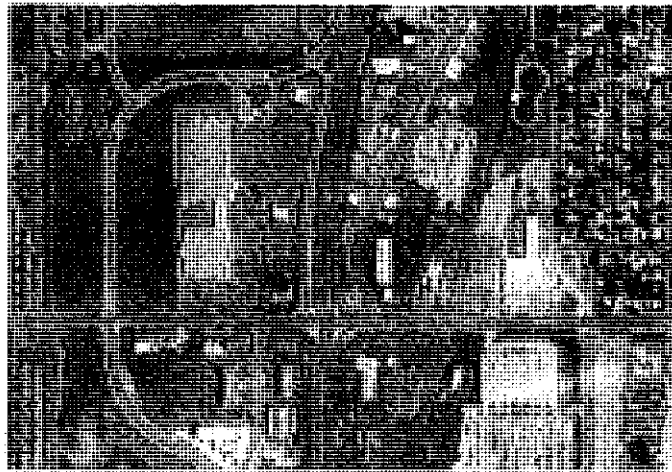


DRAFT
Phase II Environmental Site Assessment
US85 / Bromley Lane Intersection
and Safety Improvement Project
Brighton, Colorado
CDOT Project No.: NH 0853-068
Sub-Account: 16168



YA Project No: 210-213
April 29, 2011

Prepared for:

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1 INTRODUCTION

This report presents the results of the Phase II Environmental Site Assessment (ESA) performed by Yeh and Associates, Inc, for the proposed US85 / Bromley Lane Intersection and Safety Improvement project located within the City of Brighton, Colorado. The Colorado Department of Transportation (CDOT) is proposing improvements to the intersection of US Highway 85, Bromley Lane and realignment of Main Street with the City of Brighton participation. The project study area is shown on Figure 1, Project Location Map.



Figure 1, Project Location Map

We understand that the proposed US 85 / Bromley Lane improvements will be constructed within the existing right-of-way (ROW). The proposed realignment of Main Street will cross the property that was formerly occupied by the Ralph Schomp Chevrolet – Oldsmobile car dealership (Target Property), requiring the acquisition of a portion of the Target Property.

1.1 Summary of Phase I ESA

The Phase I ESA performed for this project identified that a historical landfill was present east of the car dealership building located on the Target Property and the proposed Main Street realignment will pass over the top of the historical landfill. Records obtained from Tri-County Health Department (Tri-County) indicated that: 1) a “dumping operation” was observed at the Target Property (referred to as Ling Ford), 2) the landfill was opened in January 1971 and closed in 1973 (estimated), 3) the City of Brighton granted a “Clean Fill Permit” in a letter dated May 18, 1972, that excluded trash, trees, limbs and vegetation, and 4) the City’s letter also required that car bodies that were in the fill be flattened. Colorado Department of Public Health and Environment (CDPHE) and Tri-County did not have any records that documented the landfill activities. It appears that the landfill activities consisted of placement of material in the depression that was observed on a USGS historical topographic map (1957). There is also evidence based on the historical USGS topographic maps that landfill (dumping) activities may have occurred prior to those reported in 1971 since the depression observed on the 1957 topographic map was not obvious in the 1965 USGS historical topographic map.

The Tri-County Health Department performed a Methane Survey on February 14, 1978 within the Hottman Chevrolet building (existing car dealership building on the target Property) based on a request from the Brighton Fire Marshall. They indicated that the observed methane concentrations (150 and 200 ppm) at a hole dug in the floor slab were below the 20 percent LEL (10,000 ppm). We believe that Tri-County intended to write 5 percent LEL, as 150 and 200 ppm are below methane’s 5 percent LEL, indicating that the methane environment is too lean to combust. They stated that some of the detected gas was probably due to automobile exhaust and that relatively little may be attributable to methane gas from the landfill. They suggested that the Fire Marshall or Tri-County Health Department be contacted if any holes or ditches (excavations) are planned in the area.

The Target Site is also identified twice in the EDR Report as Ralph Schomp Chevrolet – Oldsmobile (Ralph Schomp) and Al Smith Chevrolet – Oldsmobile (Al Smith). The Al Smith dealership predated Ralph Schomp and is identified as having 3 underground storage tanks (UST) that were installed in April 1974. A leak from one of the USTs (Leaking

Underground Storage Tank, LUST) was reported in January 1993 and the LUST was reported to be closed in September 1994. The USTs were identified as closed; however, the date was not included in the EDR database. The Phase I ESA provides the opinion that the closed USTs, closed LUST and RCRA SQG activities at the facility will not impact the proposed Main Street realignment; however, there may be some residual petroleum contamination from the LUST, which should be below regulatory clean-up levels.

1.2 Purpose and Scope of Work

The purpose of the Phase II ESA was to identify potential environmental concerns associated with the historic landfill that may impact the proposed construction activities.

The scope of work included the following:

- Drill five borings to delineate approximate horizontal and vertical limits of the potential landfill materials within the limits of the proposed Main Street realignment.
- Installation of 2-inch diameter monitoring wells in borings 2 borings to allow the collection of groundwater samples.
- Collect soil and groundwater samples for chemical analysis. Samples were field screened visually and with a photo-ionization meter (PID) for methane and volatile organic compounds (VOCs).
- Based on the results of our field investigation, four soil and two groundwater samples were submitted to Analytica Group for chemical analysis. Analysis included the following:
 - RCRA Metals (8) plus Iron
 - Semi-Volatile Organic Compounds (SVOCs)
 - Volatile Organic Compounds (VOCs)
 - Gasoline Range Organics (GRO)
 - Diesel Range Organics (DRO)
 - Oil Range Organics (ORO)

1.3 Project Location

The proposed Main Street realignment is located in Section 7, Township 1S, Range 66W (approximately Latitude 39.97° North, Longitude 104.83° West), Adams County, Colorado. The Phase II study area is limited to the area of the historical land fill located east of the existing car dealership building on the Target Property. The location of the Target Property is shown on Figure 1, Project Location Map.

2 SUBSURFACE INVESTIGATION

2.1 Field Investigation

Five borings (Borings YA-13, YA-14, YA-15, YA-16 and YA-19) were drilled to evaluate the historic landfill along the proposed Main Street realignment. The boring locations are shown on Sheet A1, Engineering Geology presented in Appendix A.

The borings were completed on March 24th and 25th, 2011 by Precision Sampling, a Yeh Subcontractor, utilizing a CME 75 drill rig. The borings were drilled using 8-inch outside diameter, hollow-stem augers. The subsurface conditions encountered in the boring were logged by representatives of Yeh and Associates. The boring logs are included in Appendix B.

Monitoring wells were installed in Borings YA-16 and YA-19 to allow for collection of groundwater samples. Well completion details are also included in Appendix B.

The recorded penetration resistance measurements were obtained by driving a modified California sampler or a Standard Split Spoon sampler, typically at 5-foot intervals, into the subsurface materials with an automatic hammer dropping a 140-pound ram 30 inches. The driving procedure is similar to ASTM D1586, "Standard Test Method for Standard Penetration Test (SPT) and Split Barrel Sampling of Soils". The penetration resistance value (blow count (N-value)) is a useful index to the consistency and relative density or hardness of the materials encountered.

The soils samples were screened in the field for hydrocarbon range VOCs using a MiniRAE PID calibrated with isobutylene. Ambient air and down-hole landfill gases were monitored using a Landtec Gem 500 gas meter with tygon tubing. Stabilized methane readings were recorded on the Boring Logs, included in Appendix B.

Groundwater observations are shown on the boring log. Year-round groundwater conditions were not established as part of the field investigations. Groundwater conditions in the study area may vary significantly throughout the year during different seasons, following precipitation events, after construction and site grading, and due to changes in surface and subsurface drainage characteristics of the surrounding area.

2.2 Subsurface Conditions

Borings YA-13 through YA-16 were located on the paved parking lot (approximately 4 inches of asphalt). Boring YA-19 was located in a grass covered, low area that appeared to be part of the Target Property storm water detention system. The asphalt pavement and grass area were underlain by landfill debris. The landfill debris extended from 13 to 20 feet below existing grades, and was underlain by silty and gravelly sand. Bedrock was not encountered during this investigation. In YA-16, silty and clayey sand fill was encountered to a depth of 14 feet below existing grade. Landfill materials were not observed in this boring.

The drill cuttings were visually examined during the field investigation. Evidence of asbestos was not observed in the cuttings.

Soil samples were field screened using a MiniRAE PID to detect the presence of hydrocarbon range VOCs. The field readings ranged from background to 7.9 ppm in the samples. Background readings ranged from 0.4 to 0.7 ppm.

Landfill gases (methane, carbon dioxide and oxygen) were measured down-hole in borings YA-13 through YA-16 and YA-19. The methane concentrations ranged from 0.1 (YA-16) to 20.5 (YA-14) percent of the total gas observed. Methane concentrations are explosive when concentrations are between 5 and 15 percent.

During drilling, groundwater was encountered at depths of 20 to 23 feet below existing grade. Groundwater levels observed in the monitoring wells at YA-16 and YA-19 were 20 to 22 feet below existing grade.

3 LABORATORY TEST RESULTS

3.1 Soils

Four samples of the near-surface, fill material were submitted to Analytica Group for chemical analyses. The samples were analyzed for volatile organic compounds (EPA Method 8260B), semi volatile organic compounds (EPA Method 8270), and RCRA metals by EPA Method 6010B and 7471A. Complete laboratory testing results are presented in Appendix C.

Volatile organic compounds were not detected in the soil samples. Some semi-volatile organic compounds (SVOCs) were detected in the soil samples as summarized in Table 1. The SVOC concentrations in the soil samples were below the Colorado Soil Evaluation

Values (CSEV) for workers engaged in light to moderate activities, except for Benzo(a)pyrene in Sample YA-14.

Table 1, Semi-Volatile Organic Compounds Detected in Soils

Analyte (ug/Kg)	Boeing No.				CSEV Level
	YA-13	YA-14	YA-15	YA-16	
2-Methylnaphthalene	66 J	ND	ND	ND	1,000,000
Benzo(a)anthracene	260 J	640	ND	35 J	3,900
Benzo(a)pyrene	120 J	740	ND	29 J	390
Benzo(b)fluoranthene	ND	990	ND	39 J	3,900
Benzo(g,h,i)fluoranthene	ND	1100	ND	ND	
Benzo(k)fluoranthene	ND	470	ND	ND	39,000
Bis(2-ethylhexyl)phthalate	750	1600	35 JB	42 JB	120,000
Butylbenzylphthalate	98 J	ND	ND	19 J	1,000,000
Chrysene	280 J	1200	ND	35 J	390,000
Fluoranthene	540	2200	35 J	68 J	1,000,000
Indeno(1,2,3-cd)pyrene	ND	770	ND	ND	3,900
Naphthalene	ND	93 J	ND	ND	1,000,000
Phenanthrene	360 J	1100	ND	34 J	
Pyrene	750	2800	52 J	98	1,000,000
2,4,6- Tribromphenol	3100	2600	3200	4300	
2-Fluorobiphenyl	2400	2500	2400	2000	
2-Fluorophenol	3500	3400	3300	2500	
D14-Terphenyl	3100	2800	3300	4000	
D5-Nitrobenzene	2200	2200	2100	1700	
D6-Phenol	3500	3400	3200	2700	

- Notes: 1) J indicates quantity above the Minimum Detection Level, but below the Practical Quantitation Level.
 2) B indicates that the analyte was detected in the Method Blank
 3) CSEV – Colorado Soil Evaluation Values

The concentrations of metals detected in the soil samples are presented in Table 1. The detected metals concentrations did not exceed CSEV levels for workers engaged in light to moderate activities.

Table 2, Summary of Metals Detected in Soils

Boring No.	Sample Depth (ft)	Analyte (mg/Kg)								
		Arsenic	Barium	Cadmium	Chromium	Iron	Lead	Selenium	Silver	Mercury
YA-13	0-10	ND	110	1.8	12	66,000	87	ND	ND	0.073
YA-14	0-5	ND	64	1.0	11	8,600	19	ND	ND	ND
YA-15	0-5	ND	83	ND	9.5	13,000	18	ND	ND	0.54
YA-16	0-5	ND	63	ND	9.3	7,400	35	ND	ND	0.072
CSEV	--	1.6	160,000	810	1,500,000	310,000	800	5100	5100	310

3.2 Groundwater

Groundwater samples from monitoring wells YA-16 and YA-19 were submitted to Analytica Group for chemical analyses. The samples were analyzed for volatile organic compounds (EPA Method 8260B), semi-volatile organic compounds (EPA Method 8270C), and RCRA metals by EPA Method 6010B and 7470A. Complete laboratory testing results are presented in Appendix C.

Volatile organic compounds were not detected in the groundwater samples. Some semi-volatile organic compounds (SVOCs) were detected as summarized in Table 3.

Table 3, Semi-Volatile Organic Compounds Detected in Groundwater

Analyte (ug/L)	Boring No.		CSEV Level
	YA-16	YA-19	
Bis(2-ethylhexyl)phthalate	0.84 J	ND	1,000,000
Benzoic Acid	ND	0.83 J	110,000
2,4,6- Tribromophenol	32	110	
2-Fluorobiphenyl	18	55	
2-Fluorophenol	29	73	
D14-Terphenyl	7.0	43	
D5-Nitrobenzene	22	63	
D6-Phenol	33	71	

The concentrations of metals detected in the groundwater samples are presented in Table 4. Groundwater samples YA-16 and YA-19 exceeded CSEV Water Standards for barium, cadmium, chromium, iron, and lead.

Table 4, Summary of Metals Detected in Groundwater

Boring No.	Analyte (mg/L)								
	Arsenic	Barium	Cadmium	Chromium	Iron	Lead	Selenium	Silver	Mercury
YA-16	ND	5.3	0.016	0.32	940	0.34	ND	ND	0.0012
YA-19	ND	0.20	ND	ND	10	ND	ND	ND	ND
CSEV	0.05	2	0.005	0.1	0.3	0.05	0.02	0.05	0.002

4 CONCLUSIONS AND RECOMMENDATIONS

This Phase II ESA was conducted general accordance with ASTM E-1903 to evaluate the potential impact that the historical landfill might have on the construction of the proposed Main Street realignment across the Target Property with anticipated minimal penetration of the landfill materials. It is our opinion that we have provided sufficient information to assist CDOT in making an informed business decision regarding the property, provided there is minimal penetration of the landfill materials. Test pits and additional exploration will be required to delineate the full extent of the landfill beyond the roadway alignment if complete removal of the landfill is required.

Our recommendations and conclusions related to the construction of the proposed Main Street realignment over the historic landfill include the following:

- Based on the USGS topographic map from 1957, we estimate the historic landfill to be approximately 600 feet by 100 feet. Our borings indicated the landfill materials extended to depths ranging from 13 to 20 feet below existing grade.
- The historic landfill was operated and closed prior to RCRA enactment; thus, the operation and composition of the landfill is not documented. From an engineering standpoint, the long term performance of the pavement will be impacted if the roadway is constructed over the landfill material. The risk associated with

construction of a roadway on a landfill cannot be eliminated unless the entire landfill is removed below the entire roadway prism; however, it is our opinion that if the roadway is constructed on a reinforced subbase consisting of 18 inches of Class 1 aggregate base with a layer of Tensar TX5 (or equivalent), future maintenance should be minimized.

- Disturbance to the historic landfill should be minimized during construction of the roadway. If CDPHE and Tri-County Health Department will allow, the landfill materials should be left undisturbed except as required to construct the roadway. It is possible that CDPHE and Tri-County Health Department may require the removal of the entire landfill. If this is the case, dewatering should not be required and embankment fill will have to be placed and compacted in accordance with CDOT Standard Specifications.
- The chemical analyses of soil and groundwater samples didn't detect volatile organic compounds and hydrocarbons. Relatively low concentrations of some semi-volatile organics were detected. In addition, barium, cadmium, iron and lead concentrations exceeded CSEV Water Standards.
- Based on the limited number of borings and the boring diameter, it is anticipated that the landfill material can be disposed as a solid waste; however, based on the age of the historic landfill, it is possible that materials containing asbestos may be encountered in the landfill material and hazardous materials may have been dumped in the landfill.
- It is recommended that CDOT meet with CDPHE and Tri-County Health Department to identify regulatory requirements related to penetration into the historical landfill.
- Because of the proximity to the landfill materials and the need to install storm sewers, a health and safety plan and materials management plan will be required to allow for worker safety and the proper handling and disposal of excavated landfill material. Because of the potential of encountering asbestos, we recommend that a certified asbestos inspector be at the site during all excavations and handling of landfill materials.

5 LIMITATIONS

This Phase II ESA has been conducted in general accordance with the ASTM E-1903. The purpose of the Phase II ESA is to provide sufficient information regarding the nature and extent of contamination to assist in making informed business decisions regarding the property. The findings and conclusions presented in this report are based upon a reasonable

level of investigation within normal bounds and standards of professional practice for a site in this particular geographic and geologic setting.

All observations and conclusions pertaining to environmental conditions at the subject property are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No other warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. Accordingly, the Client hereby waives any claim, liability or defense for injury or loss sustained by any party from such exposure allegedly arising out of or related to our findings, conclusions and recommendations.

This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties.

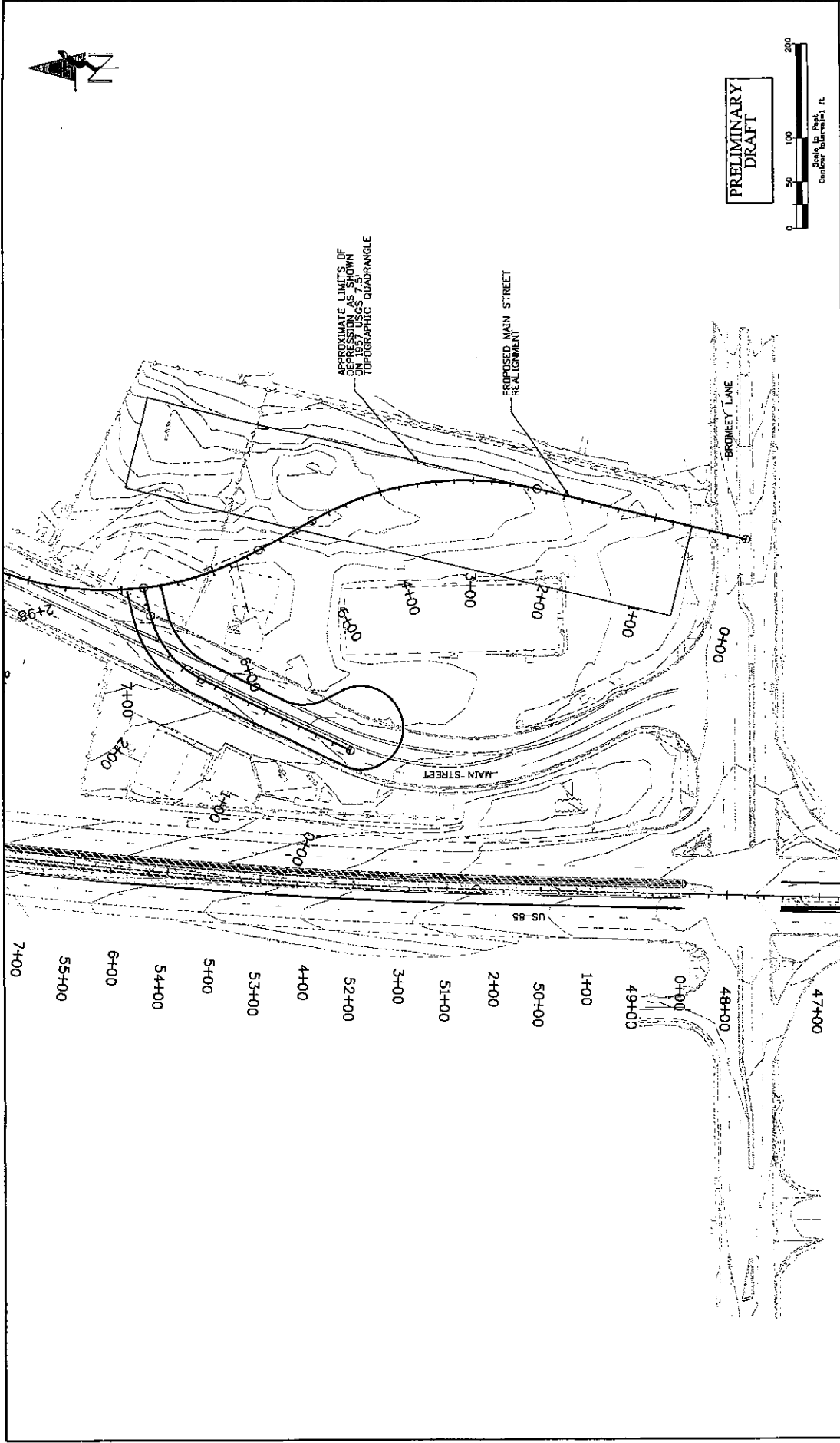
Yeh and Associates, Inc.

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Senior Project Manager

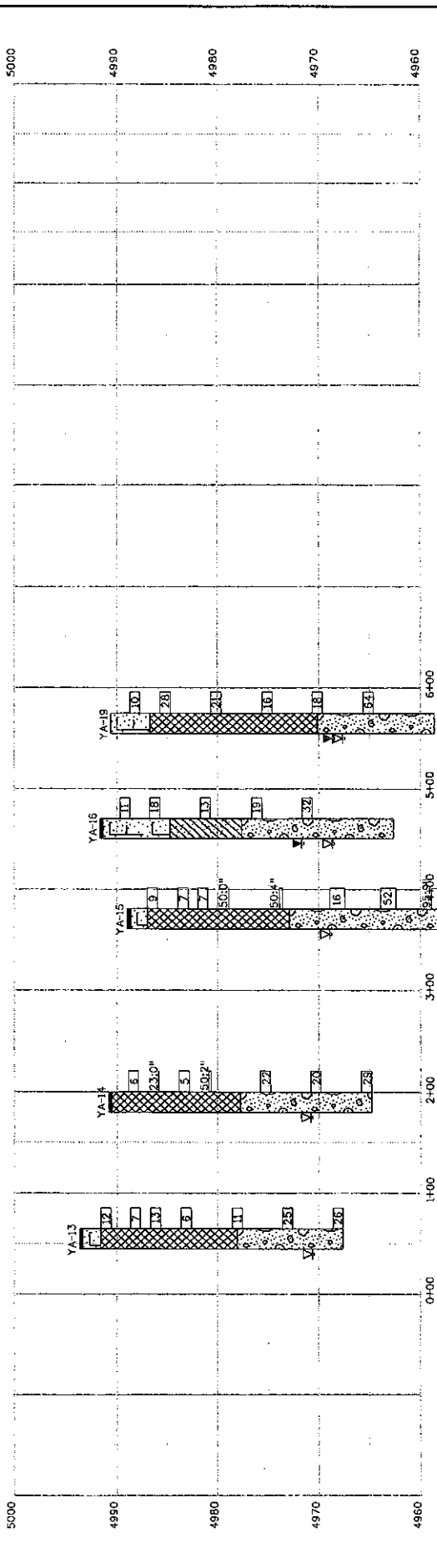
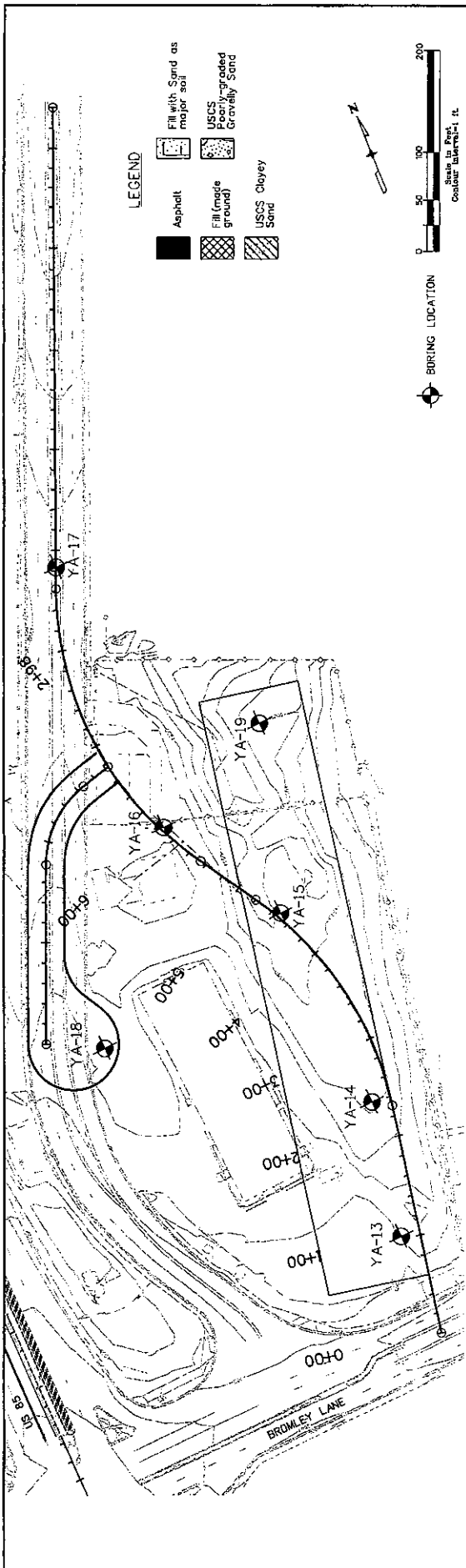


PRELIMINARY DRAFT



Print Date: 2/3/2011 File Name: 210-213 Plan Sheet.dgn Horiz. Scale: 1"=100' Unit Information: Yeh and Associates, Inc. Consulting Engineer & Scientists		Date: _____ Comments: _____ Init.: _____		Colorado Department of Transportation 2000 S. Holly Street Denver, CO 80272 Phone: 303-757-9350 FAX: 303-757-9004  Region 6		As Constructed: No Revisions: _____ Revised: _____ Void: _____		US 85/BROMLEY LN INTERSECTION TARGET PROPERTY PLAN SHEET		Project No./Code: NH 0653-088	
Unit Leader Initials: _____ Yeh and Associates, Inc. Consulting Engineer & Scientists		Designer: MLK Designer Number: 16168 Estimator: MLW Estimator Number: _____		Sheet No.: _____ Total Sheets: 1 of 1		Sheet Number: 16168 FIG 2		Sheet Subsets: _____ Total Subsets: _____		Sheet No.: _____ Total Sheets: _____	

Appendix A, Engineering Geology Sheet



Print Date: 4/29/2011	File Name: 210-213 EngGeo.dgn	Vert. Scale: As Noted	Unit Information: Unit Leader initials
Horiz. Scale: 1:100	Yeh and Associates, Inc.	Consulting Engineers & Scientists	
Colorado Department of Transportation		Region 6	
2000 S. Holly Street Denver, CO 80202 Phone: 303-757-5350 FAX: 303-757-9004		WAM	
As Constructed		No Revisions:	
Revised:		Void:	
US 85/BROMLEY LN INTERSECTION RELOCATED MAIN STREET ENGINEERING GEOLOGY		Project No./Code NH 0653-068	
Designer: MLK		Structure Numbers	
Detailer: M.J.W		16168	
Sheet Subst: 1 of 1		Sheet Number A-1	

Appendix B, Legend, Boring Logs and Well Completion Logs



Legend for Symbols Used on Borehole Logs

Sample Types



Auger Cuttings



Grab Sample



Modified California
Sampler 2-inch ID



Standard
Penetration Test

Soil Lithology



Asphalt



Fill with Sand as
major soil



Topsoil



USCS Low Plasticity
Sandy Clay



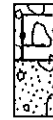
USCS Clayey Sand



Fill (made ground)



USCS Silty Sand



Fill with Gravel as
major soil



USCS Poorly-graded
Gravelly Sand

Bedrock Lithology

Lab Test Abbreviations

MC-Moisture Content
DD-Dry Density
#200-Percent Passing #200 Sieve
LL-Liquid Limit
PL-Plastic Limit
PI-Plastic Index
S-Sulphate Content
S/C-Swell/Consolidation
UCCS-Unconfined Compressive Strength
Re-Resistivity
PtL-Point Load Test
AASHTO-AASHTO Classification
USCS-USCS Classification

* Indicates that gradation analysis was performed, Atterberg limits were not performed, but the USCS classification was applied assuming non plastic characteristics



Boring Began: 3/24/2011

Completed: 3/24/2011

Total Depth: 26.0 ft

Drilling Method: Hollow-Stem Auger

Drill Bit:

Ground Elevation: 4993.6 ft

Drill: CME 75

Casing:

Location:

Weather:

Coordinates: N: 1,233,585.3 E: 3,188,938.4

Driller: Precision Sampling

Logged By: R. Bartingale

Ground Water Notes:

Final By: T. Hansen

Inclination: Vertical

Depth	▽ 23.0 ft	-	-	-
Date	3/24/11	-	-	-
Time	-	-	-	-

Elevation (feet)	Depth (feet)	Run / Sample Type	Recovery (%)	Soil Samples		Lithology	Material Description	Field Notes and Lab Tests
				RQD	Blows per 6 in N			
4993.6	0.0						0.0 - 0.3 ft. Asphalt Pavement 4 inches.	
4993.6	0.3	Hand			6/6	12	0.3 - 2.0 ft. gravelly SAND FILL, brown, moist, medium dense.	PID = 4.5 ppm
4990	5	Hand			3/4	7	2.0 - 15.5 ft. Landfill Debris clayey sand with some gravel, glass, wood, plastic, metal, gray to brown, moist, loose to medium dense.	PID = 7.9 ppm
4985	10				2/11	13		PID = 2.3 ppm CH ₄ = 3.8%
4980	15				4/2	6		
4975	20				7/4	11		15.5 - 26.0 ft. silty SAND with gravel, gray, moist to wet, medium dense.
4970	25				8/17	25		PID = 0.4
4965	30				12/14	26		PID = 0.6 CH ₄ = 5.7%
4960							Bottom of Hole at 26.0 ft.	

BORING LOG 210-213 US 85 BROMLEY LANE.GPJ YEH ASSOCIATES.GDT 4/29/11



Boring Began: 3/24/2011

Completed: 3/24/2011

Total Depth: 26.0 ft

Drilling Method: Hollow-Stem Auger

Drill Bit:

Ground Elevation: 4990.8 ft

Drill: CME 75

Casing:

Location:

Weather:

Coordinates: N: 1,233,717.5 E: 3,188,969.9

Driller: Precision Sampling

Logged By: R. Bartingale

Final By: T. Hansen

Inclination: Vertical

Ground Water Notes:

Depth	▽ 20.0 ft	-	-	-
Date	3/24/11	-	-	-
Time	-	-	-	-

Elevation (feet)	Depth (feet)	Run / Sample Type	Recovery (%)	Rock	Soil Samples		Lithology	Material Description	Field Notes and Lab Tests
					RQD	Blows per 6 in			
4990		Hand						0.0 - 0.3 ft. Asphalt Pavement 4 inches.	PID = 0.4
		Hand			3/3	6		0.3 - 13.0 ft. Landfill Debris sand, glass, porcelain, wood, fabric, metal, wire, dark brown, moist, loose to very dense.	
4985	5				23:0"	23:0"		Sampler refusal on debris.	
					2/3	5			
4980	10				50:2"	50:2"		Sampler refusal on debris.	PID = 1.0 ppm CH ₄ = 8.8%
4975	15				10/12	22		13.0 - 26.0 ft. silty SAND with gravel, gray to brown, moist to wet, medium dense.	PID = 1.9 ppm CH ₄ = 20.5%
4970	20				9/11	20			PID = 4.5 ppm
4965	25				14/15	29			PID = 0.9 ppm
								Bottom of Hole at 26.0 ft.	
4960	30								

BORING LOG 210-213 US 85 BROMLEY LANE.GPJ YEH ASSOCIATES.GDT 4/29/11



Boring Began: 3/24/2011 Completed: 3/24/2011 Total Depth: 30.8 ft
 Drilling Method: Hollow-Stem Auger Drill Bit: Ground Elevation: 4988.9 ft
 Drill: CME 75 Casing: Location:
 Driller: Precision Sampling Weather: Coordinates: N: 1,233,923.9 E: 3,188,969.5
 Logged By: R. Bartingale

Ground Water Notes:

Depth	▽ 20.0 ft	-	-	-
Date	3/24/11	-	-	-
Time	-	-	-	-

Final By: T. Hansen
 Inclination: Vertical

Elevation (feet)	Depth (feet)	Run / Sample Type	Recovery (%)	Soil Samples		Lithology	Material Description	Field Notes and Lab Tests
				Blows per 6 in	N			
							0.0 - 0.4 ft. Asphalt Pavement 5 inches.	
							0.4 - 2.0 ft. silty SAND FILL, dark brown, moist, stiff.	
4985	5			6/3	9		2.0 - 16.0 ft. Landfill Debris sand with clay, glass, wood, paper, metals, brown and gray, moist, loose to very dense.	
				3/4	7			
4980	10			4/3	7			
				50:0"	50:0"		Sampler refusal on debris.	PID = 1.3 ppm CH ₄ = 7.4%
4975	15			50:4"	50:4"		Sampler refusal on debris.	CH ₄ = 14.5%
4970	20			10/8/8	16		16.0 - 31.0 ft. silty SAND with gravel, brown, wet, dense to very dense.	
4965	25			21/24/28	52			
4960	30			95:9"	95:9"			
							Bottom of Hole at 30.8 ft.	
4955								

BORING LOG 210-213 US 85 BROMLEY LANE.GPJ YEH ASSOCIATES.GDT 4/29/11



Boring Began: 3/24/2011

Completed: 3/24/2011

Total Depth: 29.0 ft

Drilling Method: Hollow-Stem Auger

Drill Bit:

Ground Elevation: 4991.7 ft

Drill: CME 75

Casing:

Location:

Driller: Precision Sampling

Weather:

Coordinates: N: 1,234,050.0 E: 3,188,902.9

Logged By: R. Bartingale

Ground Water Notes:

Final By: T. Hansen

Inclination: Vertical

Depth	▽ 23.0 ft	▽ 20.0 ft	-	-
Date	3/24/11	3/28/11	-	-
Time	-	-	-	-

Elevation (feet)	Depth (feet)	Run / Sample Type	Recovery (%)	Rock	Soil Samples		Lithology	Material Description	Field Notes and Lab Tests
					Blows per 6 in	N			
4990	5				6/5	11		0.0 - 0.3 ft. Asphalt Pavement 2.5 inches. 0.3 - 7.0 ft. silty SAND FILL with gravel, brown, moist, medium dense.	MC= 11.4 % DD= 122.8 pcf pH= 7.7 S= 0.006 % Re= 2994 ohms-cm Cl= 0.0007 %
4985	10				8/10	18		7.0 - 14.0 ft. clayey SAND with some gravel, brown, moist, very stiff.	PID = 0.7 ppm
4980	15				6/7	13		14.0 - 29.0 ft. silty SAND with gravel, brown, moist to wet, dense.	PID = 0.7 ppm
4975	20				8/11	19			PID = 0.7 ppm
4970	25				14/18	32			PID = 0.7 ppm
4965	30							Bottom of Hole at 29.0 ft.	
4960									

BORING LOG 210-213 US 85 BROMLEY LANE.GPJ YEH ASSOCIATES.GDT 4/29/11



Boring Began: 3/25/2011

Completed: 3/25/2011

Total Depth: 32.0 ft

Drilling Method: Hollow-Stem Auger

Drill Bit:

Ground Elevation: 4990.6 ft

Drill: CME 75

Casing:

Location:

Weather:

Coordinates: N: 1,234,103.0 E: 3,189,032.2

Driller: Precision Sampling

Logged By: R. Bartingale

Ground Water Notes:

Final By: T. Hansen

Inclination: Vertical

Depth	▽ 23.0 ft	▽ 22.0 ft	-	-
Date	3/25/11	3/28/11	-	-
Time	-	-	-	-

Elevation (feet)	Depth (feet)	Run / Sample Type	Recovery (%)	Rock	Soil Samples		Lithology	Material Description	Field Notes and Lab Tests
					RQD	Blows per 6 in			
4990								0.0 - 4.0 ft. silty SAND FILL with some gravel, brown, moist, loose.	
	5				6/4	10			
4985								4.0 - 20.5 ft. Landfill Debris cardboard, wood, plastic, wire, metal, very little soil matrix, black and gray.	PID = 0.5 ppm
	10				17/11	28			
4980									
	15				15/6	21			
4975									CH ₄ = 0.7 %
	20				8/8	16			
4970								20.5 - 32.0 ft. silty SAND with gravel, brown, moist to wet, dense to very dense.	
	25				10/8	18			
4965									
	30				28/36	64			
4960									
Bottom of Hole at 32.0 ft.									

BORING LOG 210-213 US 85 BROMLEY LANE GPJ YEH ASSOCIATES.GDT 4/29/11



Yeh and Associates, Inc.
Consulting Engineers & Scientists

Project: US 85 Bromley Lane

Boring: YA -16

Project Number: 210-213

Date:

Sheet 1 of 1

Boring Began: 3/24/11 **Completed:** 3/24/11 **Total Depth:** 29
Drilling Method: Hollow-Stem Auger **Drill Bit:** **Ground Elevation:** 4991.7 ft
Drill: CME 75 **Casing:** **Location:**
Driller: Precision Sampling **Weather:** **Coordinates:** N: 1,234,050.0, E:3,188,902

Ground Water Notes:

Logged By: RJB
Final By: I. Chen
Inclination: Vertical

Depth:	23	20	
Date:	3/24/11	3/28/11	
Time:	--	--	

Elevation (ft)	Depth (ft)	PID or FID (ppm)	Blows per 6 inches	Completion	Lithology	Material Description	Field Notes and Lab Tests
4990	5	0.7	6-5	Bentonite seal 2" pvc riser pipe Filter sand 2" spaced PVC	T T T	0.0- 0.3 ft. Asphalt Pavement 2.5"	Well completed with locking flush-mount cover
4985	10	0.7	8-10		T T T	0.3-7.0 ft silty SAND FILL with gravel, brown, moist, medium dense.	
4980	15	0.7	6-7			7.0 - 14.0 ft clayey SAND with some gravel, brown, moist, very stiff.	
4975	20	0.7	8-11			14.0 - 21.0 ft silty SAND with gravel, brown, moist to wet, dense.	
4970	25	0.7	14-18				
4965	30					Bottom of Hole at 29.0 ft.	
	35					Background FID = 0.7 ppm	



Yeh and Associates, Inc.
Consulting Engineers & Scientists

Project: US 85 Bromley Lane

Boring: YA -19

Project Number: 210-213

Date:

Sheet 1 of 1

Boring Began: 3/25/11 Completed: 3/25/11 Total Depth: 32
 Drilling Method: Hollow-Stem Auger Drill Bit: Ground Elevation: 4991.7 ft
 Drill: CME 75 Casing: Location:
 Driller: Precision Sampling Weather: Coordinates: N: 1,234,050.0, E:3,188,902.9

Ground Water Notes:

Logged By: RJB
 Final By: I. Chen
 Inclination: Vertical

Depth:	23	22
Date:	3/24/11	3/28/11
Time:	--	--

Elevation (ft)	Depth (ft)	PID or FID (ppm)	Blows per 6 inches	Completion	Lithology	Material Description	Field Notes and Lab Tests
4990	5	0.5	6-4	Bentonite seal	T	0.0-4.0 ft silty SAND FILL with some gravel, brown, moist, loose.	Well completed with locking metal standpipe cover
4985	10		17-11	2" pvc riser pipe	T	4.0 - 21.0 ft Landfill Debris cardboard, wood, plastic, wire, metal with little to no soil matrix, black and gray.	
4980	15		15-6				
4975	20		8-8				
4970	25		10-8			14.0 - 21.0 ft silty SAND with gravel, brown, moist to wet, dense to very dense.	
4965	30		28-36	Filter sand			
	35			2" spaced pvc			
						Bottom of Hole at 32.0 ft. Background FID = 0.5 ppm	

Appendix C, Analytica Group Reports
