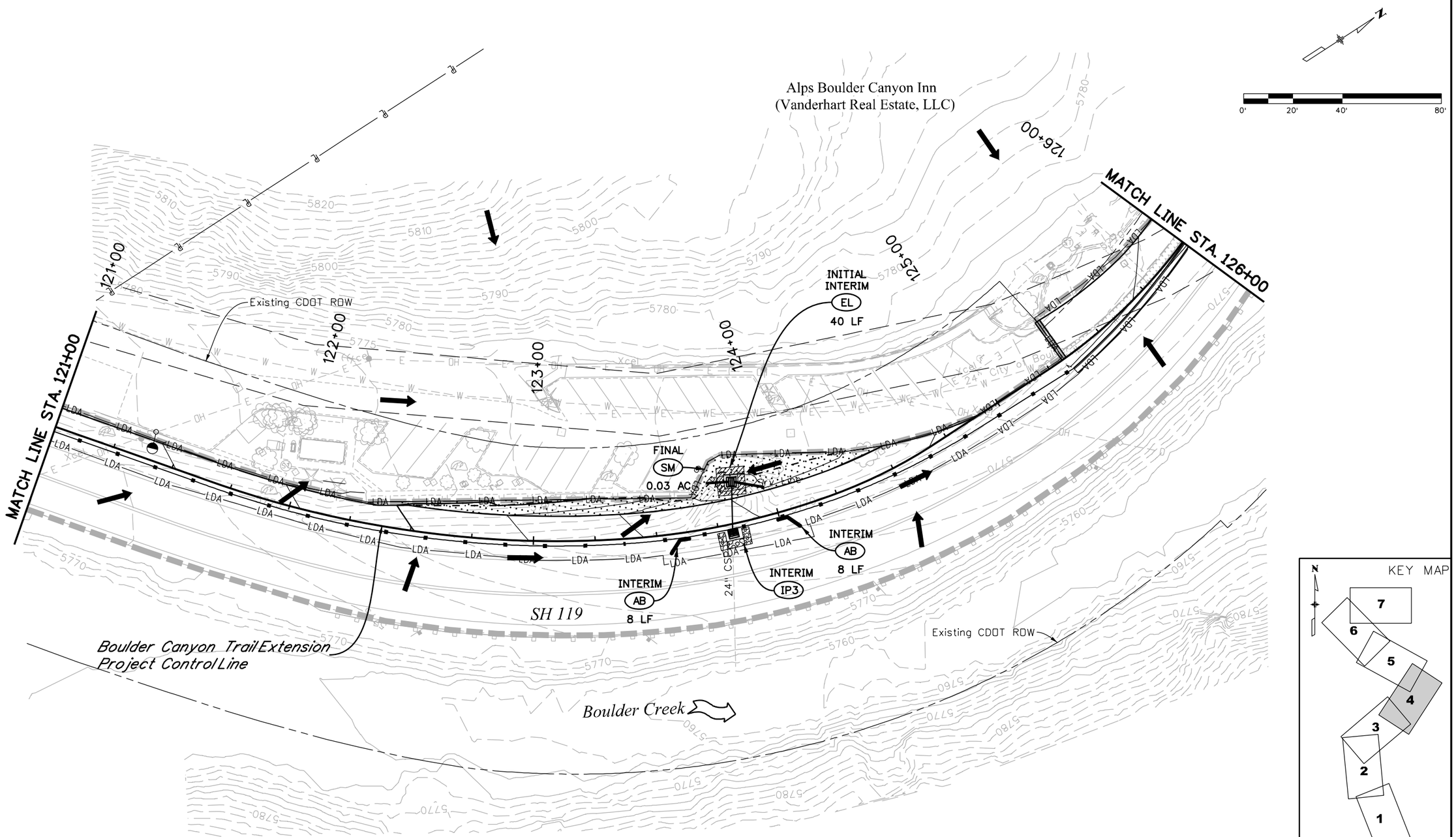

KEY MAP

Print Date: 11/16/2016	Sheet Revisions			As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888Erosion Control Plan04.dgn	Date:	Comments	Init.	No Revisions:	EROSION CONTROL PLAN
Horiz. Scale: 1:40 Vert. Scale: As Noted				Revised:	Designer: MMM Structure Numbers
Unit Information Unit Leader Initials				Void:	Detailer: ZDA
MULLER ENGINEERING COMPANY					Sheet Subset: EC Subset Sheets: 4 of 7
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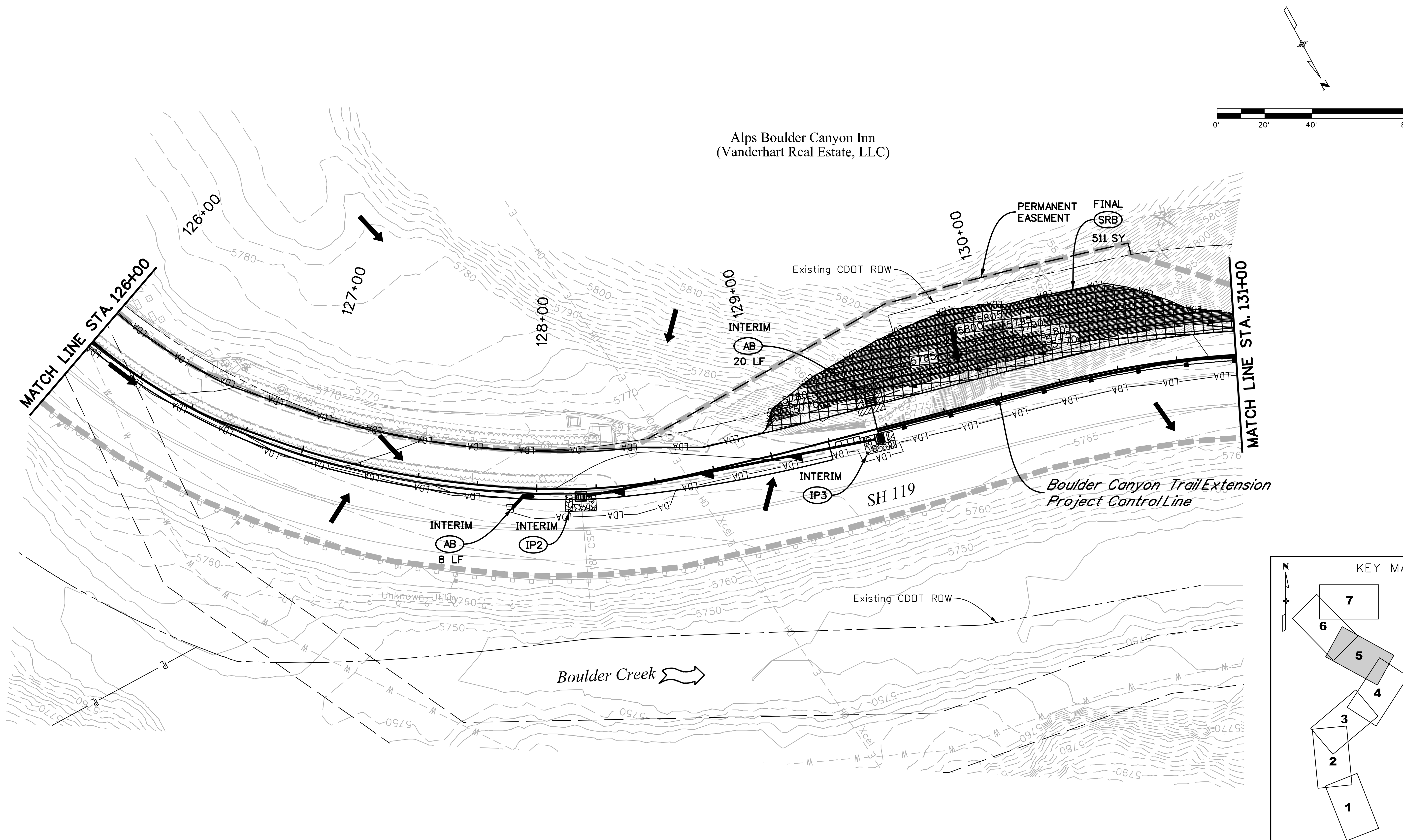

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Drawing File Name: 19888Erosion Control Plan05.dgn
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BOULDER CANYON TRAIL EXTENSION
EROSION CONTROL PLAN

Designer: MMM
Detailer: ZDA
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Vanderhart Real Estate, LLC

Boulder County

0' 20' 40' 80'

MATCH LINE STA. 131+00

132+00

133+00

134+00

135+00

MATCH LINE STA. 136+00

SH 119

Boulder Canyon Trail Extension
Project Control Line

Boulder Creek

INTERIM ELD 20 LF

PERMANENT EASEMENT

INTERIM ELD 20 LF

FINAL SM 0.14 AC

FINAL SRB 160 SY

INTERIM EL 40 LF

INITIAL ELI 30 LF

INITIAL ELI 20 LF

FINAL SM 0.12 AC

INTERIM EL 40 LF

INITIAL INTERIM EL 250 LF

FINAL SM 0.04 AC

INITIAL EL 70 LF

FINAL SRB 50 SY

KEY MAP

1 2 3 4 5 6 7

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Boulder County

BOULDER CANYON TRAIL EXTENSION

EROSION CONTROL PLAN

Designer:	MMM	Structure Numbers	
Detailer:	ZDA		
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BOULDER CANYON TRAIL EXTENSION

EROSION CONTROL PLAN

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TABULATION OF SIGNS

SIGN NO.	STATION	LOCATION	SIDE	SIGN CODE	SIGN PANEL SIZE W" x H"	BACKGROUND COLOR	LEGEND	REMOVAL OF SIGN PANEL	RESET GROUND SIGN	SIGN PANEL CLASS I	ASSEMBLY GROUP SIZE WIDTH	ASSEMBLY GROUP SIZE HEIGTH	POST SIZE	NO. POSTS	STEEL SIGN POST (2X2 TUBING)	STEEL SIGN SUPPORT: STEEL SIGN POST (2.25X2.25 TUBING)	STEEL SIGN SUPPORT: (2-INCH ROUND) (POST)	STEEL SIGN SUPPORT: (2-INCH ROUND) (SOCKET)	COMMENTS
								EA	EA	SF	WIDTH	HEIGTH			LF	LF	LF	EA	
1	104+60	BOULDER CANYON TRAIL	Rt	W7-5	18 x 18	YELLOW	HILL			2.25	18	18	S	1	10	3			
2	105+18	SH 119	Rt	W1-8	18 x 24	YELLOW	CURVE CHEVRON		1										
3	105+45	BOULDER CANYON TRAIL	Rt	W1-11L	18 x 18	YELLOW	HAIRPIN CURVE (LEFT)			2.25	18	18	S	1	10	3			
4	105+65	BOULDER CANYON TRAIL	Rt	W12-51	18 x 18	YELLOW	TUNNEL			2.25	18	18	S	1	10	3			
5	106+80	BOULDER CANYON TRAIL	Lt	W1-11R	18 x 18	YELLOW	HAIRPIN CURVE (RIGHT)			2.25	18	18	S	1	10	3			
6	109+75	BOULDER CANYON TRAIL	Rt	W8-3	18 x 18	YELLOW	PAVEMENT ENDS			2.25	18	18	S	1	10	3			
7	114+18	PRIVATE DRIVE	Lt		x		NO PARKING SIGN	1											
8	114+37	BOULDER CANYON TRAIL	Rt	R1-1	18 x 18	RED	STOP			2.25	18	18	S	1	10	3			
9	114+73	BOULDER CANYON TRAIL	Lt	R1-1	18 x 18	RED	STOP			2.25	18	18	S	1	10	3			
10	116+80	BOULDER CANYON TRAIL	Lt	W8-3	18 x 18	YELLOW	PAVEMENT ENDS			2.25	18	18	S	1	10	3			
11	119+50	BOULDER CANYON TRAIL	Rt	R1-2	18 x 18	RED	YIELD			2.25	18	18	S	1	10	3			
12	120+20	BOULDER CANYON TRAIL	Lt	R1-2	18 x 18	RED	YIELD			2.25	18	18	S	1	10	3			
13	124+25	BOULDER CANYON TRAIL	Rt	W16-1	24 x 24	WHITE	SHARE THE ROAD			4.00	24	24	S	1	10	3			
14	124+35	BOULDER CANYON TRAIL	Lt	R5-3	24 x 24	WHITE	NO MOTOR VEHICLES			4.00	24	24	S	1	10	3			
15	128+35	BOULDER CANYON TRAIL	Lt	W16-1	24 x 24	WHITE	SHARE THE ROAD			4.00	24	24	S	1	10	3			
16	129+15	BOULDER CANYON TRAIL	Lt	R5-3	24 x 24	WHITE	NO MOTOR VEHICLES			4.00	24	24	S	1	10	3			
17	129+75	BOULDER CANYON TRAIL	Lt	W8-14	18 x 18	YELLOW	FALLEN ROCKS			2.25	18	18	S	1	10	3			
18	130+15	BOULDER CANYON TRAIL	Lt	W7-5	18 x 18	YELLOW	HILL			2.25	18	18	S	1	10	3			
19	130+60	BOULDER CANYON TRAIL	Rt	R10-15	30 x 30	WHITE	TURNING VEHICLES YIELD TO PEDS			6.25	30	30	P1	1			10	1	
20	131+95	BOULDER CANYON TRAIL	Lt	W8-14	18 x 18	YELLOW	FALLEN ROCKS			2.25	18	18	S	1	10	3			
21	135+75	BOULDER CANYON TRAIL	Rt	W8-3	18 x 18	YELLOW	PAVEMENT ENDS			2.25	18	18	S	1	10	3			
							PROJECT TOTALS	1	1	53.75				19	180	54.0	10	1	

TABULATION OF PAVEMENT MARKINGS

LOCATION	STATION TO STATION	PAVEMENT TYPE	SIDE	DIRECTION	MODIFIED EPOXY: CENTERLINE YELLOW SOLID 4 INCH	MODIFIED EPOXY: CENTERLINE YELLOW BROKEN 4 INCH	MODIFIED EPOXY: CENTERLINE WHITE DOTTED 4 INCH	PREFORMED PLASTIC (TYPE I)(INLAID): WORD - SYMBOL	PREFORMED PLASTIC (TYPE I)(INLAID): XWALK - STOPLINE
BOULDER CANYON TRAIL	105+20 TO 109+30	New Concrete	Lt		375				
BOULDER CANYON TRAIL	124+25 TO 124+68	New Concrete	Lt		43				
BOULDER CANYON TRAIL	125+33 TO 126+52	New Concrete	Lt		115				
BOULDER CANYON TRAIL	126+52 TO 127+82	New Concrete	Lt			130			
BOULDER CANYON TRAIL	127+82 TO 128+32	New Concrete	Lt		50				
BOULDER CANYON TRAIL	128+32 TO 129+25	New Concrete	Lt				90		
BOULDER CANYON TRAIL	129+25 TO 129+75	New Concrete	Lt		50				
BOULDER CANYON TRAIL	132+00 TO 136+25	New Concrete	Lt		440				
BOULDER CANYON TRAIL	124+25 TO 126+55	New Concrete	PAVEMENT	SYMBOLS				160.13	
				TOTAL (LF)	1073	130	90		
				TOTAL (SF)				160.13	0.00
				TOTAL (GAL)	4.21	0.13	0.07		

NOTES: CONSULT WITH PROJECT ENGINEER FOR APPROVAL OF STRIPE TYPE PRIOR TO PLACING FINAL PAVEMENT MARKINGS.

SUMMARY OF PAVEMENT MARKING QUANTITIES

	MODIFIED EPOXY (GAL)		PREFORMED PLASTIC PAVEMENT MARKING (TYPE I)(INLAID) (SF)	
	YELLOW	WHITE	WORD - SYMBOL	XWALK - STOPLINE
PROJECT TOTALS	4.34	0.07	160.13	0.00
	4.41			

Know what's **below** **Call** before you dig.

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No Revisions:
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BOULDER CANYON TRAIL EXTENSION
TABULATION OF SIGNS AND PAVEMENT MARKINGS

Designer: CZC
Detailer: CZC
Sheet Subset: TRAF TAB
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
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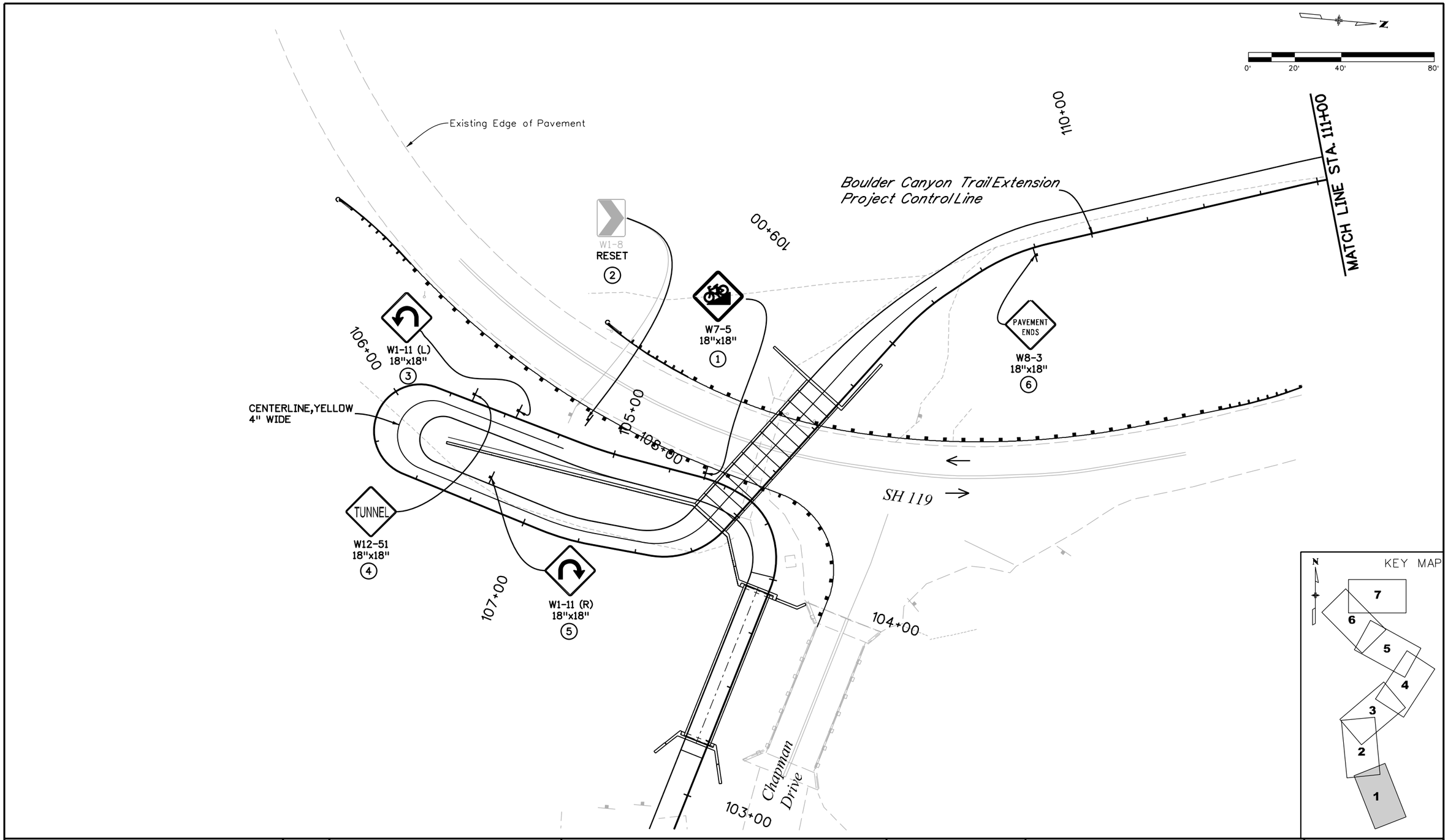

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BOULDER CANYON TRAIL EXTENSION

SIGNING AND PAVEMENT MARKING PLAN

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Sheet Number 103

N

0' 20' 40' 80'

112+00

113+00

114+00

115+00

MATCH LINE STA. 111+00

MATCH LINE STA. 116+00

STOP
R1-1
18"x18"
(8)

STOP
R1-1
18"x18"
(9)

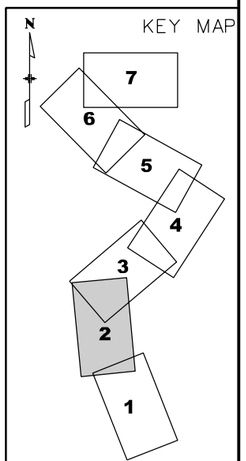
REMOVE
"NO PARKING" SIGN
(7)

Boulder Canyon Trail Extension
Project Control Line

SH 119

Existing Edge
of Pavement

KEY MAP



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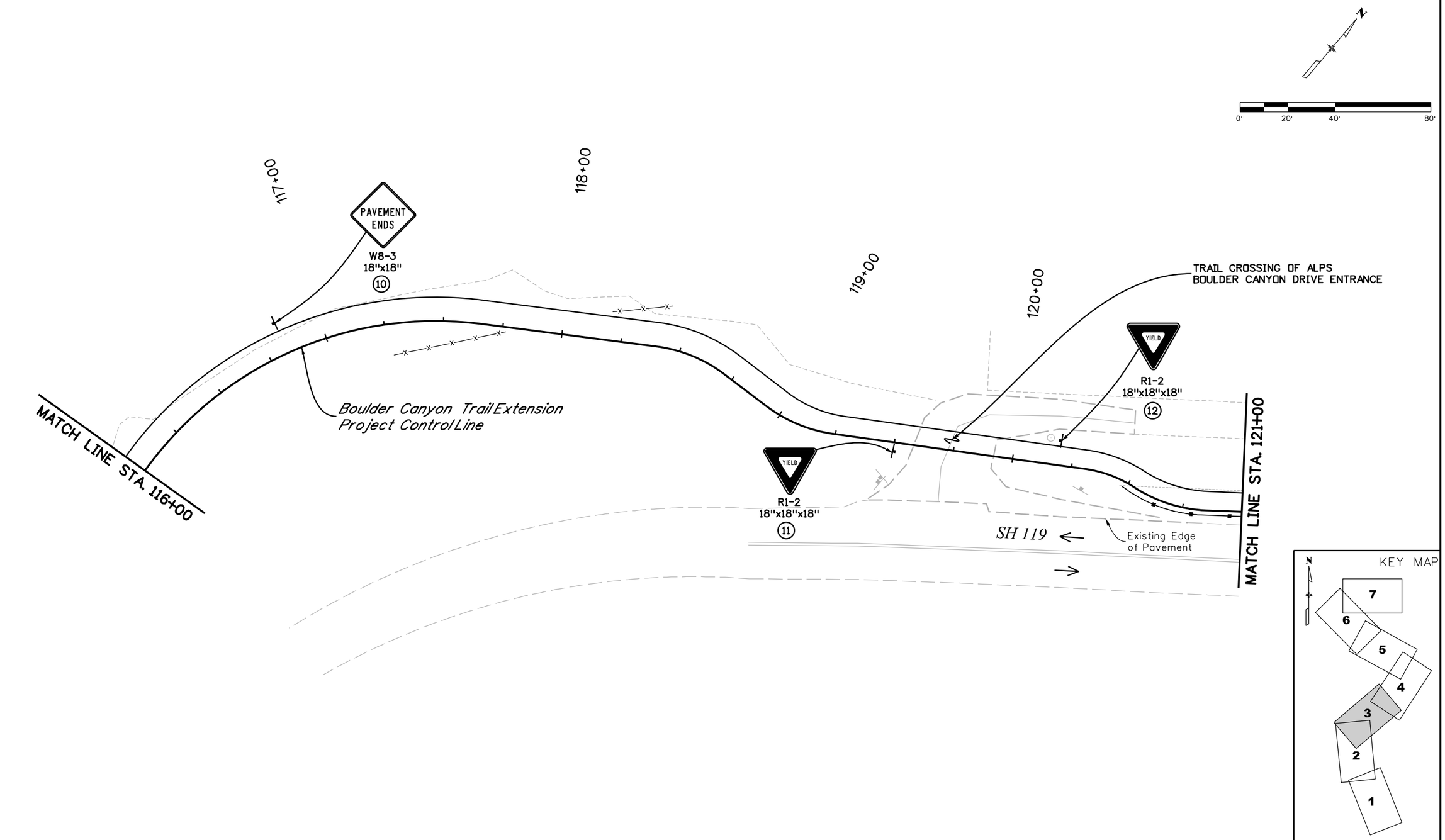
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SIGNING AND PAVEMENT MARKING PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: SIGN	Subset Sheets:	2 of 7	Sheet Number 104



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Unit Information Unit Leader Initials						Void:	Project No./Code: STU C070-043 / 19888 / Sheet Number 105
MULLER ENGINEERING COMPANY							

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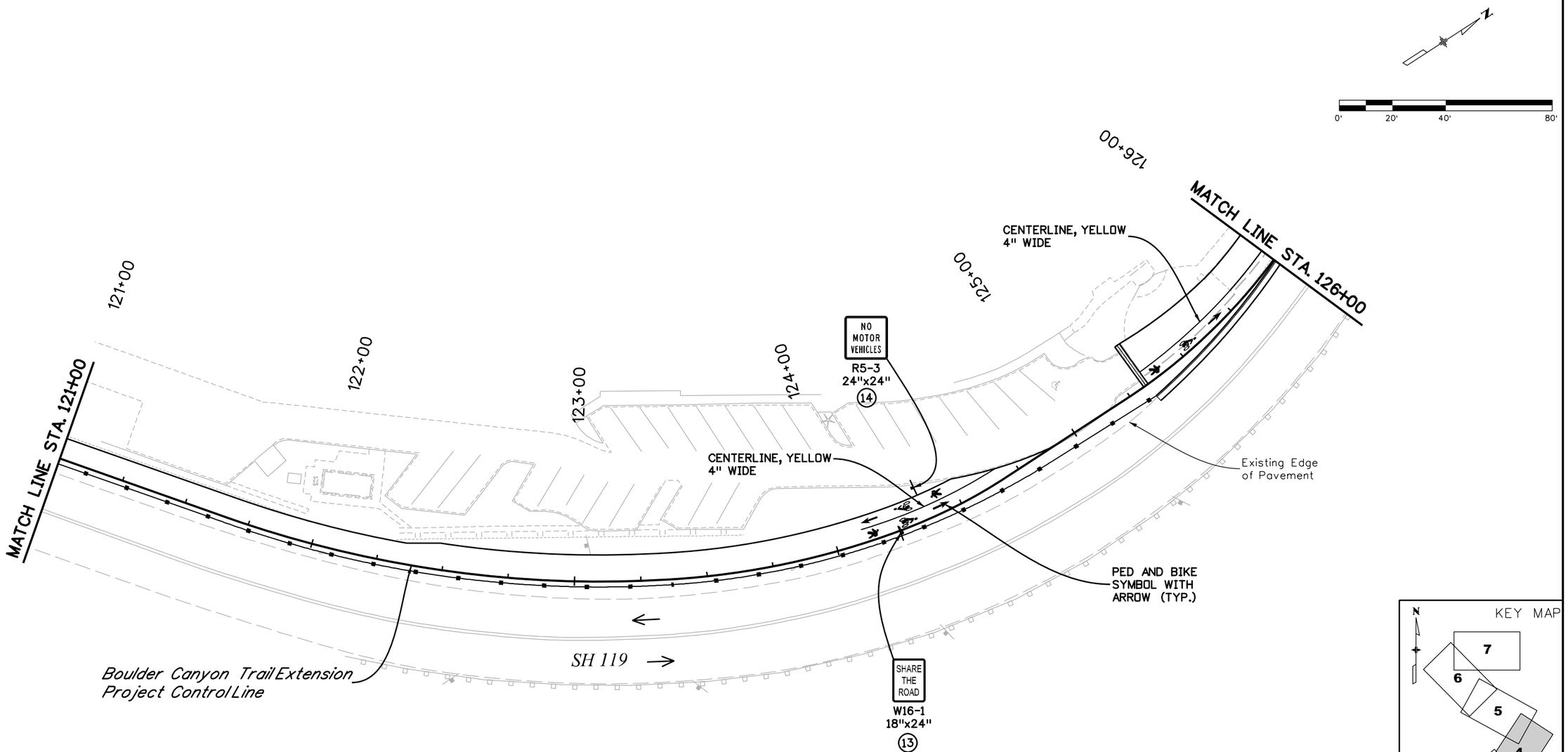

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Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SIGNING AND PAVEMENT MARKING PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			
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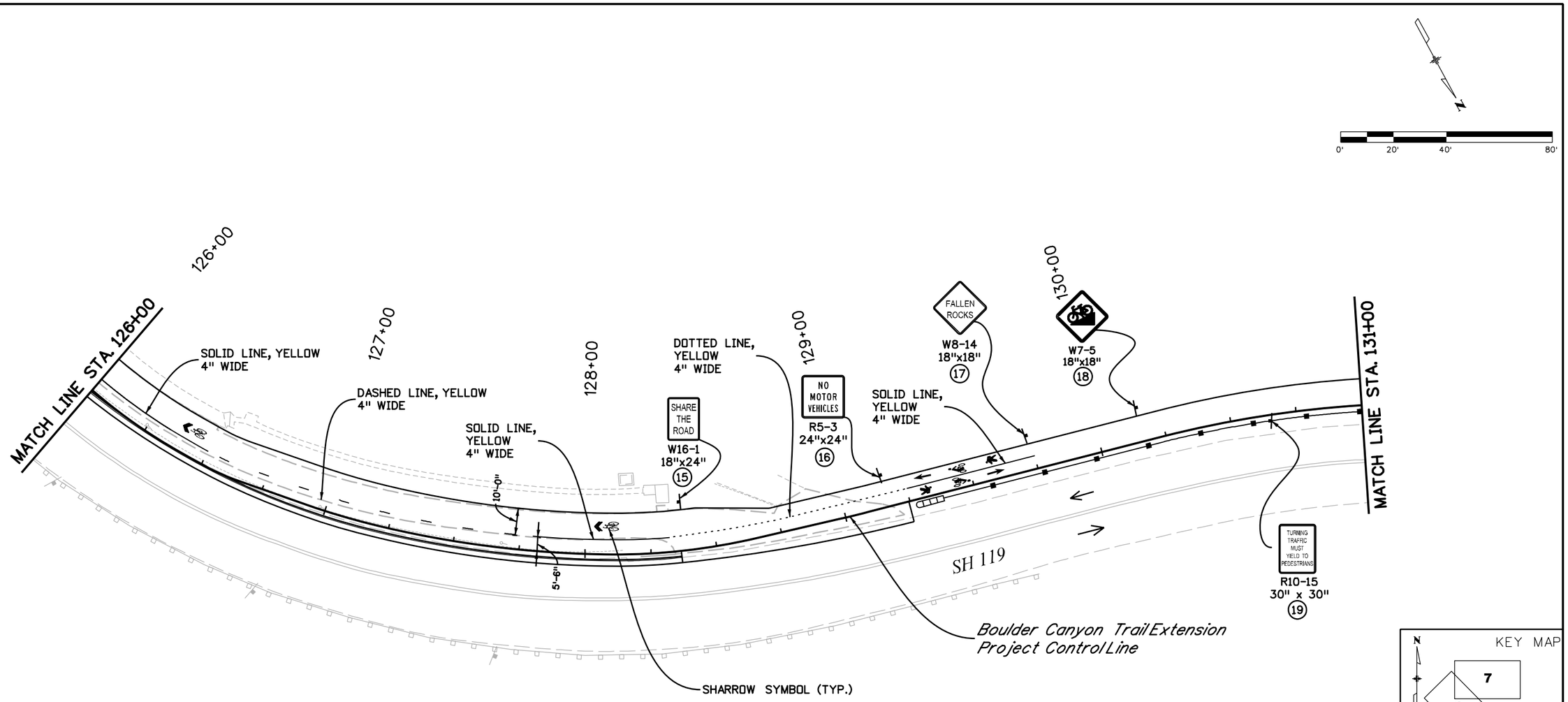
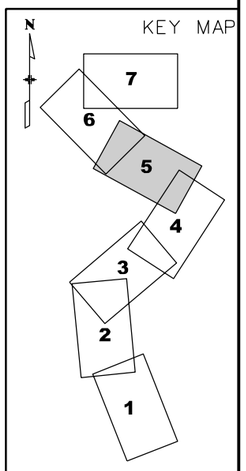


KEY MAP



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Unit Information	Unit Leader Initials					Void:	Project No./Code: STU C070-043 / 19888 / Sheet Number 107
MULLER ENGINEERING COMPANY							

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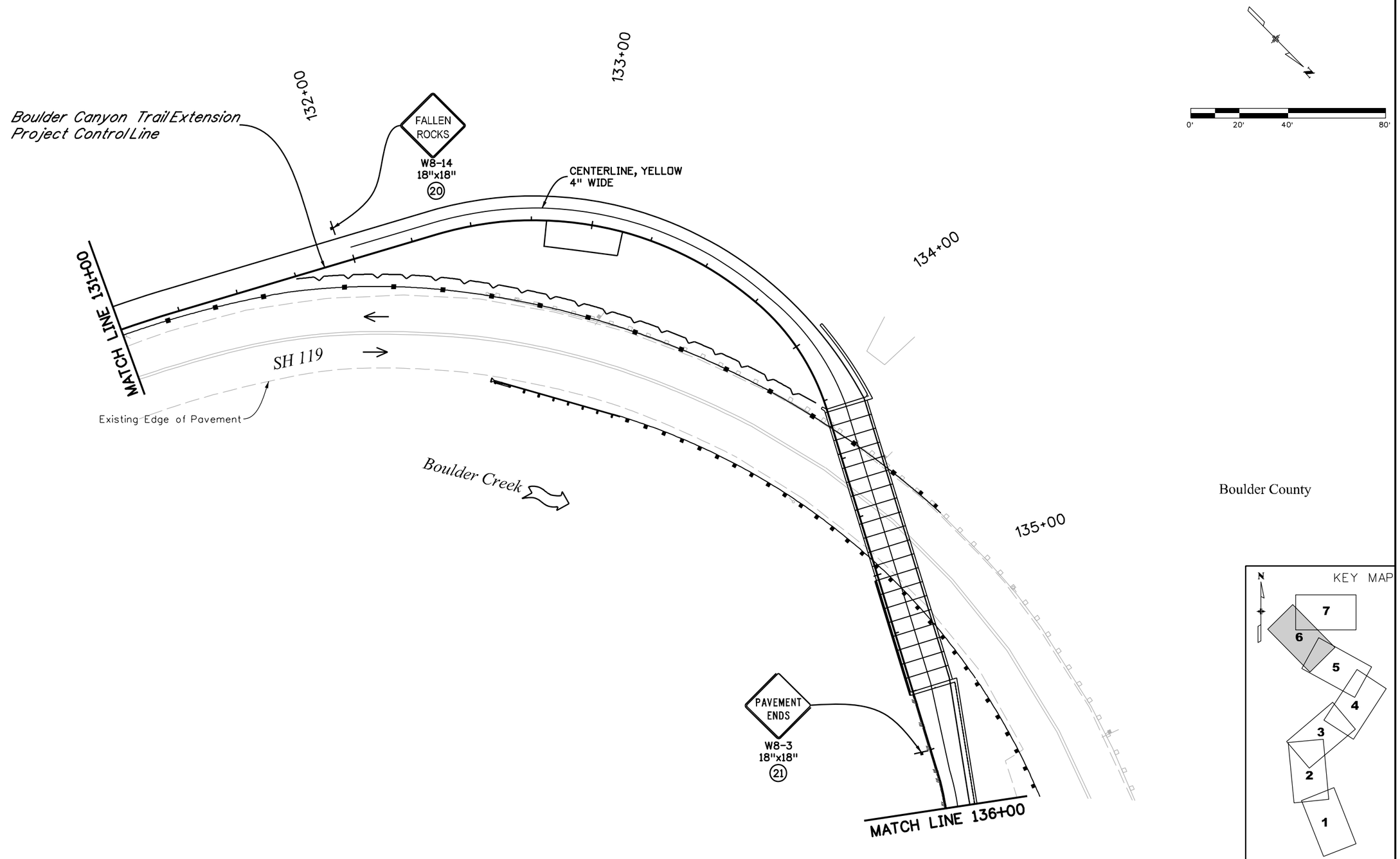

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Unit Information Unit Leader Initials			
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Region 4

Boulder County

As Constructed

No Revisions:

Revised:

Void:

BOULDER CANYON TRAIL EXTENSION

SIGNING AND PAVEMENT MARKING PLAN

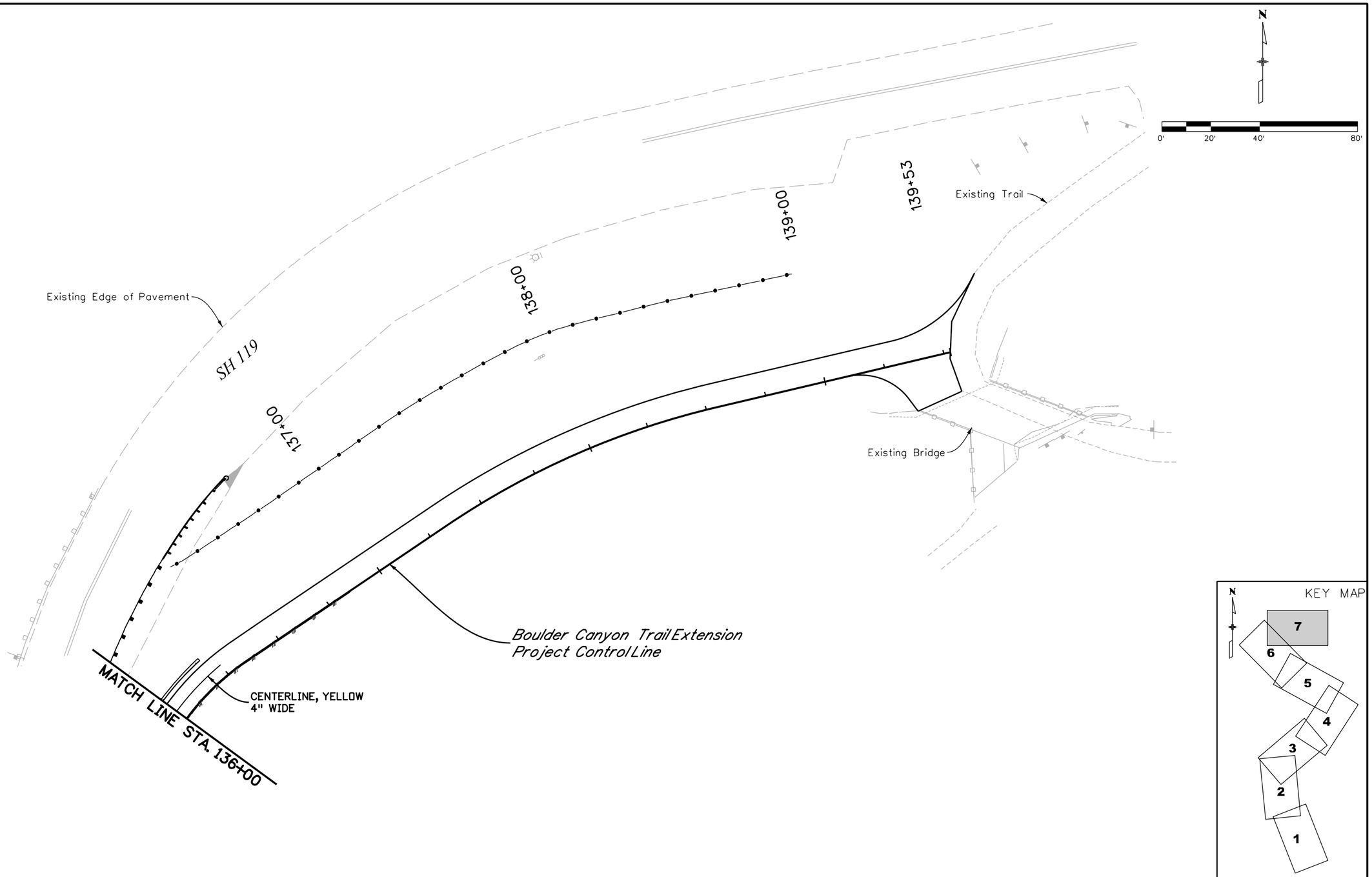
Designer:	SDB	Structure Numbers	
Detailer:	ZDA		
Sheet Subset:	SIGN	Subset Sheets:	6 of 7

Project No./Code

STU C070-043

19888

Sheet Number 108



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Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SIGNING AND PAVEMENT MARKING PLAN			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: SIGN	Subset Sheets:	7 of 7	Sheet Number 109

CONSTRUCTION TRAFFIC CONTROL NOTES

1. IT IS THE INTENT OF THE TRAFFIC CONTROL NOTES AND PLANS TO CONVEY TO THE CONTRACTOR THE GENERAL, BUT ESSENTIAL, DESIGN ELEMENTS REQUIRED TO CONSTRUCT THE PROJECT. OTHER MINI-PHASES (NOT INDICATED IN THE PLAN SET) USING TEMPORARY LANE CLOSURES MAY BE NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL SUBMIT TO BOULDER COUNTY AND CDOT FOR REVIEW AND APPROVAL, A METHOD OF HANDLING TRAFFIC (MHT) CONFORMING TO CDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND M&S STANDARDS TWO WEEKS PRIOR TO RELATED CONSTRUCTION ACTIVITY.

2. ALL CONSTRUCTION TRAFFIC CONTROL SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2009 EDITION, AND APPLICABLE STANDARDS IN THE 2011 COLORADO DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE JULY 2012 COLORADO DEPARTMENT OF TRANSPORTATION STANDARD PLANS M&S STANDARDS.

3. REFER TO CDOT M&S STANDARD PLAN S-630-1, REVISED JUNE 23, 2016, FOR STANDARD TRAFFIC CONTROL CASES THAT WILL BE REQUIRED TO IMPLEMENT PHASES AND OTHER TRAFFIC CONTROL CONDITIONS. ALL TRAFFIC CONTROL DEVICES SHALL BE PLACED IN ACCORDANCE WITH THE CONSTRUCTION TRAFFIC CONTROL PLANS, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2009 EDITION, AND CDOT M&S STANDARD PLAN S-630-1.

4. THE CONTRACTOR SHALL BEAR RESPONSIBILITY AND EXPENSE FOR MAINTAINING ADEQUATE DRAINAGE AND SAFE DRIVING CONDITIONS AT ALL TIMES. THIS WORK SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF RELATED WORK.

5. APPROPRIATE ADVANCE WARNING SIGNS SHALL BE PLACED AS NEEDED. THESE SHALL BE SHOWN IN THE MHT TO BE APPROVED BY THE ENGINEER.

6. 10' MINIMUM WIDTH FOR LANES SHALL BE MAINTAINED AT ALL TIMES UNLESS APPROVED BY THE ENGINEER.

7. A MINIMUM SHOULDER WIDTH OF 2 FEET SHALL BE PROVIDED BETWEEN THE CHANNELIZING DEVICE AND EDGE OF TRAVEL LANE AT ALL TIMES.

8. UNLESS SHOWN OTHERWISE, MINIMUM REDIRECT TAPER RATES SHALL BE 25:1 AND BAY TAPER RATES SHALL BE 12:1.

9. SLOPES WITHIN THE CLEAR ZONE SHALL BE 3:1 OR FLATTER UNLESS PROTECTED BY CONCRETE BARRIER (TEMPORARY). CONCRETE BARRIER (TEMPORARY) SHALL HAVE BOTH ENDS PROTECTED WITH AN IMPACT ATTENUATOR (TEMPORARY), UNLESS FLARED OUTSIDE OF THE CLEAR ZONE.

10. REMOVAL OF TEMPORARY PAVEMENT MARKINGS FOR TEMPORARY LANES WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF PAVEMENT MARKING PAINT. PAINT REMOVALS MUST BE DISPOSED OF PROPERLY OFF-SITE. TEMPORARY TRANSITION MARKINGS SHALL BE REMOVED AND PAID FOR BASED ON THE SQUARE FEET OF SWATH REQUIRED FOR REMOVAL.

11. CONTRACTOR SHALL MAINTAIN SAFE AND REASONABLE ACCESS TO PRIVATE PROPERTIES AT ALL TIMES, UNLESS OTHERWISE APPROVED BY THE ENGINEER AND THE PROPERTY OWNER IN WRITING.

12. EXISTING SIGNS IN CONFLICT WITH THE TEMPORARY LANES SHALL BE COVERED OR RESET AS CONDITIONS REQUIRE FOR EACH CONSTRUCTION PHASE AND AS DIRECTED BY THE ENGINEER. MASKING OF EXISTING SIGNS, INCLUDING THE COVERING MATERIALS AND FASTENING DEVICES, WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

13. CONTRACTOR SHALL REFER TO *COLORADO DEPARTMENT OF TRANSPORTATION REGION 4 LANE CLOSURE STRATEGY SECOND EDITION, 2013* FOR WORK HOUR AND LANE CLOSURE RESTRICTIONS. THE SPRING/SUMMER ALLOWED HOURS FOR LANE CLOSURES LESS THAN 0.5 MILE IN LENGTH IS ANYTIME ON WEEKDAYS AND 9PM TO 6AM ON WEEKENDS.

14. TEMPORARY TRAFFIC SIGNALS ARE ESTIMATED TO OPERATE A TOTAL OF 180 DAYS ON THE PROJECT. PHASING ASSUMED A MAXIMUM OF TWO PAIRS OF PORTABLE TRAILER TEMPORARY SIGNALS OPERATING CONCURRENTLY WITHIN THE CORRIDOR.

SUGGESTED CONSTRUCTION PHASING WORK ITEMS

(REFER TO CONSTRUCTION PHASING SHEETS FOR ADDITIONAL DETAILS.)

GENERAL PHASING:

1. IT IS ANTICIPATED THAT TRAFFIC CONTROL FOR CONSTRUCTION OF CBC 1 AND CBC 2 CAN BE HANDLED THROUGH USE OF CDOT S-630-1 STANDARD PLAN CASE 17.
2. IT IS ANTICIPATED THAT WORK DIRECTLY ADJACENT TO SH 119 THAT IMPACTS TRAFFIC CAN BE HANDLED THROUGH USE OF CDOT S-630-1 STANDARD PLAN CASES 15, 17, AND 24. THIS WORK INCLUDES:
   a. GUARDRAIL INSTALLATION
   b. RETAINING WALL CONSTRUCTION
   c. CURB AND GUTTER INSTALLATION AT ALPS INN
   d. RECONSTRUCTION OF DRIVEWAY AT ALPS INN
   e. ROCK EXCAVATION (MAY REQUIRE BLASTING)
3. CONSTRUCTION OF BRIDGE OVER BOULDER CREEK AT CHAPMAN DRIVE IS NOT ANTICIPATED TO IMPACT TRAFFIC.
4. THE ROCK EXCAVATION WORK MAY BE CONDUCTED IN COORDINATION WITH THE CONSTRUCTION OF CBC 2 IF THE TOTAL LENGTH OF THE WORK ZONE CAN BE MAINTAINED AT A LENGTH OF 0.15 MILE OR LESS. IF THE RESULTING WORK ZONE LENGTH IS LONGER THAN 0.15 MILE, THE ROCK EXCAVATION WORK SHOULD PRECEDE OR FOLLOW THE CONSTRUCTION OF CBC 2. THE TEMPORARY TRAFFIC SIGNAL FROM CBC 2 SHOULD BE UTILIZED TO MAINTAIN AN ALTERNATING LANE OF TRAFFIC THROUGH THE WORK ZONE.

CBC 1 PHASE 1:

1. INSTALL DETOUR PAVEMENT ON WEST SIDE OF SH-119 AT CBC 1 LOCATION
2. INSTALL TEMPORARY SIGNALS AND TRAFFIC CONTROL AS SHOWN IN THE PLANS TO DIVERT TRAFFIC TO WEST-BOUND LANE/DETOUR PAVEMENT
3. CLEAR AND GRUB AREAS NEAR EAST SIDE OF CBC 1 CROSSING.
4. COMPLETE PRELIMINARY GRADING AT EASTSIDE OF CBC 1 CROSSING LOCATION IN PREPARATION FOR INSTALLATION.
5. EXCAVATE AREA AND INSTALL TEMPORARY SHORING
6. REMOVE EXISTING CBC FROM THE EAST HALF OF SH-119
7. INSTALL 6 PRECAST SECTIONS OF CBC 1 ON THE EAST HALF OF SH-119 AS SHOWN IN PHASING PLANS.
8. INSTALL WALLS 3 AND 5 AND COMPLETE ALL EMBANKMENT WORK FOR FUTURE BIKE PATH ON THE EAST SIDE OF SH-119
9. REMOVE DETOUR AND SHIFT TRAFFIC BACK ONTO SH-119.

CBC 1 PHASE 2:

1. INSTALL DETOUR PAVEMENT ON EAST SIDE OF SH-119 AT CBC 1 LOCATION
2. INSTALL TEMPORARY SIGNALS AND TRAFFIC CONTROL AS SHOWN IN THE PLANS TO DIVERT TRAFFIC ONTO DETOUR PAVEMENT
3. CLEAR AND GRUB AREAS ON WEST SIDE OF CBC 1 CROSSING.
4. COMPLETE PRELIMINARY GRADING ON WEST SIDE OF CBC 1 CROSSING LOCATION IN PREPARATION FOR INSTALLATION.
5. EXCAVATE AREA AND INSTALL TEMPORARY SHORING
6. REMOVE EXISTING CBC FROM THE WEST HALF OF SH-119
7. INSTALL REMAINING 6 PRECAST SECTIONS OF CBC ON THE WEST HALF OF SH-119 AS SHOWN IN PHASING PLANS.
8. INSTALL WALLS 6 AND 7
9. INSTALL PERMANENT TYPE 3 GUARDRAIL ON WEST SIDE OF SH-119
10. INSTALL PERMANENT PAVEMENT MARKINGS. REMOVE DETOUR AND SHIFT TRAFFIC BACK ONTO SH 119.

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MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	TRAFFIC CONTROL NOTES			STU C070-043
Revised:	Designer: KSF	Structure Numbers		19888
Void:	Detailer: CZC			Sheet Number 110
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CBC 2 PHASE 1:

1. IF NECESSARY TO COMPLETE CONSTRUCTION ACTIVITIES INSTALL TEMPORARY SIGNALS.
2. CLEAR AND GRUB AREA ON EAST SIDE OF CBC 2 CROSSING.
3. COMPLETE PRELIMINARY GRADING AT EAST SIDE OF CBC 2 CROSSING LOCATION IN PREPARATION FOR INSTALLATION.
4. EXCAVATE AREA AND INSTALL TEMPORARY SHORING.
5. INSTALL WALL 10.

CBC 2 PHASE 2:

1. REMOVE EXISTING GUARDRAIL AND INSTALL DETOUR PAVEMENT ON WEST SIDE OF SH-119 AT CBC 2 LOCATION
2. INSTALL TEMPORARY SIGNALS AND TRAFFIC CONTROL AS SHOWN IN THE PLANS TO DIVERT TRAFFIC ONTO DETOUR PAVEMENT.
3. EXCAVATE AREA AND INSTALL TEMPORARY SHORING.
4. INSTALL 16 PRECAST SECTIONS OF CBC ON THE EAST HALF OF SH-119 AS SHOWN IN PHASING PLANS.
5. INSTALL PORTION OF STORM LINE LOCATED IN EXCAVATED AREA NEXT TO CBC 2.
6. INSTALL PERMANENT TYPE 3 GUARDRAIL ON EAST SIDE OF SH-119.
7. REMOVE DETOUR AND SHIFT TRAFFIC BACK ONTO SH-119.

CBC 2 PHASE 3:

1. INSTALL TEMPORARY SIGNALS AND TRAFFIC CONTROL AS SHOWN IN THE PLANS TO DIVERT TRAFFIC TO EAST-BOUND LANE.
2. CLEAR AND GRUB AREA NEAR WEST SIDE OF CBC 2 CROSSING.
3. COMPLETE PRELIMINARY GRADING AT WEST SIDE OF CBC CROSSING LOCATION IN PREPARATION FOR INSTALLATION.
4. EXCAVATE AREA AND INSTALL TEMPORARY SHORING.
5. INSTALL REMAINING 4 PRECAST SECTIONS OF CBC ON THE WEST HALF OF SH-119 AS SHOWN IN PHASING PLANS.
6. INSTALL REMAINING PORTION OF STORM LINE LOCATED IN EXCAVATED AREA NEXT TO CBC 2.
7. INSTALL WALLS 8 AND 9 AND PERMANENT TYPE 3 GUARDRAIL ON WEST SIDE OF SH-119
8. INSTALL PERMANENT PAVEMENT MARKINGS. REMOVE DETOUR AND SHIFT TRAFFIC BACK ONTO SH 119.

Print Date: 11/16/2016		Sheet Revisions			Region 4	As Constructed	BOULDER CANYON TRAIL EXTENSION
Drawing File Name: 19888TRAF_Traffic ControlNotes.dgn		Date:	Comments	Init.		No Revisions:	TRAFFIC CONTROL NOTES
Horiz. Scale: 1:1 Vert. Scale: As Noted						Revised:	Designer: KSF / Detailer: CZC / Sheet Subset: TC / Structure Numbers / Subset Sheets: 2 of 2
Unit Information Unit Leader Initials						Void:	
MULLER ENGINEERING COMPANY							

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19888
Sheet Number 111

TABULATION OF CONSTRUCTION TRAFFIC CONTROL ITEMS

ITEM NO.	ITEM	UNIT	TOTALS
621-00425	DETOUR (CBC 1)[1]	LS	1
621-00425	DETOUR (CBC 2)[2]	LS	1
627-00011	PAVEMENT MARKING PAINT (WATERBORNE)[TEMPORARY]	GAL	15
630-00000	FLAGGING	HOUR	500
630-00003	UNIFORMED TRAFFIC CONTROL	HOUR	16
630-00007	TRAFFIC CONTROL INSPECTION	DAY	51
630-00012	TRAFFIC CONTROL MANAGEMENT	DAY	129
630-80341	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	EA	40
630-80342	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	EA	12
630-80350	VERTICAL PANEL	EA	150
630-80355	PORTABLE MESSAGE SIGN PANEL	EA	2
630-80360	DRUM CHANNELIZING DEVICE	EA	100
630-80364	DRUM CHANNELIZING DEVICE (WITH LIGHT) (STEADY BURN)	EA	20
630-80370	CONCRETE BARRIER (TEMPORARY)	LF	2,000
630-85010	IMPACT ATTENUATOR (TEMPORARY)	EA	6
630-86810	TRAFFIC SIGNAL (TEMPORARY)[3]	EA	2

NOTES (FOR INFORMATION ONLY):

1. DETOUR (CBC 1) (LUMP SUM) SHALL CONSIST OF ALL WORK NECESSARY TO CONSTRUCT AND REMOVE TEMPORARY DETOURS DURING PHASE 1 AND PHASE 2. IT IS ESTIMATED THAT THIS WORK SHALL CONSIST OF 950 CY EMBANKMENT MATERIAL, 180 SY DETOUR PAVEMENT, AND REMOVAL OF EMBANKMENT MATERIAL AND DETOUR PAVEMENT.
2. DETOUR (CBC 2) (LUMP SUM) SHALL CONSISTS OF ALL WORK NECESSARY TO CONSTRUCT AND REMOVE TEMPORARY DETOUR DURING PHASE 2. IT IS ESTIMATED THAT THIS WORK SHALL CONSIST OF 870 CY EMBANKIMENT MATERIAL, 450 SY DETOUR PAVEMENT, 25 LF OF 48" DRAINAGE PIPE, PROTECTING EXISTING STONE HEADWALL IN PLACE, AND REMOVAL OF DETOUR PAVEMENT, EMBANKMENT MATERIAL, 48" DRAINAGE PIPE, AND HEADWALL PROTECTION.
3. TRAFFIC SIGNAL (TEMPORARY) CONSISTS OF TWO TRAILER MOUNTED TRAFFIC SIGNALS.
4. TRAFFIC CONTROL DEVICES AND MARKINGS ARE NOT INCLUDED IN DETOUR (LUMP SUM) AND SHALL BE PAID FOR SEPARATELY AS SHOWN ON THE PLANS.

SCHEDULE OF CONSTRUCTION TRAFFIC CONTROL SIGNS

SIGN CODE	LEGEND	DIMENSION	PANEL SIZE			SPECIAL
			A	B	C	
		W x H	EA	EA	EA	SF
G20-10	XYZ CONSTRUCTION THANKS YOU	48 x 48		2		
G20-11	CDOT LOGO ROAD WORK MMM YY-MMM YY FOR INFO	48 x 48		2		
G20-5aP	WORK ZONE	24 x 18	8			
R2-1(20)	SPEED LIMIT 20	24 x 30	2			
R2-1(25)	SPEED LIMIT 25	24 x 30	6			
R2-1(40)	SPEED LIMIT 40	24 x 30	2			
R10-6	STOP HERE ON RED	24 x 36	4			
R52-6a	BEGIN FINES DOUBLE ZONE	36 x 48		2		
R52-6b	END FINES DOUBLE ZONE	36 x 48		2		
W3-3	TRAFFIC SIGNAL	36 x 36	4			
W3-5a	20 MPH SPEED ZONE AHEAD	36 x 36	1			
W3-5a	25 MPH SPEED ZONE AHEAD	36 x 36	1			
W20-1	ROAD WORK AHEAD	36 x 36	3			
W20-4	ONE LANE ROAD AHEAD	36 x 36	4			
W20-7A	FLAGGER	36 x 36	2			
W20-7	FLAGGER (SYMBOL)	36 x 36	1			
W22-1	BLASTING ZONE AHEAD	36 x 36	2			
W22-2	TURN OFF 2-WAY RADIO AND CELL PHONE	42 x 36		2		
W22-3	END BLASTING ZONE	42 x 36		2		
TOTALS			**40**	**12**	**0**	**0**

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Date:	Comments	Init.

Region 4

Boulder County

As Constructed
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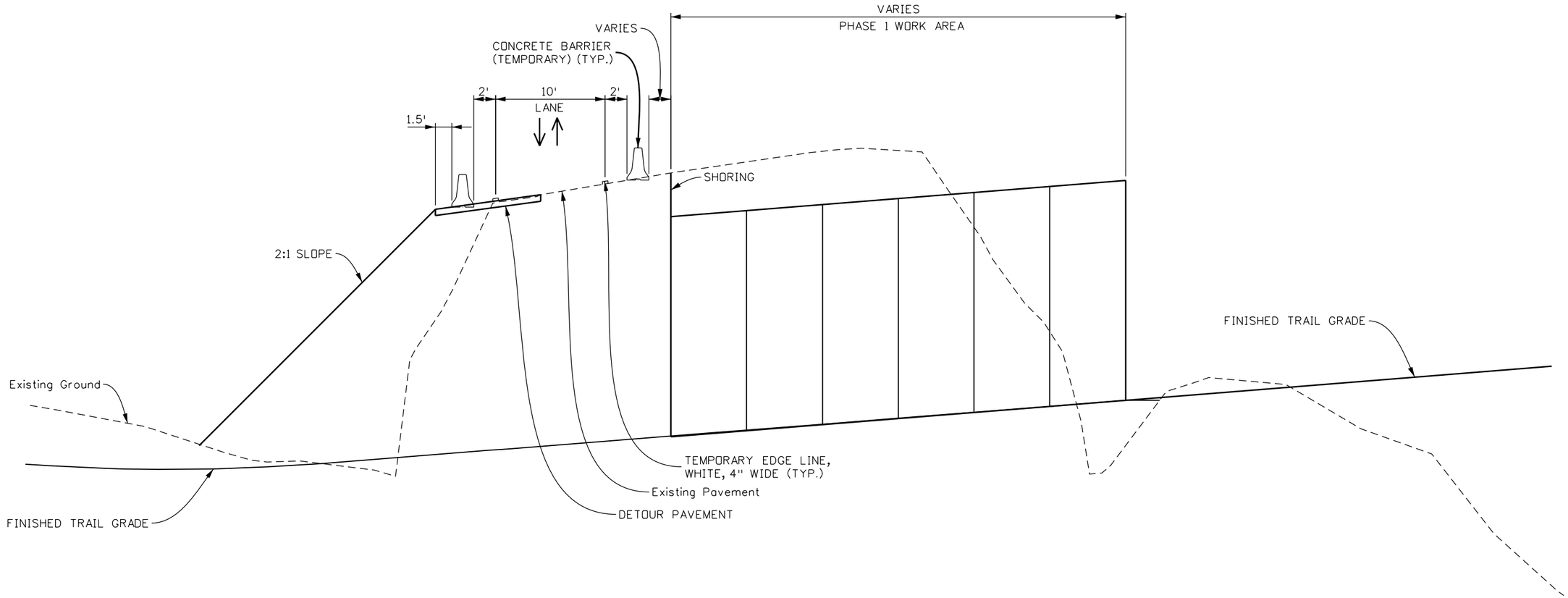
BOULDER CANYON TRAIL EXTENSION
TABULATION OF CONSTRUCTION TRAFFIC CONTROL ITEMS

Designer: SDB
Detailer: CZC
Sheet Subset: PHASING
Structure Numbers:
Subset Sheets: 1 of 1

Project No./Code
STU C070-043
19888
Sheet Number 112



CBC 1 - PHASE 1

ALL WORK NECESSARY FOR CONSTRUCTION OF DETOUR INCLUDING PLACEMENT AND REMOVAL OF TEMPORARY EMBANKMENT SLOPE AND DETOUR PAVEMENT SHALL BE PAID FOR AS 621-00425 DETOUR (CBC 1) (LUMP SUM). IT IS ESTIMATED THAT 740 CY OF EMBANKMENT AND 115 SY OF DETOUR PAVEMENT WILL BE REQUIRED IN PHASE 1.

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Unit Information Unit Leader Initials				Void:
MULLER ENGINEERING COMPANY				

Region 4

BOULDER CANYON TRAIL EXTENSION
SUGGESTED PHASING TYPICAL SECTIONS

Designer:	CZC	Structure Numbers	
Detailer:	ZDA		
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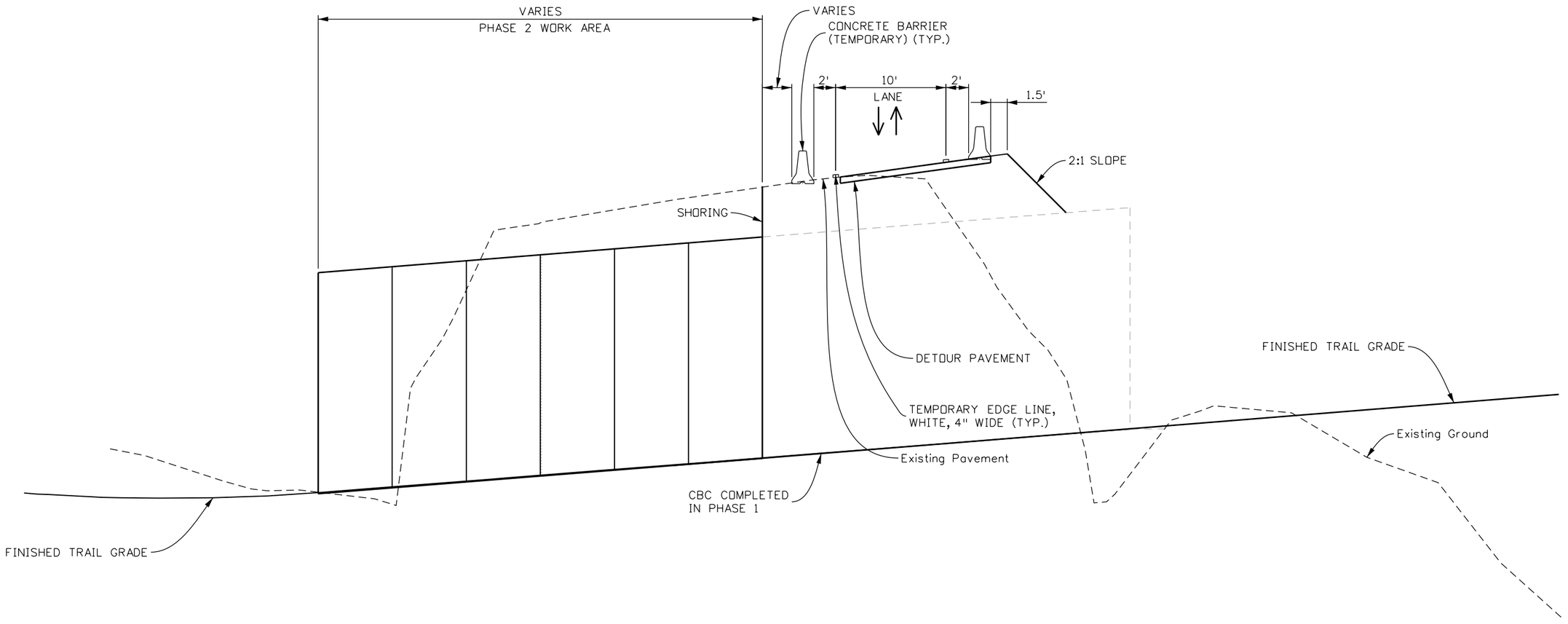
19888
Sheet Number 113



CBC 1 - PHASE 2

ALL WORK NECESSARY FOR CONSTRUCTION OF DETOUR INCLUDING PLACEMENT AND REMOVAL OF TEMPORARY EMBANKMENT SLOPE AND DETOUR PAVEMENT SHALL BE PAID FOR AS 621-00425 DETOUR (CBC 1) (LUMP SUM). IT IS ESTIMATED THAT 210 CY OF EMBANKMENT AND 65 SY OF DETOUR PAVEMENT WILL BE REQUIRED IN PHASE 2.

Know what's **below** **Call** before you dig.

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Sheet Revisions		
Date:	Comments	Init.

Region 4

Boulder County

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BOULDER CANYON TRAIL EXTENSION
SUGGESTED PHASING
TYPICAL SECTIONS

Designer: CZC
Detailer: ZDA
Sheet Subset: PHASING
Structure Numbers:
Subset Sheets: 2 of 4

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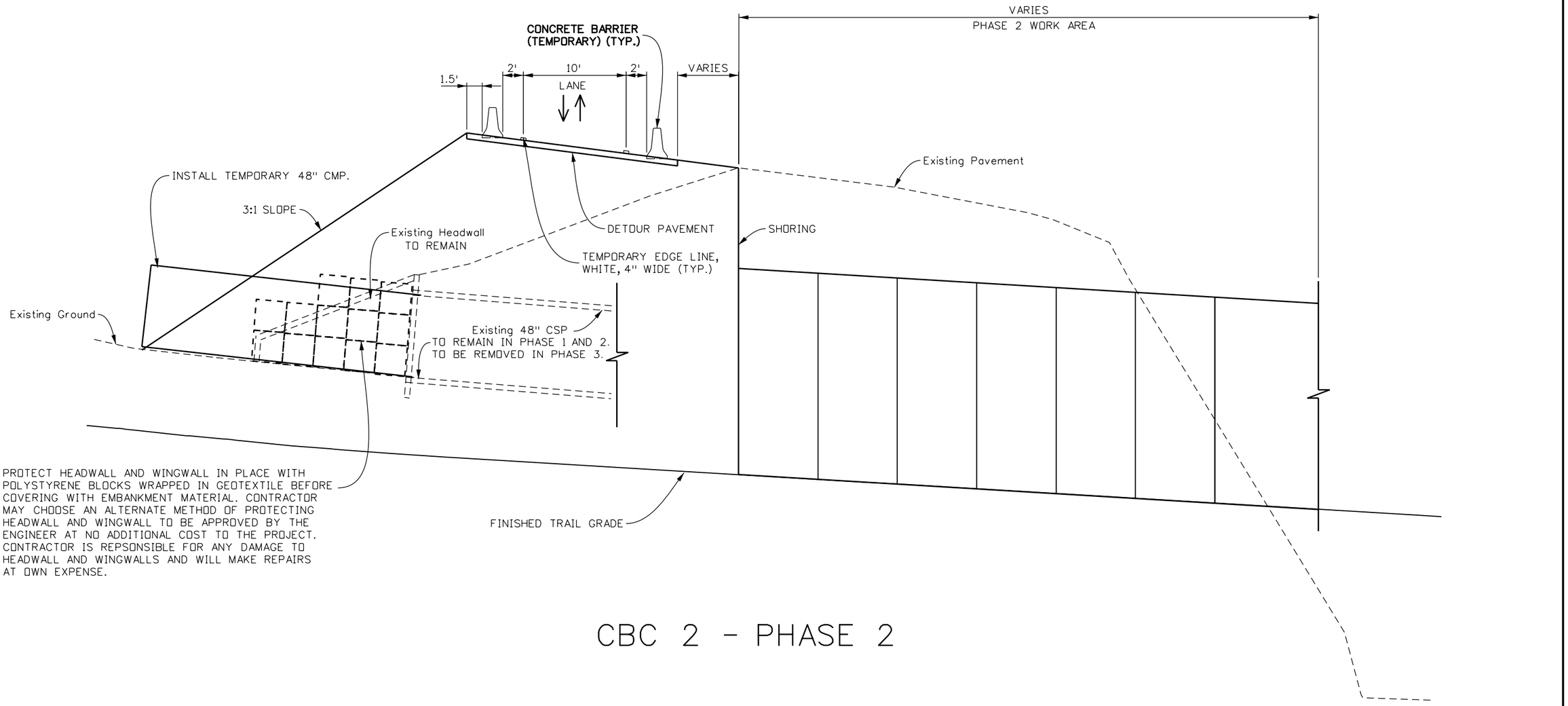
STU C070-043
19888
Sheet Number 114



PROTECT HEADWALL AND WINGWALL IN PLACE WITH POLYSTYRENE BLOCKS WRAPPED IN GEOTEXTILE BEFORE COVERING WITH EMBANKMENT MATERIAL. CONTRACTOR MAY CHOOSE AN ALTERNATE METHOD OF PROTECTING HEADWALL AND WINGWALL TO BE APPROVED BY THE ENGINEER AT NO ADDITIONAL COST TO THE PROJECT. CONTRACTOR IS REPSONSIBLE FOR ANY DAMAGE TO HEADWALL AND WINGWALLS AND WILL MAKE REPAIRS AT OWN EXPENSE.

CBC 2 - PHASE 2

NOTES:
1. CBC 2 - PHASE 1 NOT SHOWN AS IT DOES NOT IMPACT TRAFFIC.
2. ALL WORK NECESSARY FOR CONSTRUCTION OF DETOUR INCLUDING PLACEMENT AND REMOVAL OF TEMPORARY EMBANKMENT SLOPE, DETOUR PAVEMENT, 48" PIPE, AND HEADWALL PROTECTION SHALL BE PAID FOR AS 621-00425 DETOUR (CBC 2) (LUMP SUM). IT IS ESTIMATED THAT 870 CY OF EMBANKMENT, 450 SY OF DETOUR PAVEMENT, AND 25 LF OF 48 INCH CMP WILL BE REQUIRED. CONTRACTOR SHALL REMOVE TEMPORARY EMBANKMENT AND EXPOSE STONE HEADWALL AT END OF THIS PHASE. THIS WORK SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

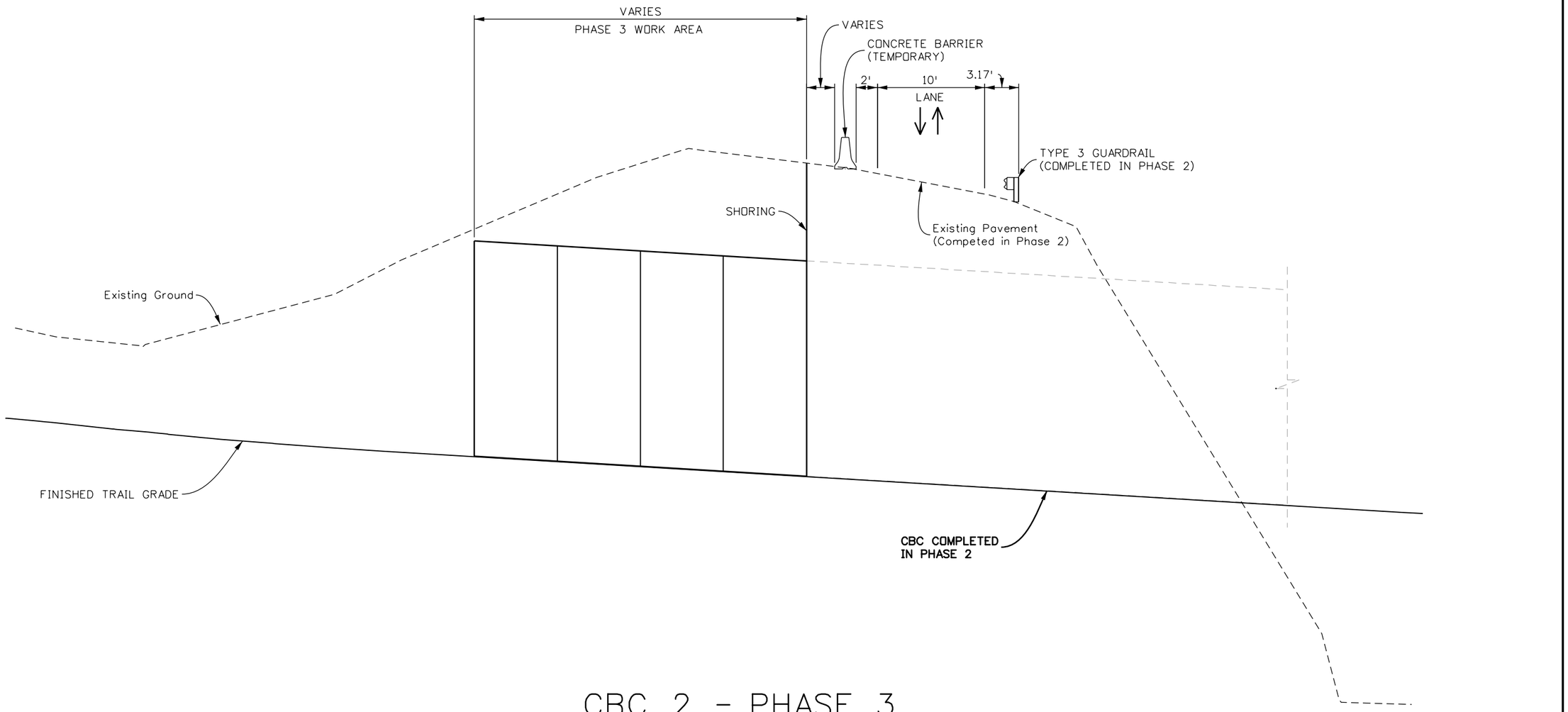
Know what's **below** **Call** before you dig.

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888TRAF_PhasingTypicals.dgn	Date:	Comments	Init.
Horiz. Scale: 1:10 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SUGGESTED PHASING TYPICAL SECTIONS			STU C070-043
Revised:	Designer: CZC	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: PHASING	Subset Sheets: 3 of 4		Sheet Number 115



CBC 2 - PHASE 3

Know what's **below**
Call before you dig.

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Drawing File Name: 19888TRAF_PhasingTypicals.dgn		Date:	Comments	Init.		No Revisions:	SUGGESTED PHASING TYPICAL SECTIONS	STU C070-043
Horiz. Scale: 1:10 Vert. Scale: As Noted						Revised:	Designer: CZC / Detailer: ZDA / Structure Numbers	19888
Unit Information Unit Leader Initials						Void:	Sheet Subset: PHASING / Subset Sheets: 4 of 4	Sheet Number 116
MULLER ENGINEERING COMPANY								

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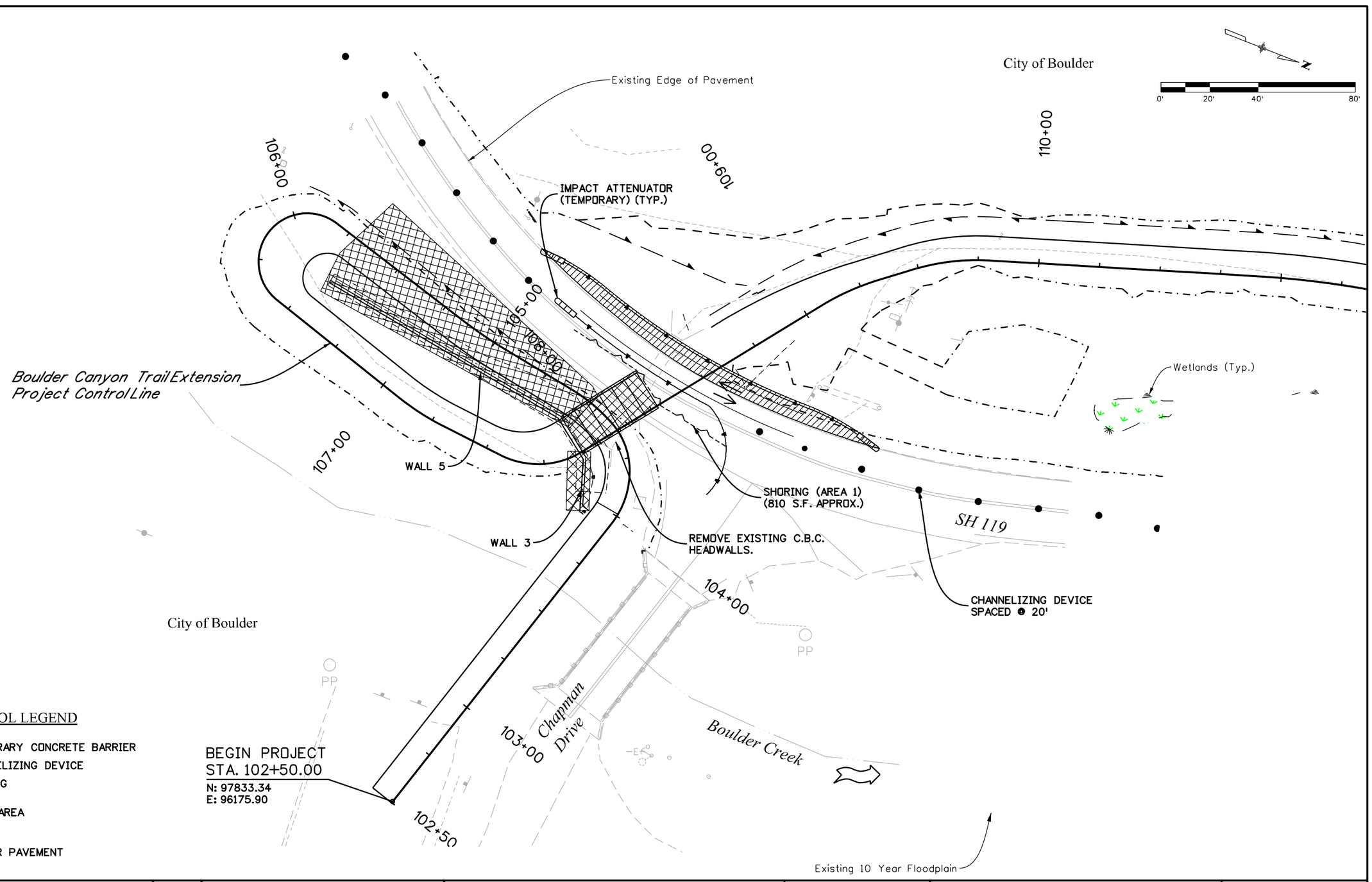

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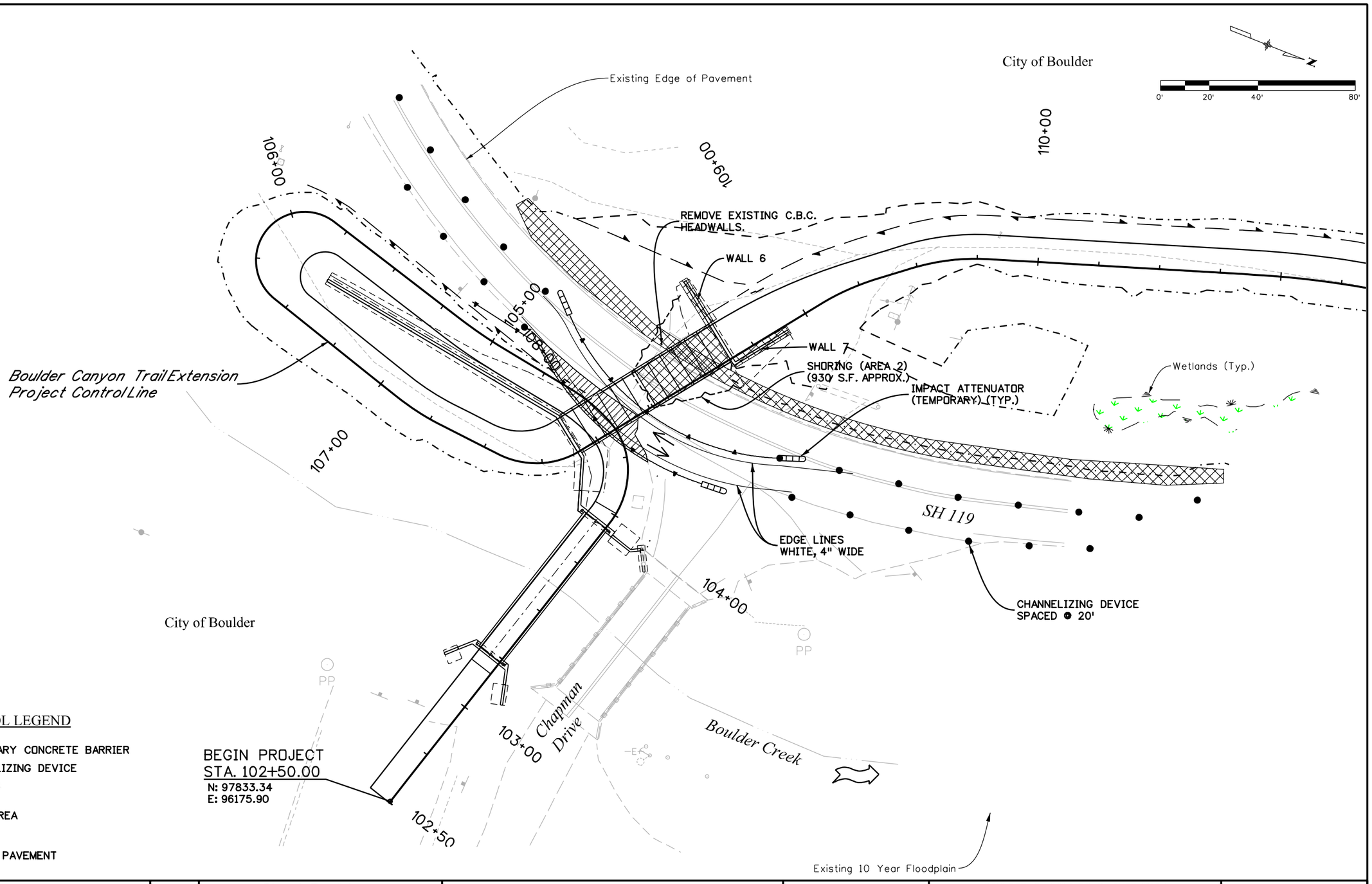
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SUGGESTED CONSTRUCTION PHASING CBC 1: PHASE 1			STU C070-043
Revised:	Designer: CZC	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: PHASING	Subset Sheets: 1 of 5		Sheet Number 117



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Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

CDOT Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	SUGGESTED CONSTRUCTION PHASING CBC 1: PHASE 2			STU C070-043
Revised:	Designer: CZC	Structure Numbers		19888
Void:	Detailer: ZDA			
	Sheet Subset: PHASING	Subset Sheets: 2 of 5		Sheet Number 118

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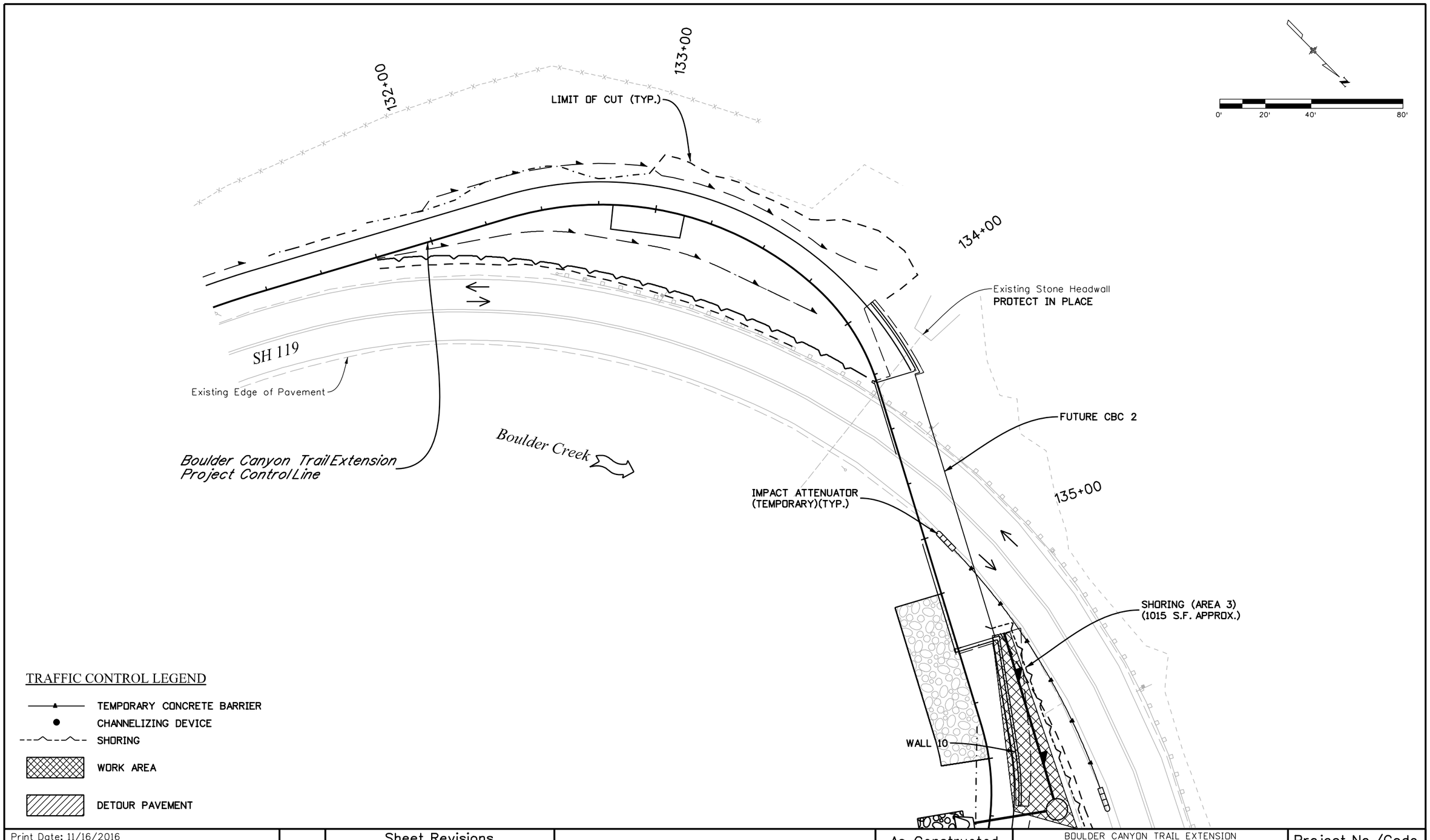

TRAFFIC CONTROL LEGEND

- TEMPORARY CONCRETE BARRIER
- CHANNELIZING DEVICE
- SHORING
- WORK AREA
- DETOUR PAVEMENT

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888TRAF_CONST_CBC 2 Phase 1.dgn	Date:	Comments	Init.
Horiz. Scale: 1:40 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION		Project No./Code
No Revisions:	SUGGESTED CONSTRUCTION PHASING CBC 2: PHASE 1		STU C070-043
Revised:	Designer: SDB	Structure Numbers	19888
Void:	Detailer: ZDA		Sheet Number 119
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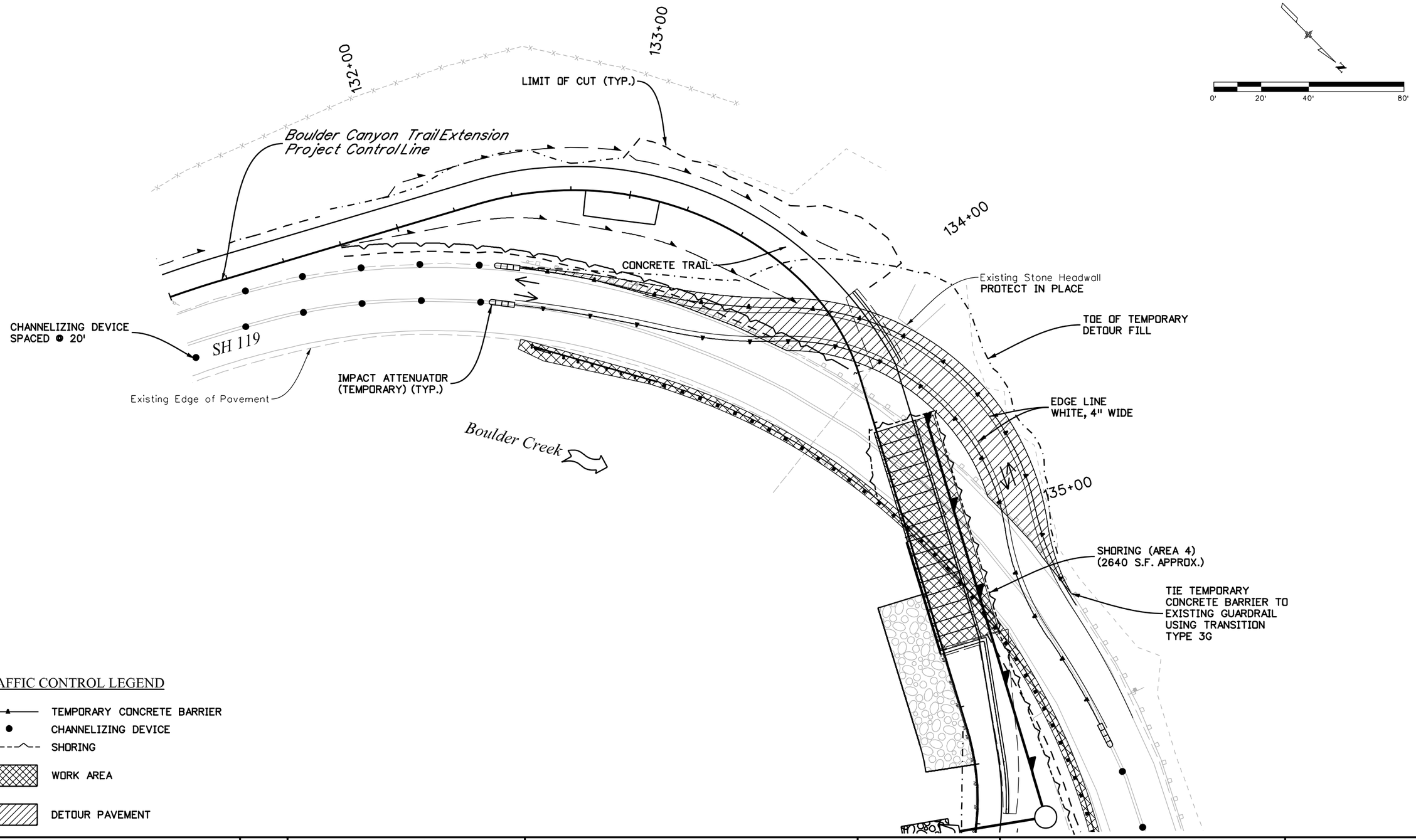

TRAFFIC CONTROL LEGEND

- TEMPORARY CONCRETE BARRIER
- CHANNELIZING DEVICE
- SHORING
- WORK AREA
- DETOUR PAVEMENT

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Drawing File Name: 19888TRAF_CONST_CBC 2 Phase 2.dgn	Date:	Comments	Init.	No Revisions:	SUGGESTED CONSTRUCTION PHASING CBC 2: PHASE 2
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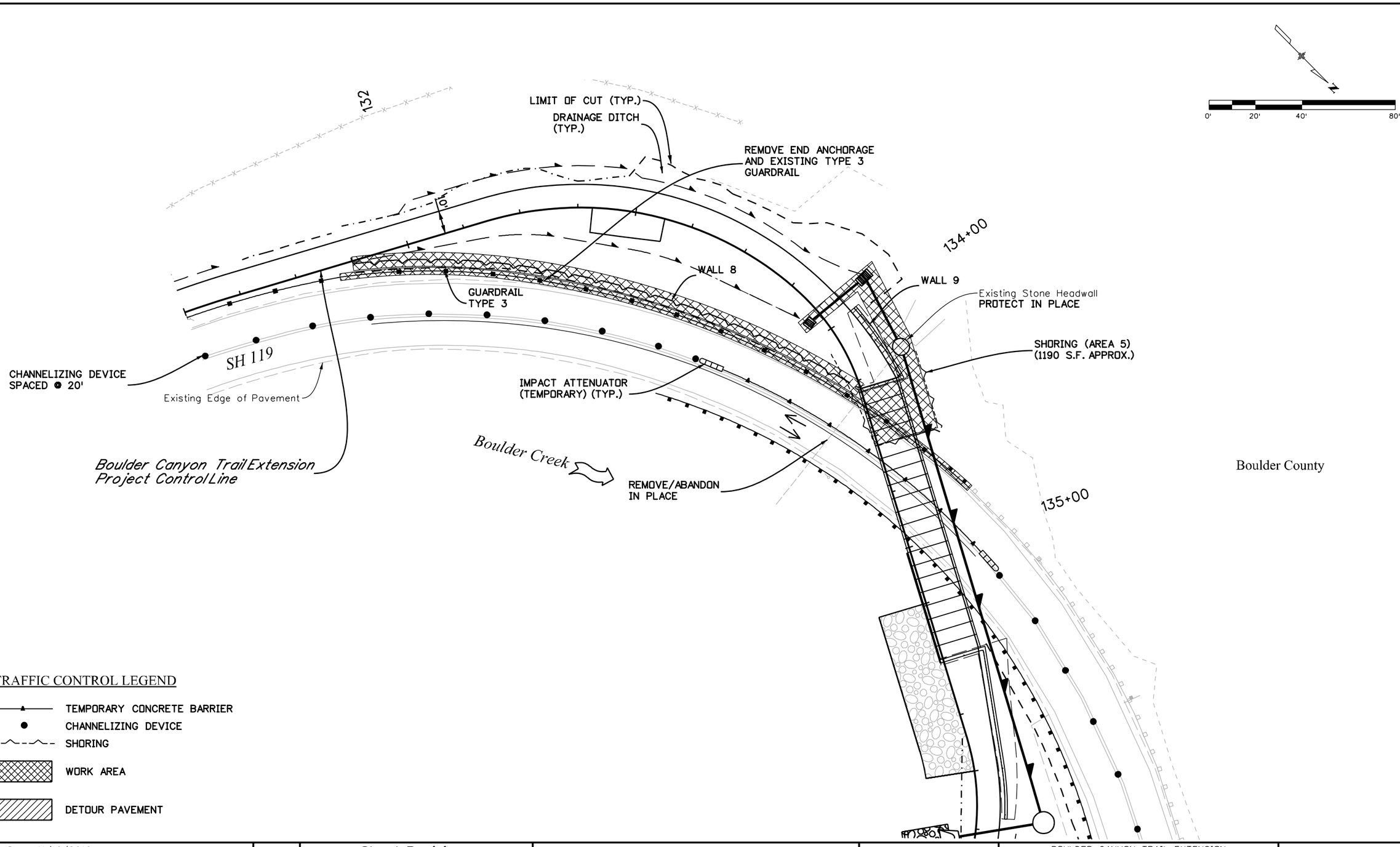
Unit Information Unit Leader Initials				Void:	Structure Numbers: / Subset Sheets: 4 of 5
MULLER ENGINEERING COMPANY					Project No./Code: STU C070-043 / 19888 / Sheet Number 120

CDOT Region 4 — Boulder County



TRAFFIC CONTROL LEGEND

- TEMPORARY CONCRETE BARRIER
- CHANNELIZING DEVICE
- SHORING
- WORK AREA
- DETOUR PAVEMENT

Print Date: 11/16/2016		Sheet Revisions			Region 4	As Constructed	BOULDER CANYON TRAIL EXTENSION SUGGESTED CONSTRUCTION PHASING CBC 2: PHASE 3	Project No./Code
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Horiz. Scale: 1:40	Vert. Scale: As Noted					Revised:	Designer: CZC / Detailer: ZDA / Sheet Subset: PHASING	19888
Unit Information	Unit Leader Initials					Void:	Structure Numbers / Subset Sheets: 5 of 5	Sheet Number 121
MULLER ENGINEERING COMPANY								

SEGMENT A

Traffic Information (From OTIS SH 119A Station ID 104339, June 24 & 25, 2013)

AADT	Peak Hourly Volume EB	Peak Hourly Volume WB	15-Minute Volume EB	15-Minute Volume WB
6400	433	478	108	120

911 Bi-direction Volume

Platoon Capacity - CBC 1							
Segment Length (mi)	Travel Speed (mph)	Lead Car Travel Time (min)	Headway (sec/veh)	Platoon Length (veh)	Last Car Entry Time (min)	Last Car Total Time (min)	Bi-directional Capacity (vph)
0.10	20	0.300	2.5	15	0.63	0.93	973.0
0.10	25	0.240	2.5	15	0.63	0.87	1040.5
0.15	20	0.450	2.5	15	0.63	1.08	837.2
0.15	25	0.360	2.5	15	0.63	0.99	913.7

Timing Recommendations

Segment Length = 0.10 miles
Assumed Travel Speed = 25 mph

Direction	Green (sec)	Yellow (sec)	All Red (sec)	Total Split (sec)
WB	40	3	14	57
EB	40	3	14	57

SEGMENT B

Traffic Information (From OTIS SH 119A Station ID 104339, June 24 & 25, 2013)

AADT	Peak Hourly Volume EB	Peak Hourly Volume WB	15-Minute Volume EB	15-Minute Volume WB
6400	433	478	108	120

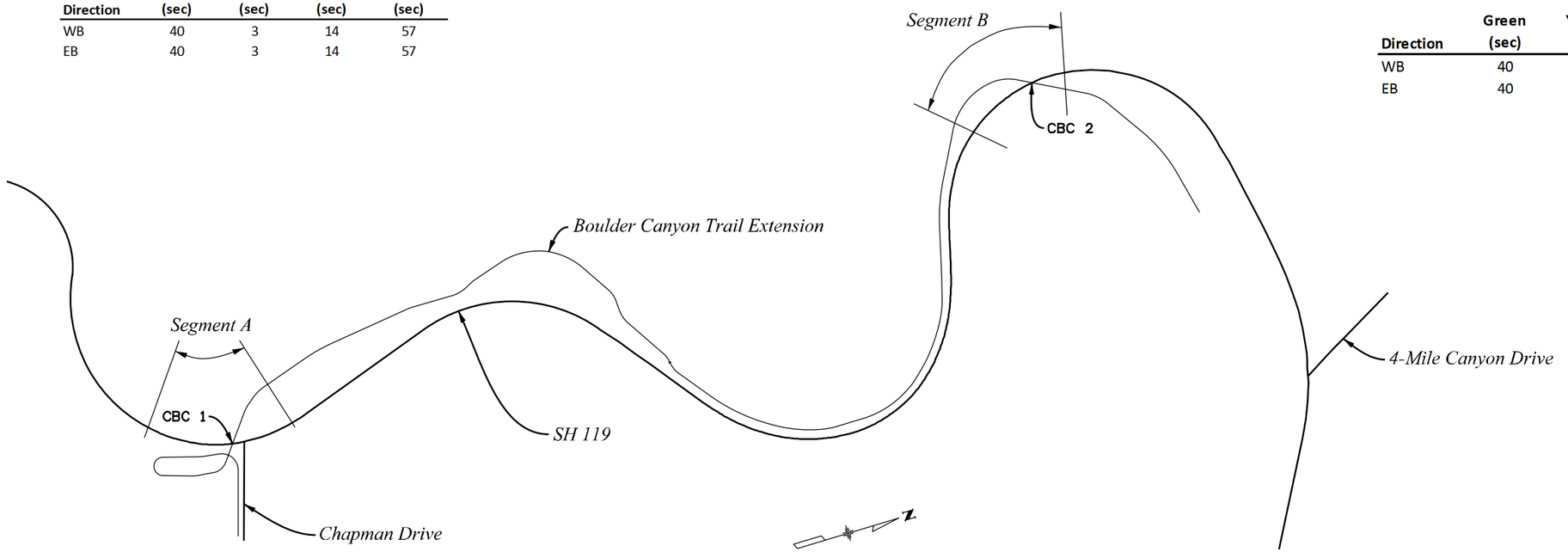
911 Bi-direction Volume

Platoon Capacity - CBC 2							
Segment Length (mi)	Travel Speed (mph)	Lead Car Travel Time (min)	Headway (sec/veh)	Platoon Length (veh)	Last Car Entry Time (min)	Last Car Total Time (min)	Bi-directional Capacity (vph)
0.10	20	0.300	2.5	15	0.63	0.93	973.0
0.15	20	0.450	2.5	15	0.63	1.08	837.2
0.20	20	0.600	2.5	15	0.63	1.23	734.7
0.25	20	0.750	2.5	15	0.63	1.38	654.5

Timing Recommendations

Segment Length = 0.10 miles
Assumed Travel Speed = 20 mph

Direction	Green (sec)	Yellow (sec)	All Red (sec)	Total Split (sec)
WB	40	3	18	61
EB	40	3	18	61



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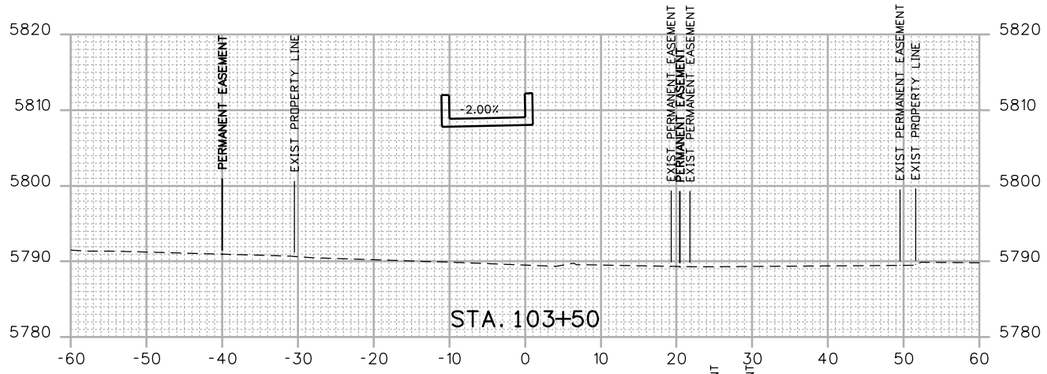
Horiz. Scale: 1:1 Vert. Scale: As Noted					Revised:
Unit Information Unit Leader Initials					Void:
MULLER ENGINEERING COMPANY					

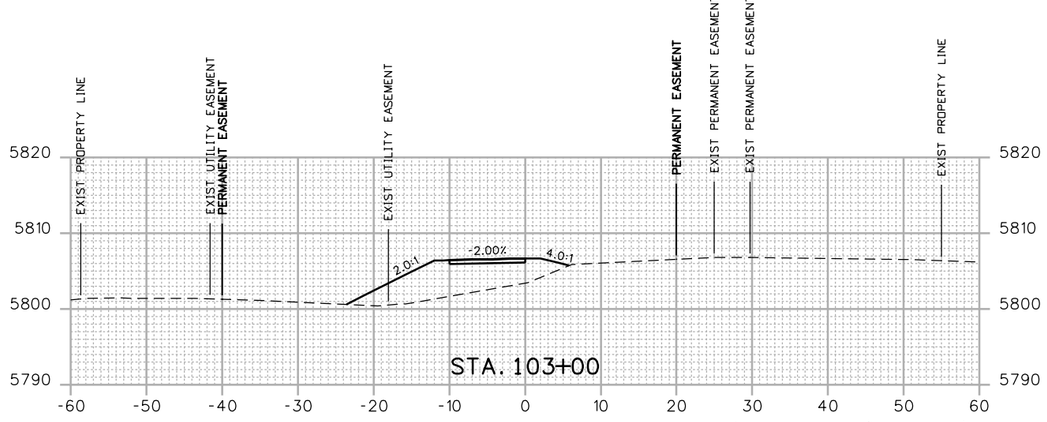
CDOT Region 4 — Boulder County

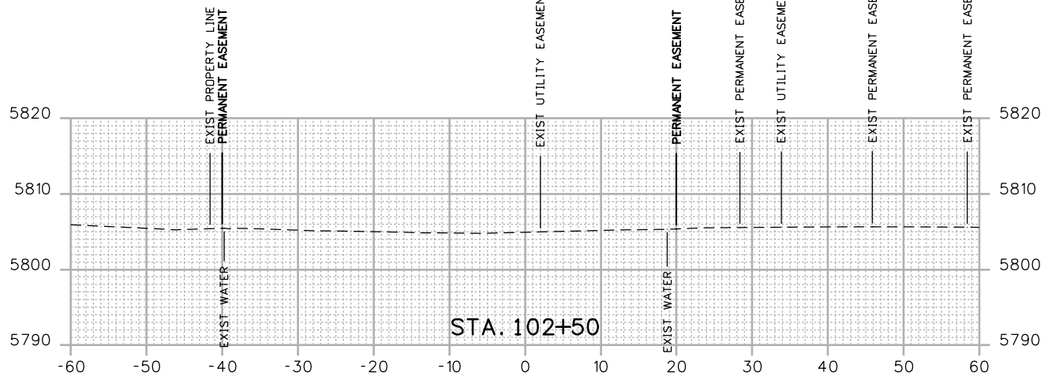
BOULDER CANYON TRAIL EXTENSION
TRAFFIC SIGNAL (TEMPORARY) SUGGESTED TIMINGS

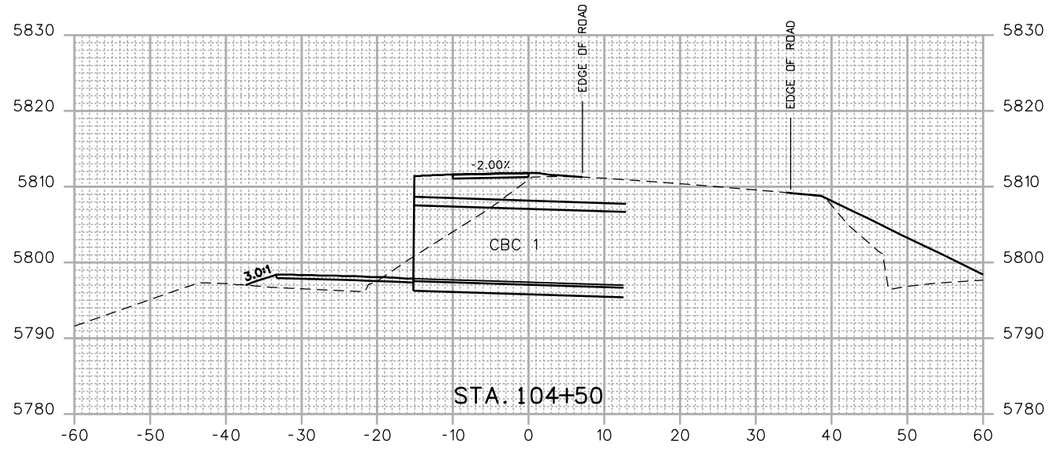
Designer:	CZC	Structure Numbers	
Detailer:	CZC		
Sheet Subset:	TC	Subset Sheets:	1 of 1

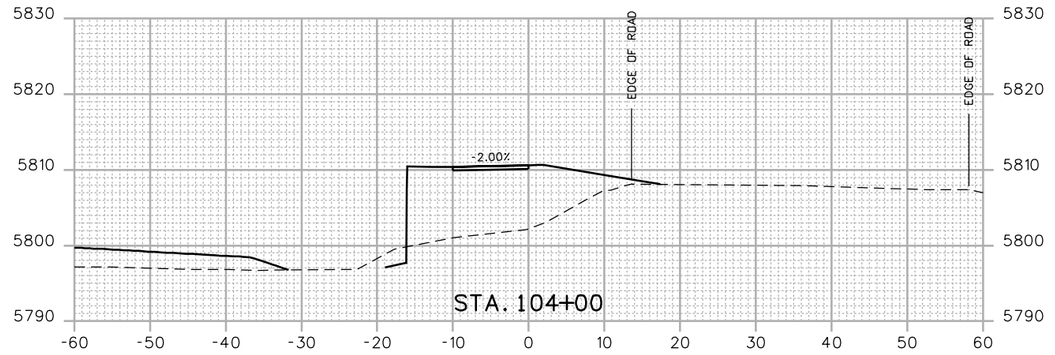
Project No./Code
STU C070-043
19888
Sheet Number 122











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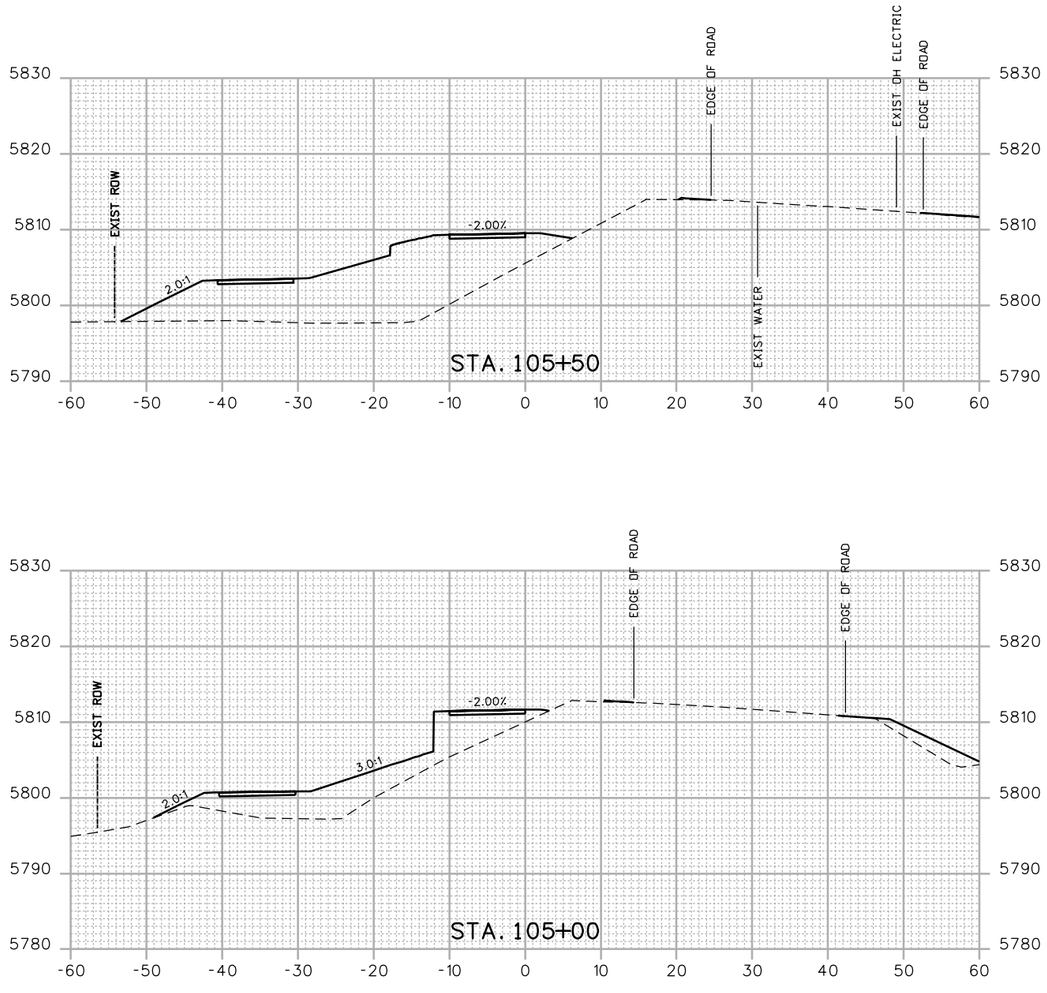
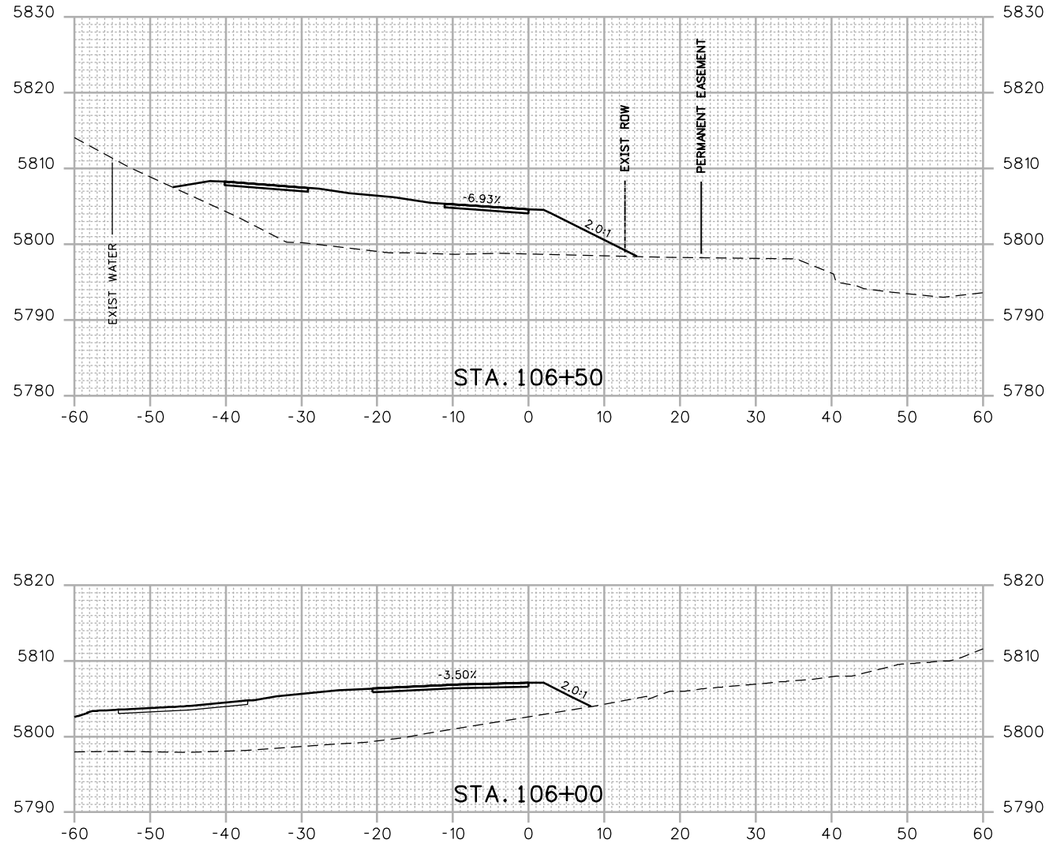
Horiz. Scale: 1:20	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		
MULLER ENGINEERING COMPANY			

Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	CROSS SECTIONS			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: REW			Sheet Number 123
	Sheet Subset: XSEC	Subset Sheets:	1 of 18	





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Drawing File Name: 19888DES_Cross Sections.dgn	Date:	Comments	Init.
Horiz. Scale: 1:20 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

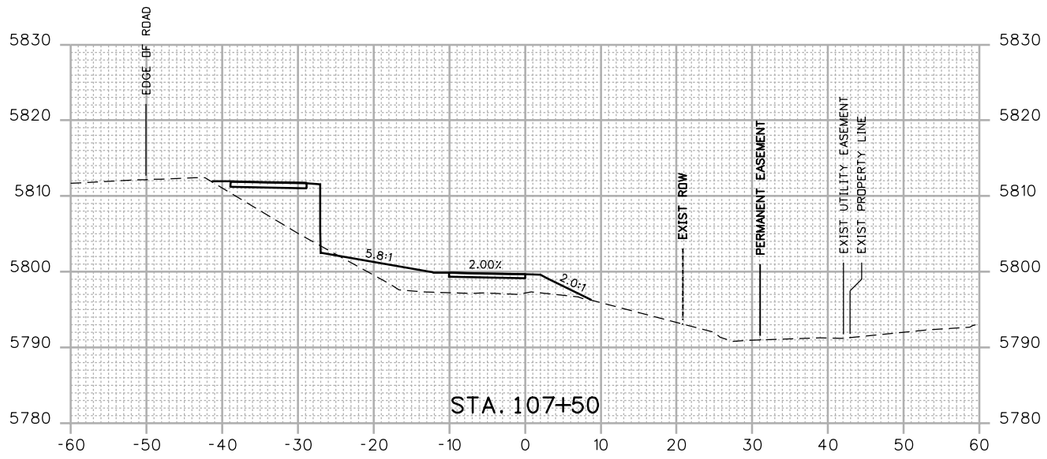
As Constructed	
No Revisions:	
Revised:	
Void:	

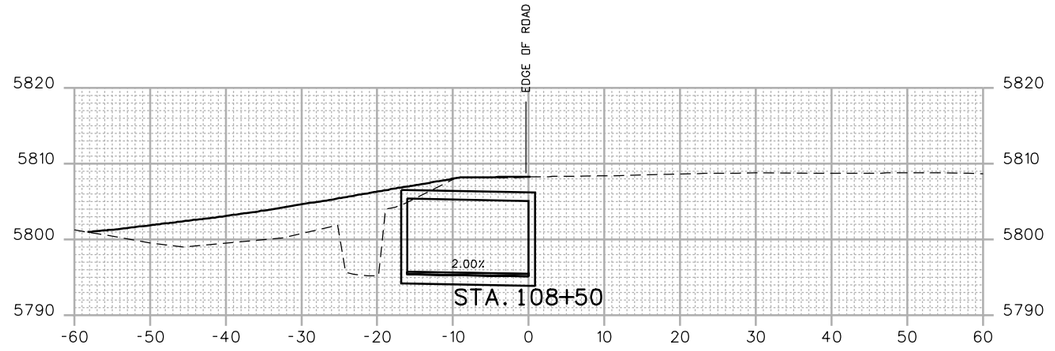
BOULDER CANYON TRAIL EXTENSION

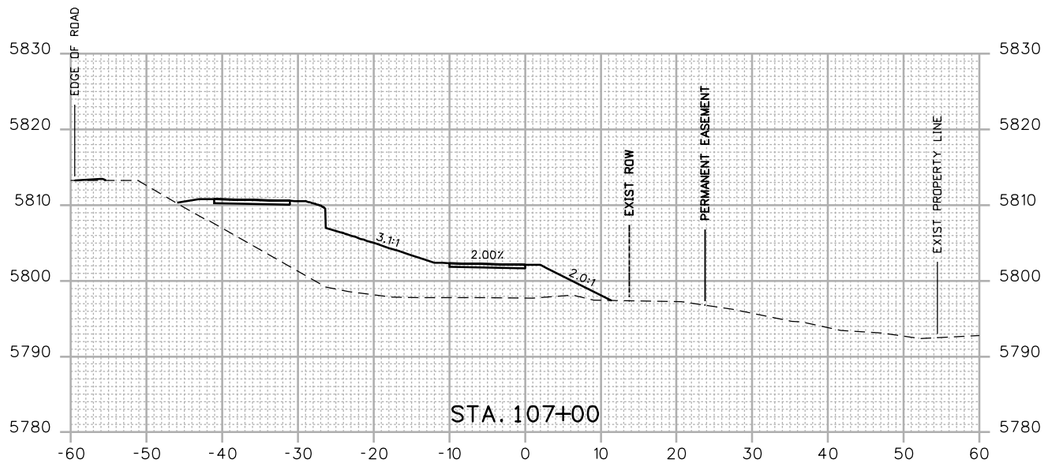
CROSS SECTIONS

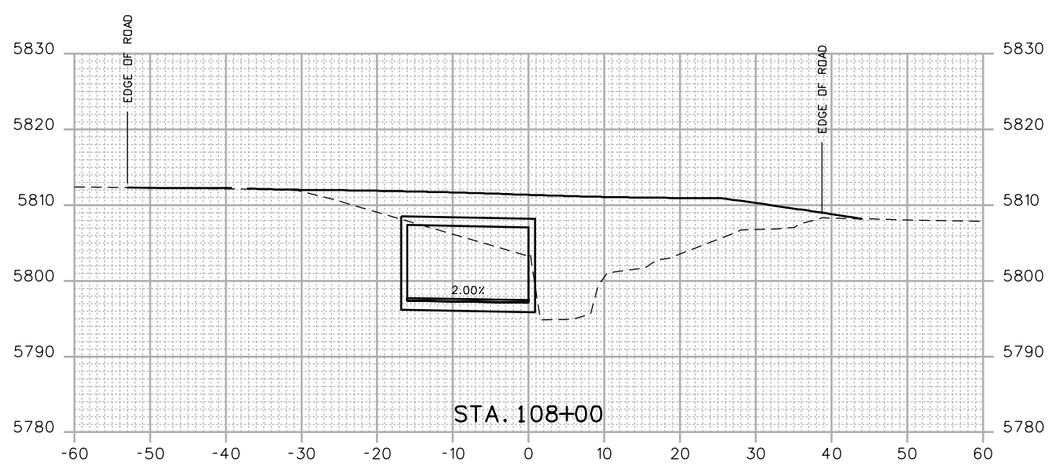
Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	XSEC	Subset Sheets:	2 of 18

Project No./Code	
STU C070-043	
19888	
Sheet Number	124









Print Date: 11/16/2016
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Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
CROSS SECTIONS

Designer: SDB
Detailer: REW
Sheet Subset: XSEC
Structure Numbers:
Subset Sheets: 3 of 18

Project No./Code
STU C070-043
19888
Sheet Number 125

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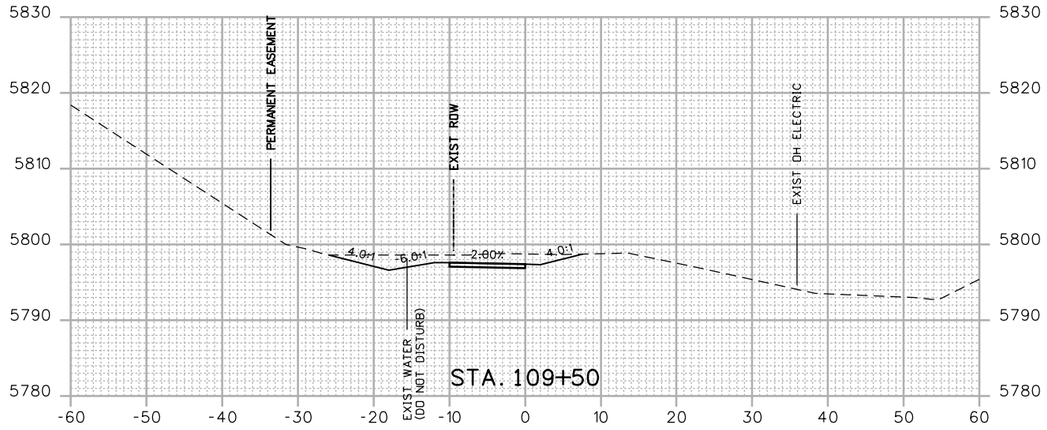

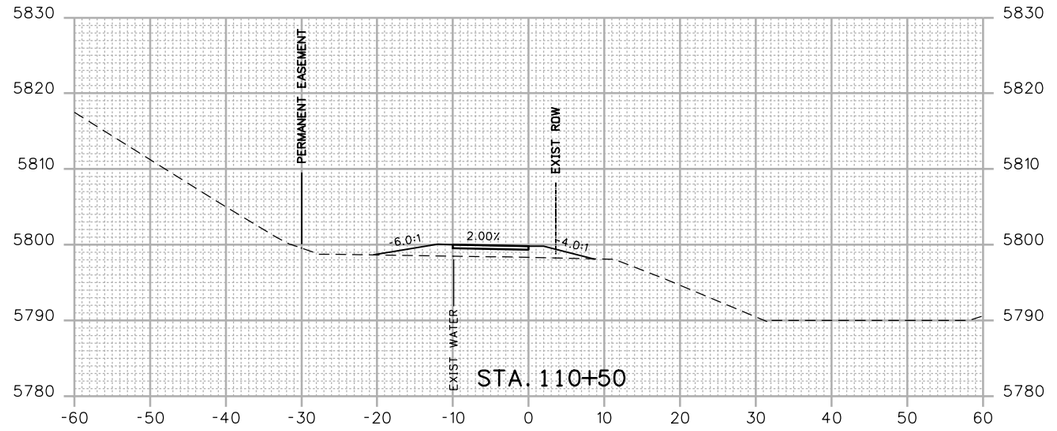

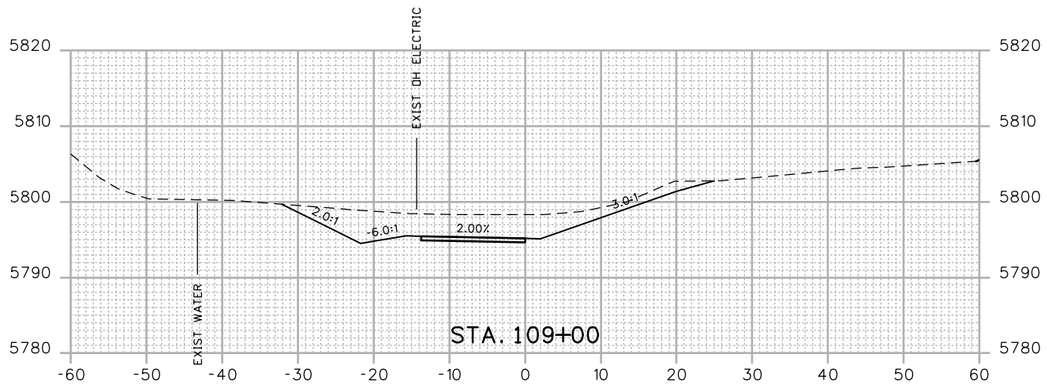

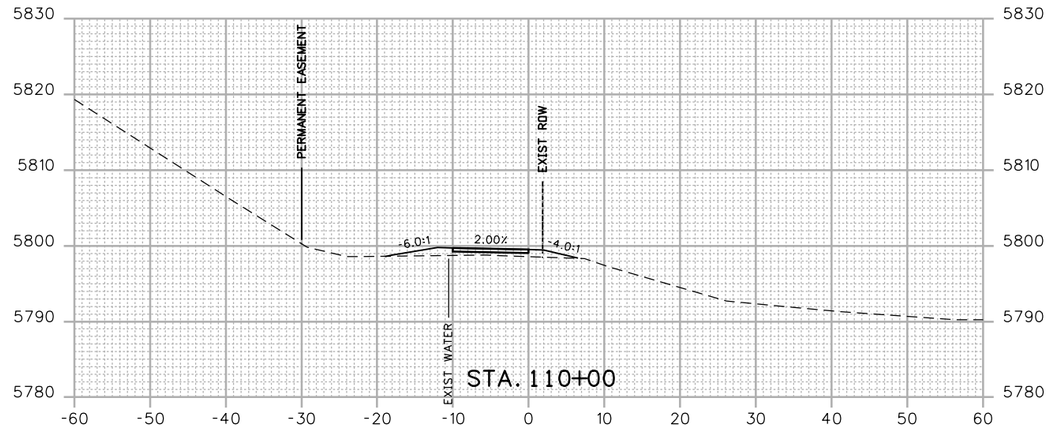

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Print Date: 11/16/2016	Sheet Revisions			As Constructed
Drawing File Name: 19888DES_Cross Sections.dgn	Date:	Comments	Init.	No Revisions:
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Unit Information Unit Leader Initials				Void:
MULLER ENGINEERING COMPANY				

Region 4

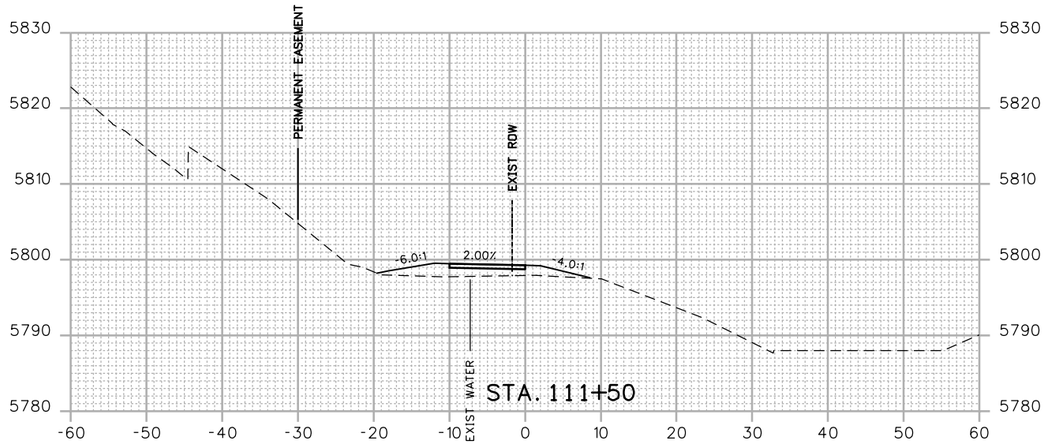
Boulder County

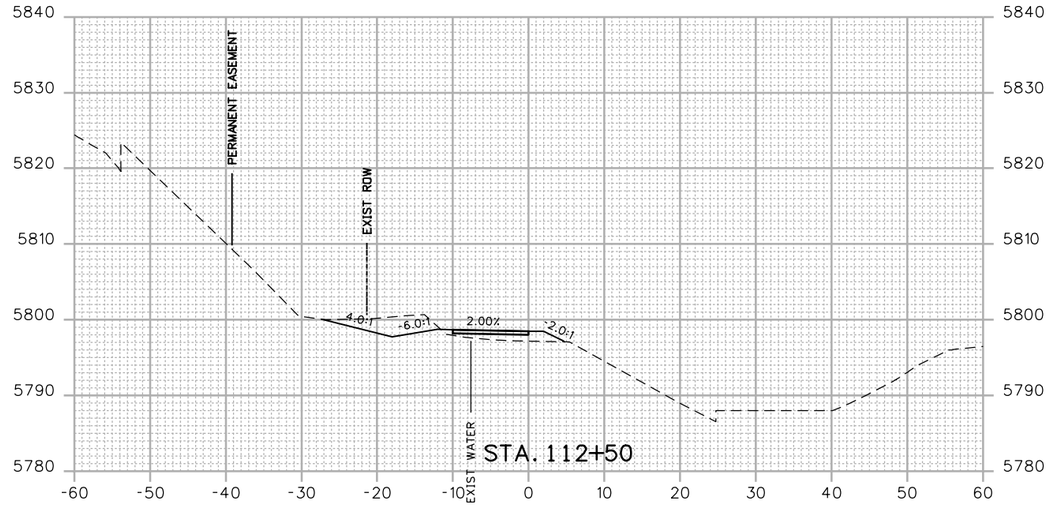
BOULDER CANYON TRAIL EXTENSION

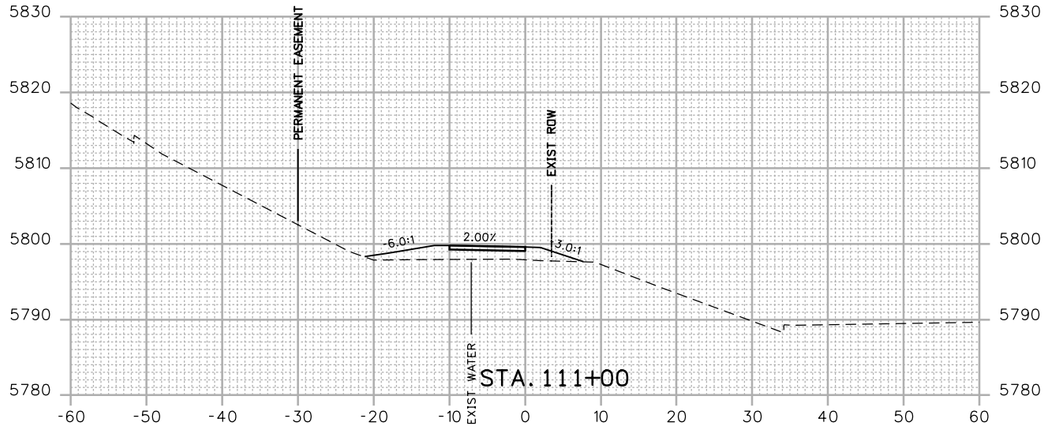
CROSS SECTIONS

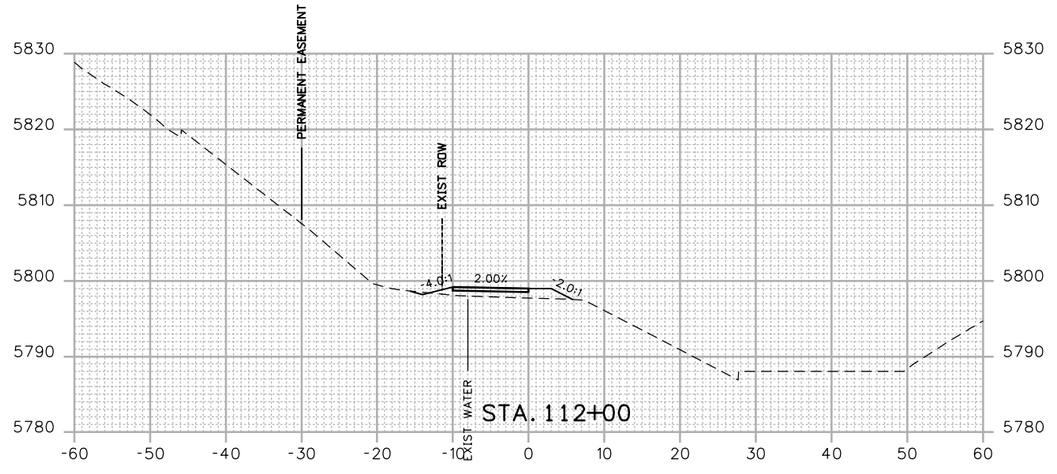
Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	XSEC	Subset Sheets:	4 of 18

Project No./Code	
STU C070-043	
19888	
Sheet Number	126









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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT V8i BW.tbl

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Horiz. Scale: 1:20 Vert. Scale: As Noted				
Unit Information Unit Leader Initials				
MULLER ENGINEERING COMPANY				

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	CROSS SECTIONS			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: REW			
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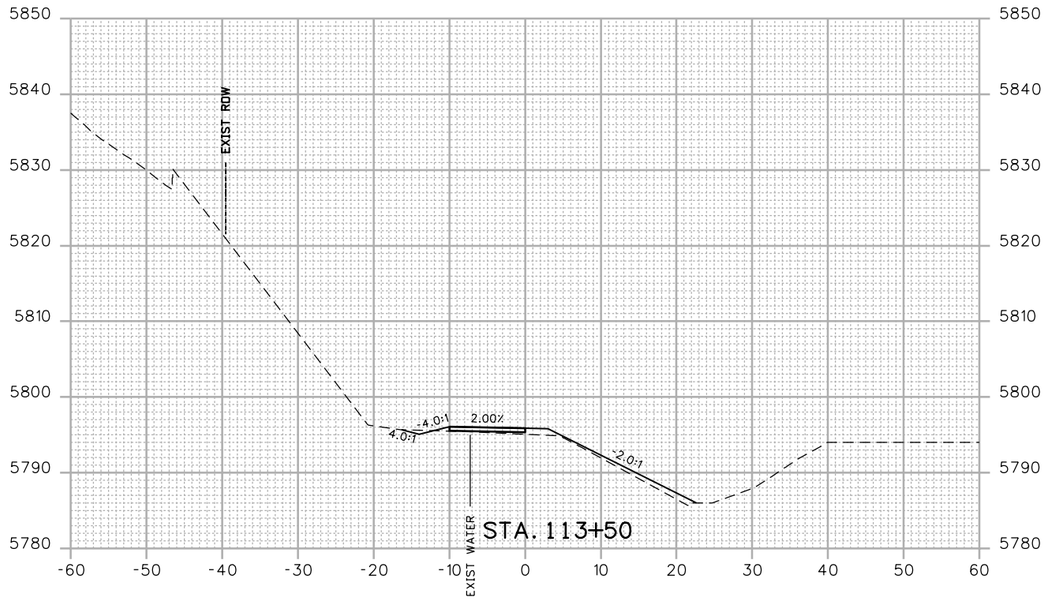

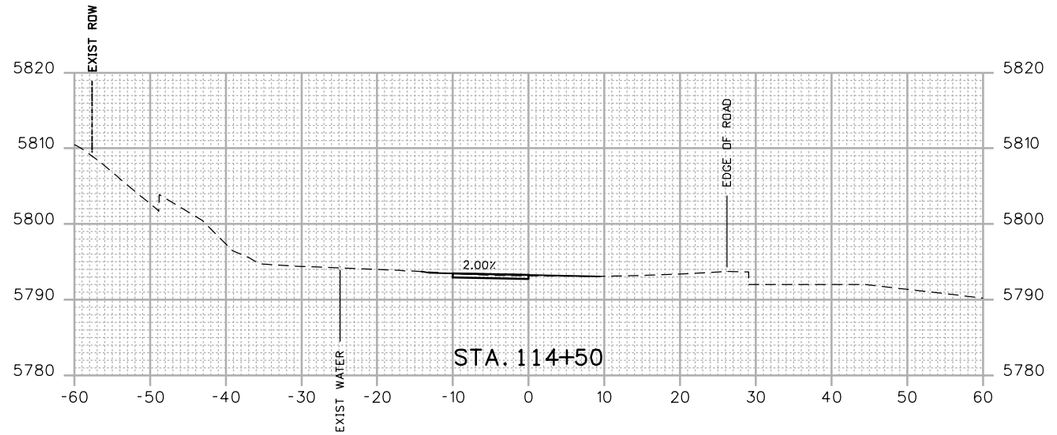

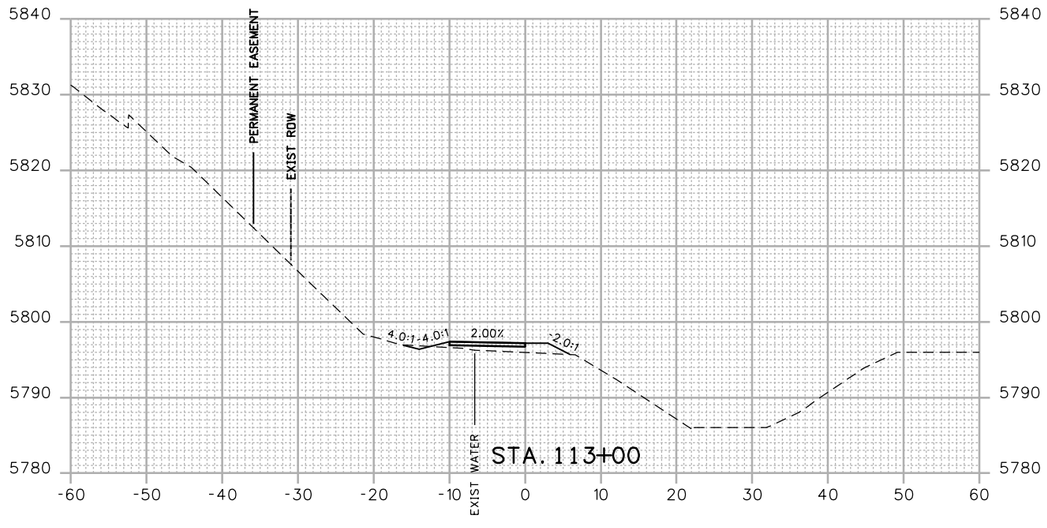

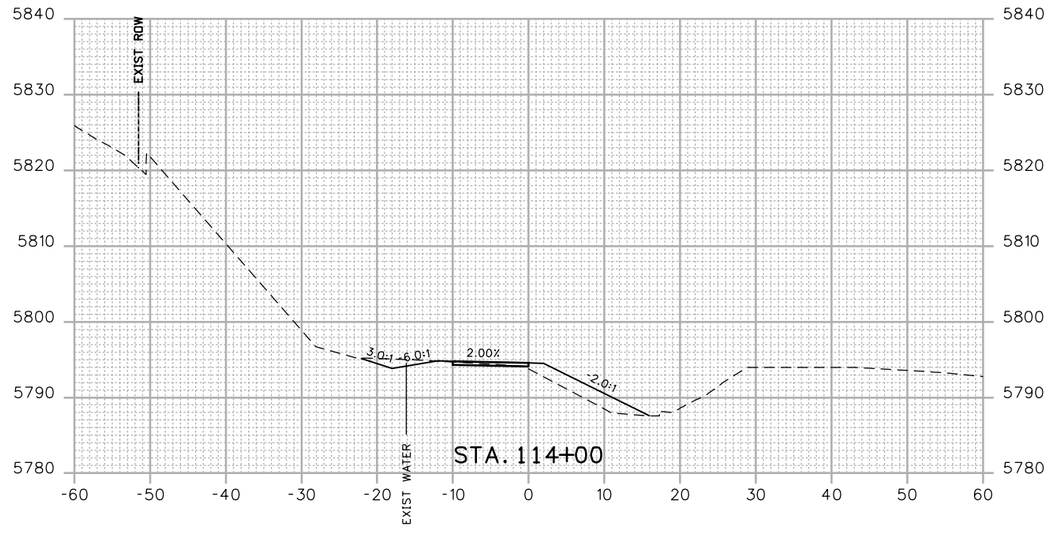

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Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
CROSS SECTIONS

Designer: SDB
Detailer: REW
Sheet Subset: XSEC
Structure Numbers:
Subset Sheets: 6 of 18

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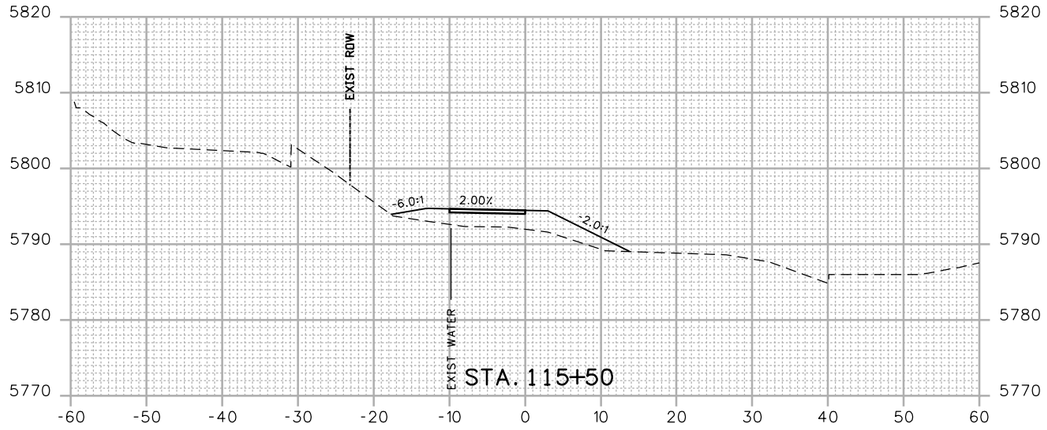
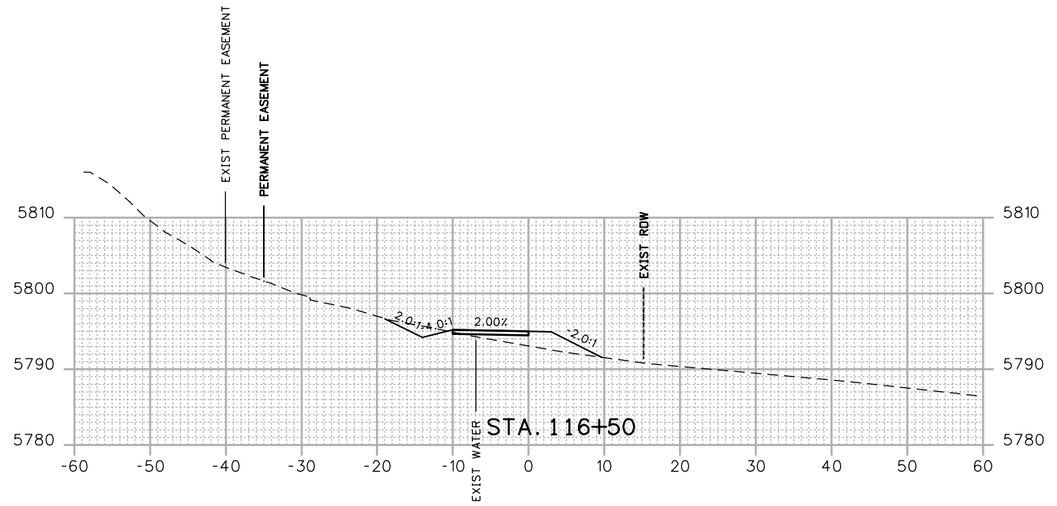
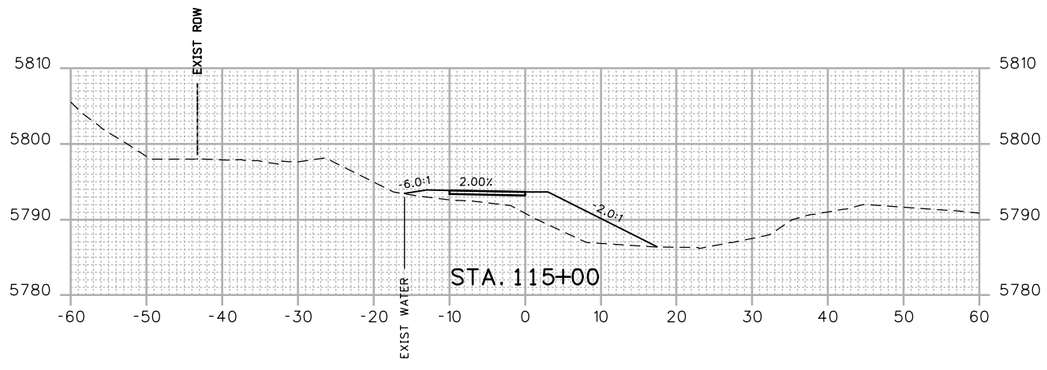
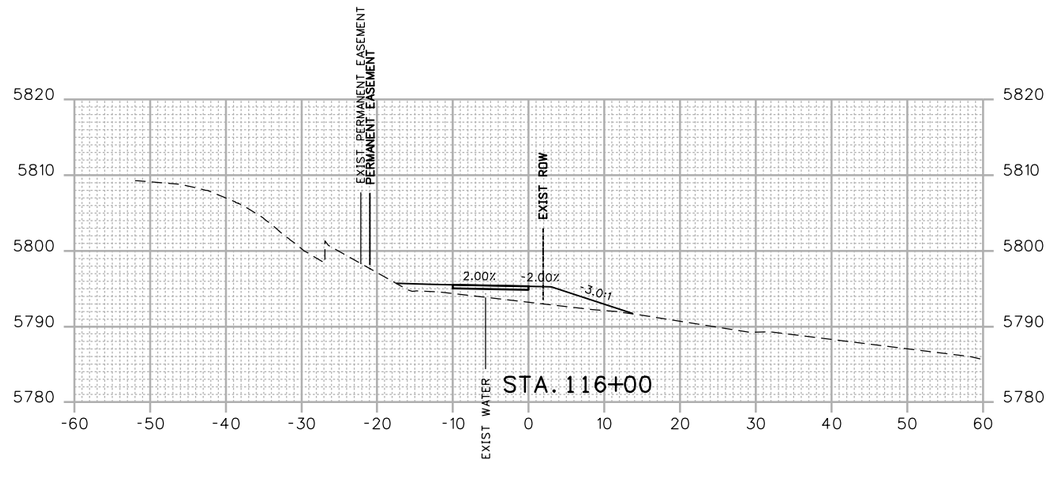
19888
Sheet Number 128









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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT V8i BW.tbl

Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888DES_Cross Sections.dgn	Date:	Comments	Init.
Horiz. Scale: 1:20 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	CROSS SECTIONS			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
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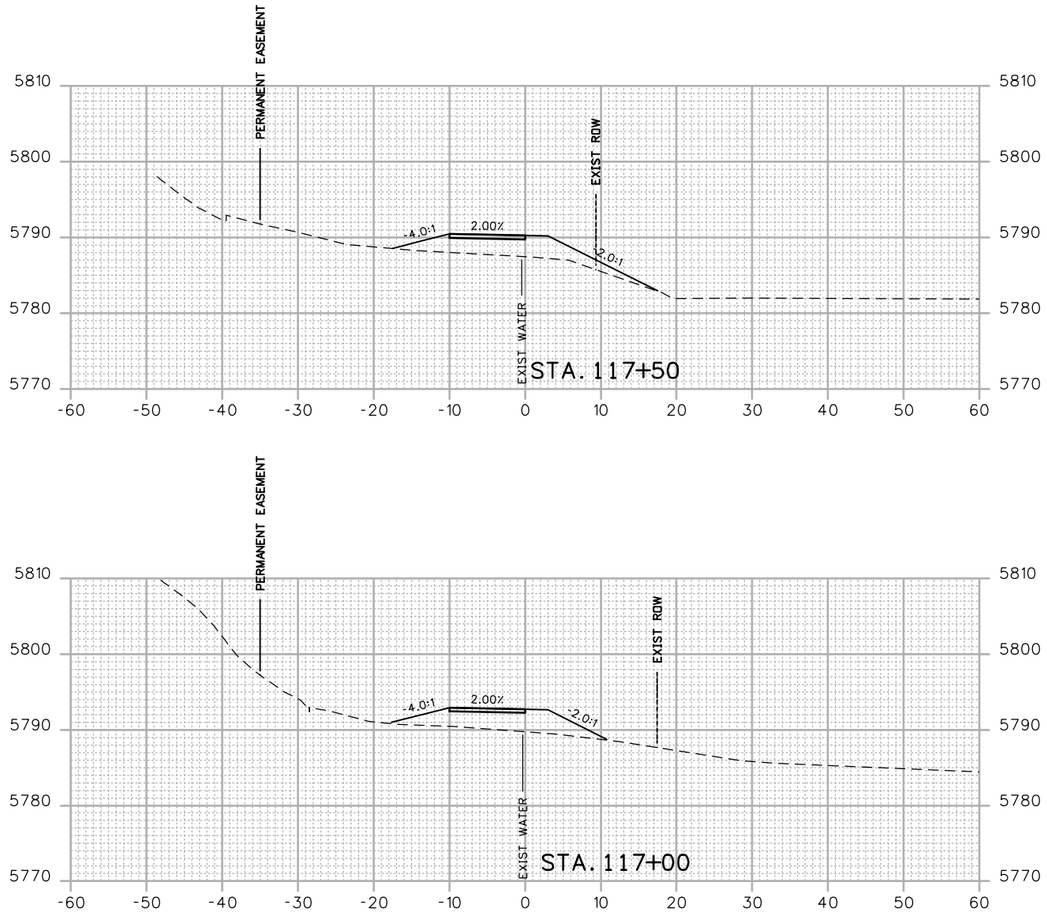
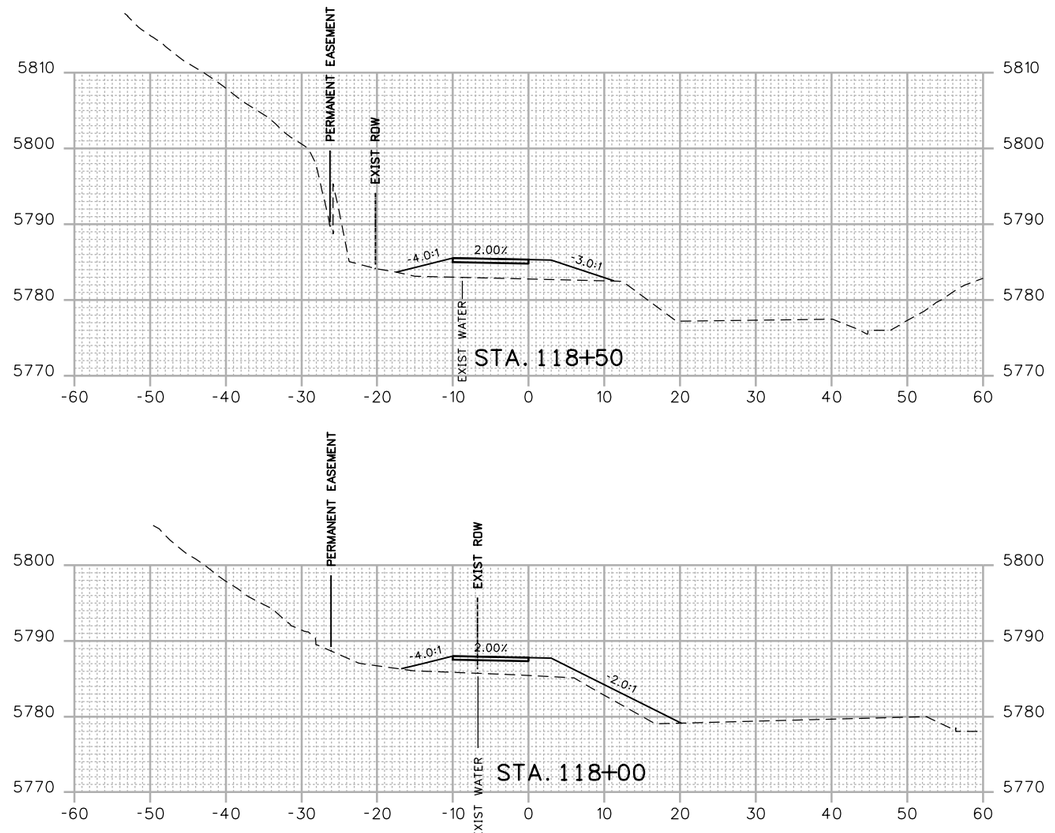
	Sheet Subset: XSEC	Subset Sheets: 7 of 18		Sheet Number 129





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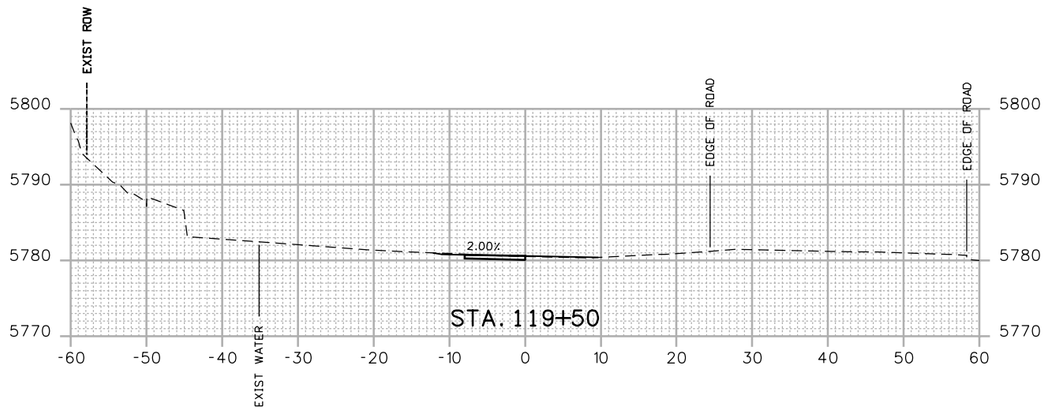
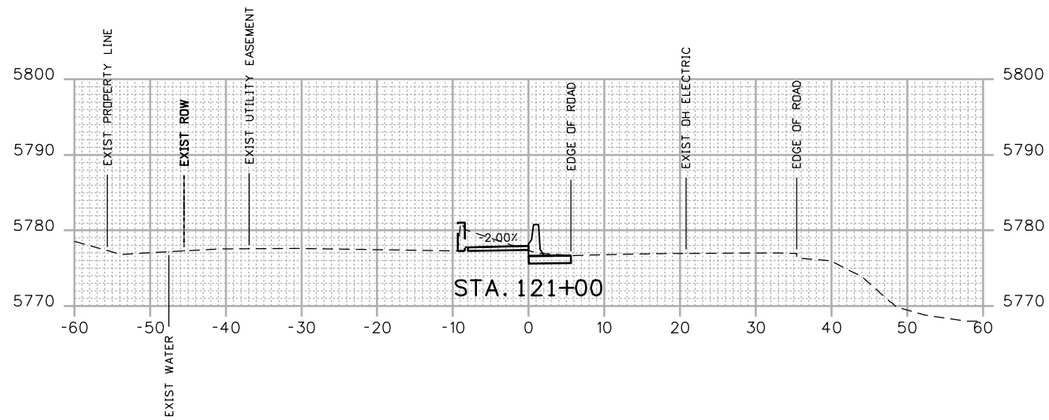
Print Date: 11/16/2016		Sheet Revisions		
Drawing File Name: 19888DES_Cross Sections.dgn		Date:	Comments	Init.
Horiz. Scale: 1:20 Vert. Scale: As Noted				
Unit Information Unit Leader Initials				
MULLER ENGINEERING COMPANY				

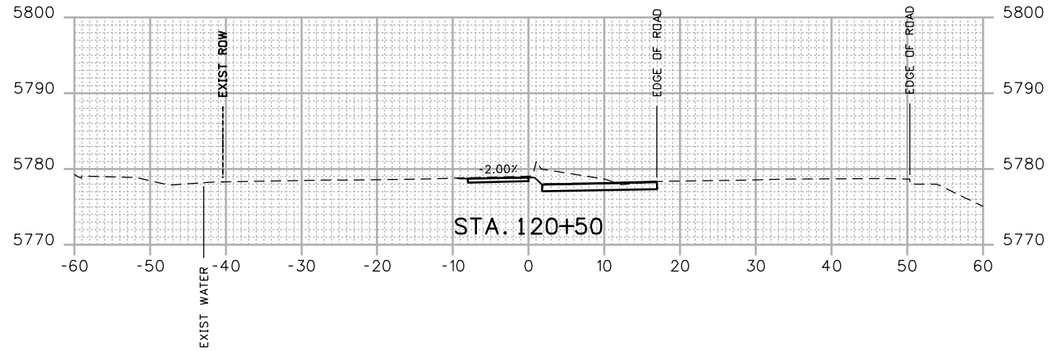
Region 4

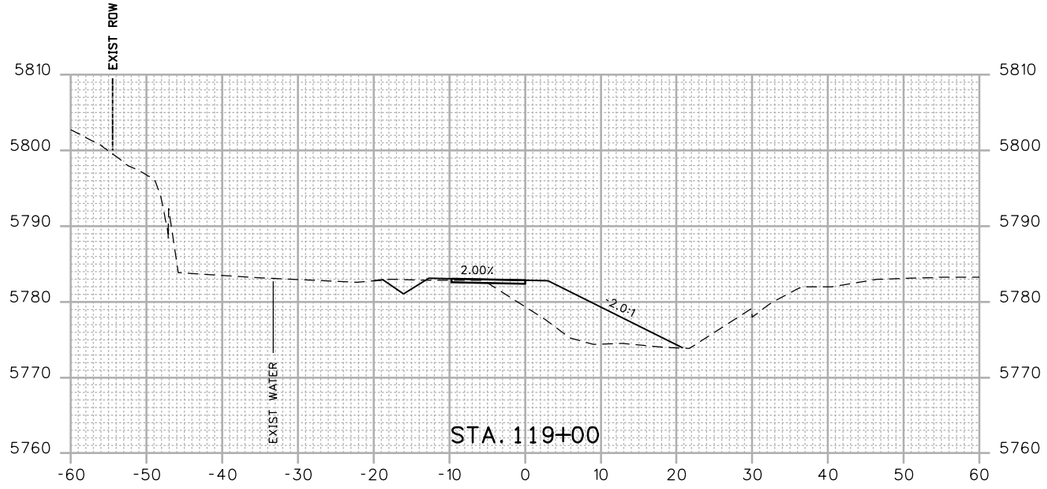
Boulder County

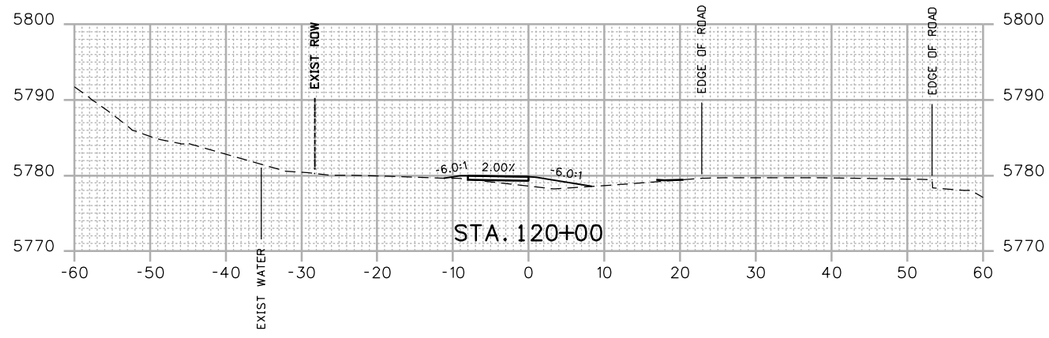
As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	CROSS SECTIONS			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: REW			
	Sheet Subset: XSEC	Subset Sheets:	8 of 18	Sheet Number 130











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Drawing File Name: 19888DES_Cross Sections.dgn
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Region 4

Boulder County

As Constructed
No Revisions:
Revised:
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BOULDER CANYON TRAIL EXTENSION
CROSS SECTIONS

Designer: SDB
Detailer: REW
Sheet Subset: XSEC
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Subset Sheets: 9 of 18

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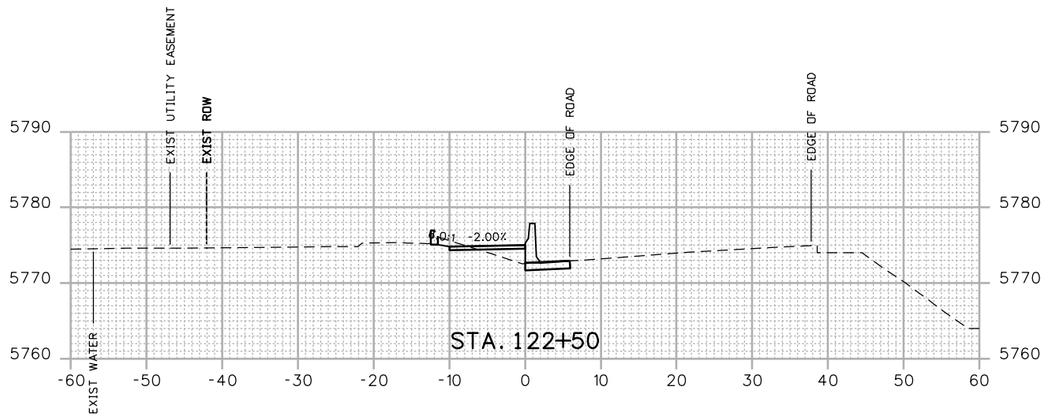

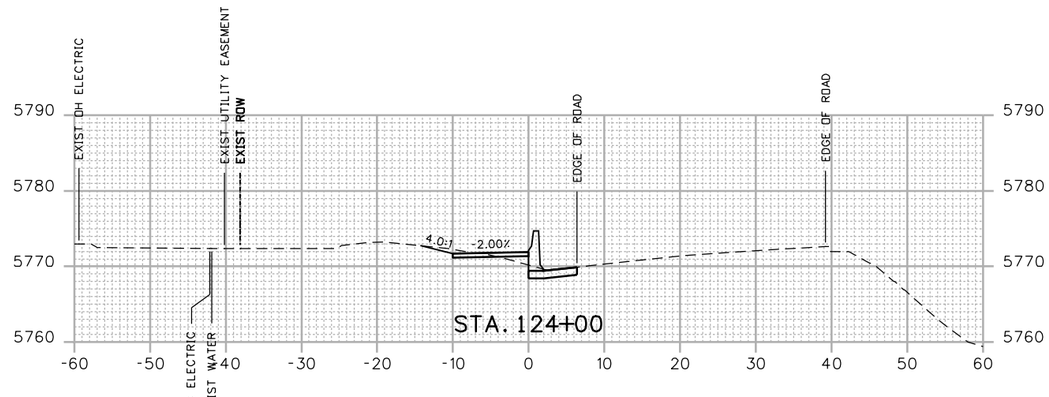

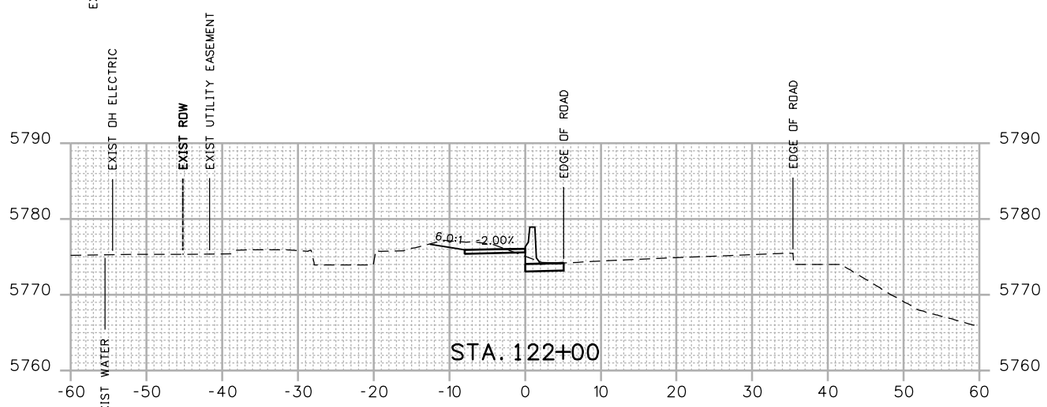

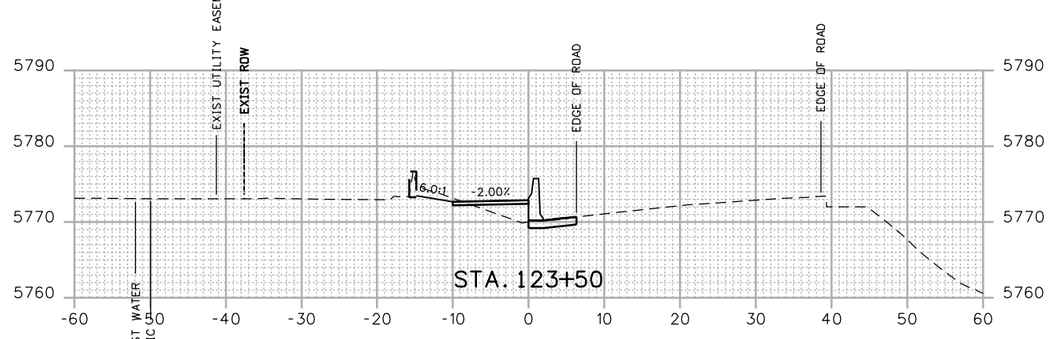

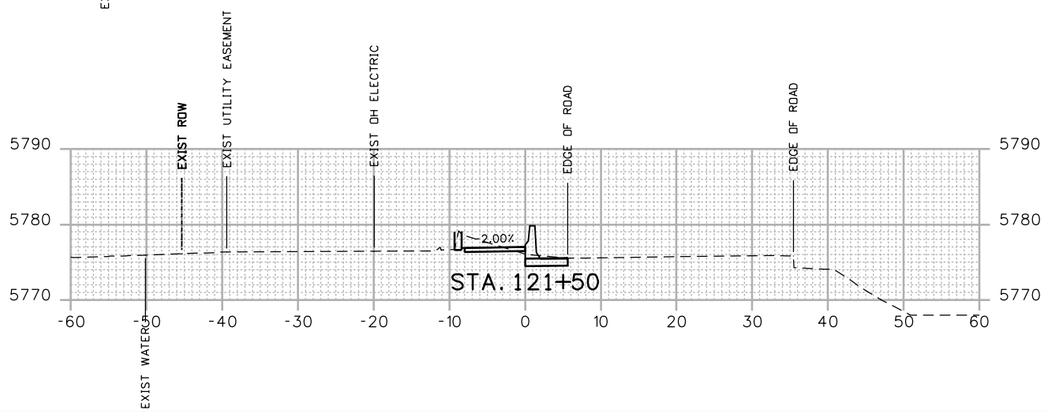

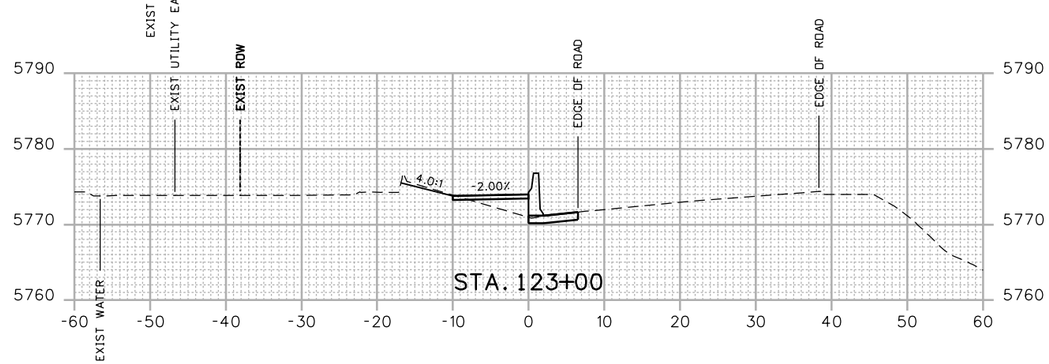

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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT V8i BW.tbl

Print Date: 11/16/2016	
Drawing File Name: 19888DES_Cross Sections.dgn	
Horiz. Scale: 1:20	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

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Boulder County

As Constructed

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Revised:	
Void:	

BOULDER CANYON TRAIL EXTENSION

CROSS SECTIONS

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Detailer:	REW		
Sheet Subset:	XSEC	Subset Sheets:	10 of 18

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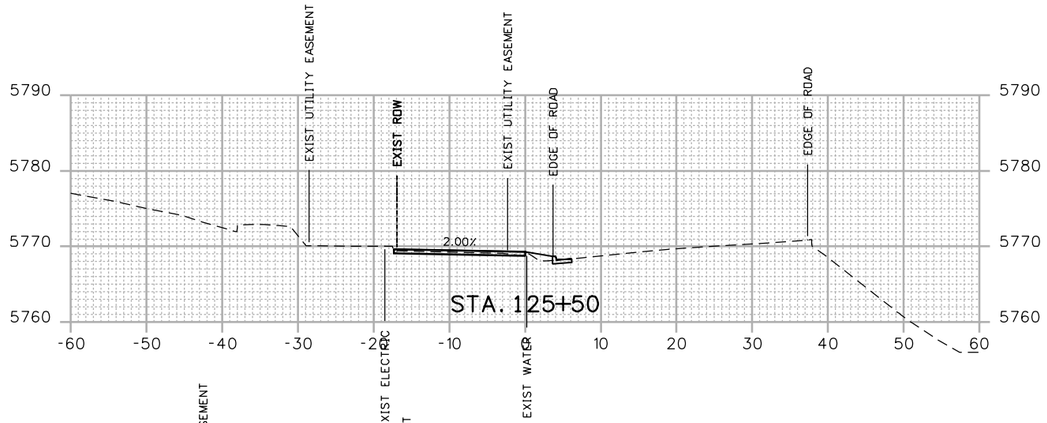
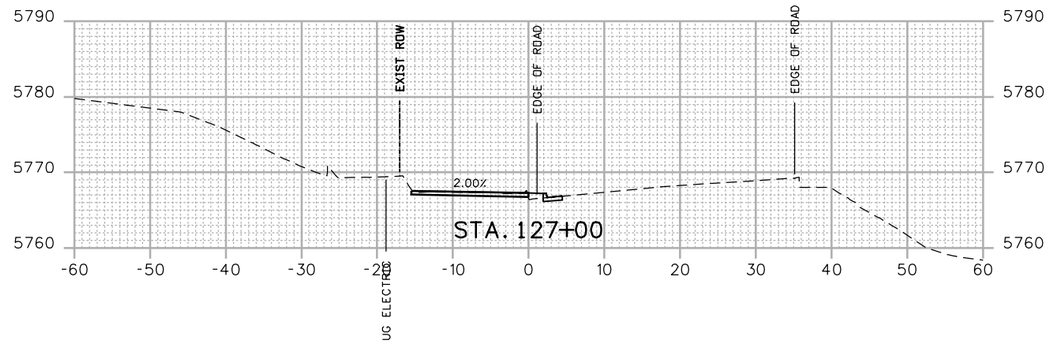
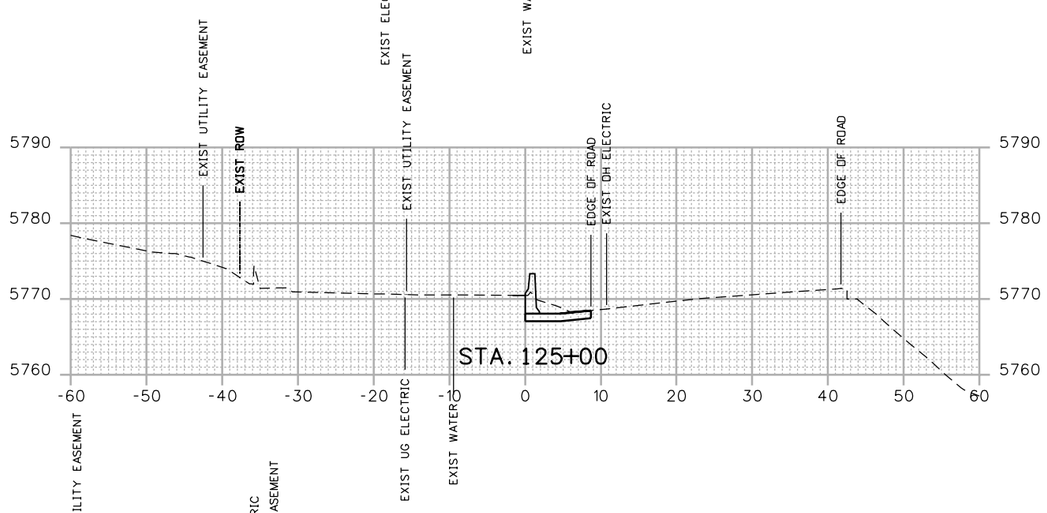
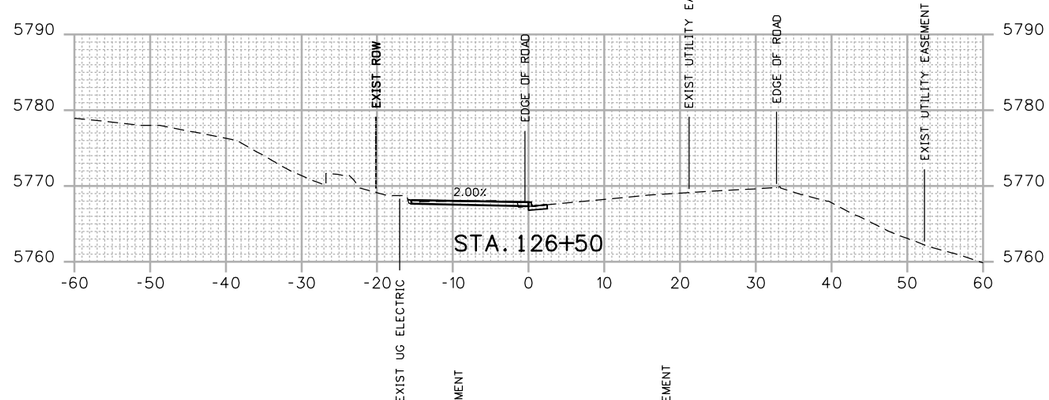
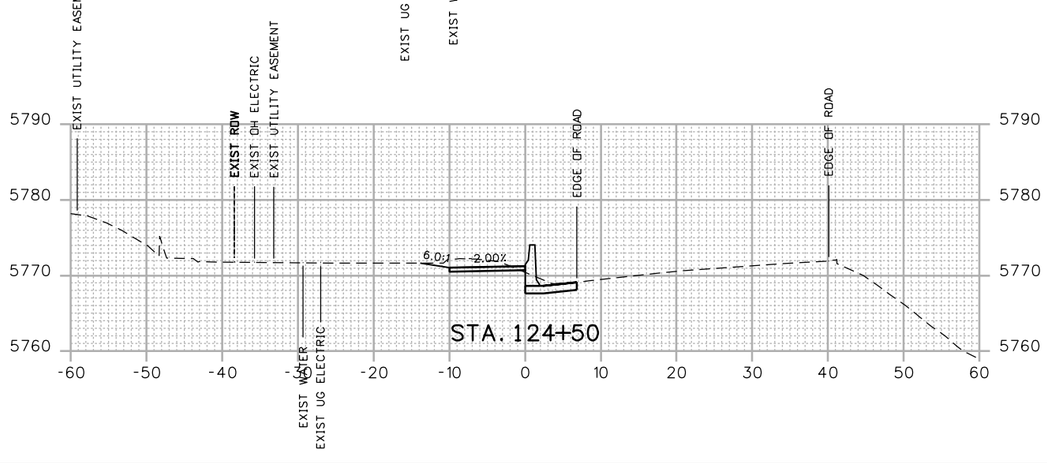
19888	
Sheet Number	132

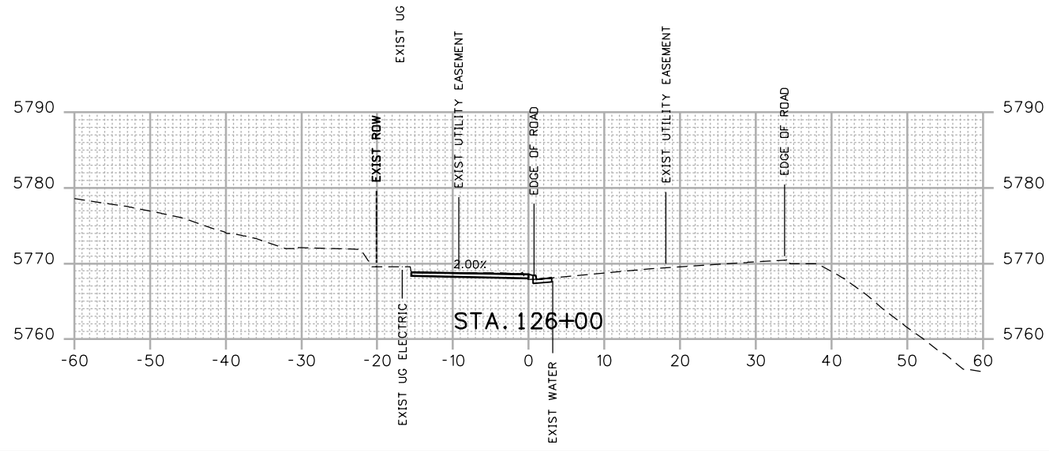












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11/16/2016 CDOT-DefaultPrinter_V8i.pltcfg CDOT V8i BW.tbl

Print Date: 11/16/2016		Sheet Revisions		
Drawing File Name: 19888DES_Cross Sections.dgn		Date:	Comments	Init.
Horiz. Scale: 1:20	Vert. Scale: As Noted			
Unit Information	Unit Leader Initials			
MULLER ENGINEERING COMPANY				

Region 4

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
No Revisions:	CROSS SECTIONS			STU C070-043
Revised:	Designer: SDB	Structure Numbers		19888
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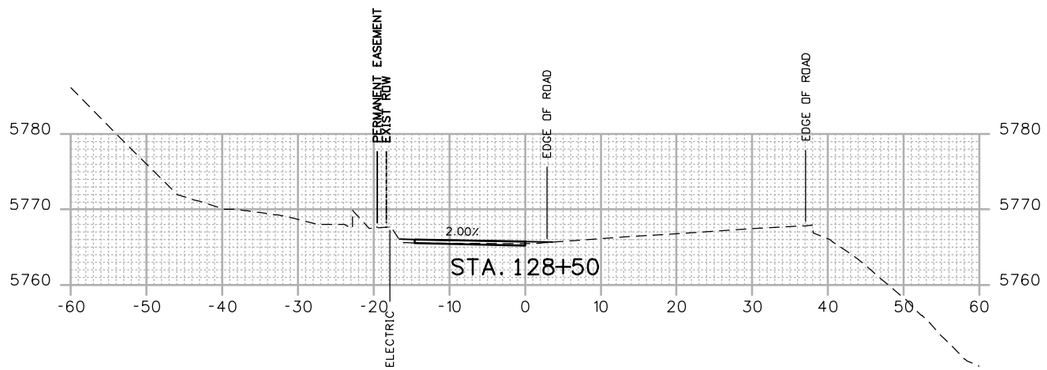
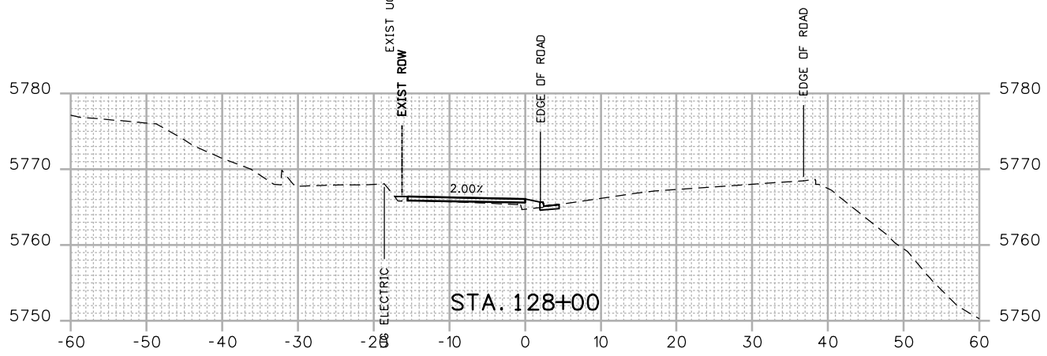
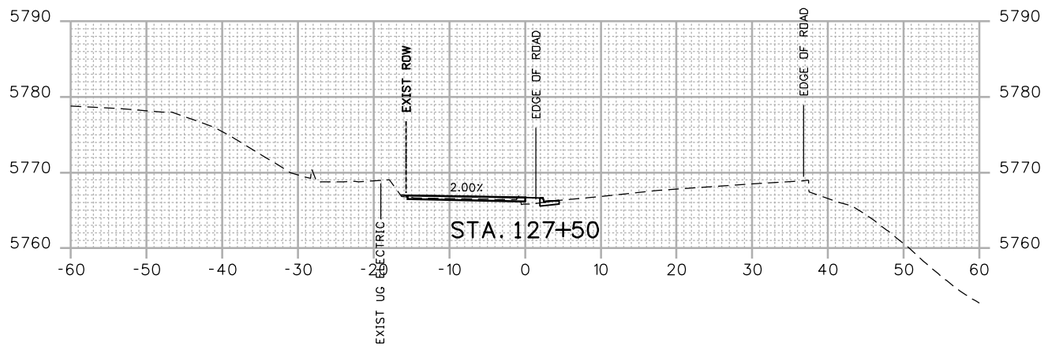
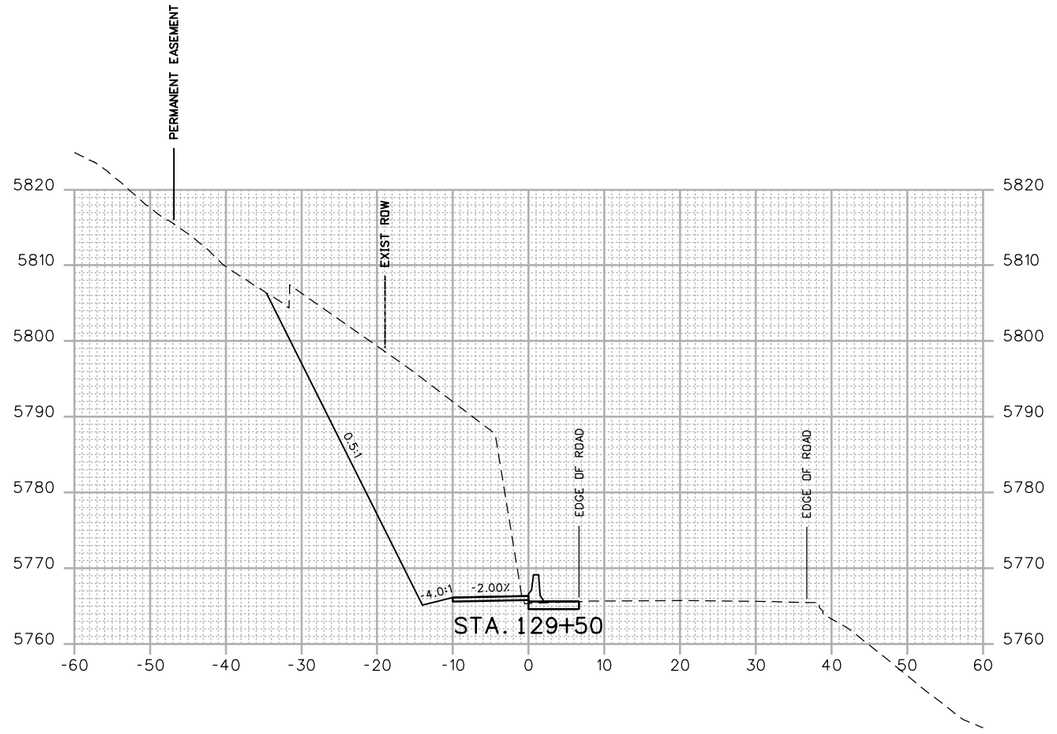
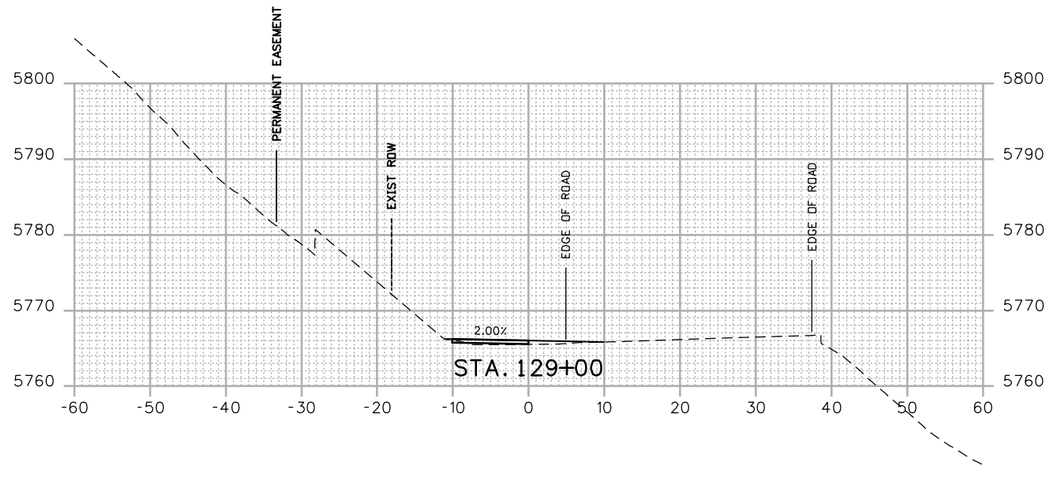
	Sheet Subset: XSEC	Subset Sheets:	11 of 18	Sheet Number 133











Print Date: 11/16/2016	Sheet Revisions		
Drawing File Name: 19888DES_Cross Sections.dgn	Date:	Comments	Init.
Horiz. Scale: 1:20 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			
MULLER ENGINEERING COMPANY			

CDOT Region 4

Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
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zadkison 3:34:44 PM Q:\2015 Projects\15-025.01 Boulder Canyon Trail Extension - Boulder County\19888\Design\Drawings\Cross Sections\FDR\19888DES_Cross Sections.dgn
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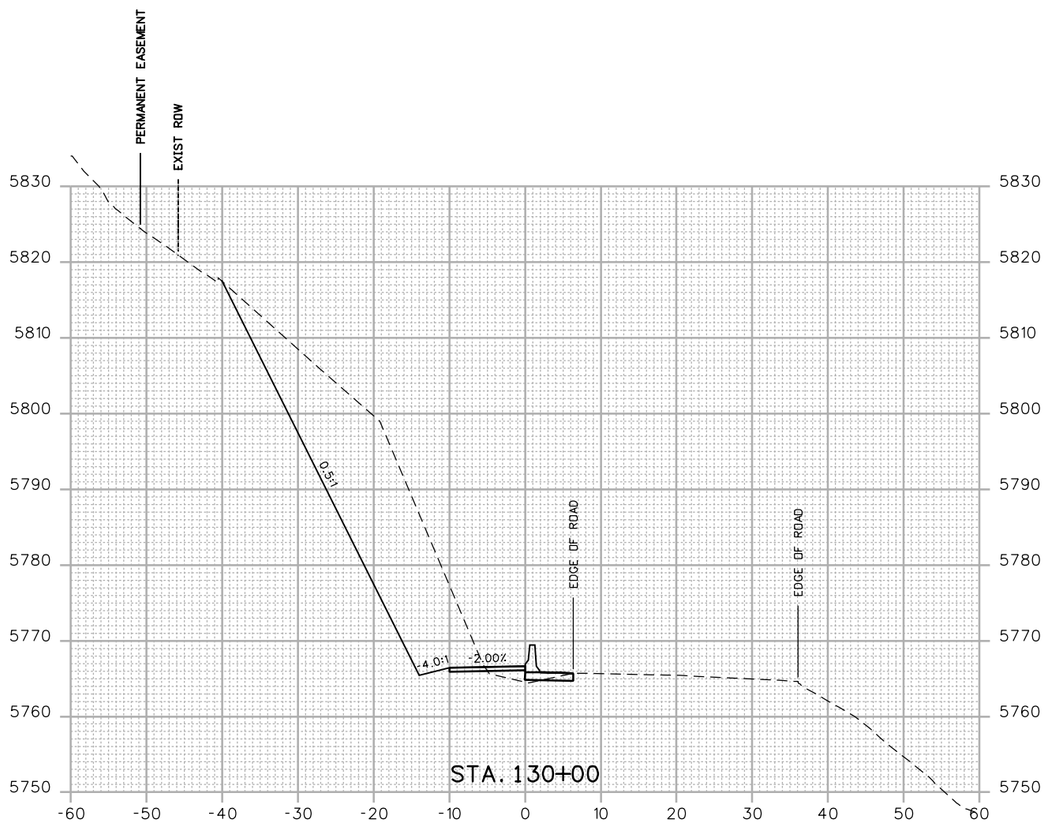

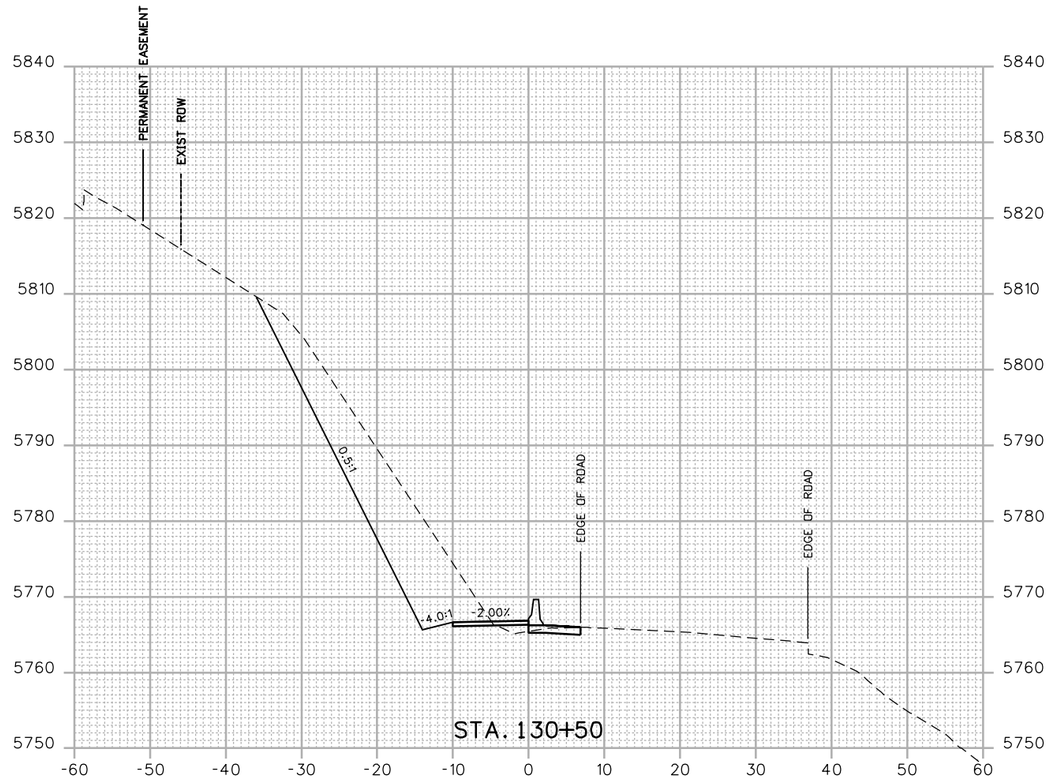

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Print Date: 11/16/2016	
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Horiz. Scale: 1:20	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

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Boulder County

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Void:	

BOULDER CANYON TRAIL EXTENSION

CROSS SECTIONS

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Detailer:	REW		
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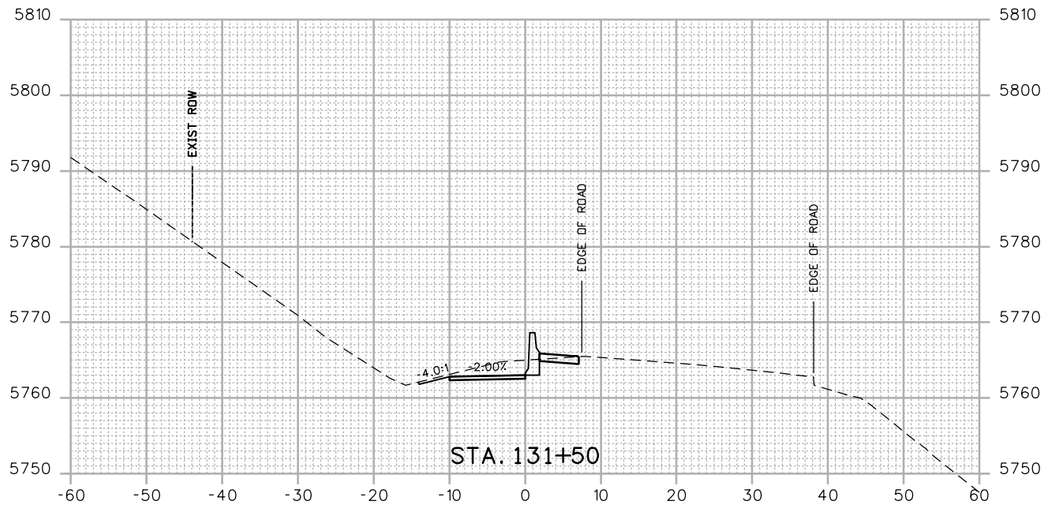

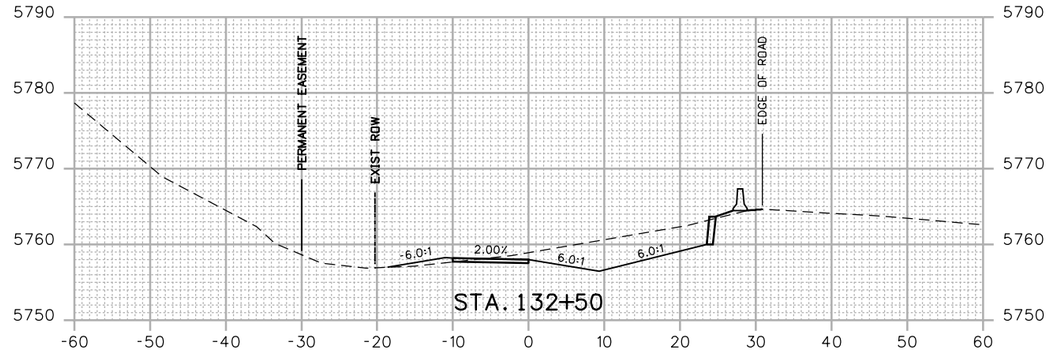

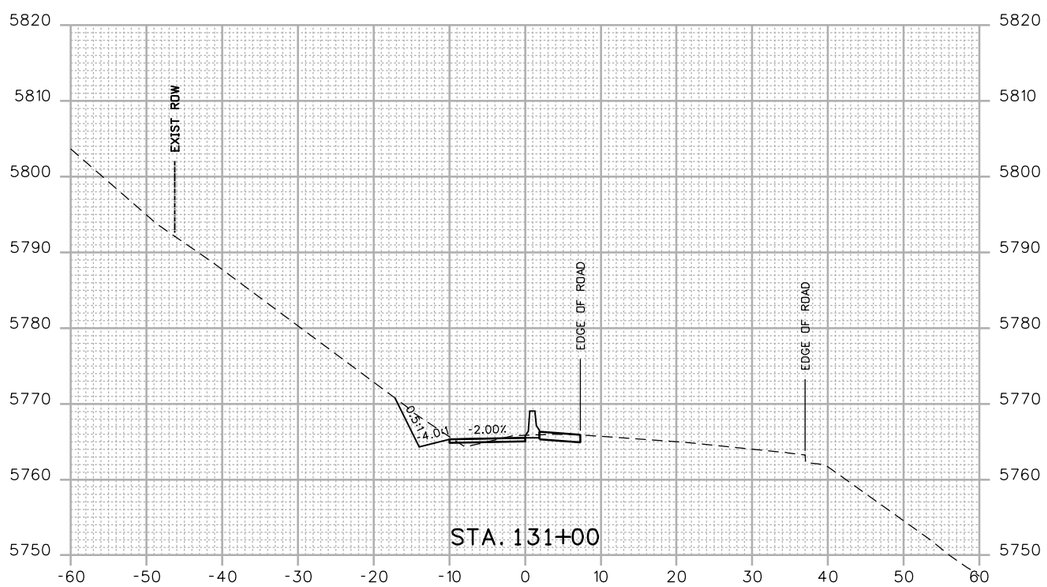

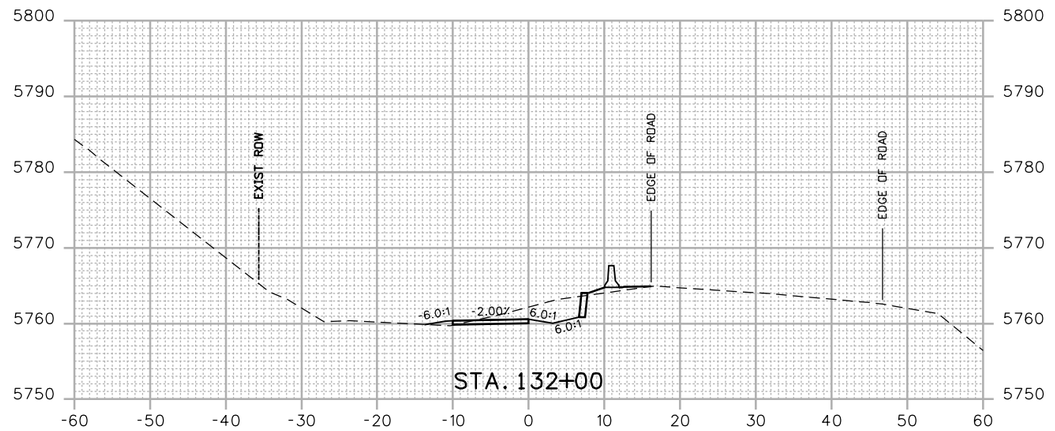

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Print Date: 11/16/2016			
Drawing File Name: 19888DES_Cross Sections.dgn			
Horiz. Scale: 1:20	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

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Boulder County

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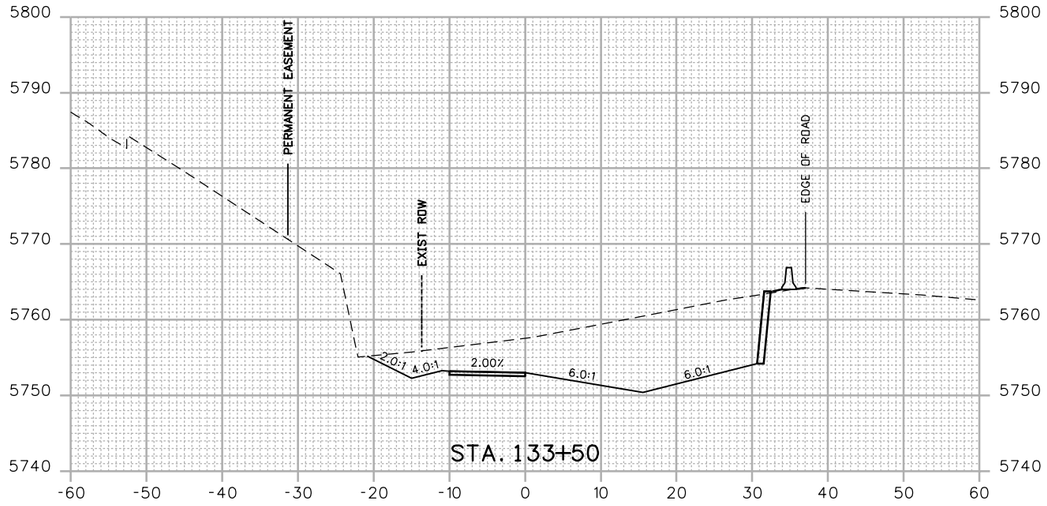

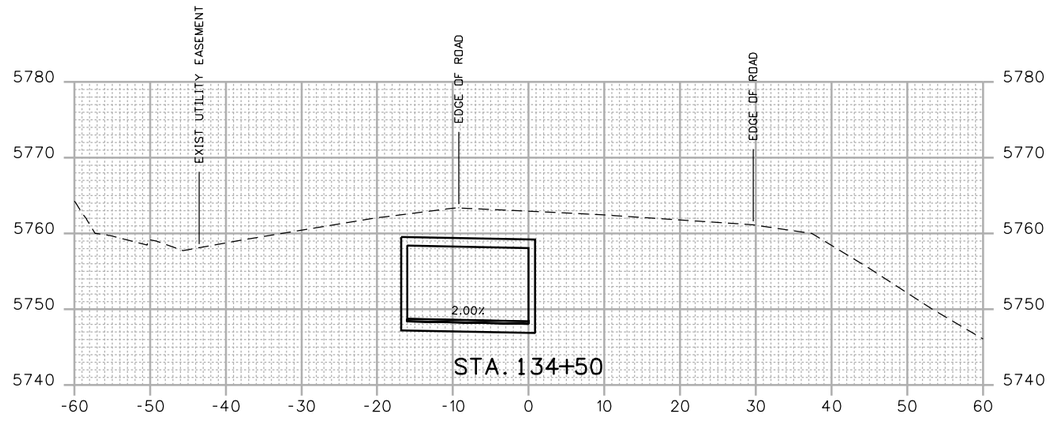

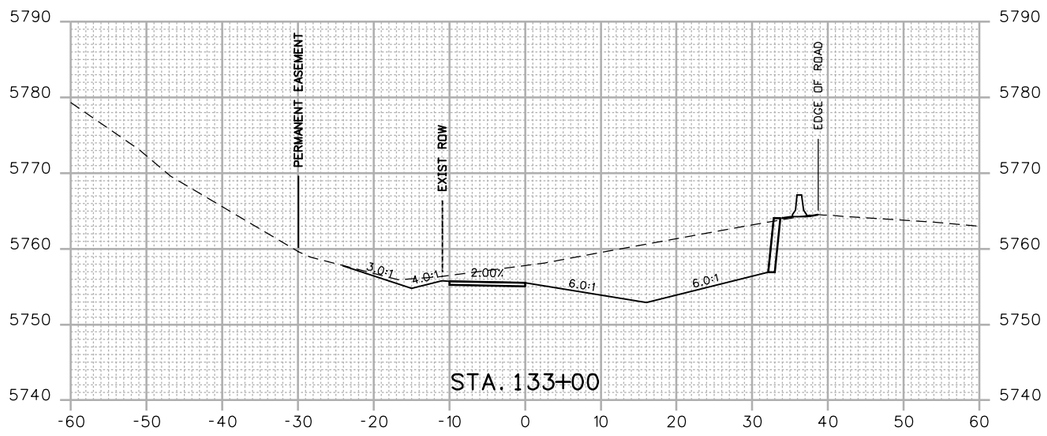

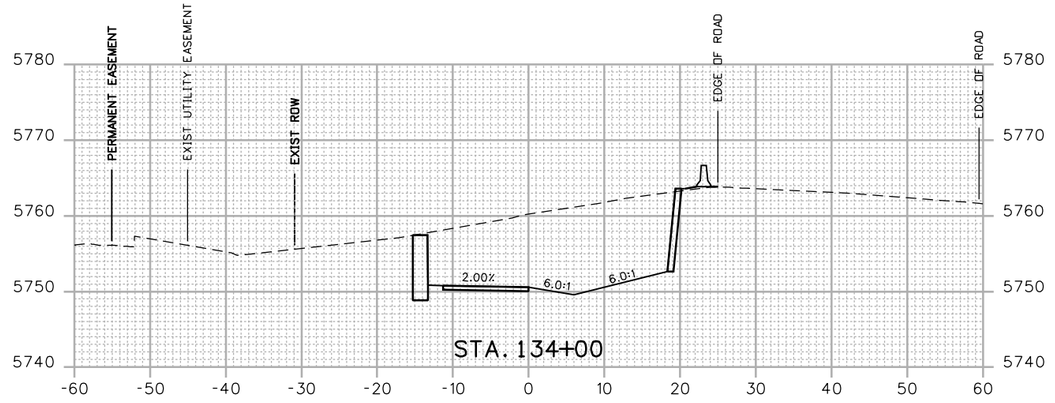

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Print Date: 11/16/2016	Sheet Revisions			As Constructed
Drawing File Name: 19888DES_Cross Sections.dgn	Date:	Comments	Init.	No Revisions:
Horiz. Scale: 1:20 Vert. Scale: As Noted				Revised:
Unit Information Unit Leader Initials				Void:
MULLER ENGINEERING COMPANY				

Region 4

Boulder County

BOULDER CANYON TRAIL EXTENSION

CROSS SECTIONS

Designer:	SDB	Structure Numbers	
Detailer:	REW		
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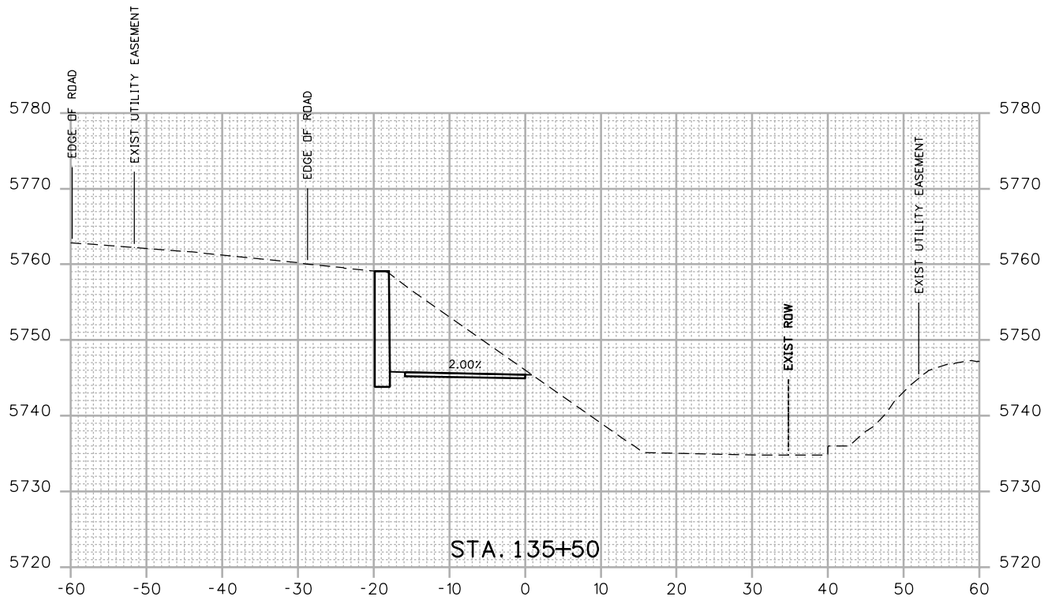

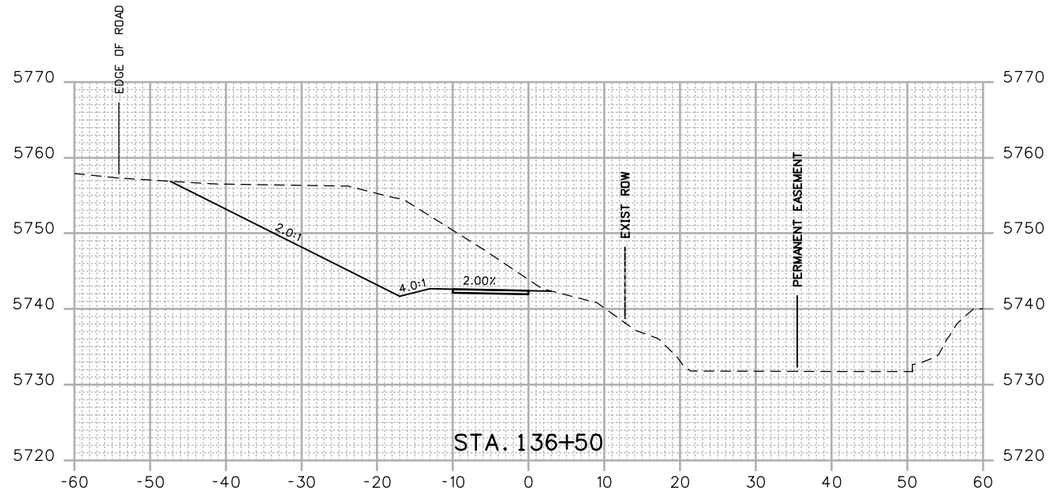

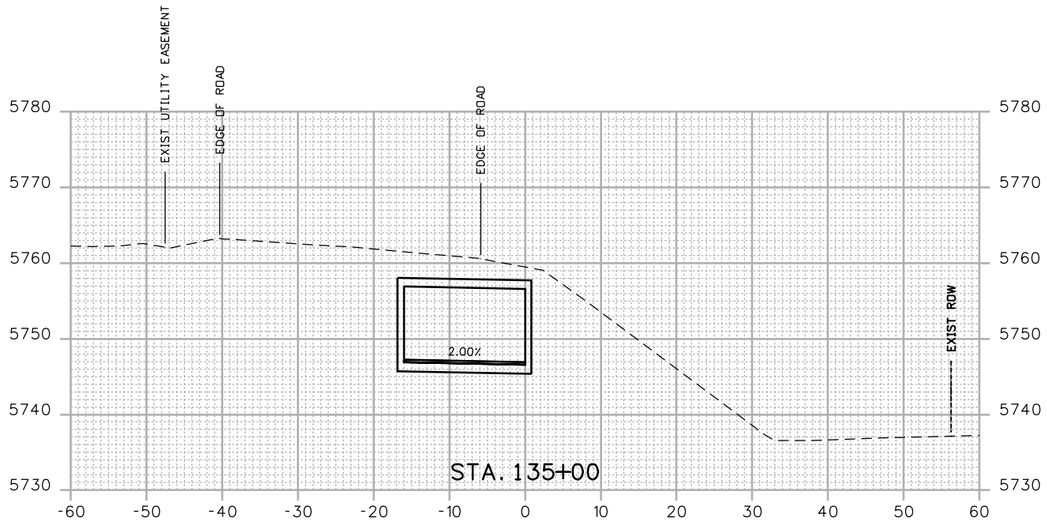

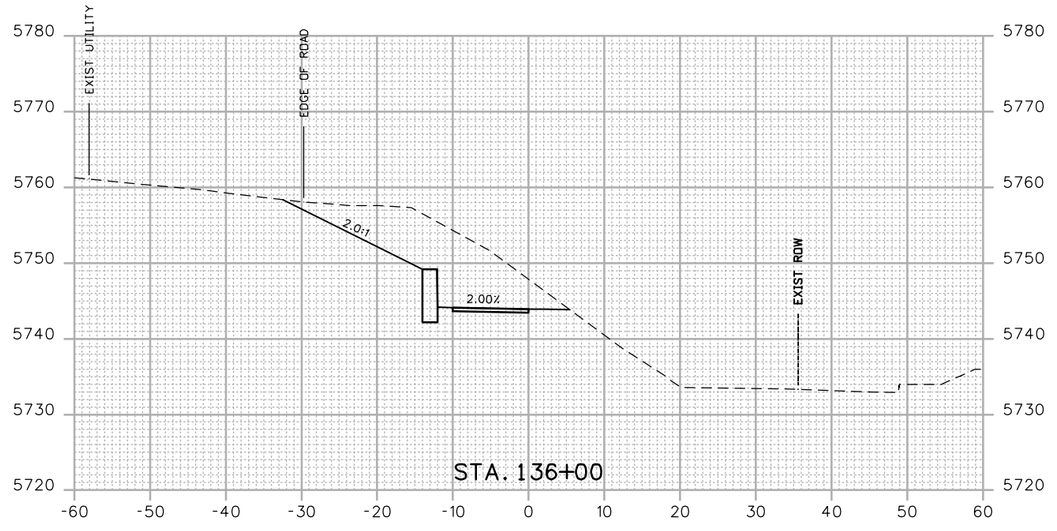

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Print Date: 11/16/2016		Sheet Revisions		
Drawing File Name: 19888DES_Cross Sections.dgn		Date:	Comments	Init.
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Unit Information Unit Leader Initials				
MULLER ENGINEERING COMPANY				

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Boulder County

As Constructed	BOULDER CANYON TRAIL EXTENSION			Project No./Code
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Revised:	Designer: SDB	Structure Numbers		19888
Void:	Detailer: REW			
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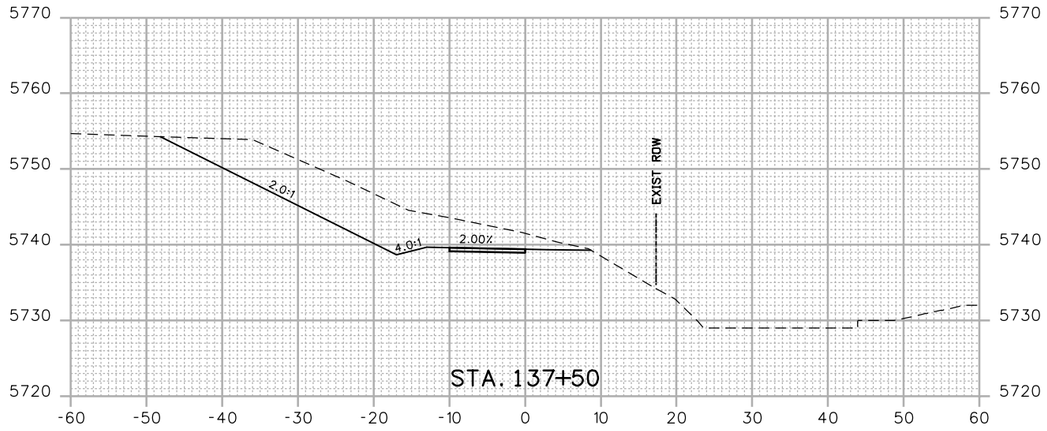

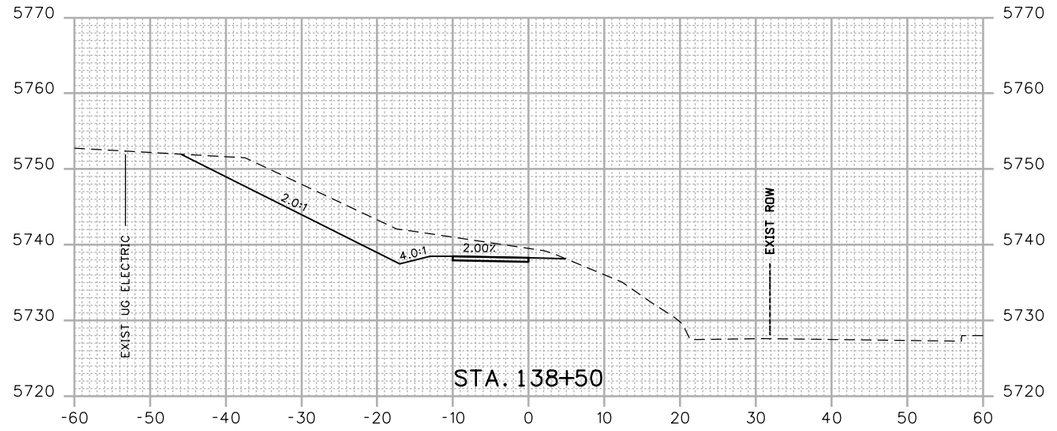

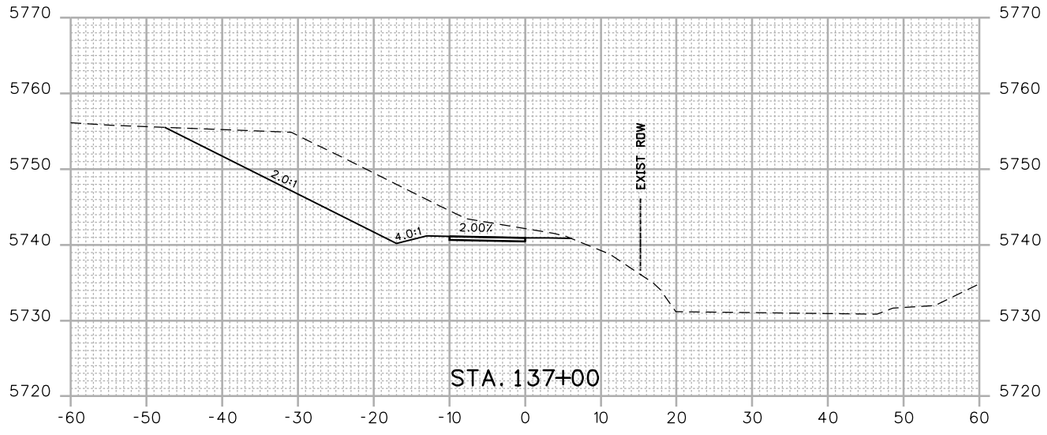

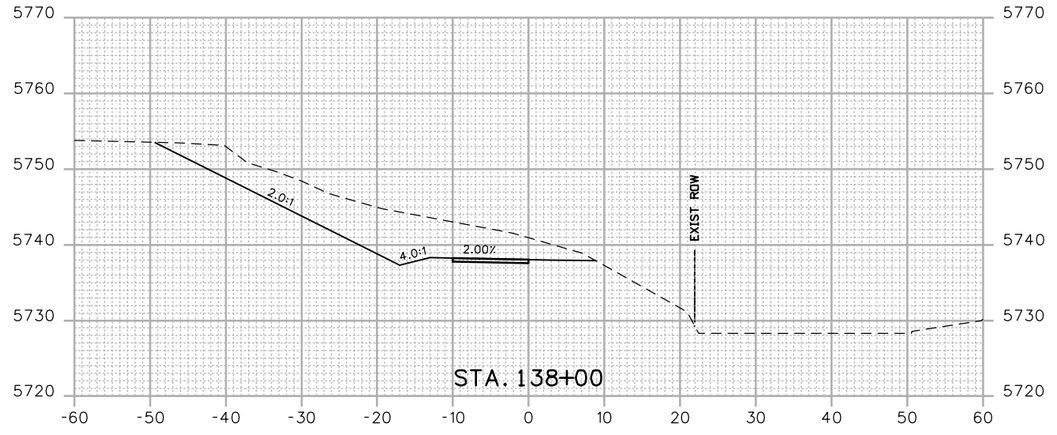

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Print Date: 11/16/2016
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Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

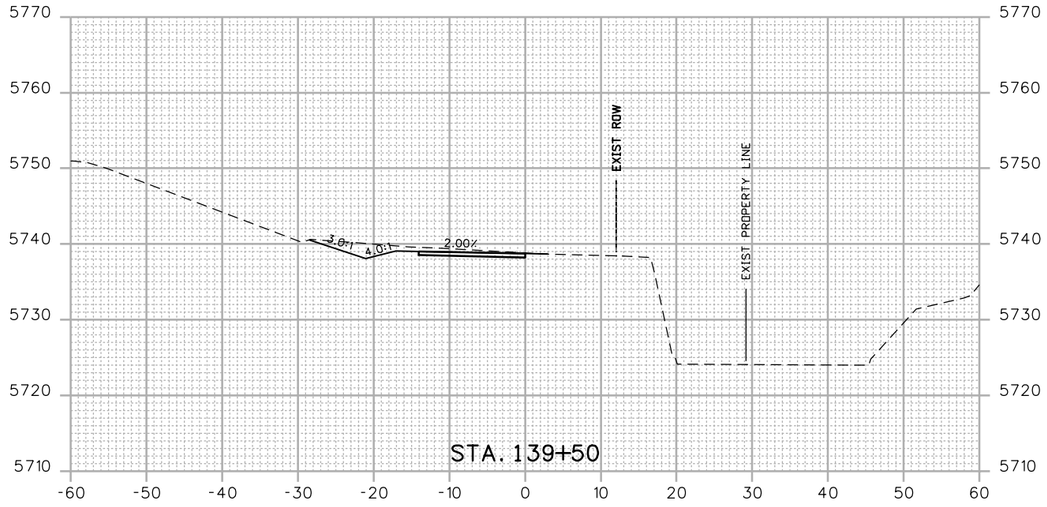
Region 4

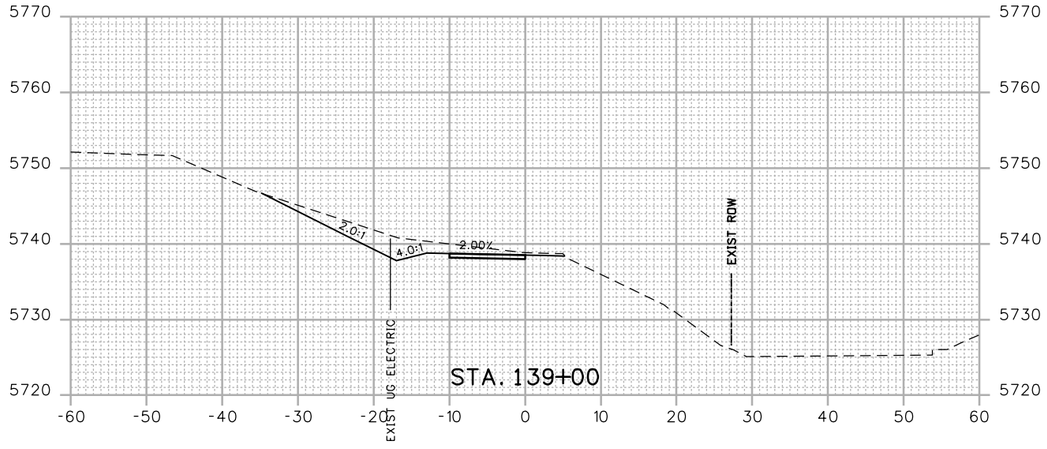
As Constructed
No Revisions:
Revised:
Void:

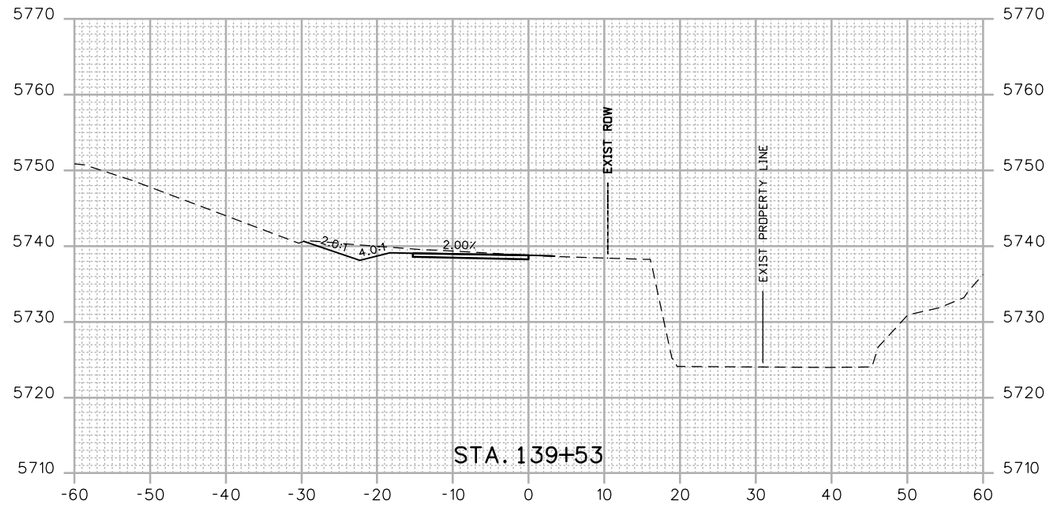
BOULDER CANYON TRAIL EXTENSION
CROSS SECTIONS

Designer:	SDB	Structure Numbers	
Detailer:	REW		
Sheet Subset:	XSEC	Subset Sheets:	17 of 18

Project No./Code
STU C070-043
19888
Sheet Number 139







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Unit Information Unit Leader Initials

MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

CDOT Region 4

Boulder County

As Constructed
No Revisions:
Revised:
Void:

BOULDER CANYON TRAIL EXTENSION
CROSS SECTIONS

Designer: SDB
Detailer: REW
Sheet Subset: XSEC
Structure Numbers:
Subset Sheets: 18 of 18

Project No./Code
STU C070-043
19888
Sheet Number 140

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