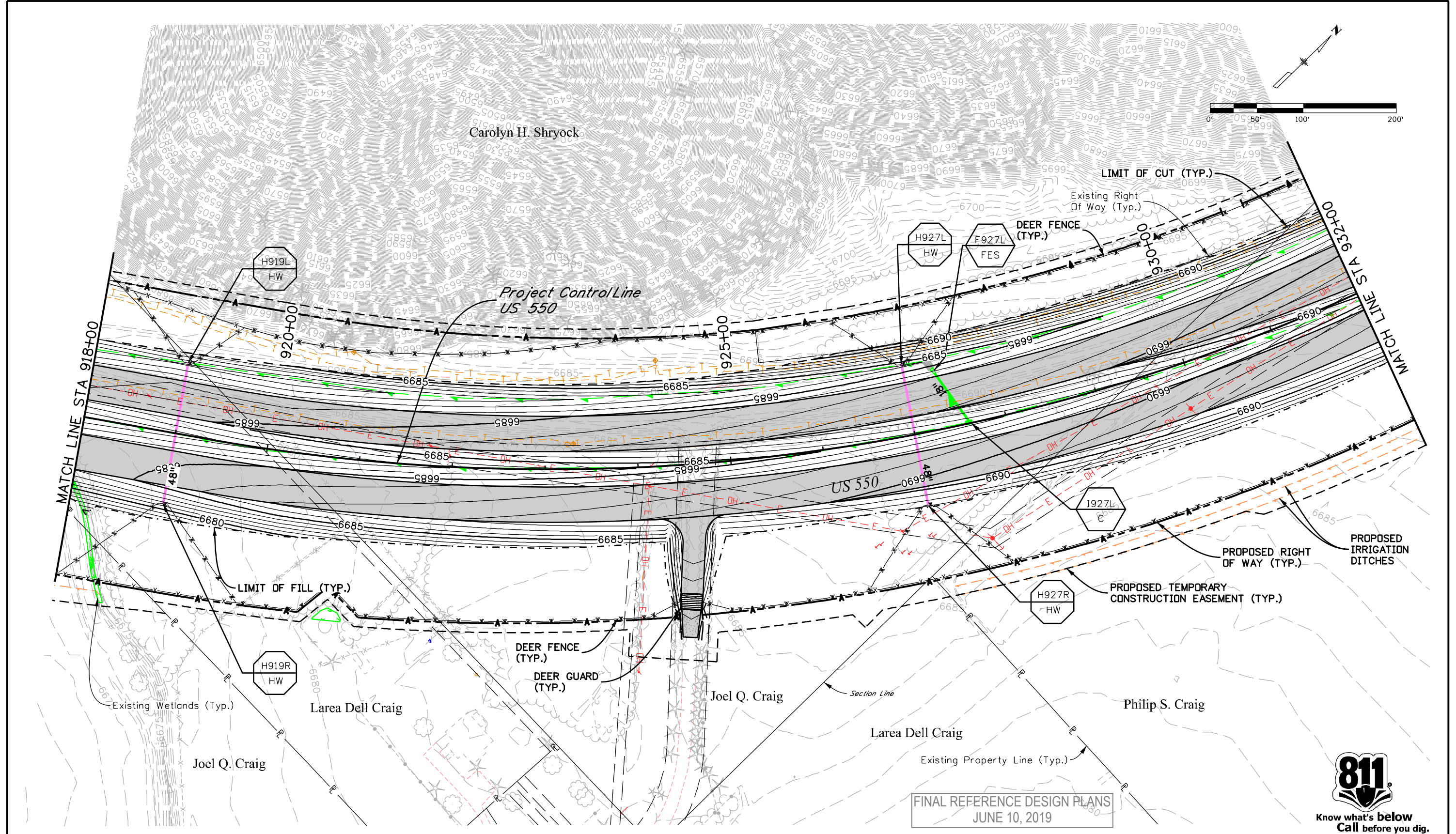


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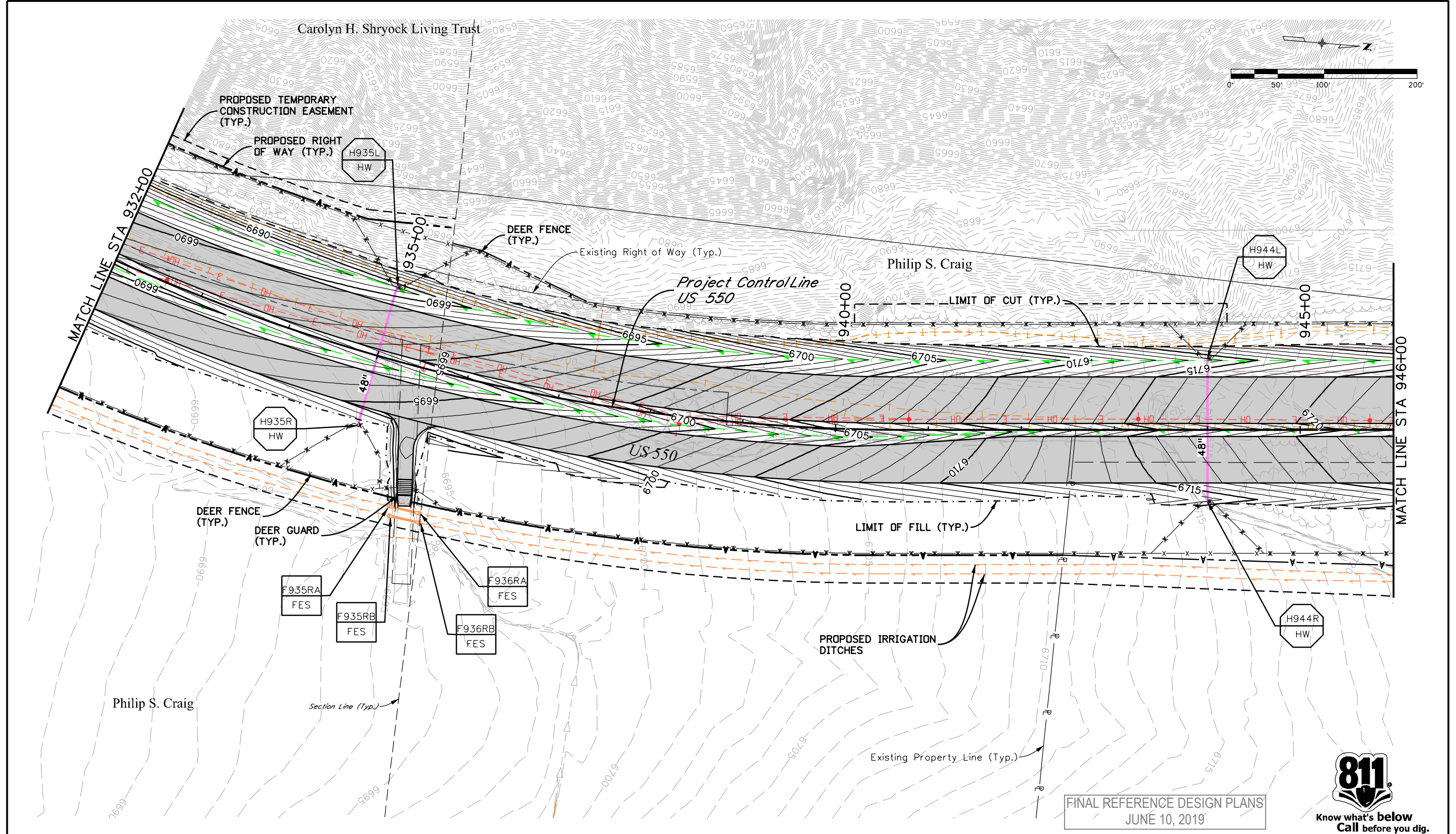
FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019



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Drawing File Name: 22420HYDR_Plan10.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365		No Revisions:		NHPP 5501-029		
Horiz. Scale: 1:100 Vert. Scale: As Noted					Region 5 DRV		Revised:		22420		
Unit Information Unit Leader Initials							Void:		Sheet Number 131		
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JUNE 10, 2019



Print Date: 5/2/2019	
Drawing File Name: 22420HYDR_Plan1.dgn	
Horiz. Scale: 1:100	Vert. Scale: As Noted
Unit Information	Unit Leader Initials
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Sheet Revisions		
Date:	Comments	Init.

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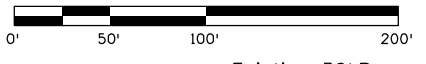
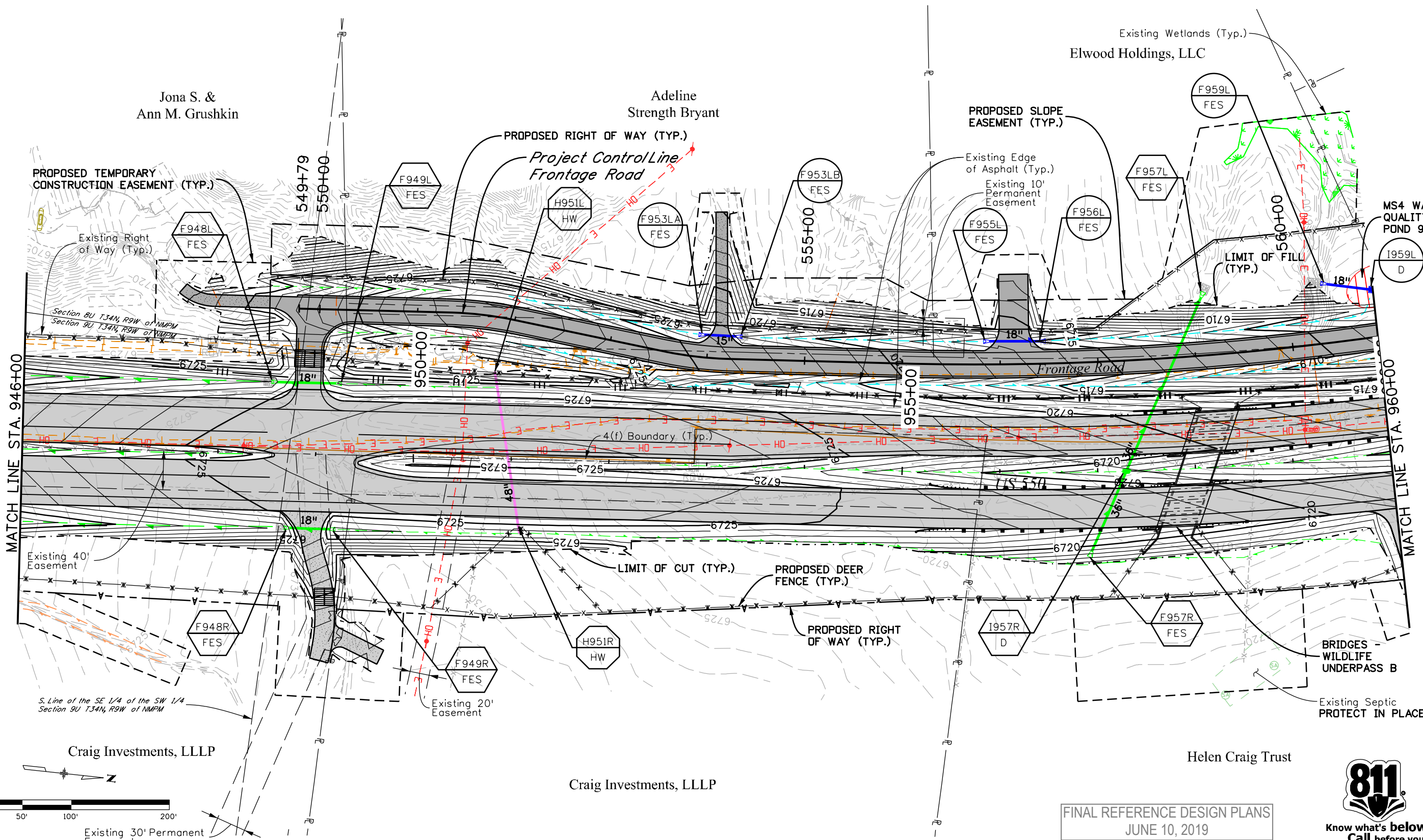
Region 5 DRV

As Constructed	
No Revisions:	
Revised:	
Void:	

US 550 DRAINAGE PLAN STA. 932+00 TO STA. 946+00			
Designer:	CHH	Structure	
Detailer:	LMR	Numbers	
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Project No./Code	
NHPP 5501-029	
22420	
Sheet Number	132

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Craig Investments, LLLP

Craig Investments, LLLP

Helen Craig Trust

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Print Date: 5/2/2019	0000
Drawing File Name: 22420HYDR_Plan12.dgn	
Horiz. Scale: 1:100 Vert. Scale: As Noted	
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Sheet Revisions		
Date:	Comments	Init.

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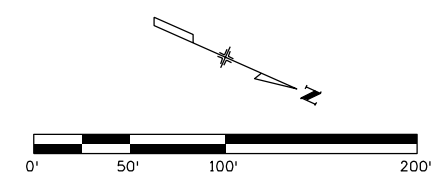
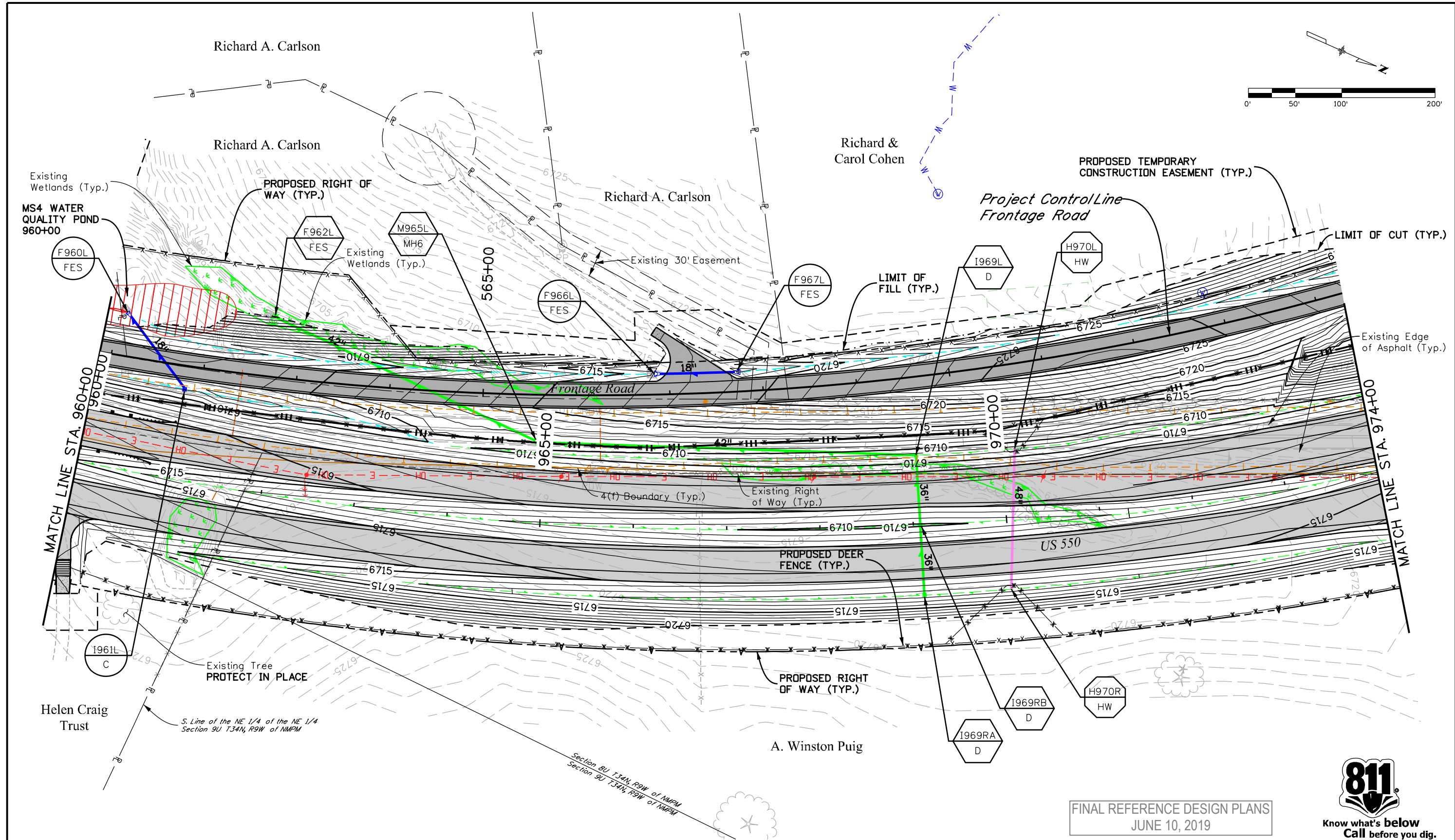
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As Constructed
No Revisions:
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Detailer:	LMR	Numbers	
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Project No./Code
NHPP 5501-029
22420
Sheet Number 133

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FINAL REFERENCE DESIGN PLANS
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Print Date: 5/2/2019	0000
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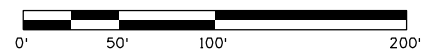
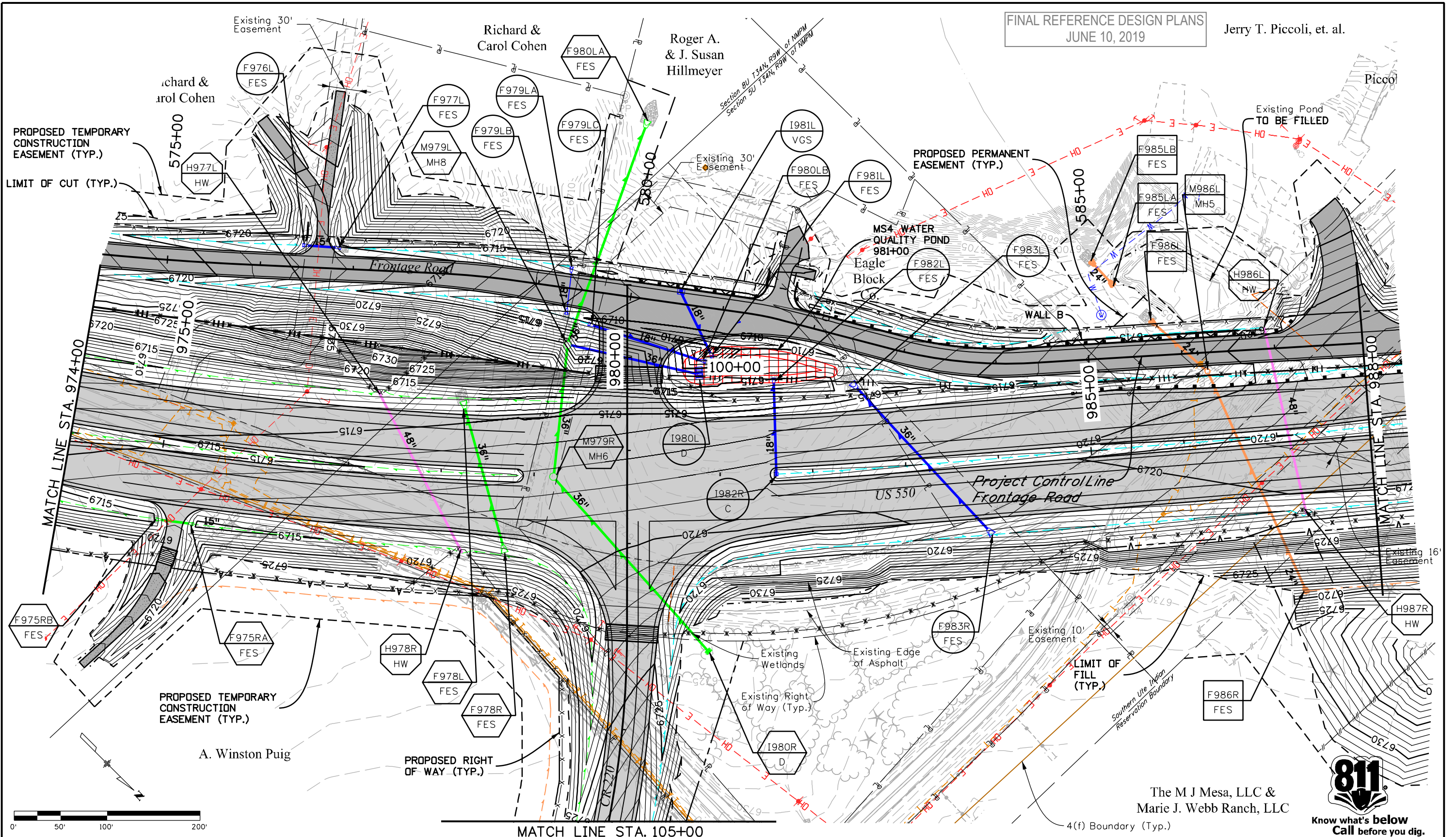
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Region 5 **DRV**

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No Revisions:
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Void:

US 550 DRAINAGE PLAN			
STA. 960+00 TO STA. 974+00			
Designer:	WVW	Structure	
Detailer:	LMR	Numbers	
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Project No./Code
NHPP 5501-029
22420
Sheet Number 134



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Unit Information	Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

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Region 5 DRV

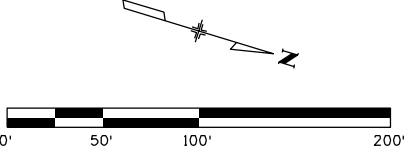
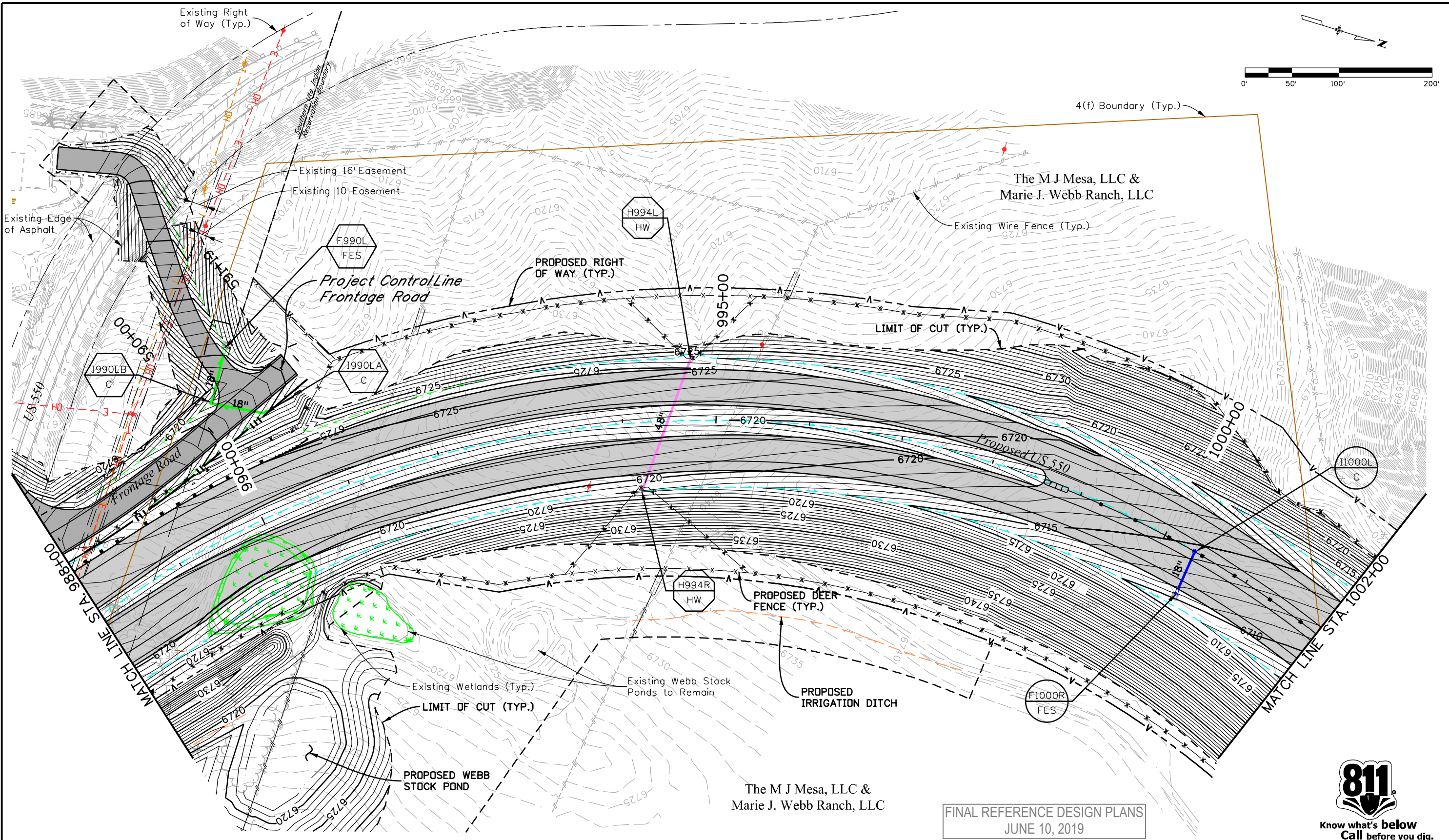
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Detailer:	LMR	Numbers	
Sheet Subset:	DRAINAGE	Subset Sheets:	14 of 19

Project No./Code	
NHPP 5501-029	
22420	
Sheet Number	135

The M J Mesa, LLC &
Marie J. Webb Ranch, LLC





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Unit Information	Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

Region 5

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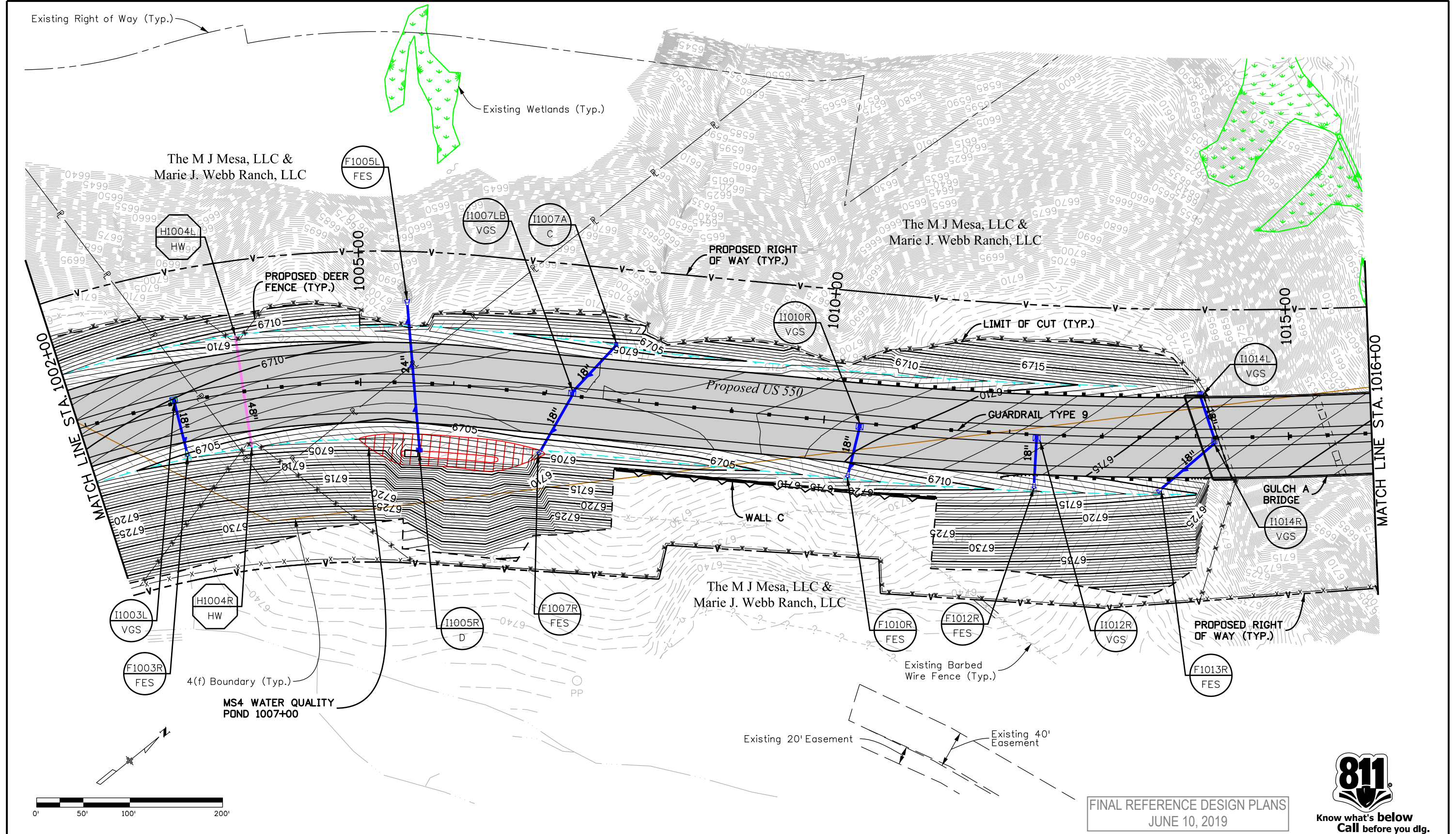
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No Revisions:
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Void:

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Detailer:	LMR	Numbers	
Sheet Subset:	DRAINAGE	Subset Sheets:	15 of 19

Project No./Code
NHPP 5501-029
22420
Sheet Number 136

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JUNE 10, 2019



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Unit Information	Unit Leader Initials
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Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

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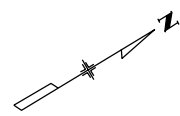
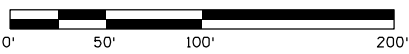
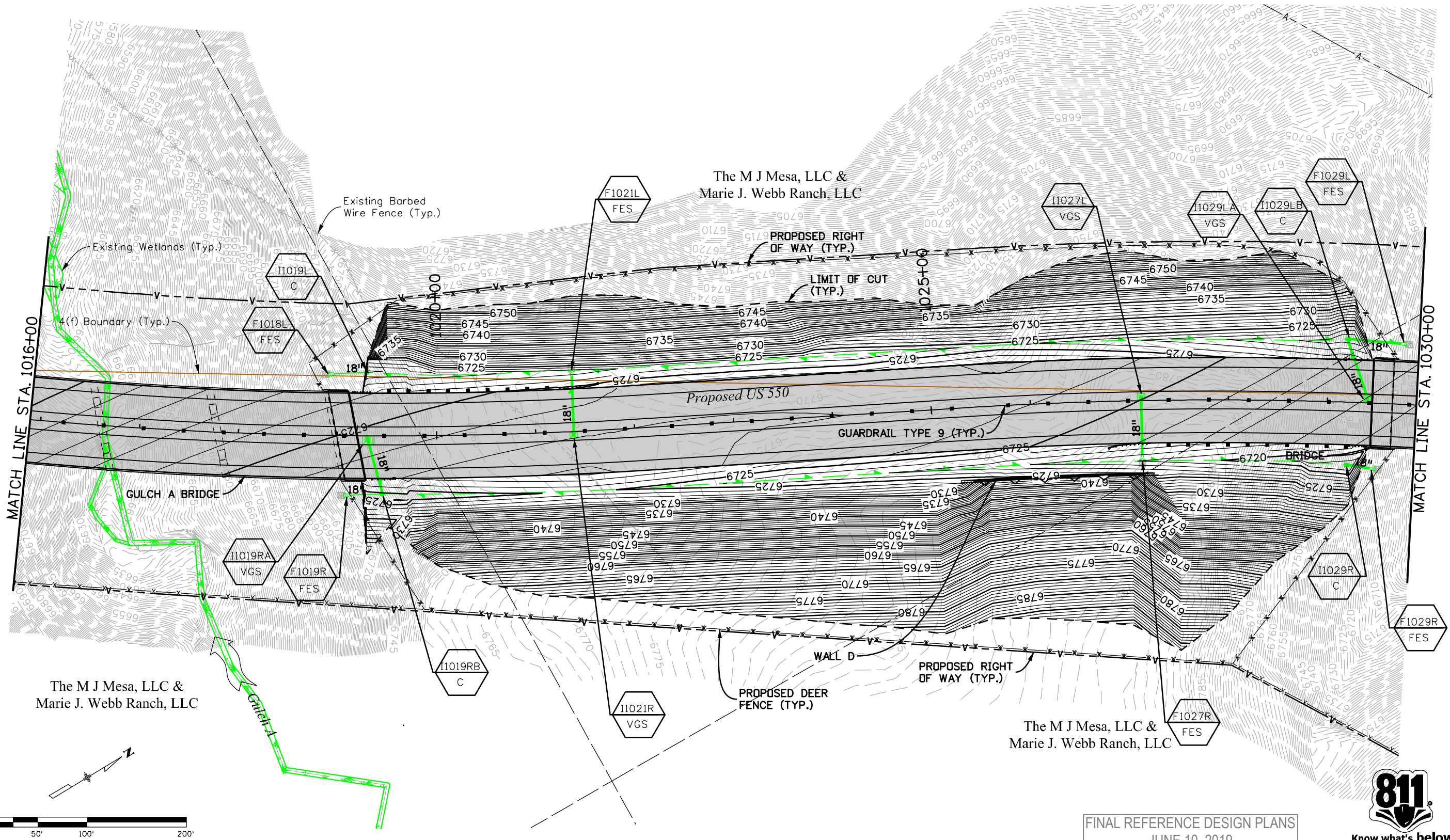
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As Constructed
No Revisions:
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US 550 DRAINAGE PLAN STA. 1002+00 TO STA. 1016+00			
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Detailer:	LMR	Numbers	
Sheet Subset:	DRAINAGE	Subset Sheets:	16 of 19

Project No./Code
NHPP 5501-029
22420
Sheet Number 137

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 JUNE 10, 2019



Print Date: 5/2/2019
Drawing File Name: 22420HYDR_Plan17.dgn
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Unit Information Unit Leader Initials
MULLER ENGINEERING COMPANY

Sheet Revisions		
Date:	Comments	Init.

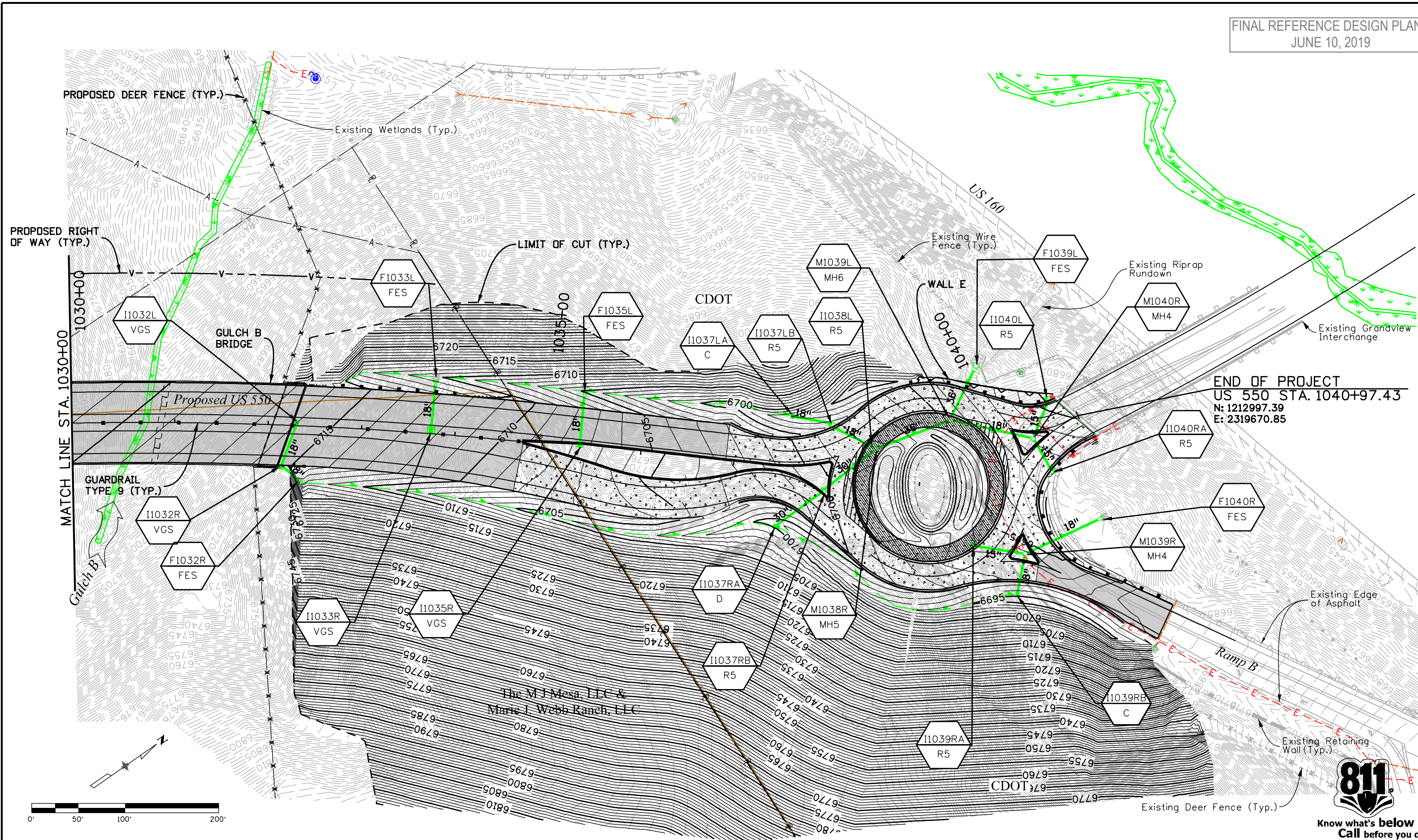
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Region 5 **DRV**

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No Revisions:
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Void:

US 550 DRAINAGE PLAN			
STA. 1016+00 TO STA. 1030+00			
Designer:	WVW	Structure	
Detailer:	LMR	Numbers	
Sheet Subset:	DRAINAGE	Subset Sheets:	17 of 19

Project No./Code
NHPP 5501-029
22420
Sheet Number 138



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Unit Information	Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

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Region 5

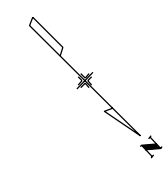
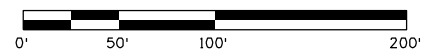
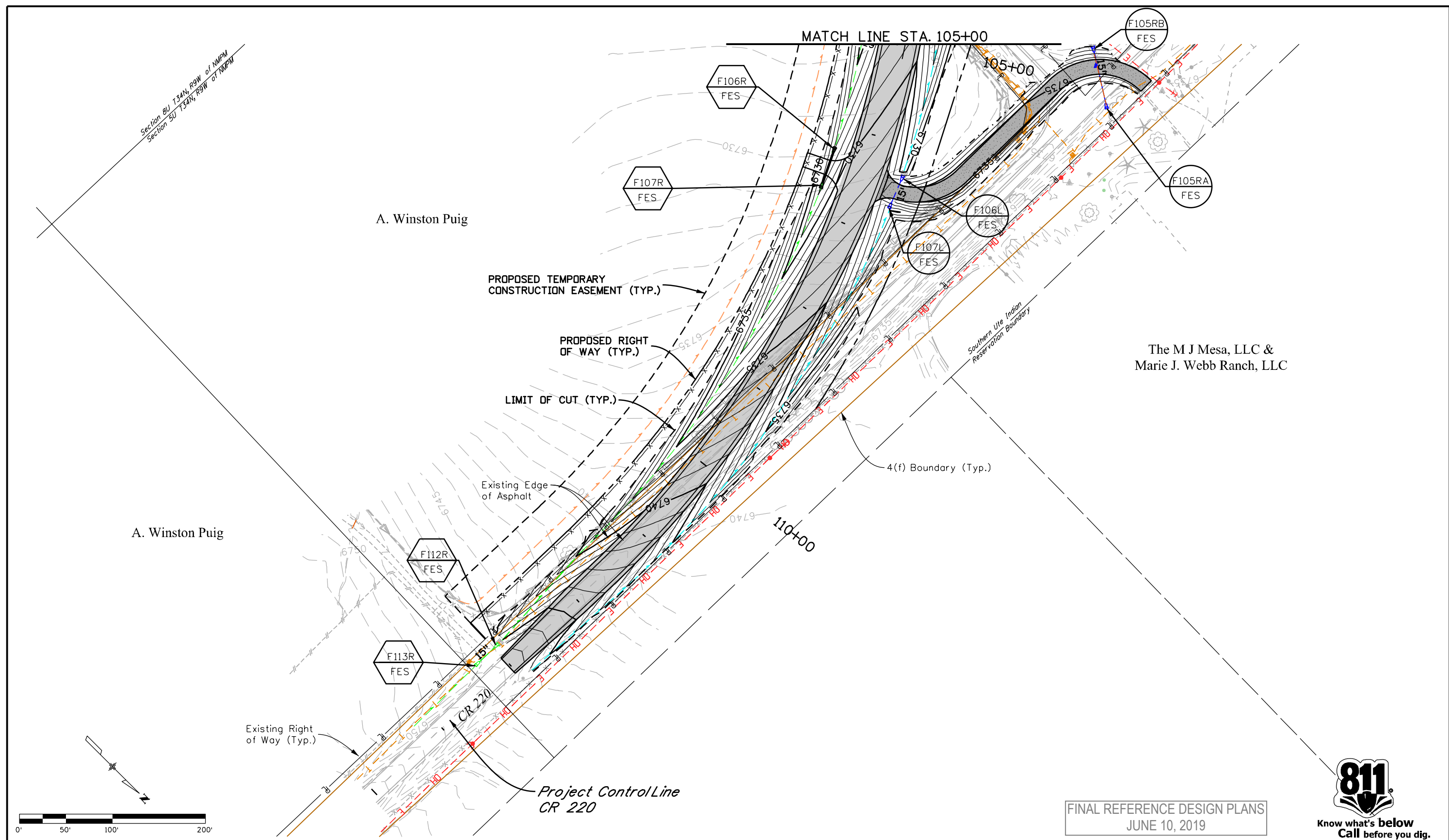
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Project No./Code
NHPP 5501-029
22420
Sheet Number 139



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FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019



Print Date: 5/2/2019
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Horiz. Scale: 1:100 Vert. Scale: As Noted
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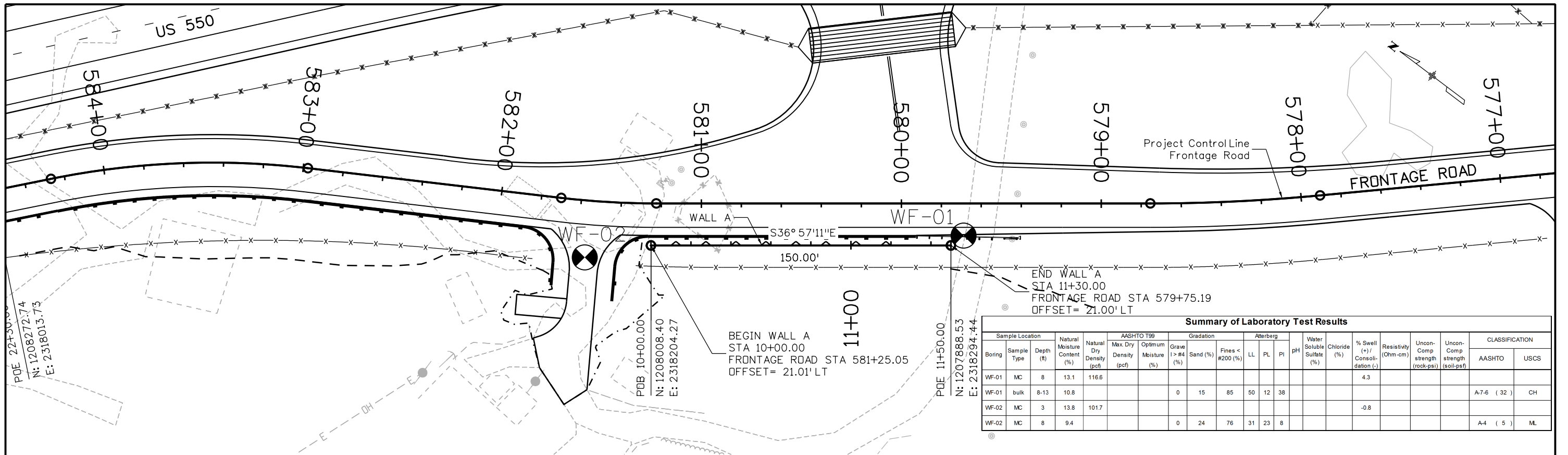
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No Revisions:
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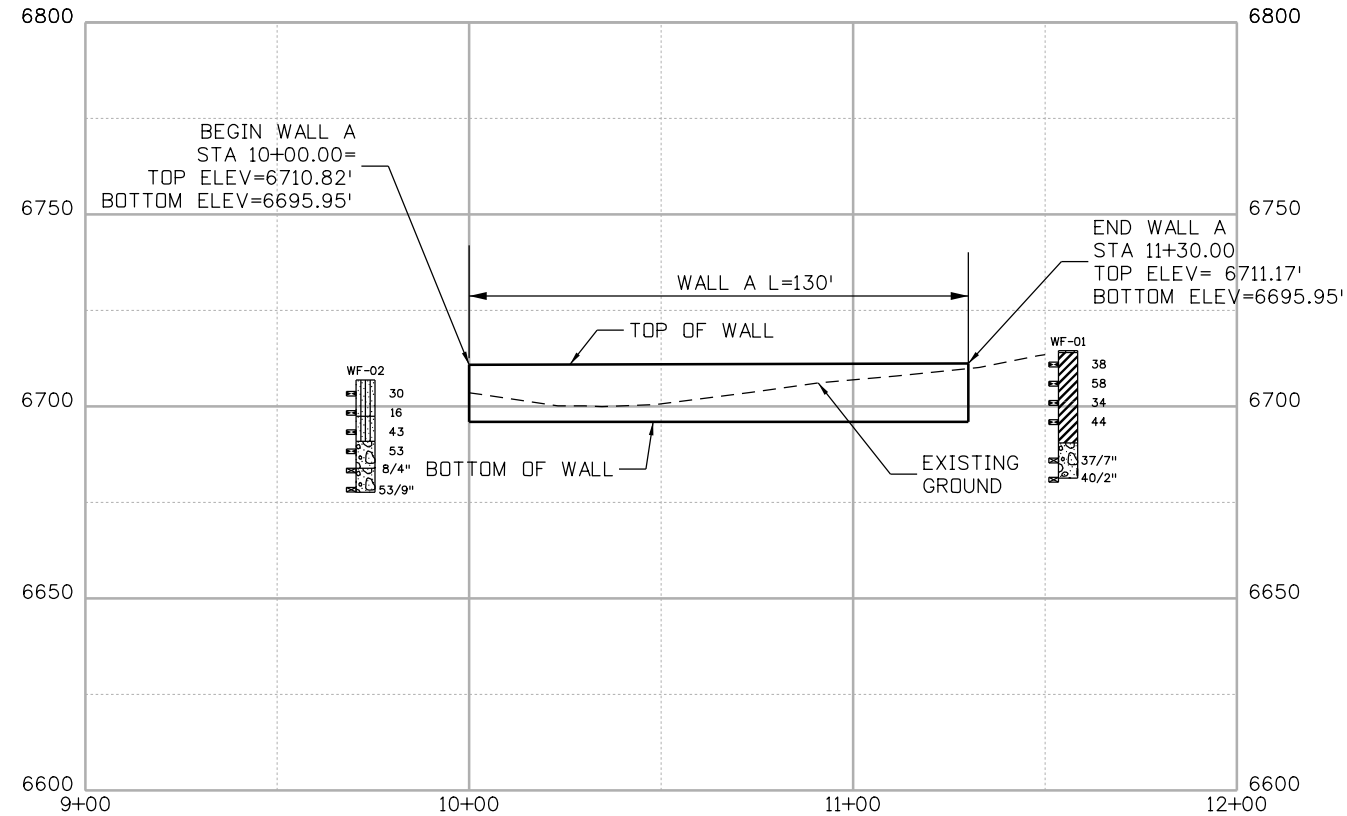
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Project No./Code
NHPP 5501-029
22420
Sheet Number 140

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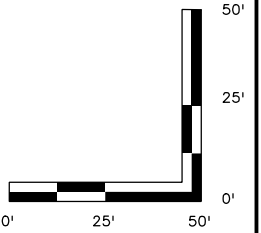


Summary of Laboratory Test Results																			
Boring	Sample Location	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	ASTM D 1557			Atterberg			Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION	
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave (>#4) (%)	Sand (%)	Fines < #200 (%)	LL							PL	PI
WF-01	MC	8	13.1	116.6															
WF-01	bulk	8-13	10.8			0	15	85	50	12	38							A-7-6 (32)	CH
WF-02	MC	3	13.8	101.7															
WF-02	MC	8	9.4			0	24	76	31	23	8							A-4 (5)	ML



LEGEND

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JUNE 10, 2019



Print Date: 3/6/2019
 File Name: 001_22420_Wall_A_Pnp.dgn
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 Consulting Engineers & Scientists

Sheet Revisions		
Date:	Comments	Init.

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Region 5 **DRV**

As Constructed
No Revisions:
Revised:
Void:

STRUCTURE ENGINEERING GEOLOGY
WALL A

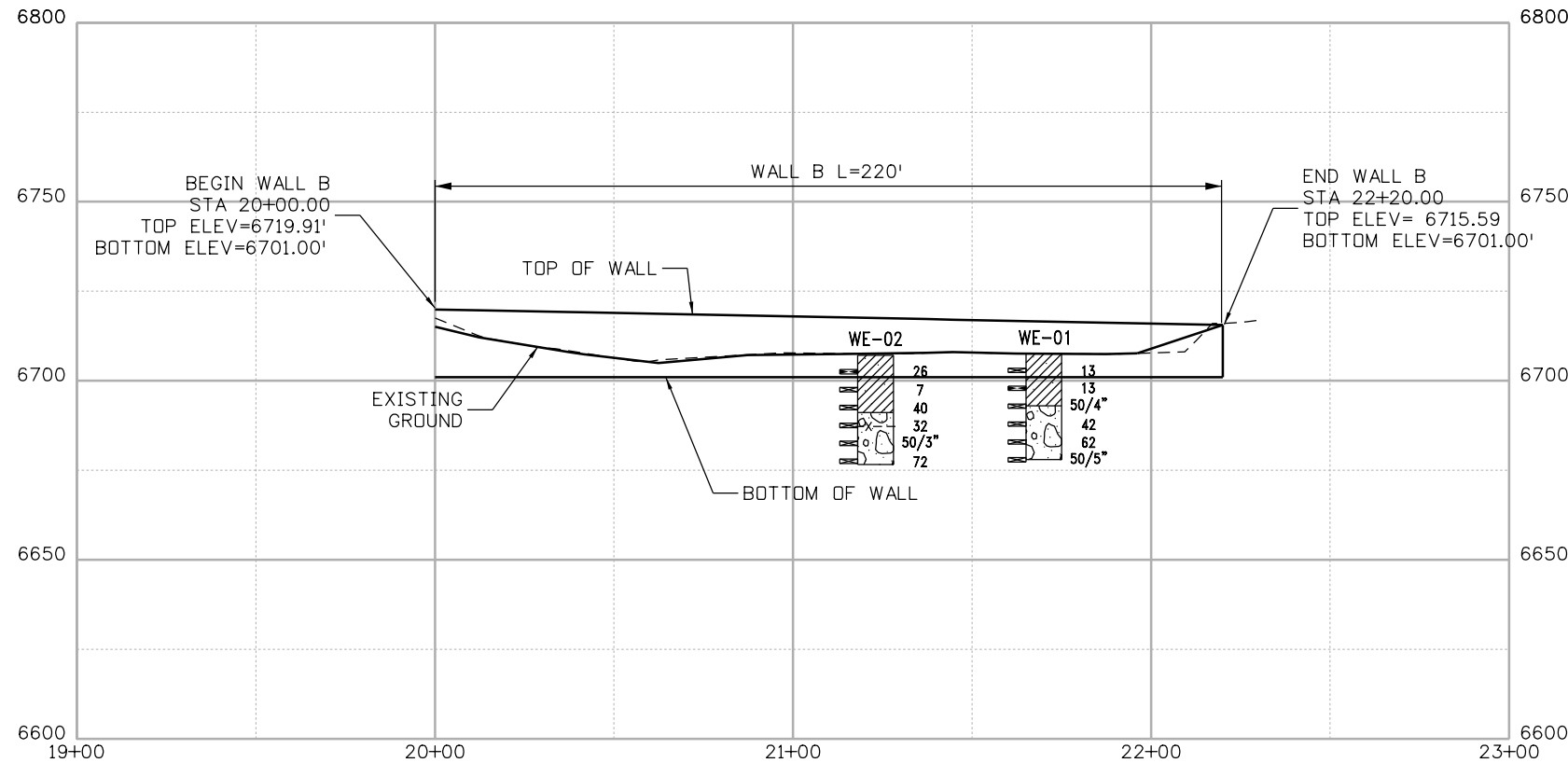
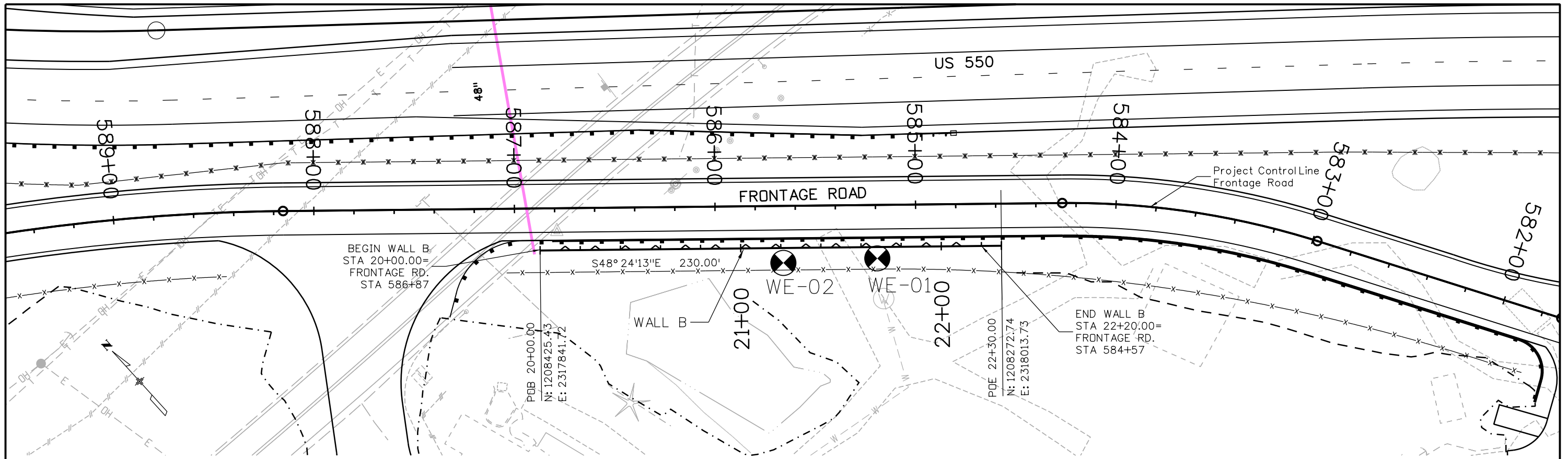
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Project No./Code
 NHPP 5501-029

22420

Sheet Number **141**

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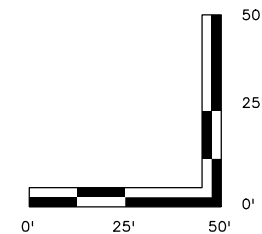
LEGEND

Soil Lithology

- USCS Low Plasticity Sandy Clay
- USCS Poorly-graded Sandy Gravel

Summary of Laboratory Test Results

Sample Location	Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+/- Consolidation)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION		
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS	
WE-01	SS	4.0	7.6					0	28	72	26	18	8								A-4 (4)	CL	
WE-01	bulk	4-9	14.9					0	16	84	29	19	10	8.5	0.054	0.00784		1000			A-4 (7)	CL	
WE-01	MC	9	14.8	107.4													-0.2						
WE-01	bulk	19-24	1.8					58	34	8	NV	NP	NP								A-1-a (0)	GP-GM	
WE-02	bulk	9-14	18.4					0	26	74	33	15	18									A-6 (11)	CL



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JUNE 10, 2019

Print Date: 3/6/2019
 File Name: 002_22420_Wall_B_Pnp.dgn
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Sheet Revisions		
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Region 5 **DRV**

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No Revisions:
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STRUCTURE ENGINEERING GEOLOGY
WALL B

Designer: TA Structure Numbers:
 Detailer: LR Subset Sheets: 2 of 9

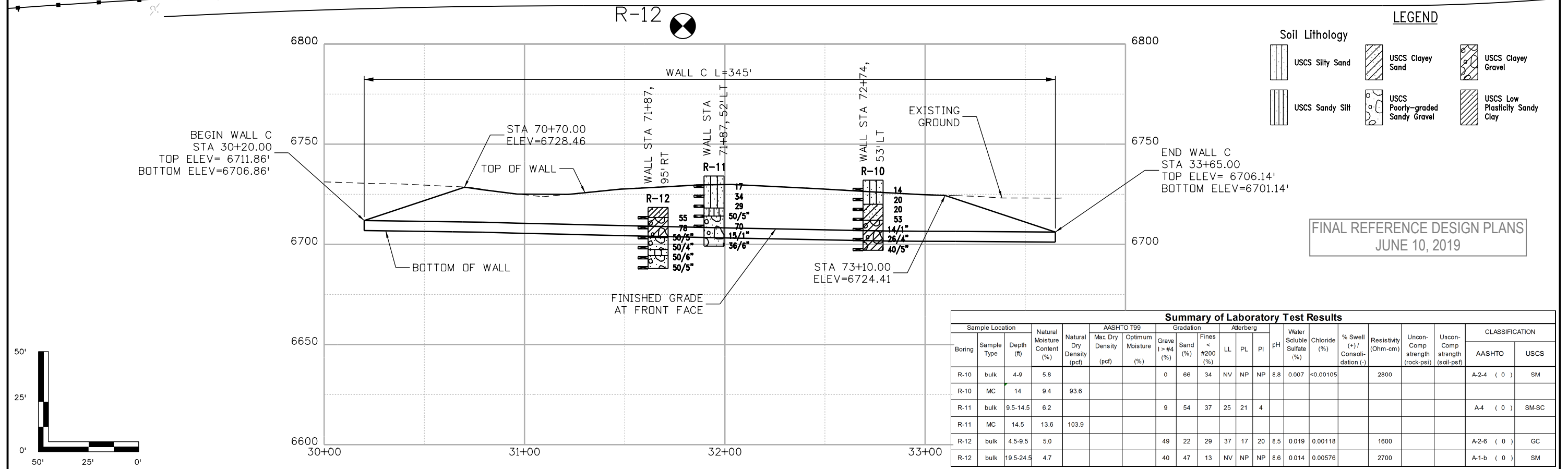
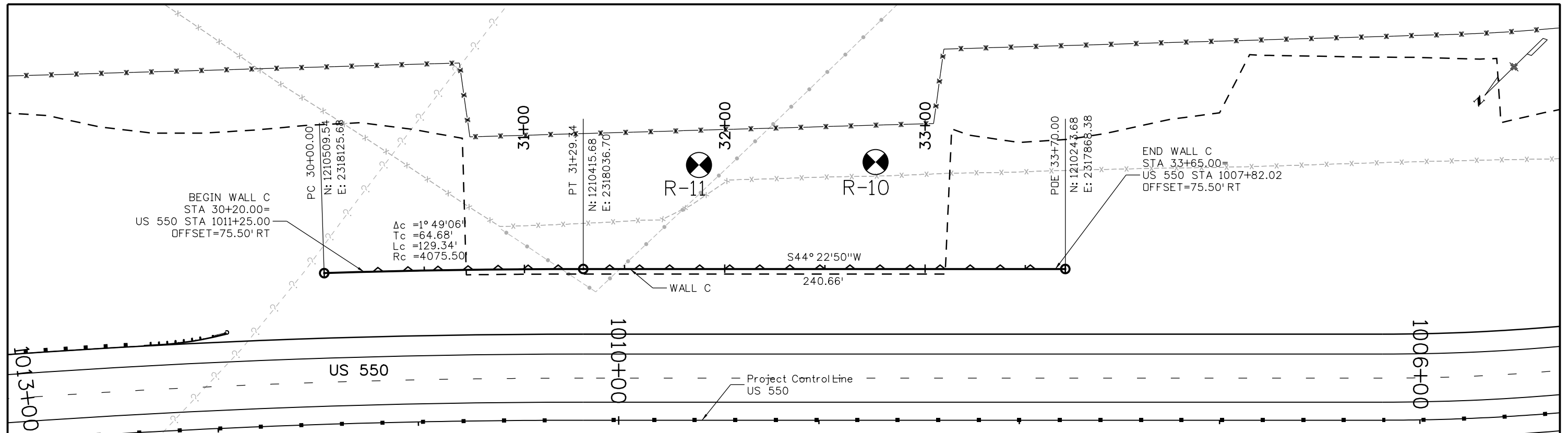
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Project No./Code
 NHPP 5501-029

22420

Sheet Number **142**

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Print Date: 3/6/2019

File Name: 003_22420_Wall_C_Pnp.dgn

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3803 North Main Avenue
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Region 5 DRV

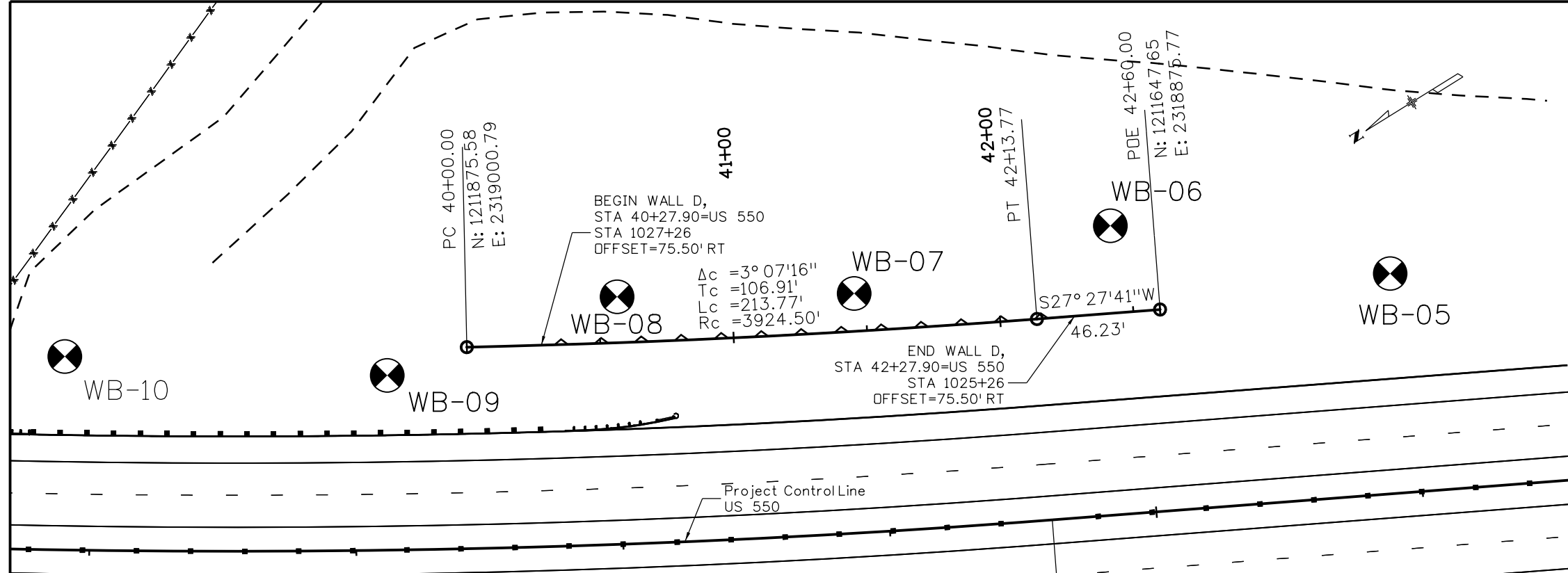
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Revised:
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STRUCTURE ENGINEERING GEOLOGY
WALL C

Designer: TA Structure Numbers:
Detailer: LR

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Project No./Code
NHPP 5501-029
22420
Sheet Number **143**



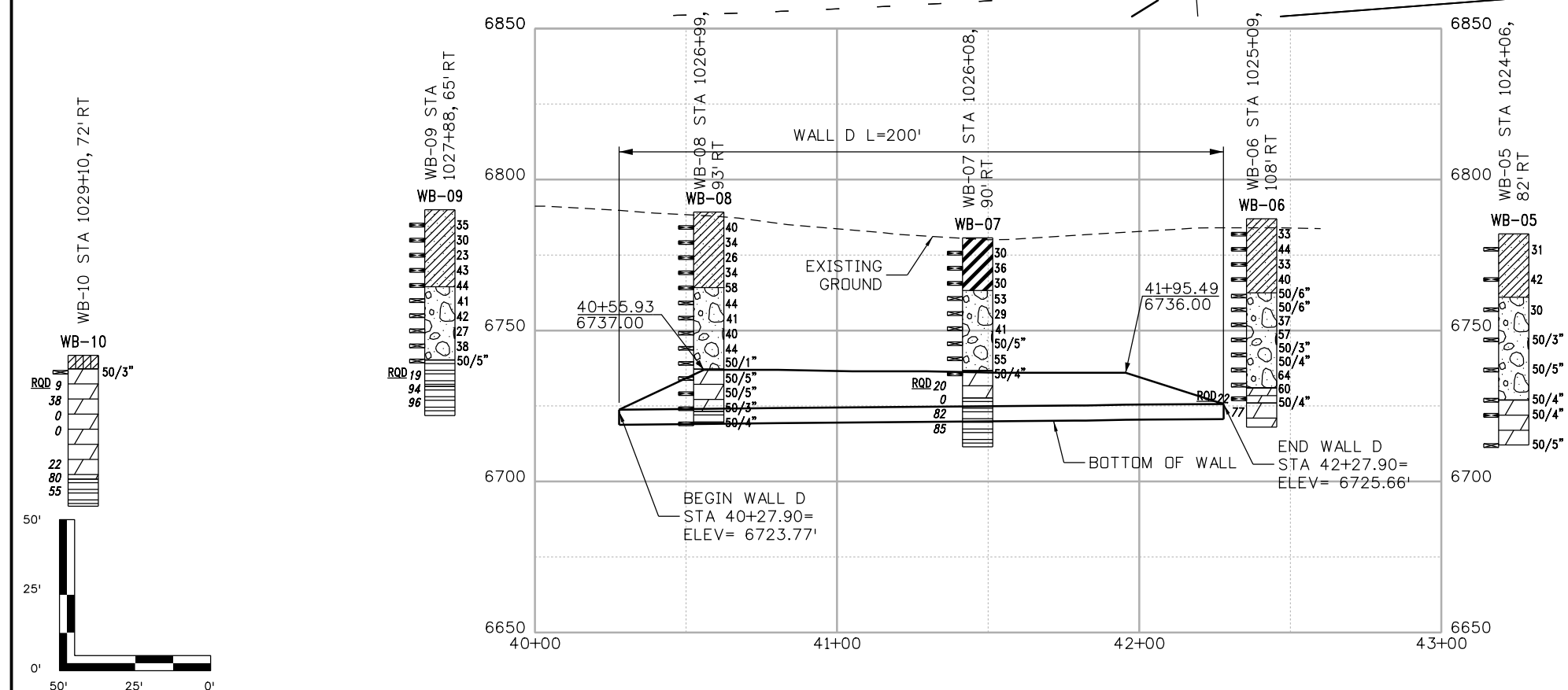
LEGEND

Soil Lithology

- USCS Low Plasticity Sandy Clay
- USCS High Plasticity Clay
- USCS Poorly-graded Gravelly Sand
- USCS Low Plasticity Silty Clay
- USCS Poorly-graded Sandy Gravel

Rock Lithology

- CLAYSTONE
- Shale
- Alternating layers of sandstone and claystone
- Alternating layers of sandstone and shale



Summary of Laboratory Test Results

Sample Location	Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99				Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION			
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave (> #4) (%)	Fines (< #200) (%)							LL	PL	PI	AASHTO
WB-05	SS	4.5	8.8													A-7-6 (20)	CL		
WB-05	MC	14.5	14.8	108.0															
WB-05	bulk	24.5-29.5	5.9			46	50	4	NV	NP	NP						A-1-a (0)	SP	
WB-05	bulk	49.5-54.5	3.3			48	23	29	NV	NP	NP							A-2-4 (0)	GM
WB-05	bulk	54.5-59.5	14.2			0	47	53	39	22	17	8.5	0.012	<0.0011	1400			A-6 (6)	CL
WB-05	bulk (remold)	59.5-64.5																	
WB-06	MC	4.5	13.7	110.5														A-7-6 (17)	CL
WB-06	MC	9.5	9.6	97.6															
WB-06	MC	14.5	9.2	94.9											1472				
WB-06	bulk	14.5-19.5	11.0			0	10	90	34	18	16	8.4	0.010	0.0062	1300			A-6 (14)	CL
WB-06	bulk (remold)																		
WB-06	CORE	65.25-84.80		(wet) 166.8											3057				
WB-07	bulk	9.5-14.5	13.4			0	16	84	59	19	40							A-7-6 (35)	CH
WB-07	bulk	29.5-34.5	35.6 (added)			59	34	7	NV	NP	NP							A-1-a (0)	GP-GM
WB-07	bulk	44.5-49.5	10.3			0	63	37	34	20	14	8.3	0.012	<0.0011	1600			A-6 (1)	SC
WB-07	CORE	84.7-85.2	3.5	139.5											3728				
WB-08	MC	9.5	7.5	98.6															
WB-08	bulk	34.5-39.5	7.1			55	42	3	NV	NP	NP							A-1-a (0)	GP
WB-08	MC	59.5	13.2	91.5		0	70	30	39	22	17								
WB-08	bulk	59.5-69.5	9.4			0	32	68	37	18	19	8.8	0.018	<0.001	1400			A-6 (11)	CL
WB-09	MC	9.5	9.6	95.6		0	23	77	31	16	15							A-6 (10)	CL
WB-09	bulk	14.5-24.5	11.5		107.0	18.4	0	14	86	34	20	14						A-6 (11)	CL
WB-09	bulk	24.5-29.5	8.0			15	59	26	32	21	11							A-2-6 (0)	SC
WB-09	bulk	49.5-54.5	10.4			0	58	42	41	24	17							A-7-6 (3)	SC

Print Date: 3/6/2019
 File Name: 004_22420_Wall_D_Pnp.dgn
 Horiz. Scale: 1:50 Vert. Scale: As Noted
 Unit Information Unit Leader Initials

Yeh and Associates, Inc.
 Consulting Engineers & Scientists

Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

Region 5 **DRV**

As Constructed
 No Revisions:
 Revised:
 Void:

STRUCTURE ENGINEERING GEOLOGY
WALL D

Designer: TA Structure Numbers:
 Detailer: LR

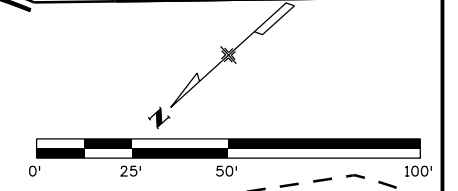
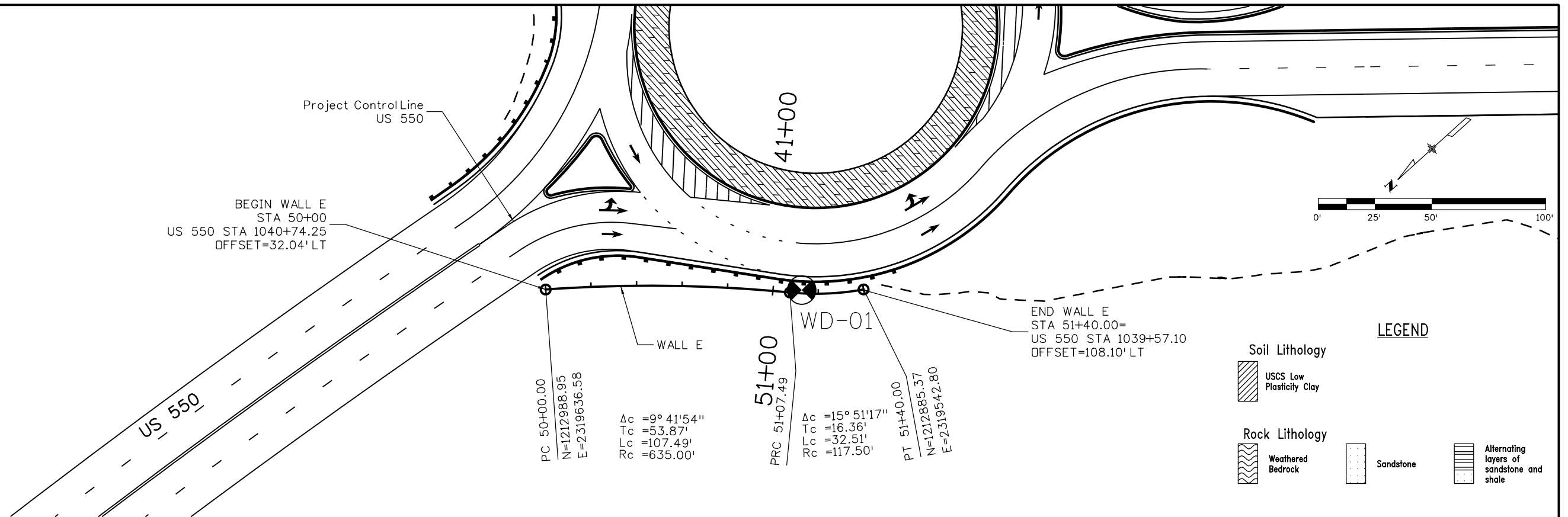
Sheet Subset: EG_WALLS Subset Sheets: 4 OF 9

Project No./Code
 NHPP 5501-029

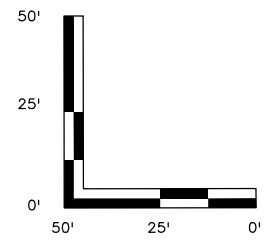
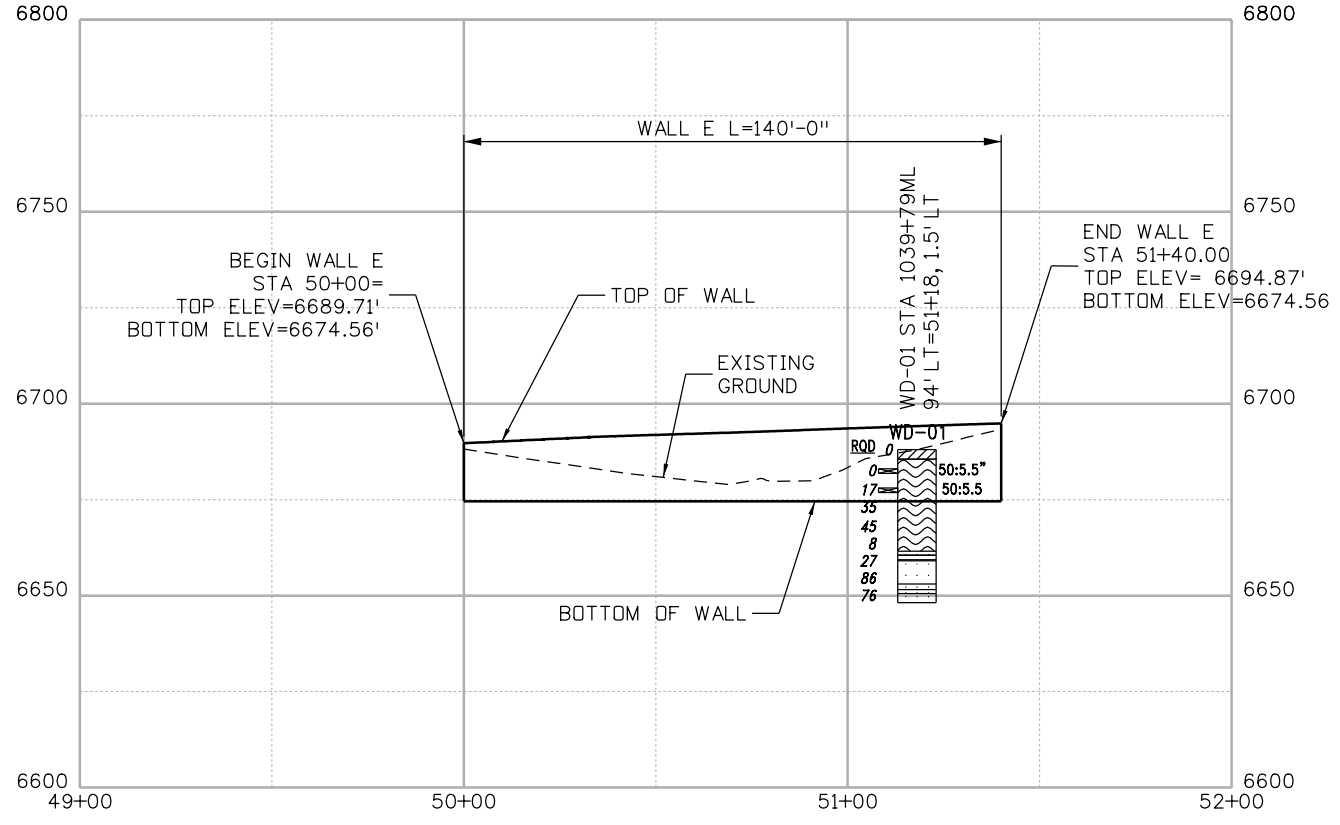
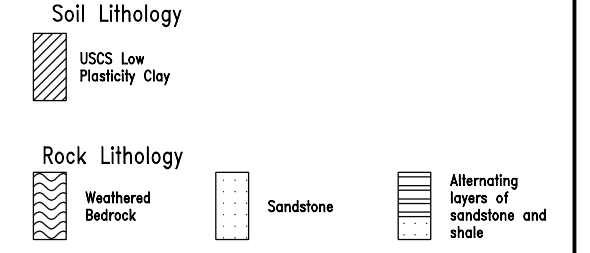
22420

Sheet Number **144**

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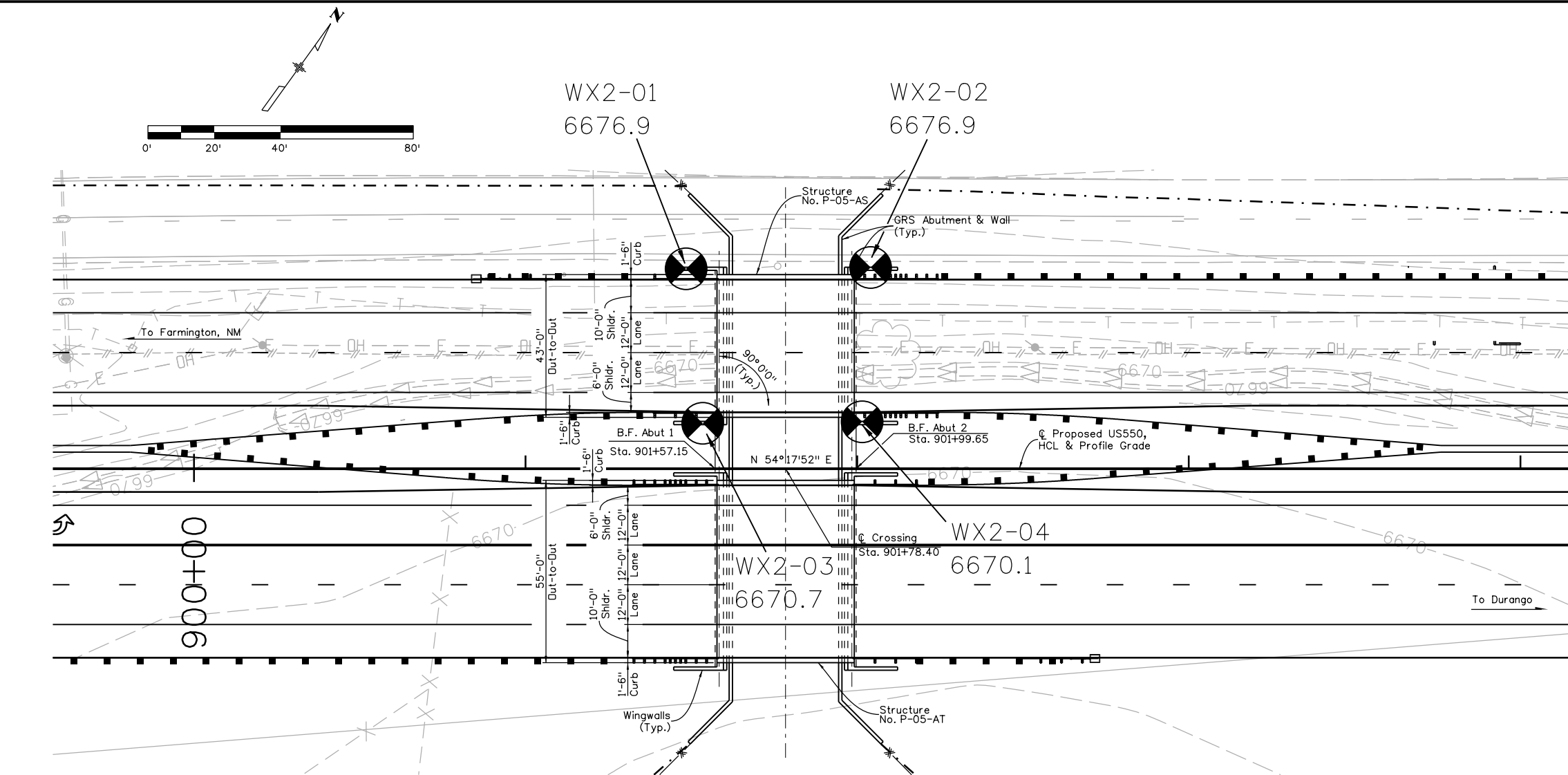
LEGEND



FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

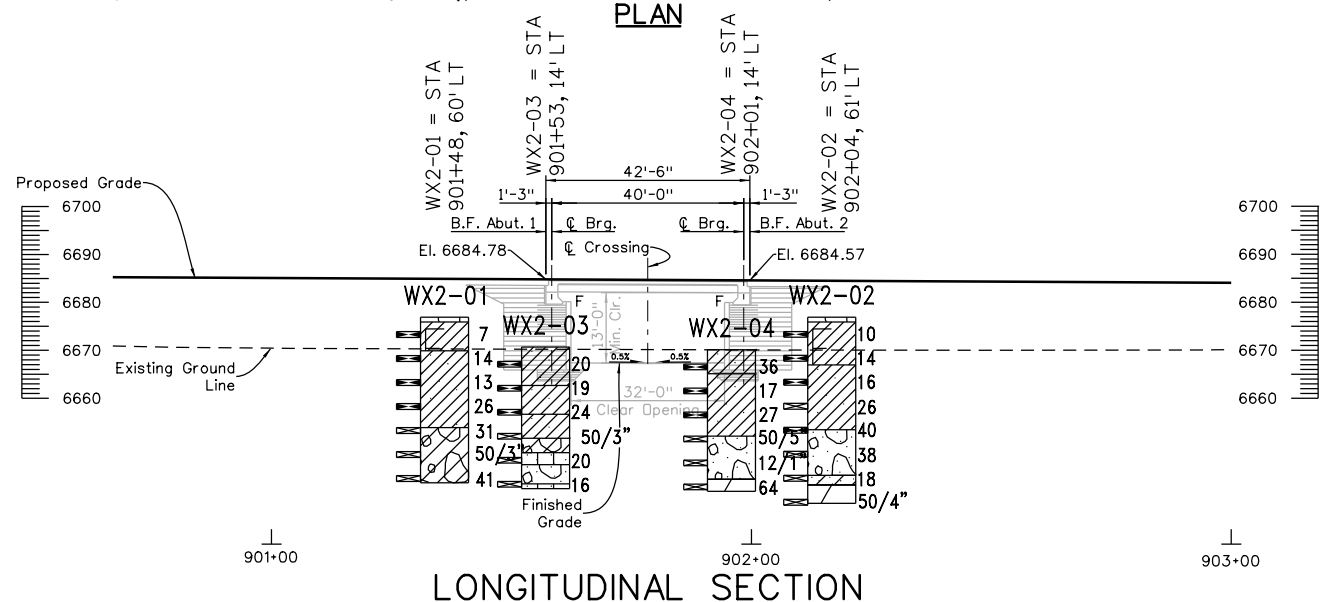
Print Date: 3/6/2019		Sheet Revisions		Colorado Department of Transportation 3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5	As Constructed No Revisions: Revised: Void:	STRUCTURE ENGINEERING GEOLOGY		Project No./Code NHPP 5501-029 22420 Sheet Number 145	
File Name: 005_22420_Wall_E_Pnp.dgn		Date:	Comments			Init.	WALL E		
Horiz. Scale: 1:50 Vert. Scale: As Noted							Designer: TA		Structure Numbers
Unit Information Unit Leader Initials							Detailer: LR		Subset Sheets: 5 OF 9
Yeh and Associates, Inc. Consulting Engineers & Scientists				DRV	Sheet Subset: EG_WALLS				

Design		Detail		Quantities	
DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
MM/YY	XXX	MM/YY	XXX	MM/YY	XXX
Designed By	Checked By	Detailed By	Checked By	Quantities By	Checked By
XXX	XXX	XXX	XXX	XXX	XXX



LEGEND

Soil Lithology		Rock Lithology	
	Fill with Gravel as major soil		Claystone
	USCS Clayey Gravel		
	USCS Silty Sand		
	Fill with Clay as major soil		
	USCS Poorly-graded Sandy Gravel		
	USCS Low Plasticity Sandy Clay		
	USCS Clayey Sand		



Summary of Laboratory Test Results

Sample Location	Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation		Atterberg			Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION	
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave (>#4 (%))	Sand (<#200 (%))	LL	PL	PI							AASHTO	USCS
WX2-01	bulk	8-13	19.2					0	8	92	40	12	28	8.6	0.00543				A-6 (25)	CL
WX2-01	MC	13	17.3	105.9																
WX2-02	bulk	8-13	19.7					0	20	80	47	16	31						A-7-6 (24)	CL
WX2-03	MC	13	15.7	106.8																
WX2-03	SS	23	5.1					22	64	14	NV	NP	NP						A-1-b (0)	SM
WX2-04	MC	8	16.3	111.4																
WX2-04	MC	13	17.3	111.3																
WX2-04	bulk	18-23	5.2					33	52	15	NV	NP	NP						A-1-b (0)	SM

FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

Print Date: 3/6/2019
File Name: 006_22420_Wildlife Underpass A.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Staff Bridge Branch - Unit 0221 STW

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 **DRV**

As Constructed
No Revisions:
Revised:
Void:

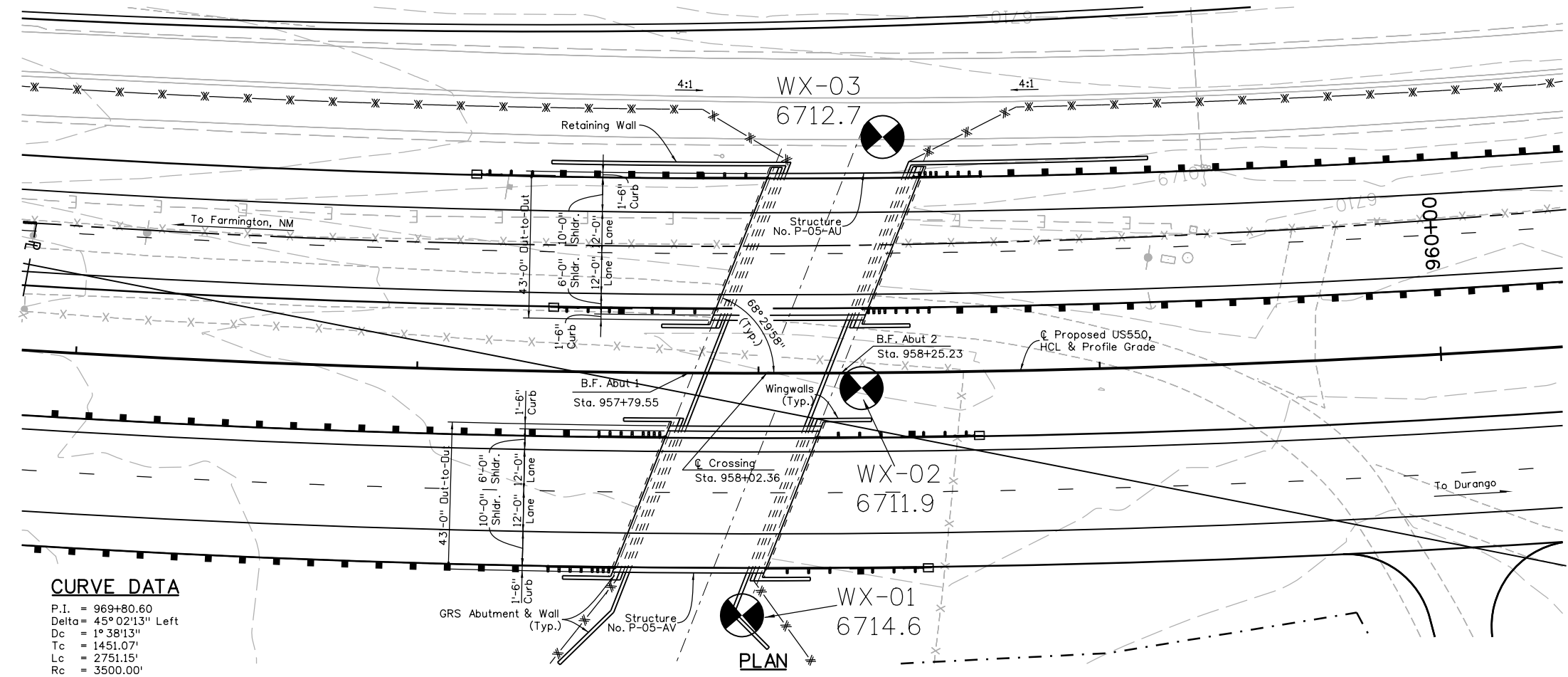
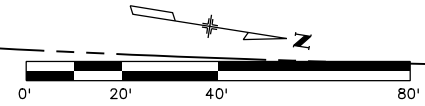
**STRUCTURE ENGINEERING GEOLOGY
WILDLIFE UNDERPASS A**

Designer: TA
Detailer: LR
Structure Numbers: P-05-AS, P-05-AT
Sheet Subset: EG_XING
Subset Sheets: 6 OF 9

Project No./Code
NHPP 5501-029
22420
Sheet Number **146**



WX-04
6705.8

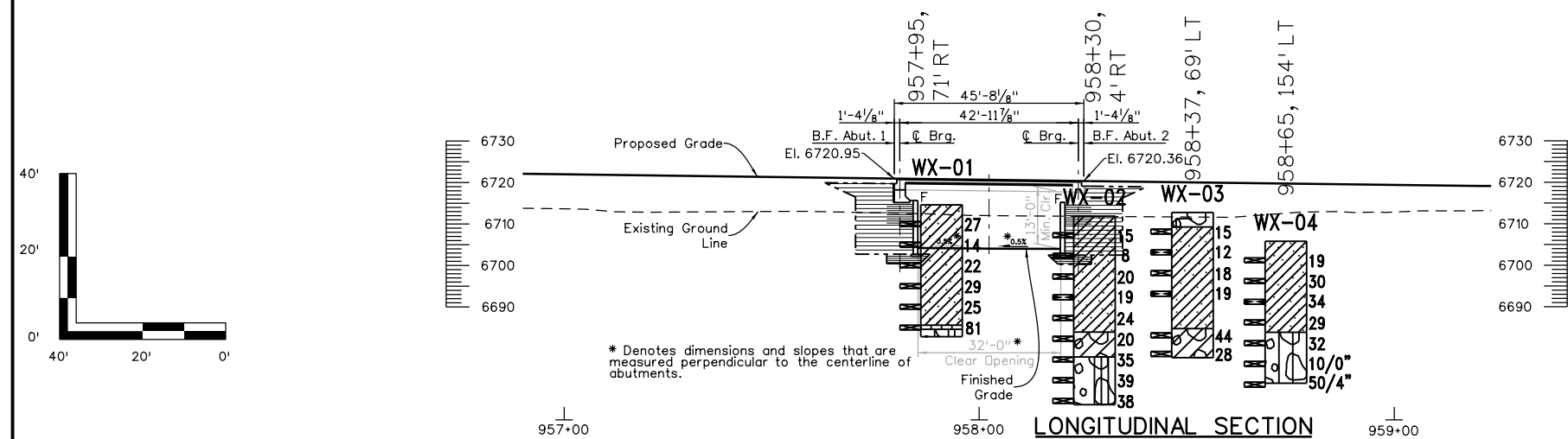


CURVE DATA
 P.I. = 969+80.60
 Delta = 45° 02'13" Left
 Dc = 1° 38'13"
 Tc = 1451.07'
 Lc = 2751.15'
 Rc = 3500.00'

LEGEND

Soil Lithology	
	USCS Low Plasticity Sandy Clay
	USCS Silty Gravel
	USCS Silty Clay
	USCS Clayey Gravel
	USCS Poorly-graded Gravel with Silt
	Fill with Gravel as major soil
	USCS Silt
	USCS Poorly-graded Gravel with Silt

Design		Detail		Quantities	
DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
MM/YY	MM/YY	MM/YY	MM/YY	MM/YY	MM/YY
Designed By	Checked By	Detailed By	Checked By	Quantities By	Checked By
XXX	XXX	XXX	XXX	XXX	XXX



Summary of Laboratory Test Results

Sample Location	Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99			Gradation			Atterberg			Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION			
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave (> #4 (%))	Fines (< #200 (%))	LL	PL	PI	PI	AASHTO							USCS			
WX-01	SS	9.5	8.9					0	12	88	32	19	13								A-6 (11)	CL		
WX-01	bulk	19-24	11.3					0	19	81	29	15	14								A-6 (9)	CL		
WX-01	SS	29	13.1					0	39	61	NV	NP	NP								A-4 (0)	ML		
WX-02	MC	19	17.2	109.3																				
WX-02	bulk	34-39	3.5					56	34	10	NV	NP	NP									A-1-a (0)	GP-GM	
WX-03	MC	9	19.3	106.2				0	6	94	34	16	18									A-6 (16)	CL	
WX-03	MC	19	17.8	109.5																				
WX-04	MC	14	11.2	111.4																				
WX-04	bulk	24-29	3.7					44	42	14	NV	NP	NP										A-1-a (0)	GM

Print Date: 3/6/2019
 File Name: 007_22420_Wildlife Underpass B.dgn
 Horiz. Scale: 1:40 Vert. Scale: As Noted
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Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Durango, CO 81301
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 Region 5 DRV

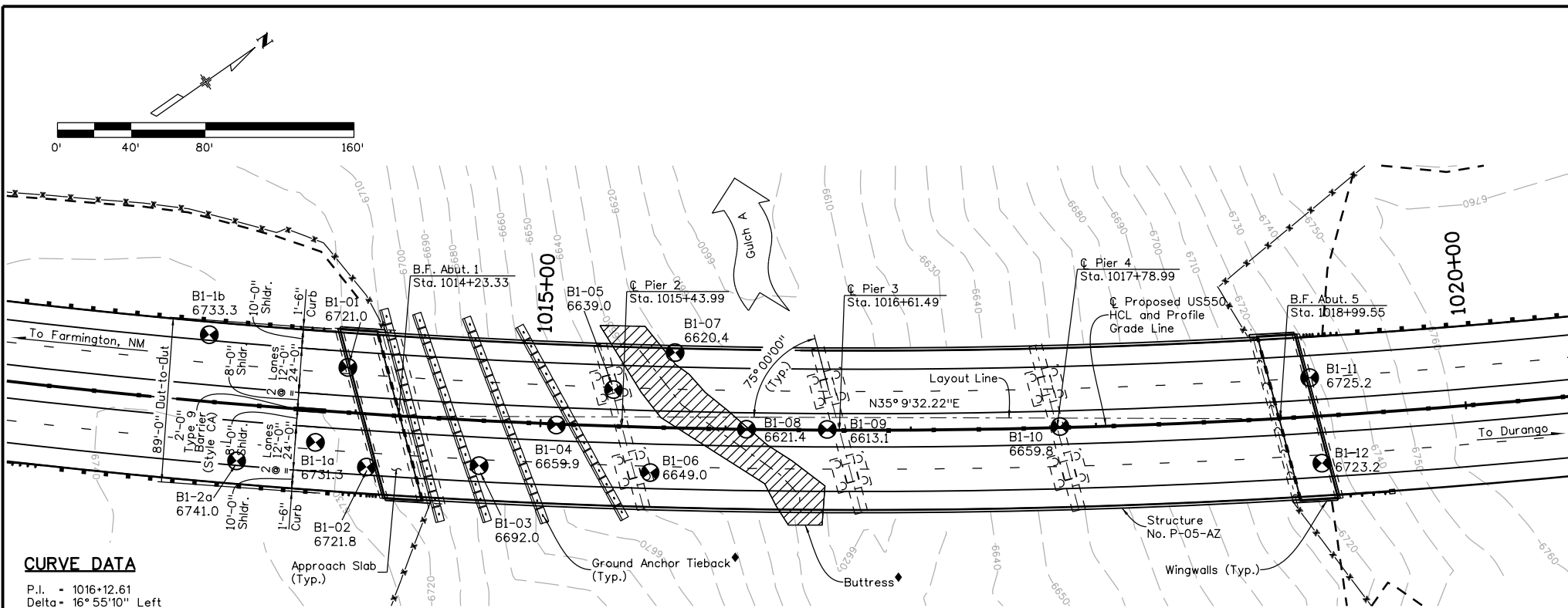
As Constructed
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 Revised:
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**STRUCTURE ENGINEERING GEOLOGY
 WILDLIFE UNDERPASS B**
 Designer: TA
 Detailer: LR
 Sheet Subset: EG_XING
 Structure Numbers: P-05-AU, P-05-AV
 Subset Sheets: 7 OF 9

Project No./Code
 NHPP 5501-029
 22420
 Sheet Number 147

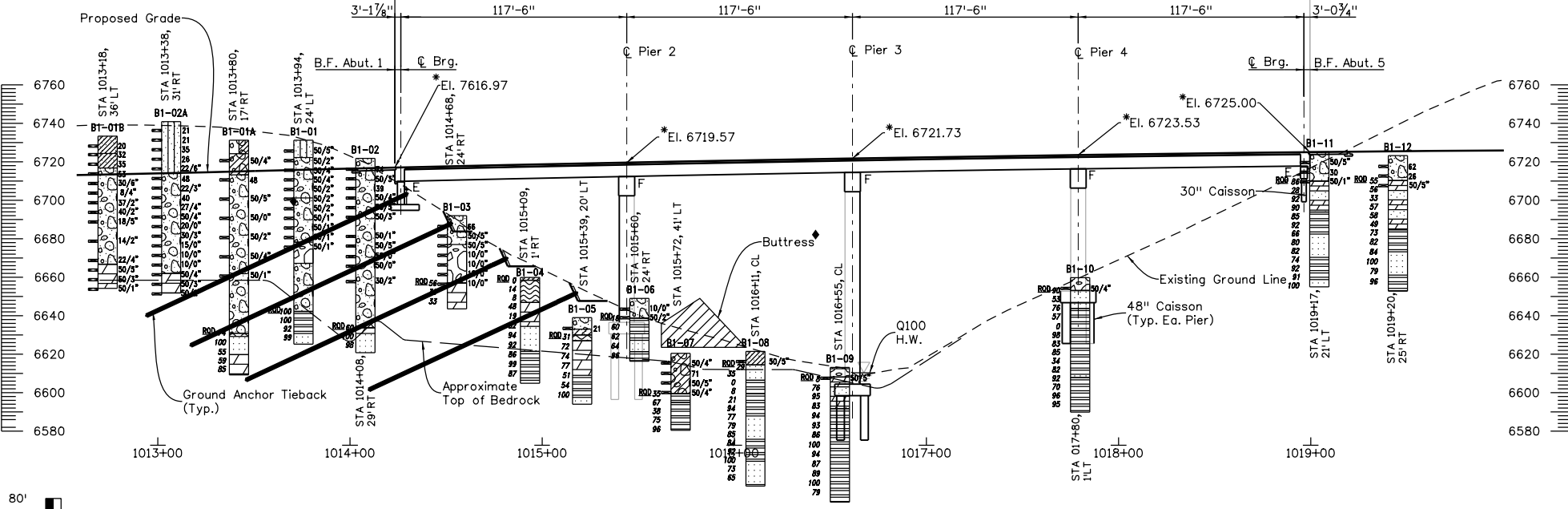
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XXX	MM/YY	XXX	MM/YY	XXX	MM/YY
Checked By	Detailed By	Checked By	Detailed By	Checked By	Detailed By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY



CURVE DATA
 P.I. = 1016+12.61
 Delta = 16° 55' 10" Left
 Dc = 1° 25' 57"
 Tc = 594.93'
 Lc = 1181.19'
 Rc = 4000.00'

PLAN
476'-2 3/4"



SECTION
(Taken along HCL)
*Finished Profile Grade Elevations (Top of HMA)

LEGEND

Soil Lithology

- USCS Silty Sand
- USCS Poorly-graded Sandy Gravel
- USCS Poorly-graded Gravel with Clay
- USCS Clayey Sand
- USCS Clayey Gravel
- USCS Low Plasticity Sandy Clay
- Boulders and cobbles

Rock Lithology

- Alternating layers of sandstone and shale
- CLAYSTONE
- Alternating layers of sandstone and claystone
- Weathered Bedrock
- Shale
- Sandstone
- Sandy Shale

Summary of Laboratory Test Results

Sample Location	Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO 199 Gradation			Atterberg			Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION	
						Max. Dry Density (pcf)	Optimum Moisture (%)	Grave 1 > #4 (%)	Sand (%)	Fines < #200 (%)	LL							PL	PI
B1-01	CORE		92	4.7	153.2											9964			
B1-08	CORE		27	8.0	141.0											2843			
B1-06	CORE		36	6.5	143.3											3496			
B1-09	CORE		8	8.5	140.8											1180			
B1-10	CORE		1	5.9	145.7											3907			
B1-12	CORE		21	8.5	137.9											1072			
B1-12	CORE		40	7.8	137.5											1405			

FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

Print Date: 3/6/2019
 File Name: 009_22420_Gulch A_PnP.dgn
 Horiz. Scale: 1:80 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW

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 Consulting Engineers & Scientists

Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Durango, CO 81301
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Region 5 **DRV**

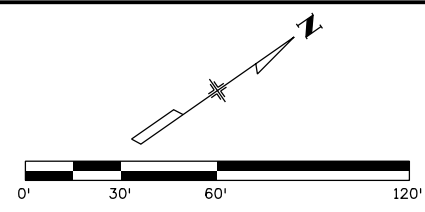
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 Revised:
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STRUCTURE ENGINEERING GEOLOGY
GULCH A BRIDGE

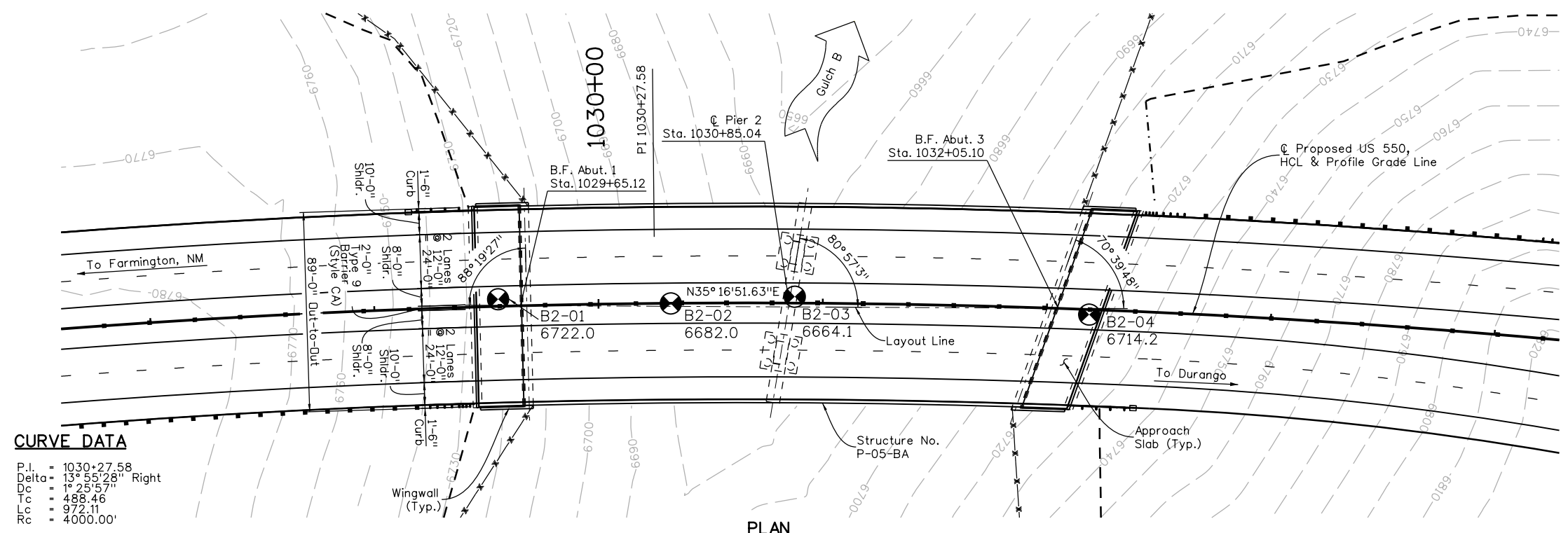
Designer: TA
 Detailer: LR
 Sheet Subset: EG_BRIDGES
 Subset Sheets: 8 OF 9

Project No./Code
 NHPP 5501-029
 22420
 Sheet Number **148**

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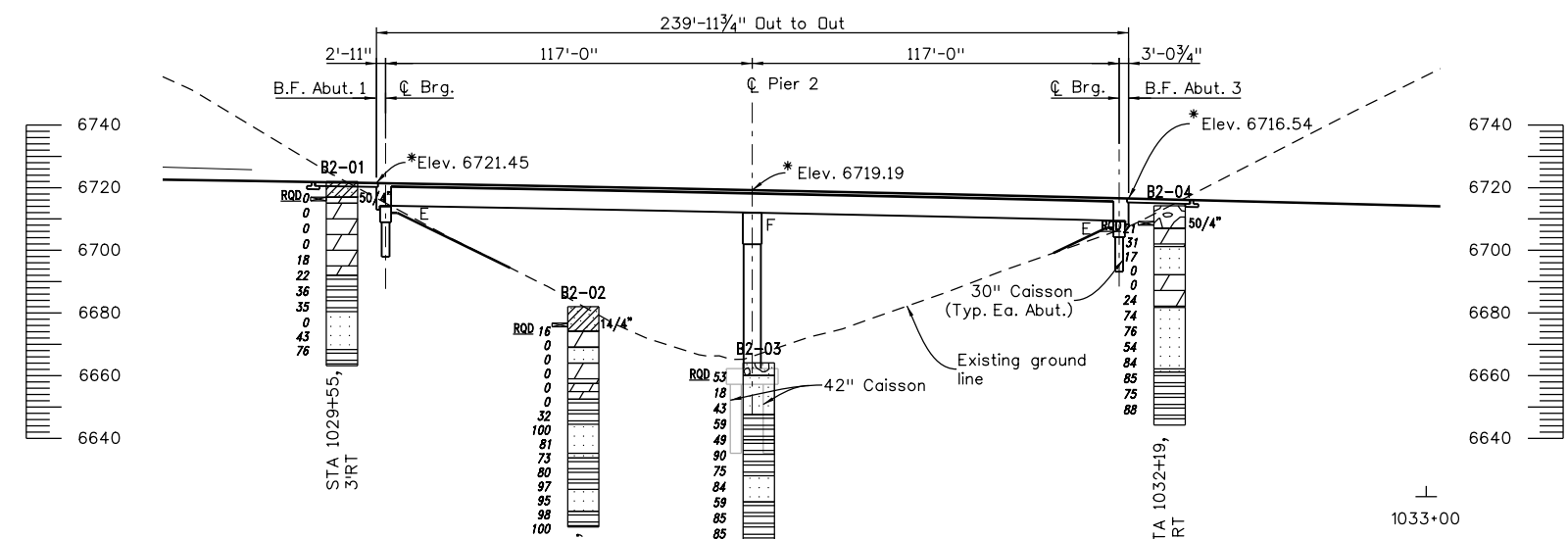
FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019



CURVE DATA

P.I.	=	1030+27.58
Delta	=	13° 55' 28" Right
Dc	=	1° 25' 57"
Tc	=	488.46
Lc	=	972.11
Rc	=	4000.00'

PLAN



SECTION
(Taken Along HCL)

* Finished Profile Grade Elevations (Top of HMA)

LEGEND

	Soil Lithology		
	Rock Lithology		

Summary of Laboratory Test Results

Sample Location	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psi)	CLASSIFICATION	
					Max Dry Density (pcf)	Optimum Moisture (%)	Grave l > #4 (%)	Sand < #200 (%)	LL	PL	PI	AASHTO								USCS	
B2-01	CORE	25.5-26.0	149.4																		
B2-01	CORE	51.5-52.3	151.3																		
B2-04	CORE	14.6-15.0	148.3																		

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY
Designed By	Checked By	Detailed By	Checked By	Quantities By	Checked By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY

Print Date: 3/6/2019
 File Name: 010_22420_Gulch B_PnP.dgn
 Horiz. Scale: 1:60.0002 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW

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Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation
 3803 North Main Avenue
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

Region 5 **DRV**

As Constructed
 No Revisions:
 Revised:
 Void:

STRUCTURE ENGINEERING GEOLOGY
BRIDGE GULCH B

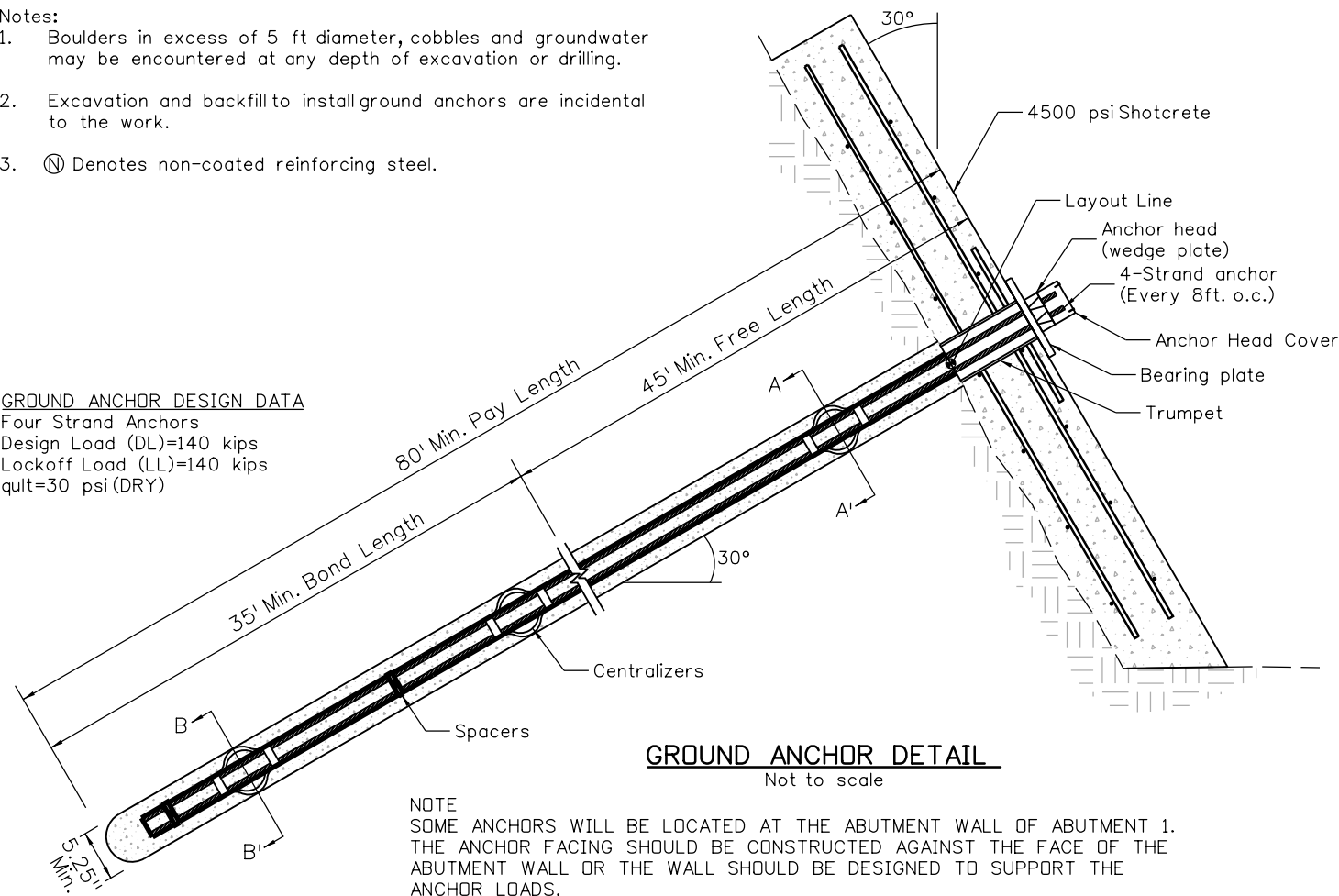
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 Detailer: LR
 Sheet Subset: EG_BRIDGE Subset Sheets: 9 OF 9

Project No./Code
 NHPP 5501-029
 22420
 Sheet Number **149**

3/6/2019

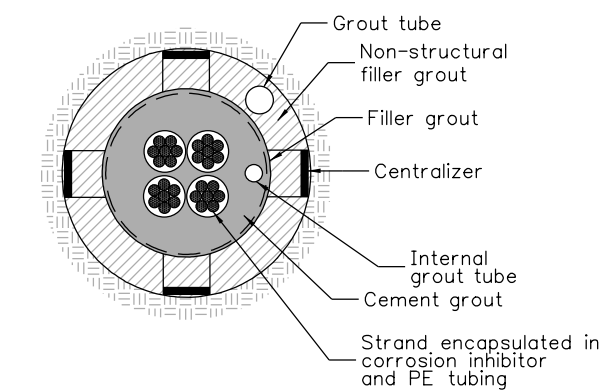
- Notes:
1. Boulders in excess of 5 ft diameter, cobbles and groundwater may be encountered at any depth of excavation or drilling.
 2. Excavation and backfill to install ground anchors are incidental to the work.
 3. (N) Denotes non-coated reinforcing steel.

GROUND ANCHOR DESIGN DATA
 Four Strand Anchors
 Design Load (DL)=140 kips
 Lockoff Load (LL)=140 kips
 qult=30 psi (DRY)

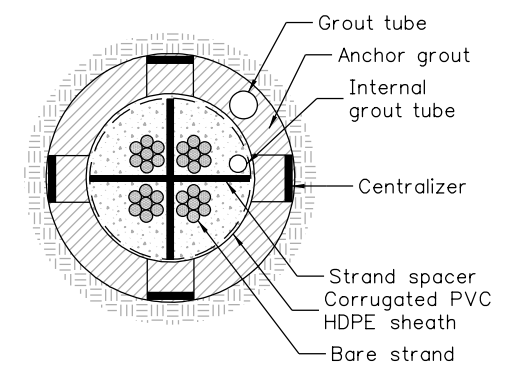


GROUND ANCHOR DETAIL
Not to scale

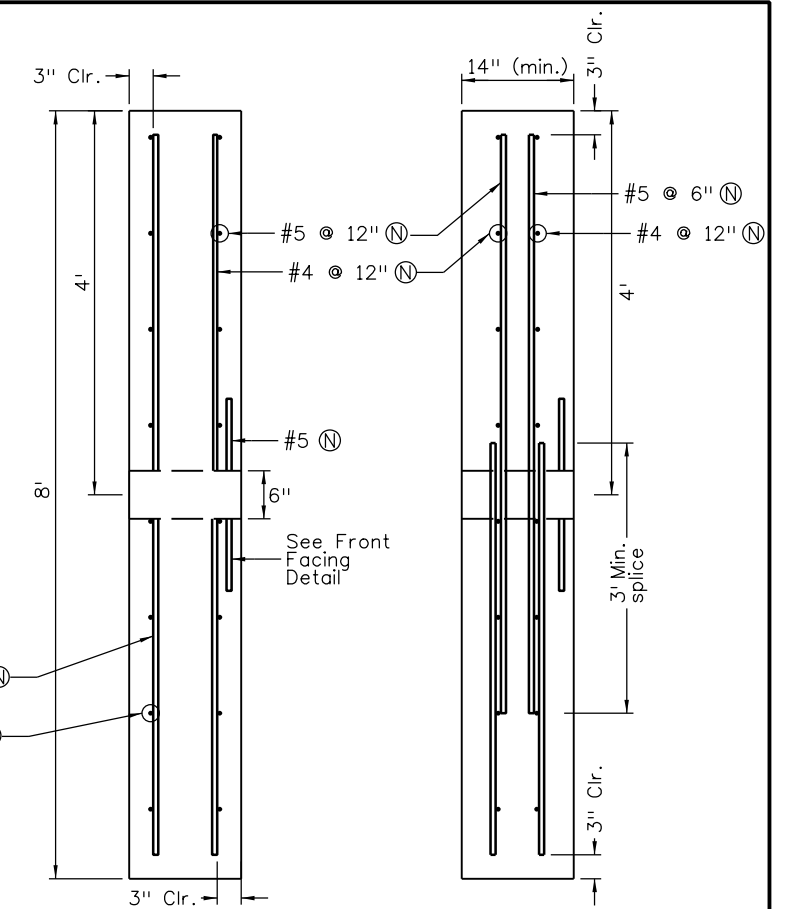
NOTE
 SOME ANCHORS WILL BE LOCATED AT THE ABUTMENT WALL OF ABUTMENT 1. THE ANCHOR FACING SHOULD BE CONSTRUCTED AGAINST THE FACE OF THE ABUTMENT WALL OR THE WALL SHOULD BE DESIGNED TO SUPPORT THE ANCHOR LOADS.



FREE LENGTH CROSS SECTION A-A'
Not to scale

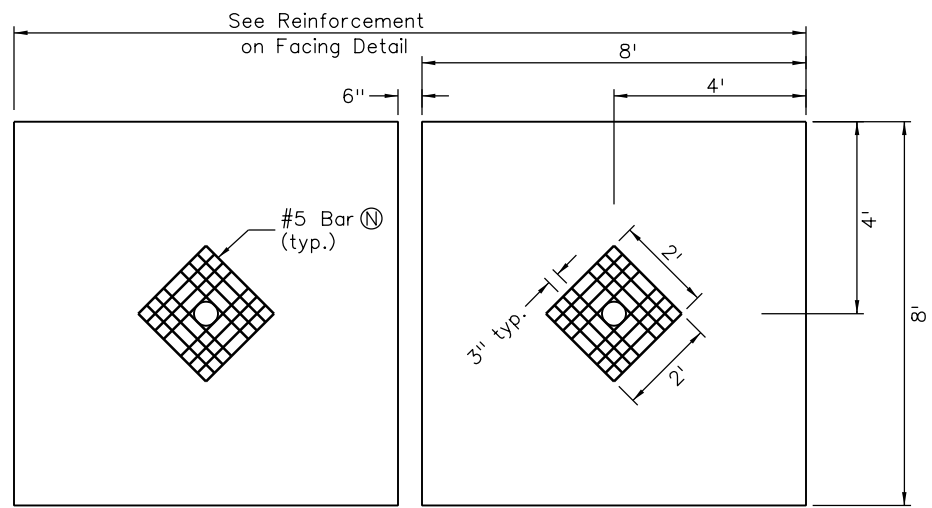


BONDED LENGTH CROSS SECTION B-B'
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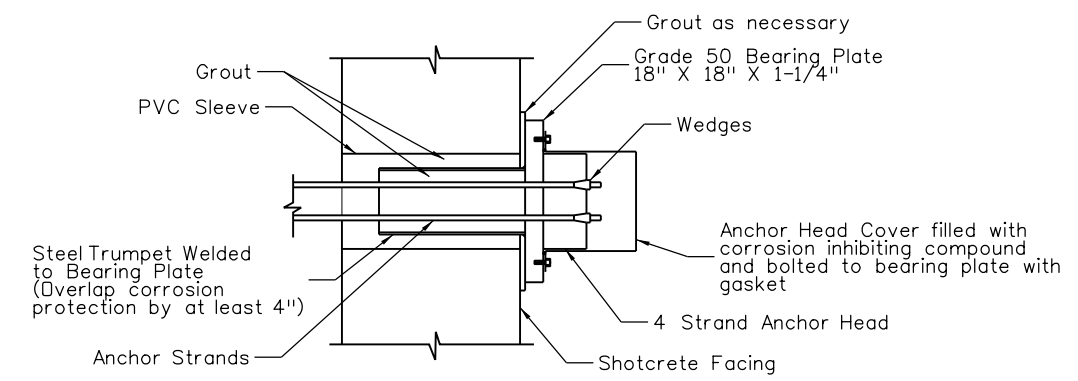


FACING DETAIL
Side View

FACING DETAIL
Top View



FRONT FACING DETAIL
Front View



ANCHORAGE HEAD DETAIL
Not to scale

FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019

Print Date: 3/6/2019	0000
File Name: 011_22420_LS Ground Anchor Detail01.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.

Colorado Department of Transportation
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 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
Region 5 **DRV**

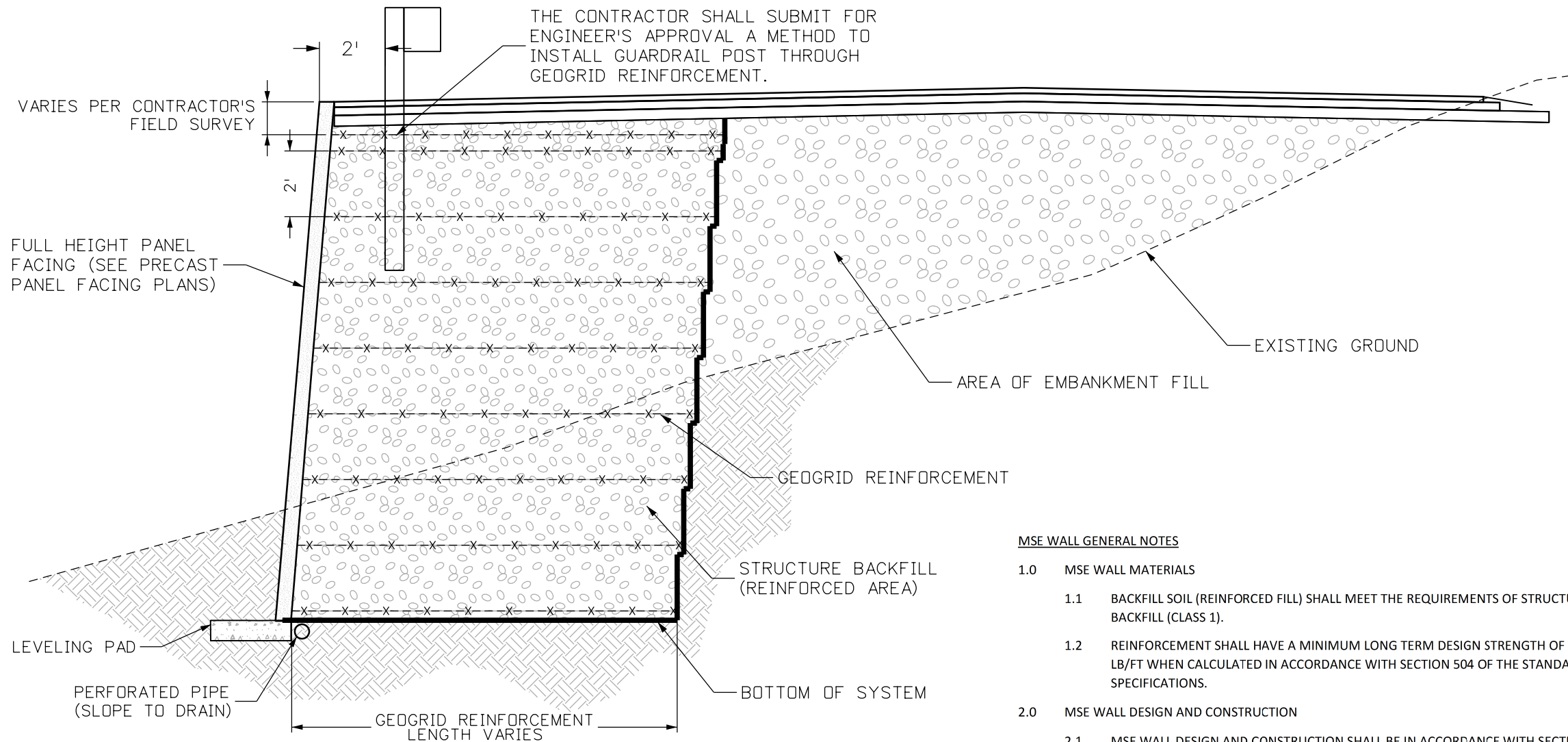
As Constructed
No Revisions:
Revised:
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GROUND ANCHOR AND REINFORCED SHOTCRETE FACING DETAIL BRIDGE GULCH A		
Designer: TA	Structure Numbers	
Detailer: LR		
Sheet Subset: LS_ANCH	Subset Sheets: 1 of 1	

Project No./Code
NHPP 5501-029
22420
Sheet Number 150

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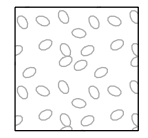
TYPICAL SECTION WALLS A, B, AND E

MSE WALL GENERAL NOTES

- 1.0 MSE WALL MATERIALS
 - 1.1 BACKFILL SOIL (REINFORCED FILL) SHALL MEET THE REQUIREMENTS OF STRUCTURE BACKFILL (CLASS 1).
 - 1.2 REINFORCEMENT SHALL HAVE A MINIMUM LONG TERM DESIGN STRENGTH OF 2000 LB/FT WHEN CALCULATED IN ACCORDANCE WITH SECTION 504 OF THE STANDARD SPECIFICATIONS.
- 2.0 MSE WALL DESIGN AND CONSTRUCTION
 - 2.1 MSE WALL DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 504 OF THE STANDARD SPECIFICATIONS.
 - 2.2 THE FOLLOWING SOIL STRENGTH PARAMETERS HAVE BEEN ASSUMED FOR THE PRELIMINARY DESIGN:

	Ø	C'	γ
	(deg)	(psf)	(pcf)
STRUCTURE BACKFILL (CLASS 1)	34	0	135
SURFICIAL SOIL	30	50	120
BEDROCK	33	500	135

Ø ANGLE OF INTERNAL FRICTION
 C' COHESION
 γ UNIT WEIGHT



STRUCTURE BACKFILL

---X---X---X---X---X--- REINFORCEMENT (MINIMUM LTDS = 2000 LBS/FT)

FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019

Print Date: 3/6/2019		Sheet Revisions Date: Comments Init.		Colorado Department of Transportation 3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 DRV		As Constructed		MSE WALL TYPICAL		Project No./Code	
File Name: 012_22420-MSE Wall Typical.dgn						No Revisions:				NHPP 5501-029	
Horiz. Scale: 1:4 Vert. Scale: As Noted						Revised:				Designer: TA Structure Numbers	
Unit Information Unit Leader Initials						Void:				Detailer: LR Sheet Subset: WALL-DET Subset Sheets: 1 OF 5	
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1.0 GENERAL NOTES

- 1.1 EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH M-206-1 AND THE PROJECT SPECIAL PROVISIONS, REVISION OF SECTION 504.
- 1.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF EXCAVATIONS DURING CONSTRUCTION.
- 1.3 EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.
- 1.4 ALL REINFORCING STEEL SHALL BE EPOXY-COATED UNLESS OTHERWISE NOTED.
- 1.5 (N) DENOTES NON-COATED REINFORCING STEEL.

2.0 DESIGN DATA

- 2.1 REINFORCED CONCRETE:

CLASS B CONCRETE: f'_c = 4,500 psi
 CLASS D CONCRETE: f'_c = 4,500 psi
 REINFORCING STEEL: f_y = 60,000 psi

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

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

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

- 2.4 THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

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

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

THE ABOVE SPLICE LENGTHS MAY BE REDUCED BY 20% WHEN 3" OF CLEAR COVER EXISTS AND BAR SPACING IS 6" OR GREATER ON CENTER.

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

FOR STRUCTURE NUMBER INSTALLATION, SEE STANDARD S-614-12.

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

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.

3.0 SOIL NAIL WALLS

- 3.1 SOIL NAILS - GRADE 75 THREADBAR OR EQUIVALENT IN ACCORDANCE WITH ASTM A615 AND CORROSION PROTECTION GALVANIZED OR EPOXY COATED IN ACCORDANCE WITH ASTM A153 AS SHOWN ON THE DRAWINGS.
 $F_y=75,000$ PSI
- 3.2 GROUT - GROUT MAY BE NEAT-CEMENT OR WITH SAND, WITH TYPE II CEMENT IN ACCORDANCE WITH ASTM C150. WATER-CEMENT RATIO SHOULD BE BETWEEN 0.4 AND 0.6 AND SHOULD DEVELOP THE FOLLOWING STRENGTHS AT THE SPECIFIED CURE PERIODS.
 $F'_c=3,000$ PSI MINIMUM 7 DAY
- 3.3 END HARDWARE - NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH SOIL NAIL MANUFACTURER'S RECOMMENDATIONS. BEARING PLATE SHALL BE IN ACCORDANCE WITH ASTM A36, GRADE 36. BEARING PLATE, NUTS AND WASHERS SHALL BE EPOXY-COATED.
- 3.4 SHOTCRETE - SHOTCRETE MIX SHALL CONSIST OF TYPE II CEMENT IN ACCORDANCE WITH ASTM C150, POTABLE WATER AND NORMAL WEIGHT AGGREGATE IN ACCORDANCE WITH ASTM C33. ADMIXTURES, IF USED, SHOULD BE NON-CORROSIVE TO STEEL.
 $F'_c=4,500$ PSI (28-DAY STRENGTH)
- 3.5 UNLESS OTHERWISE NOTED ON THE PLANS, MINIMUM COVER OF SHOTCRETE REINFORCEMENT AND NAIL END HARDWARE SHOULD BE AS FOLLOWS:
 FACE EXPOSED TO WEATHER - 2"
 FACE EXPOSED TO SOIL - 3"
- 3.6 WELDED WIRE MESH SHALL BE IN ACCORDANCE WITH ASTM A185.
- 3.7 WALERS AND VERTICAL BEARING BARS SHALL BE IN ACCORDANCE WITH ASTM A615.
 $F_y=60,000$ PSI
- 3.8 STRIP DRAINS CONSIST OF 12" WIDE DIMPLED CORES WRAPPED IN GEOTEXTILE.
- 3.9 CENTRALIZERS SHOULD BE PLASTIC AND ATTACHED TO THE NAILS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

4.0 SOIL NAIL WALL CONSTRUCTION SEQUENCE

- 4.1 EXCAVATE ONE LIFT TO A MAXIMUM DEPTH OF SIX (6) FEET. BOULDERS, COBBLES AND/OR BEDROCK MAY BE ENCOUNTERED AT ANY DEPTH OF THE EXCAVATION OR DRILLING. IF SLOUGHING GROUND CONDITIONS ARE ENCOUNTERED, GROUND NAILS MAY BE DRILLED AND INSTALLED THROUGH A TEMPORARY STABILIZING BERM. CARE SHOULD BE TAKEN DURING EXCAVATION THAT NO GROUND IS LOST FROM BEHIND THE EXISTING SHOTCRETE.
- 4.2 FOLLOW FHWA GUIDELINES TO DETERMINE SOIL NAIL LOCATIONS. PROVIDE A NAIL LOCATION PLAN TO THE ENGINEER FOR REVIEW. INSTALL SOIL NAILS AT THE SPACINGS AND TO THE LENGTHS SHOWN ON THE PLANS. THE TOP ROW OF SOIL 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 SOIL NAIL LOCATIONS SHALL BE 6 INCHES. TREMIE THE GROUT FROM THE BOTTOM OF THE HOLE UP.
- 4.3 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.
- 4.4 INSTALL SHOTCRETE TO THE MINIMUM THICKNESS SHOWN ON THE DRAWINGS AND TO ATTAIN THE MINIMUM COVERAGES SPECIFIED HEREIN. GIVE SPECIAL ATTENTION TO FILLING THE VOID IN THE BOREHOLE ABOVE THE GROUT LINE. COLD WEATHER PROTECTION MEASURES MAY BE NECESSARY.
- 4.5 INSTALL THE SOIL 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 SOIL NAIL AND END HARDWARE.
- 4.6 ONCE THE GROUT AND SHOTCRETE OF THE CURRENT LIFT HAVE ATTAINED 50% OF THEIR SPECIFIC STRENGTHS, REPEAT CONSTRUCTION SEQUENCE TO THE BOTTOM OF THE WALL.
- 4.7 AT THE BOTTOM LIFT, CONSTRUCT DRAINPIPE, FILTER MATERIAL, AND GEOCOMPOSITE STRIP DRAINS AS SHOWN ON THE DRAWINGS.

5.0 SOIL NAIL WALL DESIGN PARAMETERS

- 5.1 THE SOIL NAIL WALL HAS BEEN DESIGNED IN GENERAL ACCORDANCE WITH PROCEDURES CONTAINED IN THE FHWA "MANUAL FOR DESIGN AND CONSTRUCTION MONITORING OF SOIL NAIL WALLS", REPORT NO. FHWA-SA-96-069R, USING ASD AND GEOTECHNICAL ENGINEERING CIRCULAR NO. 7 "SOIL NAIL WALLS" PUBLICATION NO. FHWA 0-IF-03-017.
- 5.2 THE FOLLOWING VALUES HAVE BEEN USED FOR DESIGN PARAMETERS:

	ϕ (DEG)	c (PSF)	γ (PCF)	Quit (PSI)	Q_d (lb/ft)
SURFICIAL SOIL	28	50	100	6.26	1240
ALLUVIAM	38	0	130	9.63	1905
BEDROCK	33	500	135	7.22	1430

ϕ ANGLE OF INTERNAL FRICTION
 c COHESION
 γ UNIT WEIGHT
 Quit ULTIMATE SHEAR RESISTANCE BETWEEN GROUT/GROUND BOND
 Q_d BOND STRENGTH (ALLOWABLE)

- 5.3 NO GROUNDWATER TABLE WAS ASSUMED.

- 5.4 FACTORS OF SAFETY



BEARING CAPACITY - $FS=2.5$
 OVERTURNING - $ECCENTRICITY \leq B/6$
 GLOBAL STABILITY - $FS=1.30$

PULLOUT - $FS=2.0$
 YIELD REDUCTION FACTOR - $\infty y=0.55$
 FACING FLEXURE FACTOR - $\infty f=0.67$
 FACING PUNCHING FACTOR - $\infty f=0.67$
 SEISMIC COEFFICIENT = 0.04

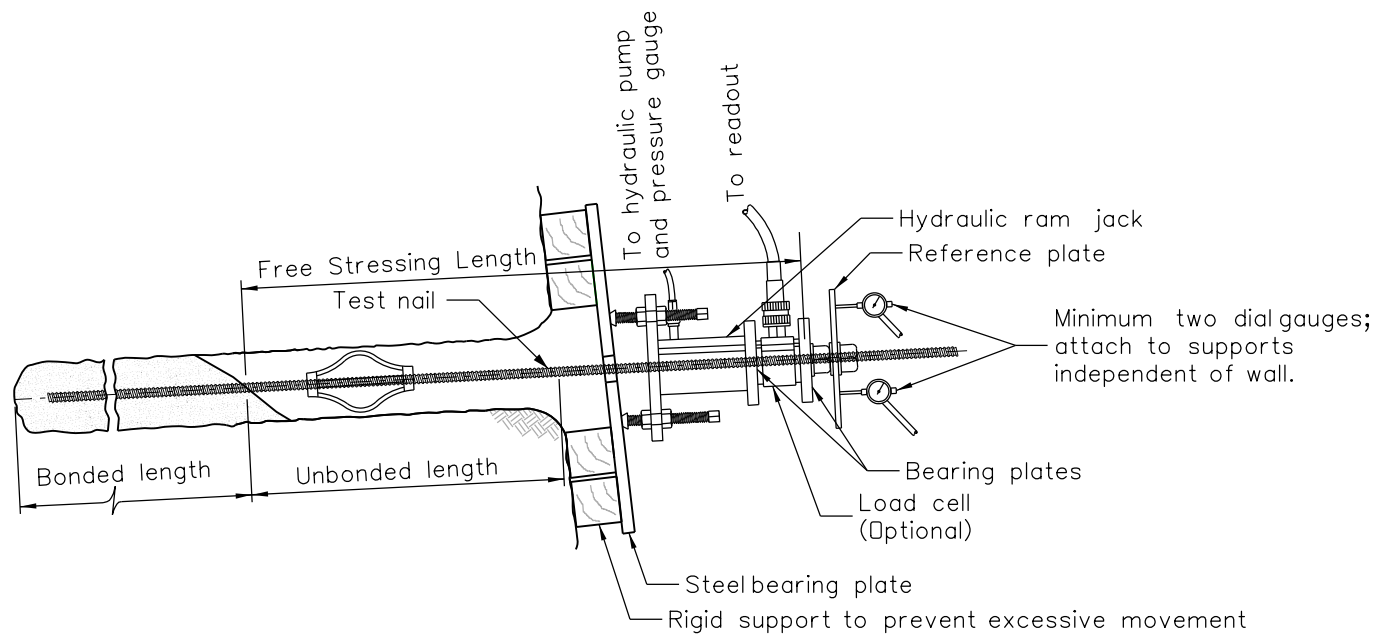
6.0 SOIL NAIL WALL SPECIAL NOTES

- 6.1 THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SLOPE STABILITY ABOVE AND BELOW THE SOIL NAIL WALL DURING CONSTRUCTION.
- 6.2 THE CONTRACTORS ARE RESPONSIBLE FOR FIELD LOCATING ALL NEARBY UTILITIES. CONFLICTING UTILITIES MAY REQUIRE SOIL NAIL WALL REDESIGN, AT ENGINEER'S DISCRETION.
- 6.3 THE BOND STRENGTHS (Q_d) SHOWN ON THE PLANS ARE THE MINIMUM ASSUMED FOR DESIGN.
- 6.4 SOIL NAIL LENGTHS SHOWN ON THE PLANS ARE THE MINIMUM LENGTHS REQUIRED.
- 6.5 PRIOR TO BEGINNING EXCAVATION FOR THE SOIL NAIL WALL, THE CONTRACTOR SHALL:
 - 6.5.1 SURVEY THE LAYOUT LINE AND TOP OF WALL LINE.
 - 6.5.2 CONFIRM THE LINES, GRADES, AND EXCAVATION LIMITS SHOWN ON THE PLANS.
 - 6.5.3 MODIFY PANEL HEIGHTS AND/OR STEP ELEVATIONS TO CONFORM TO THE SURVEY DATA AND CONTRACT REQUIREMENTS FOR TOP OF WALL SMOOTHNESS.
 - 6.5.4 SUBMIT SHOP DRAWINGS INCLUDING SOIL NAIL LAYOUT, PANEL DESIGN, AND COPING DETAILS.
 - 6.5.5 THE CONTRACTOR SHALL SUBMIT THE PROPOSED WALL PROFILE TO THE ENGINEER FOR REVIEW AND APPROVAL.

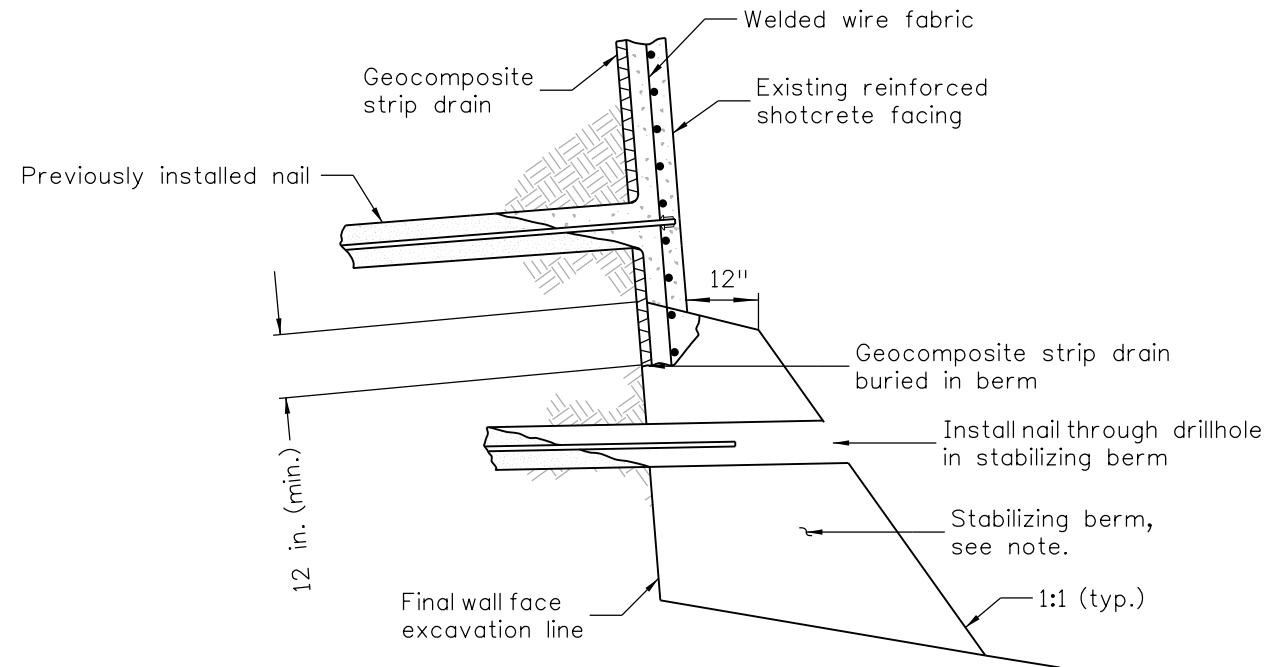
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 JUNE 10, 2019

Print Date: 3/6/2019	Sheet Revisions			Colorado Department of Transportation	As Constructed	GROUND NAIL WALL GENERAL NOTES			Project No./Code
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Horiz. Scale: 1:10				 3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	Revised:	Designer: TA	Structure		22420
Unit Information					Void:	Detailer: LR	Numbers		Sheet Number 152
 Yeh and Associates, Inc. Consulting Engineers & Scientists				Region 5	DRV	Sheet Subset: WALL-DET	Subset Sheets: 2 OF 5		

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TYPICAL GROUND NAIL TEST SETUP
(NOT TO SCALE)



NAIL INSTALLATION THROUGH TEMPORARY STABILIZING BERM
(USE IN CASE OF SLOUGHING GROUND)
(NOT TO SCALE)

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

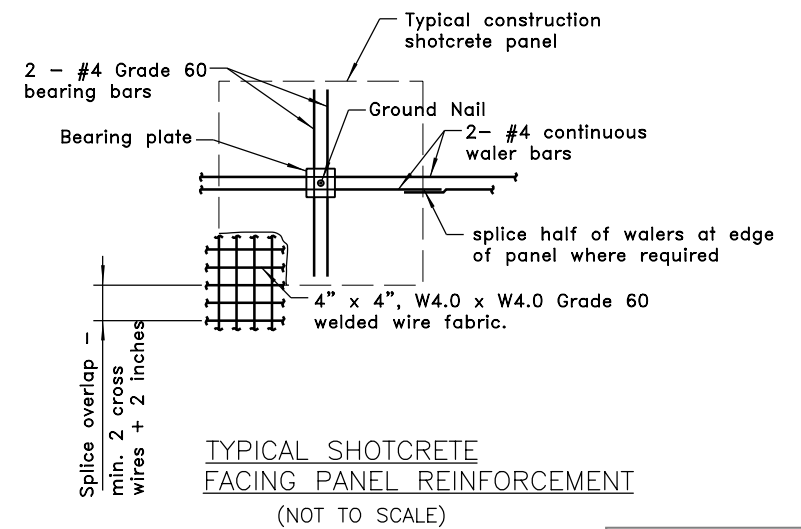
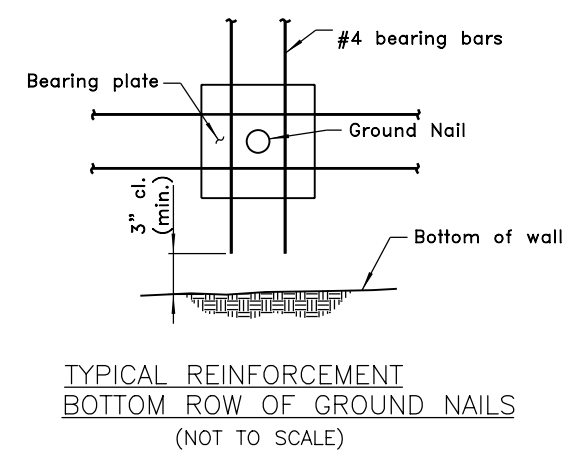
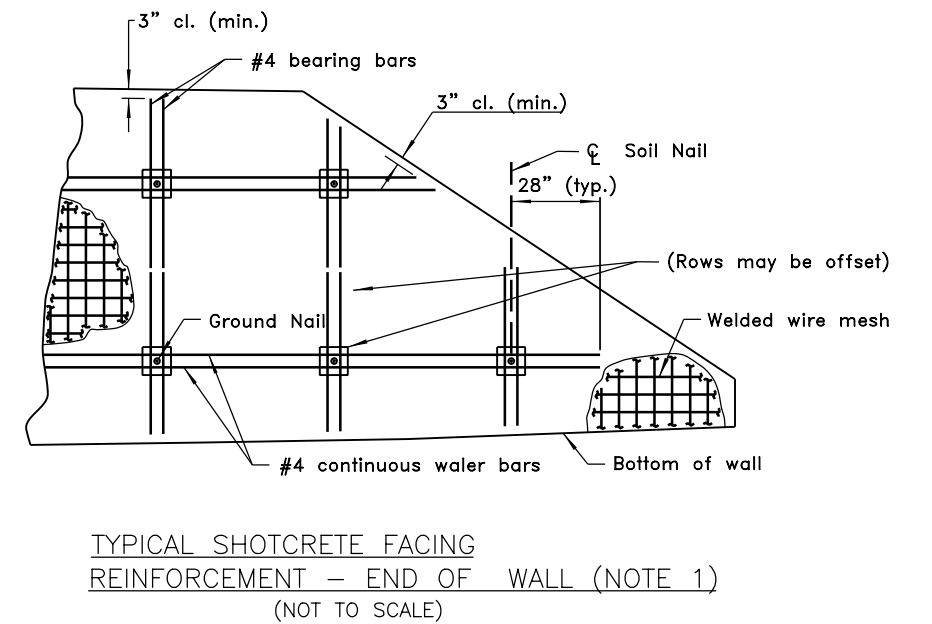
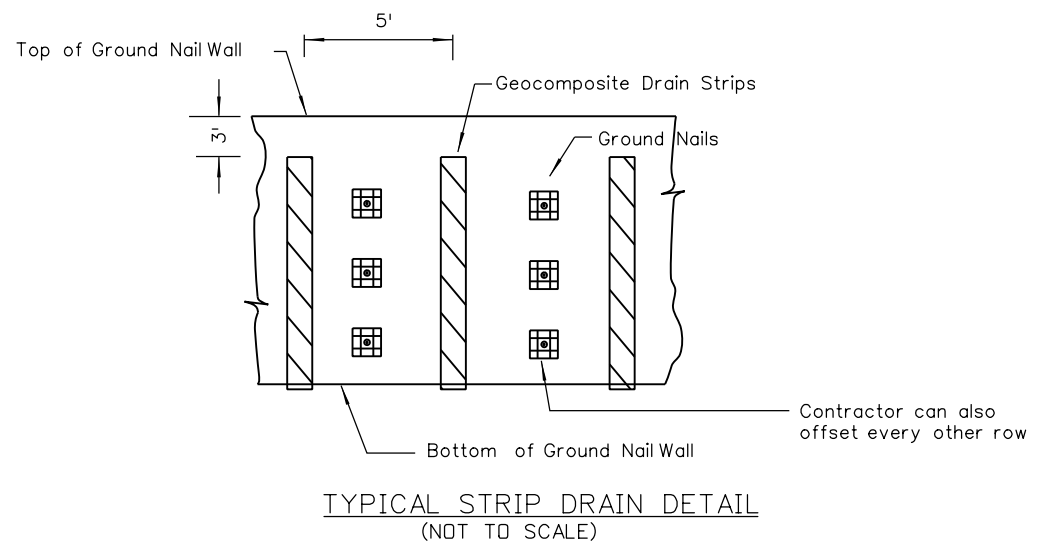
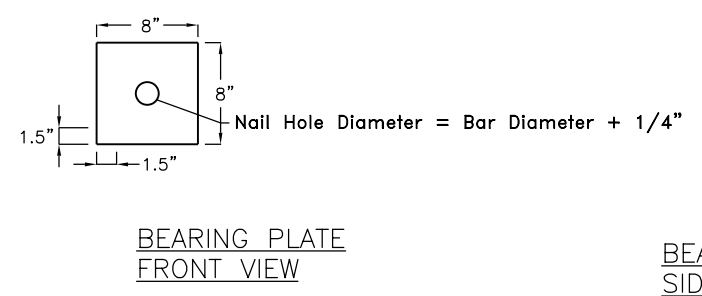
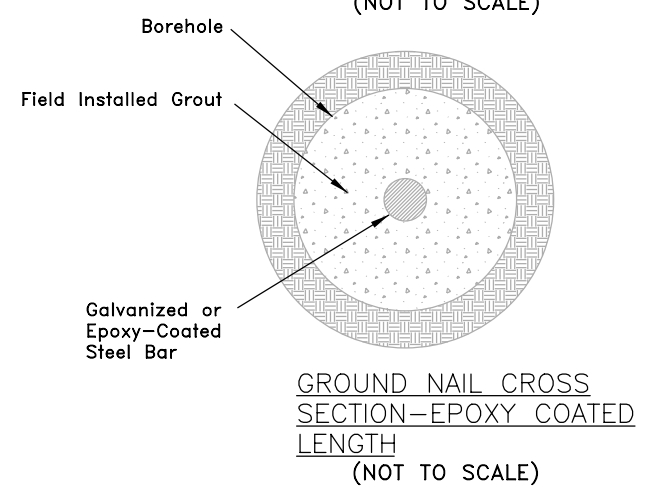
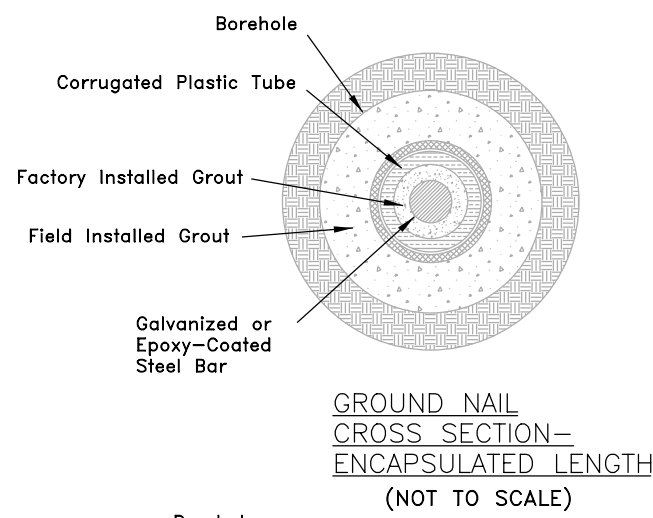
GROUND NAIL TESTING NOTES:

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

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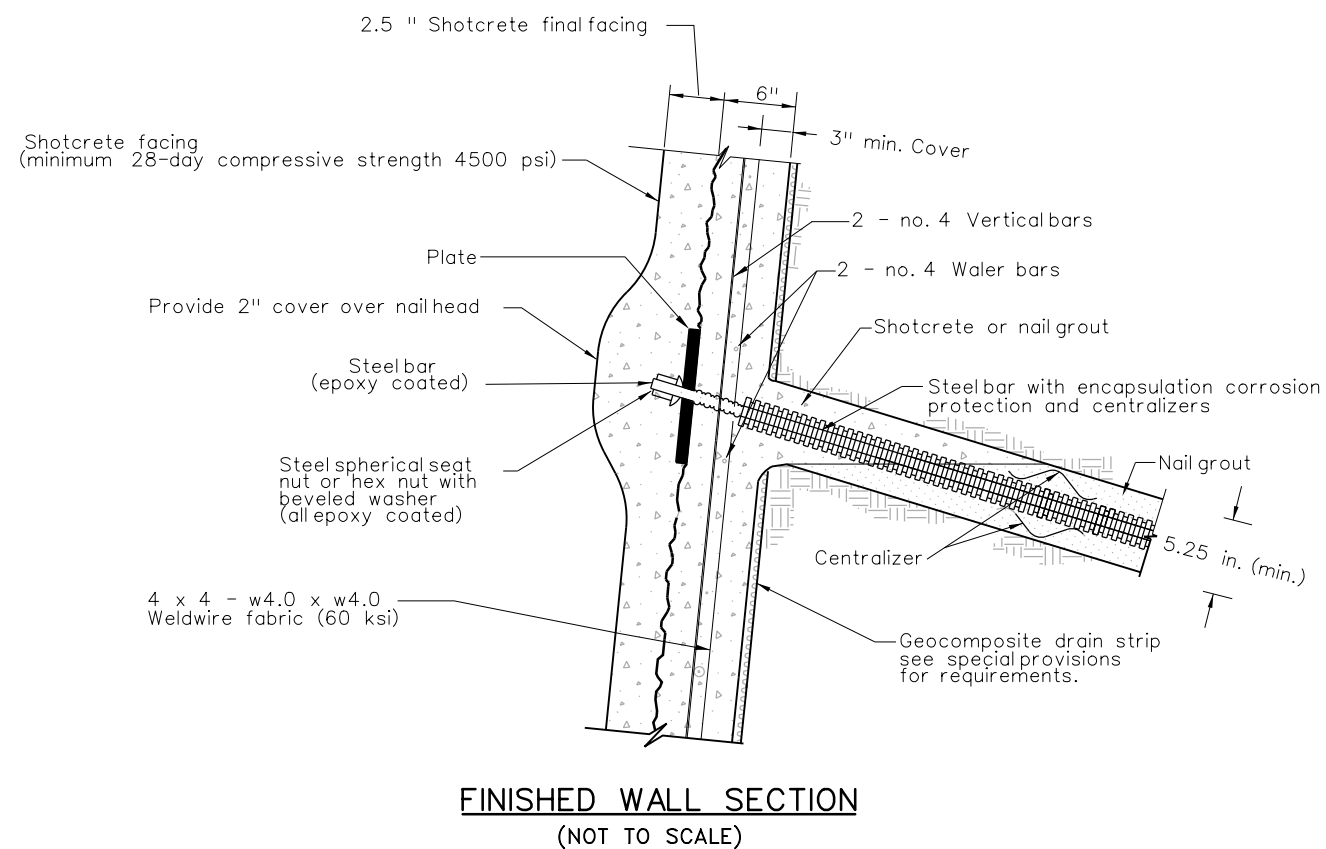
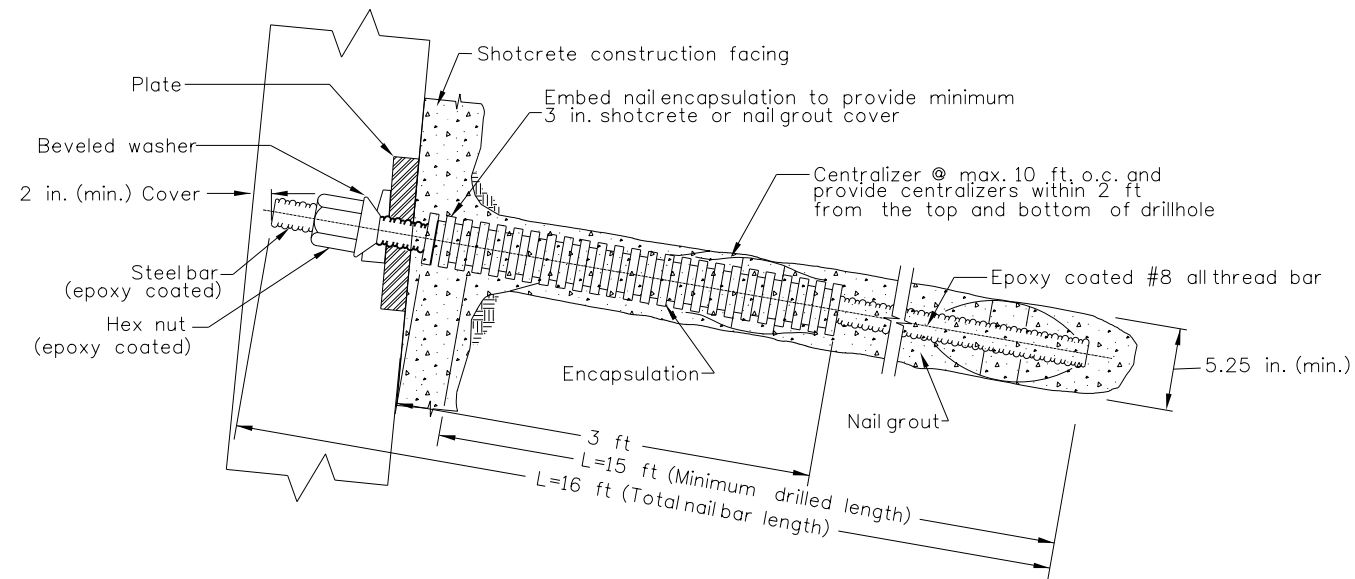
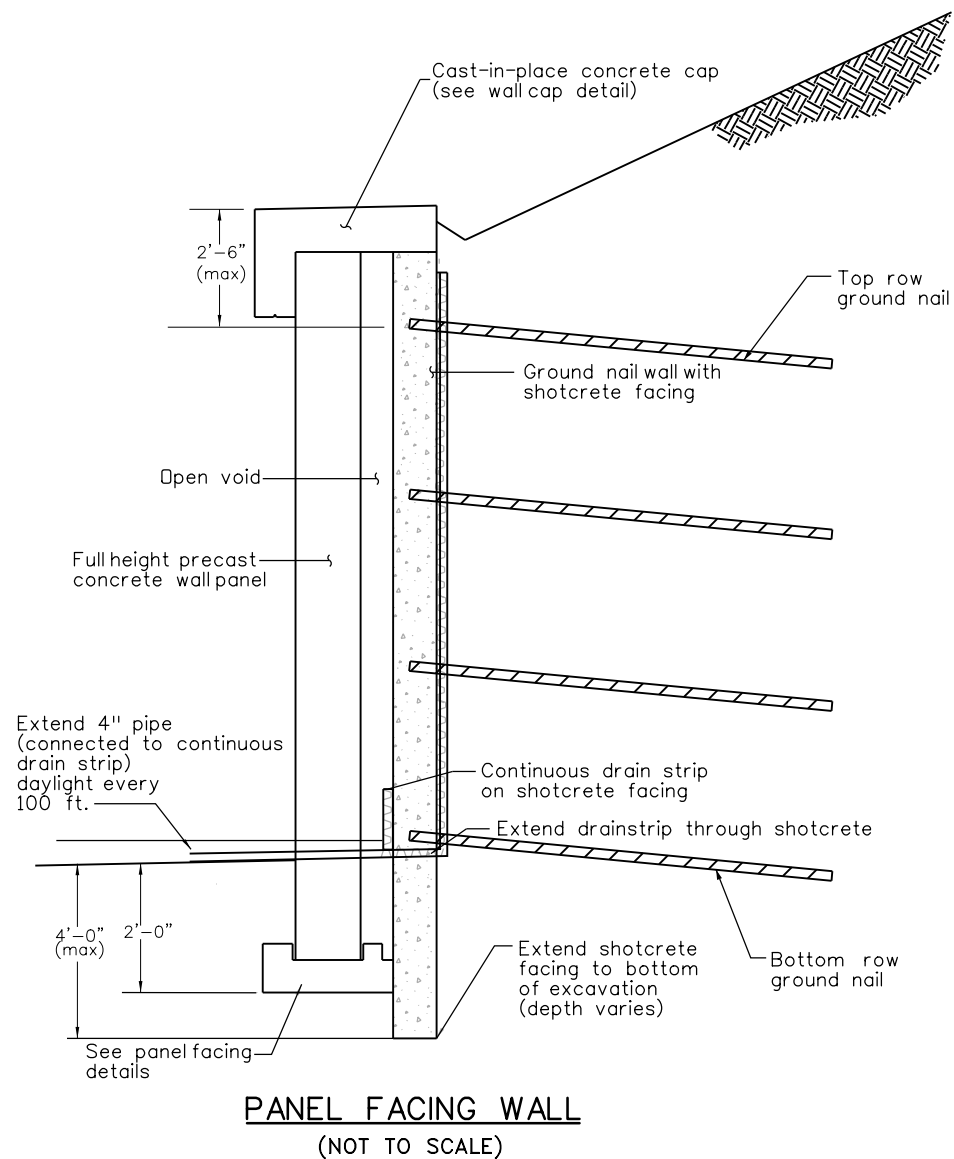


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- NOTES:
1. Reinforcement for the shotcrete facing shall be installed throughout the entire shotcrete facing, including the facing beyond the ground nails.
 2. The minimum splice length for #4 bars is 15 inches.

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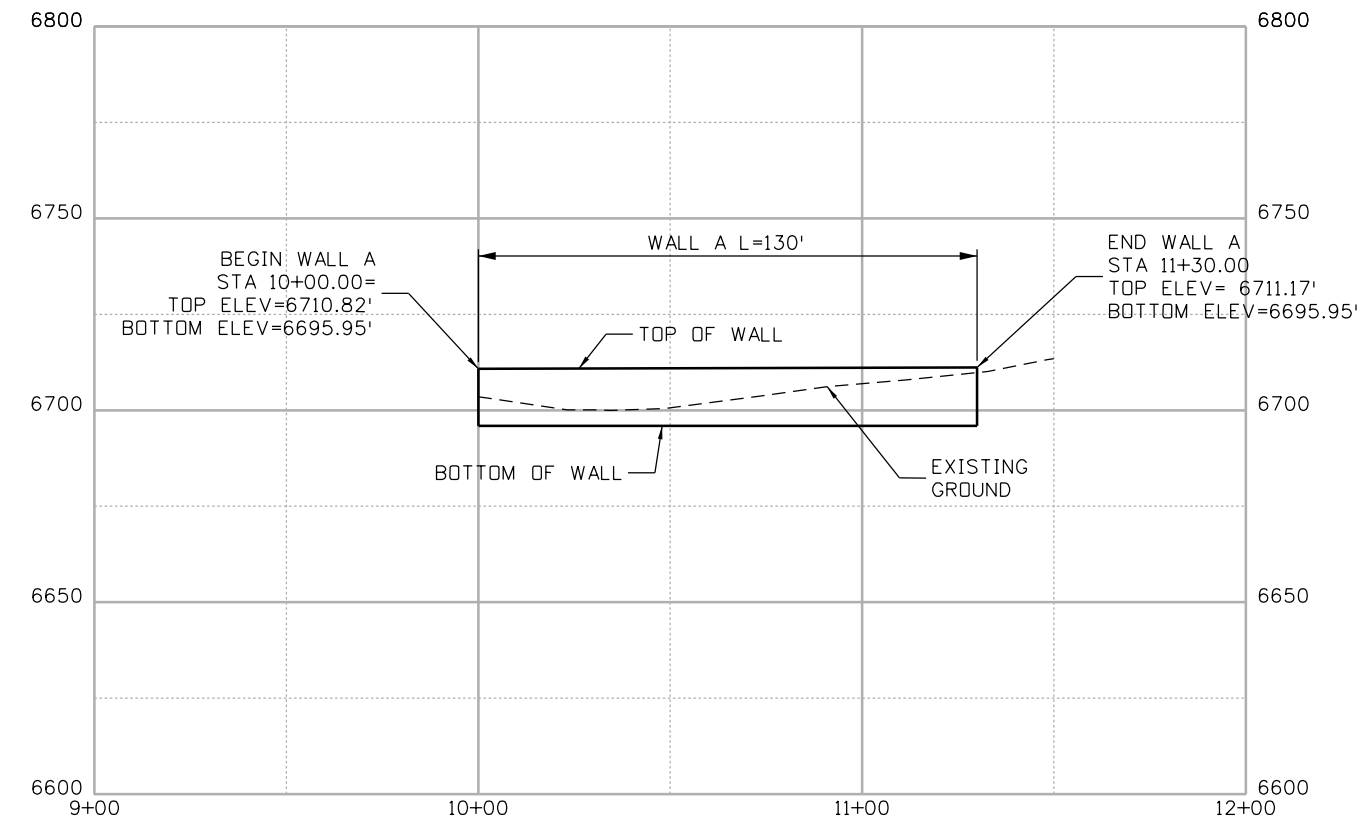
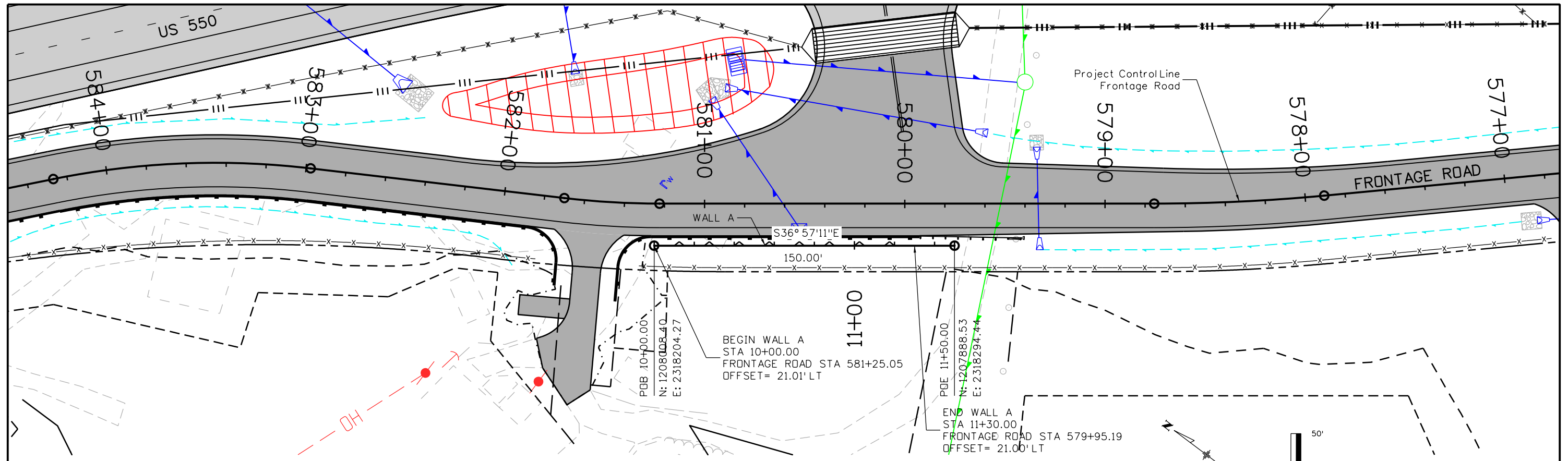
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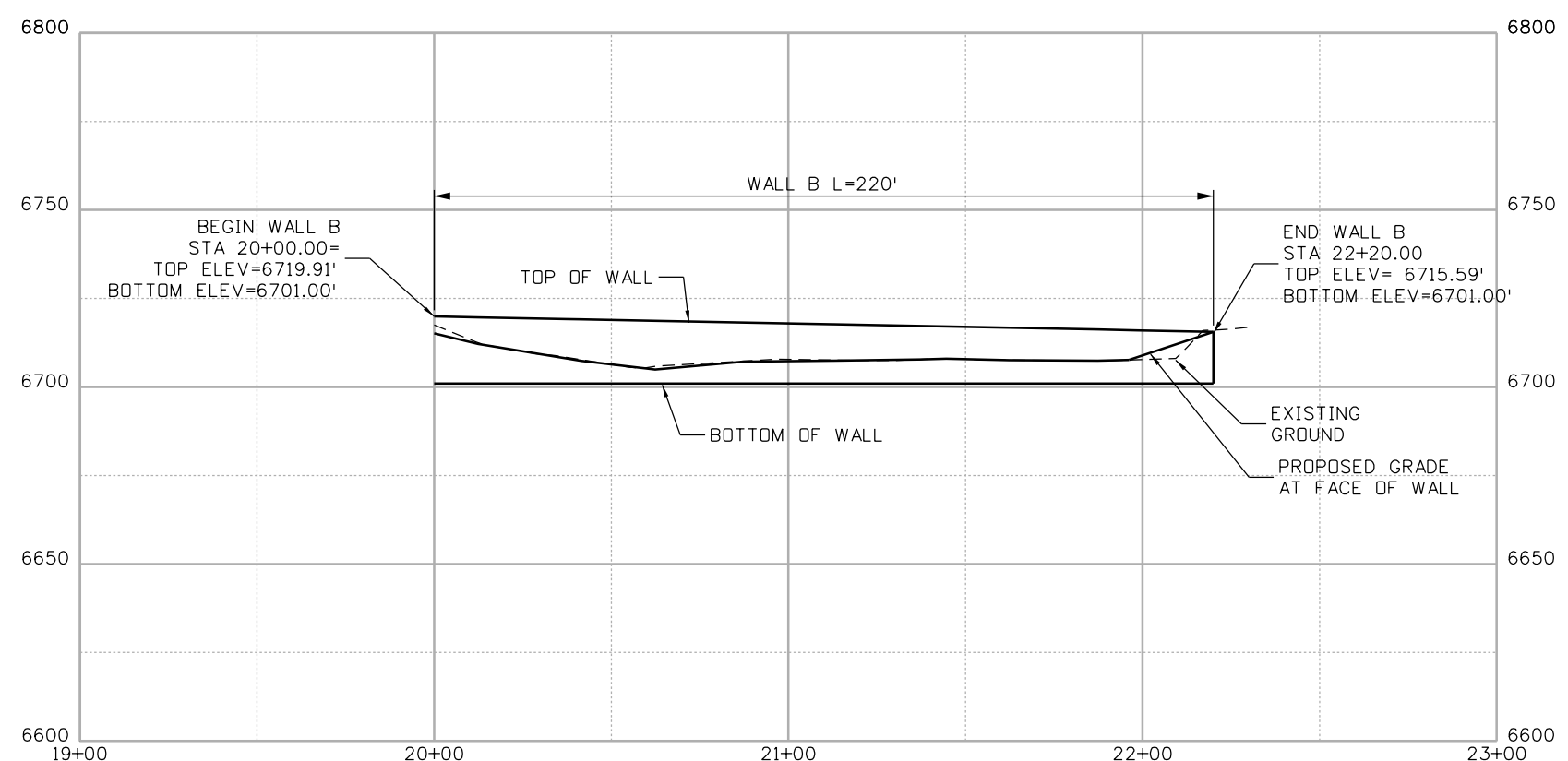
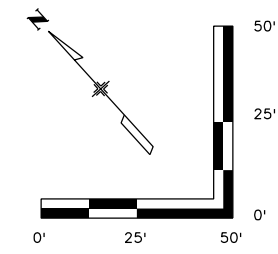
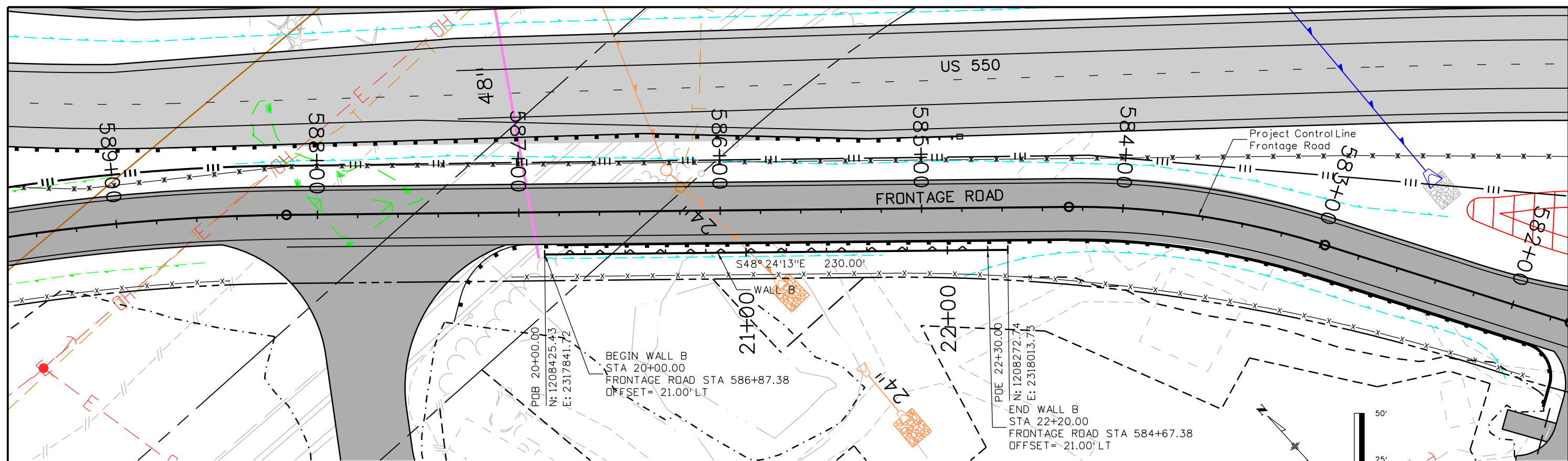
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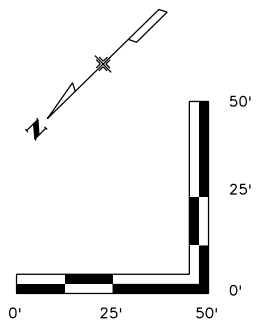
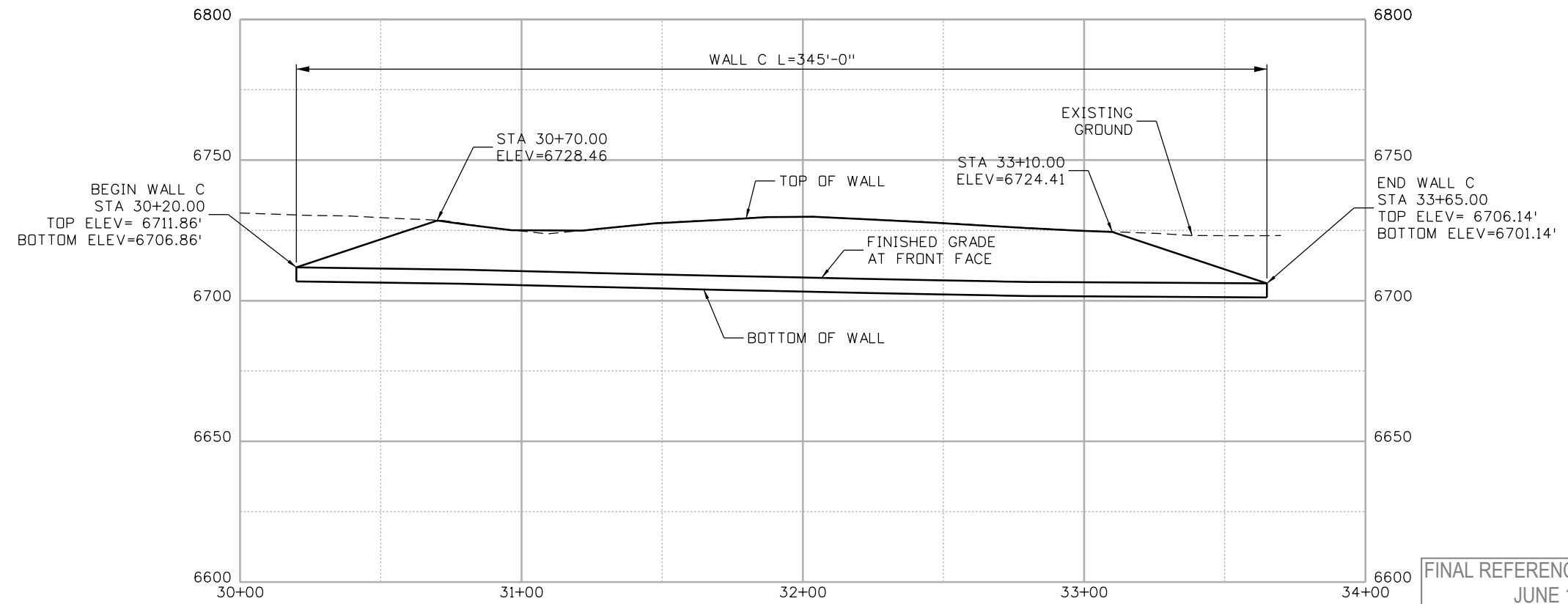
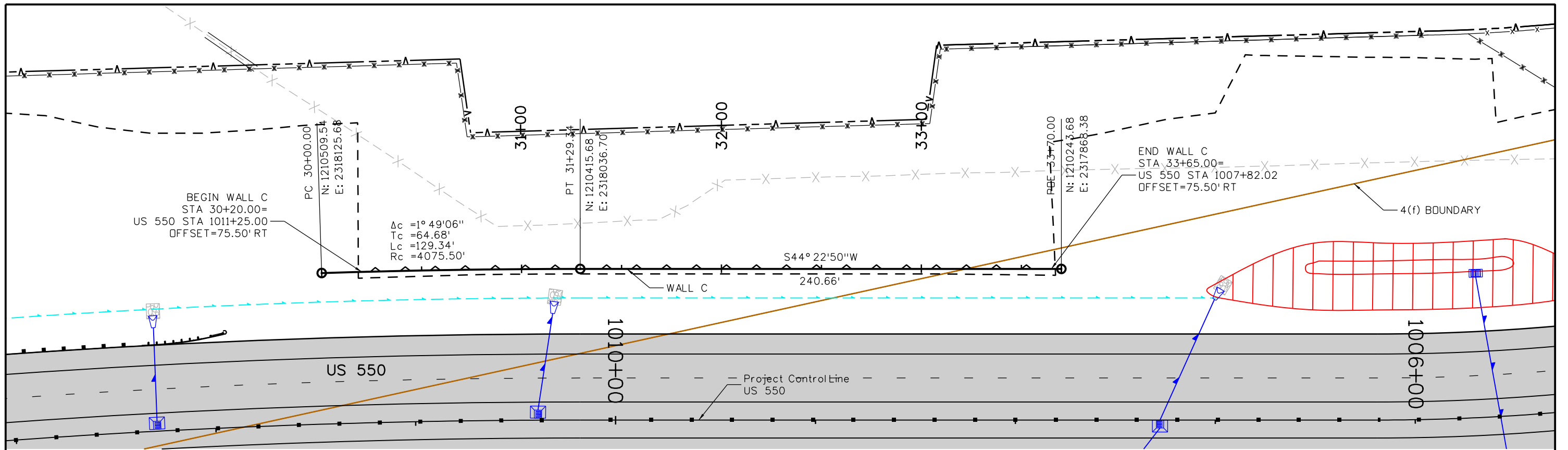
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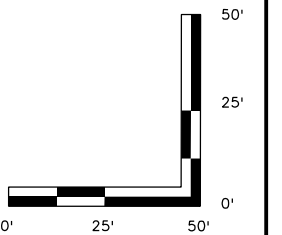
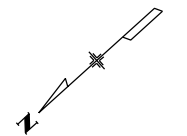
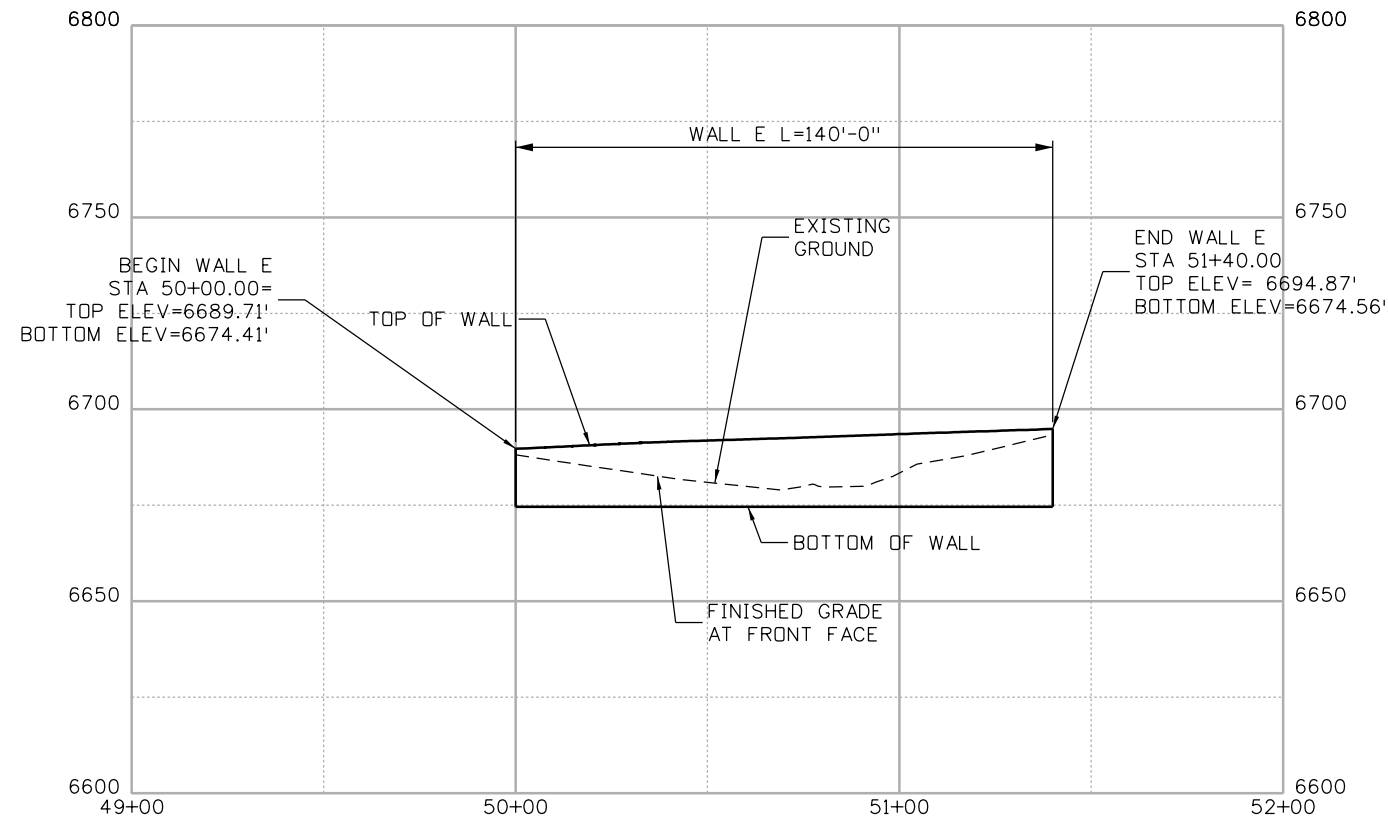
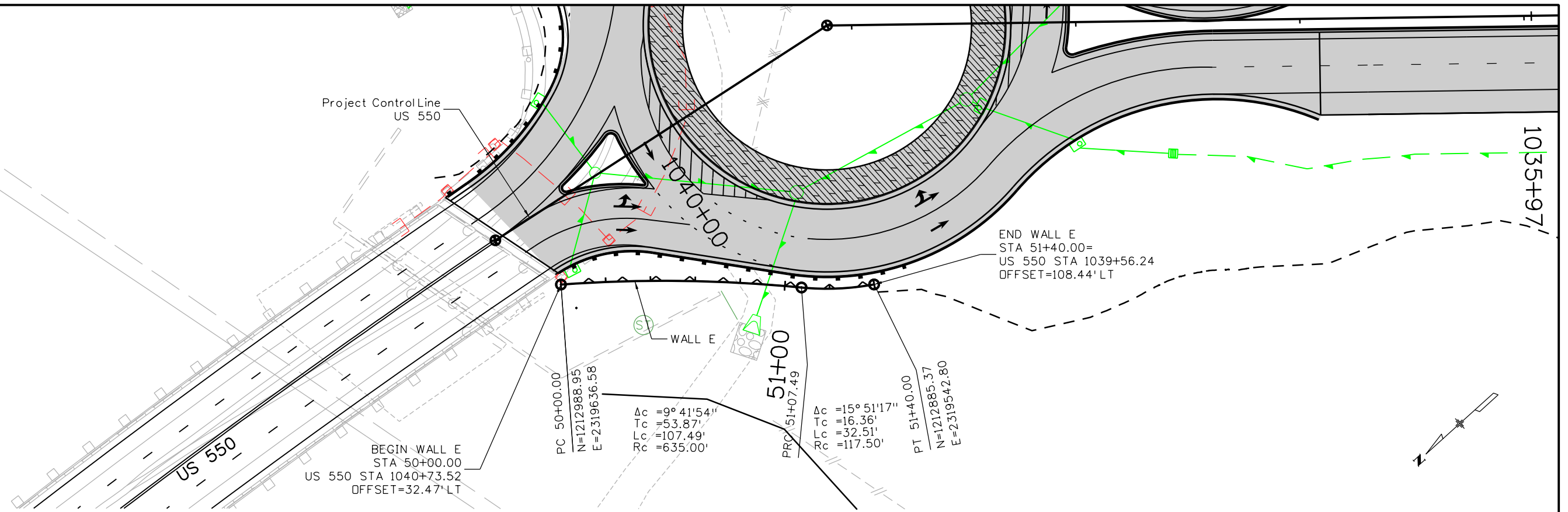
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Know what's below
 Call before you dig.

Print Date: 2/27/2019 Drawing File Name: 22420DES_Wall_PnPO3.dgn Horiz. Scale: 1:50 Unit Information wood. Colorado Center Tower 2 2000 S. Colorado Blvd Suite 2-1000 Denver, CO 80222	<table border="1"> <thead> <tr> <th colspan="3">Sheet Revisions</th> </tr> <tr> <th>Date:</th> <th>Comments</th> <th>Init.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Sheet Revisions			Date:	Comments	Init.										Colorado Department of Transportation 3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 DRV	<table border="1"> <thead> <tr> <th colspan="2">As Constructed</th> </tr> </thead> <tbody> <tr> <td>No Revisions:</td> <td> </td> </tr> <tr> <td>Revised:</td> <td> </td> </tr> <tr> <td>Void:</td> <td> </td> </tr> </tbody> </table>	As Constructed		No Revisions:		Revised:		Void:		<table border="1"> <thead> <tr> <th colspan="4">WALL C PLAN AND PROFILE</th> </tr> </thead> <tbody> <tr> <td>Designer:</td> <td>KB</td> <td>Structure</td> <td> </td> </tr> <tr> <td>Detailer:</td> <td>KB</td> <td>Numbers</td> <td> </td> </tr> <tr> <td>Sheet Subset:</td> <td>WALL</td> <td>Subset Sheets:</td> <td>3 of 5</td> </tr> </tbody> </table>	WALL C PLAN AND PROFILE				Designer:	KB	Structure		Detailer:	KB	Numbers		Sheet Subset:	WALL	Subset Sheets:	3 of 5	<table border="1"> <thead> <tr> <th colspan="2">Project No./Code</th> </tr> </thead> <tbody> <tr> <td>NHPP</td> <td>5501-029</td> </tr> <tr> <td> </td> <td>22420</td> </tr> <tr> <td>Sheet Number</td> <td>158</td> </tr> </tbody> </table>	Project No./Code		NHPP	5501-029		22420	Sheet Number	158
Sheet Revisions																																																				
Date:	Comments	Init.																																																		
As Constructed																																																				
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Detailer:	KB	Numbers																																																		
Sheet Subset:	WALL	Subset Sheets:	3 of 5																																																	
Project No./Code																																																				
NHPP	5501-029																																																			
	22420																																																			
Sheet Number	158																																																			

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FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019



Print Date: 2/27/2019	
Drawing File Name: 22420DES_Wall_Pn05.dgn	
Horiz. Scale: 1:50	Vert. Scale: As Noted
Unit Information	Unit Leader Initials
wood.	Colorado Center Tower 2 2000 S. Colorado Blvd Suite 2-1000 Denver, CO 80222

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

Region 5

3803 North Main Avenue
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

DRV

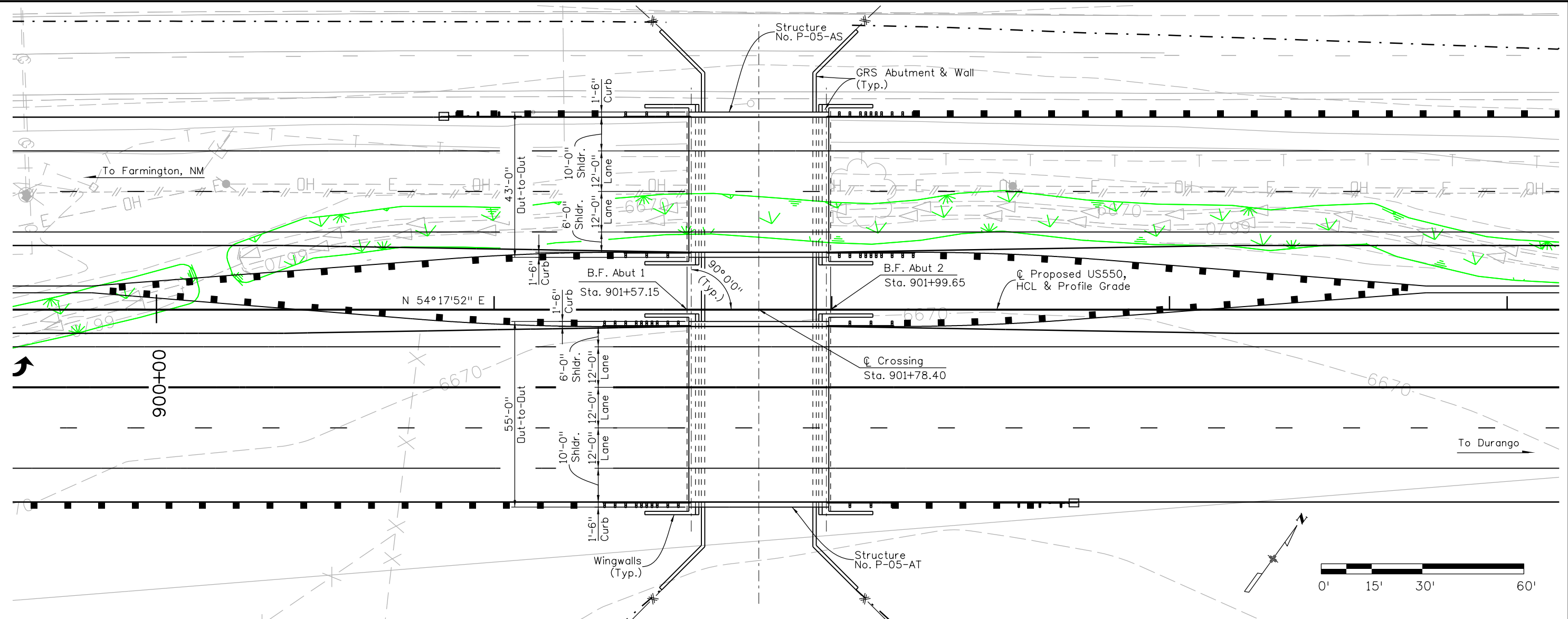
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No Revisions:	
Revised:	
Void:	

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Designer:	KB	Structure	
Detailer:	KB	Numbers	
Sheet Subset:	WALL	Subset Sheets:	5 of 5

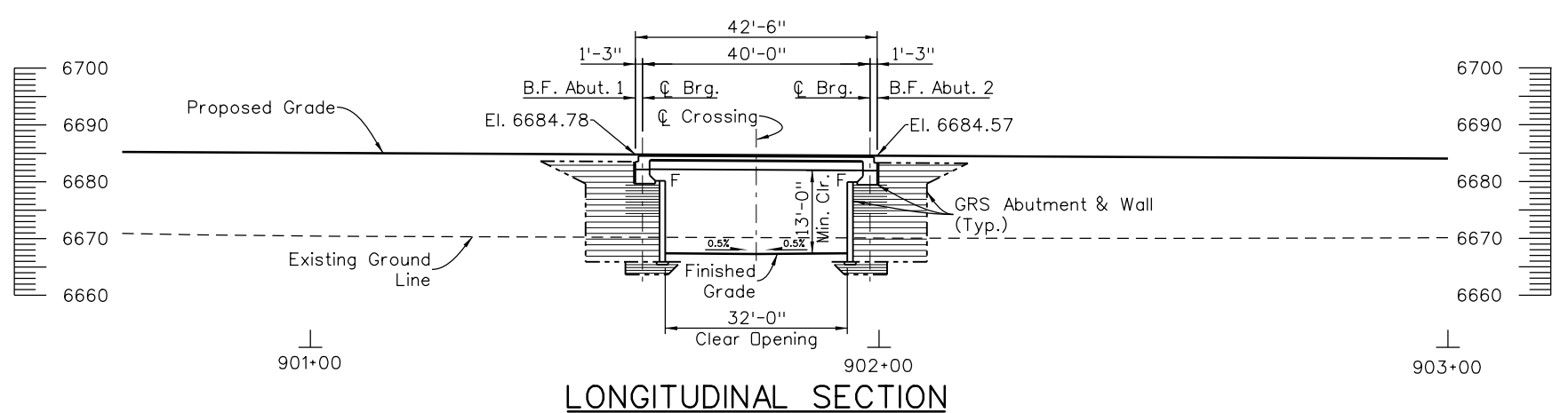
Project No./Code	NHPP 5501-029
	22420
Sheet Number	160

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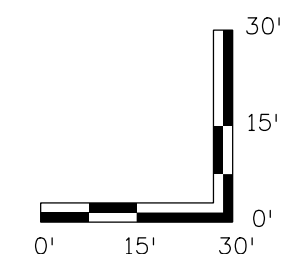
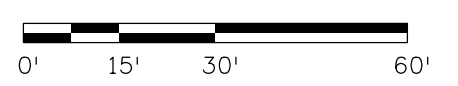
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DATE	INITIAL	DATE	INITIAL	DATE	INITIAL
MM/YY	XXX	MM/YY	XXX	MM/YY	XXX
Designed By	Checked By	Detailed By	Checked By	Quantities By	Checked By
XXX	XXX	XXX	XXX	XXX	XXX



PLAN



LONGITUDINAL SECTION



FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

Print Date: 5/1/2019
File Name: 22420_Wildlife_PnP.dgn
Horiz. Scale: 1:30 Vert. Scale: As Noted
Staff Bridge Branch - Unit 0221 STW

wood. Colorado Center Tower 2
2000 S. Colorado Blvd Suite 2-1000
Denver, CO 80222

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5 DRV

As Constructed

No Revisions:
Revised:
Void:

**WILDLIFE UNDERPASS A
GENERAL LAYOUT**

Designer: J. Broadus Structure P-05-AS
Detailer: J. Broadus Structure Numbers P-05-AT
Sheet Subset: Bridge Subset Sheets: B1 of 8

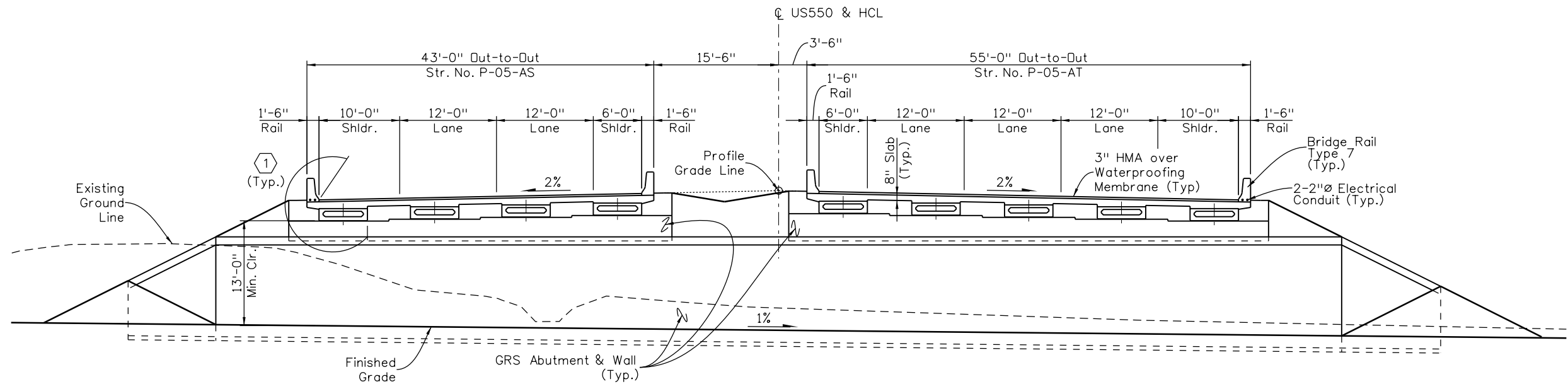
Project No./Code

NHPP 5501-029
22420
Sheet Number **161**

5/1/2019

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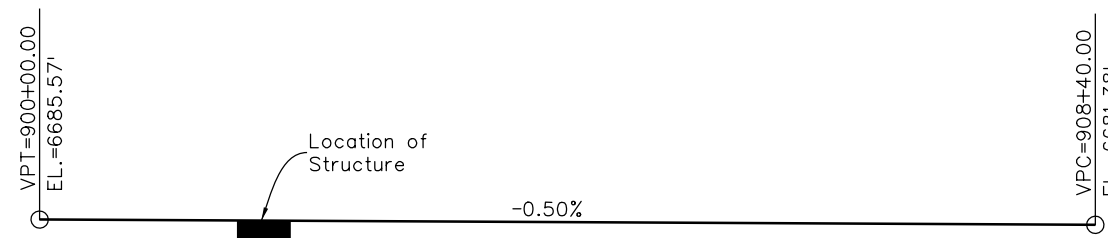
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Checked By	Detailed By	Checked By	Detailed By	Checked By	Detailed By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY



TYPICAL SECTION
(Looking Ahead Station)

KEY NOTES

① Limits of Structural Concrete Coating



PROFILE GRADE
(N.T.S.)

FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

Print Date: 5/1/2019	0000
File Name: 22420_Wildlife_TypSect.dgn	
Horiz. Scale: 1:15 Vert. Scale: As Noted	
Staff Bridge Branch - Unit 0221 STW	
wood. Colorado Center Tower 2 2000 S. Colorado Blvd Suite 2-1000 Denver, CO 80222	

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5 **DRV**

As Constructed
No Revisions:
Revised:
Void:

WILDLIFE UNDERPASS A TYPICAL SECTION			
Designer:	J. Broadus	Structure Numbers	P-05-AS
Detailer:	J. Broadus	Subset Sheets:	P-05-AT
Sheet Subset:	Bridge	Subset Sheets:	B2 OF 8

Project No./Code
NHPP 5501-029
22420
Sheet Number 162

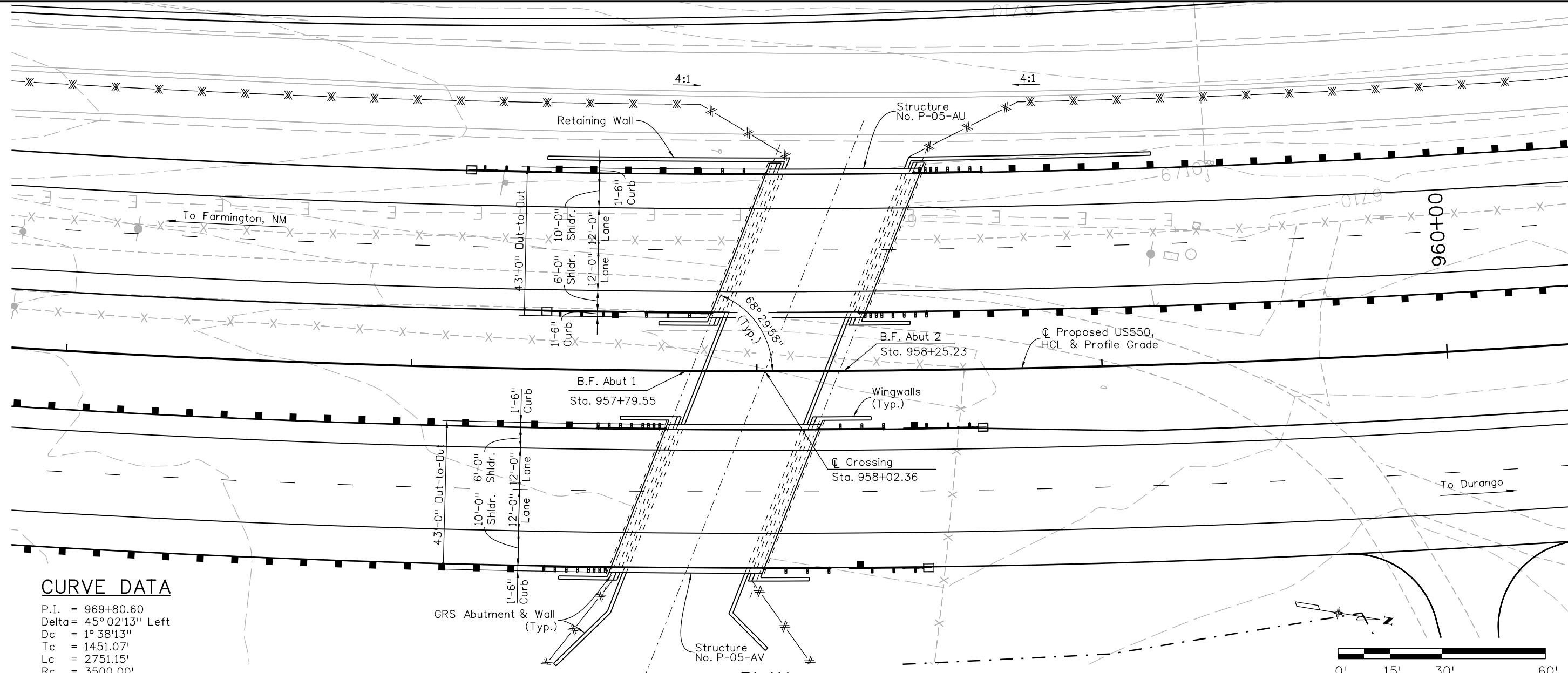
5/1/2019

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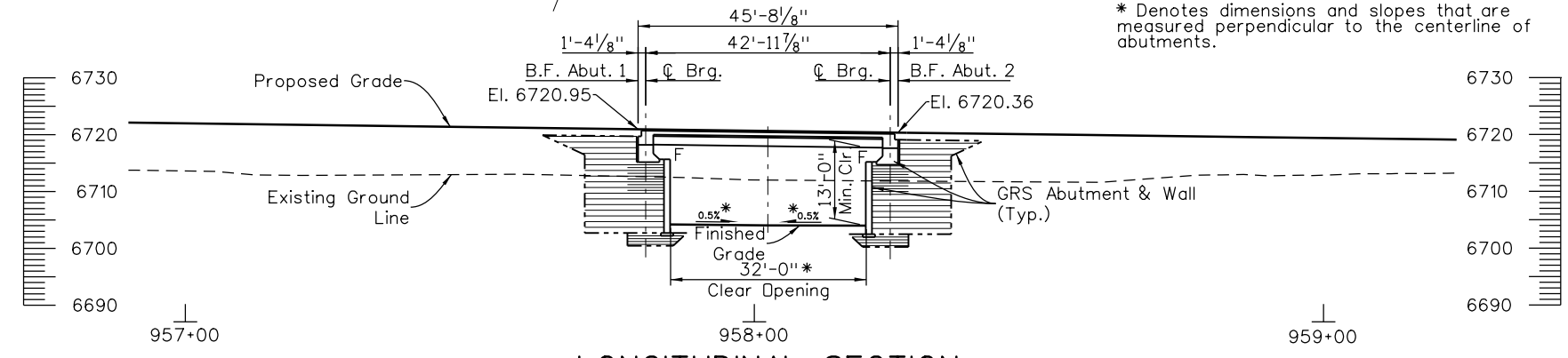
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XXX	MM/YY	XXX	MM/YY	XXX	MM/YY
Checked By	Detailed By	Checked By	Checked By	Checked By	Checked By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY

CURVE DATA

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 Rc = 3500.00'

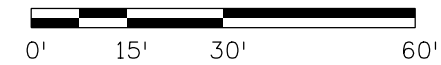


PLAN

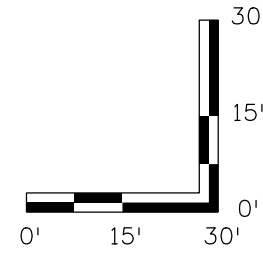


LONGITUDINAL SECTION

* Denotes dimensions and slopes that are measured perpendicular to the centerline of abutments.



FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019



Print Date: 5/2/2019
 File Name: 22420_Wildlife2_PnP.dgn
 Horiz. Scale: 1:30 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW

Colorado Center Tower 2
 2000 S. Colorado Blvd Suite 2-1000
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Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
 Durango, CO 81301
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Region 5 **DRV**

As Constructed
No Revisions:
Revised:
Void:

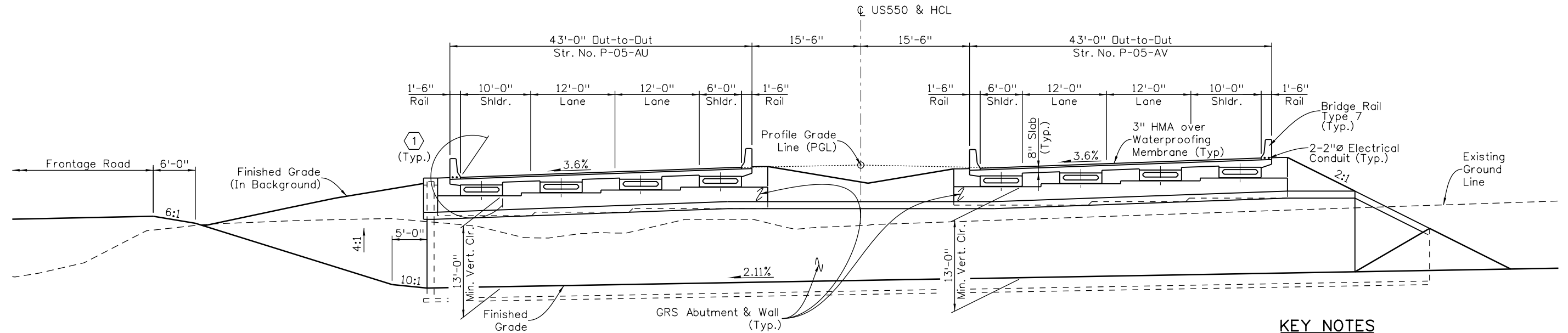
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Designer:	J. Broadus	Structure Numbers	P-05-AU
Detailer:	J. Broadus	Structure Numbers	P-05-AV
Sheet Subset:	Bridge	Subset Sheets:	B3 of 8

Project No./Code
NHPP 5501-029
22420
Sheet Number 163

5/2/2019

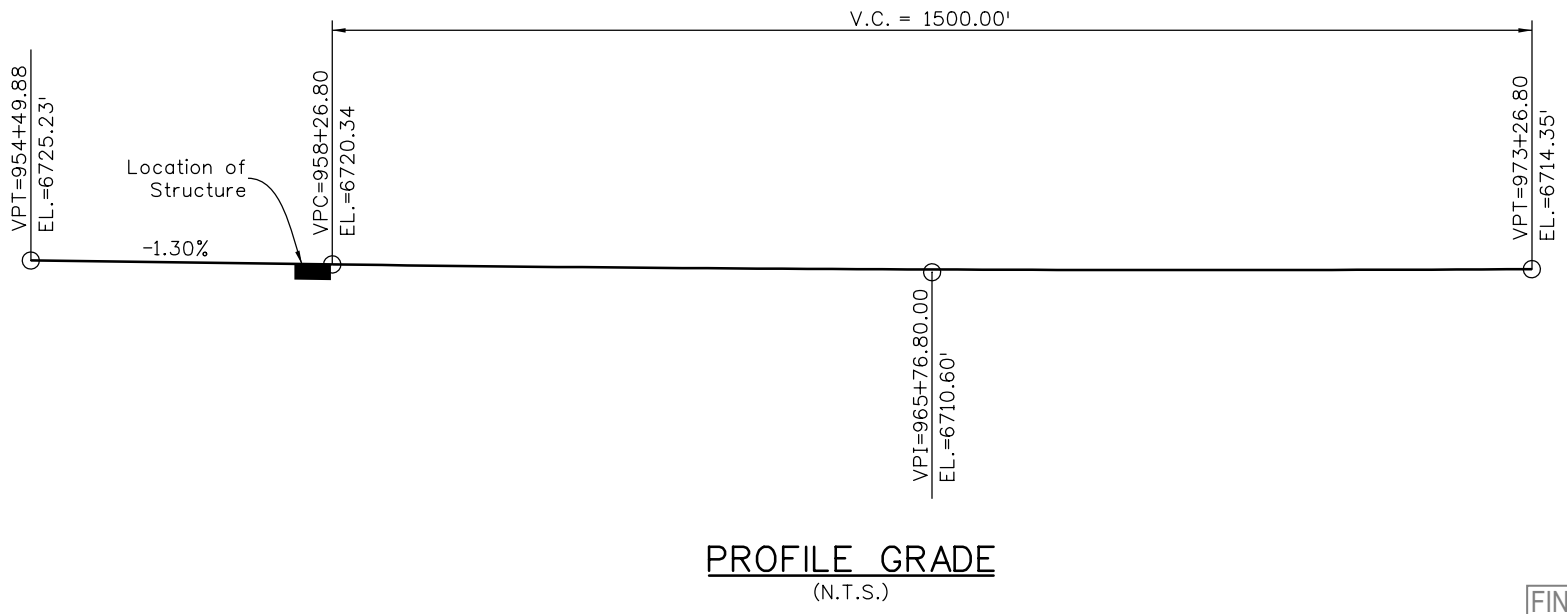
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Checked By	Detailed By	Checked By	Detailed By	Checked By	Detailed By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY



KEY NOTES
 ① Limits of Structural Concrete Coating


TYPICAL SECTION
(Looking Ahead Station)



PROFILE GRADE
(N.T.S.)

FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019

Print Date: 5/2/2019
 File Name: 22420_Wildlife2_TypSect.dgn
 Horiz. Scale: 1:15 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW



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Sheet Revisions		
Date:	Comments	Init.

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 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

Region 5 **DRV**

As Constructed
No Revisions:
Revised:
Void:

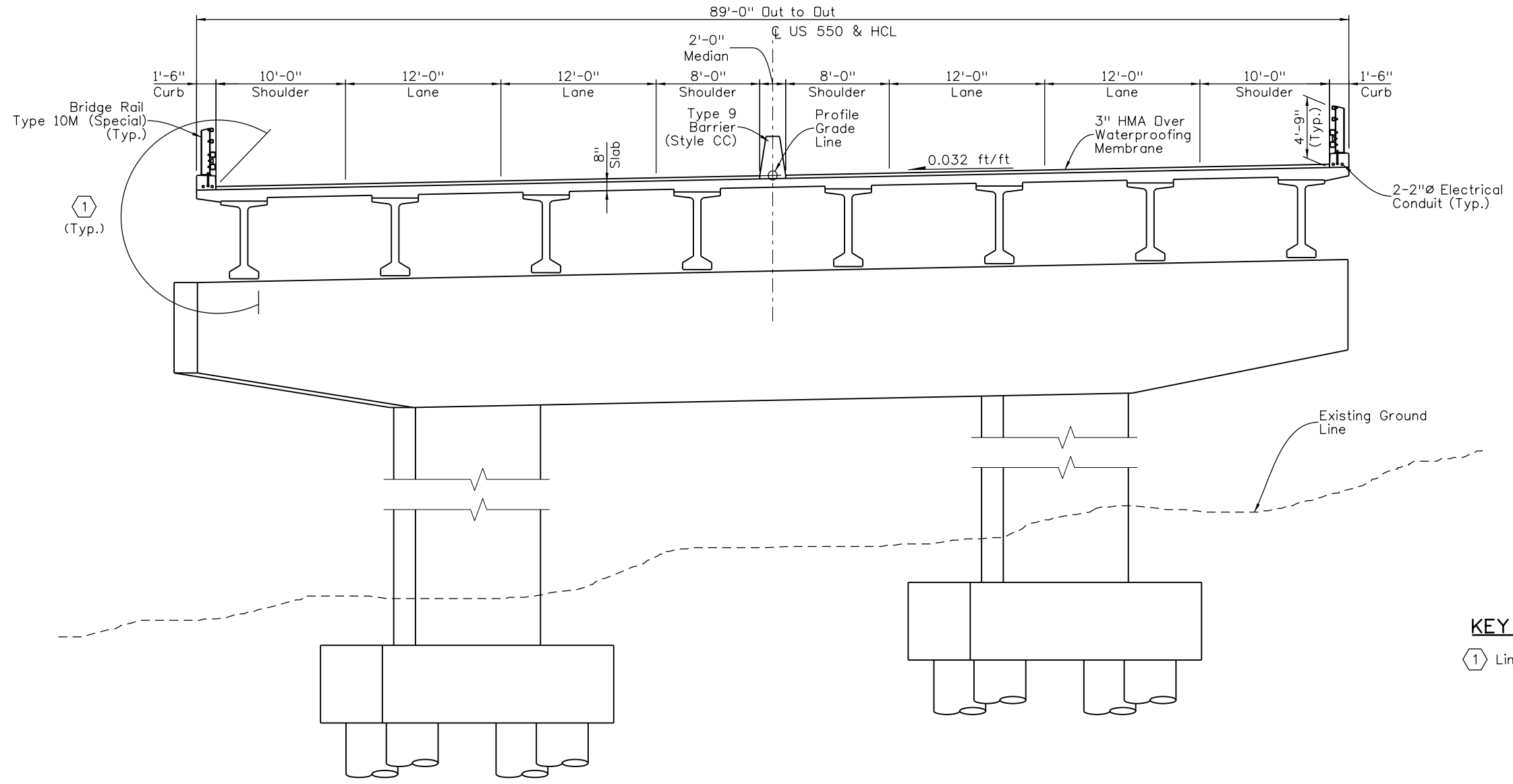
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Detailer:	J. Broadus	Structure Numbers	P-05-AV
Sheet Subset:	Bridge	Subset Sheets:	B4 of 8

Project No./Code
NHPP 5501-029
22420
Sheet Number 164

5/2/2019

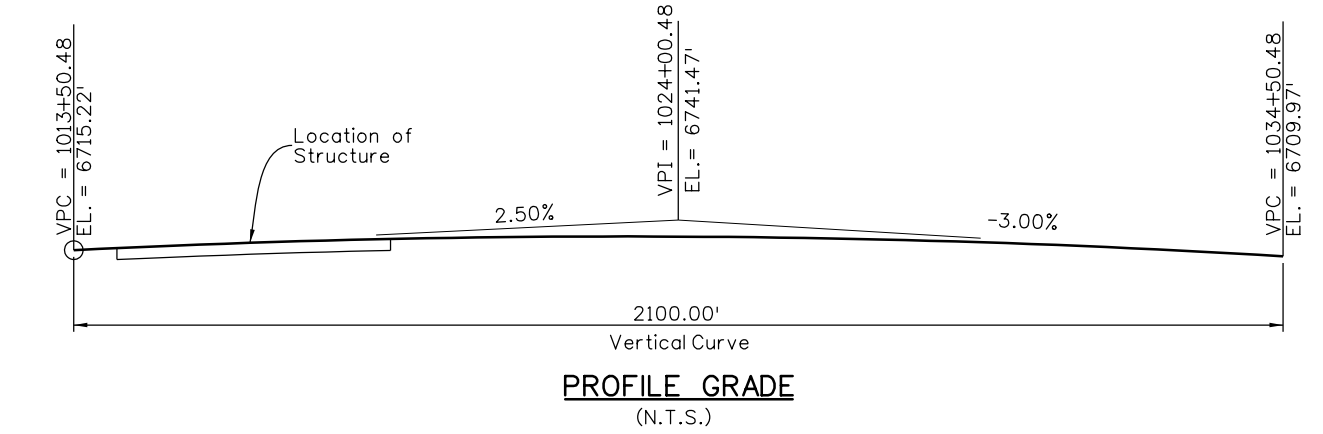
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Designed By	Checked By	Detailed By	Checked By	Quantities By	Checked By
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KEY NOTES
 1 Limits of Structural Concrete Coating

TYPICAL SECTION



PROFILE GRADE
(N.T.S.)

FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019

Print Date: 5/2/2019
 File Name: 22420_Gulch A_TypSect.dgn
 Horiz. Scale: 1:10 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW
wood. Colorado Center Tower 2
 2000 S. Colorado Blvd Suite 2-1000
 Denver, CO 80222

Sheet Revisions		
Date:	Comments	Init.

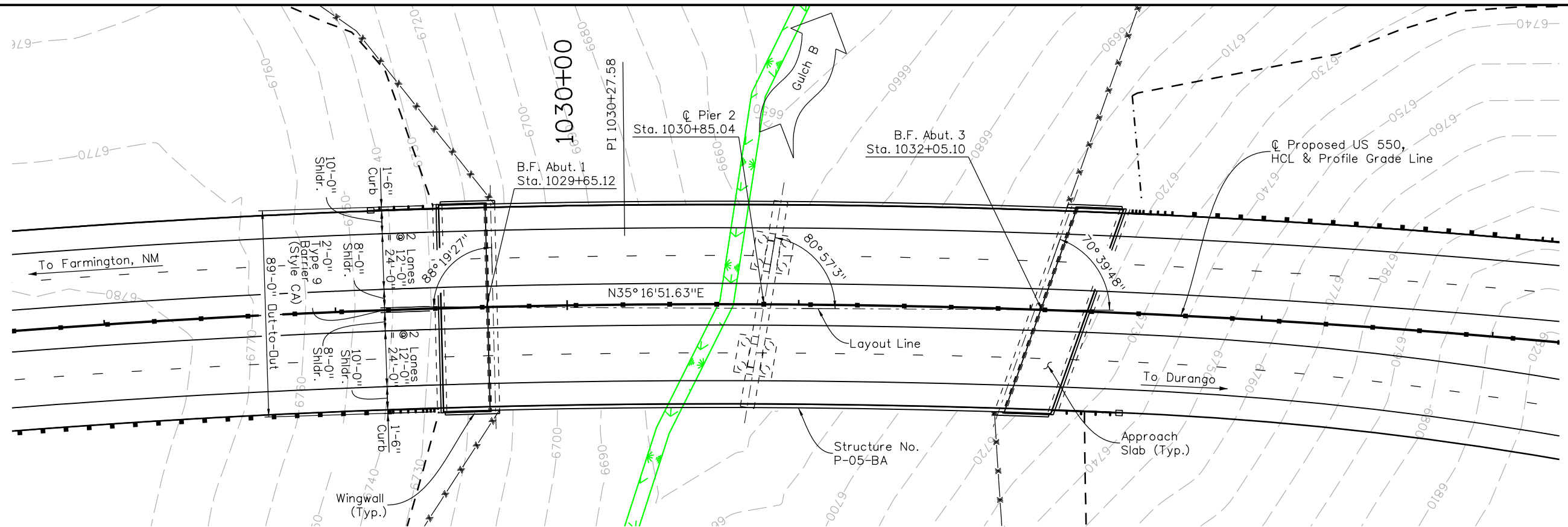
Colorado Department of Transportation
 3803 North Main Avenue
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365
Region 5 **DRV**

As Constructed
 No Revisions:
 Revised:
 Void:

GULCH A
TYPICAL SECTION
 Designer: J. Broadus
 Detailer: J. Broadus
 Sheet Subset: Bridge
 Structure Numbers: P-05-AZ
 Subset Sheets: B6 of 8

Project No./Code
 NHPP 5501-029
 22420
 Sheet Number **166**

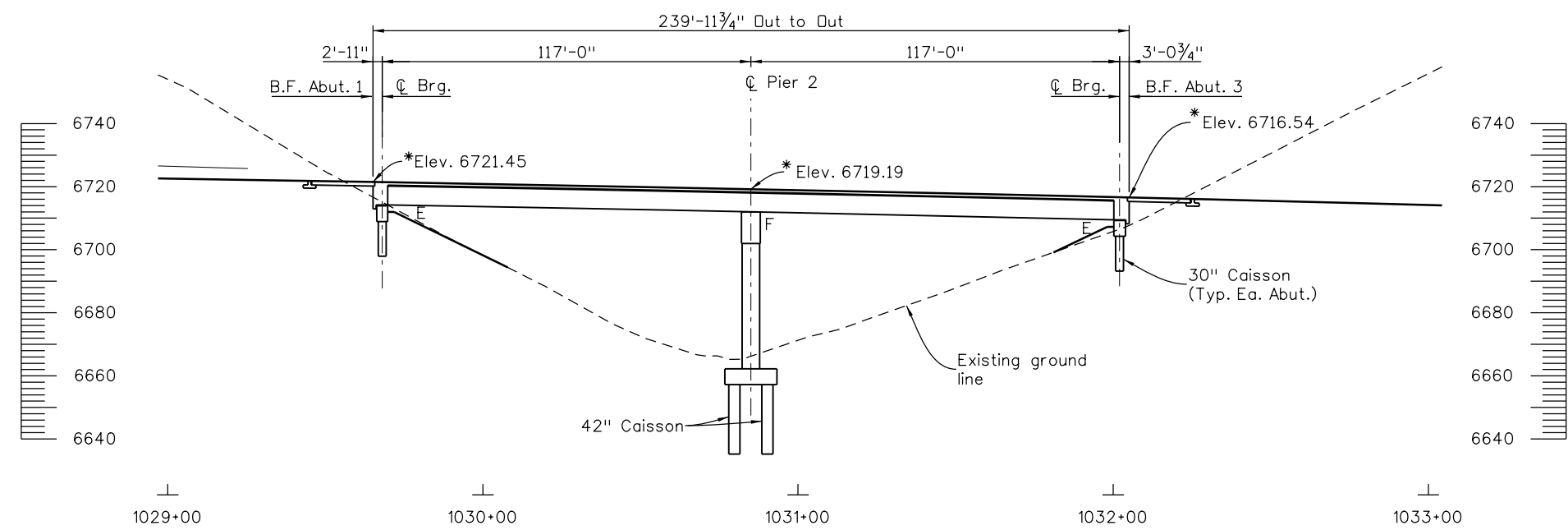
5/2/2019



PLAN

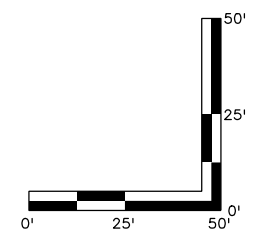
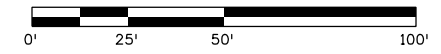
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 Tc = 488.46
 Lc = 972.11
 Rc = 4000.00'



SECTION

(Taken Along HCL)
 * Finished Profile Grade Elevations (Top of HMA)



FINAL REFERENCE DESIGN PLANS
 JUNE 10, 2019

john.broadus 7:20:45 AM P:\Project\Transportation\CDOT\RS\2017 CDDT\RS\550 US 550 DB PM sub to HDR\9.0 CADD\9.1 Bridge\22420_Gulch B_PnP.dgn

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Checked By	Detailed By	Checked By	Detailed By	Checked By	Detailed By
XXX	MM/YY	XXX	MM/YY	XXX	MM/YY

Print Date: 5/2/2019
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 Horiz. Scale: 1:50.0003 Vert. Scale: As Noted
 Staff Bridge Branch - Unit 0221 STW

Colorado Center Tower 2
 2000 S. Colorado Blvd Suite 2-1000
 Denver, CO 80222

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
 Durango, CO 81301
 Phone: 970-385-1440 FAX: 970-385-8365

Region 5 DRV

As Constructed
No Revisions:
Revised:
Void:

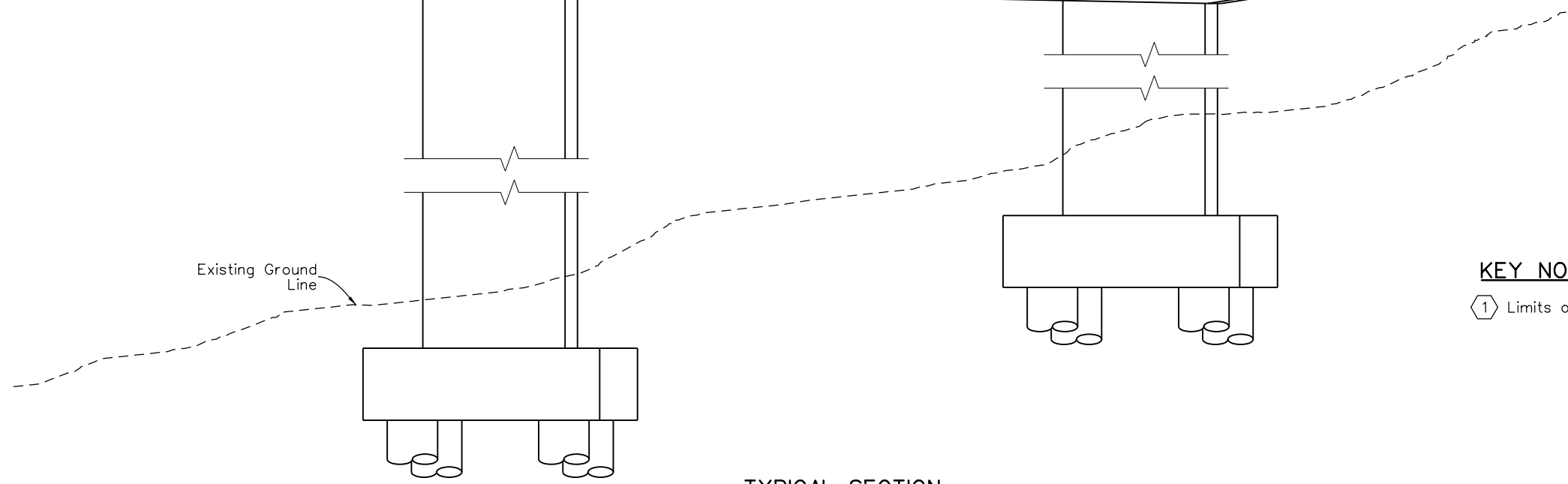
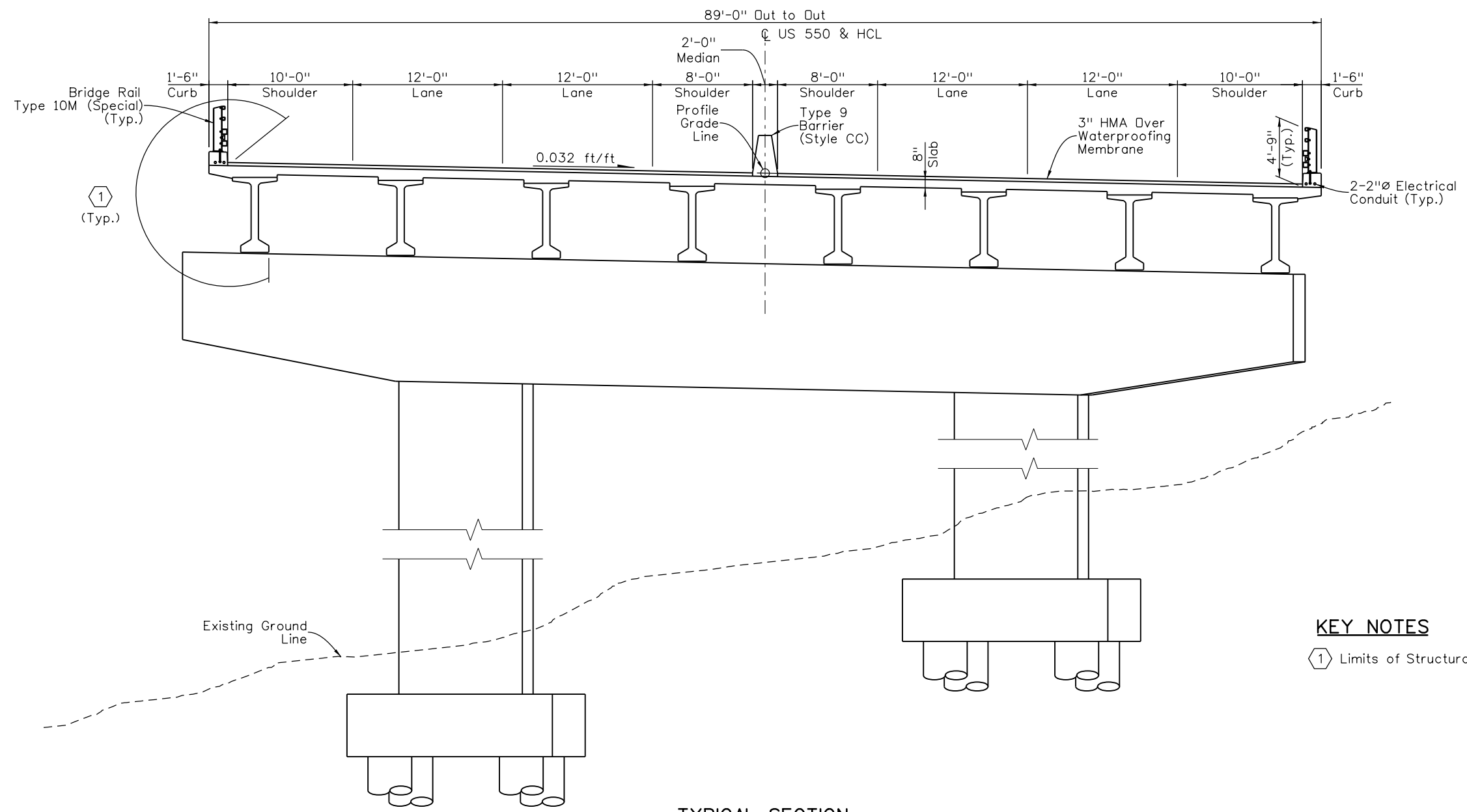
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Detailer:	J. Broadus	Subset Sheets:	B7 of 8
Sheet Subset:	Bridge		

Project No./Code
NHPP 5501-029
22420
Sheet Number 167

5/2/2019

john.broadus 7:23:19 AM P:\Project\Transportation\CDOT\RS\2017\CDOT\RS US 550 DB PM sub to HDR\9.0 CADD\9.1 Bridge\22420_Gulch B_TypSect.dgn

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Checked By	Detailed By	Checked By	Detailed By	Checked By	Detailed By
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TYPICAL SECTION

PROFILE GRADE
(N.T.S.)

KEY NOTES

① Limits of Structural Concrete Coating

FINAL REFERENCE DESIGN PLANS
JUNE 10, 2019

Print Date: 5/2/2019
File Name: 22420_Gulch B_TypSect.dgn
Horiz. Scale: 1:10.0001 Vert. Scale: As Noted
Staff Bridge Branch - Unit 0221 STW

Colorado Center Tower 2
2000 S. Colorado Blvd Suite 2-1000
Denver, CO 80222

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation

3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365

Region 5 DRV

As Constructed
No Revisions:
Revised:
Void:

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Designer:	J. Broadus	Structure Numbers	P-05-BA
Detailer:	J. Broadus	Subset Sheets:	B8 of 8

Project No./Code
NHPP 5501-029
22420
Sheet Number 168

5/2/2019