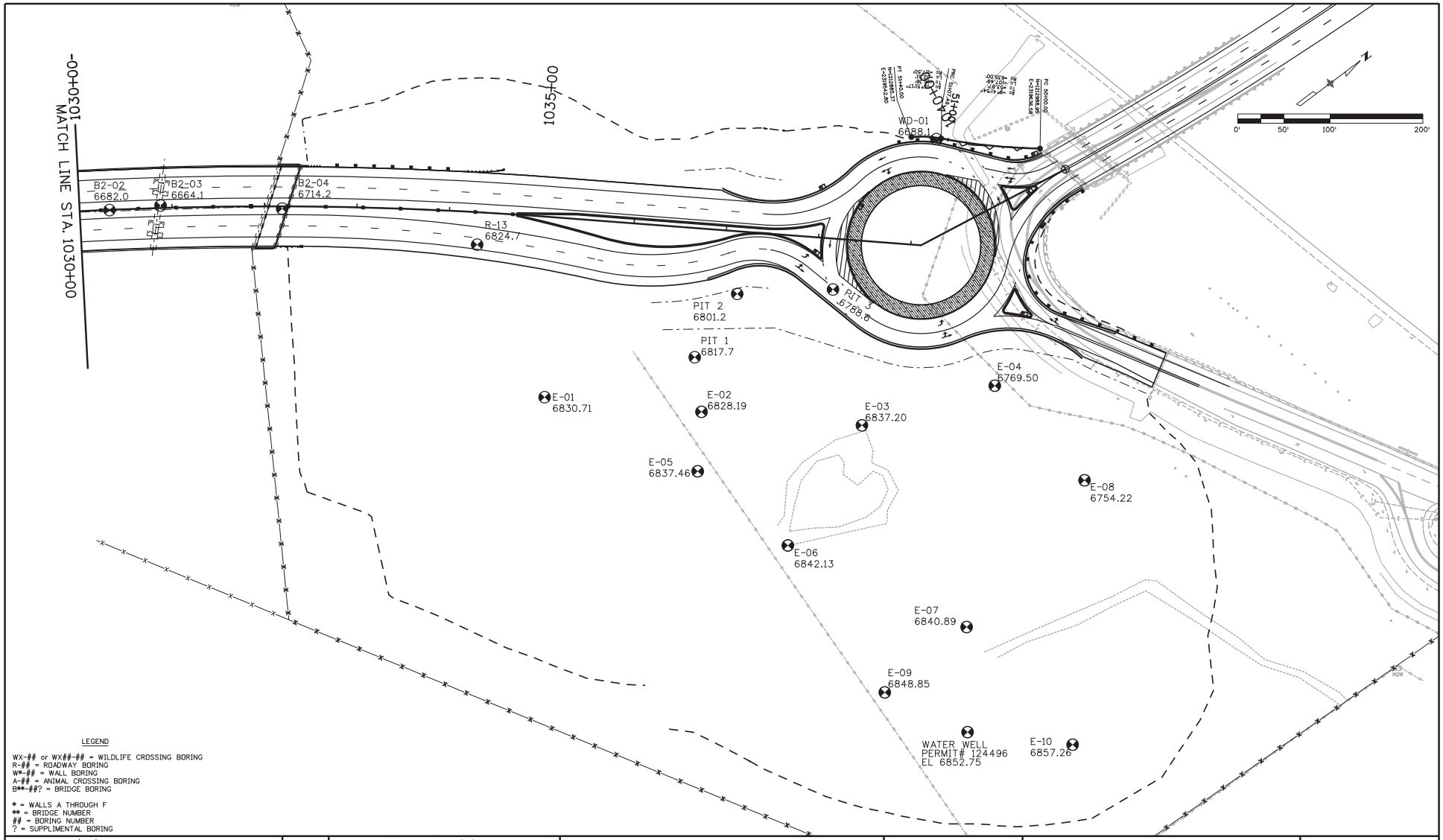


LEGEND

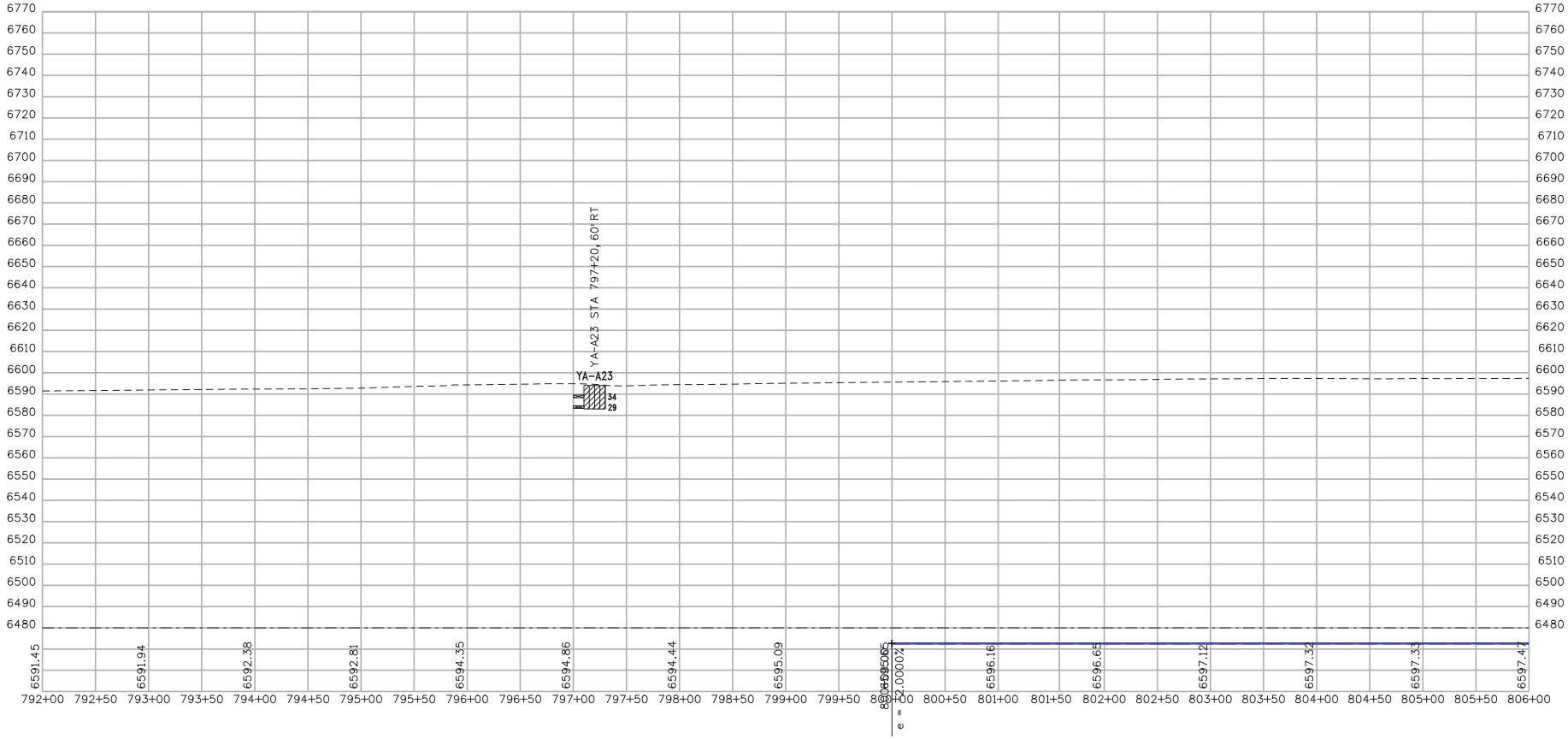
WX-## or WX##-## = WILDLIFE CROSSING BORING
R-## = ROADWAY BORING
W*-## = WALL BORING
A-## = ANIMAL CROSSING BORING
B**-##? = BRIDGE BORING

* = WALLS A THROUGH F
** = BRIDGE NUMBER
= BORING NUMBER
? = SUPPLIMENTAL BORING

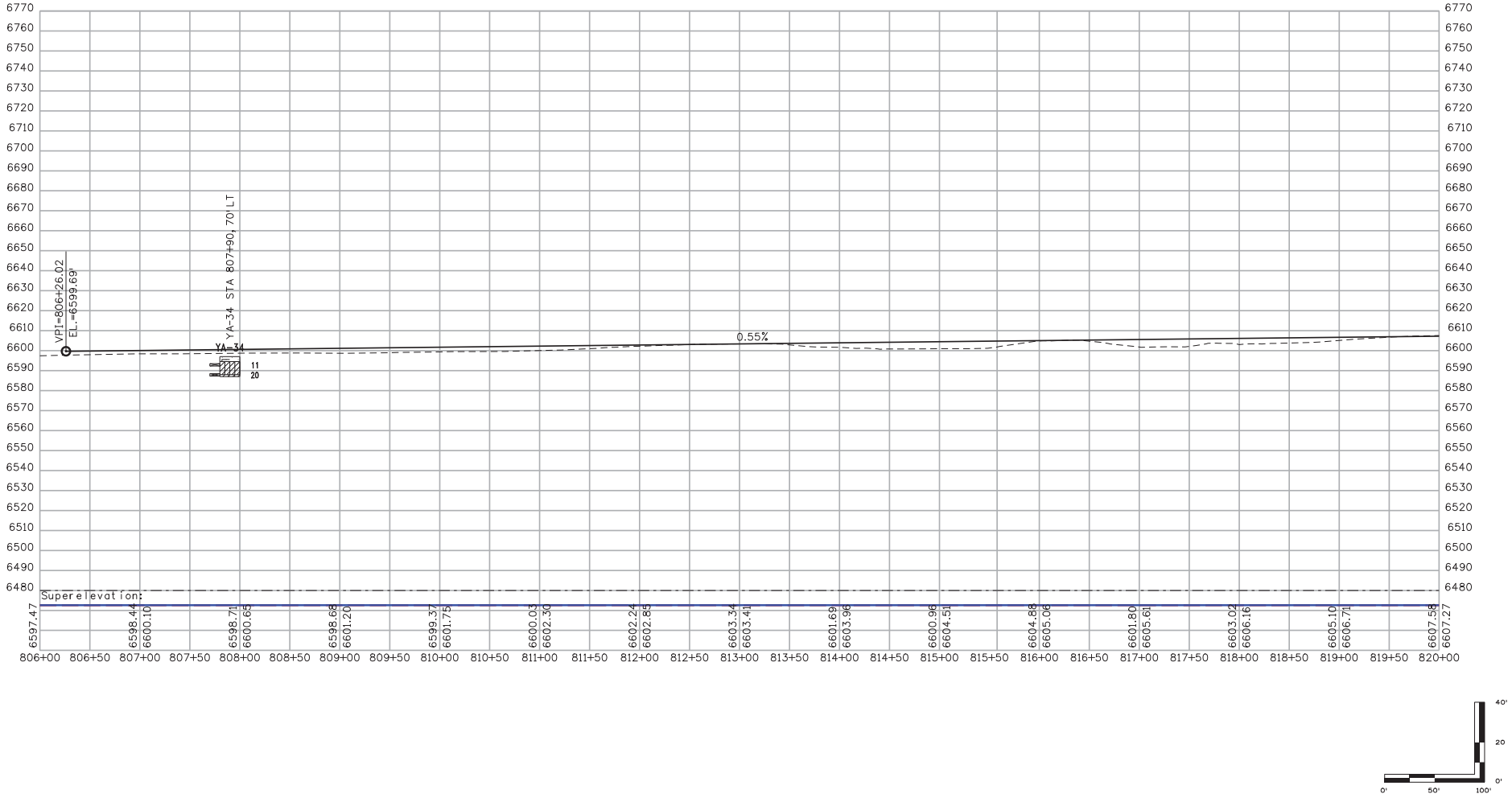
Print Date: 2/15/2019	Sheet Revisions	Colorado Department of Transportation	As Constructed
File Name: 012_22420_US 160-550-Plan Sheet 12.dgn	Date: / Comments / Init.	3803 North Main Avenue, Durango, CO 81301	No Revisions:
Horiz. Scale: 1:100 Vert. Scale: As Noted		Phone: 970-385-1440 FAX: 970-385-8365	Revised:
Unit Information Unit Leader Initials		Region 5 DRV	Void:
Yeh and Associates, Inc. Consulting Engineers & Scientists			

US 550 CONNECTION TO US 160 BORING LOCATION PLAN		Project No./Code
Designer:	Structure Numbers:	NHPP 5501-029
Detailer:		22420
Sheet Subset: EG_Plan	Subset Sheets: 12 of 12	Sheet Number

Appendix B.3 – Boring Log Profile Sheets



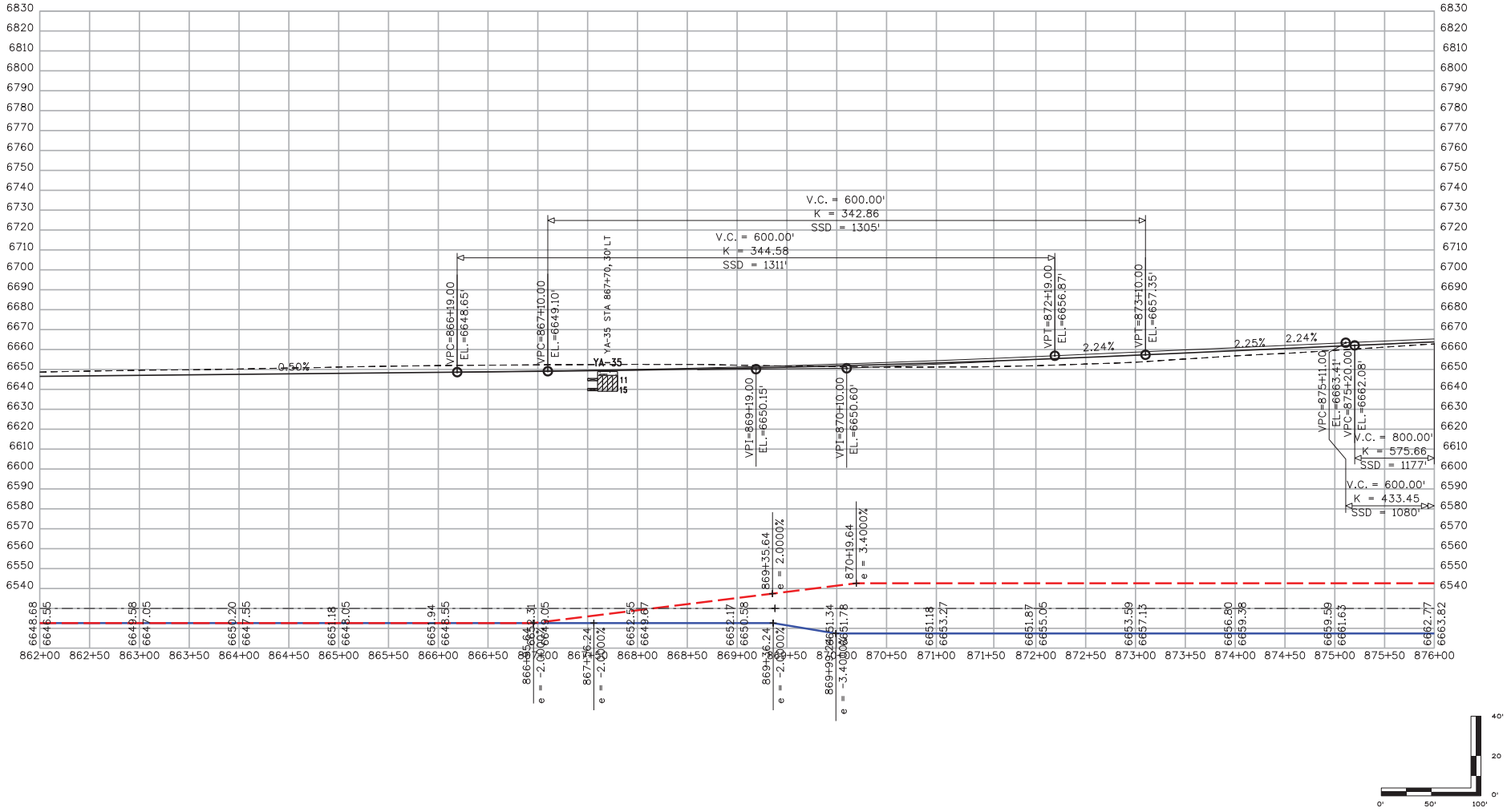
Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE		Project No./Code
File Name: 013_22420_US 160-550-Profile Sheet 01.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:			NHPP 5501-029
Horiz. Scale: 1:100 Vert. Scale: As Noted						Revised:	Designer:	Structure Numbers	22420
Unit Information Unit Leader Initials						Void:	Detailer:		
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: eg_profile	Subset Sheets: 1 of 13	Sheet Number



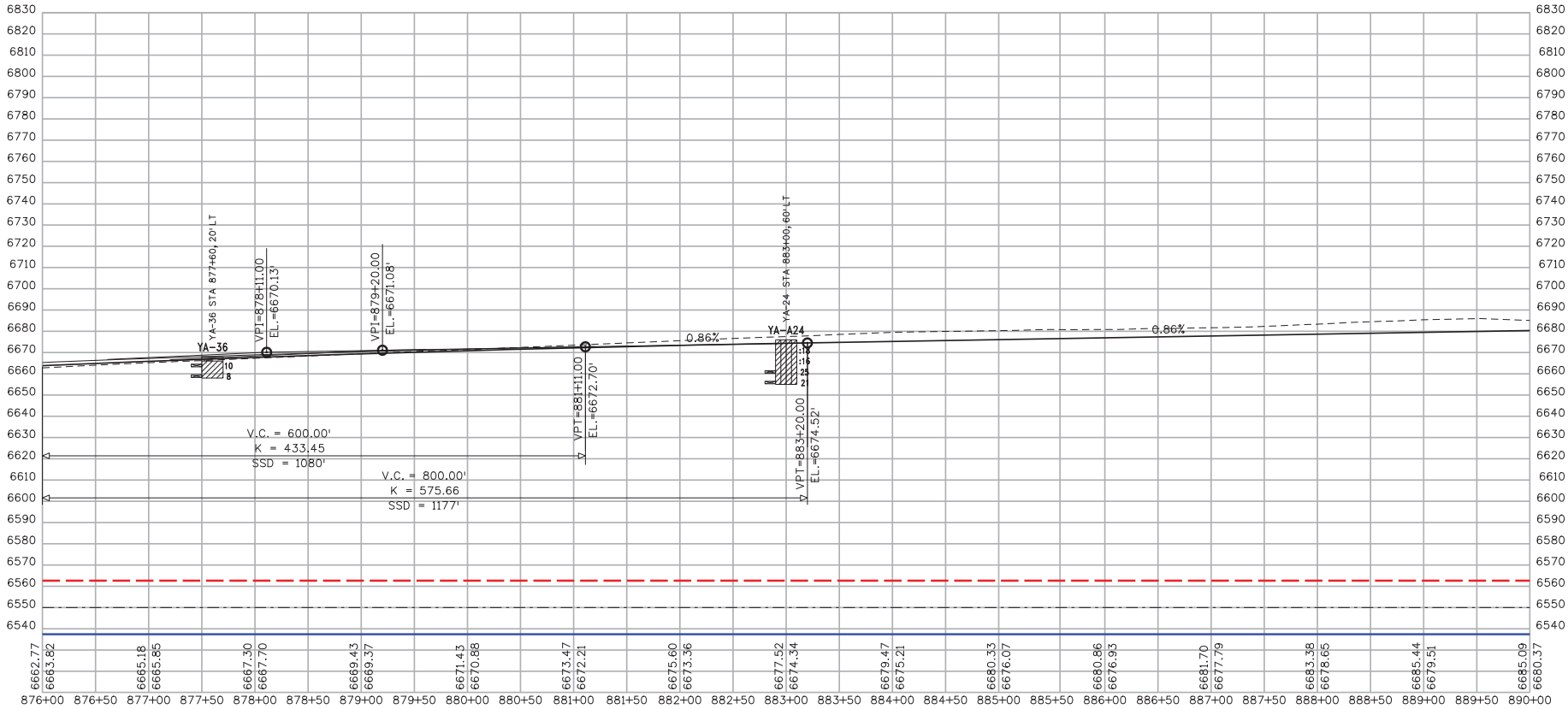
Print Date: 2/20/2019		Sheet Revisions			
File Name: 014_22420_US 160-550-Profile Sheet 02.dgn		Date:	Comments	Init.	
Horiz. Scale: 1:100 Vert. Scale: As Noted					
Unit Information Unit Leader Initials					
Yeh and Associates, Inc. Consulting Engineers & Scientists					

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

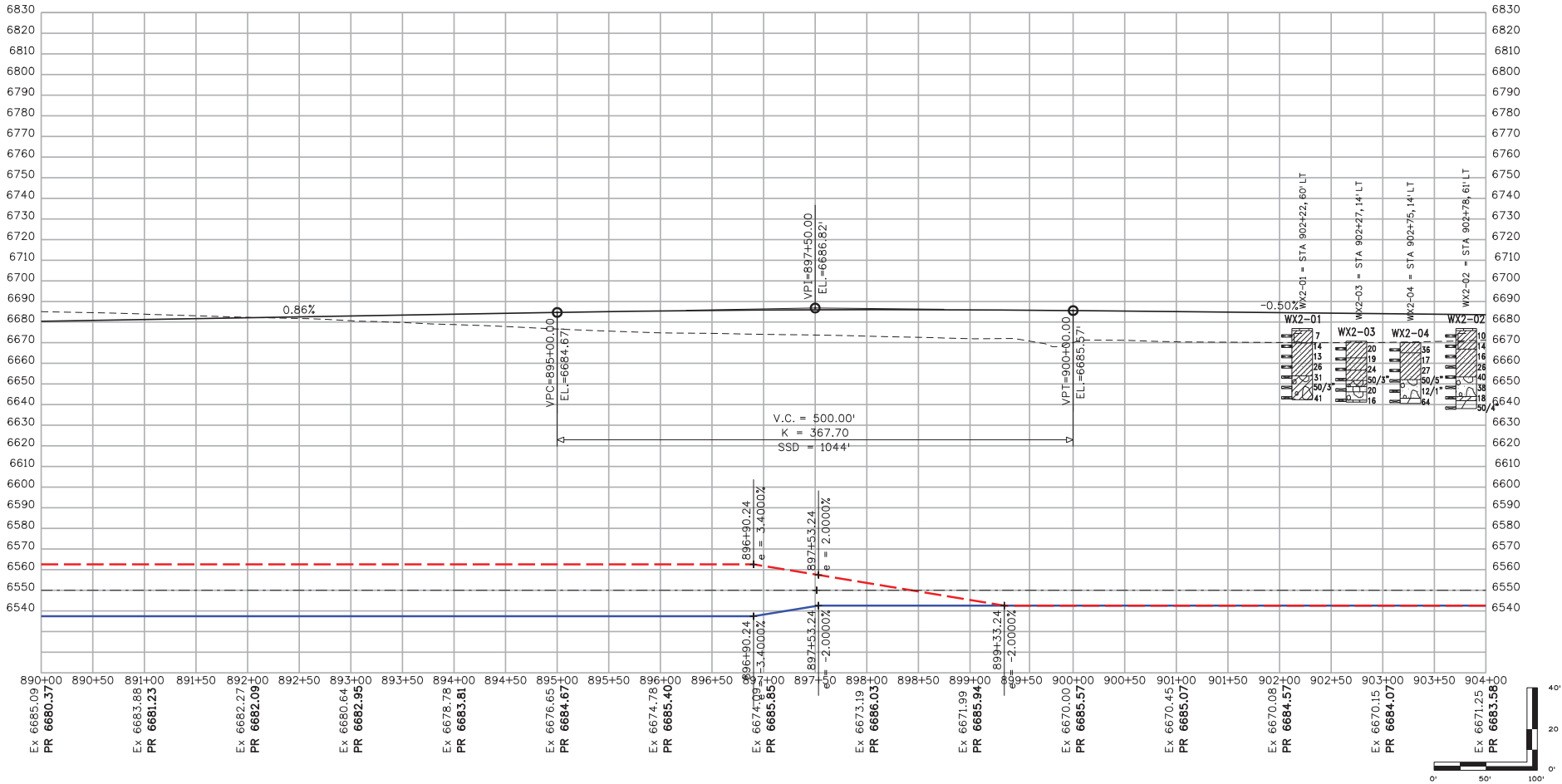
As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE		Project No./Code
No Revisions:			NHPP 5501-029
Revised:	Designer:	Structure Numbers	22420
Void:	Detailer:		Sheet Number
	Sheet Subset: eg_profile	Subset Sheets: 2 of 13	



Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 015_22420_US 160-550-Profile Sheet 03.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						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials						Void:	Detailer:	
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: eg_profile / Subset Sheets: 3 of 13	Sheet Number



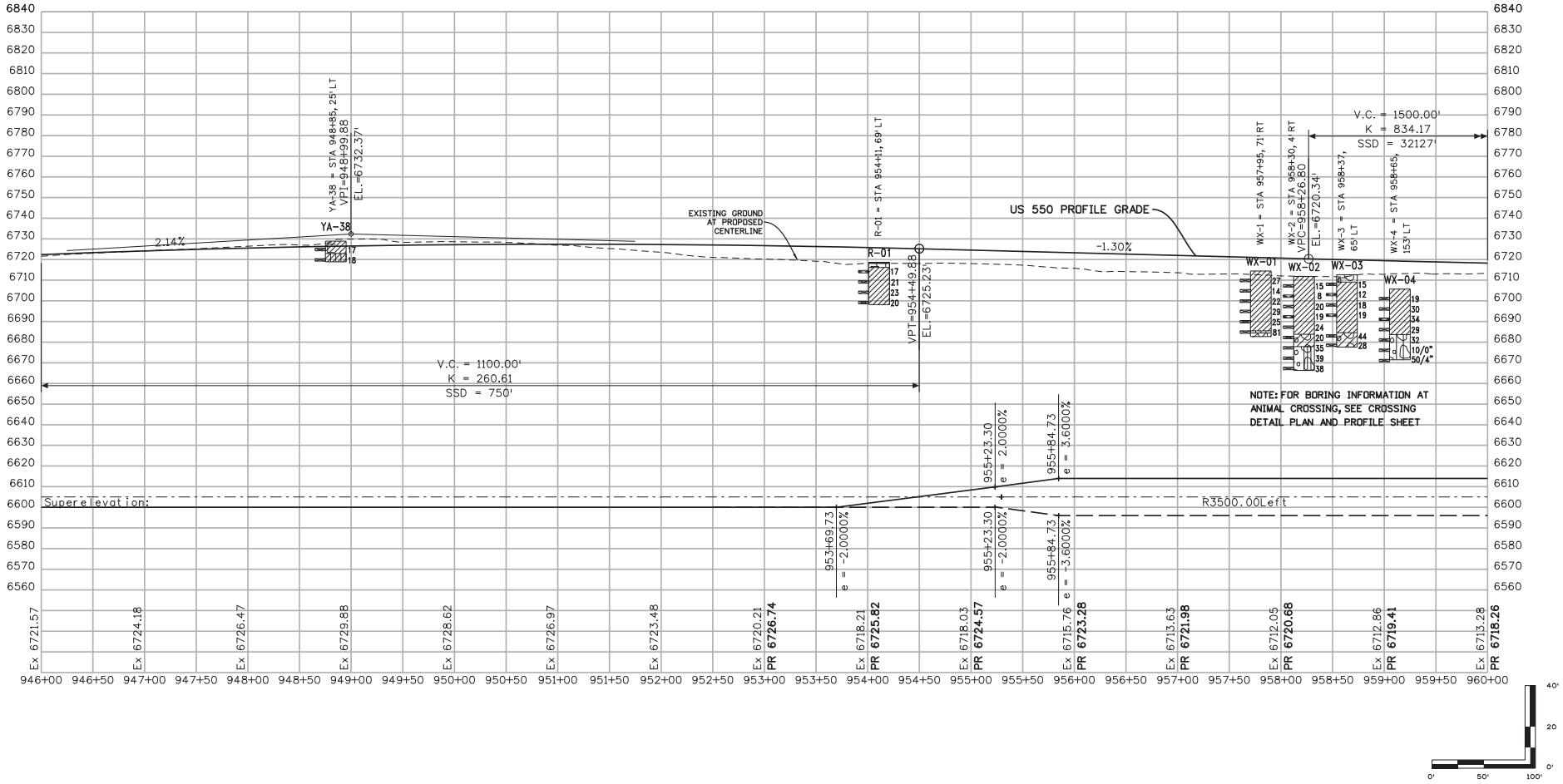
Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 016_22420_US 160-550-Profile Sheet 04.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:		NHPP 5501-029
Horiz. Scale: 1:100 Vert. Scale: As Noted						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials						Void:	Detailer:	
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: eg_profile / Subset Sheets: 4 of 13	Sheet Number



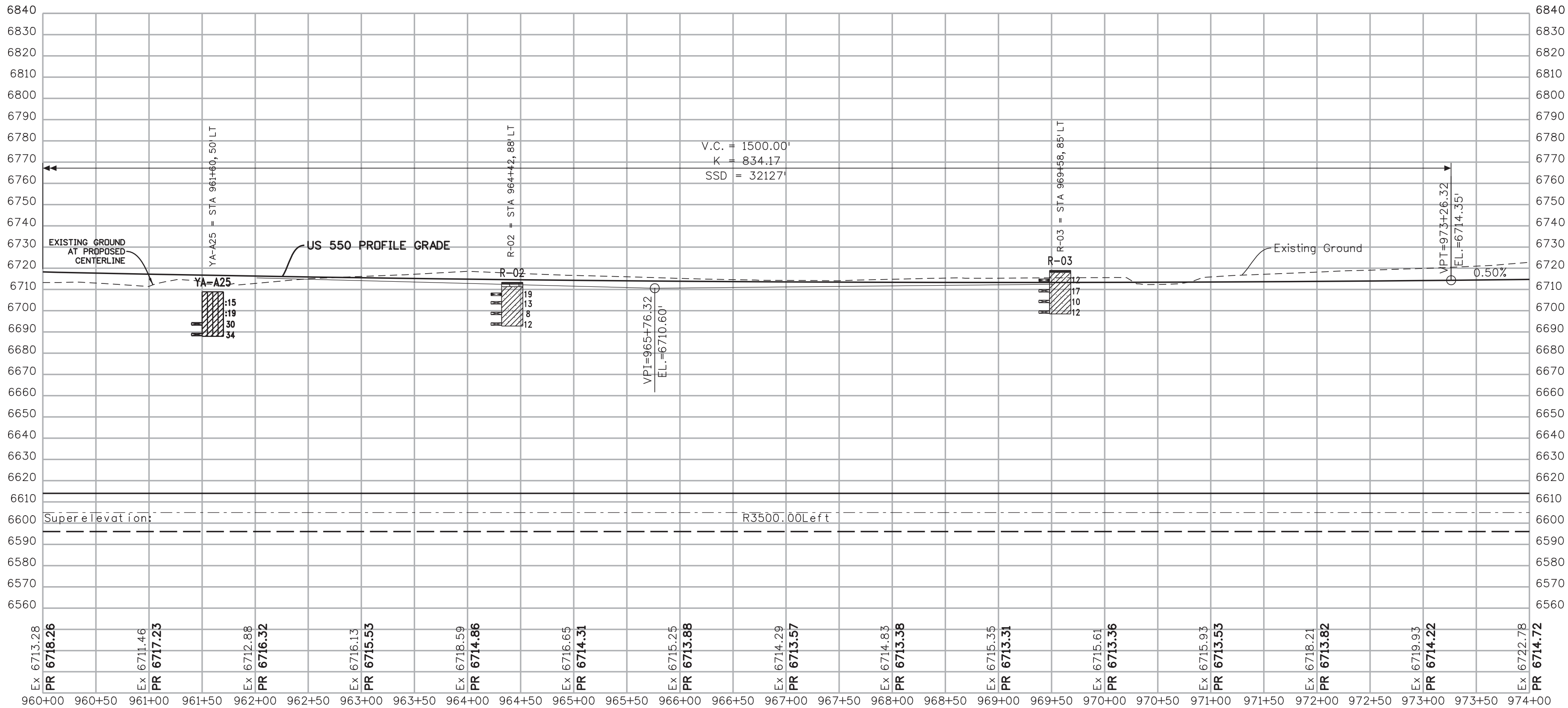
Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation
File Name: 017_22420_US 160-550-Profile Sheet 05.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365
Horiz. Scale: 1:100 Vert. Scale: As Noted					Region 5 DRV
Unit Information Unit Leader Initials					
Yeh and Associates, Inc. Consulting Engineers & Scientists					

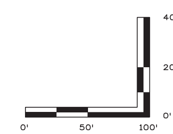
As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE		Project No./Code
No Revisions:			NHPP 5501-029
Revised:	Designer:	Structure Numbers	22420
Void:	Detailer:		
	Sheet Subset: eg_profile	Subset Sheets: 5 of 13	Sheet Number

LRuiz 10:53:40 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\017_22420_US 160-550-Profile Sheet 05.dgn



Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 018_22420_US 160-550-Profile Sheet 06.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						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials					Region 5 DRV	Void:	Detailer: / Sheet Subset: eg_profile / Subset Sheets: 6 of 13	Sheet Number
Yeh and Associates, Inc. Consulting Engineers & Scientists								





Print Date: 2/20/2019		
File Name: 019_22420_US 160-550-Profile Sheet 07.dgn		
Horiz. Scale: 1:100	Vert. Scale: As Noted	
Unit Information	Unit Leader Initials	

Yeh and Associates, Inc.
Consulting Engineers & Scientists

Sheet Revisions

Date:	Comments	Init.

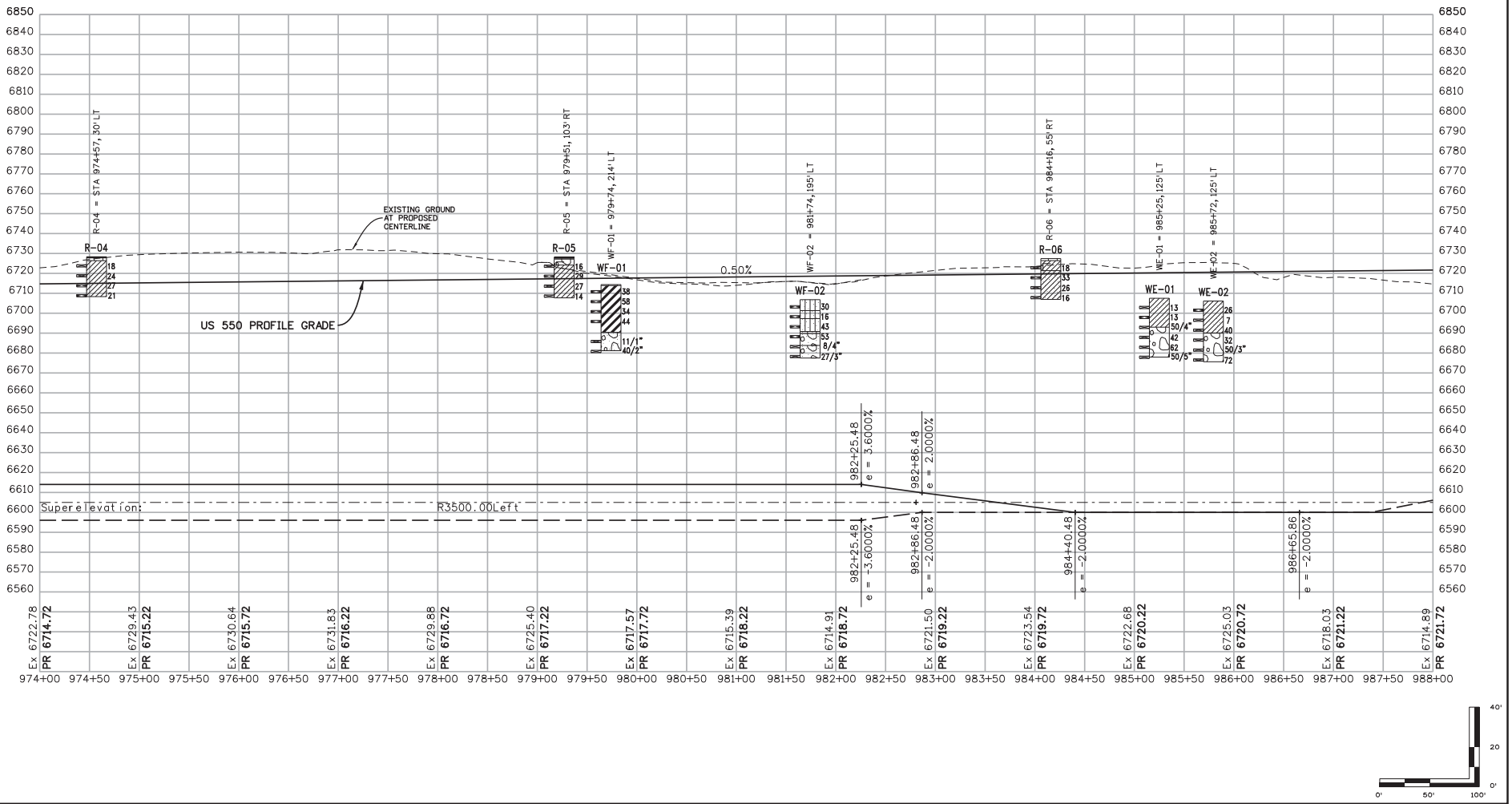
Colorado Department of Transportation
3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 DRV

As Constructed
No Revisions:
Revised:
Void:

US 550 CONNECTION TO US 160
BORING LOCATION PROFILE

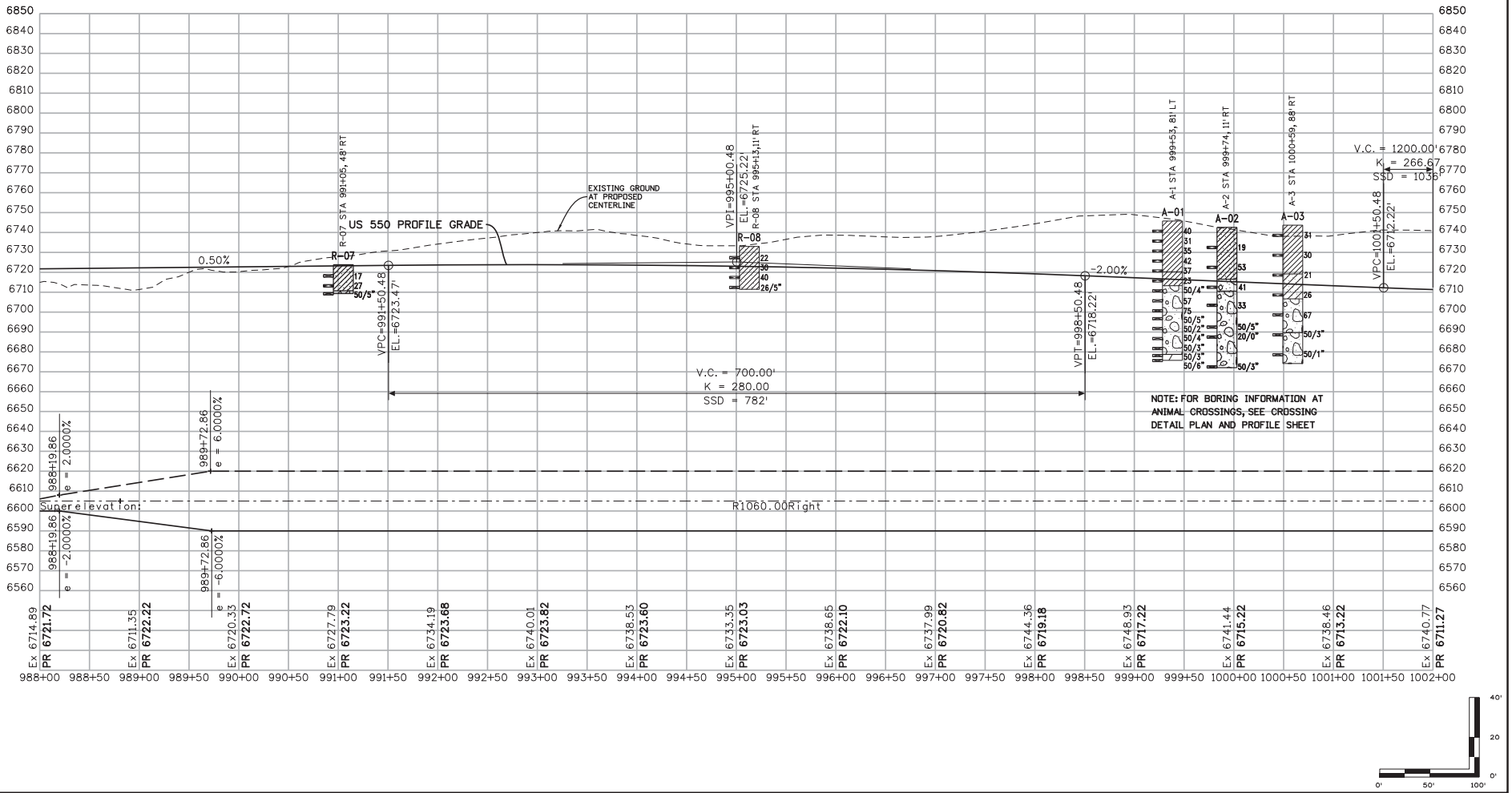
Designer:		Structure Numbers	
Detailer:			
Sheet Subset: eg_profile		Subset Sheets:	7 of 13

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

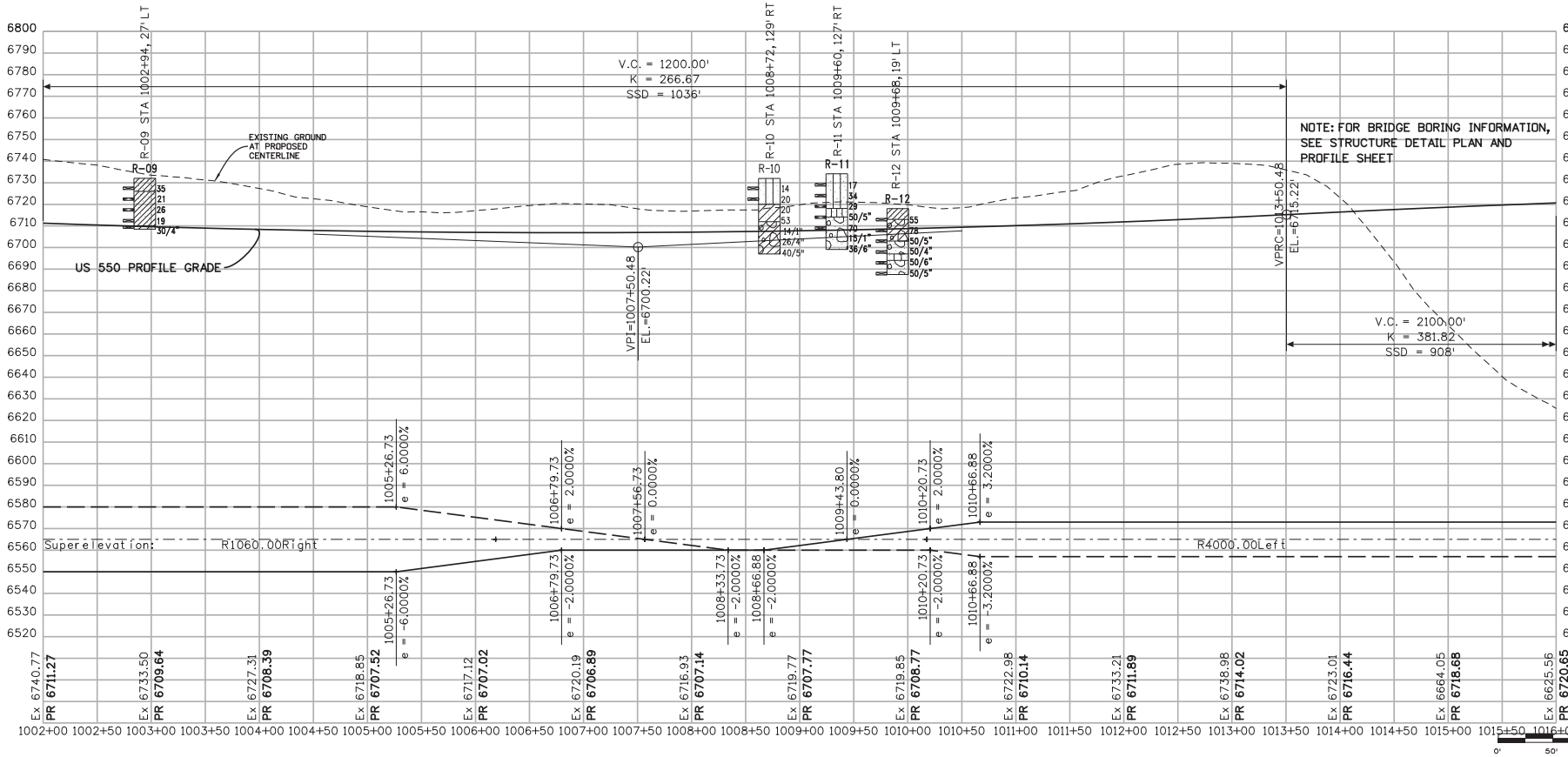


Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 020_22420_US 160-550-Profile Sheet 08.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:		NHPP 5501-029
Horiz. Scale: 1:100 Vert. Scale: As Noted						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials					Region 5 DRV	Void:	Detailer: / Sheet Subset: eg_profile / Subset Sheets: 8 of 13	Sheet Number
Yeh and Associates, Inc. Consulting Engineers & Scientists								

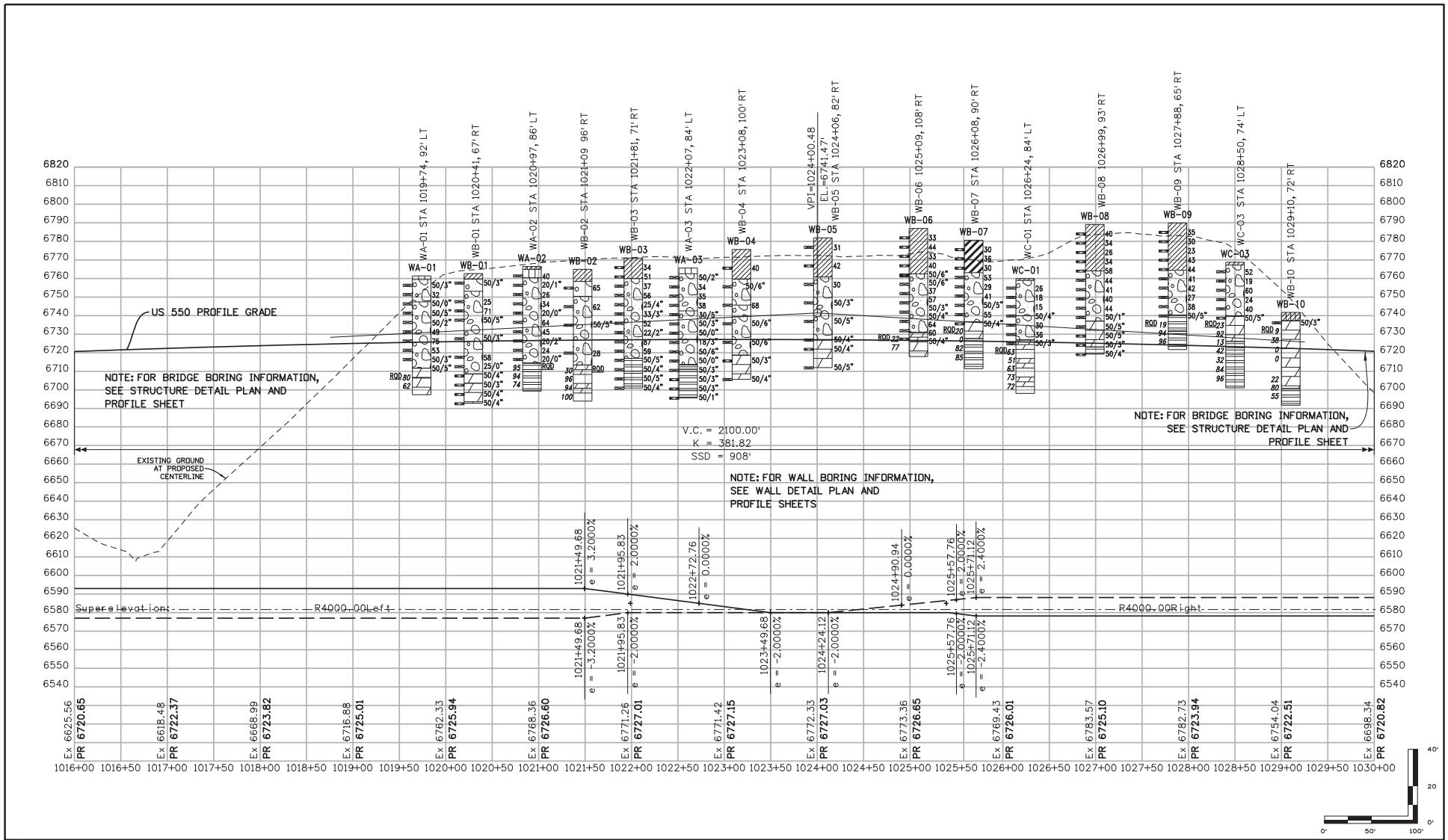
LRuiz 11:05:07 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\020_22420_US 160-550-Profile Sheet 08.dgn



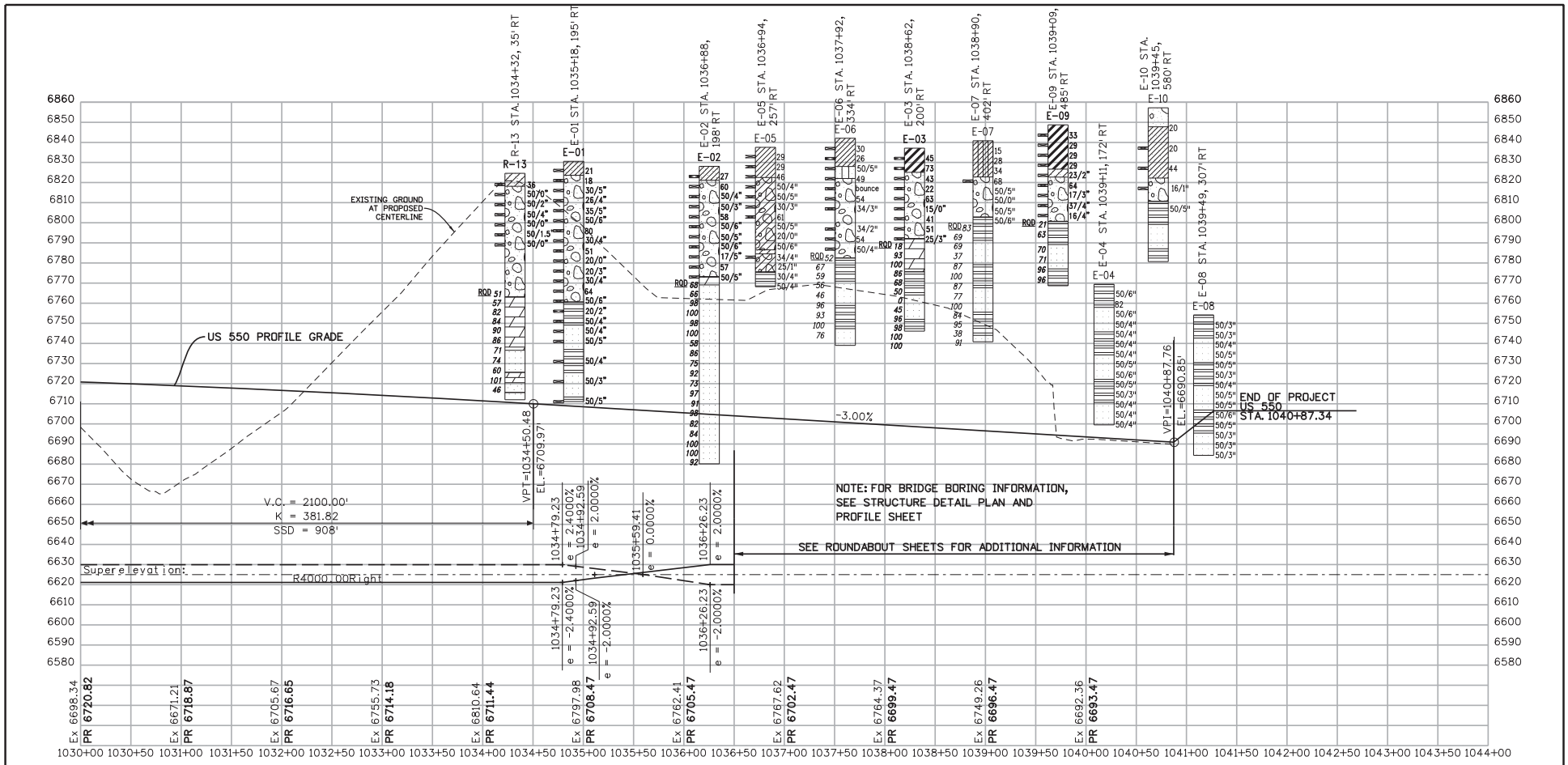
Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 021_22420_US 160-550-Profile Sheet 09.dgn		Date:	Comments	Init.	3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:		NHPP 5501-029
Horiz. Scale: 1:100 Vert. Scale: As Noted						Revised:	Designer:	Structure Numbers: 22420
Unit Information Unit Leader Initials						Void:	Detailer:	
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: eg_profile	Subset Sheets: 9 of 13 Sheet Number



Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 022_22420_US 160-550-Profile Sheet 10.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						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials					Region 5 DRV	Void:	Detailer: / Sheet Subset: eg_profile / Subset Sheets: 10 of 13	Sheet Number
Yeh and Associates, Inc. Consulting Engineers & Scientists	0000							



Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 023_22420_US 160-550-Profile Sheet 11.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						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials						Void:	Detailer:	
Yeh and Associates, Inc. Consulting Engineers & Scientists	0000				Region 5 DRV		Sheet Subset: eg_profile / Subset Sheets: 11 of 13	Sheet Number



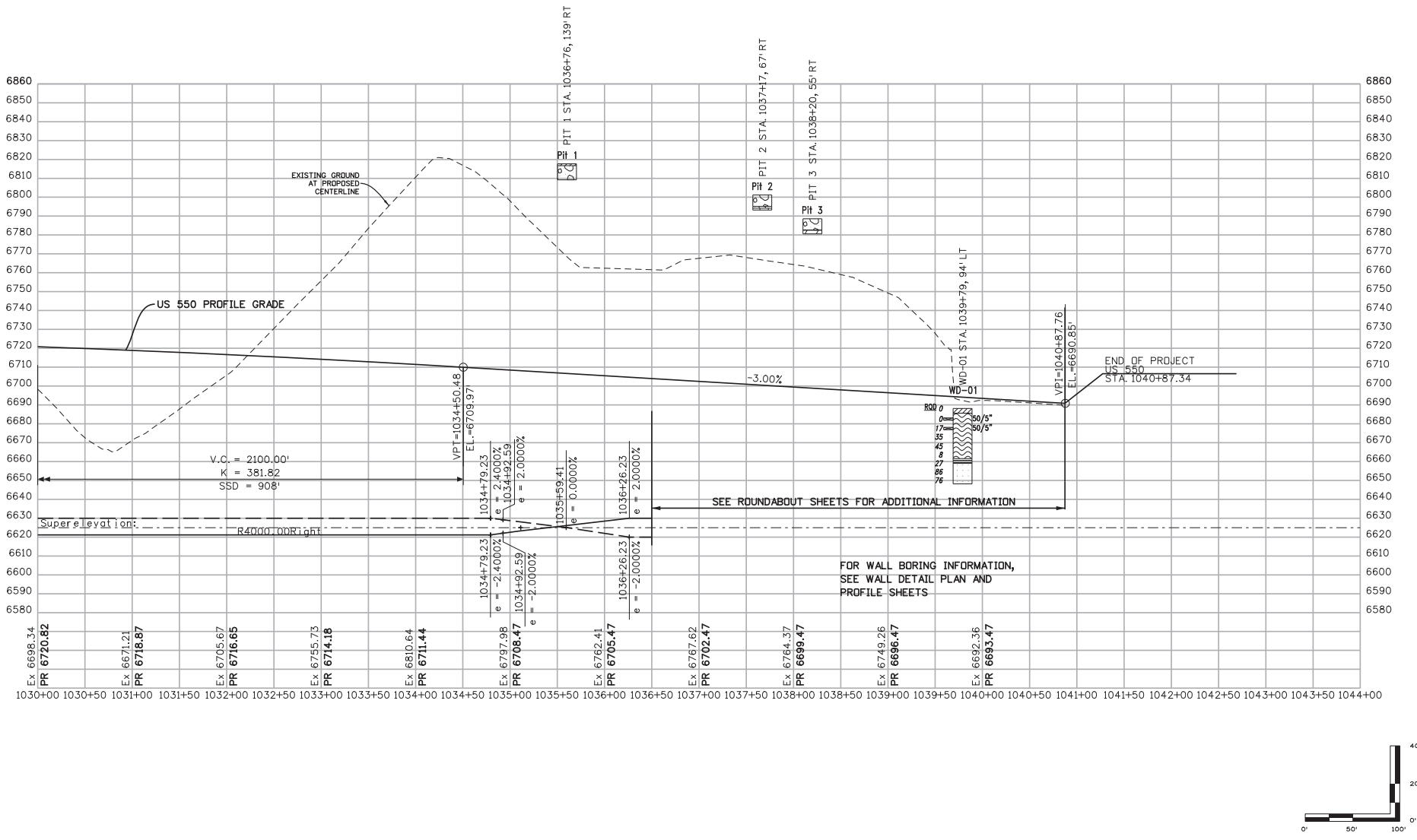
NOTES:
1. FOR WALL BORING INFORMATION, SEE WALL DETAIL PLAN AND PROFILE SHEETS
2. FOR TEST PITS, SEE FOLLWING PROFILE SHEET

Print Date: 2/20/2019	Sheet Revisions			Colorado Department of Transportation	As Constructed
File Name: 024_22420_US 160-550-Profile Sheet 12.dgn	Date:	Comments	Init.	3803 North Main Avenue, Durango, CO 81301, Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:
Horiz. Scale: 1:100 Vert. Scale: As Noted				Region 5 DRV	Revised:
Unit Information Unit Leader Initials					Void:
Yeh and Associates, Inc. Consulting Engineers & Scientists					

US 550 CONNECTION TO US 160
BORING LOCATION PROFILE

Designer:	Structure Numbers		Project No./Code
Detailer:			NHPP 5501-029
Sheet Subset: eg_profile	Subset Sheets:	12 of 13	22420
			Sheet Number

LRuiz 11:06:20 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\024_22420_US 160-550-Profile Sheet 12.dgn



Print Date: 2/20/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 CONNECTION TO US 160 BORING LOCATION PROFILE	Project No./Code
File Name: 025_22420_US 160-550-Profile Sheet 13 (test pits).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						Revised:	Designer: / Structure Numbers:	22420
Unit Information Unit Leader Initials						Void:	Detailer:	
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: eg_profile / Subset Sheets: 13 of 13	Sheet Number

Appendix C – Structure Engineering Geology Sheets

C.0 Engineering Geology Legend

C.1 Bridge Engineering Geology Sheets

C.2 Wildlife and Livestock Crossings Engineering Geology Sheets

C.3 Retaining Wall Engineering Geology Sheets

Appendix C.0 – Engineering Geology Legend

LEGEND

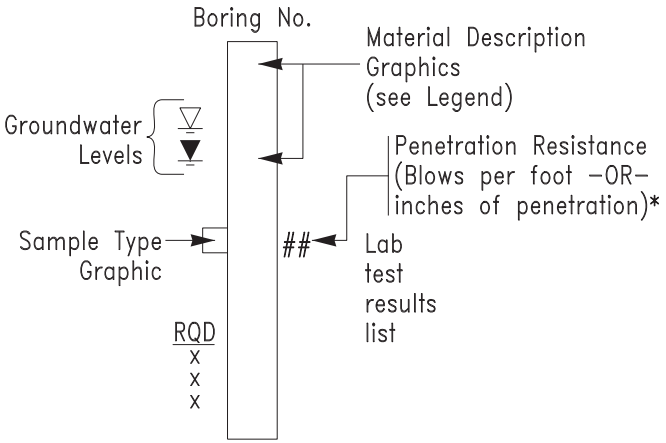
Soil Lithology

- Asphalt
- Fill with Gravel as major soil
- Fill with Clay as major soil
- USCS Low Plasticity Sandy Clay
- USCS Clayey Sand
- USCS Clayey Gravel
- USCS Low Plasticity Sandy Clay
- USCS Poorly-graded Gravel with Clay
- USCS Poorly-graded Sandy Gravel
- USCS Silty Sand
- USCS Low Plasticity Silty Clay
- Boulders and cobbles
- USCS Clayey Sand
- USCS Poorly-graded Gravelly Sand
- USCS Low Plasticity Clay
- USCS Sandy Silt
- USCS Poorly-graded Gravel
- USCS Silt
- USCS Poorly-graded Gravel with Silt
- USCS High Plasticity Clay

Rock Lithology

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

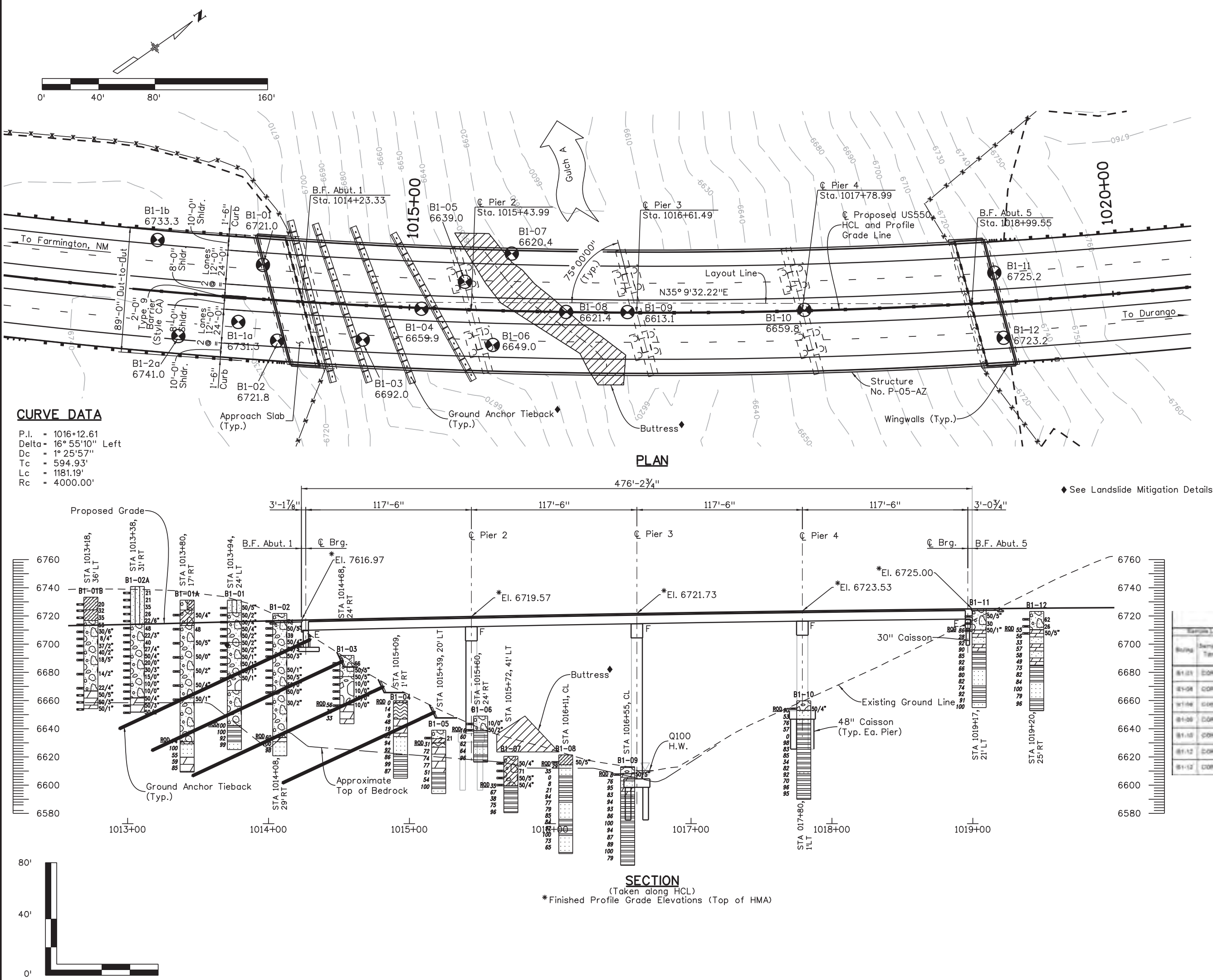
TYPICAL BOREHOLE LOG



*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.

Print Date: 2/19/2019	Sheet.dgn	Sheet Revisions			Colorado Department of Transportation	As Constructed	US 550 TO US 160 CONNECTION BORING LOG LEGEND		Project No./Code
File Name: 026_22420_Engineering Geology Legend and Typical		Date:	Comments	Init.	3803 North Main Avenue, Suite 200, Durango, CO 81301	No Revisions:			NHPP 5501-029
Horiz. Scale: 1:50 Vert. Scale: As Noted					Phone: 970-385-1440 FAX: 970-385-8365	Revised:	Designer:	Structure Numbers	22420
Unit Information Unit Leader Initials					Region 5 DRV	Void:	Detailer:		Sheet Number
Yeh and Associates, Inc. Consulting Engineers & Scientists							Sheet Subset:	Subset Sheets:	

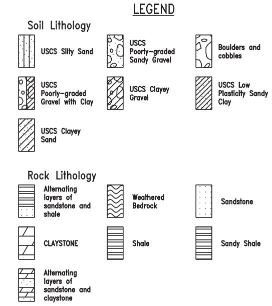
Appendix C.1 – Bridge Engineering Geology Sheets



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'

LEGEND



Summary of Laboratory Test Results

Sample Location			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-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max Dry Density (pcf)	Optimum Moisture (%)	Gravel (>#4) (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
B1-01	CORE	10	4.7	153.2														9964			
B1-08	CORE	27	8.0	141.0														2843			
B1-06	CORE	16	6.5	145.3														5496			
B1-09	CORE	8	8.5	140.9														1180			
B1-10	CORE	11	5.9	145.7														3807			
B1-12	CORE	21	8.5	137.9														1072			
B1-12	CORE	40	7.8	137.5														1405			

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

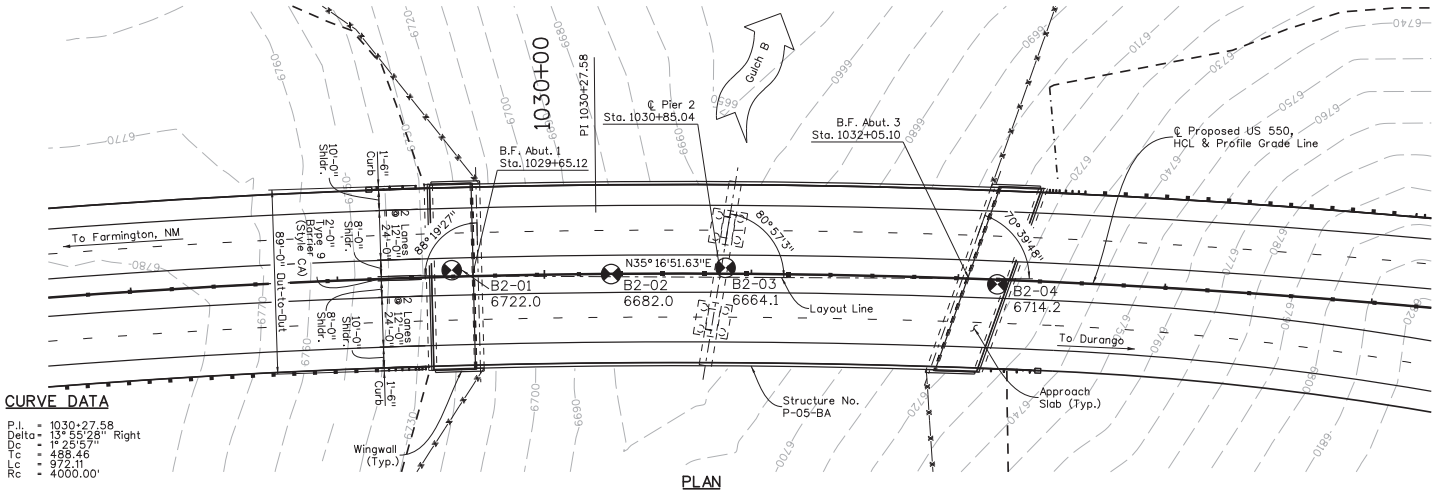
LRuiz 8:58:20 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\LNR Temp Working\009_22420_Gulch A_PnP.dgn

3/6/2019

Print Date: 3/6/2019		Sheet Revisions	
File Name: 009_22420_Gulch A_PnP.dgn		Date: / Comments / Init.	
Horiz. Scale: 1:80	Vert. Scale: As Noted		
Staff Bridge Branch - Unit 0221	STW		
Yeh and Associates, Inc. Consulting Engineers & Scientists			

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

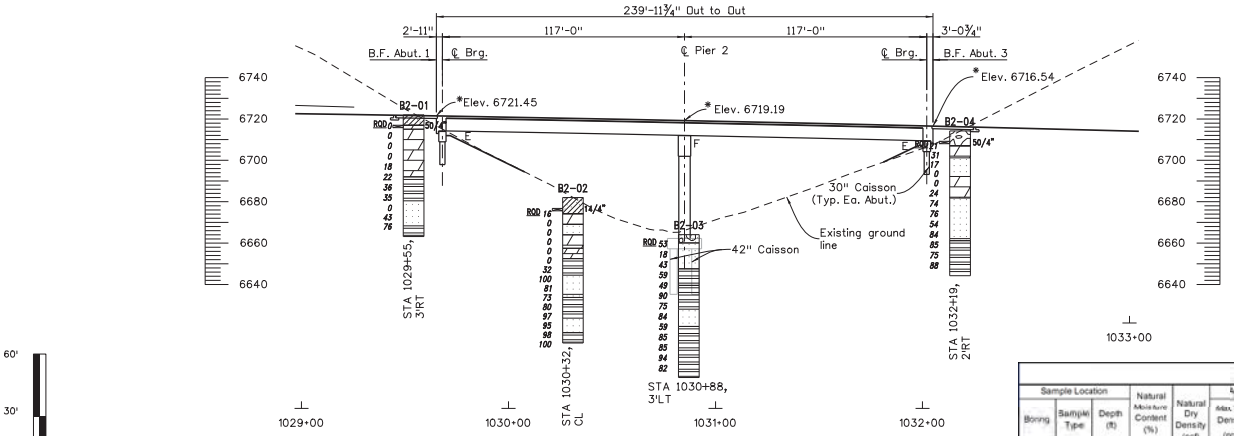
As Constructed	STRUCTURE ENGINEERING GEOLOGY GULCH A BRIDGE			Project No./Code
No Revisions:				NHPP 5501-029
Revised:	Designer: TA	Structure Numbers	P-05-AZ	22420
	Detailer: LR			
Void:	Sheet Subset: EG_BRIDGES	Subset Sheets: 9 OF 10		Sheet Number



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

- USCS Low Plasticity Sandy Clay
- USCS Poorly-graded Sandy Gravel
- Boulders and cobbles

Rock Lithology

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

Summary of Laboratory Test Results

Sample Location			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-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI	pH						AASHTO	USCS
B2-01	CORE	25.5-26.0		149.4													2230			
B2-01	CORE	51.5-52.3		151.3													2750			
B2-04	CORE	14.6-15.0		148.3													5400			

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

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:	

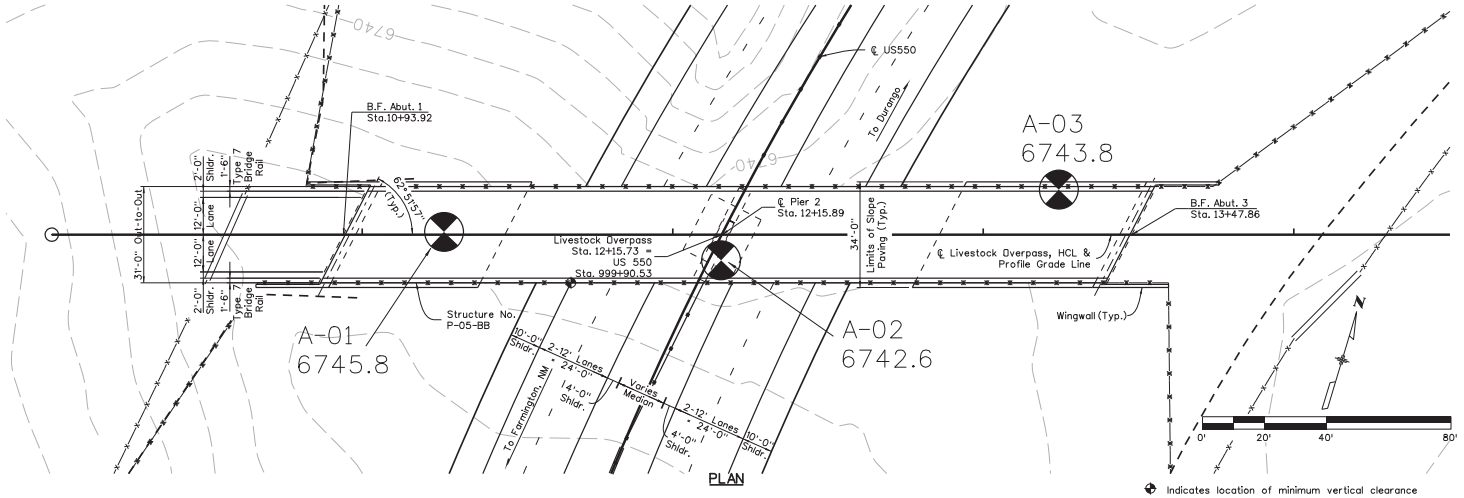
STRUCTURE ENGINEERING GEOLOGY
BRIDGE GULCH B

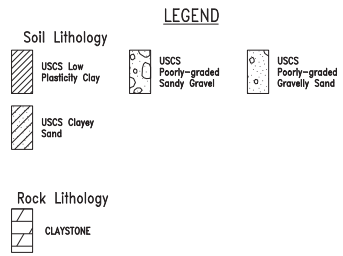
Designer:	TA	Structure Numbers	P-05-BA
Detailer:	LR		
Sheet Subset:	EG_BRIDGE	Subset Sheets:	10 OF 10

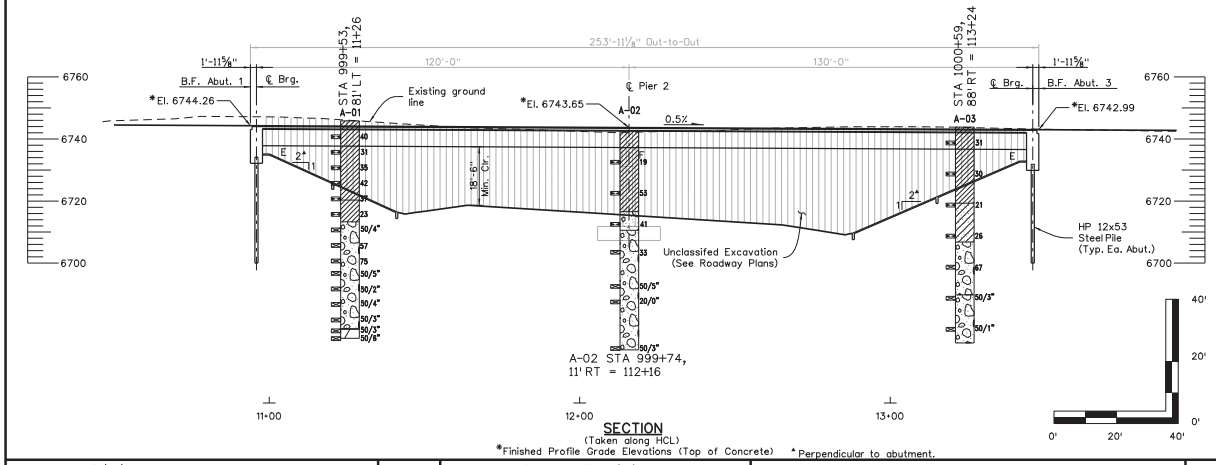
Project No./Code
NHPP 5501-029
22420
Sheet Number

LRuiz 8:59:49 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\LNR Temp Working\010_22420_Gulch B_PnP.dgn
3/6/2019

Appendix C.2 – Wildlife and Livestock Crossings Engineering Geology Sheets







Summary of Laboratory Test Results

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel (> #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
A-01	bulk	0.0-5	13.1		106.1	19.2	0	20	80	42	21	21								A-7-6 (17)	CL
A-01	MC	9.5	12.2	104.4															7063		
A-01	bulk	10.5-14.5	13.5				0	17	83	40	17	23								A-6 (18)	CL
A-01	MC	19.5	8.7	89.2			0	22	78	28	19	9								A-4 (5)	CL
A-01	bulk	48.5-53.5	10.6				30	66	4	NV	NP	NP								A-1-a (0)	SP
A-02	MC	19.5	13.1	85.2			0	11	89	39	24	15				-3.4				A-6 (14)	CL
A-02	bulk	30-32	8.6				5	71	24	NV	NP	NP	8.5	ND	0.0114		3500			A-2-4 (0)	SM
A-02	bulk	59.5-64.5	3.4				25	71	4	NV	NP	NP								A-1-a (0)	SP
A-03	MC	4.5	11.7	113.0															8357		
A-03	bulk	5.5-9.5	11.6				0	19	81	43	20	23								A-7-6 (18)	CL
A-03	bulk	29.5-34.5	7.5				1	56	43	26	22	4								A-4 (0)	SM

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

Print Date: 3/6/2019
File Name: 008_22420_Livestock Overpass.dgn
Horiz. Scale: 1:39.999 Vert. Scale: As Noted
Staff Bridge Branch - Unit 0221 STW

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

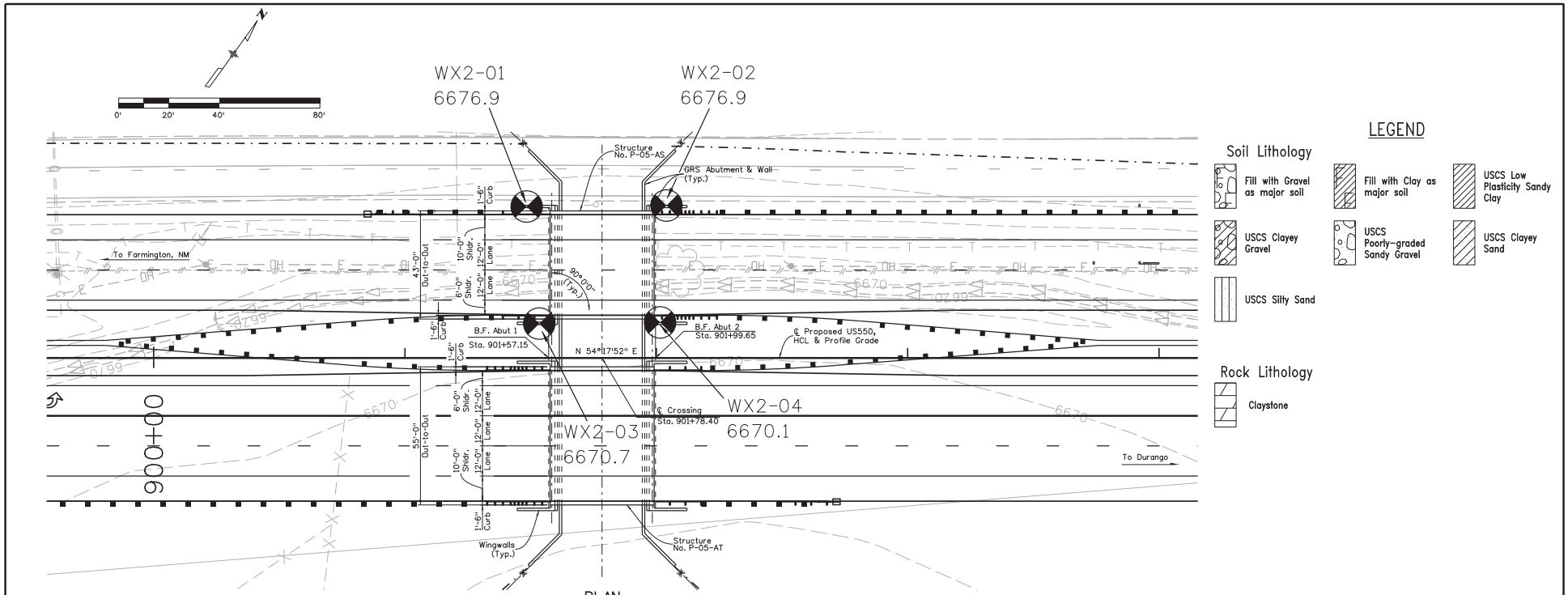
As Constructed	
No Revisions:	
Revised:	
Void:	

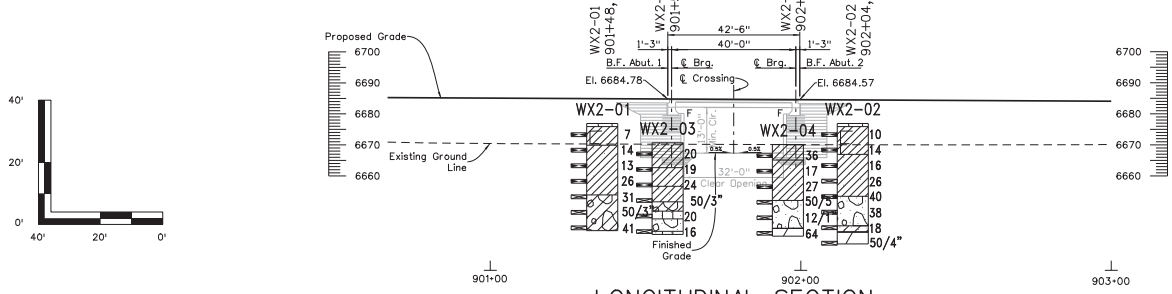
STRUCTURE ENGINEER GEOLOGY
LIVESTOCK OVERPASS

Designer:	TA	Structure Numbers	P-05-BB
Detailer:	LR		
Sheet Subset:	EG_XING	Subset Sheets:	8 OF 10

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

LRuiz 8:55:48 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7. Drawings\LNR Temp Working\008_22420_Livestock Overpass.dgn
3/6/2019





LEGEND

Soil Lithology

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

Rock Lithology

- Claystone

Summary of Laboratory Test Results

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max Dry Density (pcf)	Optimum Moisture (%)	Grave l > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI	pH						AASHTO	USCS
WX2-01	bulk	8-13	19.2				0	8	92	40	12	28	8.6	0.024	0.00543		1100		A-6 (25)	CL
WX2-01	MC	13	17.3	105.8												-0.3				
WX2-02	bulk	8-13	19.7				0	20	80	47	16	31							A-7-6 (24)	CL
WX2-02	MC	13	15.7	108.8												-0.2				
WX2-03	Bli	23	5.1				22	64	14	NV	NP	NP							A-1-b (0)	SM
WX2-04	MC	8	18.3	111.4																
WX2-04	MC	13	17.3	111.3												-0.1				
WX2-04	bulk	18-23	5.2				33	52	15	NV	NP	NP							A-1-b (0)	SM

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

LRuiz 8:51:41 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7-Drawings\LNR Temp Working\006_22420_Wildlife Underpass A.dgn

3/6/2019

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

Yeh and Associates, Inc.
Consulting Engineers & Scientists

Sheet Revisions		
Date:	Comments	Init.

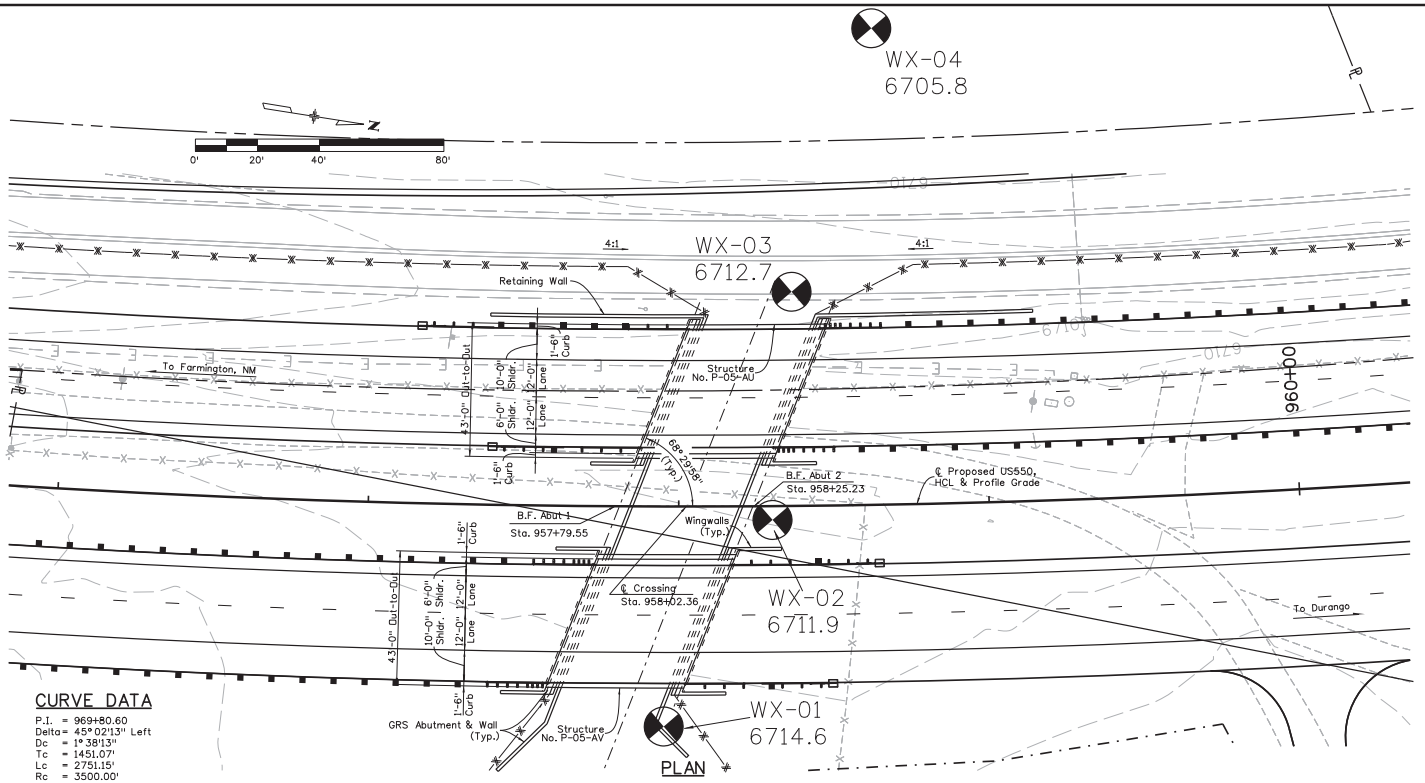
Colorado Department of Transportation
3803 North Main Avenue
Durango, CO 81301
Phone: 970-385-1440 FAX: 970-385-8365
Region 5 DRV

As Constructed	
No Revisions:	
Revised:	
Void:	

STRUCTURE ENGINEERING GEOLOGY
WILDLIFE UNDERPASS A

Designer:	TA	Structure Numbers	P-05-AS
Detailer:	LR		P-05-AT
Sheet Subset:	EG_XING	Subset Sheets:	6 OF 10

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



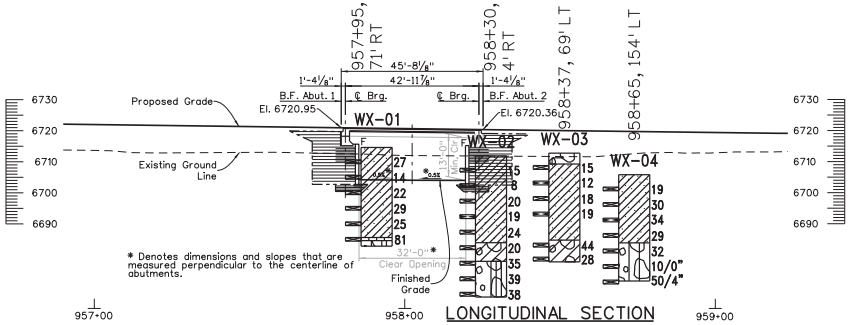
CURVE DATA

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 Silt
- USCS Silty Gravel
- USCS Clayey Gravel
- USCS Poorly-graded Gravel with Silt
- Fill with Gravel as major soil



Summary of Laboratory Test Results

Boring	Sample Location: Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99: Max. Dry Density (pcf)	AASHTO T99: Optimum Moisture (%)	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: #200 (%)	Atterberg: LL	Atterberg: PL	Atterberg: PI	SRT	Water Soluble Sulfate (%)	Fineness (%)	% Swell (+)/ Consolidation (-)	Resistivity (Ohm-cm)	Unconfined Compressive strength (rock-psi)	Unconfined Compressive strength (soil-psf)	CLASSIFICATION: AASHTO	CLASSIFICATION: USCS
WX-01	SD	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												-0.1					
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												0.3					
WX-04	bulk	24-29	3.7				44	42	14	NV	NP	NP								A-1-a (0)	GM

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

Print Date: 3/6/2019
File Name: 007_22420_Wildlife Underpass B.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Staff Bridge Branch - Unit 0221 STW

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:	

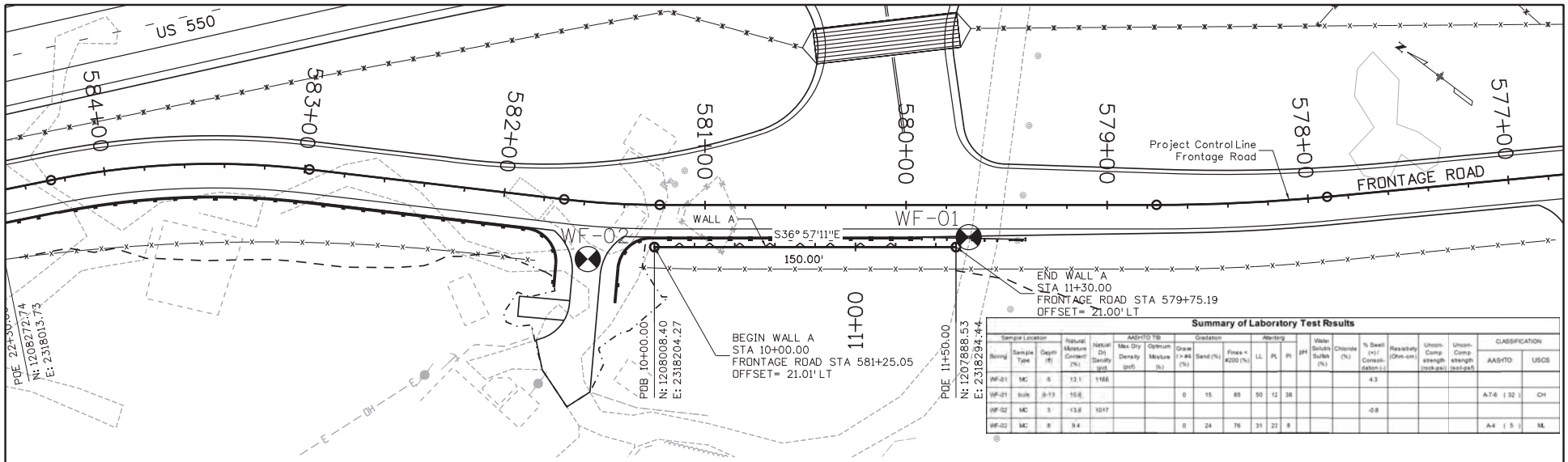
STRUCTURE ENGINEERING GEOLOGY
WILDLIFE UNDERPASS B

Designer:	TA	Structure Numbers	P-05-AU
Detailer:	LR		P-05-AV
Sheet Subset:	EG_XING	Subset Sheets:	7 OF 10

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

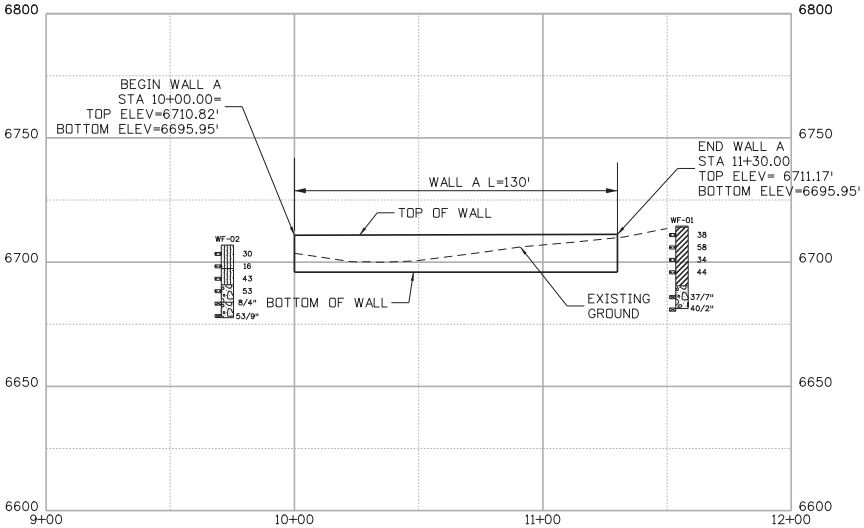
LRuiz 8:54:16 AM W:\2017 Projects\217-376 ES US 550 South Connection to US 160 Geotech\7.Drawings\LNR Temp Working\007_22420_Wildlife Underpass B.dgn
3/6/2019

Appendix C.3 – Retaining Wall Engineering Geology Sheets



Summary of Laboratory Test Results

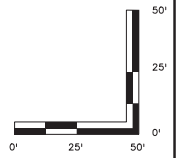
Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation		Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp. strength (rock-psi)	Uncon-Comp. strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max Dry Density (pcf)	Optimum Moisture (%)	Gravel (> #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI							AASHTO	USCS
WF-01	MC	6	13.1	1166											4.3					
WF-01	bulk	(6-13)	10.6				0	15	85	50	12	38							A-7-6 (32)	CH
WF-02	MC	3	13.8	1017											-0.8					
WF-02	MC	8	9.4				0	24	76	31	23	8							A-4 (5)	ML



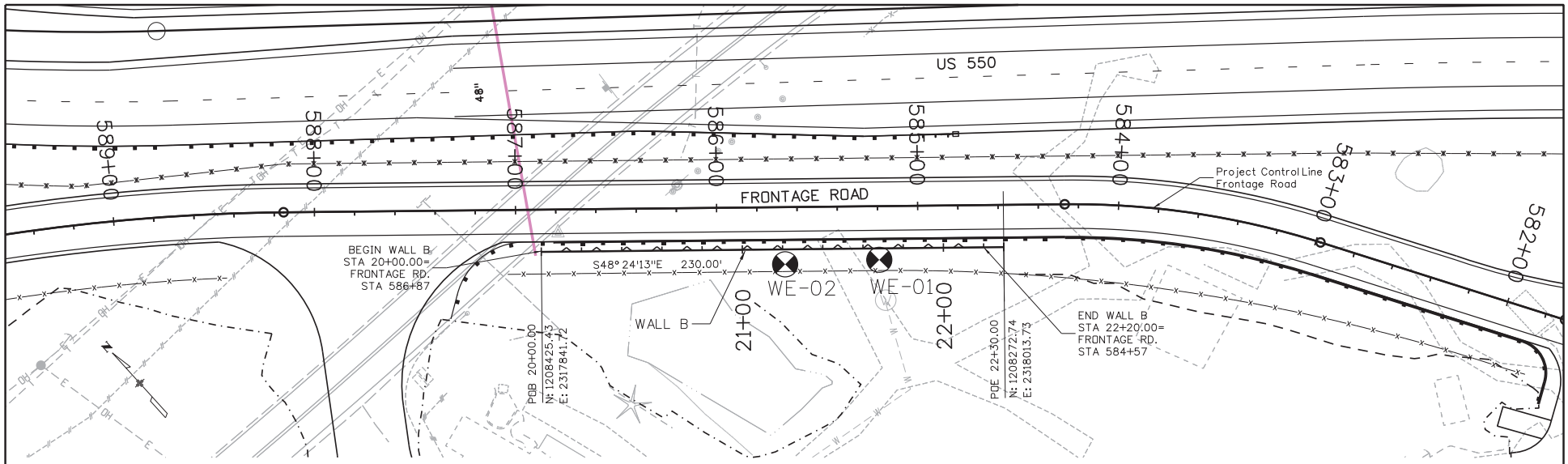
LEGEND

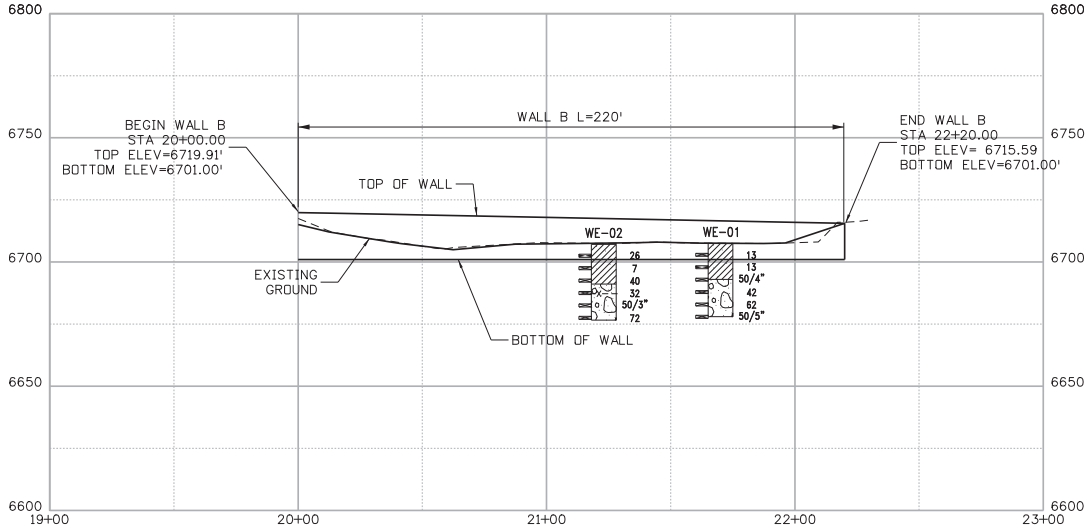
Soil Lithology

- Fill with Gravel as major soil
- USCS High Plasticity Clay
- USCS Poorly-graded Sandy Gravel
- USCS Sandy Silt



Print Date: 3/6/2019	0000	Sheet Revisions			Colorado Department of Transportation	As Constructed	STRUCTURE ENGINEERING GEOLOGY WALL A
File Name: 001_22420_Wall_A_Pnp.dgn		Date:	Comments	Init.	3803 North Main Avenue, Durango, CO 81301, Phone: 970-385-1440 FAX: 970-385-8365	No Revisions:	Designer: TA / Structure Numbers:
Horiz. Scale: 1:50 Vert. Scale: As Noted					Region 5 DRV	Revised:	Detailer: LR
Unit Information Unit Leader Initials						Void:	Sheet Subset: EG_WALLS / Subset Sheets: 1 of 10
Yeh and Associates, Inc. Consulting Engineers & Scientists							Project No./Code: NHPP 5501-029 / 22420 / Sheet Number





LEGEND

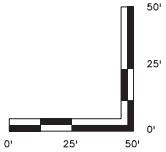
Soil Lithology

USCS Low Plasticity Sandy Clay

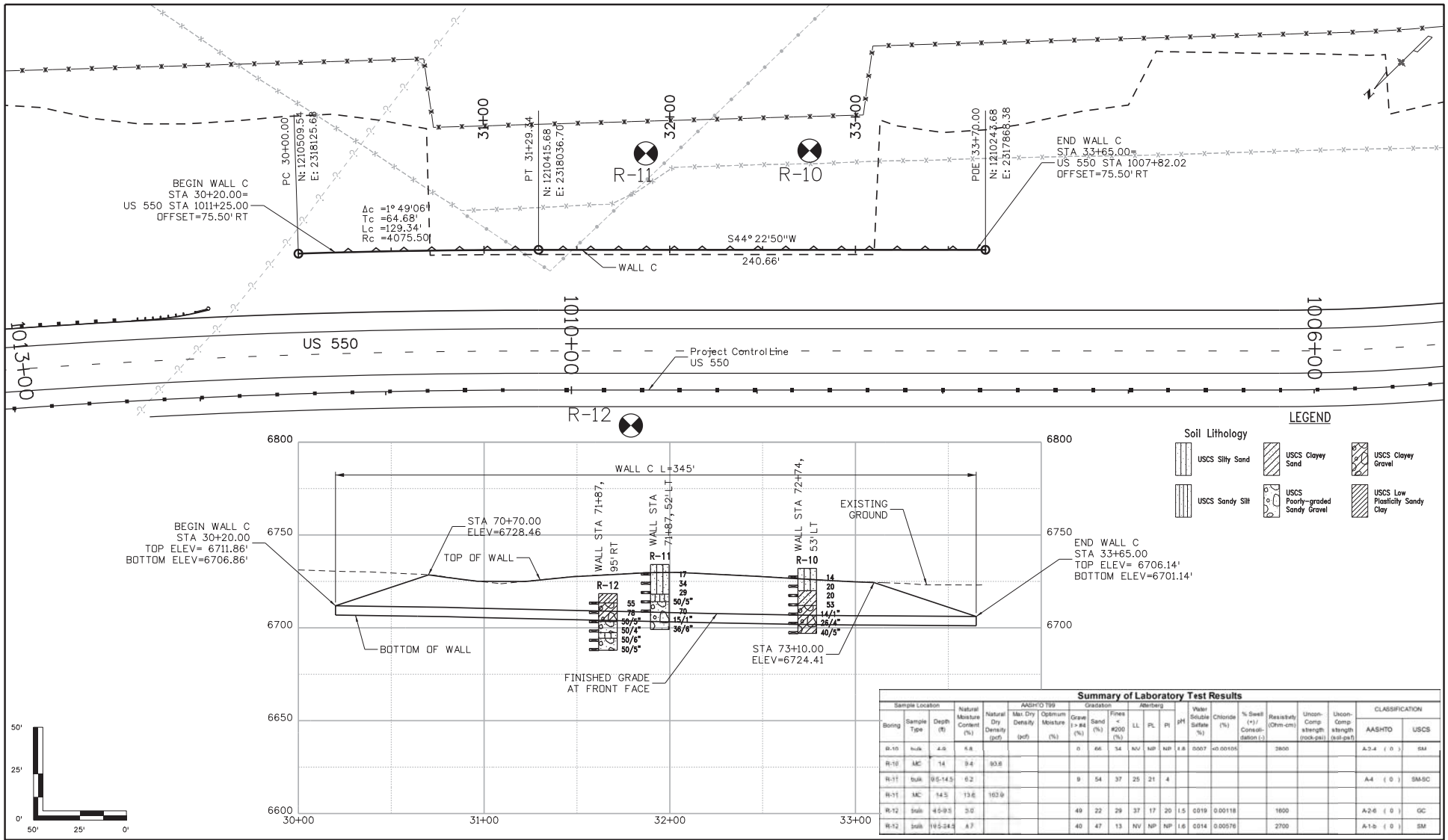
USCS Poorly-graded Sandy Gravel

Summary of Laboratory TestResults

Sample Location			Natural Moisture Content (%)		AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chlorides (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp. strength (rock psi)	Uncon-Comp. strength (soil psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)		Natural Dry Density (pcf)	Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
WE-01	SS	4-5	7.9				0	28	72	26	18	8								A4 (4)	CL
WE-01	Bulk	4-9	14.9				0	16	84	29	19	10	8.5	0.014	0.00784		1000			A4 (7)	CL
WE-01	MC	9	14.8	107.4												-0.2					
WE-01	Bulk	19-24	3.8				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								A6 (11)	CL



Print Date: 3/6/2019		Sheet Revisions			Colorado Department of Transportation	As Constructed	STRUCTURE ENGINEERING GEOLOGY WALL B	Project No./Code
File Name: 002_22420_Wall_B_Pnp.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: 1:50 Vert. Scale: As Noted						Revised:	Designer: TA Structure Numbers	22420
Unit Information Unit Leader Initials						Void:	Detailer: LR	
Yeh and Associates, Inc. Consulting Engineers & Scientists	0000				Region 5 DRV		Sheet Subset: EG_WALLS Subset Sheets: 2 of 10	Sheet Number

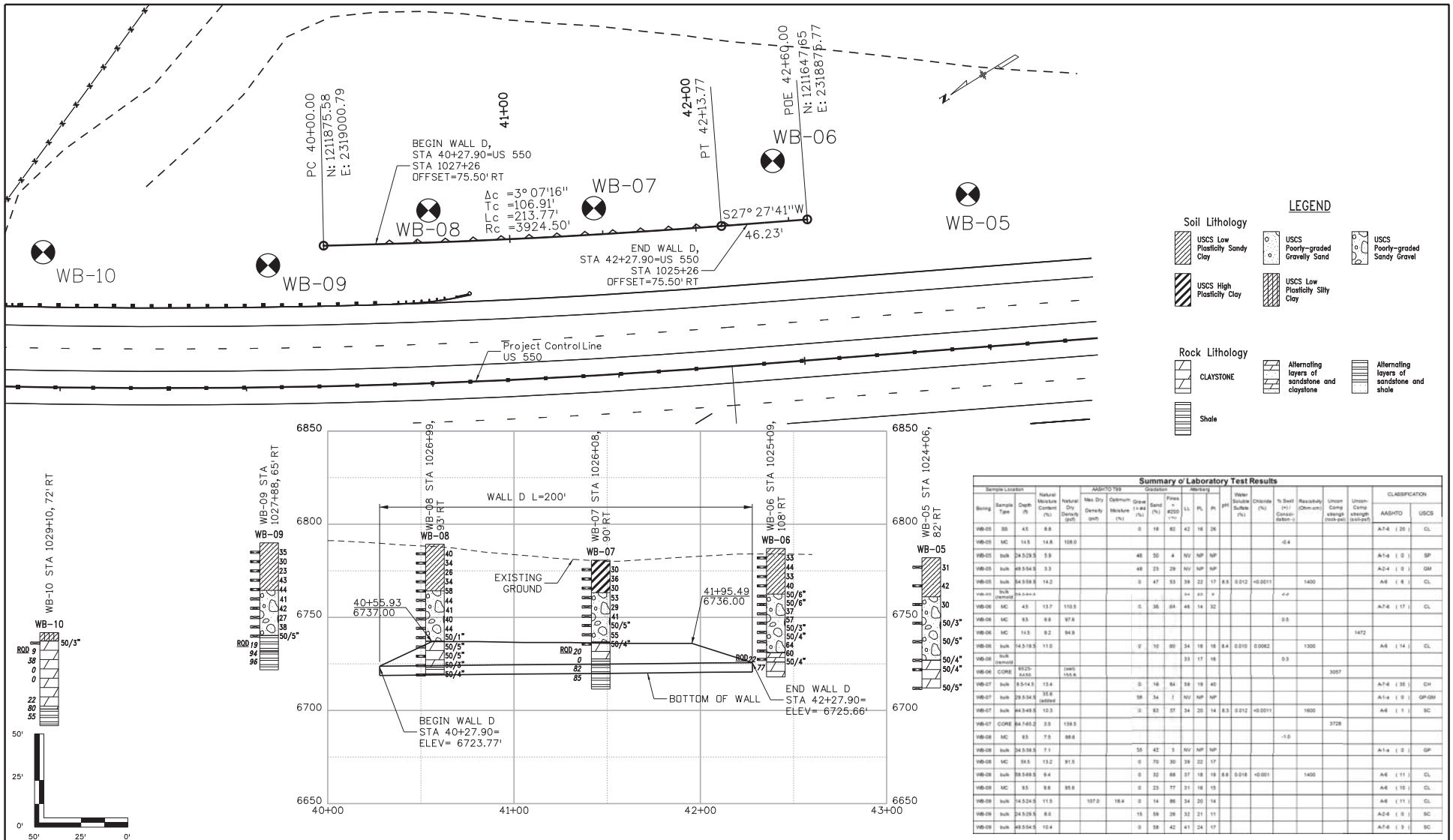


Summary of Laboratory Test Results

Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99 Max. Dry Density (pcf)	AASHTO T99 Optimum Moisture (%)	Gradation Gravel (> #4) (%)	Gradation Sand (%)	Gradation Fines < #200 (%)	Atterberg LL	Atterberg PL	Atterberg PI	pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+)/ Consolidation (-)	Resistivity (Ohm-cm)	Uncon-Comp. strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION AASHTO	CLASSIFICATION USCS
R-10	bulk	4-6	5.8				0	66	34	NV	NP	NP	7.8	0.007	<0.00105		2800			A-2-4 (0)	SM
R-10	MC	14	9.4	90.8																	
R-11	bulk	9.5-14.5	6.2				9	54	37	25	21	4								A-4 (0)	SM-SC
R-11	MC	14.5	13.6	103.9																	
R-12	bulk	4.5-9.5	5.0				49	22	29	37	17	20	1.5	0.019	0.00118		1600			A-2-6 (0)	GC
R-12	bulk	19.5-24.5	8.7				40	47	13	NV	NP	NP	1.6	0.014	0.00576		2700			A-1-b (0)	SM

Print Date: 3/6/2019	0000	Sheet Revisions			Colorado Department of Transportation 3803 North Main Avenue Durango, CO 81301 Phone: 970-385-1440 FAX: 970-385-8365 Region 5 DRV
File Name: 003_22420_Wall_C_Pnp.dgn		Date:	Comments	Init.	
Horiz. Scale: 1:50 Vert. Scale: As Noted					
Unit Information Unit Leader Initials					
Yeh and Associates, Inc. Consulting Engineers & Scientists					

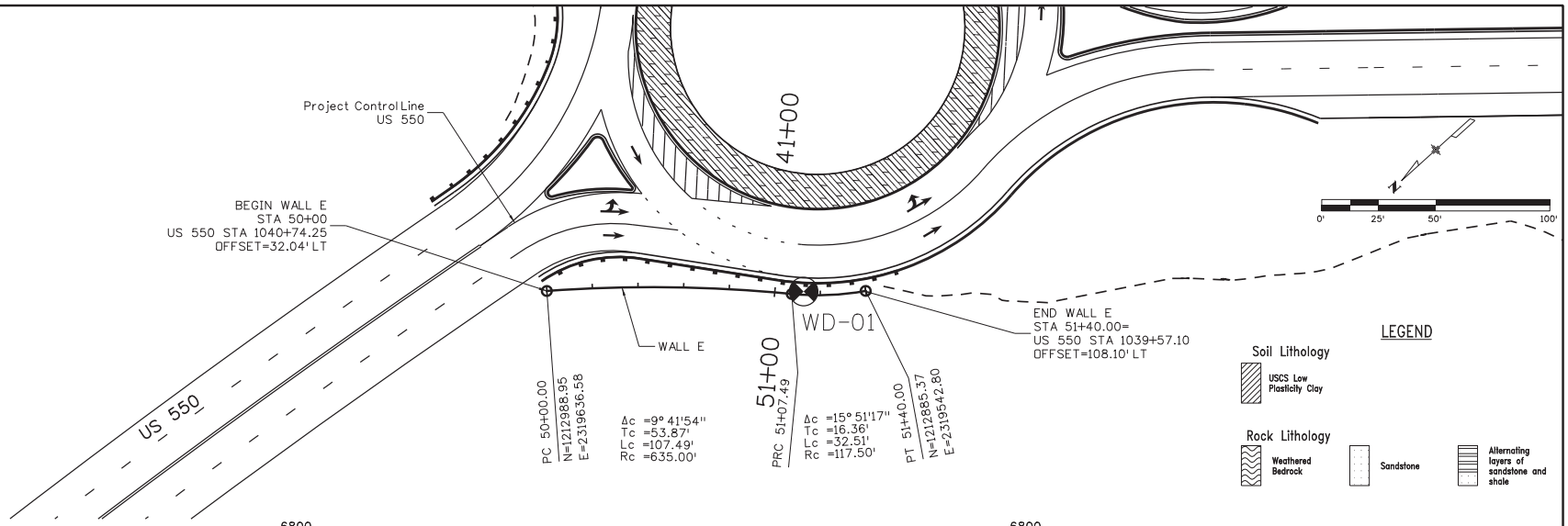
As Constructed	STRUCTURE ENGINEERING GEOLOGY WALL C		Project No./Code
No Revisions:			NHPP 5501-029
Revised:	Designer: TA	Structure Numbers	22420
Void:	Detailer: LR		Sheet Number
	Sheet Subset: EG_WALLS	Subset Sheets: 3 of 10	

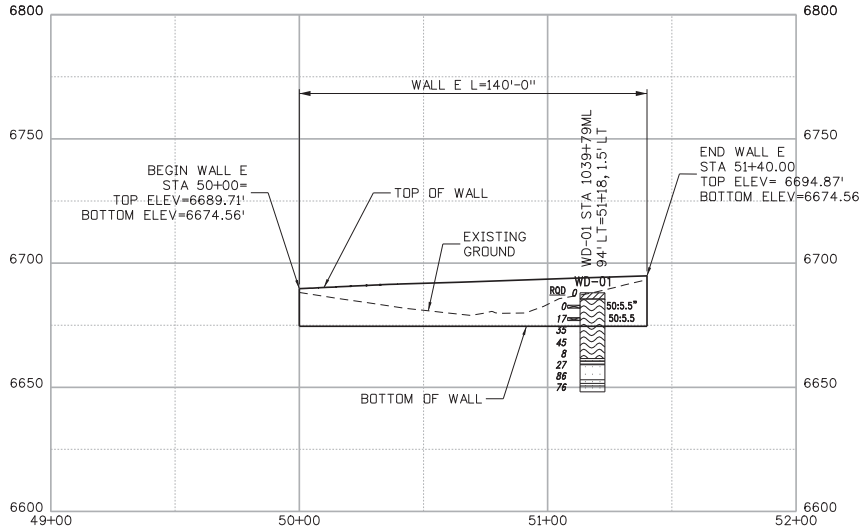


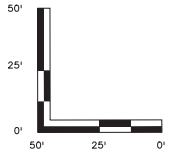
Summary of Laboratory Test Results

Sample Location				AASHTO T99		Gradation			Atterberg								CLASSIFICATION	
Boring	Sample Type	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	Max Dry Density (pcf)	Optimum Moisture (%)	Gravel (+#4) (%)	Sand (%)	Fines (-#200) (%)	LL	P_L	P_I	pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+/- Consolidation -)	Resistivity (Ohm-cm)	Uncon Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	AASHTO	USCS
WB-03	SS	4.5	8.8				0	18	82	42	16	26								A-7-6 (20)	CL
WB-03	MC	14.5	14.8	108.0												-0.4					
WB-03	bulk	24.5-29.5	5.9				46	50	4	NV	NP	NP								A-1-a (0)	SP
WB-03	bulk	49.5-54.5	3.3				48	23	29	NV	NP	NP								A-2-4 (0)	GM
WB-03	bulk	54.5-59.5	14.2				0	47	53	39	22	17	8.5	0.012	<0.0011		1400			A-6 (8)	CL
WB-05	bulk (remold)	39.5-44.5								34	23	11				-0.4					
WB-06	MC	4.5	13.7	110.5			0	36	64	48	14	32								A-7-6 (17)	CL
WB-06	MC	9.5	9.6	97.6												0.5					
WB-06	MC	14.5	9.2	94.9															1472		
WB-06	bulk	14.5-19.5	11.0				9	10	80	34	18	16	8.4	0.010	0.0062		1300			A-6 (14)	CL
WB-06	bulk (remold)									33	17	16				0.3					
WB-06	CORE	63.25-64.50		(wet) 135.5															3057		
WB-07	bulk	8.5-14.5	13.4				0	16	84	59	19	40								A-7-6 (38)	CH
WB-07	bulk	29.5-34.5	35.8 (added)				59	34	7	NV	NP	NP								A-1-a (0)	GP-GM
WB-07	bulk	44.5-49.5	10.3				0	83	17	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															3726		
WB-08	MC	9.5	7.5	88.6												-1.0					
WB-08	bulk	24.5-39.5	7.1				58	42	0	NV	NP	NP								A-1-a (0)	GP
WB-08	MC	39.5	13.2	91.5			0	70	30	39	22	17									
WB-08	bulk	58.5-69.5	9.4				0	32	68	37	18	19	8.6	0.018	<0.001		1400			A-6 (11)	CL
WB-08	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		Sheet Revisions			Colorado Department of Transportation	As Constructed	STRUCTURE ENGINEERING GEOLOGY WALL D	Project No./Code
File Name: 004_22420_Wall_D_Pnp.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: 1:50 Vert. Scale: As Noted						Revised:	Designer: TA Structure Numbers	22420
Unit Information Unit Leader Initials						Void:	Detailer: LR	Sheet Number
Yeh and Associates, Inc. Consulting Engineers & Scientists					Region 5 DRV		Sheet Subset: EG_WALLS Subset Sheets: 4 OF 10	







Print Date: 3/6/2019 File Name: 005_22420_Wall_E_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 E Designer: TA Structure Numbers Detailer: LR Sheet Subset: EG_WALLS Subset Sheets: 5 OF 10	Project No./Code NHPP 5501-029 22420 Sheet Number

Appendix D – Boring Logs

D.0	Boring Log Legend
D.1	Roadway and Excavation Boring Logs
D.2	Gulch A Bridge (Bridge 1) Boring Logs
D.3	Gulch B Bridge (Bridge 2) Boring Logs
D.4	Livestock/Wildlife Overpass (A) Boring Logs
D.5	Wildlife Underpass A (WX2) Boring Logs
D.6	Wildlife Underpass B (WX) Boring Logs
D.7	Retaining Walls A, B, C, D, E, F and G Boring Logs
D.8	Test Pits 1, 2 and 3 Logs

Appendix D.0 – Boring Log Legend

Yeh and Associates, Inc.
Consulting Engineers & Scientists

Project: U.S. 550 South Connection to U.S. 160

Project Number: 217-376

Legend for Symbols Used on Borehole Logs

Sample Types


Auger Cuttings


Standard Penetration Test (ASTM D1586)


Rock Core


Excavator trench or test pit


Modified California Sampler (2.5 inch OD, 2.0 inch ID)


ODEX/Downhole Hammer

Lithology Symbols (see Boring Logs for complete descriptions)


Asphalt


USCS Low Plasticity Silty Clay


USCS Clayey Gravel


USCS Poorly-graded Sandy Gravel


USCS Clayey Sand


Claystone


Sandy Shale


Boulders and cobbles


USCS Low Plasticity Sandy Clay


USCS Silty Gravel


USCS Silt


USCS Silty Sand


Sandstone


Shale


USCS High Plasticity Clay


Fill with Clay as major soil


USCS Poorly-graded Gravel


USCS Sandy Silt


USCS Poorly-graded Gravelly Sand


Interbedded claystone and sandstone


Weathered Bedrock


USCS Low Plasticity Clay


Fill with Gravel as major soil


USCS Poorly-graded Gravel with Silt


Interbedded claystone and sandstone


Alternating layers of sandstone and shale

Lab Test Standards

Moisture Content	ASTM D2216
Dry Density	ASTM D7263
Sand/Fines Content	ASTM D421, ASTM C136, ASTM D1140
Atterberg Limits	ASTM D4318
AASHTO Class.	AASHTO M145, ASTM D3282
USCS Class.	ASTM D2487

(Fines = % Passing #200 Sieve
Sand = % Passing #4 Sieve, but not passing #200 Sieve)

Other Lab Test Abbreviations

pH	Soil pH (AASHTO T289-91)
S	Water-Soluble Sulfate Content (AASHTO T290-91, ASTM D4327)
Chl	Water-Soluble Chloride Content (AASHTO T291-91, ASTM D4327)
S/C	Swell/Consolidation (ASTM D4546)
UCCS	Unconfined Compressive Strength (ASTM D2166)
R-Value	Resistance R-Value (ASTM D2844)
DS (C)	Direct Shear cohesion (ASTM D3080)
DS (phi)	Direct Shear friction angle (ASTM D3080)
Re	Electrical Resistivity (AASHTO T288-91)
PtL	Point Load Strength Index (ASTM D5731)

Notes

1. "Penetration Resistance" on the Boring Logs refers to the uncorrected N value for SPT samples only, as per ASTM D1586. For samples obtained with a Modified California sampler, drive depth is 12 inches, and "Penetration Resistance" refers to the sum of all blows. Where blow counts were > 50 for the 3rd increment (SPT) or 2nd increment (MC), "Penetration Resistance" combines the last and 2nd-to-last blows and lengths; for other increments with > 50 blows, the blows for the last increment are reported.

2. The Modified California sampler used to obtain samples is a 2.5-inch OD, 2.0-inch ID (1.95-inch ID with liners), split-barrel sampler with internal liners, as per ASTM D3550. Sampler is driven with a 140-pound hammer, dropped 30 inches per blow.

3. "ER" for the hammer is the Reported Calibrated Energy Transfer Ratio for that specific hammer, as provided by the drilling company.

Appendix D.1 – Roadway and Excavation Boring Logs

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-01**

Boring Began: 1/16/2018
Boring Completed: 1/16/2018
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.5 ft
Ground Elevation: 6718.8 ft
Coordinates: N: E:
Location: Sta. 954+11, 69' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
						0.0 - 0.6 ft. Asphalt.									
						0.6 - 2.5 ft. Aggregate Base Course.									
						2.5 - 20.5 ft. CLAY trace sand, brown, moist, very stiff.									
6715	5		7-10	17			15.3	107.8							S/C=1% **R-Value Sample: 4'-9'** R-Value=10
6710	10		9-10-11	21			14.0		2	13	85	32	18	A-6 (14) CL	
6705	15		8-10-13	23			15.1		0	13	87	34	16	A-6 (13) CL	pH=8.3 S=0.005% Chl=0.00788% Re=730ohm·cm
6700	20		7-10-10	20											

Bottom of Hole at 20.5 ft.

Civil Engineering Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-02**

Boring Began: 1/16/2018
Boring Completed: 1/16/2018
Drilling Method(s): Air Rotary
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.5 ft
Ground Elevation: 6713.4 ft
Coordinates: N: E:
Location: Sta. 964+42, 88' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710	0					**0.0 - 0.6 ft.** Asphalt.									
						0.6 - 2.0 ft. Road Base.	2.2		47	40	13	NV	NP	A-1-a (0) GM	pH=8.8 S=0.002% Chl=0.00433% Re=3000ohm·cm
						2.0 - 20.5 ft. CLAY with some sand, red-brown, moist, stiff.									
	5		8-11	19											
6705															
	10		8-7-6	13											
6700															
	15		4-4-4	8											
6695							16.2		0	25	75	31	15	A-6 (9) CL	
	20		4-5-7	12											
6690						Bottom of Hole at 20.5 ft.									
6685															
6680															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-03**

Boring Began: 1/16/2017
Boring Completed: 1/16/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.5 ft
Ground Elevation: 6719.1 ft
Coordinates: N: E:
Location: Sta. 969+58, 85' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
						0.0 - 0.6 ft. Asphalt.									
						0.6 - 1.0 ft. Aggregate Base Course.									
						1.0 - 20.5 ft. CLAY with some sand, red-brown, moist, stiff.									
6715	5		5-7	12			18.1	107.5							S/C=0.4%
6710	10		5-6-11	17											
6705	15		5-5-5	10			18.5		0	28	72	40	23	A-6 (15) CL	pH=8.2 S=0.016% Chl=0.00164% Re=1200ohm·cm
6700	20		4-5-7	12											
6695						Bottom of Hole at 20.5 ft.									
6690															
6685															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-04**

Boring Began: 1/16/2018
Boring Completed: 1/16/2018
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.0 ft
Ground Elevation: 6728.5 ft
Coordinates: N: E:
Location: Sta. 974+57, 30' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6725						**0.0 - 0.6 ft.** Asphalt.									
						0.6 - 2.0 ft. Aggregate Base Course.									
						2.0 - 20.0 ft. CLAY with some sand, red-brown, moist, very stiff.									
	5		7-8-10	18											
6720															
	10		11-11-13	24			17.4		0	24	76	46	27	A-7-6 (20) CL	pH=8.1 S=0.019% Chl=0.00292% Re=1060ohm·cm
6715															
	15		11-16	27			11.9	115.6							S/C=1.6%
6710															
	20		9-12	21											
6705						Bottom of Hole at 20.0 ft.									
6700															
6695															

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-05**

Boring Began: 1/17/2018
Boring Completed: 1/17/2018
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.5 ft
Ground Elevation: 6728.3 ft
Coordinates: N: E:
Location: Sta. 979+51, 103,R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6725						**0.0 - 0.6 ft.** Asphalt. **0.6 - 1.0 ft.** Aggregate Base Course. **1.0 - 4.0 ft. clayey GRAVEL** sandy, brown, moist, dense.									
	5		8-7-9	16		**4.0 - 20.5 ft. CLAY** with some sand, red-brown, moist, very stiff.									**R-Value Sample: 4'-9'** R-Value=22
6720	10		10-19	29			12.2		0	19	81	35	18	A-6 (13) CL	pH=8.8 S=0.012% Chl=0.0029% Re=1200ohm·cm
6715	15		11-12-15	27											
6710	20		8-7-7	14											**More sand content at 19'**
6705						Bottom of Hole at 20.5 ft.									
6700															
6695															

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-06**

Boring Began: 1/17/2018
Boring Completed: 1/17/2018
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 20.5 ft
Ground Elevation: 6727.5 ft
Coordinates: N: E:
Location: Sta. 984+16, 55' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6725	0					**0.0 - 1.0 ft.** Shouldering material.									
						1.0 - 6.0 ft. CLAY with some sand, dark brown, moist, very stiff.									
	5		5-8-10	18											
6720						**6.0 - 20.5 ft. CLAY** with some sand, red-brown, moist, very stiff.	15.5		0	15	85	38	21	A-6 (17) CL	pH=7.6 S=0.02% Chl=0.106% Re=340ohm·cm
	10		11-22	33			13.5	117.9							S/C=3.9% **Calcium deposits at 10 ft**
6715															
	15		10-12-14	26											
6710															**More sand content at 17 ft**
	20		7-8-8	16											
6705						Bottom of Hole at 20.5 ft.									
6700															
6695															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-07**

Boring Began: 11/16/2017
Boring Completed: 11/16/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 14.5 ft
Ground Elevation: 6723.9 ft
Coordinates: N: E:
Location: Sta.991+05, 48' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6720	5		8-9-8	17		**0.0 - 13.0 ft. . CLAY** with some sand, red-brown, damp to moist, very stiff.	11.0		0	28	72	47	27	A-7-6 (18) CL	pH=8.2 S=0.026% Chl=0.00534% Re=1300ohm·cm **R-Value Sample: 5'-13'** R-Value=11 S/C=-1.8%
6715	10		12-15	27			8.9	97.8	0	54	46	31	17	A-6 (4) SC	
6710			50/5"	50/5"		**13.0 - 14.5 ft. clayey GRAVEL**, tan-brown, moist, very dense.									
						Bottom of Hole at 14.5 ft.									
6705															
6700															
6695															
6690															

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-08**

Boring Began: 11/16/2017
Boring Completed: 11/16/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 21.5 ft
Ground Elevation: 6733.1 ft
Coordinates: N: E:
Location: Sta. 995+13, 11' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730	5		8-10-12	22		**0.0 - 21.0 ft. CLAY** with some sand, tan, damp, very stiff to hard.									**R-Value Sample: 15'-20'** R-Value=18
6725	10		14-16	30			6.6		1	20	79	38	22	A-6 (16) CL	**Calcite Vening at 12 ft**
6720	15		16-24	40			9.8	107.0							S/C=1.1%
6715	20		15-26/5"	26/5"											**No movement in final 10 blows. Drive terminated**
6710						**21.0 - 21.5 ft. clayey GRAVEL**, brown, damp, very dense.									
6705						Bottom of Hole at 21.5 ft.									
6700															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-09**

Boring Began: 11/16/2017
Boring Completed: 11/16/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 23.5 ft
Ground Elevation: 6732.0 ft
Coordinates: N: E:
Location: Sta. 1002+94, 27' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 6.0 ft. CLAY** with some sand, red-brown to white-brown, damp, hard.									**Calcite Veining at 3 ft**
	5		15-18-17	35											
6725						**6.0 - 22.0 ft. CLAY** with some sand, tan, dry to moist, very stiff.									
	10		10-11	21											
6720															**R-Value Sample: 9'-19'** R-Value=22
	15		15-11	26			4.4		1	28	71	27	10	A-4 (5) CL	pH=8.4 S=0.027% Chl=0.00647% Re=1300ohm·cm
6715															
	20		8-10-9	19											
6710			37-30/4"	30/4"		**22.0 - 23.5 ft. clayey SAND** with some gravel, very dense.	6.4		22	37	41	32	17	A-6 (3) SC	**No movement in final 10 blows. Drive terminated**
6705						Bottom of Hole at 23.5 ft.									
6700															

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-10**

Boring Began: 11/16/2017
Boring Completed: 11/17/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 35.0 ft
Ground Elevation: 6732.0 ft
Coordinates: N: E:
Location: Sta. 1008+72, 129' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 12.0 ft. silty SAND**, tan, damp, medium dense.									
	5		7-8-6	14			5.8		0	66	34	NV	NP	A-2-4 (0) SM	pH=8.8 S=0.007% Re=2800ohm·cm
6725															
	10		11-10-10	20											
6720						**12.0 - 20.0 ft. sandy CLAY**, brown, damp, very stiff to hard.									
	15		8-12	20			9.4	93.6							
6715															
	20		18-35	53		**20.0 - 35.0 ft. clayey GRAVEL** sandy, gray brown, moist, very dense.									
6710															
	25		44-14/1"	14/1"											
6705															
	30		26/4"	26/4"											
6700															
			17-40/5"	40/5"											

Bottom of Hole at 35.0 ft.

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Civil Engineering Associates, Inc.
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-11**

Boring Began: 11/18/2017
Boring Completed: 11/18/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 35.0 ft
Ground Elevation: 6734.1 ft
Coordinates: N: E:
Location: Sta. 1009+60, 127' R
Logged By: B. Kunz
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 16.0 ft. silty SAND** trace gravel, brown, dry, medium dense.									
	5		8-8-9	17											
6725															
	10		10-15-19	34			6.2		9	54	37	25	4	A-4 (0) SM-SC	
6720															
	15		16-13	29			13.6	103.9							
6715						**16.0 - 20.0 ft. SILT** with some sand, dark brown, dry, very dense.									
	20		50/5"	50/5"		**20.0 - 35.0 ft. sandy GRAVEL** with some cobbles, gray, dry, very dense.									
6710															
	25		47-36-34	70											
6705															
	30		15/1"	15/1"											**No movement in 10 blows. Drive terminated**
6700			36/6"	36/6"											**No movement in 10 blows. Drive terminated**

Bottom of Hole at 35.0 ft.

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ci u l hg E aae. sl A ar &h. S
Y e h a n d A s h o c h o s h i i t a , I . s i h A s a A a

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 **Boring No.:** R-12

Boring Began: 12/1/2017
Boring Completed: 12/1/2017
Drilling Method(s): Hollow-Stem Auger / ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 30.5 ft
Ground Elevation: 6718.0 ft
Coordinates: N: E:
Location: Sta. 1009+68, 19' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6715						**0.0 - 5.0 ft. CLAY** with some sand, tan, damp, stiff to very stiff.									
	5		27-33-22	55		**5.0 - 15.0 ft. GRAVEL** with some clay and sand, red-brown to gray, damp to moist, very dense.	5.0		49	22	29	37	20	A-2-6 (0) GC	pH=8.5 S=0.019% Chl=0.00118% Re=1600ohm·cm
6710															
	10		24-44-34	78											
6705															**R-Value Sample: 5'-18'** R-Value=18
	15		18-50/5"	50/5"		**15.0 - 21.0 ft. GRAVEL** with some sand and cobbles, gray, dry, dense.									**Cobbles and Boulders at 14.5 ft to bottom of hole**
6700															**Switched to ODEX at 18.5 ft**
	20		50/4"	50/4"											
						21.0 - 24.0 ft. gravelly SAND with some silt, brown, moist.	4.7		40	47	13	NV	NP		pH=8.6 S=0.014% Chl=0.00576% Re=2700ohm·cm
6695															
	25		50/6"	50/6"		**24.0 - 30.5 ft. GRAVEL** with some sand and cobbles, gray, dry, very dense.									
6690															
	30		45-50/5"	50/5"											
6685						Bottom of Hole at 30.5 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-13**

Boring Began: 3/21/2018
Boring Completed: 3/24/2018
Drilling Method(s): HQ Coring / NX Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 112.6 ft
Ground Elevation: 6824.7 ft
Coordinates: N: E:
Location: 1034+32, 35' R
Logged By: R. Borst
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6820	5				29-20-16	36		**0.0 - 6.5 ft. clayey SAND** with gravel, reddish brown, moist, dense, well graded, angular to rounded gravel, organics- roots. 1.0' Boulder @ 2.5'.							
6815	10				50/0"	50/0"		**6.5 - 61.5 ft. sandy GRAVEL** with cobbles and boulders, brown, very dense, rounded to subangular.							
6810	15				50/2"	50/2"									
6805	20				37-50/4"	50/4"		Greater density of gravel.							
6800	25				50/0"	50/0"									
6795	30				50/1.5"	50/1.5"		Large gravel and cobble grain size.							
6790															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
					50/0"	50/0"		**6.5 - 61.5 ft. sandy GRAVEL** with cobbles and boulders, brown, very dense, rounded to subangular.							
6785	40														
6780	45														
6775	50							1.0' Boulder @ 50.0'.							
6770	55														
6765	60		62	52				**61.5 - 88.0 ft. SANDY CLAYSTONE**, brown to gray, predominantly decomposed to slightly weathered, medium hard to hard, joint, clay and iron oxide infilling, lignite stringers, (ANIMAS FORMATION).							
6760	65		96	57											
6755	70		91	82											
6750	75		108	84											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6745	80		99	90											
6740	85		101	86				Evaporte infilling, (ANIMAS FORMATION).							
6735	90		98	71				**88.0 - 99.0 ft. CLAYEY SANDSTONE**, blue-grey, slightly weathered to fresh, hard, joint, clay and iron oxide infilling, iron oxide staining, (ANIMAS FORMATION).							
6730	95		103	75				~.5" coal seam, (ANIMAS FORMATION).							
6725	100		86	60				**99.0 - 109.0 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, blue-grey with brown, moderately weathered to slightly weathered, medium hard to hard, joint, clay and gravel infilling, lignite stringers and seams, (ANIMAS FORMATION).							
6720	105		111	101											
6715	110		100	47				**109.0 - 112.6 ft. CONGLOMERATE**, gray, slightly weathered, very hard, (ANIMAS FORMATION).							
6710								Bottom of Hole at 112.6 ft.							
6705															

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-01**

Boring Began: 1/22/2018
Boring Completed: 1/23/2018
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 119.5 ft
Ground Elevation: 6830.7
Coordinates: N: E:
Location: Sta. 1035+18, 195' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6830						**0.0 - 7.0 ft. CLAY** with some sand, brown, high plasticity, moist, very stiff.	17.9		0	16	84	72	50	A-7-6 (45) CH	
	5		10-9-12	21											
6825						**7.0 - 70.0 ft. GRAVEL** with some cobbles, sand and clay, brown-tan, moist, medium dense to very dense.									
	10		7-9-9	18											**Cobbles at 11 ft to 70 ft**
6820															
	15		29-30/5"	30/5"											
6815															
	20		26/4"	26/4"			1.8		68	27	5	NV	NP	A-1-a (0) GP	**Recovered drill cuttings**
6810															
	25		23-35/5"	35/5"											**Driller began adding water at 24 ft**
6805															
	30		50/6"	50/6"											
6800															
			26-36-44	80											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6795						**7.0 - 70.0 ft. GRAVEL** with some cobbles, sand and clay, brown-tan, moist, medium dense to very dense.									
			30/4"	30/4"											
6790	40														
			24-25-26	51											
6785	45														
			20/0"	20/0"											
6780	50														
			34-20/3"	20/3"											
6775	55														
			30/4"	30/4"											
6770	60														
			29-26-38	64											
6765	65														
			50/6"	50/6"											
6760	70					**70.0 - 119.5 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, medium hard to hard, (ANIMAS FORMATION).									**70.0 ft** - Switch to air rotary
			37-20/2"	57/8"											
6755	75						11.8		0	67	33	38	17		**Drill cuttings: Fragmented bedrock**

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-01**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6750	80		32-50/4"	50/4"											
												30	9		**Drill cuttings: Fragmented bedrock** pH=9 S=0.011% Chl=0% Re=1500ohm·cm
6745	85		50/4"	50/4"											
6740	90		50/5"	50/5"											
6735	95														
6730	100		50/4"	50/4"											
6725	105														
6720	110		50/3"	50/3"											
6715	115											28	9		**Drill cuttings: Fragmented bedrock** pH=9.4 S=0.015% Chl=0% Re=1500ohm·cm
			50/5"	50/5"											

Bottom of Hole at 119.5 ft.

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-02**

Boring Began: 1/17/2018
Boring Completed: 1/19/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 148.0 ft
Ground Elevation: 6828.2
Coordinates: N: E:
Location: Sta. 1036+88, 198' R
Logged By: K. Moran
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6825								**0.0 - 7.0 ft. CLAY** with some sand, red-brown, dry to moist, very stiff.									
	5				13-14	27			7.9	97.3							
6820								**7.0 - 55.0 ft. GRAVEL** with some sand, cobbles and boulders, trace clay, gray brown, dry to moist, very dense.	3.5		26	61	13	22	4		**Drill cuttings: fragmented gravel and cobbles**
	10				26-39-21	60											
6815																	
	15				50/4"	50/4"											
6810																	
	20				23-50/3"	50/3"											
6805																	
	25				28-41-17	58											
6800																	
	30				50/6"	50/6"											
6795																	

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6790					42-50/5"	50/5"		**7.0 - 55.0 ft. GRAVEL** with some sand, cobbles and boulders, trace clay, gray brown, dry to moist, very dense.									
	40				50/6"	50/6"											**Boulders**
6785																	
	45				17/5"	17/5"											
6780																	
	50				12-23-34	57											
6775																	
	55				31-50/5"	50/5"		**55.0 - 59.0 ft. CLAYSTONE**, yellow, moderately weathered, (ANIMAS FORMATION).									
6770																	
	60		97	68				**59.0 - 148.0 ft. SHALE**, blue-gray, interbedded with sandstone, (ANIMAS FORMATION).	3.8	139.6							**Switch to Coring at 59 ft** UCCS=3100psi
6765																	
	65		100	66													
6760																	
	70		99	99					6.4	138.1							UCCS=1526psi
6755																	
	75		100	100													

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6750	80		98	98													
6745	85		100	100													
6740	90		85	58					6.4	144.6							UCCS=3298psi
6735	95		99	86													
6730	100		94	76													**R-Value Sample: 95'-105'** R-Value=25
6725	105		100	92					3.6	143.7							UCCS=3392psi
6720	110		99	73													
6715	115		99	97													
6710																	

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6705			99	91													
	125		100	98					3.9	141.6							UCCS=2427psi
6700																	
	130		95	82													
6695																	
	135		100	84													**Conglomerate (Volcaniclastic) layer from 134' to 136'**
6690																	
	140		100	100													
			100	100					4.4	149.1							UCCS=7021psi
6685																	
	145		100	93													
6680								Bottom of Hole at 148.0 ft.									
6675																	
6670																	

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-03**

Boring Began: 1/17/2018
Boring Completed: 1/18/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 91.0 ft
Ground Elevation: 6837.2
Coordinates: N: E:
Location: Sta. 1038+62, 200' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6835	0							**0.0 - 12.0 ft. CLAY** with some sand, trace gravel, light brown, high plasticity, damp, hard to very hard.									
	5				21-24	45			14.0	112.5							
6830									11.5		5	20	75	50	32	A-7-6 (23) CH	
	10				48-25	73											
6825								**12.0 - 45.0 ft. GRAVEL** with some sand, boulders and cobbles, light gray and yellowish brown, dry, medium dense to dense.									
	15				39-30-13	43											
6820																	
	20				14-12-10	22											
6815																	
	25				12-21-42	63											
6810																	
	30				32-15/0"	15/0"											
6805																	

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6800					16-17-24	41		**12.0 - 45.0 ft. GRAVEL** with some sand, boulders and cobbles, light gray and yellowish brown, dry, medium dense to dense.									
	40				20-26-25	51											
6795																	
	45				41-25/3"	25/3"		**45.0 - 61.5 ft. CLAYSTONE**, yellowish brown, moderately weathered, sandy, (ANIMAS FORMATION).									
6790																	
	50		55	18													
6785			100	94													
	55																
6780			100	100													
	60																
6775			98	87				**61.5 - 91.0 ft. SHALE INTERBEDDED WITH SANDSTONE**, blue-gray, very hard, (ANIMAS FORMATION).									
	65																
6770			97	69													
	70																
6765			100	50													
			0	0													
	75		95	45													
6760																	

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6755	80		98	96													
	85		98	98													
6750			100	100													
	90		100	100													
6745								Bottom of Hole at 91.0 ft.									
6740																	
6735																	
6730																	
6725																	
6720																	

Civil Engineering Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-04**

Boring Began: 1/20/2018
Boring Completed: 1/20/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.9 ft
Ground Elevation: 6769.5
Coordinates: N: E:
Location: Sta. 1039+11, 172' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6765	5		50/6"	50/6"		**0.0 - 69.9 ft. SILTY SHALE**, yellowish brown to olive gray, hard, slightly moist, (ANIMAS FORMATION).							
6760	10		36-46	82			12.7	110.3					
6755	15		50/6"	50/6"									
6750	20		37-50/4"	87/10"									
6745	25		50/4"	50/4"									
6740	30		50/4"	50/4"									
6735			50/4"	50/4"									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6730	40		50/5"	50/5"									
6725	45		37-50/6"	50/6"									
6720	50		50/5"	50/5"									
6715	55		50/3"	50/3"									
6710	60		50/4"	50/4"						29	10		**Drill cuttings: Fragmented bedrock** pH=8.7 S=0.002% Chl=0.00109% Re=4000ohm·cm
6705	65		50/4"	50/4"									
6700			50/4"	50/4"									
6695						Bottom of Hole at 69.9 ft.							

Ciu lhg Eaae. sl Aar &h. S
YehandAsho choshiita, I.sihAsaAa

Project Name:	US 550 Connector	PAGE 1 of 2
Project Number: 217-376	Boring No.: **E-05**	

Boring Began: 1/19/2018
Boring Completed: 1/19/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.3 ft
Ground Elevation: 6837.6
Coordinates: N: E:
Location: Sta. 1036+94, 257' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
	0					**0.0 - 15.0 ft. CLAY** with some sand, brown, moist, very stiff.									
6835															
	5		8-12-17	29											
6830															
	10		15-15-14	29											
6825															
	15		21-24-22	46		**15.0 - 19.0 ft. GRAVEL** with clay and sand, brown, damp, dense to very dense.									
6820															
	20		20-50/4"	50/4"		**19.0 - 51.0 ft. GRAVEL** with cobbles and boulders, some clayey sand, brown, moist, very dense.									
6815															
	25		31-50/5"	50/5"											
6810							2.2		48	44	8	NV	NP		**Drill cuttings: Fragmented gravel**
	30		48-30/3"	30/3"											
6805															
			19-29-32	61											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6800						**19.0 - 51.0 ft. GRAVEL** with cobbles and boulders, some clayey sand, brown, moist, very dense.									
			50/5"	50/5"											
	40														
6795															
			20/0"	20/0"											
	45														
6790															
			50/6"	50/6"											
	50					**51.0 - 53.0 ft. SAND** with some silt, brown, moist, medium dense.	2.6		49	46	5	NV	NP		**Drill cuttings: Fragmented gravel and cobble**
6785						**53.0 - 62.0 ft. GRAVEL** with cobbles, some sand and clay, brown, damp, very dense.									
			48-34/4"	34/4"											
	55														
6780															
			25/1"	25/1"											
	60														
6775						**62.0 - 68.0 ft. SANDSTONE**, tan-yellow, (ANIMAS FORMATION).									
			30/4"	30/4"											
	65														
6770						**68.0 - 69.3 ft. SANDSTONE**, gray, hard, (ANIMAS FORMATION).									
			50/4"	50/4"											
						Bottom of Hole at 69.3 ft.									
6765															

Ciulhg Eaae. sl Aar &. S
YehandAshochoshiita, I.sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-06**

Boring Began: 11/20/2017
Boring Completed: 11/21/2017
Drilling Method(s): Air Rotary/ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 103.0 ft
Ground Elevation: 6842.1
Coordinates: N: E:
Location: Sta. 1037+92, 334' R
Logged By: B. Kunz
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6840								**0.0 - 14.0 ft. CLAY** with some sand, red-brown, dry, very stiff.									
	5				12-13-17	30			13.1		0	24	76	46	32	A-7-6 (23) CL	
6835																	**Air Rotary at 6 ft to 15 ft**
	10				11-15	26											
6830																	
	15				47-50/5"	50/5"		**14.0 - 20.0 ft. SAND** with some gravel, trace silt, red-brown, dry, very dense.	1.7		19	68	13	NV	NP		pH=8.6 S=0.007% Chl=0.00196% Re=4000ohm·cm
6825																	
	20				20-26-23	49		**20.0 - 55.0 ft. GRAVEL** with cobbles, some sand, brown to red, dry, very dense.									
6820																	**Cobbles at 20 ft to 59.5 ft**
	25				bounce	bounce											
6815																	
	30				44-22-32	54											
6810									1.8		27	64	9	NV	NP		**Drill cuttings: Fragmented gravel and cobble**

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6805					38-34/3"	34/3"		**20.0 - 55.0 ft. GRAVEL** with cobbles, some sand, brown to red, dry, very dense.									
	40				22/3"	22/3"											
6800																	
	45				28-34/2"	34/2"											
6795																	
	50				41-31-23	54											
6790																	
	55				42-50/4"	50/4"		**55.0 - 73.0 ft. SANDSTONE**, olive-brown, moderately weathered, medium hard to hard, (ANIMAS FORMATION).									
6785																	
	60		76	52													**59.5 ft** - Switched to coring
6780																	
	65		97	68													
6775																	
	70		98	59													
6770																	
	75		95	57				**73.0 - 103.0 ft. SHALE**, gray, slightly weathered, hard, (ANIMAS FORMATION).									
6765																	

Yeh and Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376 Boring No.: **E-06**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock Recovery (%)	Rock RQD (%)	Soil Samples Blows per 6 in	Soil Samples Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits Liquid Limit	Atterberg Limits Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
	80		100	47													
6760																	Vertical fractures at 83 ft
	85		100	97													
6755																	
	90		100	93													
6750																	
	95		100	100													
6745																	
	100		100	77													
6740																	

Bottom of Hole at 103.0 ft.

6735

6730

6725

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-07**

Boring Began: 1/16/2018
Boring Completed: 1/17/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 100.0 ft
Ground Elevation: 6840.9
Coordinates: N: E:
Location: Sta. 1038+90, 403' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6840								**0.0 - 18.0 ft. CLAY** with some sand, red-brown, damp, stiff to very stiff.									
	5				7-8	15											
6835																	
	10				13-15	28											
6830																	
	15				14-20	34			20.4	99.7			81				
6825																	
	20				43-35-33	68		**18.0 - 38.0 ft. GRAVEL** with some sand, cobbles and boulders, brown, dry, very dense.	7.5		19	45	36	35	20		**Drill cuttings: Fragmented gravel and cobble**
6820																	
	25				25-50/5"	50/5"											
6815																	
	30				50/0"	50/0"											
6810																	**33.0 ft** - Water added by driller

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6805					22-50/5"	50/5"		**18.0 - 38.0 ft. GRAVEL** with some sand, cobbles and boulders, brown, dry, very dense.									
	40				50/6"	50/6"		**38.0 - 47.4 ft. SHALE**, olive-yellow, moderately weathered, hard, (ANIMAS FORMATION).									
6800																	
	45		100	83													
6795									5.6	135.1							UCCS=1297psi
	50		99	69				**47.4 - 100.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, slightly weathered, hard to very hard, fine grained, (ANIMAS FORMATION).									
6790																	
	55		99	69													
6785																	
	60		98	37													
6780																	
	65		100	88													
6775																	
	70		100	100													
6770																	
	75		100	87													
6765																	

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6760	80		89	77													
6755	85		100	100					6.7	136.6							UCCS=1122psi
			100	85													
6750	90		98	95													
6745	95		100	39													
			93	91					5.0	138.7							UCCS=1538psi
6740	100							Bottom of Hole at 100.0 ft.									
6735																	
6730																	
6725																	

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-08**

Boring Began: 1/20/2018
Boring Completed: 1/20/2018
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.8 ft
Ground Elevation: 6754.2
Coordinates: N: E:
Location: Sta. 1039+49, 307' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6750						**0.0 - 29.5 ft. SILTY SHALE**, olive-brown, hard to very hard, (ANIMAS FORMATION).							
	5		44-50/3"	94/9"									
6745													
	10		37-50/3"	87/9"									
6740										36	11		pH=8.4 Re=1700ohm·cm
	15		50/4"	50/4"									
6735													
	20		50/5"	50/5"									
6730													
	25		50/5"	50/5"									
6725													
	30		50/3"	50/3"		**29.5 - 69.8 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, hard to very hard, fine grained, (ANIMAS FORMATION).							
6720			50/4"	50/4"									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6715	40		50/5"	50/5"									
6710	45		50/5"	50/5"						30	8		pH=9.4 S=0.009% Re=1400ohm·cm
6705	50		50/6"	50/6"									
6700	55		50/5"	50/5"									
6695	60		50/3"	50/3"									
6690	65		50/3"	50/3"									
6685			50/3"	50/3"		Bottom of Hole at 69.8 ft.							
6680													

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita , I . sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-09**

Boring Began: 11/18/2017
Boring Completed: 11/18/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 80.0 ft
Ground Elevation: 6848.8
Coordinates: N: E:
Location: Sta. 1039+09, 485' R
Logged By: B. Kunz
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6845								**0.0 - 22.0 ft. CLAY** with some sand, red-brown to brown, high plasticity, dry, very stiff to hard.	11.8		0	20	80	52	35	A-7-6 (28) CH	
	5				12-15-18	33											
6840																	**Air Rotary at 8.5 ft to 24.5 ft**
	10				11-10-19	29											
6835																	
	15				17-17-12	29											
6830																	
	20				12-14-15	29											**Trace Gravel at 20 ft to 22 ft**
6825								**22.0 - 26.0 ft. SAND** with some clay, brown, dry, very dense.									**Cobbles at 22 ft to 48 ft**
	25				27-23/2"	23/2"											
6820								**26.0 - 48.0 ft. GRAVEL** with sand and cobbles, red to gray, dry, very dense.									
	30				25-31-33	64											
6815																	
					17/3"	17/3"											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6810	40				27-37/4"	37/4"		**26.0 - 48.0 ft. GRAVEL** with sand and cobbles, red to gray, dry, very dense.	1.2		26	67	7	NV	NP		**Drill Cuttings: Fragmented gravel and cobble**
6805	45				42-16/4"	16/4"											
6800	50		43	22				**48.0 - 80.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, (ANIMAS FORMATION).									
6795	55		98	63													
6790	60																
6785	65		96	71					4.5	98.7	0	59	41	35	2		**Shale/bedrock core. Slaking test performed. Degrades into a pile of flakes or mud.**
6780	70		98	72													
6775	75		100	97													

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6770	80		96	96													

Bottom of Hole at 80.0 ft.

6765

6760

6755

6750

6745

6740

6735

6730

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **E-10**

Boring Began: 11/21/2017
Boring Completed: 11/21/2017
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 76.5 ft
Ground Elevation: 6857.3
Coordinates: N: E:
Location: Sta. 1039+45, 580' R
Logged By: B. Kunz
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6855	5							**0.0 - 9.5 ft. SAND** with some gravel and clay, light brown, dry, (Colluvium).									
6850																	
6845	10				11-9	20		**9.5 - 35.0 ft. CLAY** with some sand, yellow red, dry, very stiff to hard.	13.0	88.3							**Switch to Air Rotary at 9.5'** S/C=-1.7%
6840	15																
6835	20				9-10-10	20											
6830	25																
6825	30				14-21-23	44			12.1		3	29	68	30	17	A-6 (9) CL	**Trace cobbles at 29.5 ft to 35 ft** **Switch to ODEX at 34.5"**

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6820								**35.0 - 46.5 ft. sandy GRAVEL** with boulders and cobbles, gray - brown, dry, very dense.									
	40				45-16/1"	16/1"											**Cobbles at 39.5 ft to 42 ft**
6815																	
	45																**Drilling terminated 11/21/17 at 44.5 ft Drilling resumed 01/10/18**
6810								**46.5 - 76.5 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, (ANIMAS FORMATION).									
	50				50/5"	50/5"											
6805																	
	55		64	30													
6800																	
	60		100	65													
6795																	
	65		100	96													
6790																	
	70		100	74													
6785																	
	75		100	77													
6780								Bottom of Hole at 76.5 ft.									

Appendix D.2 – Gulch A Bridge (Bridge 1) Boring Logs

Ciu lhg Eaae. sl Aar &h. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-01**

Boring Began: 3/6/2018
Boring Completed: 3/7/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 106.0 ft
Ground Elevation: 6721.0
Coordinates: N: E:
Location: Sta. 1013+94, 24' L
Logged By: K. Dye
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6720								**0.0 - 9.0 ft. SAND** with some silt, trace gravel, brown, very dense.							**6-inches of top soil** **Water continuously added for coring**
6715	5				50/5"	50/5"									
6710	10				24-50/2"	50/2"		**9.0 - 30.0 ft. GRAVEL** with some sand, trace silt, brown and green, very dense.							
6705	15				30-50/4"	50/4"									
6700	20				22-50/4"	50/4"									
6695	25				50/2"	50/2"									
6690	30				50/2"	50/2"		**30.0 - 53.0 ft. GRAVEL** with some sand and cobbles, very dense.							

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Project Name: US 550 Connector

Project Number: 217-376

Boring No.: **B1-01**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
					50/2"	50/2"		**30.0 - 53.0 ft. GRAVEL** with some sand and cobbles, very dense.							
6685															
	40				50/1"	50/1"									
6680															
	45				50/1"	50/1"									
6675															
	50				50/1"	50/1"									
6670															
								53.0 - 64.0 ft. GRAVEL with some sand, cobbles and boulders, very dense.							Single boulder 53 ft to 54.5 ft
	55				50/1"	50/1"									
6665															
															Single boulder 58.5 ft to 60 ft
	60														
6660															
								64.0 - 89.0 ft. GRAVEL with some sand and cobbles, very dense.							
	65														
6655															
	70														Switch from HQ to NQ core
6650															
	75														
6645															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6640	80							**64.0 - 89.0 ft. GRAVEL** with some sand and cobbles, very dense.							
6635	85														
6630	90		100	100				**89.0 - 106.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, hard, (ANIMAS FORMATION).	4.7	153.2					UCCS=9964psi
6625	95		100	100											
6620	100		96	92											
6615	105		100	99											
								Bottom of Hole at 106.0 ft.							
6610															
6605															

Project Name: US 550 Connector

Project Number: 217-376 Boring No.: **B1-01A**

Boring Began: 3/26/2018
Boring Completed: 3/29/2018
Drilling Method(s): HQ Coring / NX Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 122.0 ft
Ground Elevation: 6731.3
Coordinates: N: E:
Location: Sta. 1013+80, 17' R
Logged By: R. Borst and K. Moran
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730								**0.0 - 7.0 ft. GRAVEL** with some clay, cobbles and boulders, brown, moist, (Colluvium).							
6725	5														
								7.0 - 18.0 ft. GRAVEL with some sand and clay, brown, very dense.							
6720	10				24-50/4"	50/4"									
6715	15														
								18.0 - 100.4 ft. GRAVEL and COBBLES with some sand, boulders, clay lenses, red-brown, very dense, subangular to rounded.							
6710	20				24-23-25	48									
6705	25														
6700	30				50/5"	50/5"									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6695	40				50/0"	50/0"		**18.0 - 100.4 ft. GRAVEL** and COBBLES with some sand, boulders, clay lenses, red-brown, very dense, subangular to rounded.							
6690															
	45														
6685															
	50				50/2"	50/2"									
6680															
	55														
6675															
	60				50/4"	50/4"									
6670															
	65														
6665															
	70				50/1"	50/1"									
6660															
	75														
6655															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6650	80							**18.0 - 100.4 ft. GRAVEL** and COBBLES with some sand, boulders, clay lenses, red-brown, very dense, subangular to rounded.							
6645	85														
6640	90														
6635	95														
6630	100		93	74				**100.4 - 102.0 ft. SANDY CLAYSTONE**, brown to blue-grey, predominantly decomposed to moderately weathered, (ANIMAS FORMATION).							
6625	105		100	100				**102.0 - 111.5 ft. SANDSTONE**, blue-gray, slightly weathered to fresh, hard, joint, clay infilling, medium to very coarse grained sand granules with some conglomerate layers, (ANIMAS FORMATION).							
6620	110		99	55											
6615	115		98	59				**111.5 - 122.0 ft. SANDY CLAYSTONE**, blue-gray, moderately weathered to fresh, joint, clay and gravel infilling, (ANIMAS FORMATION).							
			100	85											

Project Name: US 550 Connector

Project Number: 217-376 | Boring No.: **B1-01A**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6610															

Bottom of Hole at 122.0 ft.

Elevation scale (feet): 6610, 6605, 6600, 6595, 6590, 6585, 6580, 6575, 6570

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-01B**

Boring Began: 4/19/2018
Boring Completed: 4/19/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 79.1 ft
Ground Elevation: 6733.3 ft
Coordinates: N: E:
Location: Sta. 1013+18, 36' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 9.0 ft. CLAY** with some sand, brown-tan, dry, very stiff.							
	5		9-11	20									
6725													
	10		15-17	32		**9.0 - 16.5 ft. CLAY** with some sand, red-brown gray, moist, very stiff.							
6720													
	15		15-20	35									
6715						**16.5 - 66.5 ft. GRAVEL** with some sand, Cobbles and Boulders, multi-colored, dry, very dense.							
	20		17-25-28	53									
6710													
	25		30/6"	30/6"									
6705													
	30		8/4"	8/4"									
6700													**32.0 ft** - 1.5' Boulder
			28-32-37/2"	69/8"									

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
						16.5 - 66.5 ft. GRAVEL with some sand, Cobbles and Boulders, multi-colored, dry, very dense.							
6695													
			40/2"	40/2"									
	40												
6690													
			18/5"	18/5"									
	45												
6685													
	50												
6680													
			14/2"	14/2"									
	55												
6675													
	60												
6670													
			22/4"	22/4"									
	65												
						66.5 - 79.1 ft. CLAYSTONE, olive-brown, moderately weathered, hard to very hard, (ANIMAS FORMATION).							
6665													
			50/5"	50/5"									
	70												
6660													
			36-50/3"	86/9"									
	75												

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6655			50/1"	50/1"		Bottom of Hole at 79.1 ft.							
6650													
6645													
6640													
6635													
6630													
6625													
6620													
6615													

Ciu lhg Eaae. sl Aar &. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-02**

Boring Began: 3/12/2018
Boring Completed: 3/16/2018
Drilling Method(s): HQ Coring / NQ Coring
Driller: Salisbury & Associates
Drill Rig:
Hammer: Cathead and rope, ER: %

Total Depth: 101.0 ft
Ground Elevation: 6721.8
Coordinates: N: E:
Location: Sta. 1014+08, 29' R
Logged By: B. Kunz and K. Moran
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6720	0							**0.0 - 88.0 ft. GRAVEL** and Cobbles in sandy matrix, multi-colored, very dense.							**Cobble on surface** **Water added by driller**
	5				18-40-34	74									
6715															
	10				25-50/3"	50/3"									
6710															
	15				17-19-20	39									
6705															
	20				50/4"	50/4"									
6700															
	25				50/5"	50/5"									
6695															
	30				50/3"	50/3"									
6690															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6685								**0.0 - 88.0 ft. GRAVEL** and Cobbles in sandy matrix, multi-colored, very dense.							
6680	40				50/1"	50/1"									
6675	45				50/5"	50/5"									
6670	50				50/0"	50/0"									
6665	55				50/0"	50/0"									
6660	60														
6655	65				30/2"	30/2"									
6650	70														**Switch to NQ Coring at 70 feet**
6645	75														

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-02**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6640	80							**0.0 - 88.0 ft. GRAVEL** and Cobbles in sandy matrix, multi-colored, very dense.							
6635	85														
6630	90		83	60				**88.0 - 91.0 ft. CLAYSTONE**, blue-gray, predominantly decomposed, soft to medium hard, (ANIMAS FORMATION).							
6625	95		100	100				**91.0 - 101.0 ft. SANDSTONE**, blue-gray, slightly weathered, medium hard to hard, (ANIMAS FORMATION).							
6620	100		98	98											
								Bottom of Hole at 101.0 ft.							
6615															
6610															
6605															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita , I . si hAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-02A**

Boring Began: 4/20/2018
Boring Completed: 4/20/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 89.2 ft
Ground Elevation: 6741.0
Coordinates: N: E:
Location: Sta. 1013+38, 31' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6740						**0.0 - 27.0 ft. SAND** with some silt, occasional gravel and cobbles, light brown, dry to moist, medium dense.							
	5		9-12	21									
6735													
	10		10-11	21									
6730													
	15		11-24	35									
6725													
	20		11-15	26									
6720													
	25		22/6"	22/6"									**Cobble at 24 ft**
6715						**27.0 - 79.0 ft. GRAVEL** with some sand, boulders and cobbles, multi-colored, dry, dense to very dense.							
	30		15-20-28	48									
6710													
			27-31-22/3"	53/9"									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6705						**27.0 - 79.0 ft. GRAVEL** with some sand, boulders and cobbles, multi-colored, dry, dense to very dense.							
	40		8-12-28	40									
6700													
	45		9-27/4"	27/4"									
6695													
	50		31-50/4"	50/4"									
6690													
	55		20/0"	20/0"									
6685													
	60		30/3"	30/3"									
6680													
	65		15/0"	15/0"									
6675													
	70		10/0"	10/0"									
6670													
	75		10/0"	10/0"									
6665													

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
						27.0 - 79.0 ft. GRAVEL with some sand, boulders and cobbles, multi-colored, dry, dense to very dense.							
			39-50/4"	50/4"		**79.0 - 89.2 ft. CLAYSTONE**, olive to reddish brown, hard to very hard, (ANIMAS FORMATION).							
6660	80												
			29-50/3"	50/3"									
6655	85												
			50/2"	50/2"		Bottom of Hole at 89.2 ft.							
6650													
6645													
6640													
6635													
6630													
6625													

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-03**

Boring Began: 3/16/2018
Boring Completed: 3/16/2018
Drilling Method(s): HQ Coring / NX Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 48.5 ft
Ground Elevation: 6692.0
Coordinates: N: E:
Location: Sta. 1014+68, 24' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6690								**0.0 - 15.0 ft. GRAVEL** with some cobbles and boulders in a sandy matrix, trace clay, multi-colored, very dense, (Colluvium).							**Water added by driller**
	5				13-26-40	66									
6685															
	10				14-50/5"	50/5"									
6680															
	15				50/5"	50/5"		**15.0 - 35.0 ft. COBBLES** and BOULDERS in sand and gravel matrix, multi-colored, very dense.							
6675															
	20				10/0"	10/0"									
6670															
	25				10/0"	10/0"									
6665															
	30				10/0"	10/0"									
6660															

Ciu lhg Eaae. sl Aar &h. S
Yehand Asho choshiita, I. si h Asa Aa

Project Name: US 550 Connector

Project Number: 217-376 Boring No.: **B1-03**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
					10/0"	10/0"		**35.0 - 48.5 ft. CLAYSTONE**, blue-gray, slightly weathered to fresh, hard to very hard, silty, (ANIMAS FORMATION).							
6655			100	57											
	40														**39.5 ft** - Switch to NX core
6650			78	36											
	45														
6645			76	34											

Bottom of Hole at 48.5 ft.

Elevation (feet)
6640
6635
6630
6625
6620
6615

Civil Engineering Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-04**

Boring Began: 3/14/2018
Boring Completed: 3/15/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 55.0 ft
Ground Elevation: 6659.9
Coordinates: N: E:
Location: Sta. 1015+09, 1' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
								0.0 - 1.5 ft. CLAY with gravel, red-brown, (Colluvium).							
			86	0				**1.5 - 13.0 ft. WEATHERED SANDSTONE**, light brown, medium grained, well cemented with highly weathered bedding planes, (ANIMAS FORMATION).							
6655	5		82	14											
6650	10		78	8											
								13.0 - 25.5 ft. CLAYSTONE, olive, moderately weathered, hard to very hard, (ANIMAS FORMATION).							
6645	15		92	48											
6640	20		70	20											
6635	25		99	83				**25.5 - 38.5 ft. SANDSTONE**, blue-gray, very hard, (ANIMAS FORMATION).							
6630	30		94	94											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6620	40		100	92											**Conglomerate layer from 35-36'**
			100	86				**38.5 - 55.0 ft. SHALE**, blue-gray, fresh, very hard, (ANIMAS FORMATION).							
6615	45		99	99											
6610	50		99	88											
6605	55							Bottom of Hole at 55.0 ft.							
6600															
6595															
6590															
6585															

Ciu lhg Eaae. sl Aar &. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-05**

Boring Began: 3/12/2018
Boring Completed: 3/13/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 45.0 ft
Ground Elevation: 6639.0
Coordinates: N: E:
Location: Sta. 1015+39, 20' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6635	5				6-9-12	21		**0.0 - 6.0 ft. GRAVEL** with cobble, some sand, trace clay, multicolored, (Colluvium).							**Water added by driller**
6630	10							**6.0 - 9.0 ft. SAND** with some clay, brown-tan, medium dense.							
6625	15		94	31				**9.0 - 12.0 ft. SANDSTONE**, olive, predominantly decomposed, soft to medium hard.							
6620	20		94	72				**12.0 - 30.0 ft. CLAYSTONE**, olive-brown, predominantly decomposed to fresh, medium hard to hard, (ANIMAS FORMATION).							
6615	25		92	75											
6610	30		99	77											
6605			99	52				**30.0 - 45.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, moderately weathered to fresh, hard to very hard, well cemented, (ANIMAS FORMATION).							**Conglomerate 33 ft to 34 ft**

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-05**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6600	40		100	54											
6595	45		100	100				Bottom of Hole at 45.0 ft.							
6590															
6585															
6580															
6575															
6570															
6565															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-06**

Boring Began: 3/13/2018
Boring Completed: 3/14/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 32.7 ft
Ground Elevation: 6649.0
Coordinates: N: E:
Location: Sta. 1015+60, 24' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6645	5				10/0"	10/0"		**0.0 - 10.3 ft. GRAVEL** with some sand and cobbles, light brown to olive-brown, dense to very dense, (Colluvium).							**Water added by driller**
6640	10				50/2"	50/2"									
6635	15		83	16				**10.3 - 27.7 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, olive, moderately weathered, (ANIMAS FORMATION).							
6630			98	60											
6625	20		100	62											**Conglomerate layer from 21-22.5'**
6620	25		92	64											
6615	30		100	97				**27.7 - 32.7 ft. SHALE**, blue-gray, fresh, hard, (ANIMAS FORMATION).							

Bottom of Hole at 32.7 ft.

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-07**

Boring Began: 3/8/2018
Boring Completed: 3/10/2018
Drilling Method(s): HQ Coring / NQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 40.0 ft
Ground Elevation: 6620.4
Coordinates: N: E:
Location: Sta. 1015+72, 41' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6620								**0.0 - 21.0 ft. GRAVEL** with some sand, cobbles and boulders, trace clay, brown, very dense, (Colluvium).							
6615	5				36-50/4"	50/4"									
6610	10				30-39-33	72									
6605	15				39-50/5"	50/5"									
6600	20				30-50/4"	50/4"									
			76	36				**21.0 - 25.5 ft. SANDY SHALE**, olive gray, predominantly decomposed, soft to medium hard, very fractured, (ANIMAS FORMATION).							
6595	25		94	67				**25.5 - 40.0 ft. SHALE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).							
6590	30		74	38											**Switch to NQ Coring at 29.7 ft**

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: US 550 Connector

Project Number: 217-376

Boring No.: **B1-07**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6585															
			96	75											
	40		97	97											
6580								Bottom of Hole at 40.0 ft.							
6575															
6570															
6565															
6560															
6555															
6550															
6545															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-08**

Boring Began: 3/6/2018
Boring Completed: 3/7/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 70.0 ft
Ground Elevation: 6621.4
Coordinates: N: E:
Location: Sta. 1016+11, 0' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6620								**0.0 - 7.0 ft. CLAY** with some sand, boulders and cobbles, red-brown, stiff, (Colluvium).							**Water added by driller**
	5				26-50/5"	50/5"									
6615								**7.0 - 15.0 ft. SANDSTONE**, olive-brown, and conglomerate, well cemented, fractured, (ANIMAS FORMATION).							
	10		100	30											
6610			100	35											
			100	0											
	15							**15.0 - 22.0 ft. SILTY SHALE**, olive-brown, fractured, (ANIMAS FORMATION).							
6605			90	8											
	20														
6600			82	22				**22.0 - 70.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, fresh, hard, well cemented, (ANIMAS FORMATION).							
	25														
6595			100	94					8.0	141.0					UCCS=2843psi
	30														
6590			98	77											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6585			96	80											
6580	40		100	85											
6575	45		99	84											**Some conglomerate at 47 ft**
6570	50		96	93											
6565	55		100	100					6.5	143.3					UCCS=5496psi
6560	60		95	74											
6555	65		100	66											
	70							Bottom of Hole at 70.0 ft.							
6550															
6545															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-09**

Boring Began: 3/1/2018
Boring Completed: 3/5/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 70.0 ft
Ground Elevation: 6613.1
Coordinates: N: E:
Location: Sta. 1016+55, 0' R

Logged By: K. Dye and B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6610	5				30-50/5"	50/5"		**0.0 - 0.7 ft. silty SAND**. **0.7 - 5.0 ft. COBBLES** and boulders with some sand, multi-colored, very dense, (stream channel deposits).							**8-inches of topsoil** **Water added by driller**
6605	10		100	8				**5.0 - 21.5 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, brownish gray, moderately weathered, soft to hard, highly fractured, (ANIMAS FORMATION).							
6600	15		100	76											
6595	20		98	95					8.5	140.9					**Small diameter clast conglomerate 15 ft to 16.5 ft** UCCS=1180psi
6590	25		94	83				**21.5 - 70.0 ft. SHALE**, blue-gray, moderately weathered to fresh, moderate to strong cementation, (ANIMAS FORMATION).							
6585	30		100	94											**Unweathered below 26 ft**
6580			100	94											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6575			100	86											
	40														
6570			100	100											
	45														
6565			100	94											
	50														
6560			100	87											
	55														
6555			100	90											
	60														
6550			100	100											**Conglomerate layer from 62'-65'**
	65														
6545			99	79											
	70							Bottom of Hole at 70.0 ft.							
6540															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-10**

Boring Began: 2/27/2018
Boring Completed: 3/1/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 70.0 ft
Ground Elevation: 6659.8
Coordinates: N: E:
Location: Sta. 1017+80, 1' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6655	5				18-50/4"	50/4"		**0.0 - 6.7 ft. GRAVEL** with boulders, cobbles and sand, multi-colored, very dense, (Colluvium).							**Water added by driller**
			100	91				**6.7 - 13.0 ft. SANDSTONE**, gray, medium hard to hard, well cemented, (ANIMAS FORMATION).							
6650	10		98	54					5.9	145.7					UCCS=3907psi
								13.0 - 16.0 ft. CONGLOMERATIC SANDSTONE, gray, volcaniclastic.							
6645	15		94	76				**16.0 - 50.3 ft. SHALE**, olive gray.							
6640	20		100	58											**Thin coal seams**
6635	25		100	0											
6630	30		100	98											
6625			99	83											

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-10**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6620	40		98	85											
			95	34											**Thin coal seams at 41 ft and 44 ft**
6615	45														
			99	82											
6610	50							**50.3 - 52.0 ft. CONGLOMERATIC SANDSTONE**, blue-gray, very hard, volcaniclastic.							
			98	92				**52.0 - 70.0 ft. SHALE**, gray, very hard.							
6605	55														
			100	70											
6600	60														
			100	97											
6595	65														
			100	95											
6590	70							Bottom of Hole at 70.0 ft.							
6585															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-11**

Boring Began: 2/27/2018
Boring Completed: 2/28/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 70.2 ft
Ground Elevation: 6725.2
Coordinates: N: E:
Location: Sta. 1019+17, 21' L

Logged By: K. Moran and E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6720	5				50/5"	50/5"		**0.0 - 15.2 ft. GRAVEL** Cobbles and Boulders in a sandy matrix, multi-colored, medium dense to very dense.							**Water added by driller**
6715	10				24-17-13	30									
6710	15				21-50/1"	50/1"									
			100	87				**15.2 - 31.3 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, gray - brown, moderately weathered to fresh, (ANIMAS FORMATION).							
6705	20		72	28											
			100	92											
6700	25														
			100	91											
6695	30														
			100	86				**31.3 - 70.2 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-grey, (ANIMAS FORMATION).							

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-11**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6685	40		100	92											
			100	66											
6680	45		100	80											
6675	50		82	82											
6670	55		100	74											
6665	60		100	93											
6660	65		91	91											
6655	70		100	100				Bottom of Hole at 70.2 ft.							
6650															

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciu lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B1-12**

Boring Began: 3/2/2018
Boring Completed: 3/5/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 70.4 ft
Ground Elevation: 6723.2
Coordinates: N: E:
Location: Sta. 1019+20, 25' R
Logged By: K. Dye and B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6720	0							**0.0 - 13.0 ft. GRAVEL** with some sand, cobbles and boulders, multi-colored, medium dense to very dense.							**Water added by driller**
	5				15-25-37	62									
6715															
	10				18-14-12	26									
6710			100	55				**13.0 - 38.5 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, green-gray, moderately weathered, soft to hard, Some fractured zones, (ANIMAS FORMATION).							
	15				50/5"	50/5"									
6705			96	56											
	20								8.5	137.9					UCCS=1072psi
6700			93	33											
	25														
6695			100	58											
	30														
6690			100	59											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6685			96	49											
	40							**38.5 - 70.4 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-grey, moderately weathered, soft to hard, Some fractured zones with iron staining, (ANIMAS FORMATION).	7.8	137.5					UCCS=1405psi
6680			100	73											
	45														
6675			100	83											
	50														
6670			94	84											
	55														
6665			100	100											
	60														
6660			100	80											
	65														
6655			100	96											
	70							Bottom of Hole at 70.4 ft.							
6650															

Appendix D.3 – Gulch B Bridge (Bridge 2) Boring Logs

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-01**

Boring Began: 3/20/2018
Boring Completed: 3/21/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 58.8 ft
Ground Elevation: 6722.0
Coordinates: N: E:
Location: Sta. 1029+55, 3' R
Logged By: E. Pickerill and A. Hotchkiss
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6720	0							**0.0 - 5.0 ft. CLAY** with some sand, reddish brown, medium stiff.							**Water added by driller**
	5				50/4"	50/4"		**5.0 - 7.0 ft. CLAYSTONE**, olive to yellowish brown, decomposed to predominantly decomposed, soft, (ANIMAS FORMATION).							
6715			93	0				**7.0 - 30.0 ft. CLAYSTONE**, olive, predominantly decomposed to fresh, medium hard, (ANIMAS FORMATION).							
	10		75	0											
6710															
	15		95	0											
6705															
	20		89	0											
6700															
	25		100	19						149.4					UCCS=2230psi
6695															
	30		100	23				**30.0 - 58.8 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, fresh, medium hard to hard, well cemented, fractured zones with some iron staining, (ANIMAS FORMATION).							
6690															

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT-KEVIN.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciu lhg Eaae. sl Aar &h. S
Yehand Asho choshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-01**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6685			100	37											
6680	40		95	35											
6675	45		100	0											
6670	50		100	43						151.3					UCCS=2750psi
6665	55		98	77											

Bottom of Hole at 58.8 ft.

6660

6655

6650

6645

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-02**

Boring Began: 3/21/2018
Boring Completed: 3/23/2018
Drilling Method(s): HQ Coring / NQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 70.2 ft
Ground Elevation: 6682.0
Coordinates: N: E:
Location: Sta. 1030+32, 0' R
Logged By: E. Pickerill and A. Hotchkiss
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6680								**0.0 - 7.8 ft. CLAY** some sand, Cobbles and Boulders, reddish brown, (Colluvium).							**Water added by driller**
	5				14/4"	14/4"									
6675															
			100	16				**7.8 - 13.0 ft. CLAYSTONE**, olive-brown, predominantly decomposed to moderately weathered, medium hard, silty, blocky, (ANIMAS FORMATION).							
	10														
6670			87	0				**13.0 - 18.0 ft. SANDSTONE**, olive, predominantly decomposed to moderately weathered, medium hard, very fine grained, (ANIMAS FORMATION).							
	15														
6665			75	0											
			80	0				**18.0 - 24.5 ft. CLAYSTONE**, olive, predominantly decomposed to moderately weathered, medium hard, minor coal inclusions, (ANIMAS FORMATION).							
	20														
6660			87	0											
			20	0											
	25							**24.5 - 29.5 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, moderately weathered, hard, (ANIMAS FORMATION).							**Switch to NQ Coring at 24.5**
6655			75	33											
	30							**29.5 - 37.5 ft. SHALE**, dark gray, slightly weathered, hard, 3" thick coal stringer at 37.2 feet, (ANIMAS FORMATION).							
6650			100	100											

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-02**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6645	40		91	82				**37.5 - 46.7 ft. SANDSTONE**, Iron staining in occasional fractures, (ANIMAS FORMATION).							
6640	45		84	73											
6635	50		100	80				**46.7 - 48.2 ft. CONGLOMERATE**, blue-gray, (ANIMAS FORMATION).							
6630	55		97	97				**48.2 - 58.2 ft. SHALE**, dark gray, fresh, hard, well cemented, (ANIMAS FORMATION).							
6625	60		100	95				**58.2 - 65.2 ft. SANDSTONE**, tan to gray, interbedded with gray shale, (ANIMAS FORMATION).							
6620	65		100	98											
6615	70		100	100				**65.2 - 70.2 ft. SHALE**, dark gray, slightly weathered to fresh, occasional sandstone lenses, (ANIMAS FORMATION).							
6610								Bottom of Hole at 70.2 ft.							
6605															

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-03**

Boring Began: 3/24/2018
Boring Completed: 3/26/2018
Drilling Method(s): HQ Coring / NQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 69.0 ft
Ground Elevation: 6644.1
Coordinates: N: E:
Location: Sta. 1030+88, 3'L
Logged By: A. Hotchkiss
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6640	0							**0.0 - 4.0 ft. GRAVEL** and Cobbles with some sand, multi-colored, (Colluvium).							**Water added by driller**
	5		93	53				**4.0 - 16.5 ft. SILTY SANDSTONE**, tan to gray, slightly weathered, medium hard, (ANIMAS FORMATION).							
6635	10		80	18											
6630	15		86	43				**16.5 - 24.5 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, fresh, medium hard, fine grained, some fractures, (ANIMAS FORMATION).							
6625	20		86	59											
6620	25		98	49				**24.5 - 36.0 ft. SHALE**, blue-gray, hard to very hard, (ANIMAS FORMATION).							**24.5 ft** - Switch to NQ
6615	30		100	90											
6610															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6605	40		100	76				**36.0 - 44.3 ft. SANDSTONE**, blue-gray, very hard, coarse grained, (ANIMAS FORMATION).							
			99	84											**42.0 ft** - Conglomerate lense
6600	45		99	59				**44.3 - 69.0 ft. SHALE**, gray, fresh, very hard, occasional iron staining in fractures, (ANIMAS FORMATION).							
6595	50		99	85											
6590	55		96	85											
6585	60		100	94											
6580	65		100	82											
6575								Bottom of Hole at 69.0 ft.							
6570															

Ciulhg Eaae. sl Aar &. S
YehandAshochoshiita, I.sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **B2-04**

Boring Began: 3/28/2018
Boring Completed: 3/29/2018
Drilling Method(s): HQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 69.9 ft
Ground Elevation: 6714.2
Coordinates: N: E:
Location: Sta. 1032+19, 2' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6710	5				19-50/4"	50/4"		**0.0 - 7.2 ft. COBBLES** and BOULDERS in sand and clay matrix, multi-colored.							**Water added by driller**
6705	10		98	22				**7.2 - 13.0 ft. CLAYSTONE**, dark gray, predominantly decomposed, fractured, (ANIMAS FORMATION).							
			98	31											
6700	15							**13.0 - 22.0 ft. SANDSTONE**, moderately weathered to predominantly decomposed, medium hard to hard, occasional fractured zones with iron staining, (ANIMAS FORMATION).		148.3					UCCS=5400psi
			99	18											
6695	20														
			100	0				**22.0 - 32.4 ft. CLAYSTONE**, tan, predominantly decomposed, medium hard, (ANIMAS FORMATION).							
6690	25														
			86	0											
6685	30														
			79	24											
6680								**32.4 - 52.0 ft. SANDSTONE**, blue-gray, fresh, hard to very hard, occasional fractured zones with iron staining, (ANIMAS FORMATION).							

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6675	40		98	74											
			92	76											
6670	45		98	54											
6665	50		95	84				**52.0 - 53.0 ft. CONGLOMERATE**, blue-gray, fresh, very hard, (ANIMAS FORMATION). **53.0 - 69.9 ft. SHALE**, blue-gray to dark gray, fresh, very hard, (ANIMAS FORMATION).							
6660	55		92	86											
6655	60		100	76											
6650	65		100	89											
6645								Bottom of Hole at 69.9 ft.							
6640															

Appendix D.4 – Livestock/Wildlife Overpass (A) Boring Logs

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **A-01**

Boring Began: 11/28/2017
Boring Completed: 11/29/2017
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 70.0 ft
Ground Elevation: 6745.8
Coordinates: N: E:
Location: Sta. 999+53, 81' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6745						**0.0 - 25.5 ft. CLAY** with some sand, red-brown to tan, damp to dry, very stiff to very hard.									
	5		17-23	40			13.1		0	20	80	42	21	A-7-6 (17) CL	**T99A Proctor Performed. Max density 106.1 pcf, optimum moisture 19.2%**
6740															
	10		16-15	31			12.2	104.4							UCCS=7063psf
6735							10.5		0	17	83	40	23	A-6 (18) CL	
	15		15-20	35											
6730															
	20		18-24	42											
6725															**Calcite veining at 21.5 ft to 25.5 ft**
	25		17-20	37											
6720						**25.5 - 32.5 ft. CLAY** with some sand, tan, damp, medium dense to dense.									
	30		10-13	23			8.7	89.2	0	22	78	28	9	A-4 (5) CL	
6715															
						32.5 - 67.0 ft. GRAVEL with cobbles, dry, very dense.									
			50/4"	50/4"											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710						**32.5 - 67.0 ft. GRAVEL** with cobbles, dry, very dense.									
6705	40		18-22-35	57											**Moist chips last 1 ft of drive at 40 ft**
6700	45		27-33-42	75											
6695	50		22-50/5"	50/5"			0.6		30	66	4	NV	NP		**Drill Cuttings: Fragmented gravel and cobble**
6690	55		16-50/2"	50/2"											
6685	60		50/4"	50/4"											
6680	65		50/3"	50/3"											
6675	70		50/3"	50/3"		**67.0 - 70.0 ft. CLAYSTONE**, olive gray, moderately weathered, (ANIMAS FORMATION).									
6670			50/6"	50/6"		Bottom of Hole at 70.0 ft.									

Project Name: US 550 Connector

Project Number: 217-376 Boring No.: **A-02**

Boring Began: 11/29/2017
Boring Completed: 11/29/2017
Drilling Method(s): Air Rotary / ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 70.5 ft
Ground Elevation: 6742.6
Coordinates: N: E:
Location: Sta. 999+74, 11' R

Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Blows per 6 in	Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Liquid Limit	Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
	0					**0.0 - 26.0 ft. CLAY** , trace sand, red-brown, dry to damp, very stiff to hard.									
6740	5														
6735	10		9-10	19											
6730															**R-Value Sample: 10'-25'** R-Value=28
6725	15														
	20		16-37	53			13.1	85.2	0	11	89	39	15	A-6 (14) CL	**Calcite veining at 19.5 ft** S/C=-3.4%
6720	25														
6715						**26.0 - 32.0 ft. SAND** with some gravel, orange - brown, damp, dense.									
	30		15-26	41			6.6		5	71	24	NV	NP	A-2-4 (0) SM	pH=8.5 S=0% Chl=0.00114% Re=3500ohm·cm
6710						**32.0 - 70.5 ft. GRAVEL** with some sand, gray, damp, very dense.									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6705						**32.0 - 70.5 ft. GRAVEL** with some sand, gray, damp, very dense.									
	40		20-17-16	33											
6700															
	45														
6695															
	50		22-50/5"	50/5"											
6690															
	55		20/0"	20/0"											
6685															
	60														
6680							0.4		25	71	4	NV	NP		**Drill Cuttings: Fragmented gravel and cobble**
	65														
6675															
	70		30-50/3"	50/3"											
6670						Bottom of Hole at 70.5 ft.									**Claystone in tip of sampler at 70.5 ft**

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **A-03**

Boring Began: 11/30/2017
Boring Completed: 11/30/2017
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.5 ft
Ground Elevation: 6743.8
Coordinates: N: E:
Location: Sta. 1000+59, 88' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6740						**0.0 - 24.5 ft. CLAY** with some sand, brown red-brown, damp to dry, stiff to very stiff.									
	5		14-17	31			11.7	113.0							UCCS=8357psf
							11.0		0	19	81	43	23	A-7-6 (18) CL	
6735	10														
6730															
	15		14-16	30											**Calcite Veining at 17 ft to 19 ft**
6725															
	20														
6720															
	25		10-11	21		**24.5 - 37.0 ft. silty SAND**, brown to beige, dry, medium dense.									
6715															
	30						7.5		1	56	43	26	4		
6710															

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: US 550 Connector

Project Number: 217-376 *Boring No.:* **A-03**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6705	40		11-15	26		**24.5 - 37.0 ft. silty SAND**, brown to beige, dry, medium dense.									
						37.0 - 54.0 ft. GRAVEL in sandy matrix, multi-colored, dry, very dense.									**Water added by driller 42 ft to 69 ft**
6700	45		10-32-35	67											
6695	50														
6690	55		50/3"	50/3"		**54.0 - 69.5 ft. GRAVEL** and COBBLE in sandy matrix, gray, dry, very dense.									
6685	60														
6680	65		50/1"	50/1"											
6675															
6670						Bottom of Hole at 69.5 ft.									

Appendix D.5 – Wildlife Underpass A (WX2) Boring Logs

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX2-01**

Boring Began: 4/24/2018
Boring Completed: 4/24/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 34.5 ft
Ground Elevation: 6676.9 ft
Coordinates: N: E:
Location: Sta. 902+24, 17' R of CL (measured in field from existing CL and survey lath)
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
						0.0 - 1.0 ft. sandy GRAVEL mixed with asphalt millings, gray and black, dry, loose, Shouldering material.									
			3-4	7		**1.0 - 7.0 ft. CLAY** with some sand, brown, moist, medium stiff, Embankment fill.									
6670															
			5-9	14		**7.0 - 23.0 ft. CLAY** with some sand, reddish brown, moist, stiff to very stiff.									
	10						19.2		0	8	92	40	28	A-6 (25) CL	pH=8.6 S=0.024% Chl=0.00543% Re=1100ohm·cm
			6-7	13			17.3	105.9							S/C=-0.3%
6660															
			10-16	26											
	20														
			19-15-16	31		**23.0 - 34.5 ft. GRAVEL** with some sand and cobbles, trace clay, brown, moist, dense to very dense.									
6650															
			37-50/3"	50/3"											
	30														
			16-16-25	41											
						Bottom of Hole at 34.5 ft.									
6640															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX2-02**

Boring Began: 4/24/2018
Boring Completed: 4/24/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 38.8 ft
Ground Elevation: 6676.9 ft
Coordinates: N: E:
Location: Sta. 902+77, 16' R CL (measured in field from existing CL and survey lath)
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
						0.0 - 1.0 ft. GRAVEL with some sand, gray, dry, loose, Shouldering material.									
						1.0 - 10.0 ft. CLAY with some sand, brown, moist, stiff, Embankment fill.									
			5-5	10											
6670															
			6-8	14											
	10					**10.0 - 23.5 ft. CLAY** with some sand, red-brown, moist, very stiff.	19.7		0	20	80	47	31	A-7-6 (24) CL	
			7-9	16											
6660															
			9-10-16	26											
	20														
			12-28	40		**23.5 - 33.0 ft. GRAVEL** with sand and cobbles, trace clay, brown, damp, medium dense to very dense.									
6650															
			28-19-19	38											
	30														
			15-8-10	18		**33.0 - 35.0 ft. SAND** with some clay, brown rust, dry, medium dense.									
						35.0 - 38.8 ft. CLAYSTONE, greenish gray, moderately weathered, medium hard to very hard, (ANIMAS FORMATION).									
6640			47-50/4"	50/4"											
						Bottom of Hole at 38.8 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX2-03**

Boring Began: 4/24/2018
Boring Completed: 4/24/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 29.5 ft
Ground Elevation: 6670.7 ft
Coordinates: N: E:
Location: Sta. 902+25, 21' East of ROW (measured in field from ROW fence and survey lath)
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6670						**0.0 - 8.0 ft. CLAY** with some sand, dark brown, damp to moist, very stiff.									
			9-11	20											
			9-10	19		**8.0 - 14.0 ft. CLAY** with some sand, red-brown, moist, very stiff.									
6660	10														
			12-12	24			15.7	106.8							S/C=-0.2%
						14.0 - 19.0 ft. CLAY with some sand, trace gravel, red-brown, moist, very stiff.									
			50/3"	50/3"											
6650	20					**19.0 - 22.0 ft. GRAVEL** with some sand, trace clay, brown, moist, dense.									
			11-8-12	20		**22.0 - 24.5 ft. SAND** trace silt, dark brown, moist, medium dense.	5.1		22	64	14	NV	NP	A-1-b (0) SM	
						24.5 - 28.5 ft. GRAVEL with some sand, Cobbles and Boulders, multi-colored, damp, very dense.									
			14-9-7	16		**28.5 - 29.5 ft. SAND** trace silt, dark brown, moist, medium dense.									
6640						Bottom of Hole at 29.5 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX2-04**

Boring Began: 4/24/2018
Boring Completed: 4/24/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 29.5 ft
Ground Elevation: 6670.1 ft
Coordinates: N: E:
Location: Sta. 902+73, 21' East of ROW (measured in field from ROW fence and survey lath)
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
						0.0 - 5.0 ft. CLAY with some sand, dark brown, moist, very stiff.									
			17-19	36											
						5.0 - 18.0 ft. CLAY with some sand, brown, moist, very stiff.									
			7-10	17			16.3	111.4							
6660	10														
			11-16	27			17.3	111.3							S/C=-0.1%
			50/5"	50/5"		**18.0 - 27.0 ft. GRAVEL** with some sand, cobbles, and boulders, multi-colored, damp, dense to very dense.									
6650	20						5.2		33	52	15	NV	NP	A-1-b (0) SM	**Drill cuttings: Fragmented gravel, cobbles, and boulders**
			30-12/1"	12/1"											
			22-27-37	64		**27.0 - 29.5 ft. CLAYSTONE**, greenish gray, moderately weathered, medium hard to hard, (ANIMAS FORMATION).									
6640						Bottom of Hole at 29.5 ft.									

Appendix D.6 – Wildlife Underpass B (WX) Boring Logs

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX-01**

Boring Began: 1/15/2018
Boring Completed: 1/15/2018
Drilling Method(s): Air Rotary / Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 31.8 ft
Ground Elevation: 6714.6 ft
Coordinates: N: E:
Location: Sta. 957+95, 71' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710	5		12-15-12	27		**0.0 - 29.0 ft. CLAY** with trace sand, red-brown, moist, stiff to very stiff.									
6705	10		7-8-6	14			8.9		0	12	88	32	13	A-6 (11) CL	
6700	15		11-10-12	22											
6695	20		10-13-16	29			11.3		0	19	81	29	14	A-6 (9) CL	
6690	25		9-13-12	25											
6685	30		12-33-48	81		**29.0 - 30.0 ft. SILT** with some sand, tan to brown, moist, dense.	13.1		0	39	61	NV	NP	A-4 (0) ML	**Auger refusal in very dense gravel at 31.8 feet**
						30.0 - 31.8 ft. GRAVEL with sand and cobble, trace silt, brown, moist, very dense.									
6680						Bottom of Hole at 31.8 ft.									

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX-02**

Boring Began: 1/15/2018
Boring Completed: 1/15/2018
Drilling Method(s): Air Rotary / ODEX
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 45.5 ft
Ground Elevation: 6711.9 ft
Coordinates: N: E:
Location: Sta. 958+30, 4' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710						**0.0 - 28.0 ft. CLAY** with some sand, red-brown, moist, medium stiff to very stiff.									
	5		8-8-7	15											
6705															
	10		4-4	8											
6700															
	15		6-8-12	20											
6695															
	20		8-11	19			17.2	109.3							S/C=-0.1%
6690															
	25		6-10-14	24											
6685															
	30		6-5-15	20		**28.0 - 34.0 ft. GRAVEL** with some sand, trace clay, brown, moist, medium dense.									
6680															
			34-16-19	35											

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6675						**34.0 - 45.5 ft. GRAVEL** with some sand and cobbles, trace silt, brown, moist, dense to very dense.	3.5		56	34	10	NV	NP	A-1-a (0) GP-GM	**Drill Cuttings: Fragmented gravel and cobbles**
	40		16-15-24	39											
6670															
	45		28-18-20	38											
6665						Bottom of Hole at 45.5 ft.									
6660															
6655															
6650															
6645															
6640															
6635															

Ciu lhg Eaae. sl Aar &. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX-03**

Boring Began: 1/15/2018
Boring Completed: 1/15/2018
Drilling Method(s): Air Rotary / ODEX
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 35.0 ft
Ground Elevation: 6712.7 ft
Coordinates: N: E:
Location: Sta. 958+37, 69' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710						**0.0 - 3.5 ft. GRAVEL** with some sand, trace clay, brown, moist, medium dense, Embankment Fill.									
	5		5-6-9	15		**3.5 - 28.0 ft. CLAY** with trace sand, red-brown, moist to wet, stiff to very stiff.									
6705															
	10		6-6	12			19.3	106.2	0	6	94	34	18	A-6 (16) CL	
6700															
	15		4-7-11	18											**Very Moist to Wet at 14 ft**
6695															
	20		6-13	19			17.8	109.5							
6690															
	25														
6685						**28.0 - 35.0 ft. GRAVEL** with some sand, trace clay, brown, moist to wet, dense.									
	30		15-21-23	44											
6680															
			42-13-15	28											

Bottom of Hole at 35.0 ft.

Civil Engineering Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WX-04**

Boring Began: 1/16/2018
Boring Completed: 1/16/2018
Drilling Method(s): Air Rotary / ODEX
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 34.3 ft
Ground Elevation: 6705.8 ft
Coordinates: N: E:
Location: Sta. 958+65, 153' L
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6705						**0.0 - 22.0 ft. CLAY** with some sand, brown, moist, very stiff to hard.									
	5		8-9-10	19											
6700															
	10		11-15-15	30											
6695															
	15		12-22	34			11.2	111.4							S/C=0.3%
6690															
	20		12-14-15	29											
6685						**22.0 - 34.3 ft. GRAVEL** with some sand, trace silt, brown, moist, dense to very dense.									
	25		13-18-14	32			3.7		44	42	14	NV	NP	A-1-a (0) GM	**Drill cuttings: Fragmented gravel.**
6680															
	30		32-10/0"	10/0"											
6675															
			50/4"	50/4"		Bottom of Hole at 34.3 ft.									

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Appendix D.7 - Walls A, B, C, D, E, F and G Boring Logs

Ciulhg Eaae. sl Aar &. S
YehandAshochoshiita, I.sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WA-01**

Boring Began: 1/10/2018
Boring Completed: 1/10/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 64.0 ft
Ground Elevation: 6761.5 ft
Coordinates: N: E:
Location: Sta. 1019+74, 92' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6760	0							**0.0 - 2.0 ft. silty SAND**, light gray, damp.									
								2.0 - 14.0 ft. sandy GRAVEL trace cobble, light gray, damp to dry, medium dense to very dense.									**Cobbles and Boulders at 2 ft to 49.7 ft**
6755	5				23-50/3"	50/3"											
6750	10				10-18-14	32			1.1		42	54	4	NV	NP		**Drill cuttings: Fragmented gravel and cobbles**
6745	15				50/0"	50/0"		**14.0 - 49.7 ft. GRAVEL** with some cobbles, trace sand, scattered boulders encountered.									**Driller started adding water at 15"**
6740	20				13-50/5"	50/5"											
6735	25				14-32-50/2"	82/8"											
6730	30				9-19-30	49											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6725					12-31-44	75		**14.0 - 49.7 ft. GRAVEL** with some cobbles, trace sand, scattered boulders encountered.									
	40				23-25-28	53											
6720																	
	45				42-50/3"	50/3"											
6715																	
	50				50/5"	50/5"		**49.7 - 55.0 ft. CLAYSTONE INTERBEDDED WITH SANDSTONE**, gray, medium hard, (ANIMAS FORMATION).	8.6		2	65	33	25	3		**Drill cuttings: Fragmented bedrock**
6710																	
	55		98	81				**55.0 - 64.0 ft. CLAYSTONE INTERBEDDED WITH SANDSTONE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).									
6705																	
	60		74	62													
6700																	
6695								Bottom of Hole at 64.0 ft.									
6690																	
6685																	

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WA-02**

Boring Began: 1/11/2018
Boring Completed: 1/11/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 67.0 ft
Ground Elevation: 6766.5 ft
Coordinates: N: E:
Location: 1020+97, 86' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6765	0							**0.0 - 1.5 ft. silty CLAY**, red-brown, damp.									
								1.5 - 6.0 ft. SAND with some silt and gravel, gray, damp, medium dense.	4.8		19	53	28	NV	NP	A-2-4 (0) SM	
	5				18-17-23	40											
6760								**6.0 - 52.0 ft. sandy GRAVEL**, gray and brown-gray, dry to damp, medium dense to very dense.									
	10				20/1"	20/1"											**Cobbles and Boulders at 9 ft to 52 ft**
6755																	
	15				6-10-16	26											
6750																	
	20				14-18-16	34											**Driller began adding water**
6745									11.5		61	36	3	NV	NP	A-1-a (0) GP	**Fragmented cobbles and gravel**
	25				16-20/0"	20/0"											
6740																	
	30				24-42-22	64											
6735																	

Ciulhg Eaae. sl Aar &. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WA-02**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6730					29-29-16	45		**6.0 - 52.0 ft. sandy GRAVEL**, gray and brown-gray, dry to damp, medium dense to very dense.									
	40				40-20/2"	20/2"											
6725									5.4		61	37	2	NV	NP	A-1-a (0) GP	**Fragmented cobbles and gravel**
	45				16-18-6	24											
6720																	**Boulders abundant from 46 to 52 feet**
	50				20/0"	20/0"											
6715								**52.0 - 67.0 ft. SHALE**, blue-gray, moderately weathered, medium hard, (ANIMAS FORMATION).									
	55		98	95													
6710																	
	60		99	94													
6705																	
	65		98	75													
6700								Bottom of Hole at 67.0 ft.									
6695																	
6690																	

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sih AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WA-03**

Boring Began: 1/12/2018
Boring Completed: 1/13/2018
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.6 ft
Ground Elevation: 6765.7 ft
Coordinates: N: E:
Location: 1022+07, 84' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6765						**0.0 - 3.0 ft. SAND** with some silt and gravel, red-brown, damp.	4.7		19	58	23	NV	NP	A-1-b (0) SM	
						3.0 - 23.0 ft. GRAVEL with sand and cobbles, gray and brown-gray, dry to damp, dense to very dense.									
	5		21-50/2"	50/2"											
6760															
	10		13-16-18	34											
6755															
	15		15-17-18	35											Driller began adding water
6750															
	20		10-15-23	38			2.8		53	38	9	NV	NP		
6745															
						23.0 - 52.0 ft. GRAVEL with sand, cobbles and boulders, gray and brown-gray, dry to damp, dense to very dense.									Boulders at 23 ft to 52 ft
	25		25-30/5"	30/5"											
6740															
	30		50/3"	50/3"											
6735															
			50/0"	50/0"											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6730						**23.0 - 52.0 ft. GRAVEL** with sand, cobbles and boulders, gray and brown-gray, dry to damp, dense to very dense.									
6725	40		18/3"	18/3"											
6720	45		20-50/6"	50/6"											
6715	50		50/0"	50/0"											
						52.0 - 54.5 ft. SHALE, yellowish brown, moderately weathered, medium hard, (ANIMAS FORMATION).									
6710	55		50/3"	50/3"		**54.5 - 69.9 ft. SHALE**, blue-gray, slightly weathered, very hard, (ANIMAS FORMATION).	9.3		0	44	56	27	6		**Switched to Air Rotary Drilling at 54.5 ft** **Drill Cuttings: fragmented bedrock** pH=9.5 S=0.011% Re=1400ohm·cm
6705	60		50/3"	50/3"											
6700	65		50/3"	50/3"											
6695			50/1"	50/1"		Bottom of Hole at 69.6 ft.									
6690															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-01**

Boring Began: 12/7/2017
Boring Completed: 1/13/2018
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.8 ft
Ground Elevation: 6762.7 ft
Coordinates: N: E:
Location: 1020+41, 67' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6760	0					**0.0 - 3.0 ft. sandy CLAY** trace gravel, light brown, dry to damp, stiff.									
	3					**3.0 - 9.5 ft. gravelly SAND** trace silt, light brown, dry to moist, very dense.									
	5		22-50/3"	50/3"			1.4		40	48	12	20	2	A-1-a (0) SM	**Drill cuttings: fragmented gravel and cobbles**
6755															
	9.5					**9.5 - 54.0 ft. GRAVEL** with sand, cobbes and boulders, light brown and light gray, dry, medium dense to very dense.									
6750	10														
	15		9-11-14	25											
6745															
	20		11-38-33	71											
6740															
	25		15-50/5"	50/5"											
6735															
	30														
6730															
			50/3"	50/3"											

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6725	40					**9.5 - 54.0 ft. GRAVEL** with sand, cobbes and boulders, light brown and light gray, dry, medium dense to very dense.	0.5		38	60	2	NV	NP		**Drill cuttings: fragmented gravel and cobbles** pH=8.5 S=0.002% Re=14000ohm·cm
6720															
	45		27-25-33	58											**Resumed drilling on 01/12/2018**
6715															
	50		25/0"	25/0"											**Boulders at 49 to 54 feet**
6710															
	55		50/4"	50/4"		**54.0 - 59.0 ft. SANDY CLAYSTONE**, olive-brown, moderately weathered, hard, (ANIMAS FORMATION).									**Switch to Air Rotary at 54.5 ft**
6705															
	60		50/3"	50/3"		**59.0 - 69.8 ft. CLAYSTONE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).									
6700															
	65		50/4"	50/4"											
6695															
			50/4"	50/4"											
6690						Bottom of Hole at 69.8 ft.									

Ciulhg Eaae. sl Aar &. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-02**

Boring Began: 12/5/2017
Boring Completed: 12/6/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 71.0 ft
Ground Elevation: 6765.0 ft
Coordinates: N: E:
Location: 1021+09, 96' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6760	5							**0.0 - 6.5 ft. sandy CLAY**, tan, dry, stiff.									
6755	10				33-32	65		**6.5 - 14.5 ft. gravelly SAND** trace clay, light brown, dry to damp, dense.									
6750	15							**14.5 - 51.5 ft. GRAVEL** with sand and cobbles, gray light brown, dry to damp, medium dense to very dense.									
6745	20				20-25-37	62											
6740	25								0.5		51	46	3	NV	NP	A-1-a (0) GP	**Drill cuttings: Fragmented gravel and cobble**
6735	30				50/5"	50/5"											

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6725	40							**14.5 - 51.5 ft. GRAVEL** with sand and cobbles, gray light brown, dry to damp, medium dense to very dense.									
6720	45				12-12-16	28			1.3		43	49	8	NV	NP		**Driller started adding water** **Drill cuttings: Fragmented gravel and cobble**
6715	50																
6710	55		96	31				**51.5 - 71.0 ft. CLAYSTONE INTERBEDDED WITH SANDSTONE**, blue-gray, slightly weathered, soft to very hard, (ANIMAS FORMATION).	4.5	135.4							**55.0 ft** - loss of circulation indicating fractures UCCS=1162psi
6705	60		100	96													
6700	65		98	94					3.4	132.2							**63.5 ft** - fractured, horizontal bedding planes, no visible infilling **66.5 ft** - very minor coal seam UCCS=263psi
6695	70		100	100													
6690								Bottom of Hole at 71.0 ft.									

Ciulhg Eaae. sl Aar &n. S
YehandAshochoshiita, I.sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-03**

Boring Began: 12/4/2017
Boring Completed: 12/4/2017
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: %

Total Depth: 70.0 ft
Ground Elevation: 6771.1 ft
Coordinates: N: E:
Location: Sta. 1021+81, 71' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6770						**0.0 - 11.0 ft. CLAY** with some sand, trace gravel, brown, moist, medium stiff to hard.									
	5		14-20	34											**Calcite veining at 4.5 ft**
6765															
	10		20-31	51			13.9	102.9							S/C=1.5%
6760						**11.0 - 54.0 ft. GRAVEL** with some sand and cobbles, brown and gray, moist, very dense.									
	15		8-16-21	37											
6755															
	20		14-19-37	56											
6750							0.7		28	70	2	NV	NP		**Drill Cuttings: Fragmented gravel and cobbles**
	25		32-25/4"	25/4"											
6745															
	30		22-33/3"	33/3"											
6740															

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-03**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6735			17-18-34	52		**11.0 - 54.0 ft. GRAVEL** with some sand and cobbles, brown and gray, moist, very dense.									
6730	40		20-22/2"	22/2"											
6725	45		18-40-47	87											
6720	50		16-24-35	59											
6715	55		50/5"	50/5"		**54.0 - 70.0 ft. SHALE**, gray, slightly weathered, hard, (ANIMAS FORMATION).	19.0		0	40	60	32	11		**Drill Cuttings: Fragmented bedrock** pH=8.5 S=0.014% Re=1100ohm·cm
6710	60		50/4"	50/4"											
6705	65		50/5"	50/5"											
6700	70		50/4"	50/4"											
6695						Bottom of Hole at 70.0 ft.									

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-04**

Boring Began: 12/2/2017
Boring Completed: 12/2/2017
Drilling Method(s): ODEX / Air Rotary
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: %

Total Depth: 70.0 ft
Ground Elevation: 6775.7 ft
Coordinates: N: E:
Location: Sta. 1023+08, 100' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6775						**0.0 - 16.0 ft. CLAY** with trace sand, light brown, damp, very stiff to hard.									
	5														
6770															
	10		17-23	40			12.9	117.4							
6765							14.3		0	12	88	45	24	A-7-6 (22) CL	
	15														
6760						**16.0 - 30.0 ft. GRAVEL** with some sand, multi-colored, dry to damp, dense to very dense.									
	20		50/6"	50/6"											
6755															
	25														
6750															
	30		17-41-27	68		**30.0 - 36.0 ft. GRAVEL** with some sand, multi-colored, dry to damp, loose to medium dense.									
6745															

Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-04**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6740															
						36.0 - 57.0 ft. GRAVEL with some sand, trace cobbles, multi-colored, very dense.									
	40		50/6"	50/6"											
6735															
															Cobble at 44.5 ft
6730	45														
	50		21-50/6"	50/6"											
6725							5.6		65	32	3	NV	NP	A-1-a (0) GP	**Drill Cuttings: Fragmented cobbles and gravel**
	55														
6720						**57.0 - 70.0 ft. CLAYSTONE**, dark gray grades to light gray, slightly weathered, hard, (ANIMAS FORMATION).										
	60		50/3"	50/3"											**Switched to Air Rotary at 60 ft**
6715															
	65														
6710															
	70		50/4"	50/4"											
6705						Bottom of Hole at 70.0 ft.									
6700															

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sih AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-05**

Boring Began: 12/12/2017
Boring Completed: 12/12/2017
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.9 ft
Ground Elevation: 6782.0 ft
Coordinates: N: E:
Location: Sta. 1024+06, 82' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6780						**0.0 - 21.0 ft. CLAY** with some sand, light brown to red-brown, damp, hard.									
	5		14-17-14	31			8.8		0	18	82	42	26	A-7-6 (20) CL	**Calcite Veining at 4.5 ft**
6775															
	10														
6770															
	15		16-26	42			14.8	108.0							S/C=-0.4%
6765															
	20														
6760						**21.0 - 55.0 ft. GRAVEL** with cobbles and some sand, gray, damp, dense to very dense.									
	25		35-20-10	30											**Water added by driller**
6755							5.9		46	50	4	NV	NP		**Drill Cuttings: Fragmented gravel and cobbles**
	30														
6750															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sih AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-05**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6745	40		30-50/3"	50/3"		**21.0 - 55.0 ft. GRAVEL** with cobbles and some sand, gray, damp, dense to very dense.									
6740															
	45		50/5"	50/5"											
6735															
	50														
6730							3.3		48	23	29	NV	NP		**Drill Cuttings: Fragmented gravel and cobbles**
	55		50/4"	50/4"		**55.0 - 69.9 ft. CLAYSTONE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).									
6725							14.2		0	47	53	39	17		**Drill Cuttings: Fragmented bedrock** pH=8.5 S=0.012% Re=1400ohm·cm **Swell / Consolidation test on remolded cuttings** S/C=0.6%
	60		50/4"	50/4"											
6720															
	65														
6715															
			50/5"	50/5"											
6710						Bottom of Hole at 69.9 ft.									
6705															

Ciulhg Eaae. sl Aar &. S
YehandAshochoshiita, I.sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-06**

Boring Began: 12/13/2017
Boring Completed: 12/13/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.0 ft
Ground Elevation: 6787.0 ft
Coordinates: N: E:
Location: Sta. 1025+09, 108' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6785								**0.0 - 24.5 ft. CLAY** with some sand, red-brown, damp, very stiff to hard.									
	5				15-18	33			13.7	110.5	0	36	64	46	32	A-7-6 (17) CL	**Calcite veining at 5 ft to 10 ft**
6780																	
	10				19-25	44			9.6	97.6							S/C=0.5%
6775																	
	15				15-18	33			9.2	94.9							UCCS=1472psf
6770									11.0		0	10	90	34	16	A-6 (14) CL	pH=8.4 S=0.01% Chl=0.00623% Re=1300ohm·cm
	20				17-23	40											
6765																	
	25				50/6"	50/6"		**24.5 - 56.0 ft. GRAVEL** with some sand and cobbles, brown-gray, dry, dense to very dense.									
					30-50/6"	50/6"											
6760																	
	30				13-21-16	37											
6755																	**Water added by driller**

Ci u lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-06**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6750					19-23-34	57		**24.5 - 56.0 ft. GRAVEL** with some sand and cobbles, brown-gray, dry, dense to very dense.									
	40				50/3"	50/3"											
6745																	
	45				50/4"	50/4"											
6740																	
	50				49-26-38	64											
6735																	
	55				32-26-34	60											
6730								**56.0 - 61.0 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE**, tan-brown, medium hard, (ANIMAS FORMATION).									**Swell / Consolidation test on remolded cuttings** S/C=0.3%
	60				50/4"	50/4"											
6725			63	22				**61.0 - 69.0 ft. CLAYSTONE**, olive to gray, hard, (ANIMAS FORMATION).									
	65																**Wet Density =155.8 pcf**
6720			100	78													UCCS=3057psi
6715																	
6710								Bottom of Hole at 69.0 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-07**

Boring Began: 12/14/2017
Boring Completed: 12/14/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.2 ft
Ground Elevation: 6780.7 ft
Coordinates: N: E:
Location: Sta. 1026+08, 90' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6780								**0.0 - 17.5 ft. CLAY** with some sand, red-brown, high plasticity, damp, very stiff.									
	5				15-15	30											
6775																	
	10				15-21	36			13.4		0	16	84	59	40	A-7-6 (35) CH	
6770																	
	15				12-18	30											
6765								**17.5 - 44.0 ft. GRAVEL** with some sand and cobbles, brown, dry, medium dense to very dense.									
	20				14-23-30	53											
6760																	**Water added by driller**
	25				11-13-16	29											
6755																	
	30				13-25-16	41											
6750											59	34	7	NV	NP	A-1-a (0) GP-GM	**Drill cuttings: Fragmented gravel and cobbles**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6745					17-50/5"	50/5"		**17.5 - 44.0 ft. GRAVEL** with some sand and cobbles, brown, dry, medium dense to very dense.									
6740	40				18-34-21	55											
6735	45				47-50/4"	97/10"		**44.0 - 53.0 ft. CLAYSTONE**, olive to gray, moderately weathered, medium hard, (ANIMAS FORMATION).	10.3		0	63	37	34	14		**Drill cuttings: Fragmented bedrock** pH=8.3 S=0.012% Re=1600ohm·cm
6730	50		76	21													
6725	55		24	0				**53.0 - 69.2 ft. SHALE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).									
6720	60		92	82													
6715	65		96	86					3.5	139.5							UCCS=3728psi
6710								Bottom of Hole at 69.2 ft.									
6705																	

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-08**

Boring Began: 12/15/2017
Boring Completed: 12/15/2017
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 69.8 ft
Ground Elevation: 6789.2 ft
Coordinates: N: E:
Location: Sta. 1026+99, 93' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6785						**0.0 - 25.0 ft. CLAY** with some sand, light brown, damp to moist, very stiff to hard.									
	5		20-20	40											**Calcite veining**
6780															
	10		15-19	34			7.5	98.6			49				S/C=-1%
6775															
	15		12-14	26											
6770															
	20		16-18	34											
6765															
	25		18-40	58		**25.0 - 52.0 ft. GRAVEL** with some sand and cobbles, light gray brown, dry, dense to very dense.									
6760															
	30		17-19-25	44											
6755															

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6750	40		16-19-22	41		**25.0 - 52.0 ft. GRAVEL** with some sand and cobbles, light gray brown, dry, dense to very dense.	7.1		55	42	3	NV	NP	A-1-a (0) GP	**Drill cuttings: Fragmented cobbles and gravel**
			14-18-22	40											
6745	45		15-19-25	44											
6740	50		50/1"	50/1"											
6735	55		33-50/5"	50/5"		**52.0 - 66.0 ft. CLAYSTONE INTERBEDDED WITH SANDSTONE**, olive gray, moderately weathered, medium hard to hard, (ANIMAS FORMATION).									
6730	60		50/5"	50/5"			13.2	91.5	0	70	30	39	17		
6725	65		50/3"	50/3"			9.4		0	32	68	37	19		**Drill cuttings: Fragmented bedrock** pH=8.6 S=0.018% Re=1400ohm·cm
6720			50/4"	50/4"		**66.0 - 69.8 ft. SHALE**, blue-gray, slightly weathered, hard.									
6715						Bottom of Hole at 69.8 ft.									

Ciulhg Eaae. sl Aar &. S
YehandAshochoshiita, I.sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WB-09**

Boring Began: 12/15/2017
Boring Completed: 12/16/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 68.2 ft
Ground Elevation: 6790.0 ft
Coordinates: N: E:
Location: Sta. 1027+88, 65' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
								0.0 - 25.5 ft. CLAY with some sand, red-brown, damp, very stiff to hard.									
6785	5				16-19	35											**Calcite veining at 4.5 ft**
6780	10				15-15	30			9.6	95.6	0	23	77	31	15	A-6 (10) CL	
6775	15				11-12	23											
6770	20				16-27	43			11.5		0	14	86	34	14	A-6 (11) CL	**T99 A Proctor performed. Max density 107.0 pcf, optimum moisture 18.4%**
6765	25				14-30	44		**25.5 - 49.8 ft. sandy GRAVEL**, brown gray, damp to dry, medium dense to dense.	8.0		15	59	26	32	11	A-2-6 (0) SC	**Drill Cuttings: Fragmented gravel and cobbles**
6760	30				16-24-17	41											**Cobble at 34.5 ft**

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
					16-19-23	42		**25.5 - 49.8 ft. sandy GRAVEL**, brown gray, damp to dry, medium dense to dense.									**Water added by driller**
6750	40				12-13-14	27											
6745	45				14-15-23	38											
6740	50				37-50/5"	50/5"		**49.8 - 58.5 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, tan-brown, moderately weathered, medium hard, (ANIMAS FORMATION).	10.4		0	58	42	41	17		**Drill cuttings: Fragmented bedrock**
6735	55		88	19													**Switch to coring at 54.8 ft**
6730	60		100	95				**58.5 - 68.2 ft. SHALE**, blue-gray, slightly weathered, hard, (ANIMAS FORMATION).									
6725	65		100	96													
6720								Bottom of Hole at 68.2 ft.									
6715																	

Ciulhg Eaae. sl Aar &h. S
YehandAsho c hoshi i t a , I . si h AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 **Boring No.:** **WB-10**

Boring Began: 3/27/2018
Boring Completed: 3/28/2018
Drilling Method(s): HQ Coring / NQ Coring
Driller: Salisbury & Associates
Drill Rig: GH-5 Viper
Hammer: Cathead and rope, ER: %

Total Depth: 50.0 ft
Ground Elevation: 6741.8 ft
Coordinates: N: E:
Location: Sta. 1029+10, 72' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock Recovery (%)	Rock RQD (%)	Soil Samples Blows per 6 in	Soil Samples Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits Liquid Limit	Atterberg Limits Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6741.8–6737.3	0–4.5							**0.0 - 4.5 ft. silty CLAY** with sand and cobbles, some organics, soft.							water added by driller
	5				30-50/3"	50/3"		**4.5 - 41.0 ft. CLAYSTONE**, yellow to olive, predominantly decomposed to moderately weathered, soft to hard, Fractured, (ANIMAS FORMATION).							
	10–15		76	9											
	15–20		96	38											
	20–25		90	0											
	25–30		92	0											
	30														Core sample from 30 to 36 ft was lost dure to core barrel being locked in the casing

Elevation scale: 6740, 6735, 6730, 6725, 6720, 6715, 6710
Depth scale: 5, 10, 15, 20, 25, 30

Elevation (feet)	Depth (feet)	Rock Recovery (%)	Rock RQD (%)	Soil Samples Blows per 6 in	Soil Samples Penetration Resistance	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits Liquid Limit	Atterberg Limits Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6705		80	22										**Switch to NQ Coring at 35 ft**
6700	40	98	80			**41.0 - 50.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, blue-gray, slightly weathered, hard, some infilled fractures, (ANIMAS FORMATION).							
6695	45	97	56										
	50					Bottom of Hole at 50.0 ft.							

Elevation scale: 6690, 6685, 6680, 6675, 6670, 6665

Ciulhg Eaae. sl Aar &n. S
YehandAshochoshiita, I.sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WC-01**

Boring Began: 1/8/2018
Boring Completed: 1/9/2018
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 61.8 ft
Ground Elevation: 6766.0 ft
Coordinates: N: E:
Location: Sta. 1026+24, 84' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6765								**0.0 - 1.0 ft. CLAY** with some sand, reddish brown, damp.									
								1.0 - 20.0 ft. GRAVEL with some sand, and cobbles, gray light brown, damp to dry, medium dense.									**Cobble at 1 ft to 33 ft**
	5				15-15-11	26											
6760									0.9		38	58	4	NV	NP	A-1-a (0) SP	**Drill Cuttings: Fragmented gravel**
	10				6-8-10	18											
6755																	
	15				8-7-8	15											
6750																	
	20				20-50/4"	50/4"		**20.0 - 33.0 ft. GRAVEL** with some sand, cobbles and boulders, multi-colored, damp to dry, dense to very dense.									
6745																	
	25				7-14-16	30											
6740																	
	30				12-20-16	36											
6735																	
					50/3"	50/3"		**33.0 - 61.8 ft. CLAYSTONE INTERBEDDED WITH SANDSTONE**, yellowish									**Swell / Consolidation test on remolded sample** S/C=0.3%

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6730								brown grades to gray, hard, (ANIMAS FORMATION).	8.7		15	51	34	37	21		**Drill Cuttings: Fragmented bedrock**
6725	40		100	63					7.8	122.3	0	52	48	35	10		**Shale/bedrock core. Slaking test performed. Breaks slowly, and forms several fractures**
6720	45		90	52													
6715	50		100	63													**R-Value Sample: 39'-55'** R-Value=25
6710	55		100	73													
6705	60		100	72													

Bottom of Hole at 61.8 ft.

6700

6695

6690

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WC-02**

Boring Began: 12/19/2017
Boring Completed: 12/20/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 53.5 ft
Ground Elevation: 6767.2 ft
Coordinates: N: E:
Location: Sta. 1027+61, 84' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6765	0							**0.0 - 1.0 ft. CLAY** with some sand, light brown, dry.									
								1.0 - 30.3 ft. GRAVEL with sand and cobbles, light gray, dry, medium dense to very dense.									
	5				27-34-34	68											
6760																	
	10				85-50/5"	50/5"											
6755									1.0		46	50	4	NV	NP	A-1-a (0) SP	**Drill Cuttings: Fragmented gravel and cobbles**
	15				9-15-14	29											
6750																	
	20				13-24-21	45											
6745																	
	25				21-30-26	56											
6740																	
	30				35-50/4"	50/4"											
6735								**30.3 - 42.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS**, tan-brown-rust, moderately weathered, medium hard to hard, (ANIMAS FORMATION).									

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6730			100	87													
	40		100	90													
6725								**42.0 - 53.5 ft. SANDY SHALE**, blue-grey, slightly weathered to fresh, hard to very hard, (ANIMAS FORMATION).	0.5	159.3							UCCS=7224psi
6720	45		100	96													
6715	50		96	89													

Bottom of Hole at 53.5 ft.

6710

6705

6700

6695

6690

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WC-03**

Boring Began: 12/18/2017
Boring Completed: 12/19/2017
Drilling Method(s): ODEX / HQ Coring
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 67.6 ft
Ground Elevation: 6768.6 ft
Coordinates: N: E:
Location: Sta. 1028+50, 74' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6765	0							**0.0 - 1.5 ft. CLAY** with some sand, light brown, dry.									
								1.5 - 29.0 ft. GRAVEL with some sand and cobble, light brown to light gray, dry, medium dense to very dense.	3.8		23	54	23	27	8	A-2-4 (0) SC	**Drill Cuttings: Fragmented gravel and cobbles**
	5				35-26-26	52											
6760																	
	10				6-7-12	19											
6755																	
	15				27-42-18	60											
6750																	
	20				21-12-12	24											
6745																	
	25				8-14-26	40											
6740																	
	30				50/5"	50/5"		**29.0 - 42.6 ft. CLAYSTONE**, olive gray, moderately weathered, medium hard to very hard, (ANIMAS FORMATION).	12.1	109.2	0	82	18	40	18		
									9.5		1	56	43	35	16		**Drill Cuttings: Fragmented bedrock** pH=8.5 S=0.002% Re=2000ohm·cm
6735																	

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
			81	24													
6730	40		96	92													
6725	45		34	13				**42.6 - 67.6 ft. SHALE**, blue-gray, slightly weathered, soft to hard, (ANIMAS FORMATION).									
6720	50		50	42													**Wet Density =153.1 pcf** UCCS=1675psi
6715	55		58	32													
6710	60		96	84													
6705	65		100	96													
6700								Bottom of Hole at 67.6 ft.									
6695																	

Ciu lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. si hAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WD-01**

Boring Began: 3/30/2018
Boring Completed: 3/31/2018
Drilling Method(s): HQ Coring / NX Coring
Driller: Salisbury & Associates
Drill Rig: Burly 4000
Hammer: Cathead and rope, ER: %

Total Depth: 39.9 ft
Ground Elevation: 6688.1 ft
Coordinates: N: E:
Location: Sta. 1039+79, 94' L
Logged By: R. Borst
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:

Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6685	0		100	0				**0.0 - 2.5 ft. sandy CLAY**, dark brown, moist, very fine grained sand, organics- roots.							
								2.5 - 26.5 ft. CLAYSTONE, brown and tan, predominantly decomposed to moderately weathered, very hard, organics- roots, lignite stringers, moist, (ANIMAS FORMATION).							
	5				50/5"	50/5"									
6680			33	0											
	10				50/5"	50/5"									
6675			100	18											
	15														
6670			94	35											
	20		95	45											
6665			100	8											
	25														
6660			100	27				**26.5 - 27.5 ft. SANDSTONE**, brown and blue-grey, moderately weathered, hard, very fine grained sand granules.							
								27.5 - 29.0 ft. SANDSTONE INTERBEDDED WITH SHALE LAYERS, blue-grey, slightly weathered, hard, joint, iron oxide infilling, lignite stringers,.							
	30														
6655			100	86				**29.0 - 39.9 ft. CONGLOMERATIC SANDSTONE**, blue-grey, slightly weathered to fresh, hard to very hard, with conglomerate lenses.							

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WD-01**

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Rock: Recovery (%)	Rock: RQD (%)	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6650			88	77											
								Bottom of Hole at 39.9 ft.							
6645															
6640															
6635															
6630															
6625															
6620															
6615															

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WE-01**

Boring Began: 3/14/2018
Boring Completed: 3/14/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 29.5 ft
Ground Elevation: 6707.6 ft
Coordinates: N: E:
Location: Sta. 985+25, 125' L
Logged By: K. Moran
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6705						**0.0 - 14.5 ft. CLAY** with some sand, brown, moist, stiff.									
	5		8-7-6	13			7.6		0	28	72	26	8	A-4 (4) CL	
6700							14.9		0	16	84	29	10	A-4 (7) CL	pH=8.5 S=0.054% Chl=0.00784% Re=1000ohm·cm S/C=-0.2%
	10		6-7	13			14.8	107.4							
6695			50/4"	50/4"											
	15					**14.5 - 29.5 ft. GRAVEL** with sand, Cobbles and Boulders, multi-colored, dry to damp, dense to very dense.									
6690															
	20		23-23-19	42											
6685							1.8		58	34	8	NV	NP	A-1-b (0) GP-GM	**Drill cuttings: Fragmented gravel and cobbles**
	25		40-35-27	62											
6680															
			50/5"	50/5"											
6675						Bottom of Hole at 29.5 ft.									

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WE-02**

Boring Began: 3/14/2018
Boring Completed: 3/14/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 30.5 ft
Ground Elevation: 6706.2 ft
Coordinates: N: E:
Location: Sta. 985+72, 125' L
Logged By: K. Moran
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6705						**0.0 - 16.0 ft. CLAY** with some sand, red-brown, moist, medium stiff to hard.									
	5		12-14	26											
6700															
	10		4-3-4	7											
6695							18.4		0	26	74	33	18	A-6 (11) CL	
	15		7-21-19	40											
6690						**16.0 - 30.5 ft. GRAVEL** with some sand, cobbles and boulders, multi-colored, dry to damp, dense to very dense.									
	20		7-20-12	32											
6685															
	25		50/3"	50/3"											
6680															
	30		25-33-39	72											
6675						Bottom of Hole at 30.5 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WF-01**

Boring Began: 4/18/2018
Boring Completed: 4/18/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 33.2 ft
Ground Elevation: 6714.5 ft
Coordinates: N: E:
Location: Sta. 979+74, 214' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6710	5		17-21	38		**0.0 - 0.5 ft. sandy GRAVEL** Road base. **0.5 - 24.0 ft. CLAY** with some sand, red-brown, high plasticity, moist, very stiff to hard.									
6705	10		26-32	58			13.1	116.6							**Calcite veins 7'-9'** S/C=4.3%
6700	15		17-17	34			10.8		0	15	85	50	38	A-7-6 (32) CH	
6695	20		21-23	44											
6690	25					**24.0 - 33.2 ft. GRAVEL** with some sand, cobbles and boulders, multi-colored, dry, very dense.									
6685	30		30-26-11/1"	37/7"											
6680			40/2"	40/2"		Bottom of Hole at 33.2 ft.									

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **WF-02**

Boring Began: 4/18/2018
Boring Completed: 4/18/2018
Drilling Method(s): ODEX
Driller: Authentic Drilling
Drill Rig: CME 55 Rubber Track
Hammer: Automatic (hydraulic), ER: 95%

Total Depth: 29.3 ft
Ground Elevation: 6706.9 ft
Coordinates: N: E:
Location: Sta. 981+74, 195' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6705	0					**0.0 - 9.5 ft. SILT** with some sand, red-brown, dry to moist, very stiff.									
			15-15	30			13.8	101.7							S/C=-0.8%
6700	5														
			8-8	16			9.4		0	24	76	31	8	A-4 (5) ML	
6695	10					**9.5 - 16.0 ft. SILT** with some sand, brown, moist, very stiff to hard.									
			15-28	43											
6690	15					**16.0 - 23.0 ft. GRAVEL** with some sand, and cobbles, light brown and gray, dry, medium dense to dense.									
			37-16	53											
6685	20														
			8/4"	8/4"		**23.0 - 29.3 ft. GRAVEL** with some sand, cobbles and boulders, multi-colored, dry, dense to very dense.									**Sample barrel not advancing (bouncing). Drive terminated.**
6680	25														
			30-26-27/3"	53/9"											**No movement in final 10 blows. Drive terminated**
6675						Bottom of Hole at 29.3 ft.									

Civil Engineering & Surveying
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-10**

Boring Began: 11/16/2017
Boring Completed: 11/17/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 35.0 ft
Ground Elevation: 6732.0 ft
Coordinates: N: E:
Location: Sta. 1008+72, 129' R
Logged By: B. Bunker
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 12.0 ft. silty SAND**, tan, damp, medium dense.									
	5		7-8-6	14			5.8		0	66	34	NV	NP	A-2-4 (0) SM	pH=8.8 S=0.007% Re=2800ohm·cm
6725															
	10		11-10-10	20											
6720						**12.0 - 20.0 ft. sandy CLAY**, brown, damp, very stiff to hard.									
	15		8-12	20			9.4	93.6							
6715															
	20		18-35	53		**20.0 - 35.0 ft. clayey GRAVEL** sandy, gray brown, moist, very dense.									
6710															
	25		44-14/1"	14/1"											
6705															
	30		26/4"	26/4"											
6700															
			17-40/5"	40/5"											

Bottom of Hole at 35.0 ft.

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Civil Engineering Associates, Inc.
Yeh and Associates, Inc.

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **R-11**

Boring Began: 11/18/2017
Boring Completed: 11/18/2017
Drilling Method(s): Hollow-Stem Auger
Driller: Authentic Drilling
Drill Rig: CME 750 Buggy Rig
Hammer: Automatic (hydraulic), ER: 97%

Total Depth: 35.0 ft
Ground Elevation: 6734.1 ft
Coordinates: N: E:
Location: Sta. 1009+60, 127' R
Logged By: B. Kunz
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
6730						**0.0 - 16.0 ft. silty SAND** trace gravel, brown, dry, medium dense.									
	5		8-8-9	17											
6725															
	10		10-15-19	34			6.2		9	54	37	25	4	A-4 (0) SM-SC	
6720															
	15		16-13	29			13.6	103.9							
6715						**16.0 - 20.0 ft. SILT** with some sand, dark brown, dry, very dense.									
	20		50/5"	50/5"		**20.0 - 35.0 ft. sandy GRAVEL** with some cobbles, gray, dry, very dense.									
6710															
	25		47-36-34	70											
6705															
	30		15/1"	15/1"											**No movement in 10 blows. Drive terminated**
6700			36/6"	36/6"											**No movement in 10 blows. Drive terminated**

Bottom of Hole at 35.0 ft.

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ciulhg Eaae. sl Aar &h. S
YehandAsho choshiita, I. sihAsaAa

Project Name:	U.S. 550 South Connection to U.S. 160	PAGE 1 of 1
Project Number: 217-376	Boring No.: **R-12**	

Boring Began: 12/1/2017
Boring Completed: 12/1/2017
Drilling Method(s): Hollow-Stem Auger / ODEX
Driller: Authentic Drilling
Drill Rig: Acker Renegade Track
Hammer: Automatic (hydraulic), ER: 96%

Total Depth: 30.5 ft
Ground Elevation: 6718.0 ft
Coordinates: N: E:
Location: Sta. 1009+68, 19' L
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifications	Field Notes and Other Lab Tests
						0.0 - 5.0 ft. CLAY with some sand, tan, damp, stiff to very stiff.									
6715															
	5		27-33-22	55		**5.0 - 15.0 ft. GRAVEL** with some clay and sand, red-brown to gray, damp to moist, very dense.									
							5.0		49	22	29	37	20	A-2-6 (0) GC	pH=8.5 S=0.019% Chl=0.00118% Re=1600ohm·cm
6710															
	10		24-44-34	78											
															R-Value Sample: 5'-18' R-Value=18
6705															
	15		18-50/5"	50/5"		**15.0 - 21.0 ft. GRAVEL** with some sand and cobbles, gray, dry, dense.									**Cobbles and Boulders at 14.5 ft to bottom of hole**
6700															**Switched to ODEX at 18.5 ft**
	20		50/4"	50/4"											
						21.0 - 24.0 ft. gravelly SAND with some silt, brown, moist.	4.7		40	47	13	NV	NP		pH=8.6 S=0.014% Chl=0.00576% Re=2700ohm·cm
6695															
						24.0 - 30.5 ft. GRAVEL with some sand and cobbles, gray, dry, very dense.									
	25		50/6"	50/6"											
6690															
	30		45-50/5"	50/5"											
						Bottom of Hole at 30.5 ft.									
6685															

Appendix D.8 – Test Pit Logs

Ciulhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **Pit 1**

Boring Began: 3/2/2018
Boring Completed: 3/2/2018
Drilling Method(s): Test Pit - excavator
Driller:
Drill Rig: Rubber tire Backhoe
Hammer: , ER: %

Total Depth: 8.5 ft
Ground Elevation: 6817.7 ft
Coordinates: N: E:
Location: Sta. 1036+76, 139' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
						0.0 - 1.0 ft. CLAY with some sand, reddish brown.									
6815	5					**1.0 - 8.5 ft. COBBLES** in a gravel and sand matrix, trace clay, multi-colored.	3.6		65	25	10	27	6	A-1-a (0) GP	
6810						Bottom of Hole at 8.5 ft.									

BORING LOG 2015 - SPT CDOT STYLE 217-376 US 550 CONNECTOR_CURRENT - BARNEY.GPJ 2015 YEH ASSOCIATES TEMPLATE.GDT 2015 LIBRARY.GLB 12/18/18

Ci u lhg Eaae. sl Aar &n. S
YehandAsho c hoshiita , I . sih AsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **Pit 2**

Boring Began: 3/2/2018
Boring Completed: 3/2/2018
Drilling Method(s): Test Pit - excavator
Driller:
Drill Rig: Rubber tire Backhoe
Hammer: , ER: %

Total Depth: 8.0 ft
Ground Elevation: 6801.2 ft
Coordinates: N: E:
Location: Sta. 1037+17, 67' R

Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
6800	5					**0.0 - 6.0 ft. COBBLES** in a gravel and sand matrix, multi-colored.	1.3		76	21	3	NV	NP	A-1-a (0) GP	
6795						**6.0 - 7.0 ft. silty SAND**, orange to brown.									
						7.0 - 8.0 ft. COBBLES in a gravel and sand matrix, multi-colored.									

Bottom of Hole at 8.0 ft.

Ciu lhg Eaae. sl Aar &n. S
YehandAsho choshiita, I. sihAsaAa

Project Name: U.S. 550 South Connection to U.S. 160

Project Number: 217-376 *Boring No.:* **Pit 3**

Boring Began: 3/2/2018
Boring Completed: 3/2/2018
Drilling Method(s): Test Pit - excavator
Driller:
Drill Rig: Rubber tire Backhoe
Hammer: , ER: %

Total Depth: 8.0 ft
Ground Elevation: 6788.6 ft
Coordinates: N: E:
Location: Sta. 1038+20, 55' R
Logged By: E. Pickerill
Final By: B. Bunker

Weather Notes:
Inclination from Horiz.: Vertical
Night Work: ☐

Groundwater Levels:			
Symbol			
Depth	-	-	-
Date	-	-	-

Elevation (feet)	Depth (feet)	Sample Type/ Advancement Method	Soil Samples: Blows per 6 in	Soil Samples: Penetration Resistance	Lithology	Material Description	Moisture Content (%)	Dry Density (pcf)	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index	AASHTO & USCS Classifi-cations	Field Notes and Other Lab Tests
						0.0 - 6.0 ft. COBBLES in a gravel and sand matrix, some silt, red-brown.									
6785	5						3.3		61	21	18	29	12	A-1-b (0) GM	
						6.0 - 8.0 ft. SANDSTONE INTERBEDDED WITH CLAYSTONE, olive-brown, moderately weathered, medium hard, (ANIMAS FORMATION).									R-Value=23
6780						Bottom of Hole at 8.0 ft.									

Appendix E – Laboratory Test Results

E.1 Roadway and Excavation Laboratory Test Results

E.2 Bridges Laboratory Test Results

E.3 Wildlife and Livestock Crossings Laboratory Test Results

E.4 Retaining Wall Laboratory Test Results

E.5 Test Pits 1, 2 and 3 Laboratory Test Results

E.6 Outside Laboratory Test Results

E.7 Summary of Chemical Test Results

Appendix E.1 – Roadway and Excavation Laboratory Test Results

YEH & ASSOCIATES, INC

Summary of Laboratory Test Results

Project No: 217-376 Project Name: 22420: US 550 S Connection to US 160 Roadway and Excavtion Test Results Date: 7/10/2018

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
R-01	MC	4	15.3	107.8												1.0					
R-01	SS	9	14.0				2	13	85	32	14	18								A-6 (14)	CL
R-01	bulk	9-14	15.1				0	13	87	34	18	16	8.3	0.005	0.00788		730			A-6 (13)	CL
R-02	bulk	1-2	2.2				47	40	13	NV	NP	NP	8.8	0.002	0.00433		3000			A-1-a (0)	GM
R-02	bulk	14-19	16.2				0	25	75	31	16	15								A-6 (9)	CL
R-03	MC	4	18.1	107.5												0.4					
R-03	bulk	9-14	18.5				0	28	72	40	17	23	8.2	0.016	0.00164		1200			A-6 (15)	CL
R-04	bulk	9-14	17.4				0	24	76	46	19	27	8.1	0.019	0.00292		1060			A-7-6 (20)	CL
R-04	MC	14	11.9	115.6												1.6					
R-05	bulk	9-14	12.2				0	19	81	35	17	18	8.8	0.012	0.0029		1200			A-6 (13)	CL
R-06	bulk	4-9	15.5				0	15	85	38	17	21	7.6	0.020	0.1060		340			A-6 (17)	CL
R-06	MC	9	13.5	117.9												3.9					
R-07	bulk	5-10	11.0				0	28	72	47	20	27	8.2	0.026	0.0053		1300			A-7-6 (18)	CL
R-07	MC	10	8.9	97.8			0	54	46	31	14	17				-1.8				A-6 (4)	SC
R-08	bulk	10-15	6.6				1	20	79	38	16	22								A-6 (16)	CL
R-08	MC	15	9.8	107.0												1.1					
R-09	bulk	14-19	4.4				1	28	71	27	17	10	8.4	0.027	0.0065		1300			A-4 (5)	CL
R-09	SS	22	6.4				22	37	41	32	15	17								A-6 (3)	SC

bulk - indicates drill cuttings sample
MC - indicates Modifies California sample
CORE - indicates rock core sample
SS - indicates Split Spoon sample
NV - indicates no value
NP - indicates no plasticity

YEH & ASSOCIATES, INC

Summary of Laboratory Test Results

Project No: 217-376 Project Name: 22420: US 550 S Connection to US 160 Roadway and Excavtion Test Results Date: 7/10/2018

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
R-10	bulk	4-9	5.8				0	66	34	NV	NP	NP	8.8	0.007	≤0.00105		2800			A-2-4 (0)	SM
R-10	MC	14	9.4	93.6																	
R-11	bulk	9.5-14.5	6.2				9	54	37	25	21	4								A-4 (0)	SM-SC
R-11	MC	14.5	13.6	103.9																	
R-12	bulk	4.5-9.5	5.0				49	22	29	37	17	20	8.5	0.019	0.0012		1600			A-2-6 (0)	GC
R-12	bulk	19.5-24.5	4.7				40	47	13	NV	NP	NP	8.6	0.014	0.0058		2700			A-1-b (0)	SM
E-01	bulk	0-4	17.9				0	16	84	72	22	50								A-7-6 (45)	CH
E-01	bulk	19-24	1.8				68	27	5	NV	NP	NP								A-1-a (0)	GP
E-01	bulk	74-79	11.8				0	67	33	38	21	17								crushed BR	
E-01	bulk	79-84								30	21	9	9.0	0.011	<0.00110		1500			crushed BR	
E-01	bulk	114.0-119.0								28	19	9	9.4	0.015	<0.00110		1500			crushed BR	
E-02	MC	4.5	7.9	97.3																	
E-02	bulk	4.5-9.5	3.5				26	61	13	22	18	4								A-1-b (0)	SC-SM
E-02	CORE	59.5-59.9	3.8	139.6														3100			
E-02	CORE	70.9-71.4	6.4	138.1														1526			
E-02	CORE	91.0-91.5	6.4	144.6														3298			
E-02	CORE	106.3-106.7	3.6	143.7														3392			
E-02	CORE	128.0-128.3	3.9	141.6														2427			

bulk - indicates drill cuttings sample
MC - indicates Modifies California sample
CORE - indicates rock core sample
SS - indicates Split Spoon sample
NV - indicates no value
NP - indicates no plasticity

YEH & ASSOCIATES, INC

Summary of Laboratory Test Results

Project No: 217-376 Project Name: 22420: US 550 S Connection to US 160 Roadway and Excavtion Test Results Date: 7/10/2018

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
E-02	CORE	143.0-143.7	4.4	149.1														7021			
E-03	MC	4.5	14.0	112.5																	
E-03	bulk	4.5-9.5	11.5				5	20	75	50	18	32								A-7-6 (23)	CH
E-04	MC	9.5	12.7	110.3																	
E-04	bulk	59.5-64.5								29	19	10	8.7	0.002	<0.00109		2000				
E-05	bulk	24-29	2.2				48	44	8	NV	NP	NP								A-1-a (0)	GP-GM
E-05	bulk	49-54	2.6				49	46	5	NV	NP	NP								A-1-a (0)	GP
E-06	SS	4.5	13.1				0	24	76	46	14	32								A-7-6 (23)	CL
E-06	bulk	14.5-19.5	1.7				19	68	13	NV	NP	NP	8.6	0.007	0.0020		4000			A-1-b (0)	SM
E-06	bulk	29.5-34.5	1.8				27	64	9	NV	NP	NP								A-1-b (0)	SP-SM
E-07	MC	14.5	20.4	99.7					81												
E-07	bulk	14.5-19.5	7.5				19	45	36	35	15	20								A-6 (2)	SC
E-07	CORE	47.0-47.4	5.6	135.1														1297			
E-07	CORE	84.5-85.0	6.7	136.6														1122			
E-07	CORE	98.7-99.2	5.0	138.7														1538			
E-08	bulk	9.5-14.5								36	25	11	8.4	ND	<0.00113		1700				
E-08	bulk	44.5-49.5								30	22	8	9.4	0.009	<0.00110		1400				
E-09	bulk	0-4.5	11.8				0	20	80	52	17	35								A-7-6 (28)	CH

bulk - indicates drill cuttings sample
MC - indicates Modifies California sample
CORE - indicates rock core sample
SS - indicates Split Spoon sample
NV - indicates no value
NP - indicates no plasticity

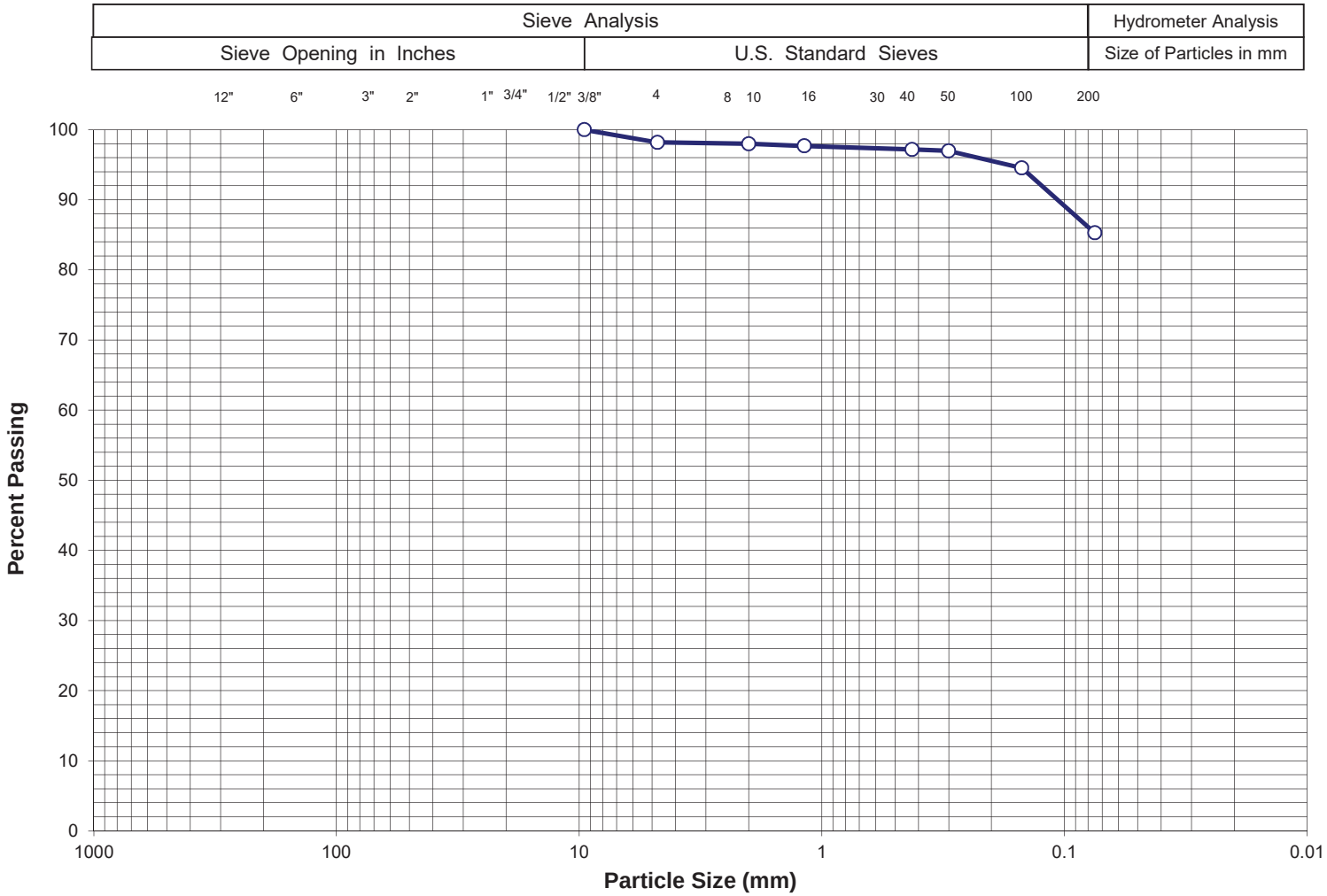
YEH & ASSOCIATES, INC

Summary of Laboratory Test Results

Project No: 217-376 Project Name: 22420: US 550 S Connection to US 160 Roadway and Excavtion Test Results Date: 7/10/2018

Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
E-09	bulk	39.5-44.5	1.2				26	67	7	NV	NP	NP								A-1-b (0)	SP-SM
E-09	CORE (slaking)	63.5-64.0	4.5	98.7			0	59	41	35	33	2									bedrock, Shale
E-10	MC	9.5-10	13.0	88.3												-1.7					
E-10	SPT	29.5	30.0	12.1			3	29	68	30	13	17								A-6 (9)	CL

bulk - indicates drill cuttings sample
MC - indicates Modifies California sample
CORE - indicates rock core sample
SS - indicates Split Spoon sample
NV - indicates no value
NP - indicates no plasticity



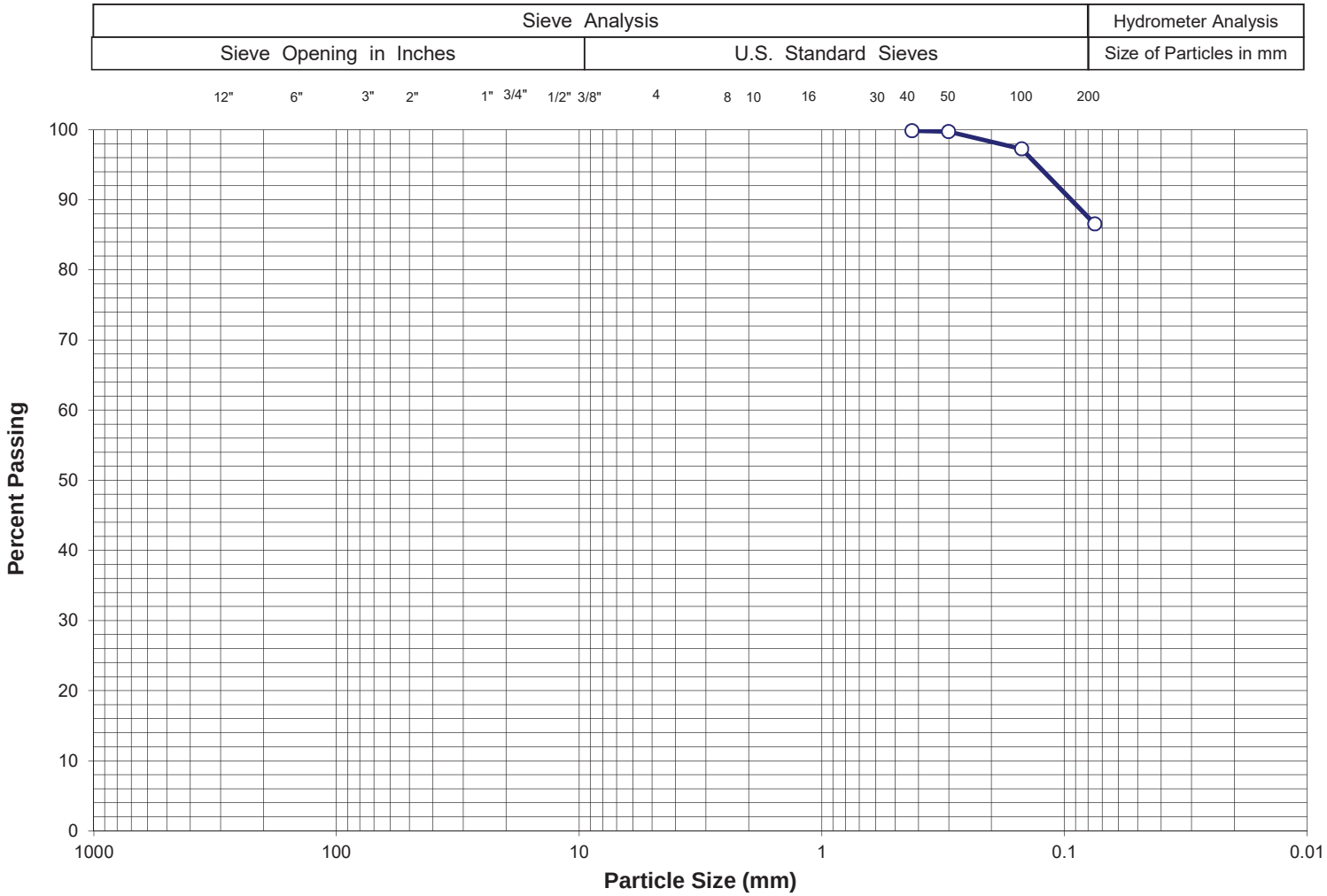
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	100
#4	98
#10	98
#40	97
#200	85.3

Gravel (%)	2	LL	32	Project Name:	US 550 S / US 160 Connector
Sand (%)	13	PL	14	Boring:	R-01
Fines (%)	85	PI	18	Sample Depth (ft):	9
Sample Classification:	sandy CLAY		**USCS:** CL	**AASHTO:** A-6 (14)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	02/20/18		



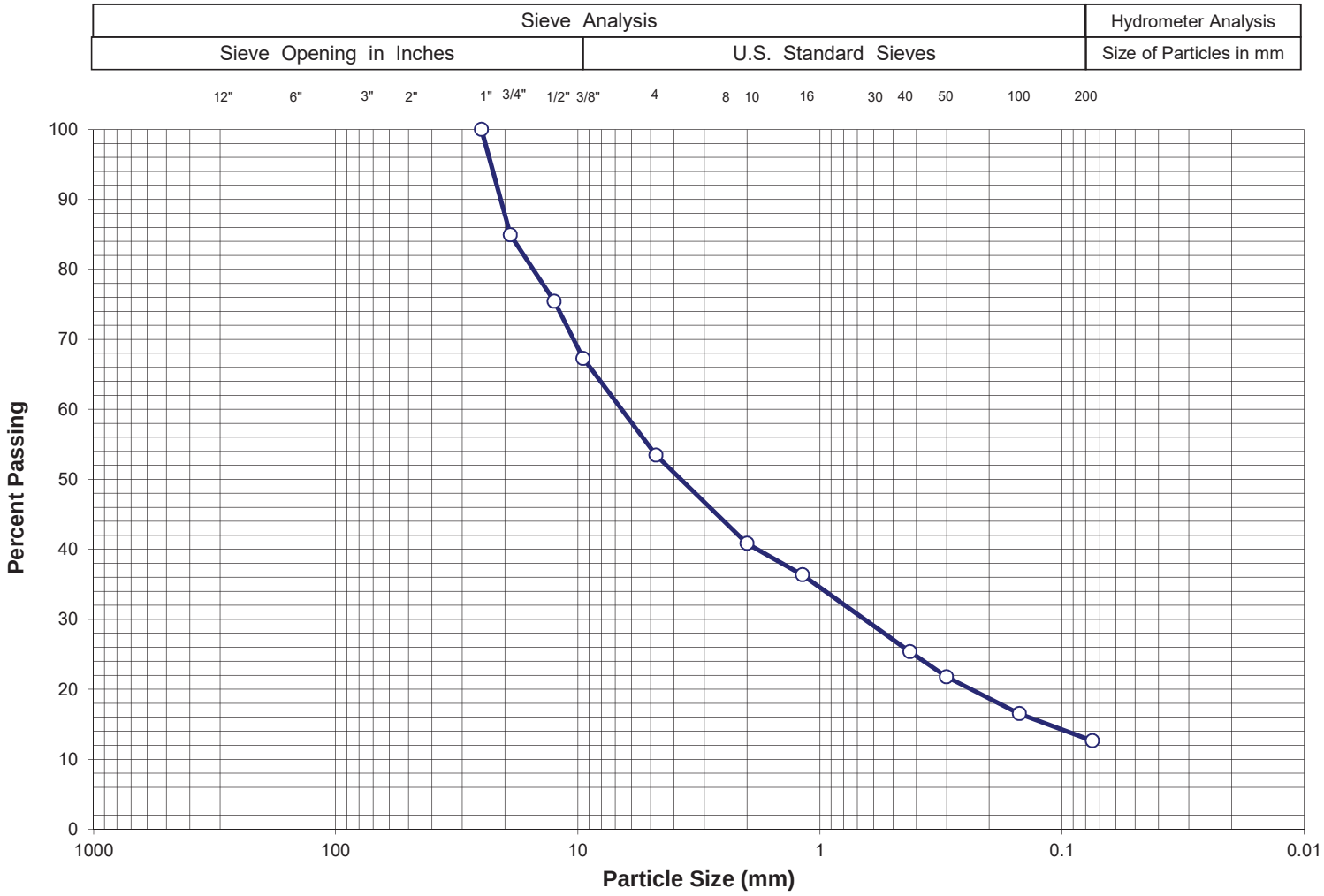
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	-
#40	100
#200	86.6

Gravel (%)	0	LL	34	Project Name:	US 550 S / US 160 Connector
Sand (%)	13	PL	18	Boring:	R-01
Fines (%)	87	PI	16	Sample Depth (ft):	9-14
Sample Classification:	sandy CLAY		**USCS:** CL	**AASHTO:** A-6 (13)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	02/13/18	Figure No.:	-



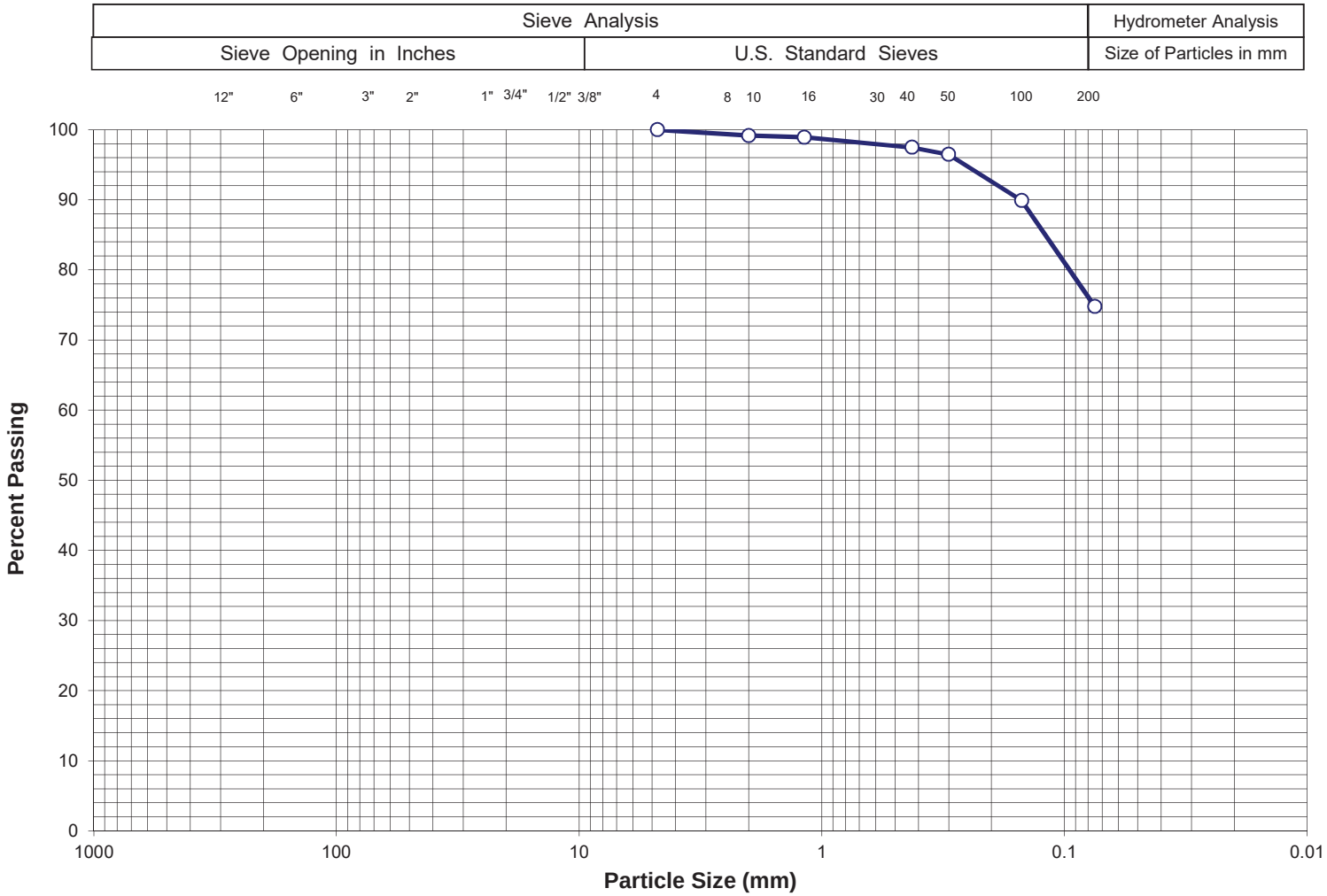
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	85
½"	75
⅜"	67
#4	53
#10	41
#40	25
#200	12.6

Gravel (%)	47	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	40	PL	NP	Boring:	R-02
Fines (%)	13	PI	NP	Sample Depth (ft):	1-2
Sample Classification:	silty GRAVEL w/ sand		**USCS:** GM	**AASHTO:** A-1-a (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	02/13/18		



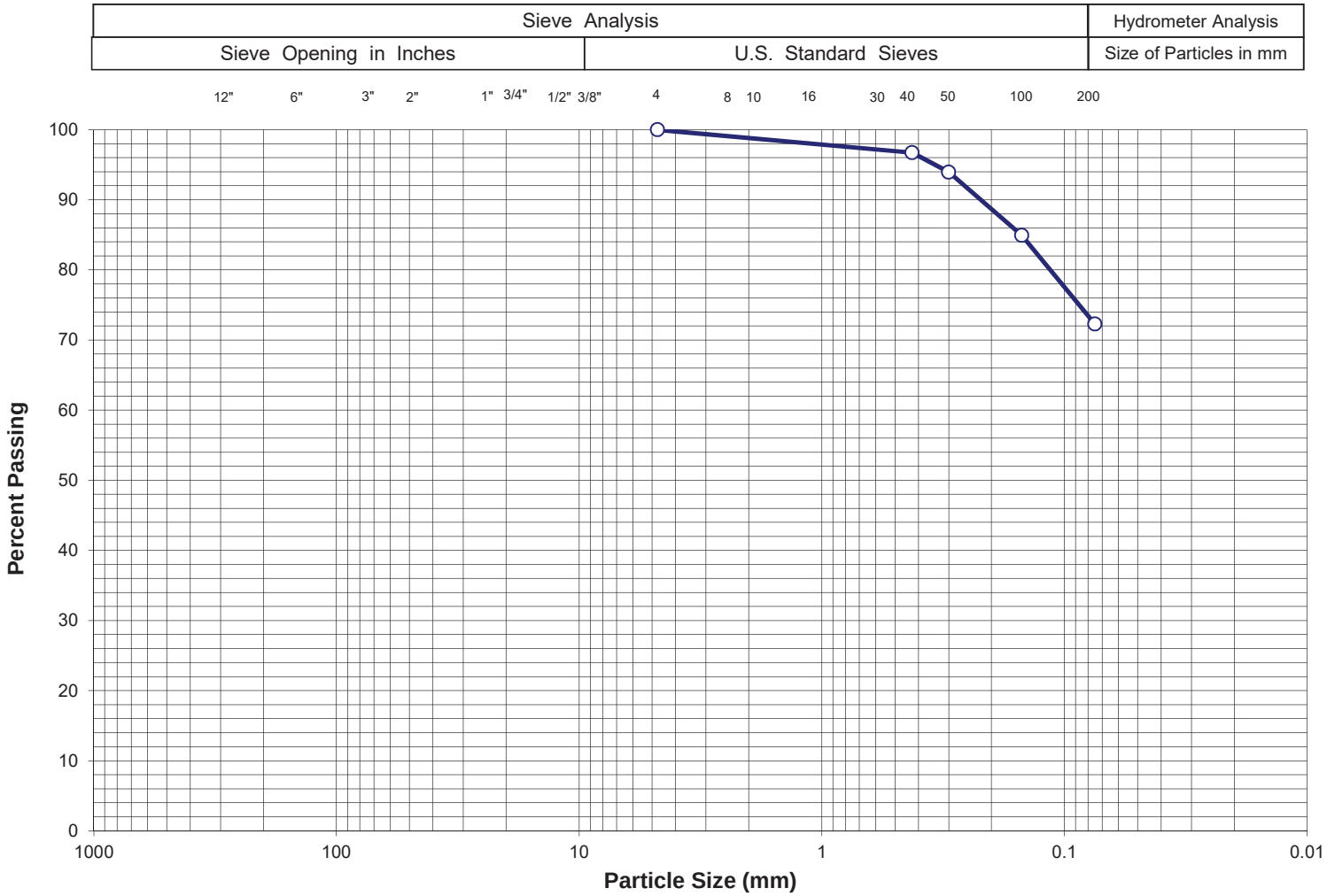
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	99
#40	97
#200	74.8

Gravel (%)	0	LL	31	Project Name:	US 550 S / US 160 Connector
Sand (%)	25	PL	16	Boring:	R-02
Fines (%)	75	PI	15	Sample Depth (ft):	14-19
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (9)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	02/20/18	Figure No.:	-



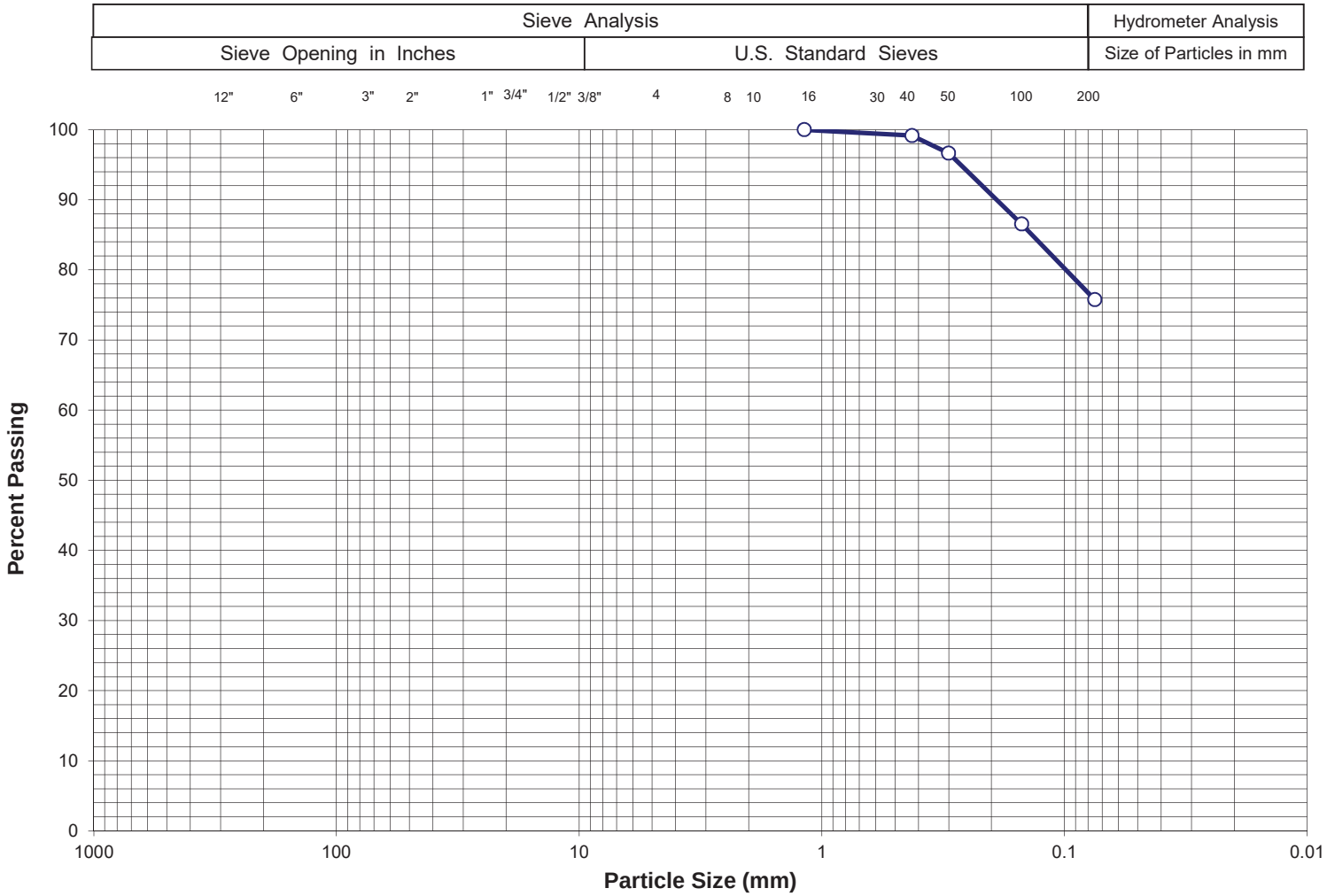
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	-
#40	97
#200	72.3

Gravel (%)	0	LL	40	Project Name:	US 550 S / US 160 Connector
Sand (%)	28	PL	17	Boring:	R-03
Fines (%)	72	PI	23	Sample Depth (ft):	9-14
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (15)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	02/13/18	Figure No.:	-



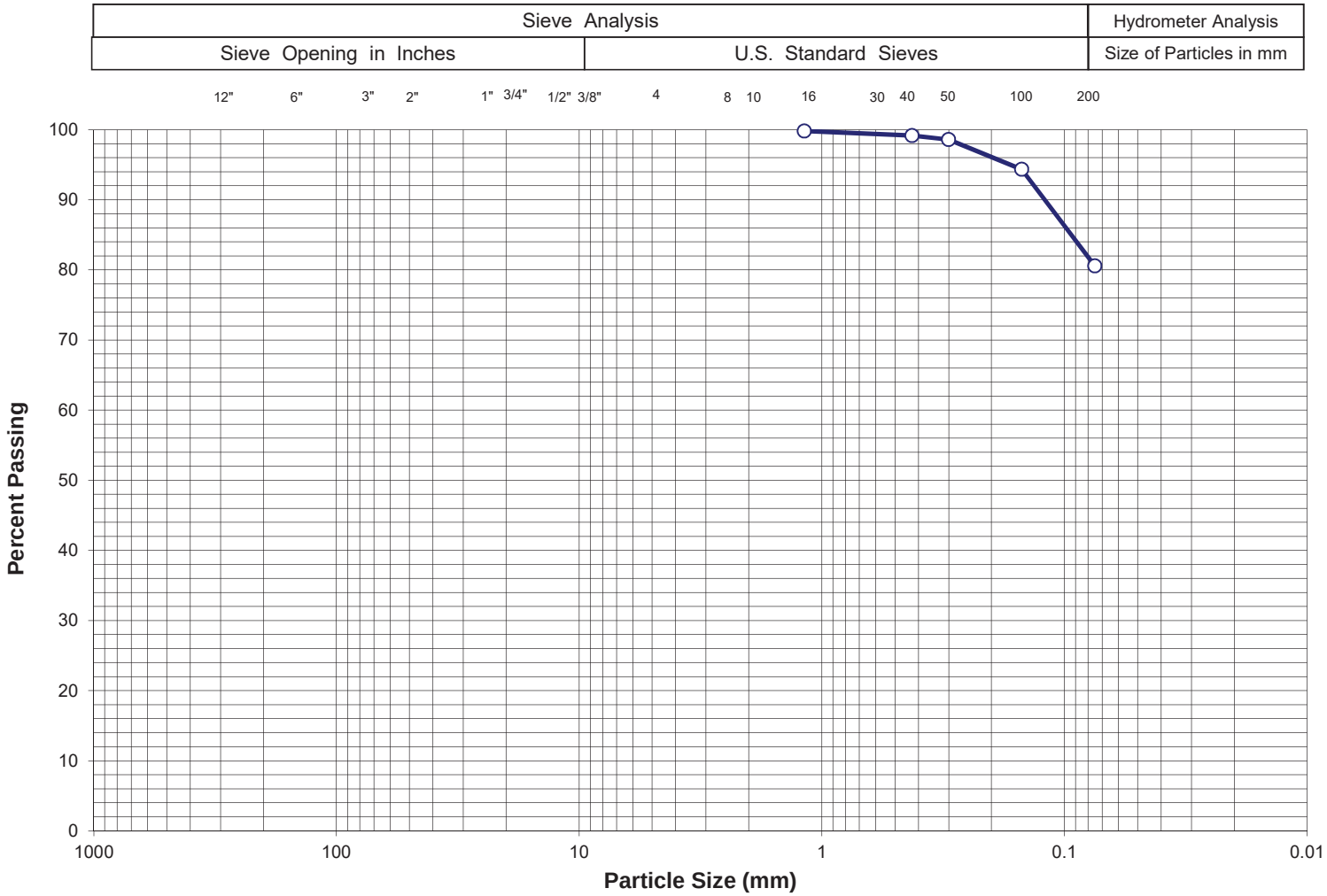
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	-
#40	99
#200	75.7

Gravel (%)	0	LL	46	Project Name:	US 550 S / US 160 Connector
Sand (%)	24	PL	19	Boring:	R-04
Fines (%)	76	PI	27	Sample Depth (ft):	9-14
Sample Classification:	sandy CLAY		**USCS:** CL	**AASHTO:** A-7-6 (20)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	02/13/18		



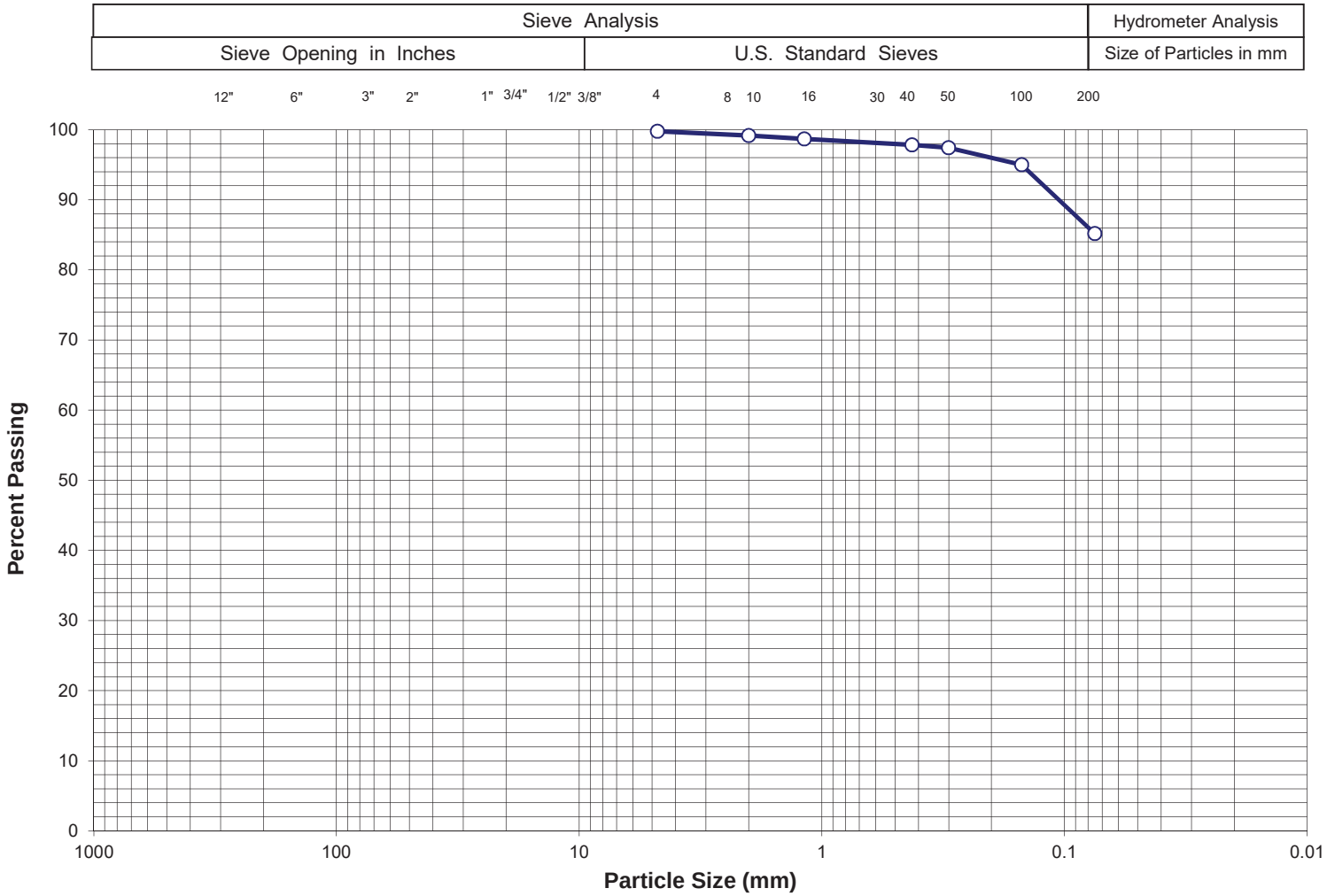
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	-
#40	99
#200	80.6

Gravel (%)	0	LL	35	Project Name:	US 550 S / US 160 Connector
Sand (%)	19	PL	17	Boring:	R-05
Fines (%)	81	PI	18	Sample Depth (ft):	9-14
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (13)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	02/13/18		



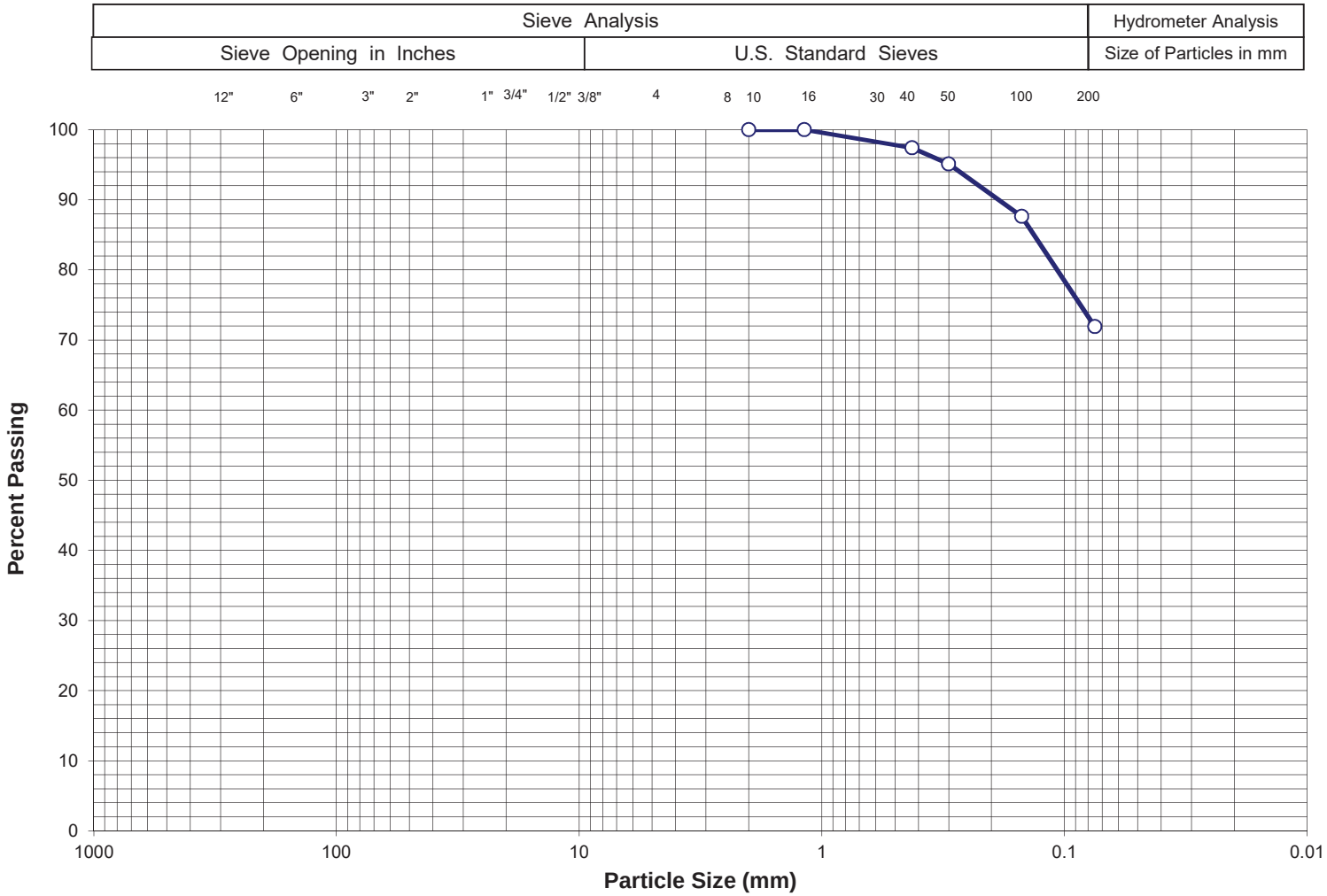
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	100
#4	100
#10	99
#40	98
#200	85.2

Gravel (%)	0	LL	38	Project Name:	US 550 S / US 160 Connector
Sand (%)	15	PL	17	Boring:	R-06
Fines (%)	85	PI	21	Sample Depth (ft):	4-9
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (17)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	02/15/18	Figure No.:	-



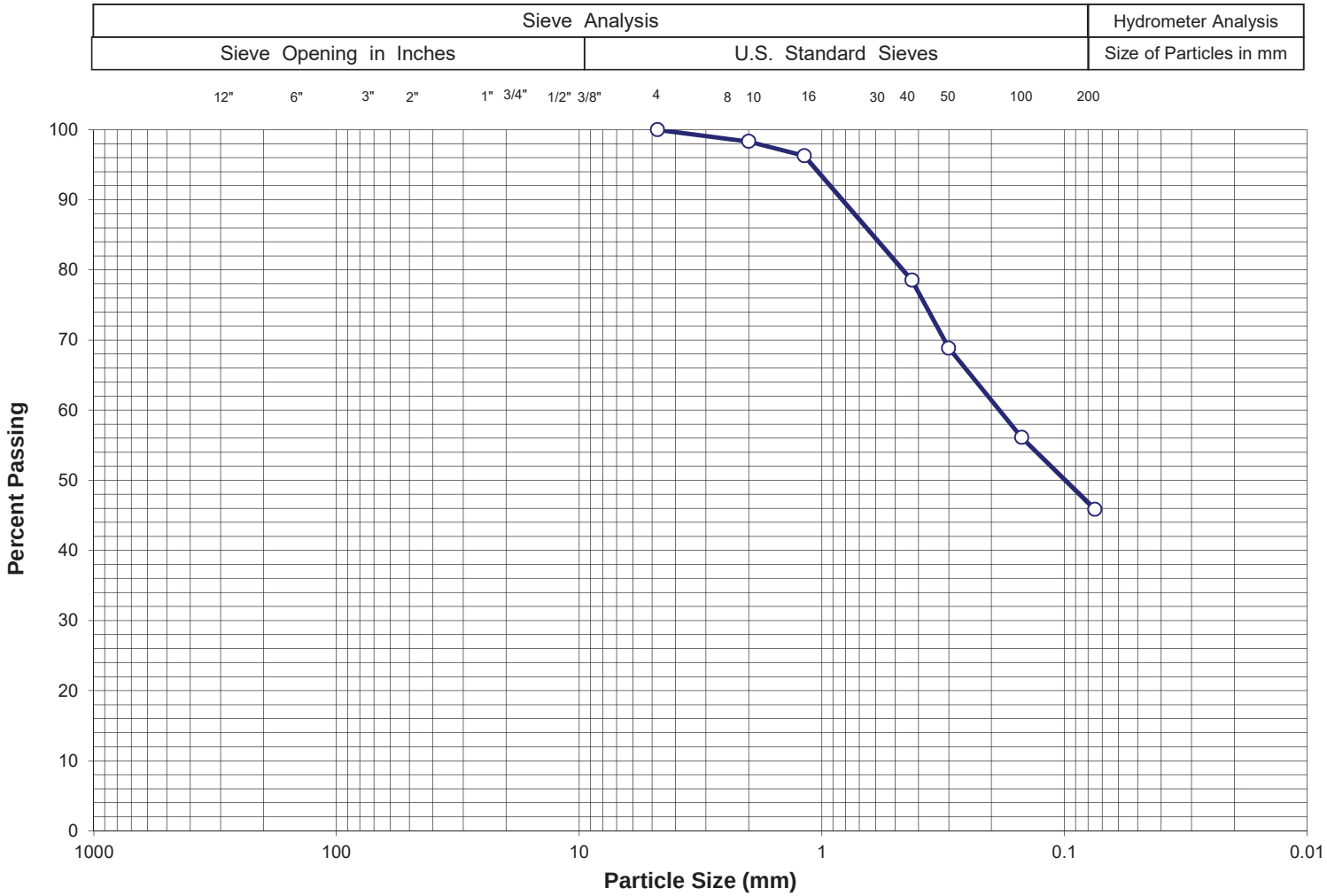
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	100
#40	97
#200	71.9

Gravel (%)	0	LL	47	Project Name:	US 550 S / US 160 Connector
Sand (%)	28	PL	20	Boring:	R-07
Fines (%)	72	PI	27	Sample Depth (ft):	5-10
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-7-6 (18)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	12/05/17		



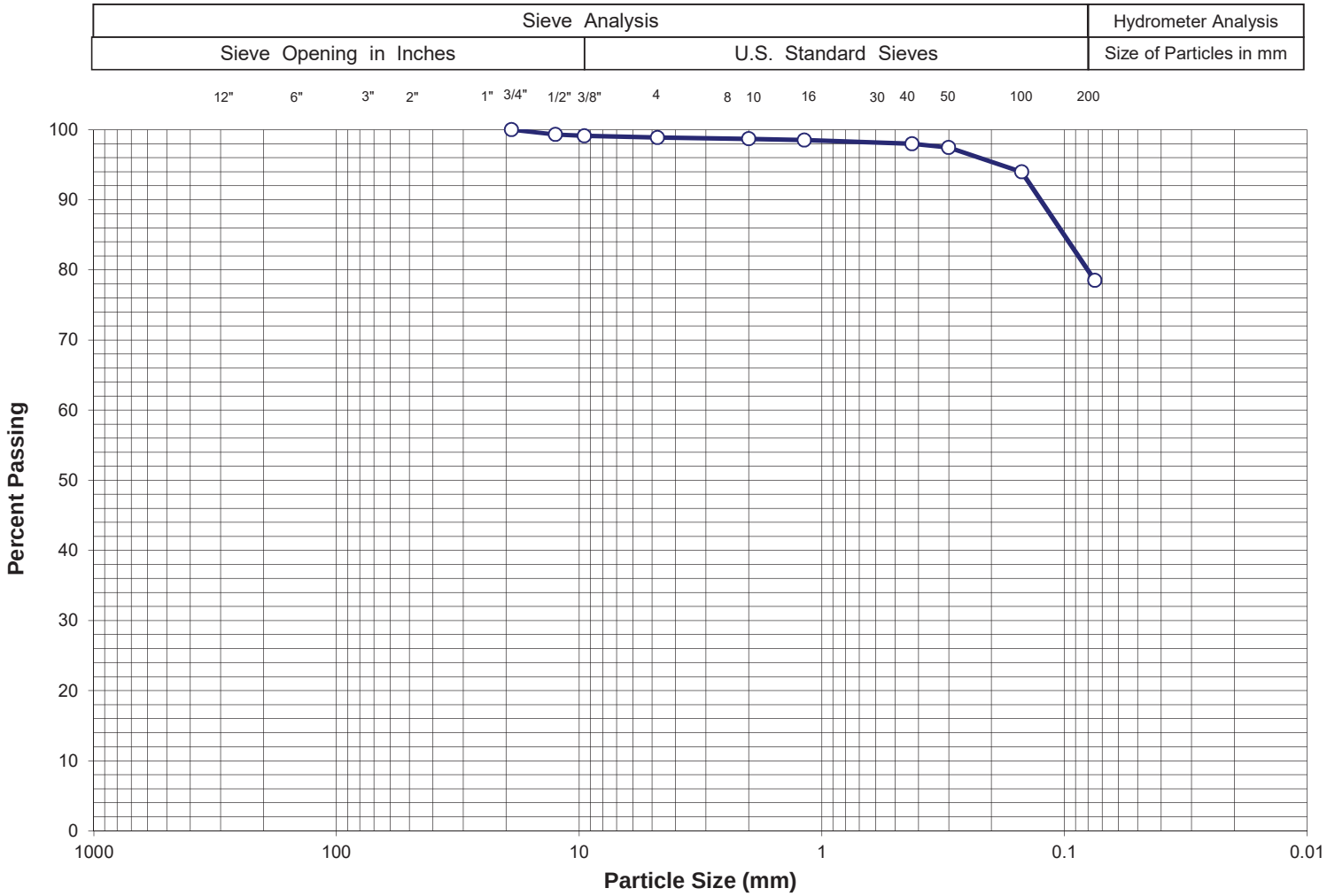
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	98
#40	79
#200	45.9

Gravel (%)	0	LL	31	Project Name:	US 550 S / US 160 Connector
Sand (%)	54	PL	14	Boring:	R-07
Fines (%)	46	PI	17	Sample Depth (ft):	10
Sample Classification:	clayey SAND		USCS: SC	AASHTO:	A-6 (4)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	LQ	Figure No.:	-
Date:	12/06/17		



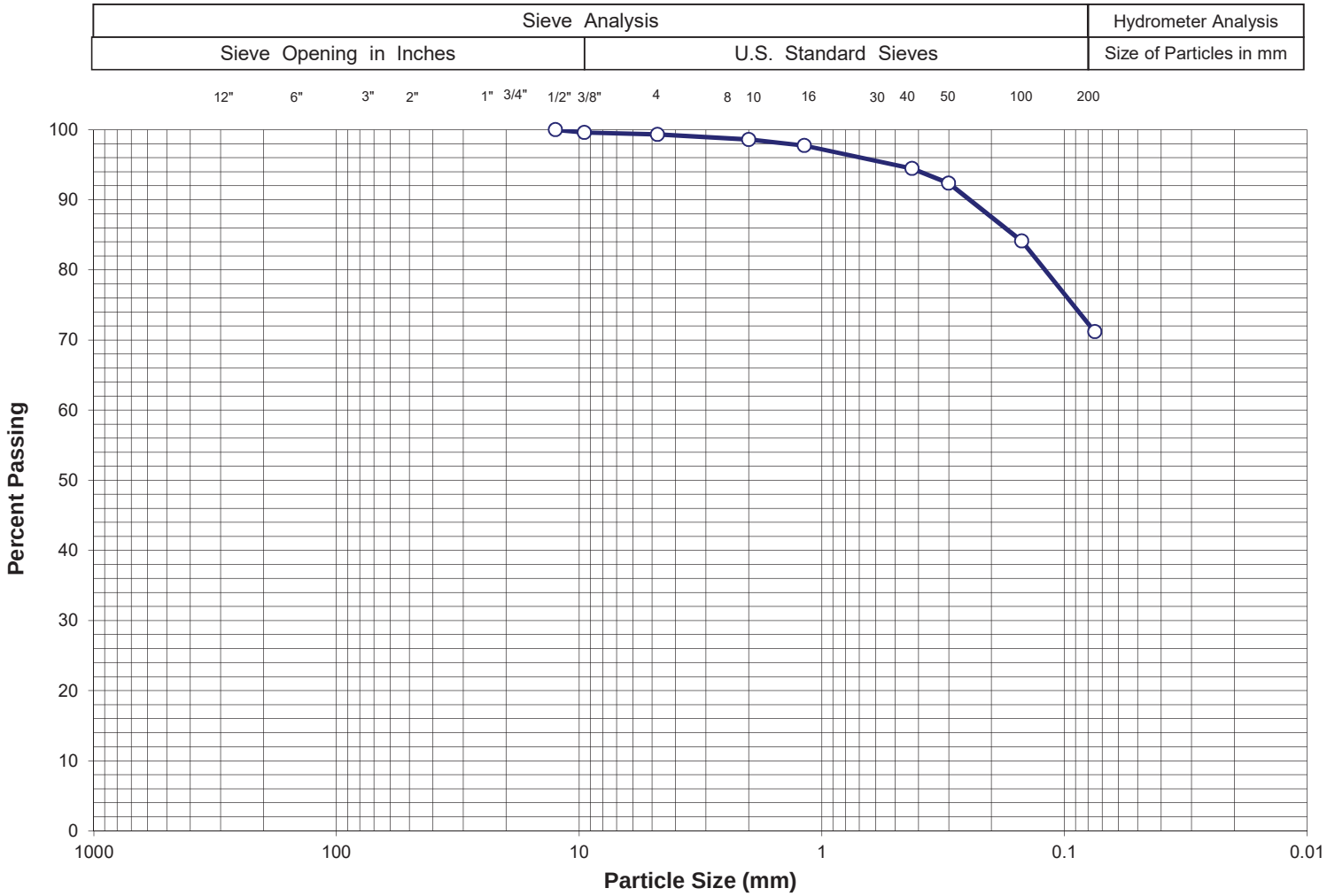
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	100
½"	99
⅜"	99
#4	99
#10	99
#40	98
#200	78.5

Gravel (%)	1	LL	38	Project Name:	US 550 S / US 160 Connector
Sand (%)	20	PL	16	Boring:	R-08
Fines (%)	79	PI	22	Sample Depth (ft):	10-15
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (16)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	LQ	Figure No.:	-
Date:	12/06/17		



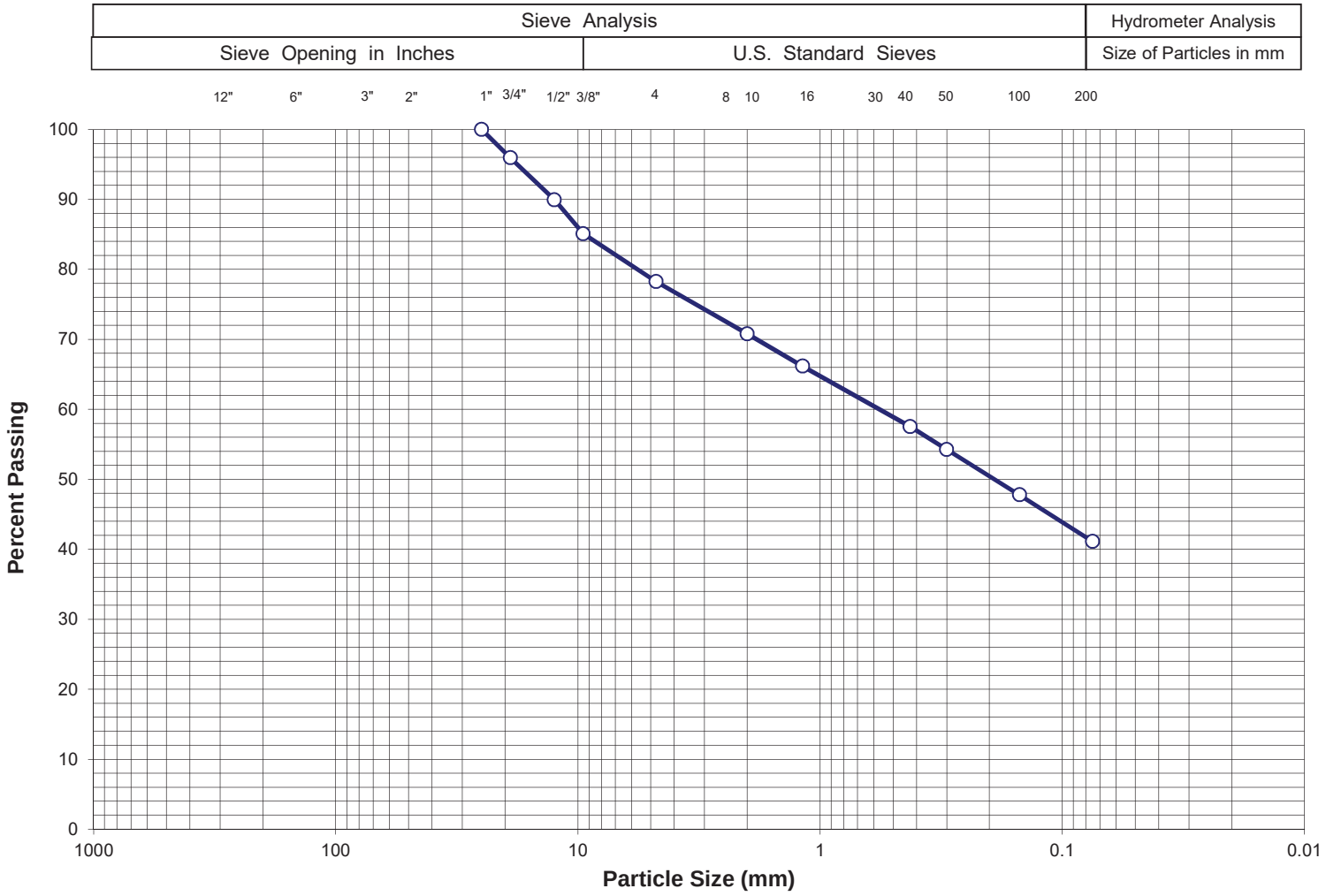
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	100
⅜"	100
#4	99
#10	99
#40	94
#200	71.2

Gravel (%)	1	LL	27	Project Name:	US 550 S / US 160 Connector
Sand (%)	28	PL	17	Boring:	R-09
Fines (%)	71	PI	10	Sample Depth (ft):	14-19
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-4 (5)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	11/30/17		



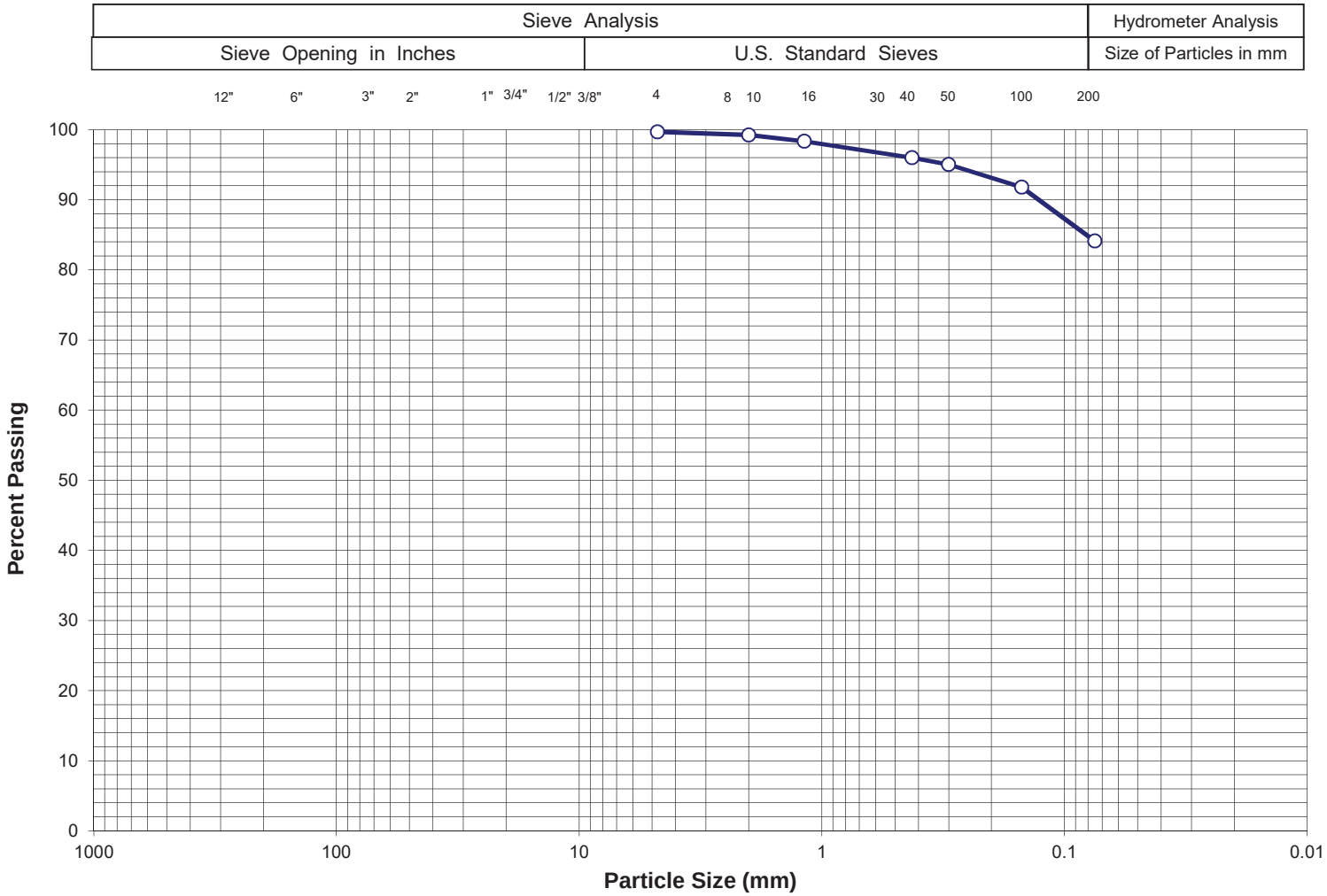
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	100
1"	100
¾ "	96
½"	90
⅜"	85
#4	78
#10	71
#40	58
#200	41.1

Gravel (%)	22	LL	32	Project Name:	US 550 S / US 160 Connector
Sand (%)	37	PL	15	Boring:	R-09
Fines (%)	41	PI	17	Sample Depth (ft):	22
Sample Classification:	clayey SAND w/ gravel		**USCS:** SC	**AASHTO:** A-6 (3)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	KM	Figure No.:	-
Date:	12/05/17		



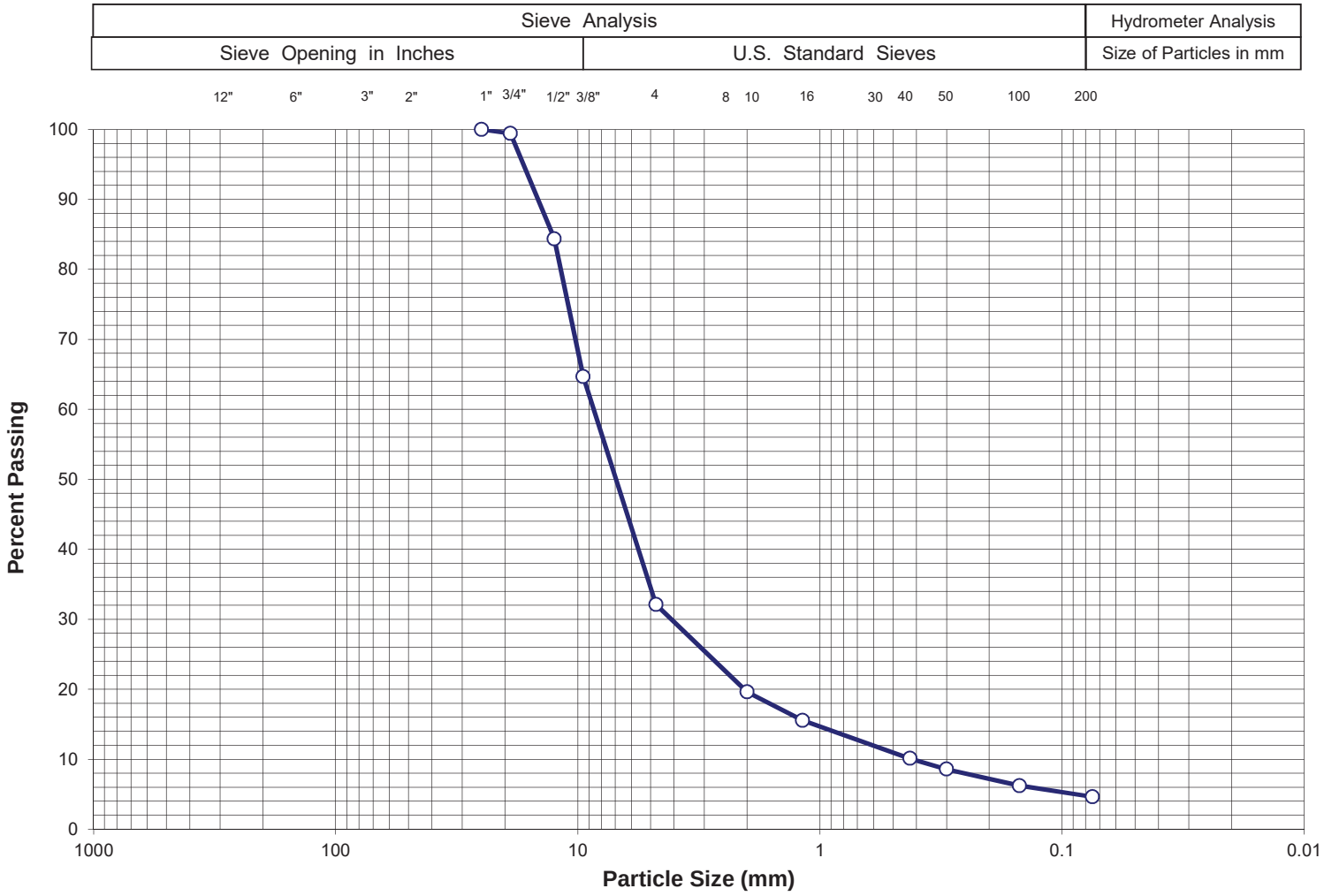
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	100
#4	100
#10	99
#40	96
#200	84.1

Gravel (%)	0	LL	72	Project Name:	US 550 S / US 160 Connector
Sand (%)	16	PL	22	Boring:	E-01
Fines (%)	84	PI	50	Sample Depth (ft):	0-4
Sample Classification:	high plasticity CLAY, trace sand		**USCS:** CH	**AASHTO:** A-7-6 (45)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	02/26/18		



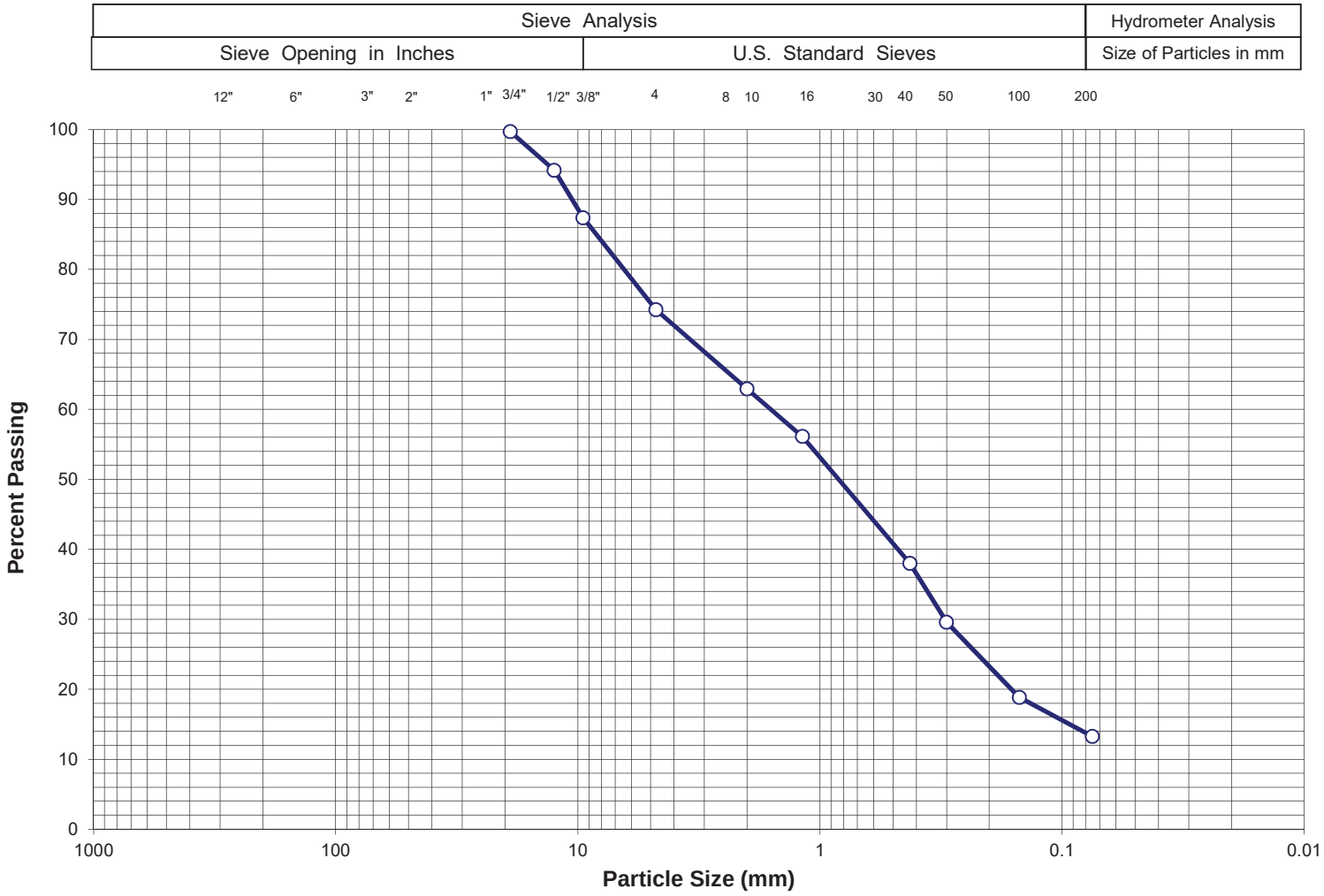
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	99
½"	84
⅜"	65
#4	32
#10	20
#40	10
#200	4.6

Gravel (%)	68	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	27	PL	NP	Boring:	E-01
Fines (%)	5	PI	NP	Sample Depth (ft):	19-24
Sample Classification:	Poorly graded GRAVEL w/ sand		USCS: GP	AASHTO: A-1-a (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	02/26/18		



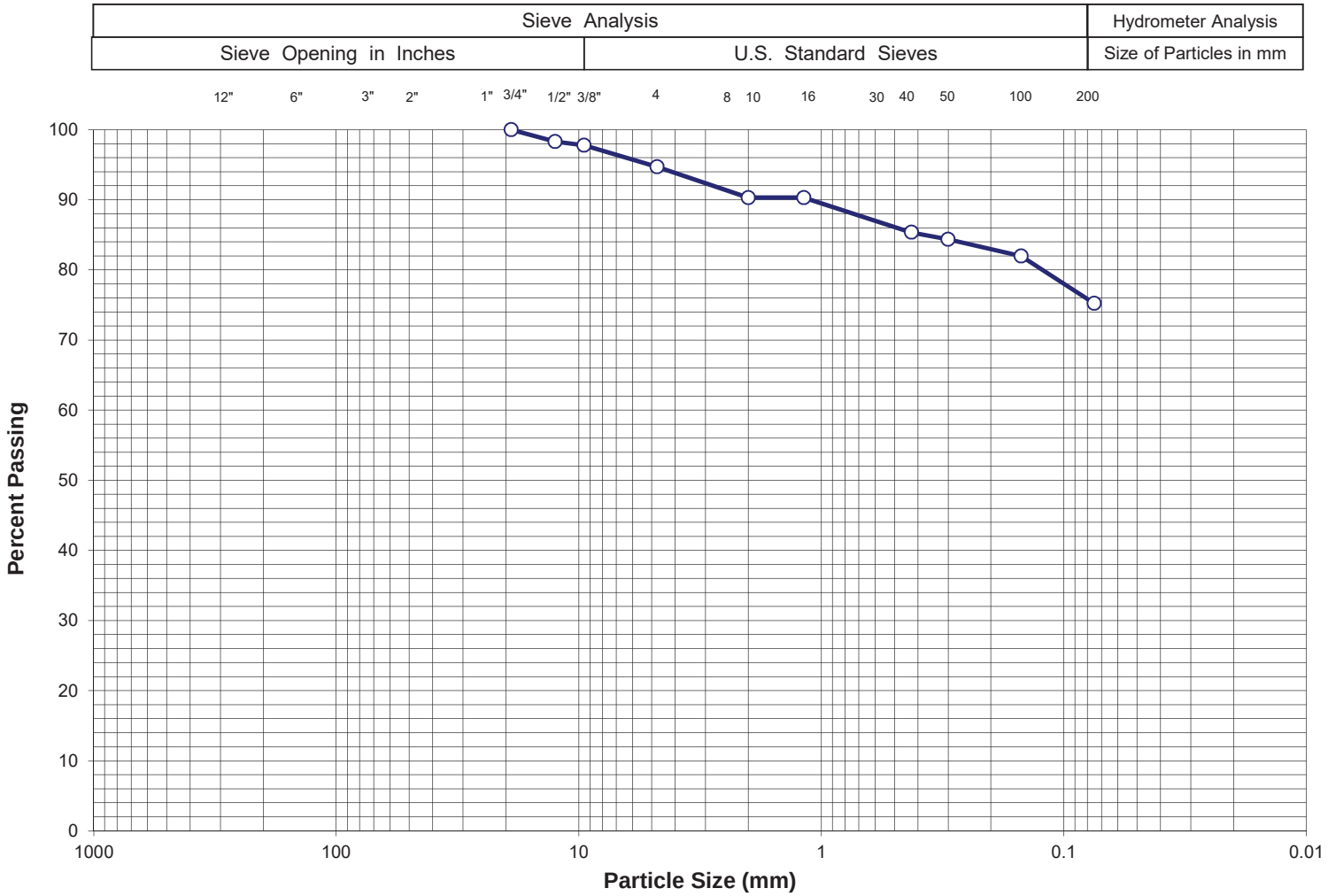
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	100
½"	94
⅜"	87
#4	74
#10	63
#40	38
#200	13.3

Gravel (%)	26	LL	22	Project Name:	US 550 S / US 160 Connector
Sand (%)	61	PL	18	Boring:	E-02
Fines (%)	13	PI	4	Sample Depth (ft):	4.5-9.5
Sample Classification:	silty-clayey SAND w/ gravel		**USCS:** SM-SC	**AASHTO:** A-1-b (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	KM	Figure No.:	-
Date:	02/27/18		



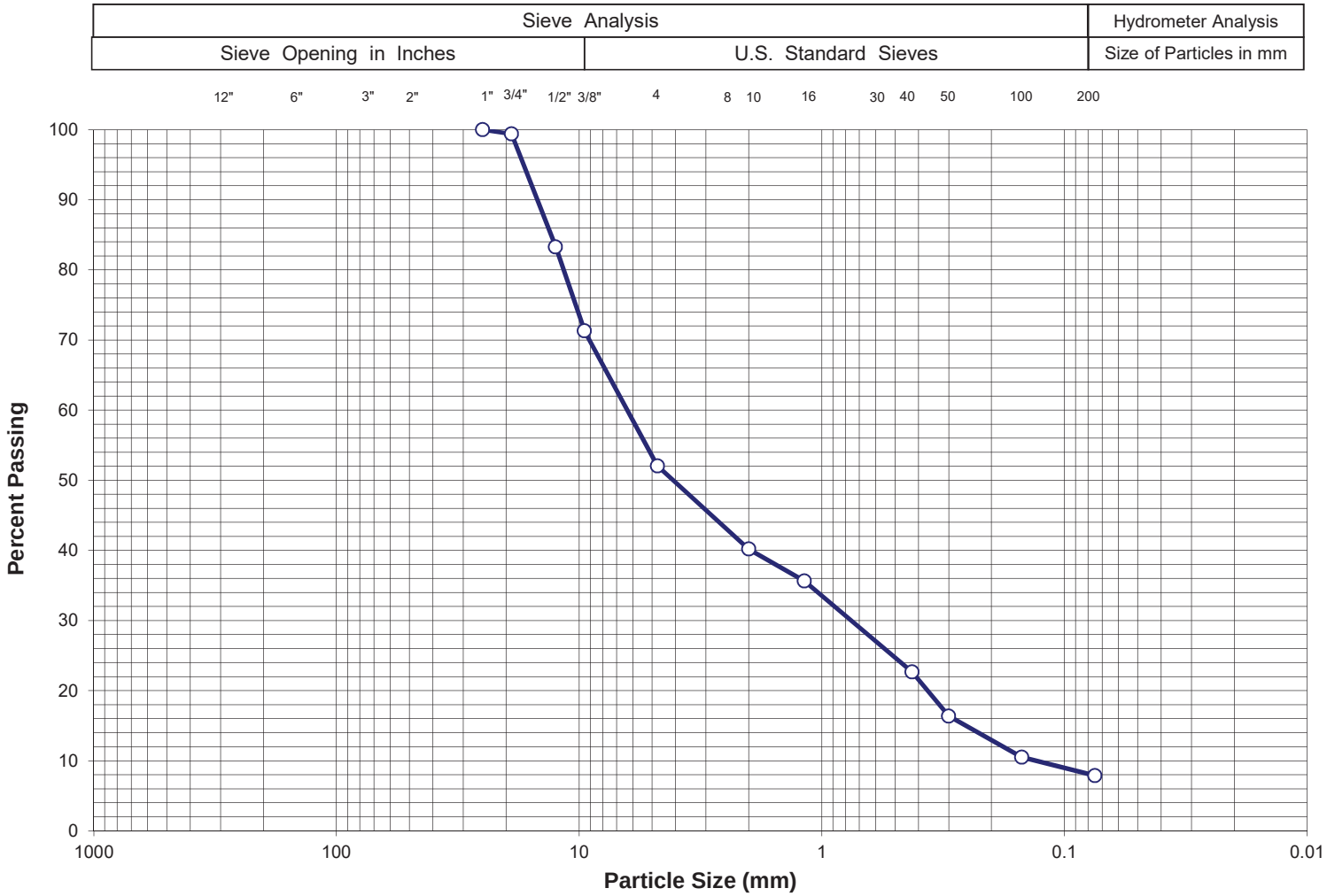
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	100
½"	98
⅜"	98
#4	95
#10	90
#40	85
#200	75.2

Gravel (%)	5	LL	50	Project Name:	US 550 South / US 160 Connector
Sand (%)	20	PL	18	Boring:	E-03
Fines (%)	75	PI	32	Sample Depth (ft):	4.5-9.5
Sample Classification:	high plasticity sandy CLAY, trace gravel		**USCS:** CH	**AASHTO:** A-7-6 (23)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	02/27/18		



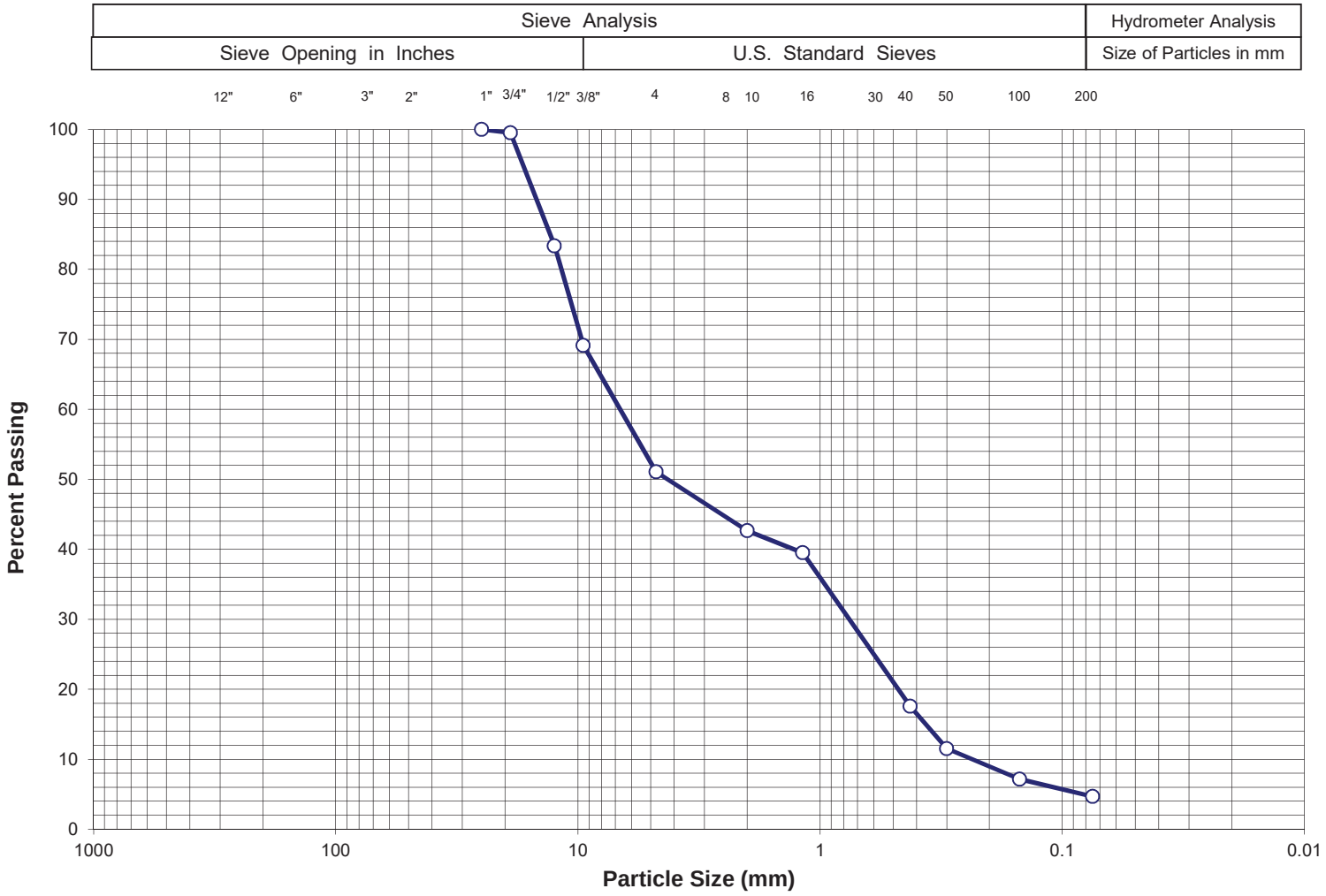
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	99
½"	83
⅜"	71
#4	52
#10	40
#40	23
#200	7.9

Gravel (%)	48	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	44	PL	NP	Boring:	E-05
Fines (%)	8	PI	NP	Sample Depth (ft):	24-29
Sample Classification:	Poorly graded GRAVEL w/ silt and sand		**USCS:** GP-GM	**AASHTO:** A-1-a (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	02/27/18	Figure No.:	-



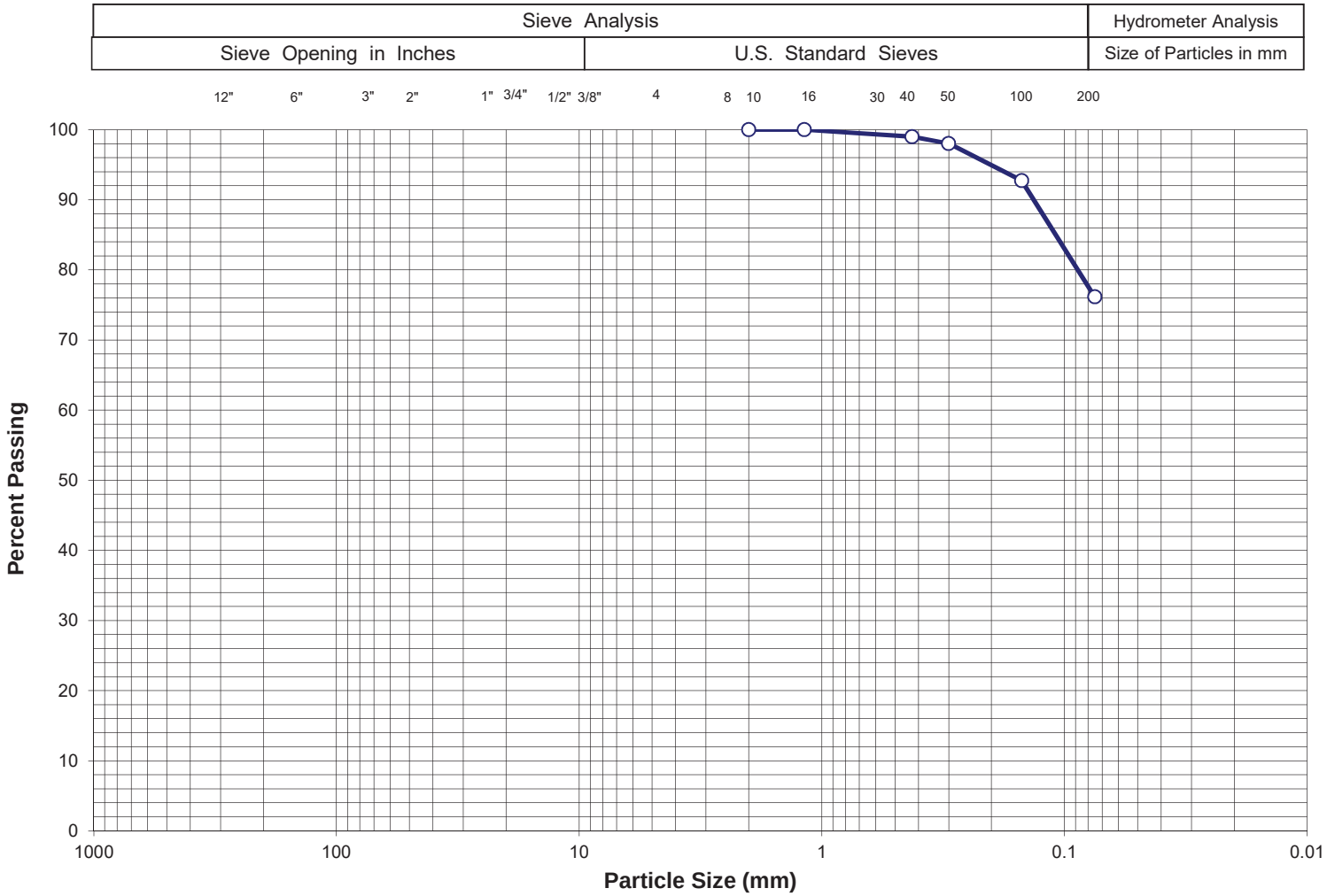
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	100
½"	83
⅜"	69
#4	51
#10	43
#40	18
#200	4.7

Gravel (%)	49	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	46	PL	NP	Boring:	E-05
Fines (%)	5	PI	NP	Sample Depth (ft):	49-54
Sample Classification:	Poorly graded GRAVEL w/ sand		**USCS:** GP	**AASHTO:** A-1-a (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	KM	Figure No.:	-
Date:	02/27/18		



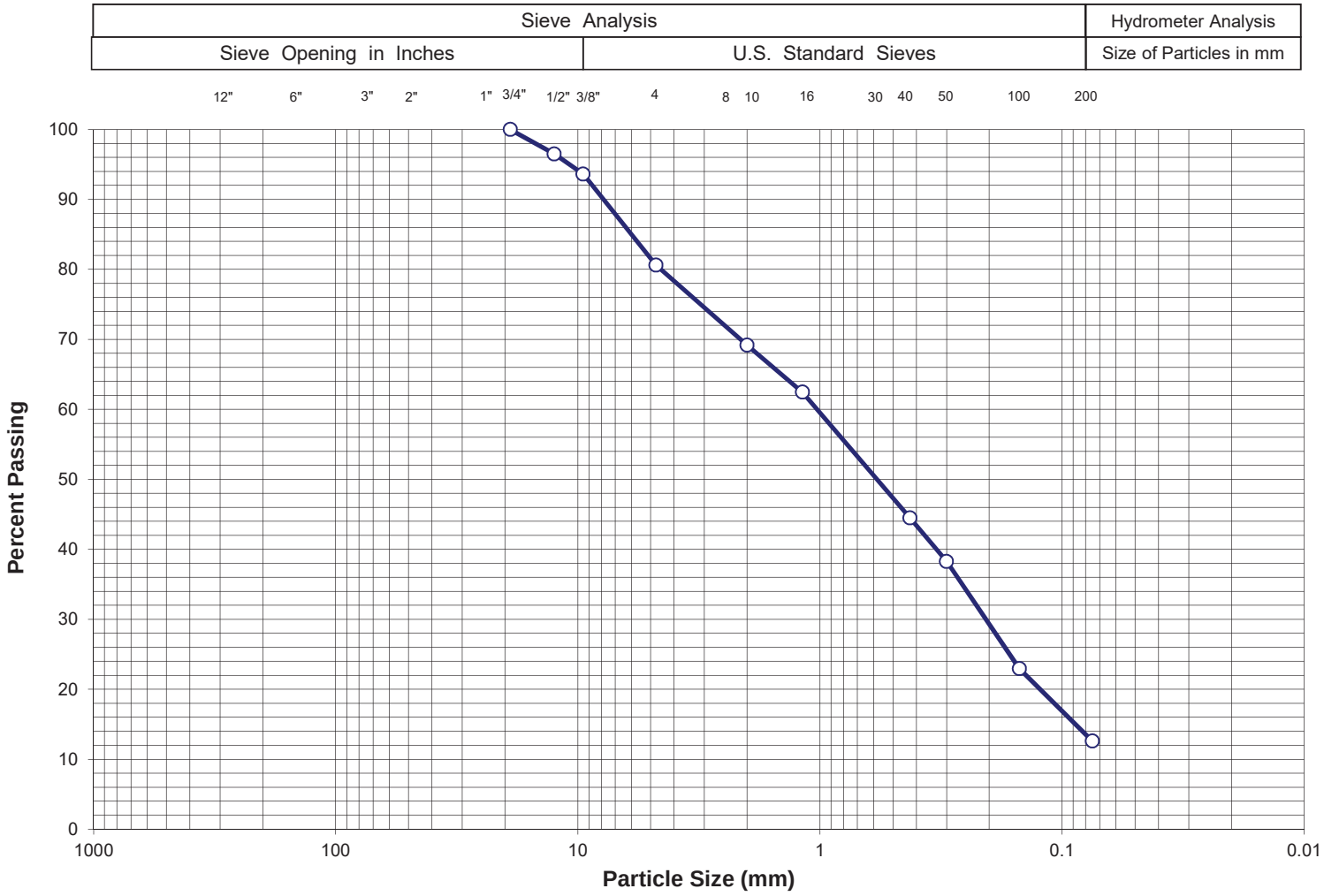
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	100
#40	99
#200	76.1

Gravel (%)	0	LL	46	Project Name:	US 550 South / US 160 Connector
Sand (%)	24	PL	14	Boring:	E-06
Fines (%)	76	PI	32	Sample Depth (ft):	4.5
Sample Classification:	sandy CLAY		**USCS:** CL	**AASHTO:** A-7-6 (23)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	12/04/17	Figure No.:	-



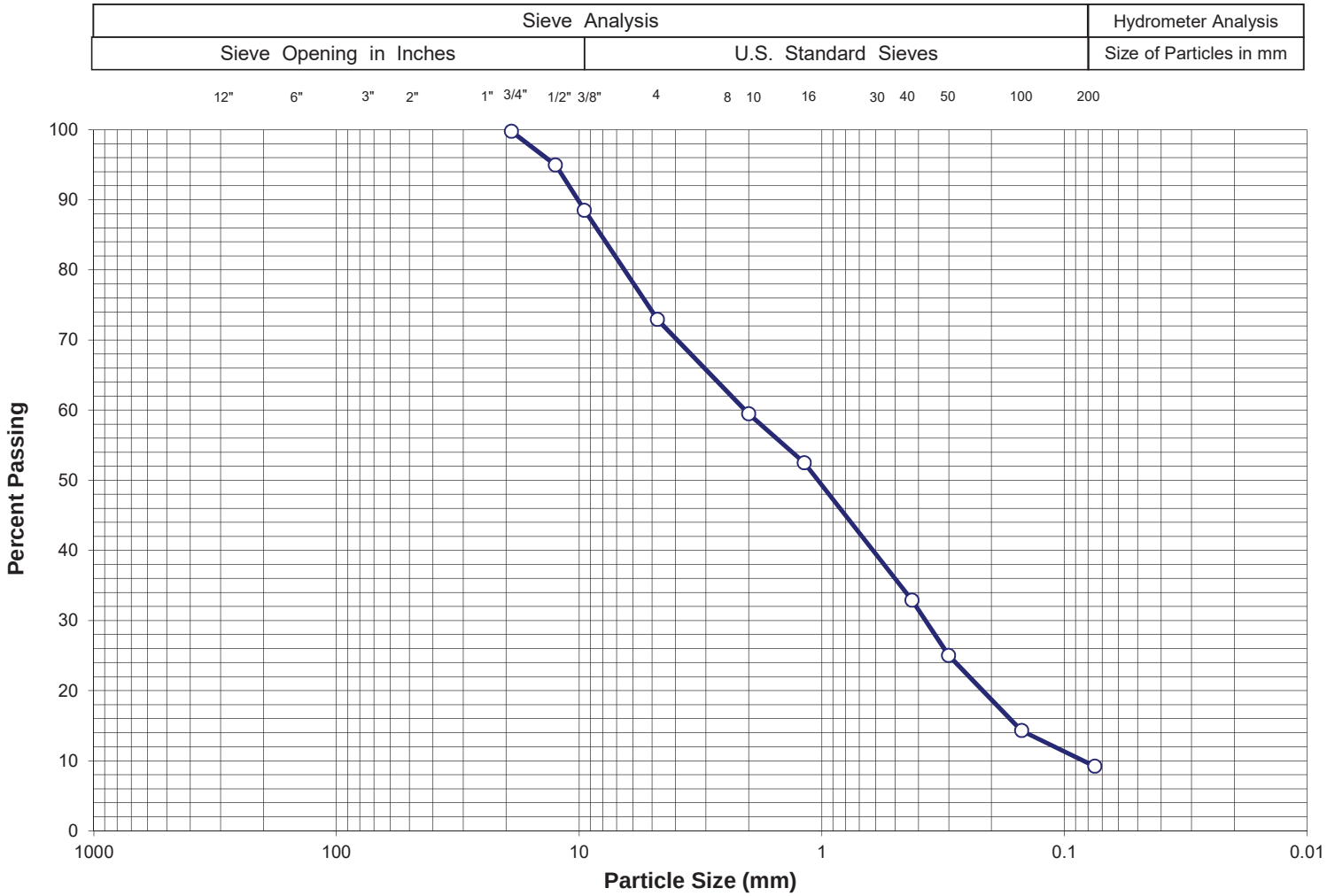
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	100
½"	96
⅜"	94
#4	81
#10	69
#40	45
#200	12.6

Gravel (%)	19	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	68	PL	NP	Boring:	E-06
Fines (%)	13	PI	NP	Sample Depth (ft):	14.5-19.5
Sample Classification:	silty SAND, w / gravel		**USCS:** SM	**AASHTO:** A-1-b (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	11/30/17		



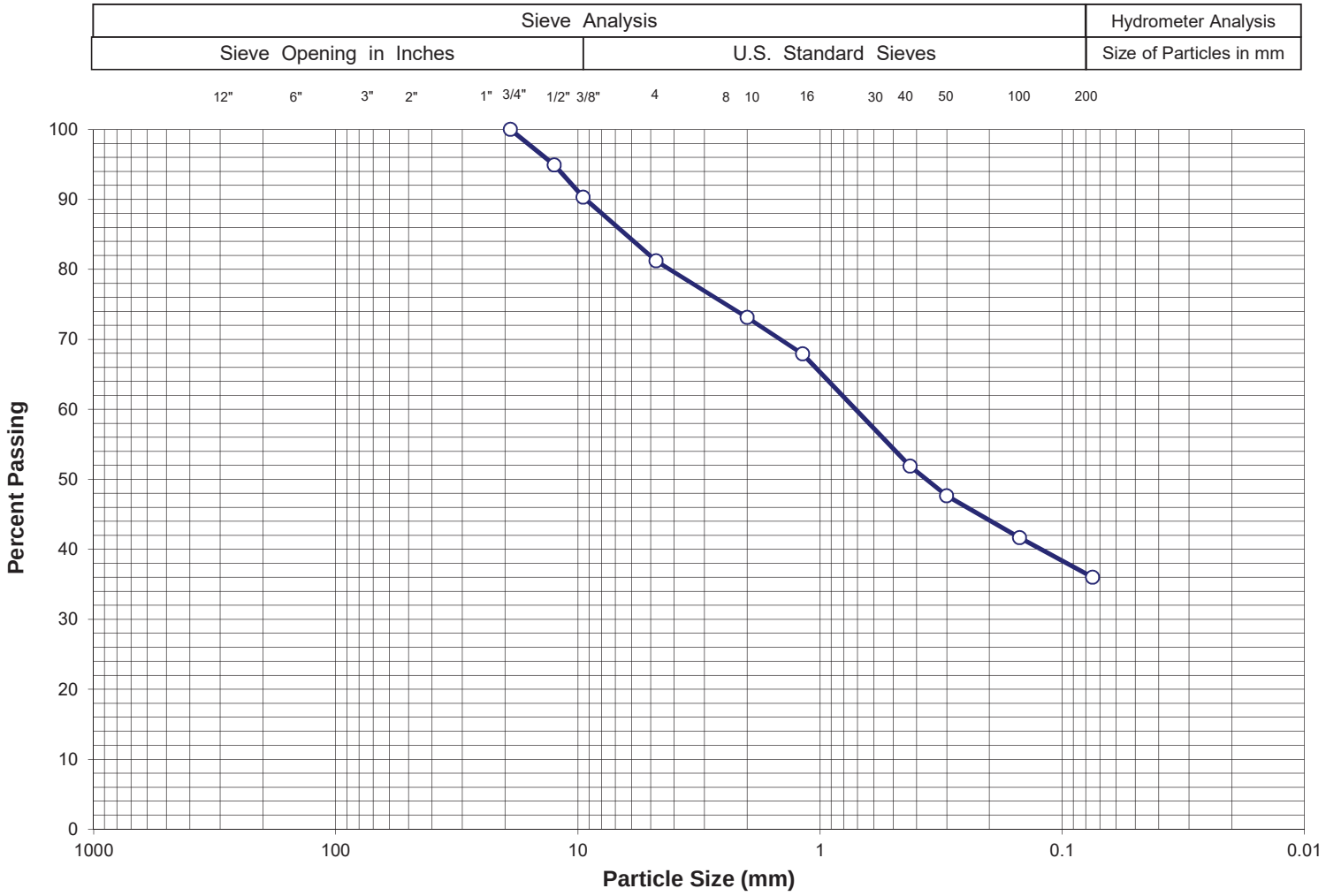
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	100
½"	95
⅜"	88
#4	73
#10	59
#40	33
#200	9.2

Gravel (%)	27	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	64	PL	NP	Boring:	E-06
Fines (%)	9	PI	NP	Sample Depth (ft):	29.5-34.5
Sample Classification:	Poorly graded SAND w/ silt and gravel		**USCS:** SP-SM	**AASHTO:** A-1-b (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	12/06/17		



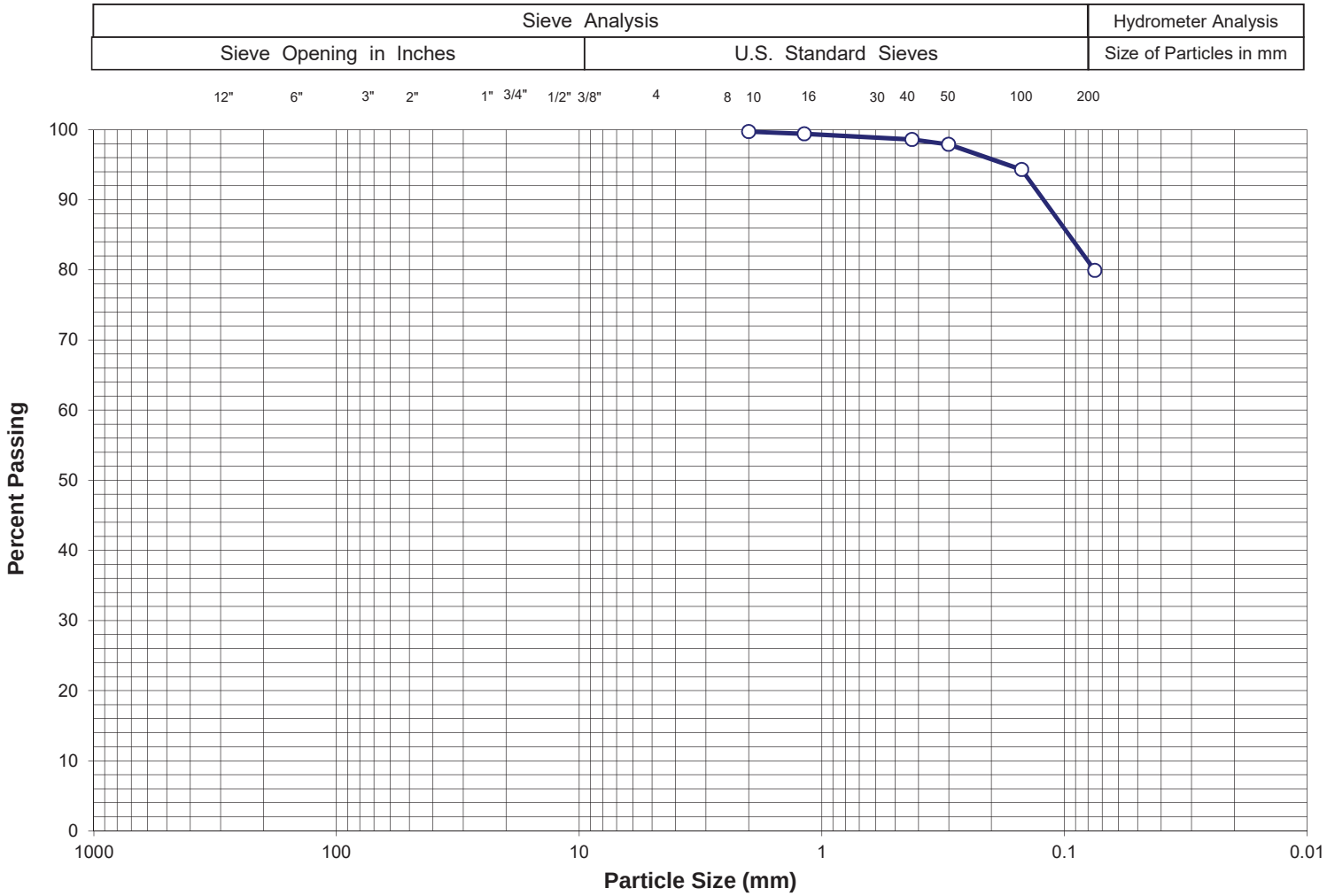
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	100
½"	95
⅜"	90
#4	81
#10	73
#40	52
#200	36.0

Gravel (%)	19	LL	35	Project Name:	US 550 S / US 160 Connector
Sand (%)	45	PL	15	Boring:	E-07
Fines (%)	36	PI	20	Sample Depth (ft):	14.5-19.5
Sample Classification:	clayey SAND w / gravel		**USCS:** SC	**AASHTO:** A-6 (2)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	KM	Figure No.:	-
Date:	02/27/18		



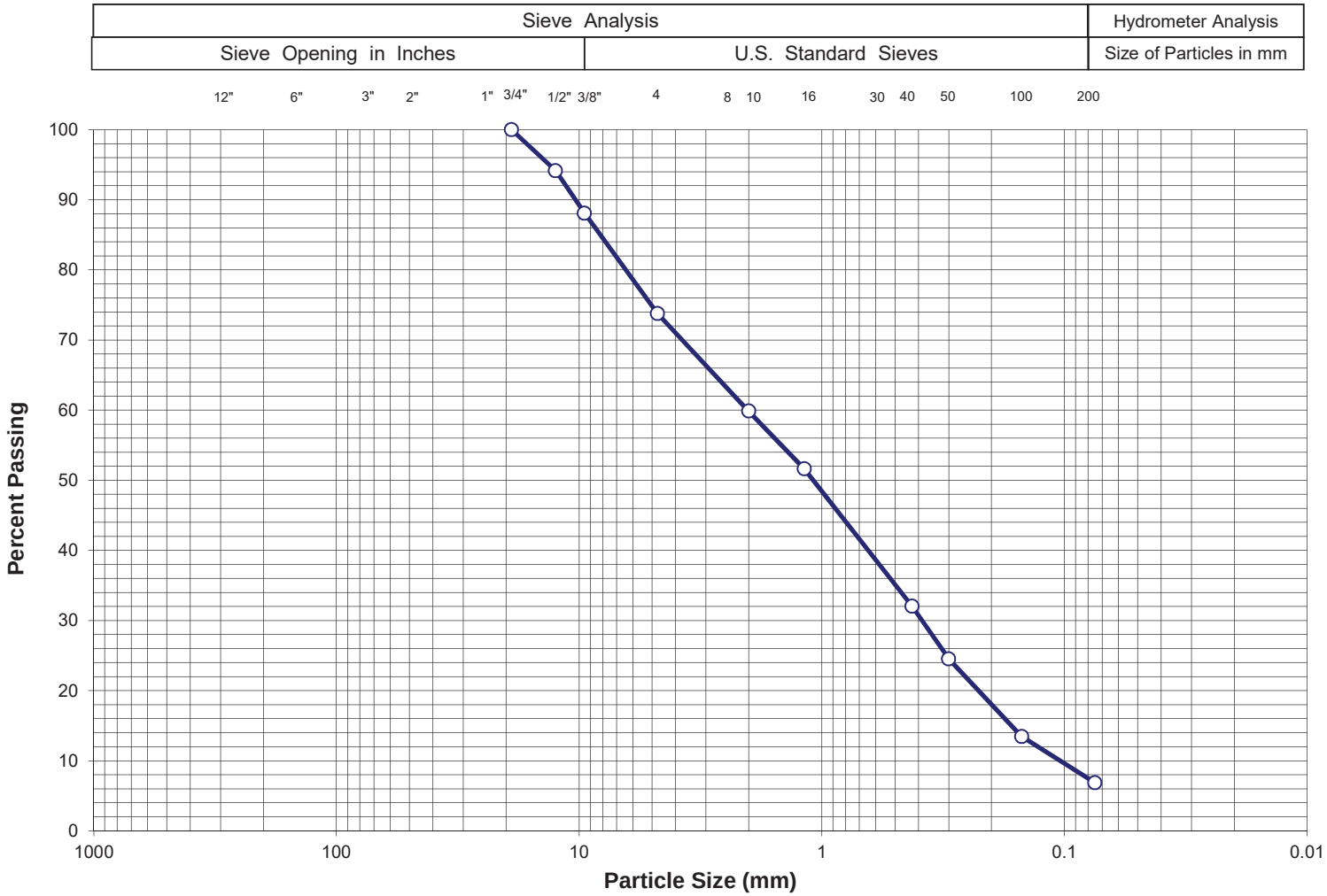
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	-
¾ "	-
½"	-
⅜"	-
#4	100
#10	100
#40	99
#200	79.9

Gravel (%)	0	LL	52	Project Name:	US 550 S / US 160 Connector
Sand (%)	20	PL	17	Boring:	E-09
Fines (%)	80	PI	35	Sample Depth (ft):	0-4.5
Sample Classification:	high plasticity sandy CLAY		**USCS:** CH	**AASHTO:** A-7-6 (28)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	AH	Figure No.:	-
Date:	12/04/17		



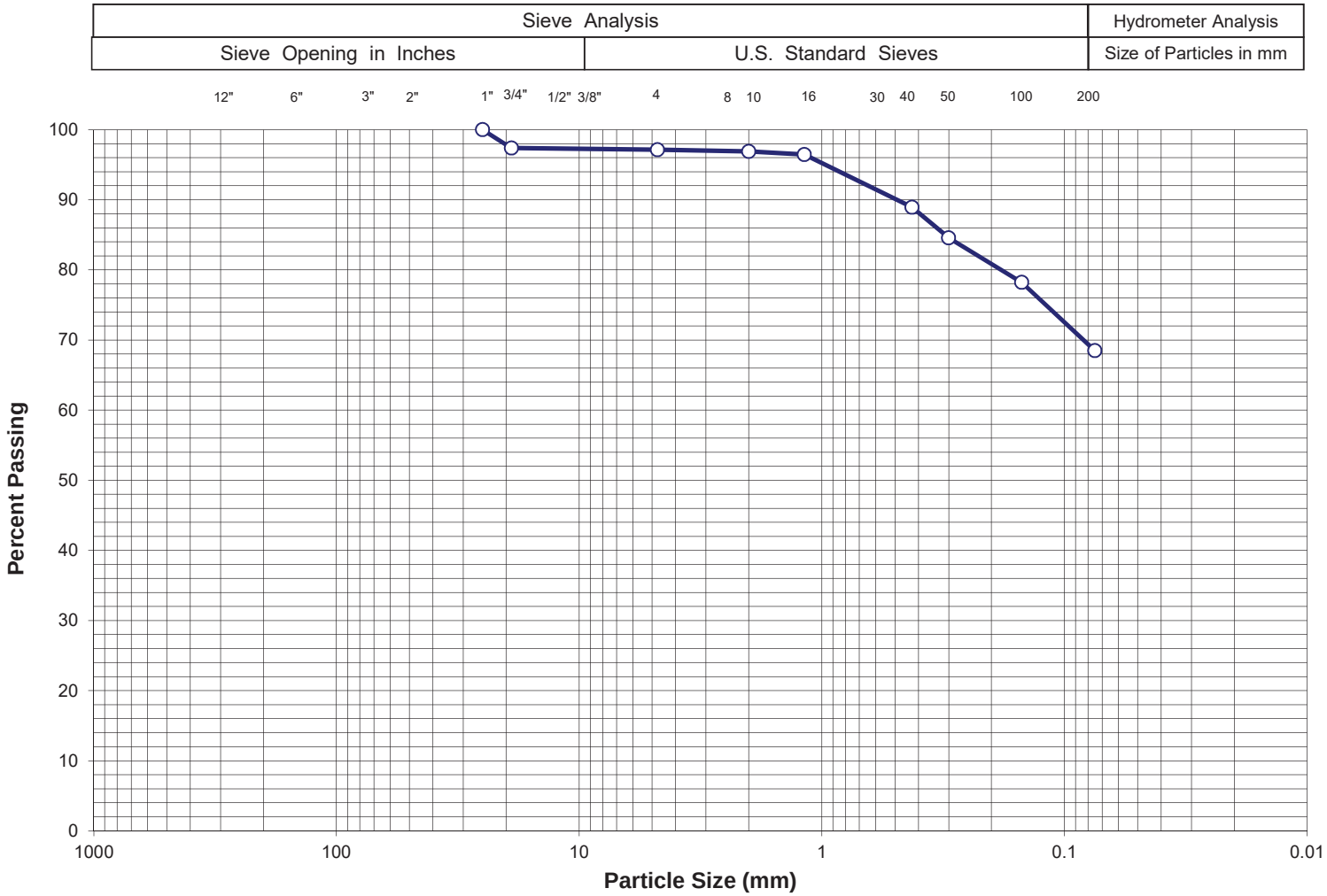
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	100
½"	94
⅜"	88
#4	74
#10	60
#40	32
#200	6.9

Gravel (%)	26	LL	NV	Project Name:	US 550 S / US 160 Connector
Sand (%)	67	PL	NP	Boring:	E-09
Fines (%)	7	PI	NP	Sample Depth (ft):	39.5-44.5
Sample Classification:	poorly graded SAND w/ silt and gravel		**USCS:** SP-SM	**AASHTO:** A-1-b (0)	

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB	Figure No.:	-
Date:	12/05/17		



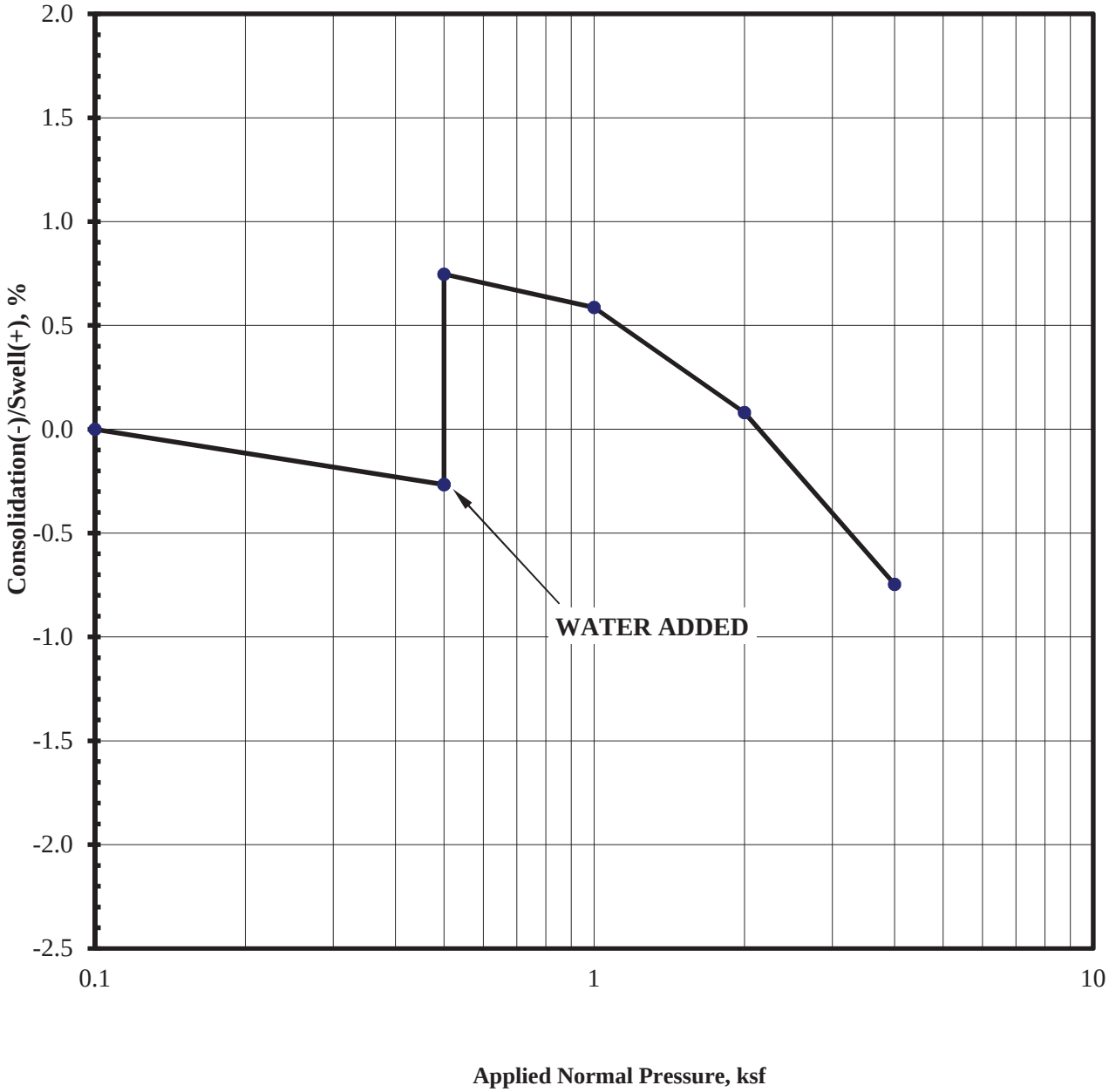
Sieve Size	% Passing
3"	-
2 ½"	-
2"	-
1 ½"	-
1"	100
¾ "	97
½"	-
⅜"	-
#4	97
#10	97
#40	89
#200	68.5

Gravel (%)	3	LL	30	Project Name:	US 550 S / US 160 Connector
Sand (%)	29	PL	13	Boring:	E-10
Fines (%)	68	PI	17	Sample Depth (ft):	29.5
Sample Classification:	sandy CLAY		USCS: CL	AASHTO:	A-6 (9)

Yeh & Associates, Inc.
Geotechnical Engineering Consultants

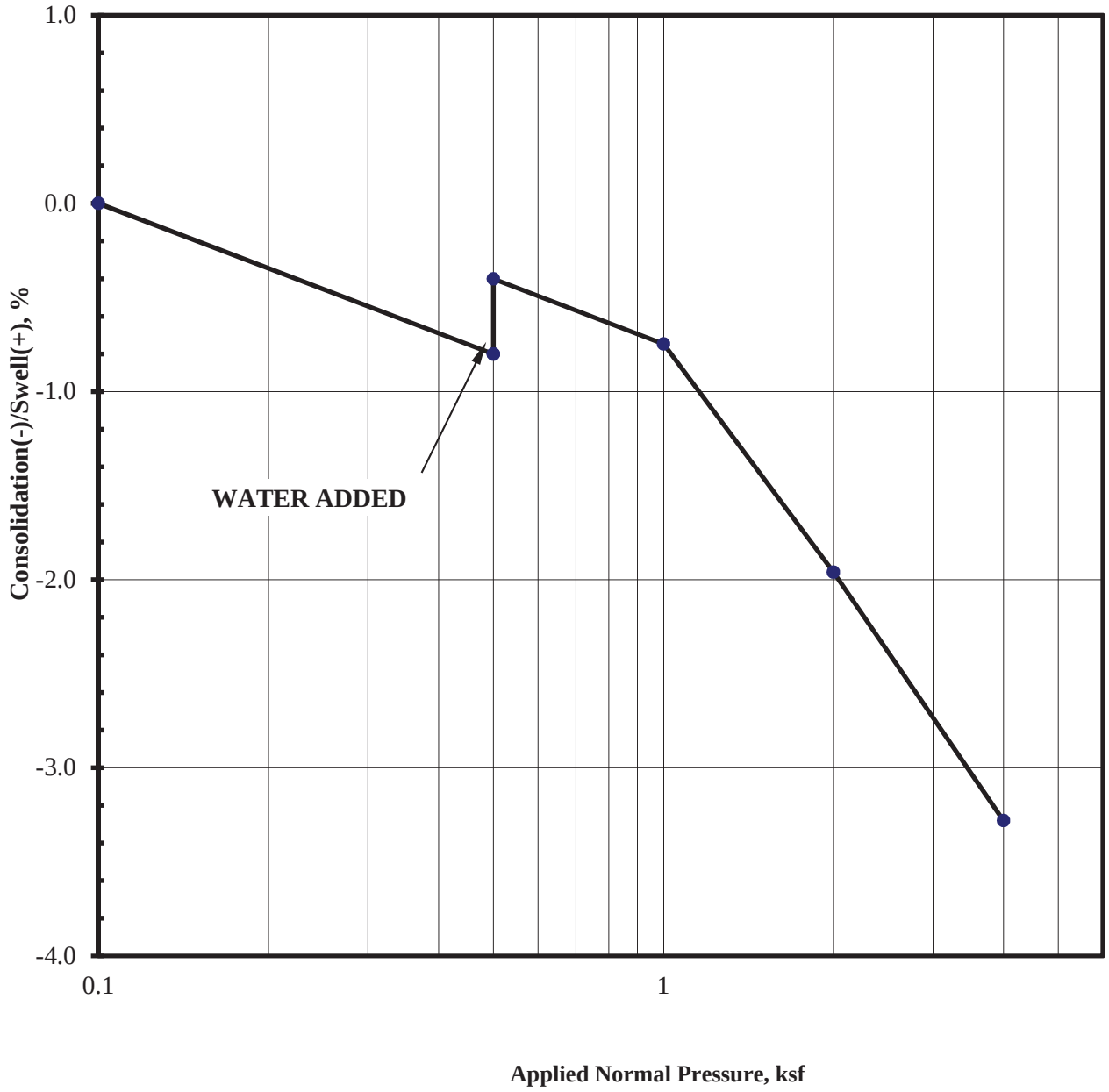
SIEVE ANALYSIS

Drawn By:	KM	Project No.:	217-376
Checked By:	BB		
Date:	12/06/17	Figure No.:	-



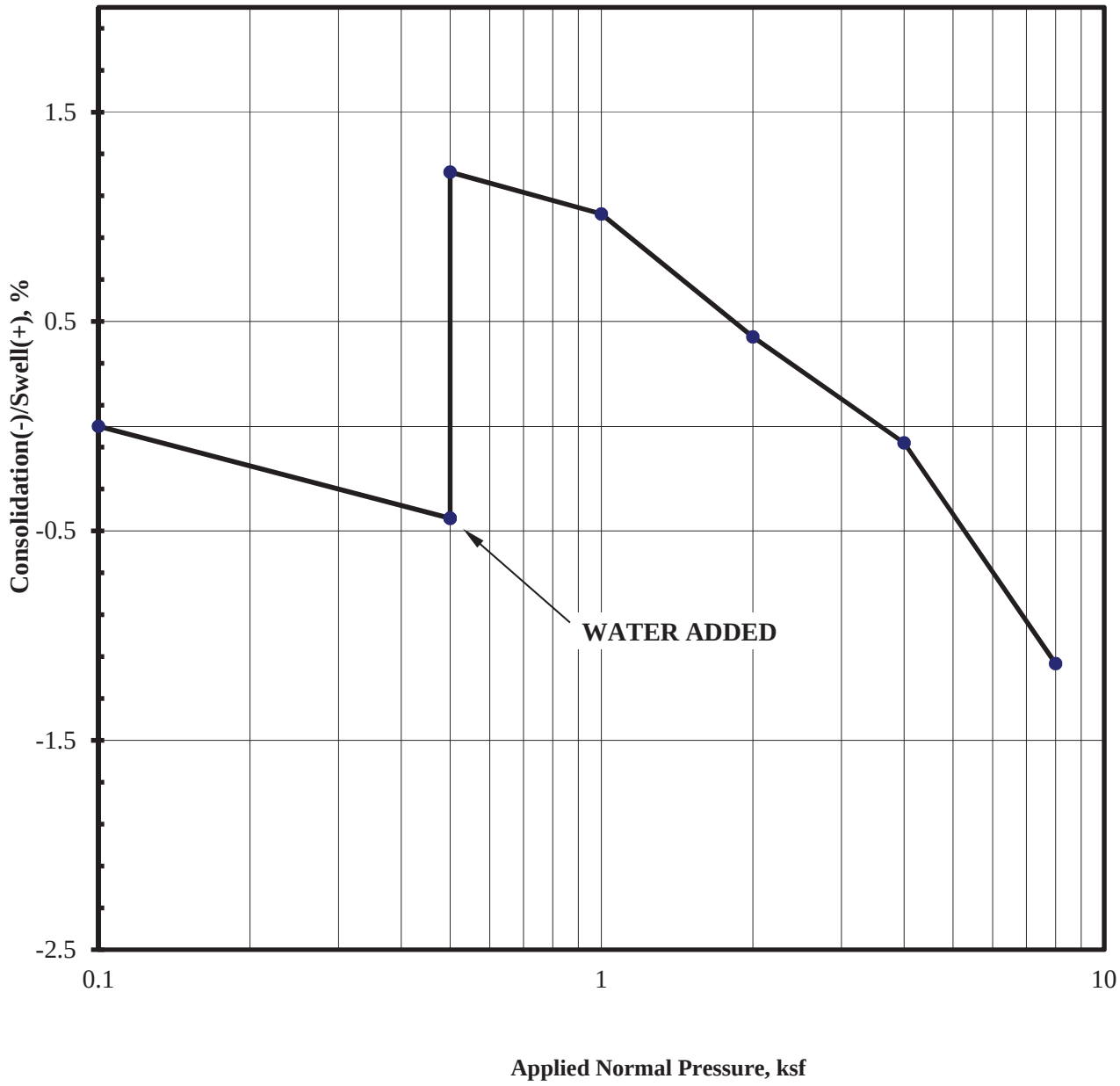
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-01	4	107.8	15.3	1.0	Lean CLAY, brown	Drawn By: KM
Job No: 217-376	**Project Name:** US 550 S/ 160 Connector					Checked By: BB

YEH & ASSOCIATES, INC



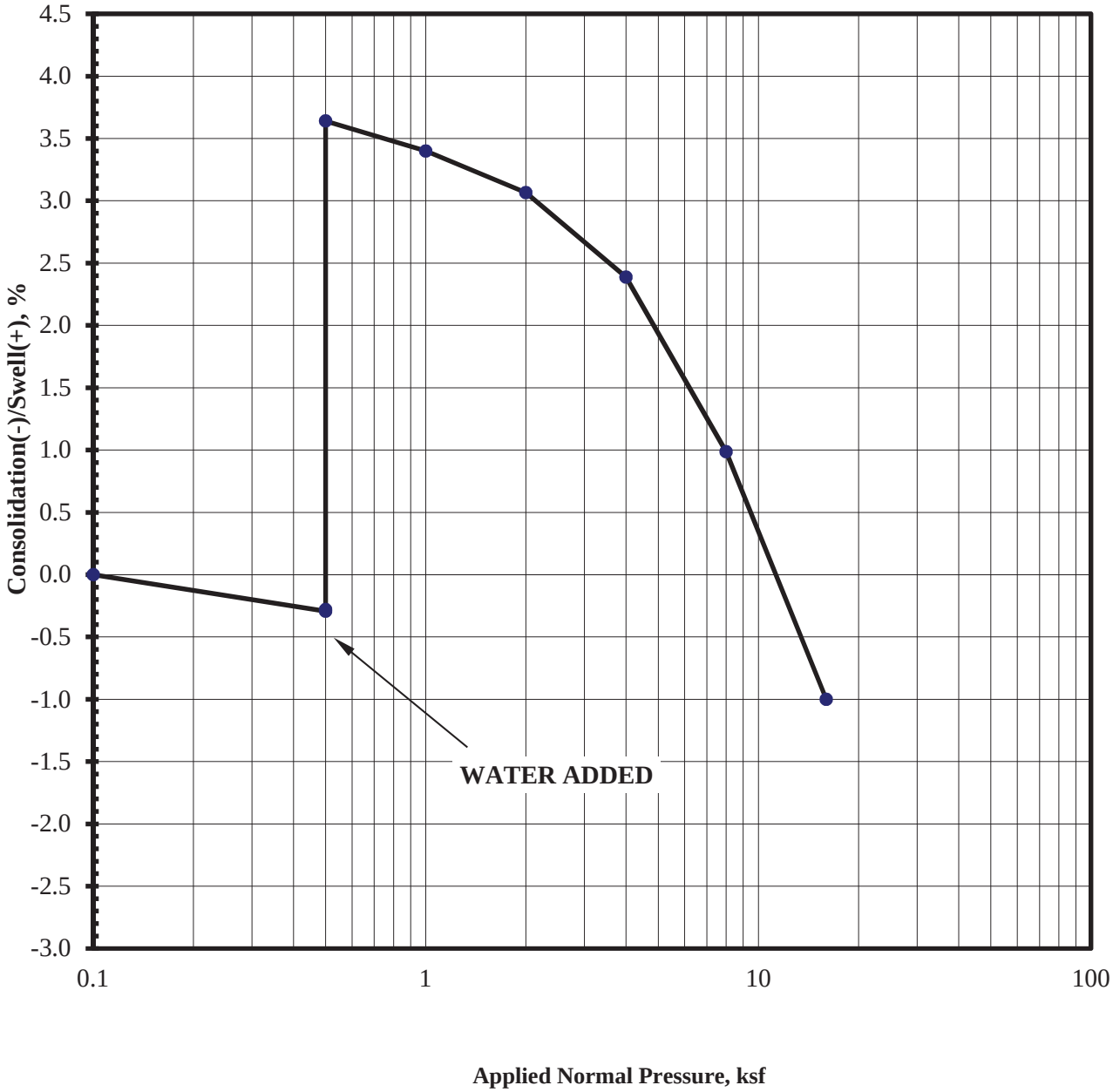
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-03	4	107.5	18.1	0.4	Lean CLAY, brown	Drawn By: KM
Job No: 217-376	**Project Name:**			US 550 S/ 160 Connector		Checked By: BB

YEH & ASSOCIATES, INC



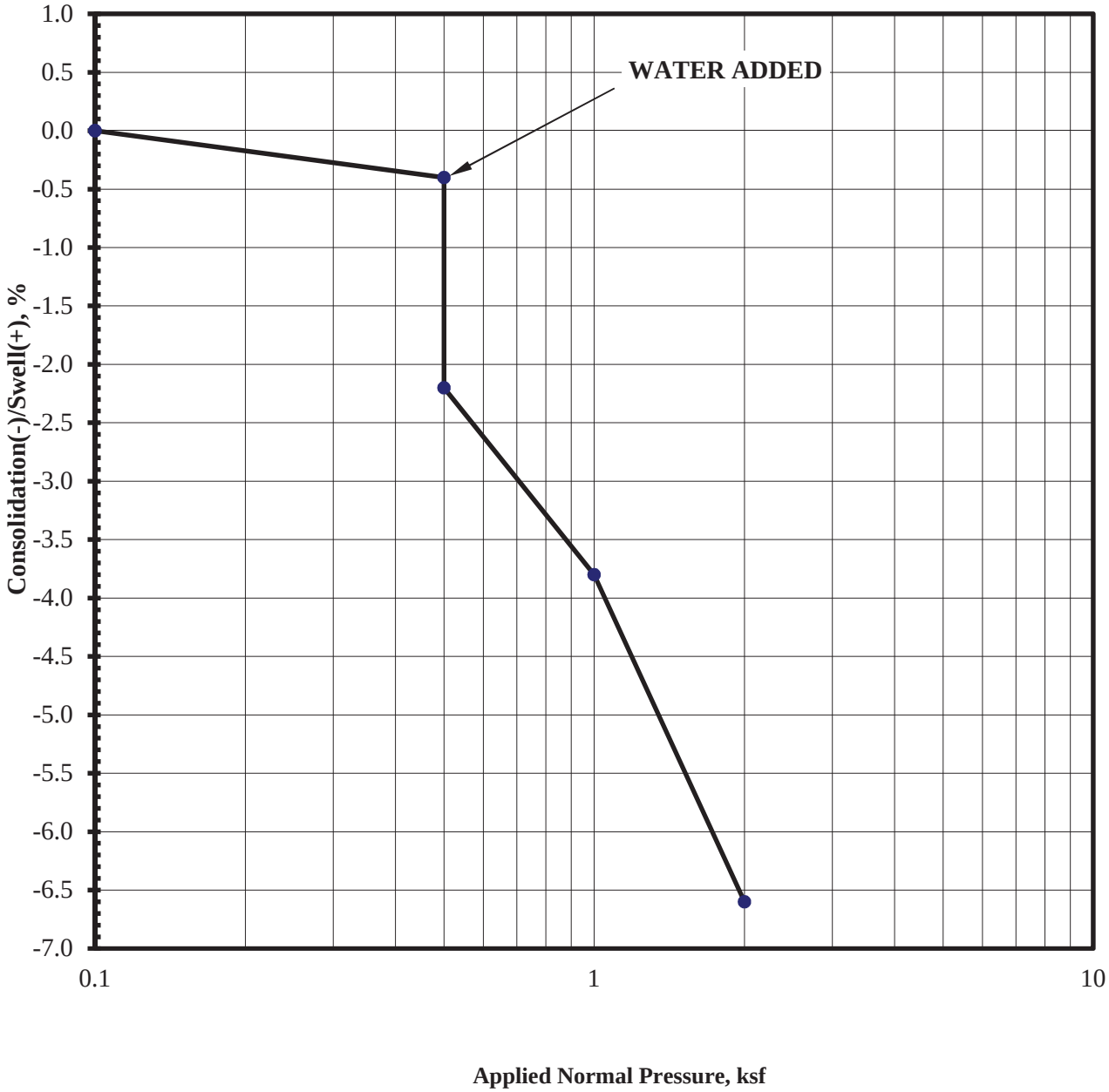
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-04	14	115.6	11.9	1.6	Clay, with some sand	Drawn By: KM
Job No: 217-376	**Project Name:**		US 550 S/ 160 Connector			Checked By: BB

YEH & ASSOCIATES, INC



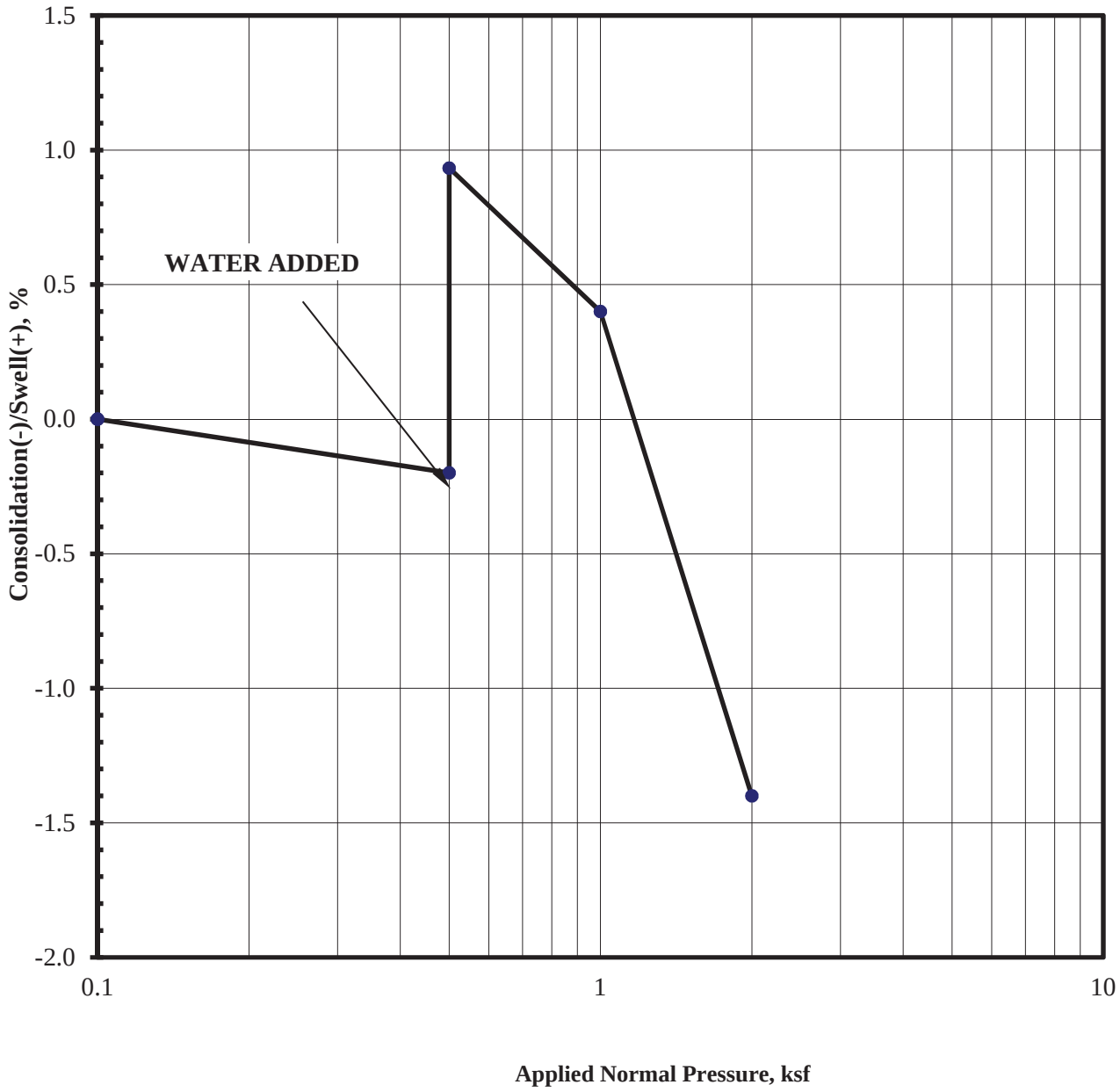
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-06	9	117.9	13.5	3.9	Lean CLAY w/ sand, red, brown	Drawn By: KM
Job No: 217-376	**Project Name:**		US 550 S/ 160 Connector			Checked By: BB

YEH & ASSOCIATES, INC



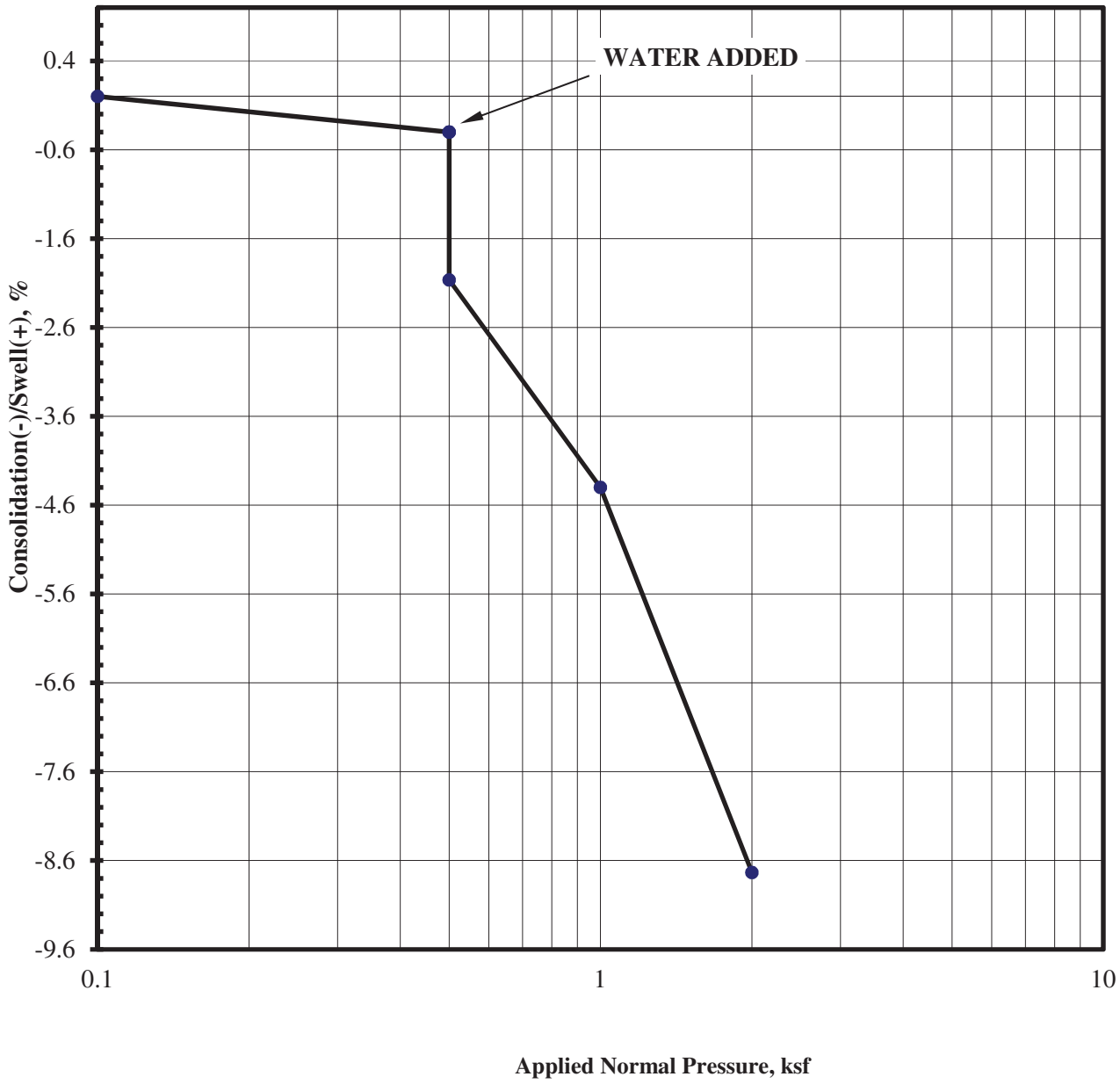
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-07	10	97.8	8.9	-1.8	Clayey SAND	Drawn By: KM
Job No: 217-376	**Project Name:**		US 550 S/ 160 Connector			Checked By: TA

YEH & ASSOCIATES, INC



Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
R-08	15	107.0	9.8	1.1	Sandy CLAY, calcareous	Drawn By: KM
Job No: 217-376	**Project Name:** US 550 S/ 160 Connector					Checked By: TA

YEH & ASSOCIATES, INC



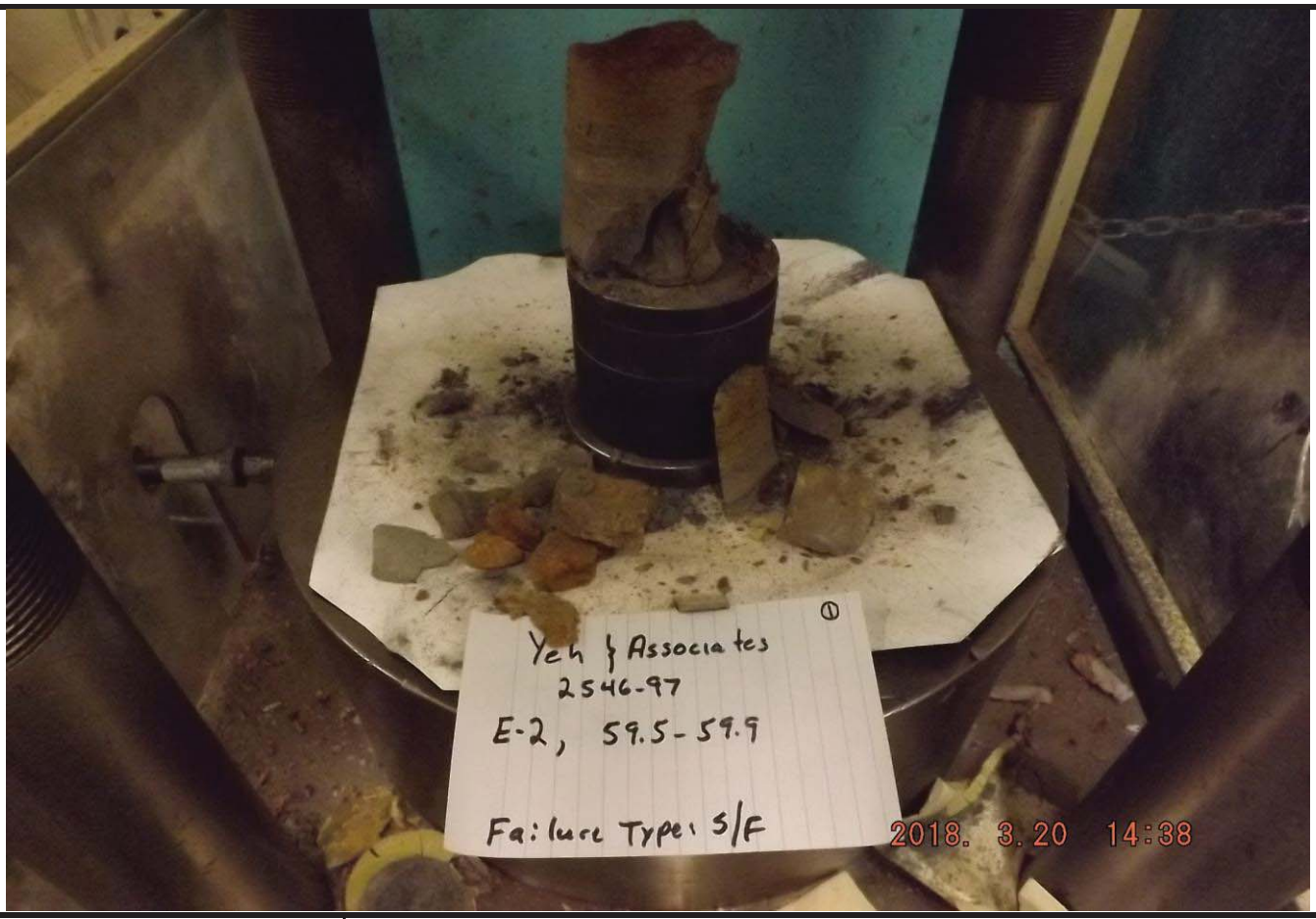
Boring Number	Depth, ft	Natural Dry Density, pcf	Moisture Content, %	Consolidation(-) /Swell(+), %	Soil Description	SWELL / CONSOLIDATION GRAPH
E-10	9.5	88.3	13	-1.7	n/a	Drawn By: KM
Job No: 217-376	**Project Name:**		US 550 S/ 160 Connector			Checked By: KM

YEH & ASSOCIATES, INC

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	59.5-59-9
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	



NOTES

File name: 2546_97_Image_18_03_21_08_09_47

Image Attachment

ADVANCED TERRA TESTING

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	70.9-71.4
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_21_08_14_55

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	91.0-91.5
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_07_49_09

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	106.3-106.7
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

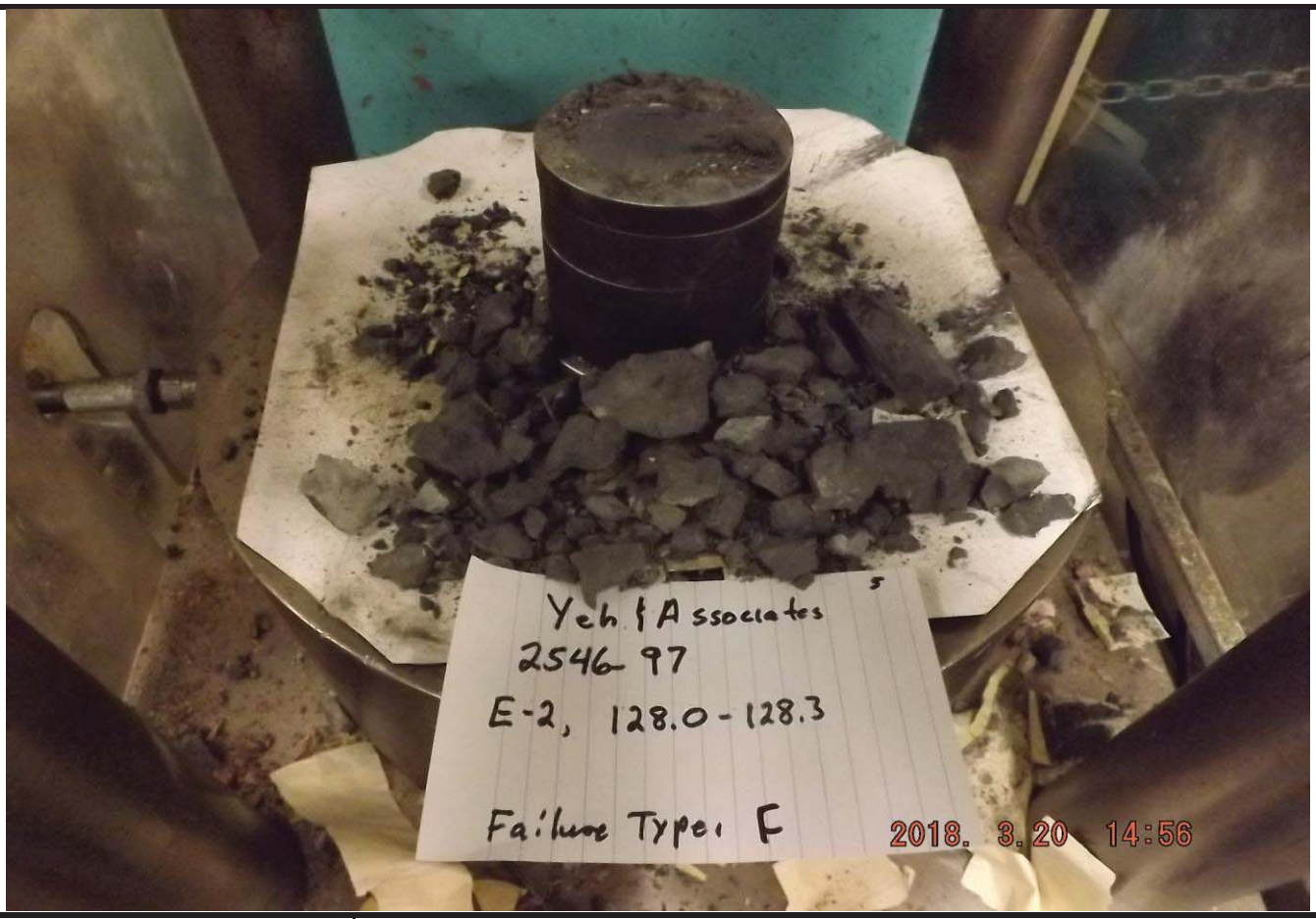
NOTES

File name: 2546_97_Image_18_03_21_08_11_54

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	128.0-128.3
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	



NOTES

File name: 2546_97_Image_18_03_21_08_11_02

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-2
JOB NO.	2546-97	DEPTH	143.0-143.7
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

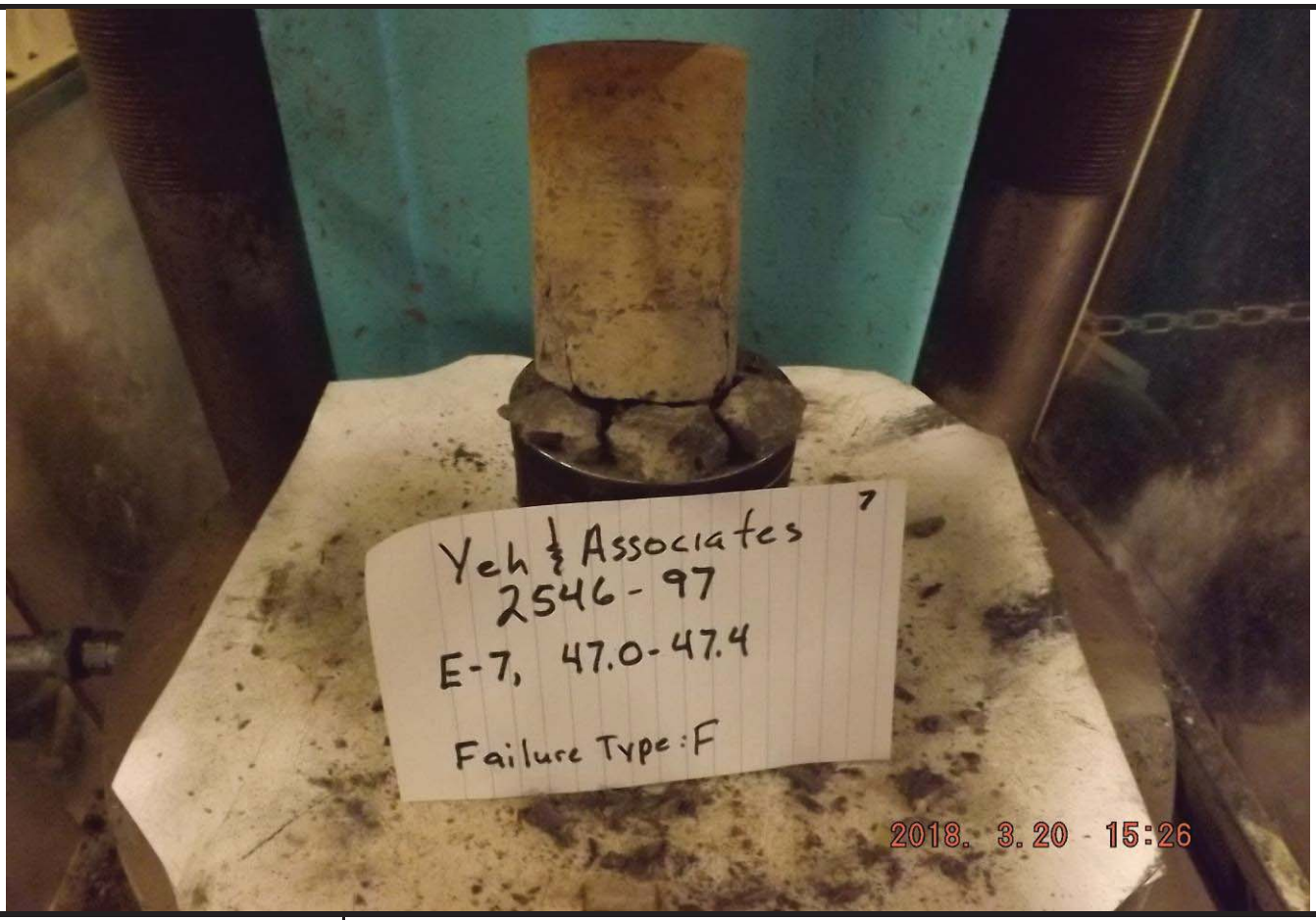
NOTES

File name: 2546_97_Image_18_03_23_07_50_17

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-7
JOB NO.	2546-97	DEPTH	47.0-47.4
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	



NOTES

File name: 2546_97_Image_18_03_21_08_13_22

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-7
JOB NO.	2546-97	DEPTH	84.5-85.0
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_07_53_48

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	E-7
JOB NO.	2546-97	DEPTH	98.7-99.2
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_07_56_37

Appendix E.2 – Bridges - Laboratory Test Results

YEH & ASSOCIATES, INC

Summary of Laboratory Test Results

Project No: 217-376 Project Name: 22420: US 550 S Connection to US 160 Bridge Laboratory Test Results Date: 7/10/2018

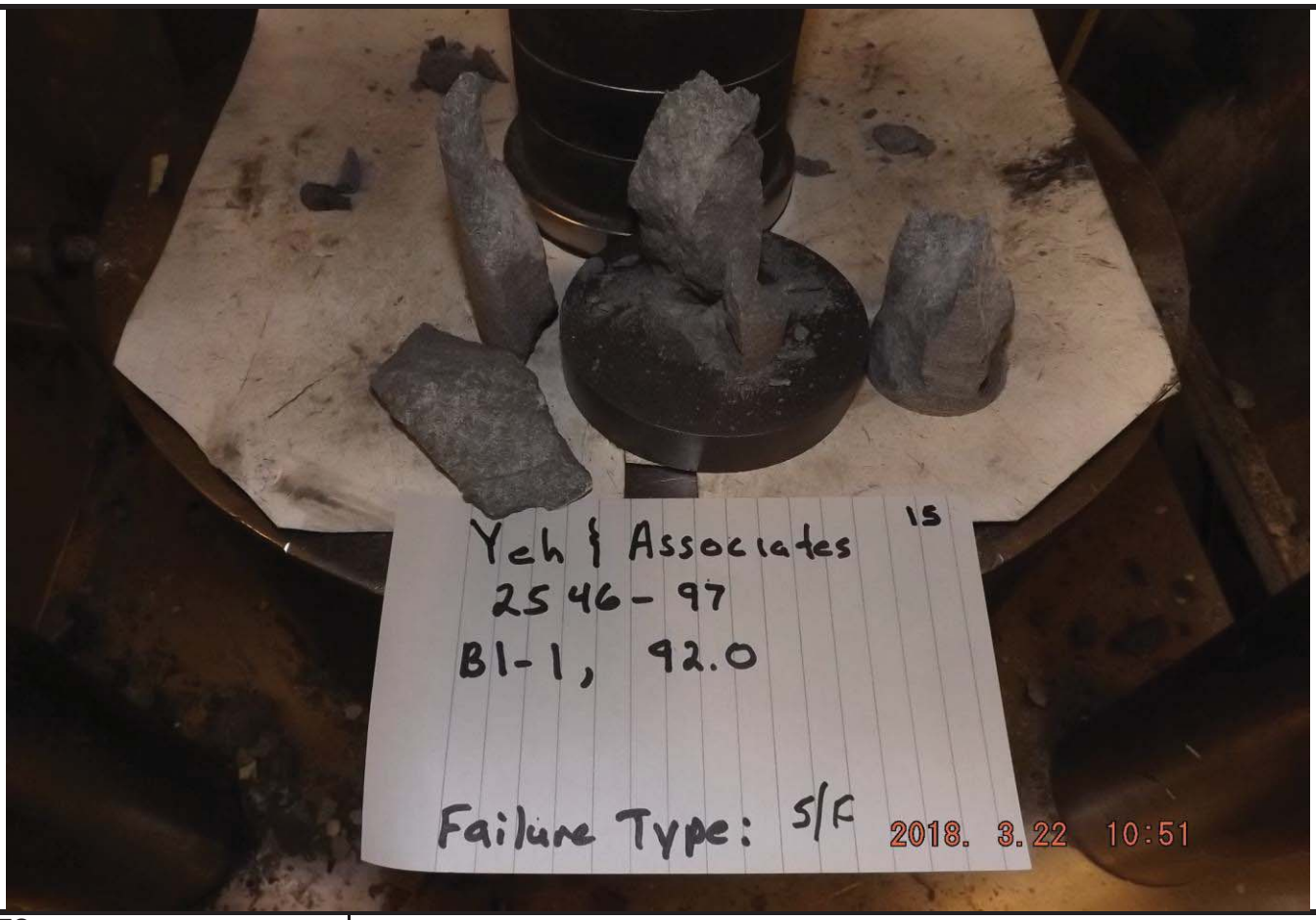
Sample Location			Natural Moisture Content (%)	Natural Dry Density (pcf)	AASHTO T99		Gradation			Atterberg			pH	Water Soluble Sulfate (%)	Chloride (%)	% Swell (+) / Consoli-dation (-)	Resistivity (Ohm-cm)	Uncon-Comp strength (rock-psi)	Uncon-Comp strength (soil-psf)	CLASSIFICATION	
Boring	Sample Type	Depth (ft)			Max. Dry Density (pcf)	Optimum Moisture (%)	Gravel > #4 (%)	Sand (%)	Fines < #200 (%)	LL	PL	PI								AASHTO	USCS
B1-01	CORE	92	4.7	153.2														9964			
B1-08	CORE	27	8.0	141.0														2843			
B1-08	CORE	56	6.5	143.3														5496			
B1-09	CORE	18	8.5	140.9														1180			
B1-10	CORE	11	5.9	145.7														3907			
B1-12	CORE	21	8.5	137.9														1072			
B1-12	CORE	40	7.8	137.5														1405			
B2-01	CORE	25.5-26.0		149.4														2230			
B2-01	CORE	51.5-52.3		151.3														2750			
B2-04	CORE	14.6-15.0		148.3														5400			

bulk - indicates drill cuttings sample
MC - indicates Modifies California sample
CORE - indicates rock core sample
SS - indicates Split Spoon sample
NV - indicates no value
NP - indicates no plasticity

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-1
JOB NO.	2546-97	DEPTH	92
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	



NOTES

File name: 2546_97_Image_18_03_23_08_04_48

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-8
JOB NO.	2546-97	DEPTH	27
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_08_03_25

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-8
JOB NO.	2546-97	DEPTH	56
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_08_04_08

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-9
JOB NO.	2546-97	DEPTH	18
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_08_05_45

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-10
JOB NO.	2546-97	DEPTH	11
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_08_07_14

ADVANCED TERRA TESTING

Image Attachment

CLIENT	Yeh & Associates	BORING NO.	B1-12
JOB NO.	2546-97	DEPTH	21
PROJECT	ES US 550 S. / 160 Contractor	SAMPLE NO.	
PROJECT NO.	217-376	DATE SAMPLED	
LOCATION	--	DESCRIPTION	

NOTES

File name: 2546_97_Image_18_03_23_08_08_10