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AN EMPLOYEE OWNED COMPANY

Consulting Engineer – Testing – Inspection Services – Analytical Laboratories Established 1927

May 24, 2023

GPD GROUP
ARCHITECTS · ENGINEERS · PLANNERS
520 South Main Street, Suite 2531
Akron, Ohio 44311

Attention: Mr. Jason Smith
Associate Project Manager

Reference: Roadway Exploration Report - Final
PID No: 112869
SUM-East Avenue (CR 630) Improvements – Phase I
Tallmadge, Summit County, Ohio

CTL Project No. 20050041CLE

Mr. Smith:

CTL Engineering, Inc. has completed the final Roadway Exploration Report for this project. Enclosed is the digital (pdf) copy of the report.

Thank you for the opportunity to work with you on this project. If you have any questions or need further information, please feel free to contact our office.

Respectfully Submitted
CTL ENGINEERING, INC.

H. Matthew Kairouz, P.E.
Project Manager

ROADWAY EXPLORATION REPORT
FINAL

SUM-EAST AVENUE (CR630) ROAD IMPROVEMENTS - PHASE I
PID NO. 112869
TALLMADGE, SUMMIT COUNTY, OHIO

CTL PROJECT NO. 20050041CLE

PREPARED FOR:

GPD GROUP
ARCHITECTS · ENGINEERS · PLANNERS
520 SOUTH MAIN STREET, SUITE 2531
AKRON, OHIO 44311

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May 24, 2023

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I EXECUTIVE SUMMARY

The project consists of widening and resurfacing about 12,050 LF of East Avenue in order to accommodate a center two-way turn lane from Community Road to Parliament Drive. The project will also include the installation of sidewalks on both sides of the roadway to facilitate pedestrian access to the area. Phase 1 of the project will be from Recreation Center Drive to Parliament Drive, Phase 2 of the project will extend from Community Road to Recreation Center Drive. This report only addresses geotechnical parameters related to the subgrade of the roadway for Phase I and mast arm signal support. This report also includes pavement cores depicting the condition of the existing pavement.

Our analyses indicated that the subgrades at all borings locations except near borings B-021 and B-026 would be unstable. Cement stabilization up to a depth of 14 inches can be considered to stabilize the unstable/unsuitable subgrades. The alternative to chemical stabilization, as listed in GB1, is to excavate unstable subgrade soils to estimated depths ranging from 12 to 39 inches below proposed design subgrade elevations near unstable boring locations B-016 to B-032. The location near B-018, B-022, B-027, B-030 to B-032 contains silt soil (A-4b) which is not suitable to be used within the top 3 feet of design subgrades due to frost susceptibility. Stabilization in these areas may be accomplished by undercut or by chemical (cement) modification. Upon subgrade stabilization per ODOT Item 206, the pavement may be designed using a California Bearing Ratio (CBR) of 5 based on our statistics. Per ODOT a CBR of 7 may be used based on average value.

The proposed mast arm signal support structure may be supported using isolated pad or drilled shaft bearing into stiff soils within the upper 10 feet.

II INTRODUCTION

The project consists of widening and resurfacing about 12,050 LF of East Avenue for the purpose of accommodating a center two-way turn lane from Community Road to Parliament Drive. The project will also include the installation of sidewalks on both sides of the roadway to facilitate pedestrian access to the area. Phase 1 of the project will be from Recreation Center Drive to Parliament Drive, Phase 2 of the project will extend from Community Road to Recreation Center Drive.

This report only addresses Phase I. The report includes geotechnical parameters related to the subgrade of the roadway for Phase I and foundation support and lateral load for the proposed mast arm signal support. This report also includes pavement cores depicting the condition of the existing pavement.

III GEOLOGY AND OBSERVATIONS OF THE PROJECT SITE

Geology

According to the Ohio Department of Natural Resources (ODNR) the bedrock underlying the project area is of Pennsylvanian age (302-307 Mas). The bedrock mainly consists of sedimentary rocks such as shale, sandstone, siltstone, mudstone, limestone and some coal, of continental and marine origin.

ODNR classifies the glacial till of the project area as Ridge Moraine. This till is of Wisconsinan age (14,000 to 24,000 years old) and consists of mixtures of clay, sand, gravel and boulders in various types of deposits. According to ODNR there are no mines in the vicinity of the project area.

Site Conditions:

The site is located in a suburban setting surrounded by commercial and residential development. The asphalt pavement is in fair to poor condition with some longitudinal and transverse cracks. The edges of the pavements are in distressed condition.

IV SUBSURFACE EXPLORATION

During the period of December 3, 2020 to January 6, 2021, Ohio TestBor under the directions of CTL Engineering advanced thirty-three (33) soil borings identified as B-001-0-20 to B-015-0-20 for Phase II of this project and B-016-0-20 to B-032-0-20 for Phase I. Borings were drilled to depths of 7.0 to 8.0 feet below existing grade, one boring B-014-1-20 was advanced to 15 feet deep for the proposed traffic signal.

The test borings were performed using a CME-truck mounted drill rig, utilizing continuous hallow stem flight augers (HSA). CTL Engineering, in collaboration with GPD Group, selected the boring/coring locations as shown approximately on the

enclosed Plan sheets provided in Appendix A. Six (6) pavement cores were obtained at locations as shown in Appendix A.

The drillers obtained continuous split spoon soil samples interval using Standard Penetration Tests (SPT). The SPT consists of driving a 2.0-inch outside diameter (OD) split-spoon sampler 18 inches into the soil with an automatic 140-pound hammer falling 30 inches. The SPT hammer used for this project was calibrated in November of 2018 and had an energy ratio of 84.5 percent in obtaining industry standard N-values (N_{60}-values).

The drilling crew visually classified the soil samples then secured them in glass jars and delivered them to an accredited CTL laboratory for further testing and analysis. A CTL geologist reclassified the soil samples and performed laboratory testing on representative samples under the direction of the Geotechnical Engineer. The laboratory testing included hand penetrometer, moisture content, grain size distribution, Atterberg limits and sulfate content.

Station, offset and ground surface elevation at each test boring location was provided by personnel from GPD Group.

V FINDINGS

A. Subsurface Conditions:

The existing pavement section at the borings B-002 to B-005, B-007 to B-009 and B-011 to B-014 consisted of about 3.0 to 12.5 inches of asphalt over about 3 to 12 inches of gravel with sand base. The pavement section at borings B-010 and B-016 consisted of about 3 to 12 inches of asphalt over about 8 inches of macadam and 5 inches of gravel with sand base. The pavement section at borings B-015 and B-018 consisted of about 6 inches of asphalt over about 10 inches of concrete. The existing pavement sections at the coring locations are summarized in Table 1 below.

Table 1– Details of Pavement Section

Street Name	Coring No.	Station	Offset (ft)	Asphalt (inch)	Concrete (inch)
East Avenue	X-003-0-20	103+13	8.75 RT	9.0	None
	X-007-0-20	121+45	6.88 RT	12.5	7.5
	X-011-0-20	136+00	13.4 RT	12.0	None
	X-015-0-20	151+03	10.4 LT	10.0	None
	X-019-0-20	166+44	16 LT	11.5	6.5
	X-023-0-20	183+49	6.8 LT	11.0	7.5

The base materials collected from borings B-011-0-20 and B-014-0-20 are classified based on grain size distribution tests. Sample 1 represents base samples

collected from borings B-011 and Sample 2 represents base sample collected from borings B-014. Based on laboratory test results, sample 1 meets ODOT specifications for item 304. Table 3 provides comparison of existing base materials with ODOT specified aggregate material size for item 304.

Table 2 – Comparison of base materials with ODOT item 304

Sieve size	Total Percent Passing		
	ODOT specification	Sample 1	Sample 2
2 inch (50 mm)	100	100	100
1 inch (25 mm)	70 to 100	100	100
¾ inch (19 mm)	50 to 90	87	87
No.4 (4.75 mm)	30 to 60	58	58
No.30 (600 µm)	9 to 33	26	34
No.200 (75 µm)	0 to 15	8	25
ODOT Specifications		Met	Not Met

The surface material at borings B-006-0-20, B-015-1-20, B-017-0-20, B-019-0-20 and B-022-0-20 to B-032-0-20 consisted of 5 to 12 inches of gravel/gravel with some cinders and slag. Below the surface cover, all the borings encountered 3.0 to 8.0 feet of fill/possible fill material. The fills/possible fills consisted of very loose gravel with sand (A-1-b), loose to medium dense gravel with sand and silt (A-2-4), very loose to loose gravel with sand, silt and clay (A-2-6), stiff to hard sandy silt (A-4a), very loose to medium dense silt (A-4b), stiff silty clay (A-6b). The natural soil consisted of medium stiff to very stiff sandy silt (A-4a), stiff to hard silt and clay/ silty clay (A-6a/A-6b).

The Standard Penetration Test (SPT) values and moisture contents within the fill/possible fill material ranged mostly from 3 to 28 blows per foot (bpf) and from 5 to 37 percent respectively. The SPT values and moisture contents within natural deposits ranged from 3 to 28 blows per foot (bpf) with isolated zone of zero (0) bpf, and from 12 to 23 percent respectively. The Liquid Limits and Plasticity Index of the cohesive soils ranged from 17 to 40 percent and 3 to 21 percent respectively. The sulfate content values of tested samples within anticipated design subgrades ranged from 100 ppm to 2000 ppm respectively (from boring B-001-0-20 to B-032-0-20).

Groundwater was encountered in borings B-003-0-20, B-006-0-20, B-015-1-20, B-27-0-20 and B-030-0-20. Depths and elevations of the observed groundwater levels are provided in Table 3.

Table 3 – Groundwater Levels in Borehole

Boring	Ground Surface Elevation	Observed Ground water Level (ft.)			
		Encountered at		At completion	
		Depth	Elevation	Depth	Elevation
B-003-0-20	1137.0	4.3	1132.7	5	1132.0
B-006-0-20	1205.0	7.3	1197.7	None	None
B-014-1-20	1160	9.5	1150.5	11.0	1149
B-027-0-20	1154.4	6.5	1147.9	None	None
B-030-0-20	1135.6	5.5	1130.1	None	None

VI ANALYSES AND RECOMMENDATIONS

CTL based its analyses and recommendations upon experience, available information, the subsurface data obtained from the field and laboratory testing, and ODOT Geotechnical Bulletin GB1 Subgrade Analysis. CTL performed GB1 subgrade analysis only for Phase I of the project based on plan and profile provided. Based on our analysis, the following recommendations are provided:

A. Subgrades Analysis

The subgrade soil's consistencies, moisture contents, and indices and pavement design parameters are summarized in Tables 4A and 4B below.

Table 4A: Summary of Subgrade Analysis

Lowest SPT N_{60}-Values (N_{60L})			In-Situ Moisture Content (%)			Estimated Optimum Moisture (%)		
Low	High	Avg.	Low	High	Avg.	Low	High	Avg.
3	10	6	5	37	17	10	22	12

Table 4B: Summary of Subgrade Analysis

Plasticity Index (PI)			Group Index (GI)			Design C.B.R (%)
Low	High	Avg.	Low	High	Avg.	
4	15	9	0	16	6	7*

**We recommend a design C.B.R. of 5% due to high GI range.*

Analyses indicated that the subgrades at all borings locations except near borings B-021 and B-026 would be unstable. The subgrade materials at the boring locations exhibited high moisture content above anticipated optimum moisture (above optimum as defined by ODOT GB1 Geotechnical Bulletin) and exhibited low Standard Penetration Test values (N value). The summary of ODOT GB1 subgrades analysis is included in Appendix C.

B. Subgrade Stabilization

Based on our analysis and in accordance with ODOT GB1 Geotechnical Bulletin, the subgrades will need to be improved by either undercut/replacement per ODOT Item 204, or by chemical (cement) stabilization per ODOT Item 206. The estimated undercut depths for stabilization, based on ODOT GB1, are summarized in Table 5 below.

Table 5: Estimated Depths of Undercut.

Approximate Stations	Excavation per GB1
154+00 to 160+82	Undercut 12”
160+82 to 164+54	Undercut 27”
164+54 to 172+77	Undercut 12”
177+46 to 181+71	Undercut 37”
181+71 to 184+67	Undercut 15”
184+67 to 192+01	Undercut 12”
199+55 to 199+42	Undercut 32”
203+22 to 207+18	Undercut 12”
207+18 to 211+23	Undercut 20”
211+23 to 214+80	Undercut 39”
214+80 to 217+00	Undercut 19”

Cement stabilization up to a depth of 14 inches can be considered as a better alternative to undercut for the stabilization of subgrades. The location near borings B-018, B-022, B-027, and B-030 to B-032 contains silt soil (A-4b) which is not suitable to be used within the top 3 feet of design subgrades due to frost susceptibility. Stabilization in these areas may be accomplished by undercut or by chemical (cement) modification. The recommended option, as listed in GB1, is to undercut unstable subgrades at the designated locations to the estimated depths provided in Appendix C, and replace with ODOT Item 703.16.C, Granular Material underlain by ODOT Item 712.09, Geotextile Fabric. Geogrid may be used in unstable subgrade areas where instability extends deeper than 24 inches. Subgrade improvements should extend the entire pavement width and any paved shoulder sections including curbs and gutters and an additional 12 inches beyond the edge of the pavement. The locations and estimated undercut based on ODOT GB1 are summarized in Appendix C.

The undercut values presented above are only estimates. The actual depth of excavation and replacement of subgrades should be based on proof roll test during construction. The Project Engineer in the field based upon proof rolling will determine the actual depths and limits of excavation/replacement. The excavation

and replace depths are measured from the anticipated proposed pavement subgrade level. Group Index (GI) values were calculated for each of the soil samples tested. Group Index values ranged from 0 to 16 with an average of 6. Due to large variation in GI, CTL recommends a design CBR of 5.

Per ODOT GB1 and ODOT comments an average CBR of 7 may be used. CTL has reservation using an average value within a large data range. However, we have no objection in using a design CBR of 7 provided CTL is not held liable for subgrade failures associated with overestimating the CBR at certain segments.

Regardless of the chosen stabilization/improvement options, the subgrades should be well-drained using perforated edge drain, and finger drains at catch basin. All perforated drain should be wrapped with filter fabric.

C. Foundation Support

1. This project consists of installing mast arm signal support at the intersection of N. Munroe Road drive and East Avenue. The proposed structure may be supported onto isolated pad at frost depth or drilled shaft bearing into stiff soils within the upper 10 feet.

2. Installation of traffic signs, sign supports and foundation complete should be in accordance with ODOT Item 630.

3. Groundwater is expected during excavation or construction of the drilled shaft foundation. Provisions should be made to dewater the excavation prior to placement of reinforcement steel and concrete.

4. The proposed structure should be designed using parameters provided in Table 5.

Table 5 Soil Parameters.

Soil Parameters	Overburden Soil
Unit Weight, pcf	120
Angle of Internal Friction, degrees	22
Cohesion, psf	100
Factored Bearing Resistance (ksf)	2.0
Soil/Concrete Friction Angle, degrees	15
At Rest Pressure Coefficient, K_o	0.62
Active Pressure Coefficient, K_a	0.45
Passive Pressure Coefficient, K_p	2.19

D. General Construction and Earthwork

General construction and earthwork recommendations for this project are provided in the following paragraphs. Site preparation and earthwork should be performed in accordance with the ODOT Construction and Material Specifications Items 200/201, 202, 203, 204 and 206. Particularly:

1. Provide perforated edge drains, per ODOT Item 605.

2. Existing underground utilities that are deeper than 4 feet are not expected to be affected by the proposed construction. Shallower utilities are susceptible to damage due to excavations. Such underground utilities may have to be relocated or subsurface improvement in their vicinity be performed carefully.

3. Temporary excavations in excess of 4.0 feet in depth should be sloped or shored in accordance with OSHA regulations assuming soil type C.

4. Minimize or eliminate vibratory roller use on cohesive material in order to prevent excess pore water pressure from developing, cohesive material should be compacted using static, sheep-foot type rollers.

VII CHANGED CONDITIONS

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, our understanding of the project and our experience with similar sites and subsurface conditions using generally accepted geotechnical engineering practices. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates drilled, they are not necessarily representative of the subsurface conditions between boring locations or subsurface conditions during other seasons of the year.

In the event that changes in the project are proposed, additional information becomes available, or if it is apparent that subsurface conditions are different from those provided in this report, CTL Engineering should be notified so that our recommendations can modified, if required.

VIII TESTING AND OBSERVATION

During the design process, it is recommended that CTL Engineering work with the project designers to confirm that the geotechnical recommendations are properly incorporated into the final plans and specifications, and to assist with establishing criteria for the construction observation and testing.

IX CLOSING

The report was prepared by CTL Engineering, Inc. (Consultant) solely for the use of the Client in accordance with an executed contract. The Client's use of or reliance on this report is limited by the terms and conditions of the contract and by the qualifications and limitations stated in the report. It is also acknowledged that the Client's use of and reliance of this report is limited for reasons which include: actual site conditions that may change with time; hidden conditions, not discoverable within the scope of the assessment, may exist at the site; and the scope of the investigation may have been limited by time, budget and other constraints imposed by the Client**.**

Neither the report, nor its contents, conclusions nor recommendations are intended for the use of any party other than the Client. Consultant and the Client assume no liability for any reliance placed on this report by such party. The rights of the Client under contract may not be assigned to any person or entity, without the consent of the Consultant which consent shall not be unreasonably withheld.

This geotechnical report does not address the environmental conditions of the site. The Consultant is not responsible for consequences or conditions arising from facts that were concealed, withheld, or not fully disclosed at the time the assessment was conducted.

To the fullest extent permitted by law, the Consultant and Client agree to indemnify and hold each other, and their officers and employees harmless from and against claims, damages, losses and expenses arising out of unknown or concealed conditions. Furthermore, neither the Consultant nor its employees shall be liable to the Owner in an amount in excess of the available professional liability insurance coverage of the Consultant. In addition, Client and Consultant agree neither shall be liable for any special, indirect or consequential damages of any kind or nature.

The Consultant's services have been provided consistent with its professional standard of care. No other warranties are made, either expressed or implied.

Respectfully Submitted,
CTL ENGINEERING, INC.

Matthew Kairouz, P.E.
Project Manager

APPENDIX A

- **PLAN SHEETS**
- **BORING/CORING LOCATION PLAN**
- **TEST BORING RECORDS**

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF WIDENING AND RESURFACING ABOUT 12,050 LF OF EAST AVENUE FOR THE PURPOSE OF ACCOMMODATING A CENTER TWO-WAY TURN LANE FROM COMMUNITY ROAD TO PARLIAMENT DRIVE. THE PROJECT WILL ALSO INCLUDE THE INSTALLATION OF SIDEWALKS ON BOTH SIDES OF THE ROADWAY TO FACILITATE PEDESTRIAN ACCESS TO THE AREA. PHASE 1 OF THE PROJECT WILL BE FROM RECREATION CENTER DRIVE TO PARLIAMENT DRIVE, PHASE 2 OF THE PROJECT WILL EXTEND FROM COMMUNITY ROAD TO RECREATION CENTER DRIVE. THIS REPORT ONLY ADDRESSES PHASE I. THE REPORT INCLUDES GEOTECHNICAL PARAMETERS RELATED TO THE SUBGRADE OF THE ROADWAY FOR PHASE I AND FOUNDATION SUPPORT AND LATERAL LOAD FOR THE PROPOSED MAST ARM SIGNAL SUPPORT. THIS REPORT ALSO INCLUDES PAVEMENT CORES DEPICTING THE CONDITION OF THE EXISTING PAVEMENT.

GEOLOGY

ACCORDING TO THE OHIO DEPARTMENT OF NATURAL RESOURCES (ODNR) THE BEDROCK UNDERLYING THE PROJECT AREA IS OF PENNSYLVANIAN AGE (302-307 MAS). THE BEDROCK MAINLY CONSISTS OF SEDIMENTARY ROCKS SUCH AS SHALE, SANDSTONE, SILTSTONE, MUDSTONE, LIMESTONE AND SOME COAL, OF CONTINENTAL AND MARINE ORIGIN. ODNR CLASSIFIES THE GLACIAL TILL OF THE PROJECT AREA AS RIDGE MORAINE. THIS TILL IS OF WISCONSINAN AGE (14,000 TO 24,000 YEARS OLD) AND CONSISTS OF MIXTURES OF CLAY, SAND, GRAVEL AND BOULDERS IN VARIOUS TYPES OF DEPOSITS. ACCORDING TO ODNR THERE ARE NO MINES IN THE VICINITY OF THE PROJECT AREA.

RECONNAISSANCE

THE SITE IS LOCATED IN A SUBURBAN SETTING SURROUNDED BY COMMERCIAL AND RESIDENTIAL DEVELOPMENT. THE ASPHALT PAVEMENT IS IN FAIR TO POOR CONDITION WITH SOME LONGITUDINAL AND TRANSVERSE CRACKS. THE EDGES OF THE PAVEMENTS ARE IN DISTRESSED CONDITION.

SUBSURFACE EXPLORATION

DURING THE PERIOD OF DECEMBER 3, 2020 TO JANUARY 6, 2021, OHIO TESTBOR UNDER THE DIRECTIONS OF CTL ENGINEERING ADVANCED THIRTY THREE (33) SOIL BORINGS IDENTIFIED AS B-001-0-20 TO B-015-0-20 FOR PHASE II OF THIS PROJECT AND B-016-0-20 TO B-032-0-20 FOR PHASE I. BORINGS WERE DRILLED TO DEPTHS OF 7.0 TO 8.0 FEET BELOW EXISTING GRADE, ONE BORING B-014-1-20 WAS ADVANCED TO 15 FEET DEEP FOR THE PROPOSED TRAFFIC SIGNAL. THE TEST BORINGS WERE PERFORMED USING A CME-TRUCK MOUNTED DRILL RIG, UTILIZING CONTINUOUS HALLOW STEM FLIGHT AUGERS (HSA). THE DRILLERS OBTAINED CONTINUOUS SPLIT SPOON SOIL SAMPLES INTERVAL USING STANDARD PENETRATION TESTS (SPT). THE SPT CONSISTS OF DRIVING A 2.0-INCH OUTSIDE DIAMETER (OD) SPLIT-SPOON SAMPLER 18 INCHES INTO THE SOIL WITH AN AUTOMATIC 140-POUND HAMMER FALLING 30 INCHES. THE SPT HAMMER USED FOR THIS PROJECT WAS CALIBRATED IN NOVEMBER OF 2018 AND HAD AN ENERGY RATIO OF 84.5 PERCENT IN OBTAINING INDUSTRY STANDARD N-VALUES (N60-VALUES).

EXPLORATION FINDINGS

THE EXISTING PAVEMENT SECTION AT THE BORINGS B-002 TO B-005, B-007 TO B-009 AND B-011 TO B-014 CONSISTED OF ABOUT 3.0 TO 12.5 INCHES OF ASPHALT OVER ABOUT 3 TO 12 INCHES OF GRAVEL WITH SAND BASE. THE PAVEMENT SECTION AT BORINGS B-010 AND B-016 CONSISTED OF ABOUT 3 TO 12 INCHES OF ASPHALT OVER ABOUT 8 INCHES OF MACADAM AND 5 INCHES OF GRAVEL WITH SAND BASE. THE PAVEMENT SECTION AT BORINGS B-015 AND B-018 CONSISTED OF ABOUT 6 INCHES OF ASPHALT OVER ABOUT 10 INCHES OF CONCRETE. THE SURFACE MATERIAL AT BORINGS B-006-0-20, B-015-1-20, B-017-0-20, B-019-0-20 AND B-022-0-20 TO B-032-0-20 CONSISTED OF 5 TO 12 INCHES OF GRAVEL/GRAVEL WITH SOME CINDERS AND SLAG. BELOW THE SURFACE COVER, ALL THE BORINGS ENCOUNTERED 3.0 TO 8.0 FEET OF FILL/POSSIBLE FILL MATERIAL. THE FILLS/POSSIBLE FILLS CONSISTED OF VERY LOOSE GRAVEL WITH SAND (A-1-b), LOOSE TO MEDIUM DENSE GRAVEL WITH SAND AND SILT (A-2-4), VERY LOOSE TO LOOSE GRAVEL WITH SAND, SILT AND CLAY (A-2-6), STIFF TO HARD SANDY SILT (A-4a), VERY LOOSE TO MEDIUM DENSE SILT (A-4b), STIFF SILTY CLAY (A-6B). THE NATURAL SOIL CONSISTED OF MEDIUM STIFF TO VERY STIFF SANDY SILT (A-4A), STIFF TO HARD SILT AND CLAY/ SILTY CLAY (A-6a/A-6b).THE STANDARD PENETRATION TEST (SPT) VALUES AND MOISTURE CONTENTS WITHIN THE FILL/POSSIBLE FILL MATERIAL RANGED MOSTLY FROM 3 TO 28 BLOWS PER FOOT (BPF) AND FROM 5 TO 37 PERCENT RESPECTIVELY. THE SPT VALUES AND MOISTURE CONTENTS WITHIN NATURAL DEPOSITS RANGED FROM 3 TO 28 BLOWS PER FOOT (BPF) WITH ISOLATED ZONE OF ZERO (0) BPF, AND FROM 12 TO 23 PERCENT RESPECTIVELY. THE LIQUID LIMITS AND PLASTICITY INDEX OF THE COHESIVE SOILS RANGED FROM 17 TO 40 PERCENT AND 3 TO 21 PERCENT RESPECTIVELY. THE SULFATE CONTENT VALUES OF TESTED SAMPLES WITHIN ANTICIPATED DESIGN SUBGRADES RANGED FROM 100 PPM TO 2000 PPM RESPECTIVELY (FROM BORING B-001-0-20 TO B-032-0-20). GROUNDWATER WAS ENCOUNTERED IN BORINGS B-003-0-20, B-006-0-20, B-015-1-20, B-27-0-20 AND B-030-0-20.

LEGEND

DESCRIPTION	ODOT CLASS	CLASSIFIED MECH./VISUAL	
GRAVEL	A-1-a	1	0
GRAVEL WITH SAND	A-1-b	2	1
GRAVEL WITH SAND AND SILT	A-2-4	2	2
GRAVEL WITH SAND, SILT AND CLAY	A-2-6	1	2
SANDY SILT	A-4a	44	46
SILT	A-4b	9	3
SILT AND CLAY	A-6a	8	6
SILTY CLAY	A-6b	2	4
	TOTAL	69	64

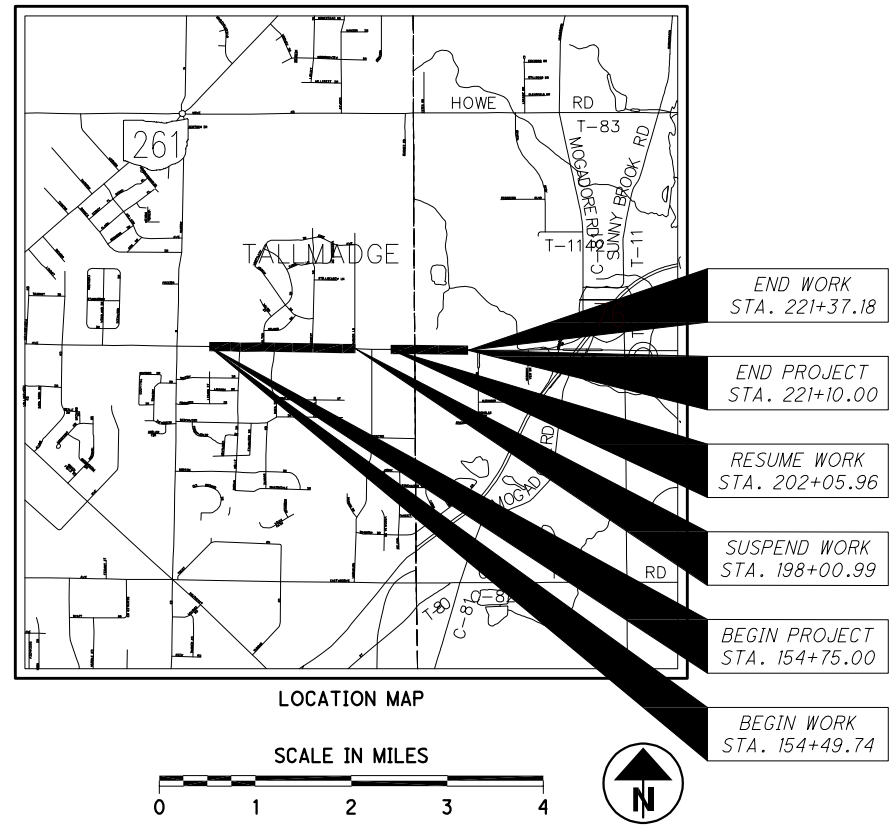
- PAVEMENT OR BASE
- EXPLORATION LOCATION - PLAN VIEW
- DRIVE SAMPLE AND/OR ROCK CORE BORING PLOTTED TO VERTICAL SCALE ONLY. HORIZONTAL BAR INDICATES A CHANGE IN STRATIGRAPHY.
- *WC* — INDICATES WATER CONTENT IN PERCENT.
- N_{60} — INDICATES STANDARD PENETRATION RESISTANCE NORMALIZED TO 60% DRILL ROD ENERGY RATIO.
- X/Y/Z — NUMBER OF BLOWS FOR STANDARD PENETRATION TEST; X= NUMBER OF BLOWS FOR FIRST 6 INCHES; Y= NUMBER OF BLOWS FOR SECOND 6 INCHES; Z= NUMBER OF BLOWS FOR THIRD 6 INCHES
- SS — INDICATES A SPLIT-SPOON SAMPLE.
- NP — INDICATES A NON-PLASTIC SAMPLE.
- *W*- — INDICATES FREE WATER ELEVATION.
- ▼ — INDICATES AT COMPLETION WATER ELEVATION.

AVAILABLE INFORMATION

THE SOIL,BEDROCK,AND GROUNDWATER INFORMATION COLLECTEDFOR THIS SUBSURFACE EXPLORATION THAT CAN BE CONVENIENTLY DISPLAYED ON THE SOIL PROFILE SHEETS HAS BEEN PRESENTED. GEOTECHNICAL REPORTS, IF PREPARED, ARE AVAILABLE FOR REVIEW ON THE OFFICE OF CONTRACT SALES WEBSITE.

SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 2020.



LOCATION MAP

PARTICLE SIZE DEFINITIONS

12"	3"	2.0 mm	0.42 mm	0.074 mm	0.005 mm
BOULDERS	COBBLES	GRAVEL	COARSE SAND	FINE SAND	SILT	CLAY
		No. 10 SIEVE	No. 40 SIEVE	No. 200 SIEVE		

INDEX OF SHEETS

LOCATION FROM STA.	TO STA.	PLAN VIEW SHEET	PROFILE SHEET	CROSS-SECTION SHEET	CUT MAX.	FILL EMB. MAX.
COVER SHEET 1						
SUMMERY OF SOIL TEST DATA 2 & 3						
EAST AVENUE						
154+75.00	166+00.00	4	4	-	-	-
166+00.00	179+00.00	5	5	-	-	-
179+00.00	192+00.00	6	6	-	-	-
192+00.00	204+50.00	7	7	-	-	-
204+50.00	217+50.00	8	8	-	-	-
217+50.00	223+00.00	9	9	-	-	-

RECON. - MK 11/16/2020
DRILLING - DON 12/03/2020 - 01/06/2021
KEITH 12/03/2020 - 01/06/2021
DRAWN - N.K.S 06/27/2021
REVIEWED - MK 06/27/2021

CTL ENGINEERING, INC.
3085 INTERSTATE PKWY.
BRUNSWICK, OHIO 44212
PHONE:(330)220-8900, FAX:(330)220-8944

PID NO. 112869

SOIL PROFILE - ROADWAY

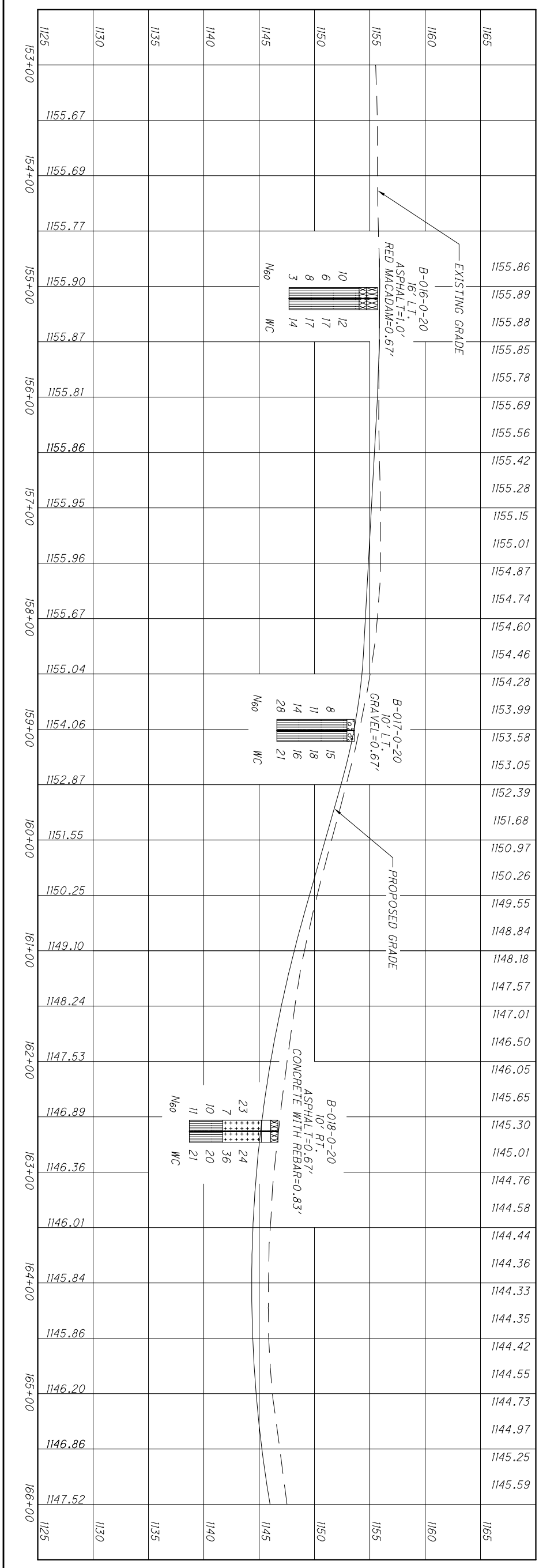
SUM-EAST AVENUE

SUMMARY OF SOIL TEST DATA
EAST AVINUE

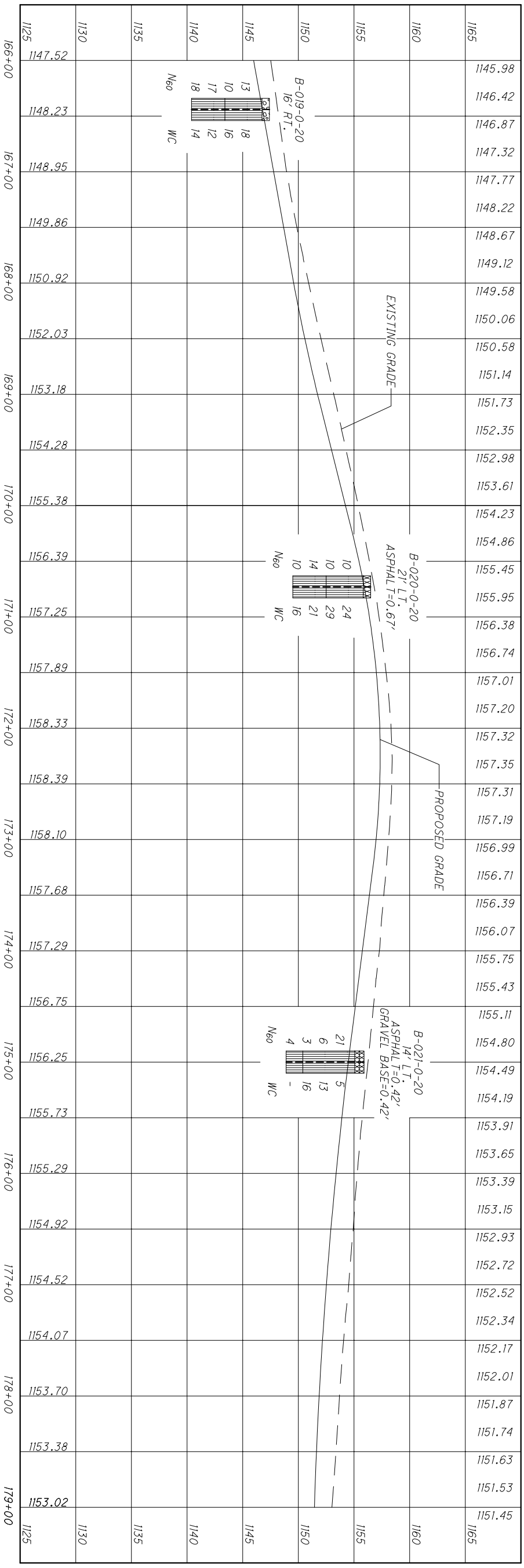
EXPLORATION NO., STATION & OFFSET	FROM TO	SAMPLE ID	N60	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO_4
B-016-0-20	02.00-03.50	SS-1	10	100	2.00	9	9	25	40	17	NP	NP	NP	12	A-4a (4)	100
STA. 155+11 ; 16′ LT.	03.50-05.00	SS-2	6	100	1.25	20	7	23	32	9	23	16	7	17	A-4a (1)	-
LATITUDE = 41.101156	05.00-06.50	SS-3	8	78	1.25				SAME AS SS-2					17	A-4a (VISUAL)	_
LONGITUDE = -81.411744	06.50-08.00	SS-4	3	78	1.25				SAME AS SS-2					14	A-4a (VISUAL)	_
B-017-0-20	01.00-02.50	SS-1	8	100	3.50	18	10	33	30	9	22	15	7	15	A-4a (1)	200
STA. 159+01 ; 10′ LT.	02.50-04.00	SS-2	11	100	2.50	17	7	19	40	17	26	17	9	18	A-4a (4)	-
LATITUDE = 41.101111	04.00-05.50	SS-3	14	100	2.50				SAME AS SS-2					16	A-4a (VISUAL)	_
LONGITUDE = -81.410331	05.50-07.00	SS-4	28	67	2.00				SAME AS SS-2					21	A-4a (VISUAL)	_
B-018-0-20	02.00-03.50	SS-1	23	100	1.25	6	5	19	62	8	NP	NP	NP	24	A-4b (7)	100
STA. 162+63 ; 10′ RT.	03.50-05.00	SS-2	7	100	1.00				SAME AS SS-1					36	A-4b (VISUAL)	-
LATITUDE = 41.101033	05.00-06.50	SS-3	10	94	2.50	35	1	3	40	21	37	27	10	20	A-4a (5)	_
LONGITUDE = -81.409022	06.50-08.00	SS-4	11	100	2.00				SAME AS SS-3					21	A-4a (VISUAL)	_
B-019-0-20	01.00-02.50	SS-1	13	89	2.00	4	9	39	43	5	NP	NP	NP	18	A-4a (3)	100
STA. 166+44 ; 16′ RT.	02.50-04.00	SS-2	10	100	2.25				SAME AS SS-1					16	A-4a (VISUAL)	-
LATITUDE = 41.100992	04.00-05.50	SS-3	17	100	2.50	17	8	22	39	14	23	17	6	12	A-4a (4)	_
LONGITUDE = -81.407639	05.50-07.00	SS-4	18	100	4.50				SAME AS SS-3					14	A-4a (VISUAL)	_
B-020-0-20	01.00-02.50	SS-1	10	78	4.25	16	5	17	38	24	23	17	6	24	A-4a (5)	100
STA. 170+73 ; 21′ LT.	02.50-04.00	SS-2	10	100	4.00	28	2	6	39	25	20	14	6	29	A-4a (6)	-
LATITUDE = 41.101067	04.00-05.50	SS-3	14	100	2.25	10	5	25	47	13	31	23	8	21	A-4a (5)	_
LONGITUDE = -81.406081	05.50-07.00	SS-4	10	100	2.50				SAME AS SS-3					16	A-4a (VISUAL)	_
B-021-0-20	01.00-02.50	SS-1	21	67	-	41	8	13	30	8	23	15	8	5	A-4a (1)	100
STA. 175+00 ; 14′ LT.	02.50-04.00	SS-2	6	67	-				SAME AS SS-1					13	A-4a (VISUAL)	-
LATITUDE = 41.101017	04.00-05.50	SS-3	3	89	-	14	6	17	42	21	24	18	6	16	A-4a (6)	_
LONGITUDE = -81.404533	05.50-07.00	SS-4	4	0	-				SAME AS SS-3					-	A-4a (VISUAL)	_
B-022-0-20	01.00-02.50	SS-1	13	78	3.50				SANDY SILT					17	A-4a (VISUAL)	100
STA. 179+92 ; 21′ RT.	02.50-04.00	SS-2	7	100	2.00	8	1	6	61	24	32	23	9	25	A-4b (8)	-
LATITUDE = 41.100886	04.00-05.50	SS-3	7	100	2.50	16	8	24	35	17	29	19	10	21	A-4a (3)	_
LONGITUDE = -81.402747	05.50-07.00	SS-4	11	100	1.00				SAME AS SS-3					15	A-4a (VISUAL)	_
B-023-0-20	01.00-02.50	SS-1	10	0	-				SAME AS SS-2					12	A-6a (VISUAL)	100
STA. 183+49 ; 7′ RT.	02.50-04.00	SS-2	7	100	1.50	17	16	11	38	18	26	15	11	15	A-6a (5)	-
LATITUDE = 41.100903	04.00-05.50	SS-3	10	100	1.25				SAME AS SS-2					15	A-6a (VISUAL)	_
LONGITUDE = -81.401453	05.50-07.00	SS-4	6	100	1.00	12	11	28	41	8	19	14	5	12	A-4a (3)	_
B-024-0-20	01.00-02.50	SS-1	10	78	4.00	18	2	8	53	19	29	16	13	18	A-6a (9)	100
STA. 185+85 ; 12′ LT.	02.50-04.00	SS-2	10	100	1.00	3	21	38	30	8	26	17	9	14	A-4a (1)	-
LATITUDE = 41.100936	04.00-05.50	SS-3	10	100	2.50				SAME AS SS-2					21	A-4a (VISUAL)	_
LONGITUDE = -81.400594	05.50-07.00	SS-4	7	100	1.50				SAME AS SS-2					16	A-4a (VISUAL)	_
B-025-0-20	01.00-02.50	SS-1	10	78	2.50				SAME AS SS-2					16	A-6a (VISUAL)	100
STA. 190+23 ; 16′ LT.	02.50-04.00	SS-2	6	72	2.00	23	5	13	39	20	27	14	13	15	A-6a (6)	-
LATITUDE = 41.100919	04.00-05.50	SS-3	4	78	2.00	24	5	13	39	19	27	18	9	16	A-4a (5)	_
LONGITUDE = -81.399006	05.50-07.00	SS-4	3	67	2.00				SAME AS SS-3					17	A-4a (VISUAL)	_
B-026-0-20	01.00-02.50	SS-1	20	78	4.50	43	4	12	30	11	26	15	11	9	A-6a (1)	360
STA. 193+79 ; 14′ RT.	02.50-04.00	SS-2	4	100	1.00	31	3	32	16	18	34	20	14	18	A-2-6 (1)	-
LATITUDE = 41.100811	04.00-05.50	SS-3	8	100	3.00				SAME AS SS-2					13	A-2-6 (VISUAL)	_
LONGITUDE = -81.397717	05.50-07.00	SS-4	10	100	-				SAME AS SS-2					12	A-2-6 (VISUAL)	_
B-027-0-20	01.00-02.50	SS-1	18	78	4.00	5	3	13	52	27	25	15	10	15	A-4b (8)	200
STA. 197+30 ; 13′ RT.	02.50-04.00	SS-2	14	100	-	2	8	23	64	3	NP	NP	NP	15	A-4b (6)	-
LATITUDE = 41.100792	04.00-05.50	SS-3	7	100	-				SAME AS SS-2					15	A-4b (VISUAL)	_
LONGITUDE = -81.396444	05.50-07.00	SS-4	17	100	1.75				SANDY SILT					16	A-4a (VISUAL)	_
B-028-0-20	01.00-02.50	SS-1	13	72	4.00	31	5	15	36	13	25	12	13	16	A-6a (4)	100
STA. 201+53 ; 10′ LT.	02.50-04.00	SS-2	6	100	2.00				SAME AS SS-1					22	A-6a (VISUAL)	-
LATITUDE = 41.100811	04.00-05.50	SS-3	4	100	2.25	40	0	2	32	26	38	26	12	37	A-6a (5)	_
LONGITUDE = -81.394908	05.50-07.00	SS-4	6	100	1.50				SAME AS SS-3					17	A-6a (VISUAL)	_
B-029-0-20	01.00-02.50	SS-1	8	78	3.00	15	10	41	27	7	21	13	8	11	A-2-4 (0)	100
STA. 204+91 ; 14′ LT.	02.50-04.00	SS-2	10	56	1.50				SAME AS SS-1					10	A-2-4 (VISUAL)	-
LATITUDE = 41.100783	04.00-05.50	SS-3	15	72	2.50				SAME AS SS-1					12	A-2-4 (VISUAL)	_
LONGITUDE = -81.393681	05.50-07.00	SS-4	7	78	2.50	14	5	13	44	24	25	17	8	10	A-4a (7)	_

SUMMARY OF SOIL TEST DATA
EAST AVINUE

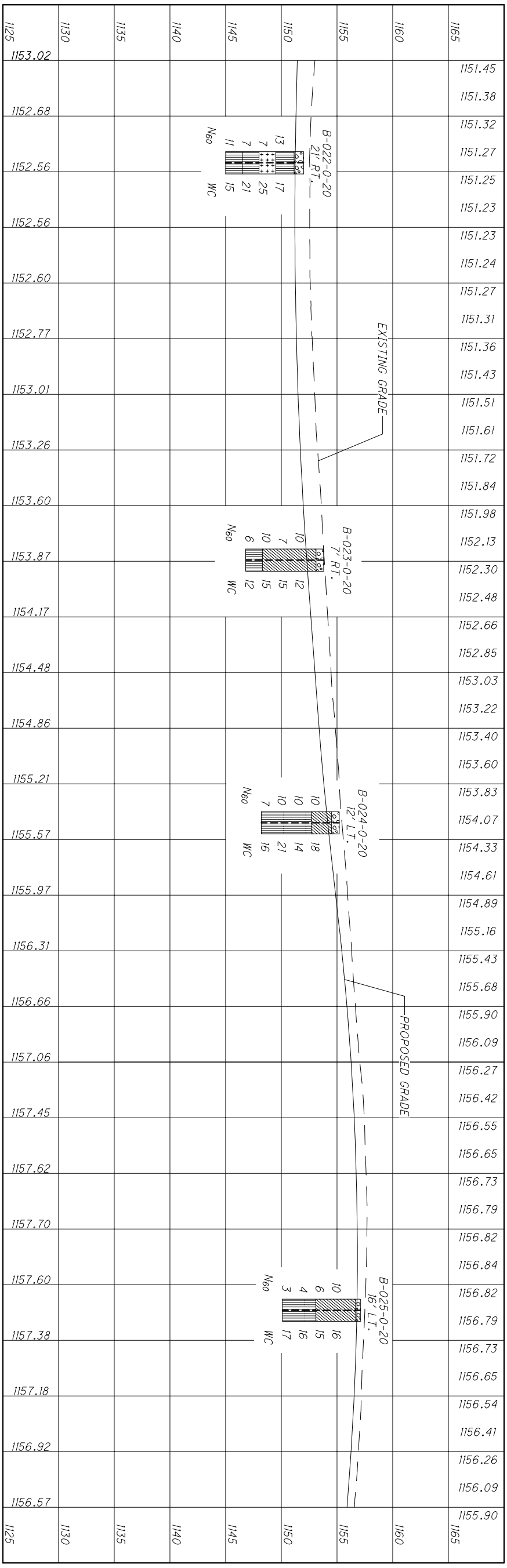
EXPLORATION NO., STATION & OFFSET	FROM	TO	SAMPLE ID	N60	% REC	HP tsf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	% WC	ODOT CLASS (GI)	ppm SO_4
B-030-0-20	01.00	02.50	SS-1	13	89	3.00	10	2	10	53	25	26	22	4	21	A-4b (8)	100
STA. 209+45 ; 23′ RT.	02.50	04.00	SS-2	6	67	1.50	40	8	15	24	13	25	18	7	13	A-4a (0)	-
LATITUDE = 41.10664	04.00	05.50	SS-3	11	100	1.75				SAME AS SS-2					12	A-4a (VISUAL)	_
LONGITUDE = -81.392033	05.50	07.00	SS-4	28	89	1.00				SAME AS SS-2					16	A-4a (VISUAL)	_
B-031-0-20	01.00	02.50	SS-1	10	89	1.50	3	1	5	67	24	31	16	15	15	A-6a (10)	100
STA. 213+01 ; 23′ LT.	02.50	04.00	SS-2	4	67	2.25	10	2	9	53	26	32	24	8	27	A-4b (8)	-
LATITUDE = 41.100722	04.00	05.50	SS-3	4	44	1.00				SAME AS SS-2					11	A-4b (VISUAL)	_
LONGITUDE = -81.390744	05.50	07.00	SS-4	7	100	3.00				SILTY CLAY					23	A-6b (VISUAL)	_
B-032-0-20	01.00	02.50	SS-1	6	56	1.50	7	3	15	51	24	27	23	4	15	A-4b (8)	100
STA. 216+58 ; 20′ LT.	02.50	04.00	SS-2	6	100	1.75	11	7	31	36	15	22	17	5	15	A-4a (3)	-
LATITUDE = 41.100692	04.00	05.50	SS-3	8	100	1.50				SAME AS SS-2					13	A-4a (VISUAL)	_
LONGITUDE = -81.389453	05.50	07.00	SS-4	7	100	1.00				SAME AS SS-2					13	A-4a (VISUAL)	_



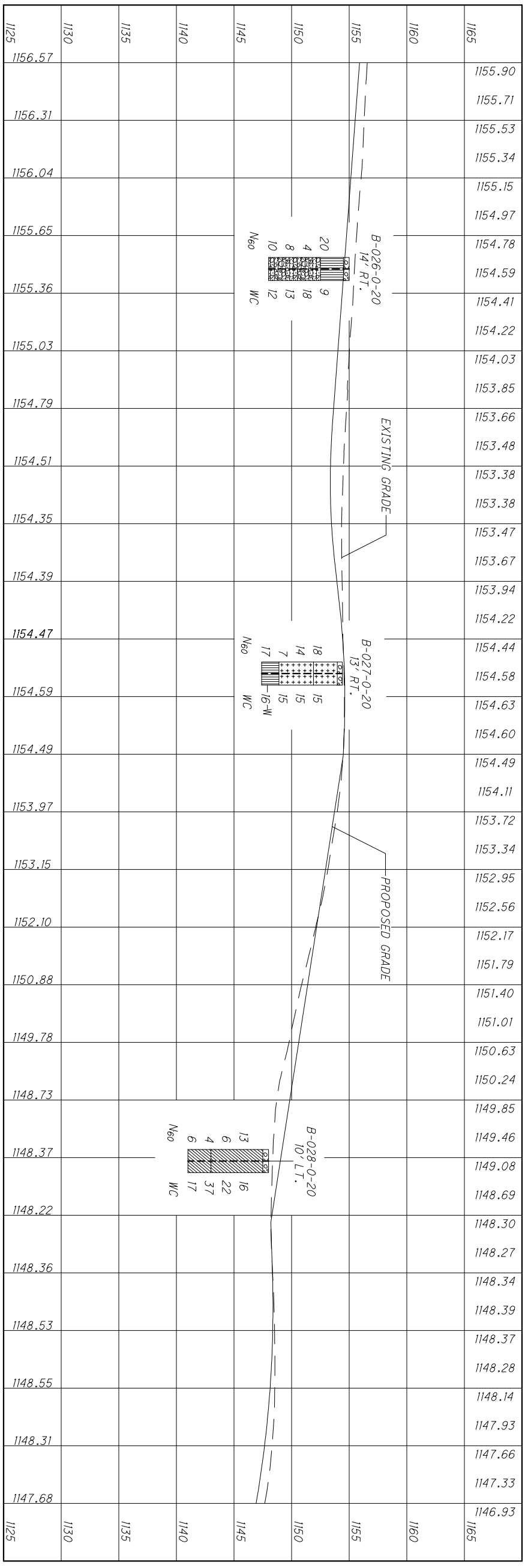
4/9	SUM-EAST AVENUE	SOIL PROFILE - EAST AVENUE STA. 154+75.00 TO STA. 166+00.00	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET	N

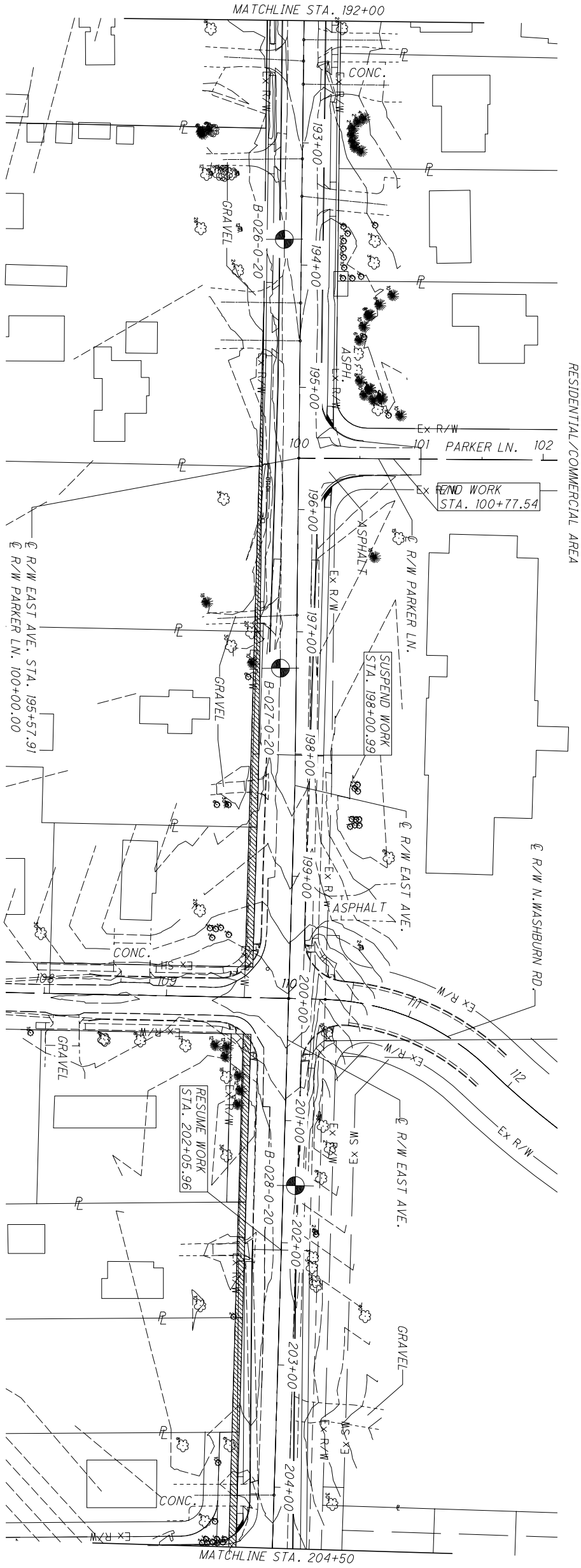


	5/9	SUM-EAST AVENUE	SOIL PROFILE - EAST AVENUE STA. 166+00.00 TO STA. 179+00.00	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET

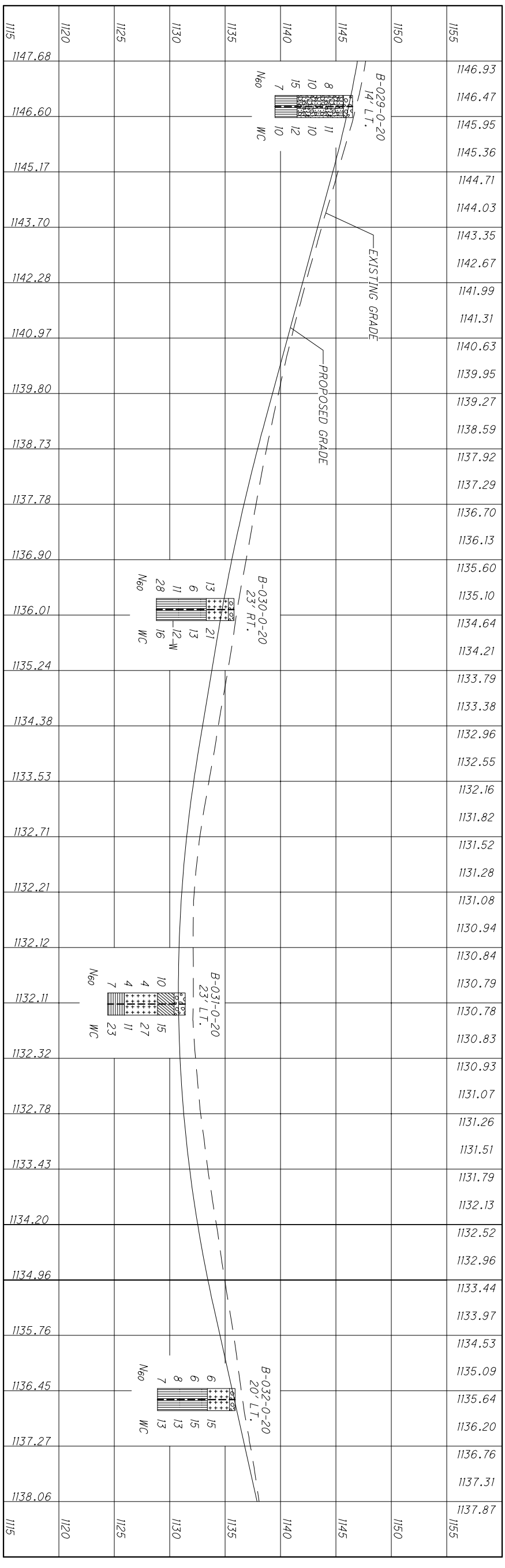


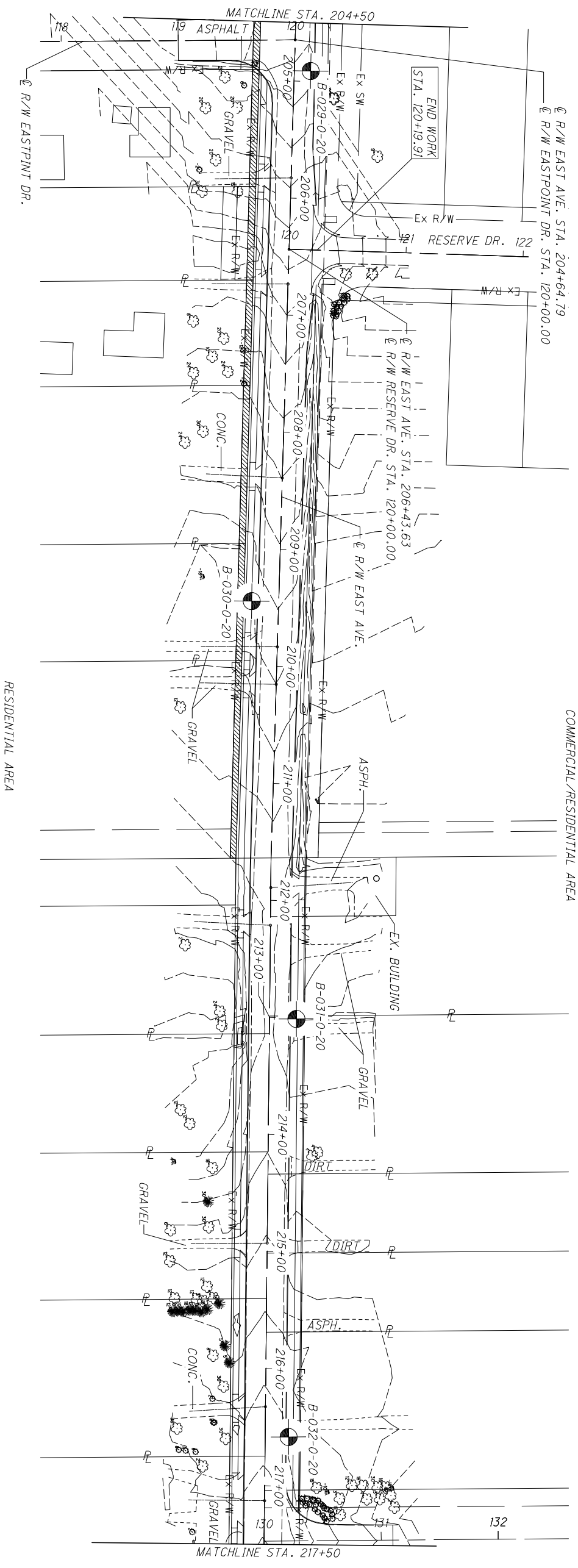
6/9	**SUM-EAST AVENUE**	**SOIL PROFILE - EAST AVENUE** **STA. 179+00.00 TO STA. 192+00.00**	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET	N





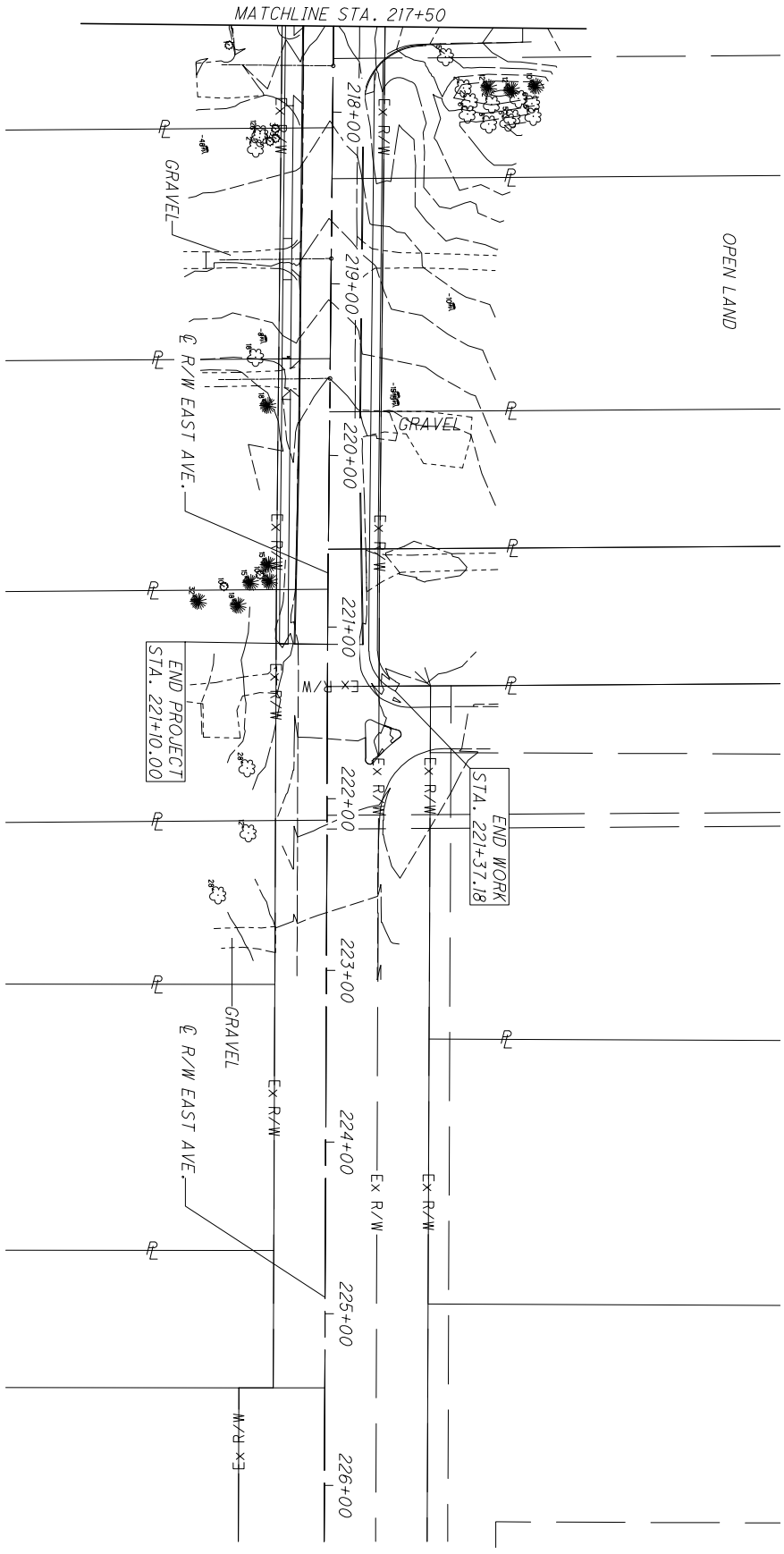
	7/9	**SUM-EAST AVENUE**	**SOIL PROFILE - EAST AVENUE** **STA. 192+00.00 TO STA. 204+50.00**	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET



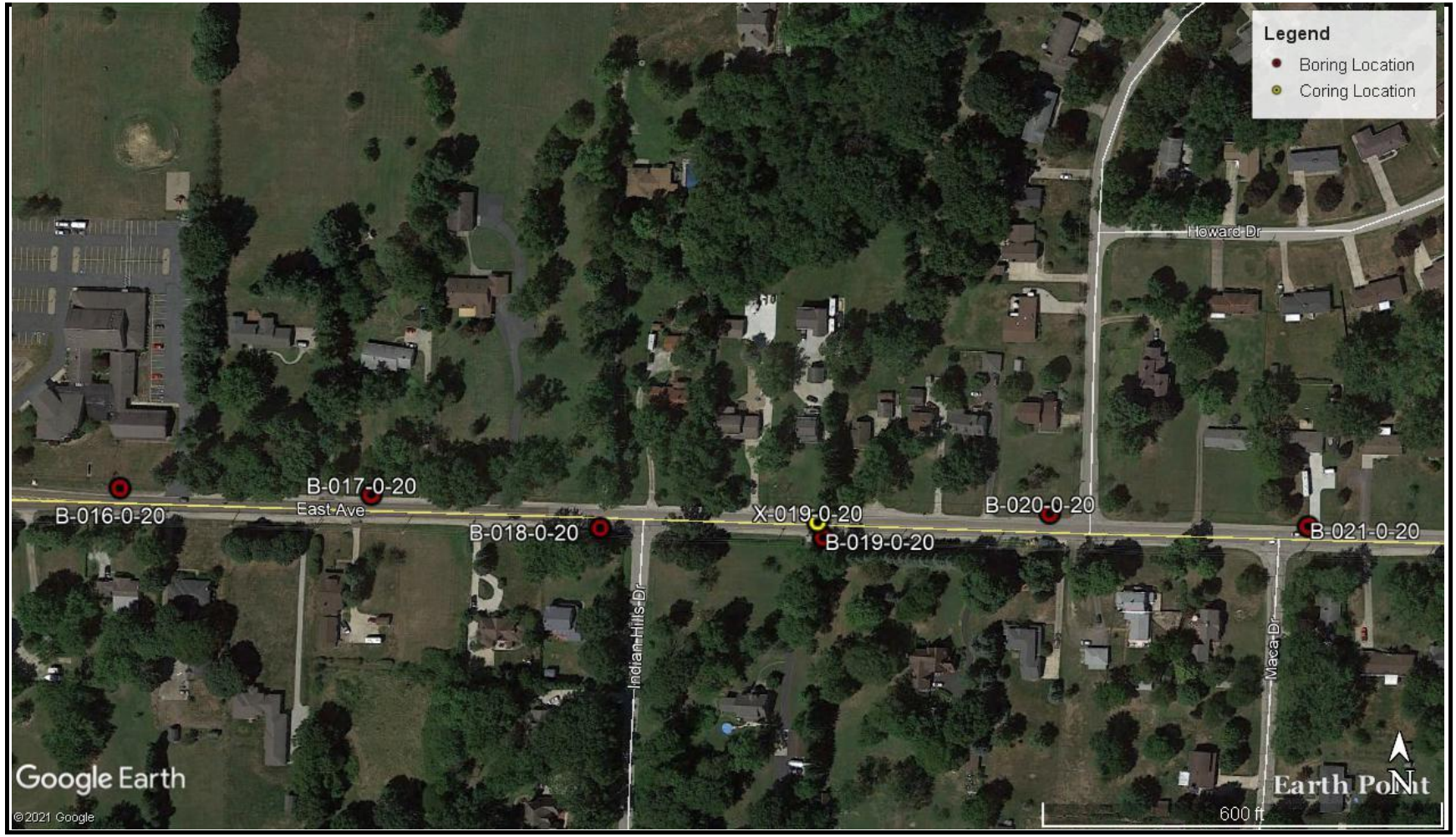


8/9	SUM-EAST AVENUE	SOIL PROFILE - EAST AVENUE STA. 204+50.00 TO STA. 217+50.00	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET	N

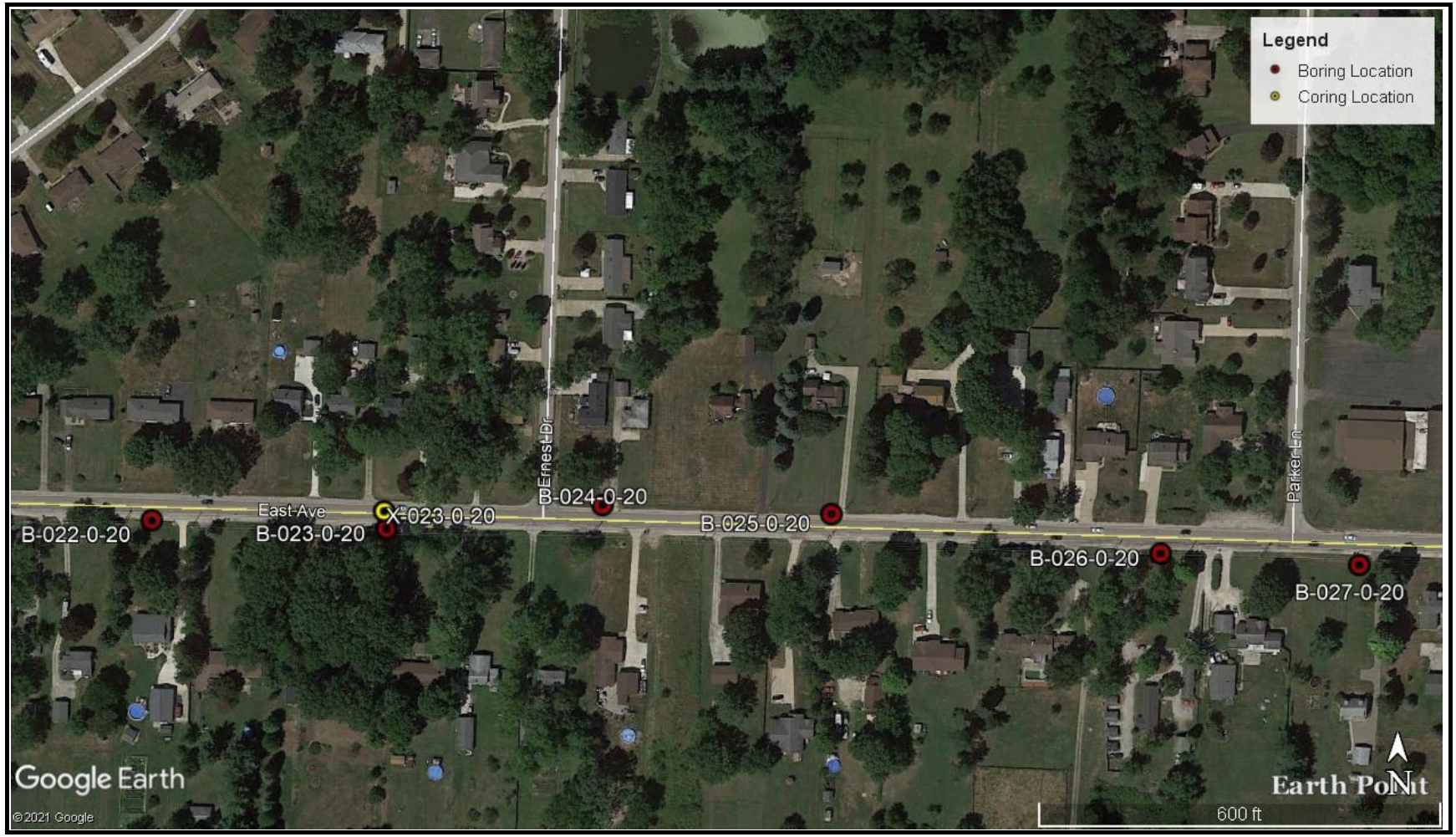
	1110	1115	1120	1125	1130	1135	1140	1145	1150
218+00	1138.06							EXISTING GRADE	1137.87
	1138.88								1138.43
									1138.99
	1139.75								1139.54
									1140.10
219+00	1140.76								1140.66
									1141.21
	1141.88								1141.73
									1142.17
220+00	1142.72							PROPOSED GRADE	1142.52
									1142.80
	1143.09								1142.99
									1143.11
221+00	1143.11								1143.14
									1143.09
	1142.59								
222+00	1141.79								
	1140.84								
223+00	1139.83								
	1110	1115	1120	1125	1130	1135	1140	1145	1150



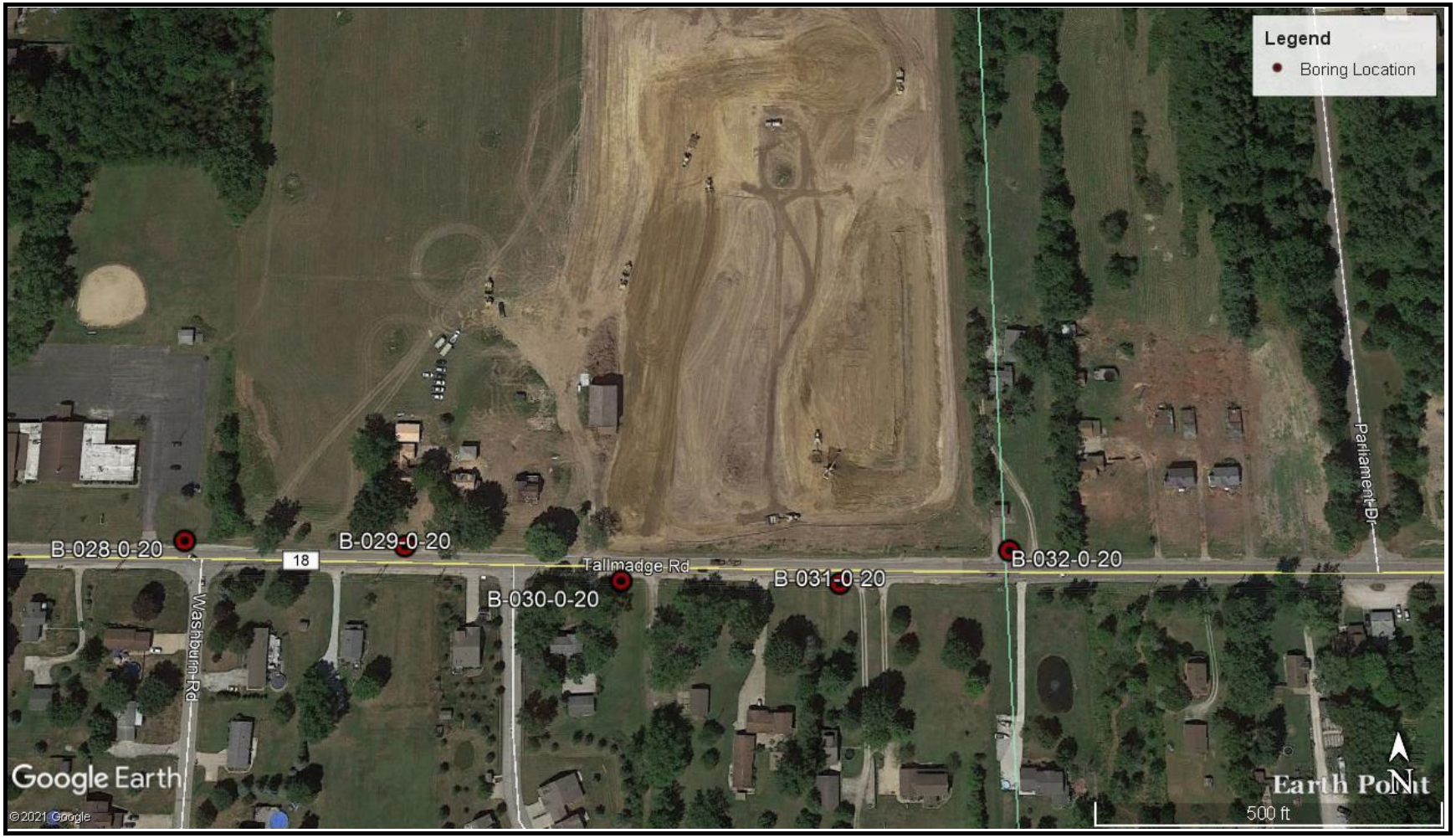
9/9	SUM-EAST AVENUE	SOIL PROFILE - EAST AVENUE STA. 217+50.00 TO STA. 223+00.00	DRAWN N.K.S CHECKED MK	0 50 25 100 HORIZONTAL SCALE IN FEET	N



	SITE LOCATION MAP			
	Date 7/7/2021	GPD GROUP SUM-CR630 (East Avenue) Improvements Tallmadge, Summit County Ohio		
CTL ENGINEERING, INC. GEOTECHNICAL ENGINEERS TESTING * INSPECTION LABORATORY SERVICES	**Scale** None			
	Drawn By NKM	**Reviewed By** MK	**Page** 4 of 6	**Project No.** 20050041CLE



	SITE LOCATION MAP			
	Date 7/7/2021	GPD GROUP SUM-CR630 (East Avenue) Improvements Tallmadge, Summit County Ohio		
CTL ENGINEERING, INC. GEOTECHNICAL ENGINEERS TESTING * INSPECTION LABORATORY SERVICES	**Scale** None			
	Drawn By NKM	**Reviewed By** MK	**Page** 5 of 6	**Project No.** 20050041CLE



	SITE LOCATION MAP			
	Date 7/7/2021	GPD GROUP SUM-CR630 (East Avenue) Improvements Tallmadge, Summit County Ohio		
CTL ENGINEERING, INC. GEOTECHNICAL ENGINEERS TESTING * INSPECTION LABORATORY SERVICES	**Scale** None			
	Drawn By NKM	**Reviewed By** MK	**Page** 6 of 6	**Project No.** 20050041CLE

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 155+11, 16' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1155.7 (MSL) EOB: 8.0 ft.
LAT / LONG: 41.101156, -81.411744

EXPLORATION ID B-016-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1155.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
ASPHALT(12")	1154.7																		
RED MACADAM (8")	1154.0																		
STIFF, BROWN, **SANDY SILT**, SOME GRAVEL,TRACE CLAY, DAMP TO MOIST (FILL)		1																	
		2	2 3 4	10	100	SS-1	2.00	9	9	25	40	17	NP	NP	NP	12	A-4a (4)	100	
		3																	
		4	1 2 2	6	100	SS-2	1.25	29	7	23	32	9	23	16	7	17	A-4a (1)	-	
		5																	
		6	2 3 3	8	78	SS-3	1.25	-	-	-	-	-	-	-	-	17	A-4a (V)	-	
@6.8' SEEPAGE SEAM		7	1 1 1	3	78	SS-4	1.25	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
	1147.7	EOB 8																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 159+01, 10' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1153.6 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.101111, -81.410331

EXPLORATION ID B-017-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1153.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
GRAVEL (8")	1153.0																		
VERY STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, TRACE TO LITTLE CLAY, DAMP TO MOIST (FILL)		1	3 3 3	8	100	SS-1	3.50	18	10	33	30	9	22	15	7	15	A-4a (1)	200	
		2	2 3 5	11	100	SS-2	2.50	17	7	19	40	17	26	17	9	18	A-4a (4)	-	
		3	3 5 5	14	100	SS-3	2.50	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
		4 5 6	3 10 10	28	67	SS-4	2.00	-	-	-	-	-	-	-	-	21	A-4a (V)	-	
	1146.6 EOB	7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS	DRILLING FIRM / OPERATOR: OTB / L.GIBEL	DRILL RIG: SIMCO	STATION / OFFSET: 162+63, 10' RT.
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: OTB / L.GIBEL	HAMMER: SIMCO AUTOMATIC	ALIGNMENT: EAST AVENUE
PID: 112869 SFN:	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 6/1/12	ELEVATION: 1146.7 (MSL) EOB: 8.0 ft.
START: 1/6/21 END: 1/6/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 84.5	LAT / LONG: 41.101033, -81.409022

EXPLORATION ID B-018-0-20

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1146.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
ASPHALT(8")	1146.0																		
CONCRETE WITH REBAR (10")	1145.2																		
LOOSE TO MEDIUM DENSE, BROWN, **SILT**, SOME SAND,TRACE GRAVEL, TRACE CLAY, WET (FILL)			2 6 10	23	100	SS-1	1.25	6	5	19	62	8	NP	NP	NP	24	A-4b (7)	100	
	1141.7		3 2 3	7	100	SS-2	1.00	-	-	-	-	-	-	-	-	36	A-4b (V)	-	
VERY STIFF, GREY, **SANDY SILT**, AND GRAVEL, LITTLE CLAY, DAMP			2 3 4	10	94	SS-3	2.50	35	1	3	40	21	37	27	10	20	A-4a (5)	-	
	1138.7	EOB	3 4 4	11	100	SS-4	2.00	-	-	-	-	-	-	-	-	21	A-4a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/6/21 END: 1/6/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 166+44, 16' RT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1147.4 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100992, -81.407639

EXPLORATION ID B-019-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1147.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (8")	1146.8																		
VERY STIFF, BROWN, **SANDY SILT**, WET (FILL)		1	3 4 5	13	89	SS-1	2.00	4	9	39	43	5	NP	NP	NP	18	A-4a (3)	100	
	1143.4	2	2 3 4	10	100	SS-2	2.25	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
VERY STIFF TO HARD, BROWN, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, MOIST		3 4 5	3 5 7	17	100	SS-3	2.50	17	8	22	39	14	23	17	6	12	A-4a (4)	-	
		6 7	5 6 7	18	100	SS-4	4.50	-	-	-	-	-	-	-	-	14	A-4a (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS	DRILLING FIRM / OPERATOR: OTB / L.GIBEL	DRILL RIG: SIMCO	STATION / OFFSET: 170+73, 21' LT.
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: OTB / L.GIBEL	HAMMER: SIMCO AUTOMATIC	ALIGNMENT: EAST AVENUE
PID: 112869 SFN:	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 6/1/12	ELEVATION: 1156.5 (MSL) EOB: 7.0 ft.
START: 1/4/21 END: 1/4/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 84.5	LAT / LONG: 41.101067, -81.406081

EXPLORATION ID B-020-0-20

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
ASPHALT(8")	1156.5																		
	1155.8																		
VERY STIFF TO HARD, BROWN, **SANDY SILT**, LITTLE TO SOME GRAVEL, SOME CLAY, WET (FILL)		1	2 3 4	10	78	SS-1	4.25	16	5	17	38	24	23	17	6	24	A-4a (5)	100	
		2	2 2 5	10	100	SS-2	4.00	28	2	6	39	25	20	14	6	29	A-4a (6)	-	
	1152.5	3																	
VERY STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, DAMP		4	3 5 5	14	100	SS-3	2.25	10	5	25	47	13	31	23	8	21	A-4a (5)	-	
		5																	
		6	2 3 4	10	100	SS-4	2.50	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
	1149.5	EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 175+00, 14' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1155.9 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.101017, -81.404533

EXPLORATION ID B-021-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1155.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
ASPHALT(5")	1155.4																		
GRAVEL BASE (5")	1155.0																		
LOOSE TO MEDIUM DENSE, BROWN, **SANDY SILT**, AND GRAVEL, TRACE CLAY, DAMP (FILL)		1	3 7 8	21	67	SS-1	-	41	8	13	30	8	23	15	8	5	A-4a (1)	100	
		2																	
		3	1 1 3	6	67	SS-2	-	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
@4.0' VERY LOOSE, LITTLE GRAVEL, SOME CLAY		4	1 1 1	3	89	SS-3	-	14	6	17	42	21	24	18	6	16	A-4a (6)	-	
	1150.4	5																	
VERY LOOSE, BROWN, **SANDY SILT**, SOME CLAY, SOME GRAVEL, MOIST		6	1 1 2	4	0	SS-4	-	-	-	-	-	-	-	-	-	-	A-4a (V)	-	
	1148.9	EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/6/21 END: 1/6/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 179+92, 21' RT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1152.0 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100886, -81.402747

EXPLORATION ID B-022-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (10")	1152.0																		
VERY STIFF, BROWN, **SANDY SILT**, MOIST (FILL)	1151.1	1	3 4 5	13	78	SS-1	3.50	-	-	-	-	-	-	-	-	17	A-4a (V)	100	
LOOSE, BROWN, **SILT**, SOME CLAY, TRACE GRAVEL, TRACE SAND, MOIST (FILL)	1149.5	2																	
VERY STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, MOIST (FILL)	1148.0	3	1 2 3	7	100	SS-2	2.00	8	1	6	61	24	32	23	9	25	A-4b (8)	-	
	1146.5	4	2 2 3	7	100	SS-3	2.50	16	8	24	35	17	29	19	10	21	A-4a (3)	-	
MEDIUM STIFF, BROWN, **SANDY SILT**, LITTLE CLAY, MOIST	1145.0	5 6	2 3 5	11	100	SS-4	1.00	-	-	-	-	-	-	-	-	15	A-4a (V)	-	
	EOB	7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS	DRILLING FIRM / OPERATOR: OTB / L.GIBEL	DRILL RIG: SIMCO	STATION / OFFSET: 183+49, 7' RT.	EXPLORATION ID B-023-0-20
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: OTB / L.GIBEL	HAMMER: SIMCO AUTOMATIC	ALIGNMENT: EAST AVENUE	
PID: 112869 SFN:	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 6/1/12	ELEVATION: 1153.8 (MSL) EOB: 7.0 ft.	PAGE 1 OF 1
START: 1/6/21 END: 1/6/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 84.5	LAT / LONG: 41.100903, -81.401453	

MATERIAL DESCRIPTION AND NOTES	ELEV. 1153.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (8")	1153.1																		
STIFF, BROWN, **SILT AND CLAY**, SOME SAND, LITTLE GRAVEL, DAMP (FILL)		1	2 3 4	10	0	SS-1	-	-	-	-	-	-	-	-	-	12	A-6a (V)	100	
		2																	
		3	2 2 3	7	100	SS-2	1.50	17	16	11	38	18	26	15	11	15	A-6a (5)	-	
		4																	
		5	2 3 4	10	100	SS-3	1.25	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
	1148.3																		
STIFF, BROWN, **SANDY SILT**, DAMP		6	2 2 2	6	100	SS-4	1.00	12	11	28	41	8	19	14	5	12	A-4a (3)	-	
	1146.8	EOB 7																	

NOTES: SS-1: DRILLERS OBTAINED AUGER CUTTINGS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\2005004\1CLE.GPD.SUM-CR-630\BORING LOGS & LAB\2005004\1CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 185+85, 12' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1155.2 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100936, -81.400594

EXPLORATION ID B-024-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (8")	1155.2																		
	1154.5																		
VERY STIFF, BROWN, **SILT AND CLAY**, LITTLE GRAVEL, TRACE SAND, MOIST (FILL)		1	2 3 4	10	78	SS-1	4.00	18	2	8	53	19	29	16	13	18	A-6a (9)	100	
	1152.7	2																	
STIFF TO VERY STIFF, BROWN, **SANDY SILT**, TRACE CLAY, TRACE GRAVEL, DAMP TO MOIST		3	2 3 4	10	100	SS-2	1.00	3	21	38	30	8	26	17	9	14	A-4a (1)	-	
		4	2 3 4	10	100	SS-3	2.50	-	-	-	-	-	-	-	-	21	A-4a (V)	-	
		5																	
		6	2 2 3	7	100	SS-4	1.50	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
	1148.2	EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 190+23, 16' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1157.1 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100919, -81.399006

EXPLORATION ID B-025-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (5")	1157.1																		
VERY STIFF, BROWN, **SILT AND CLAY**, SOME GRAVEL,LITTLE SAND, MOIST (FILL)	1156.7		2 3 4	10	78	SS-1	2.50	-	-	-	-	-	-	-	-	16	A-6a (V)	100	
VERY STIFF, BROWN, **SANDY SILT**, SOME GRAVEL,LITTLE CLAY, DAMP (FILL)	1153.1		1 2 2	6	72	SS-2	2.00	23	5	13	39	20	27	14	13	15	A-6a (6)	-	
			1 1 2	4	78	SS-3	2.00	24	5	13	39	19	27	18	9	16	A-4a (5)	-	
	1150.1	EOB	1 1 1	3	67	SS-4	2.00	-	-	-	-	-	-	-	-	17	A-4a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/6/21 END: 1/6/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 193+79, 14' RT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1155.0 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100811, -81.397717

EXPLORATION ID B-026-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1155.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (6")	1154.5																		
HARD, BROWN, **SANDY SILT**, AND GRAVEL, LITTLE CLAY, MOIST (FILL)	1152.5	1	2 7 7	20	78	SS-1	4.50	43	4	12	30	11	26	15	11	9	A-6a (1)	360	
VERY LOOSE TO LOOSE, BROWN, **GRAVEL WITH SAND, SILT, AND CLAY**, WET TO MOIST		2	2 1 2	4	100	SS-2	1.00	31	3	32	16	18	34	20	14	18	A-2-6 (1)	-	
		3	2 3 3	8	100	SS-3	3.00	-	-	-	-	-	-	-	-	13	A-2-6 (V)	-	
		4	3 3 4	10	100	SS-4	-	-	-	-	-	-	-	-	-	12	A-2-6 (V)	-	
	1148.0	EOB 5 6 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/6/21 END: 1/6/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 197+30, 13' RT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1154.4 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100792, -81.396444

EXPLORATION ID B-027-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1154.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (5")	1154.0																		
MEDIUM DENSE, BROWN, **SILT**, SOME CLAY, LITTLE SAND, TRACE GRAVEL, DAMP (FILL)	1151.9	1	6 6 7	18	78	SS-1	4.00	5	3	13	52	27	25	15	10	15	A-4b (8)	200	
LOOSE TO MEDIUM DENSE, BROWN, **SILT**, SOME SAND, TRACE GRAVEL, TRACE CLAY, MOIST	1148.9	3	1 4 6	14	100	SS-2	-	2	8	23	64	3	NP	NP	NP	15	A-4b (6)	-	
		4	2 2 3	7	100	SS-3	-	-	-	-	-	-	-	-	-	15	A-4b (V)	-	
STIFF, BROWN, **SANDY SILT**, MOIST	1147.4	6 W 1147.9	5 5 7	17	100	SS-4	1.75	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS	DRILLING FIRM / OPERATOR: OTB / L.GIBEL	DRILL RIG: SIMCO	STATION / OFFSET: 201+53, 10' LT.
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: OTB / L.GIBEL	HAMMER: SIMCO AUTOMATIC	ALIGNMENT: EAST AVENUE
PID: 112869 SFN:	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 6/1/12	ELEVATION: 1148.0 (MSL) EOB: 7.0 ft.
START: 1/4/21 END: 1/4/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 84.5	LAT / LONG: 41.100811, -81.394908

EXPLORATION ID B-028-0-20

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1148.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
GRAVEL (6")	1147.5																		
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, AND GRAVEL, LITTLE SAND, MOIST TO WET (FILL)		1	2 4 5	13	72	SS-1	4.00	31	5	15	36	13	25	12	13	16	A-6a (4)	100	
		2																	
		3	1 2 2	6	100	SS-2	2.00	-	-	-	-	-	-	-	-	22	A-6a (V)	-	
	1143.0	4																	
STIFF, GREY, **SILT AND CLAY**, MOIST		5	1 1 2	4	100	SS-3	2.25	40	0	2	32	26	38	26	12	37	A-6a (5)	-	
		6	1 2 2	6	100	SS-4	1.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	1141.0	EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 204+91, 14' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1146.5 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100783, -81.393681

EXPLORATION ID B-029-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1146.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
CINDERS AND SLAG (10")	1145.7																		
LOOSE TO MEDIUM DENSE, BROWN, **GRAVEL WITH SAND AND SILT**, TRACE CLAY, DAMP (FILL)	1141.5	1 2 3 4	3 3 3 2 3 4	8	78	SS-1	3.00	15	10	41	27	7	21	13	8	11	A-2-4 (0)	100	
			2 3 4	10	56	SS-2	1.50	-	-	-	-	-	-	-	-	10	A-2-4 (V)	-	
VERY STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, SOME CLAY, DAMP	1139.5	5	2 3 8	15	72	SS-3	2.50	-	-	-	-	-	-	-	-	12	A-2-4 (V)	-	
		6 EOB 7	2 3 2	7	78	SS-4	2.50	14	5	13	44	24	25	17	8	10	A-4a (7)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS	DRILLING FIRM / OPERATOR: OTB / L.GIBEL	DRILL RIG: SIMCO	STATION / OFFSET: 209+45, 23' RT.
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: OTB / L.GIBEL	HAMMER: SIMCO AUTOMATIC	ALIGNMENT: EAST AVENUE
PID: 112869 SFN:	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 6/1/12	ELEVATION: 1135.8 (MSL) EOB: 7.0 ft.
START: 1/6/21 END: 1/6/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 84.5	LAT / LONG: 41.100664, -81.392033

EXPLORATION ID B-030-0-20

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1135.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
LIMESTONE GRAVEL (6")	1135.3																		
MEDIUM DENSE, BROWN, **SILT**, SOME CLAY, LITTLE SAND, TRACE GRAVEL, DAMP (FILL)	1133.3	1	4 5 4	13	89	SS-1	3.00	10	2	10	53	25	26	22	4	21	A-4b (8)	100	
STIFF, BROWN, **SANDY SILT**, AND GRAVEL,LITTLE CLAY, DAMP		2																	
		3	2 2 2	6	67	SS-2	1.50	40	8	15	24	13	25	18	7	13	A-4a (0)	-	
		4																	
		5	2 3 5	11	100	SS-3	1.75	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
	W 1130.3	6	4 10 10	28	89	SS-4	1.00	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
	1128.8 EOB	7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/4/21 END: 1/4/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 213+01, 23' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1131.4 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100722, -81.390744

EXPLORATION ID B-031-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1131.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
GRAVEL (12")	1130.4																		
STIFF, BROWN, **SILT AND CLAY**, TRACE SAND, TRACE GRAVEL, DAMP (FILL)	1128.9	1	4 4 3	10	89	SS-1	1.50	3	1	5	67	24	31	16	15	15	A-6a (10)	100	
VERY LOOSE, BROWN, **SILT**, SOME CLAY, LITTLE SAND, TRACE GRAVEL, MOIST TO DAMP (FILL)	1125.9	2	1 1 2	4	67	SS-2	2.25	10	2	9	53	26	32	24	8	27	A-4b (8)	-	
		3	1 1 2	4	44	SS-3	1.00	-	-	-	-	-	-	-	-	11	A-4b (V)	-	
VERY STIFF, BROWN, **SILTY CLAY**, MOIST	1124.4	4	1 2 3	7	100	SS-4	3.00	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
		EOB 5																	
		6																	
		7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 11/10/21 14:30 - K:\DEPARTMENT 05\2020 PROJECTS\20050041CLE.GPD.SUM-CR-630\BORING LOGS & LAB\20050041CLE.GPJ

PROJECT: SUM-CR630 IMPROVEMENTS
TYPE: ROADWAY
PID: 112869 SFN:
START: 1/6/21 END: 1/6/21

DRILLING FIRM / OPERATOR: OTB / L.GIBEL
SAMPLING FIRM / LOGGER: OTB / L.GIBEL
DRILLING METHOD: 4.25" HSA
SAMPLING METHOD: SPT

DRILL RIG: SIMCO
HAMMER: SIMCO AUTOMATIC
CALIBRATION DATE: 6/1/12
ENERGY RATIO (%): 84.5

STATION / OFFSET: 216+58, 20' LT.
ALIGNMENT: EAST AVENUE
ELEVATION: 1135.9 (MSL) EOB: 7.0 ft.
LAT / LONG: 41.100692, -81.389453

EXPLORATION ID B-032-0-20

MATERIAL DESCRIPTION AND NOTES	ELEV. 1135.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	ABAN-DONED
GRAVEL (6")	1135.4																		
LOOSE, BROWN, **SILT**, SOME CLAY, LITTLE SAND, TRACE GRAVEL, MOIST (FILL)	1133.4	1	2 2 2	6	56	SS-1	1.50	7	3	15	51	24	27	23	4	15	A-4b (8)	100	
STIFF, BROWN, **SANDY SILT**, LITTLE CLAY, LITTLE GRAVEL, DAMP		2 3 4 5	2 2 2	6	100	SS-2	1.75	11	7	31	36	15	22	17	5	15	A-4a (3)	-	
			2 3 3	8	100	SS-3	1.50	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
	1128.9	6 EOB 7	2 2 3	7	100	SS-4	1.00	-	-	-	-	-	-	-	-	13	A-4a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SEALED ASPHALT PATCH; BACKFILLED WITH AUGER CUTTINGS

APPENDIX B

- **CORE REPORT**

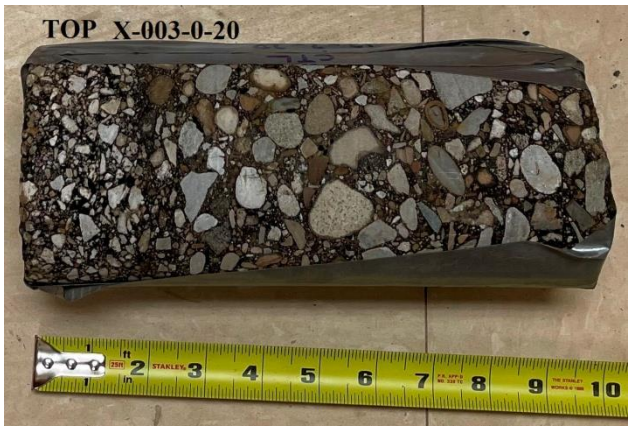
CTL Engineering, Inc.
3085 Interstate Parkway, Brunswick, Ohio 44212
Phone: 330/220-8900 • Fax: 330/220-8944
email: ctlcleve@ctleng.com

PAVEMENT CORE - DATA REPORT

Project: SUM-East Avenue (CR 630) **Core Date: 12/03/2020**
Project No.: 20050041CLE **Core diameter: 4 inches**

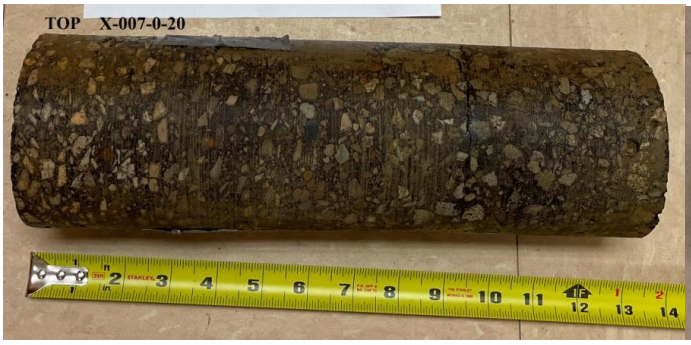
X-003-0-20: **Station/Offset (ft)**

2.0″ Surface Asphalt 103+13 / 8.75 RT
7.0″ Base Asphalt
9.0″ Total Pavement Section



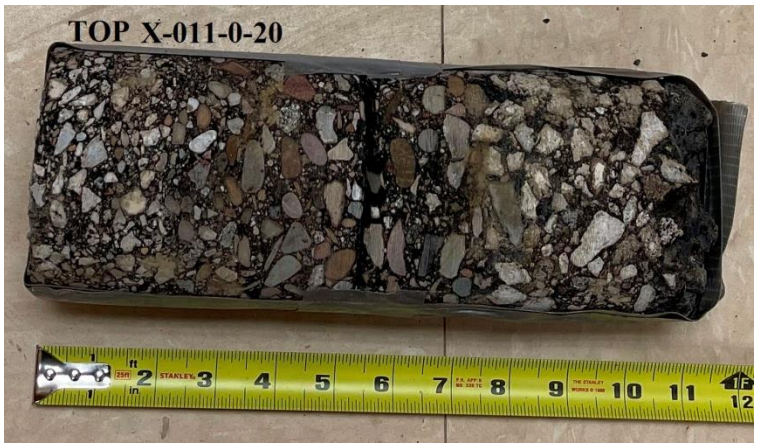
X-007-0-20: **Station/Offset (ft)**

12.5″ Surface/Intermediate Asphalt 121+45 / 6.88 RT
7.5″ Concrete
20.0″ Total Pavement Section



X-011-0-20: **Station/Offset (ft)**

3.5″ Surface Asphalt 136+00 / 13.4 RT
8.5″ Base Asphalt
12.0″ Total Pavement Section



X-015-0-20: **Station/Offset (ft)**

4.0″ Surface Asphalt 151+03 / 10.4 LT
6.0″ Base Asphalt
10.0″ Total Pavement Section

X-019-0-20: **Station/Offset (ft)**

6.0″ Surface Asphalt
5.5″ Base Asphalt
6.5″ Concrete
18″ Total Pavement Section

166+44 / 16 LT

X-023-0-20: **Station/Offset (ft)**

9.5″ Surface Asphalt
1.5″ Base Asphalt
7.5″ Concrete
18.5″ Total Pavement Section

183+49 / 6.8 LT

APPENDIX C

- **GB1 SUBGRADE ANALYSIS**

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

SUM-E. AVE. (CR 630) - Phase 1
PID 112869

Tallmadge, Summit County, Ohio

CTL ENGINEERING INC

Prepared By: Edited by HMK
Date prepared: Wednesday, May 24, 2023

CTL ENGINEERING PVT LTD
3085 INTERSTATE PKWY
BRUNSWICK
OHIO 44212
330 220 8900
nkmanikkam@ctleng.com

NO. OF BORINGS: 17

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-016-0-20	EAST AVENUE	15511	16	Lt	SIMCO	85	1155.7	1154.4	1.3 C
2	B-017-0-20	EAST AVENUE	15901	10	Lt	SIMCO	85	1153.6	1152.6	1.1 C
3	B-018-0-20	EAST AVENUE	16263	10	Rt	SIMCO	85	1146.7	1145.4	1.3 C
4	B-019-0-20	EAST AVENUE	16644	16	Rt	SIMCO	85	1147.4	1146.6	0.9 C
5	B-020-0-20	EAST AVENUE	17073	21	Lt	SIMCO	85	1156.5	1155.1	1.4 C
6	B-021-0-20	EAST AVENUE	17500	14	Lt	SIMCO	85	1155.9	1154.8	1.1 C
7	B-022-0-20	EAST AVENUE	17992	21	Rt	SIMCO	85	1152.0	1151.1	0.9 C
8	B-023-0-20	EAST AVENUE	18349	7	Rt	SIMCO	85	1153.8	1152.4	1.4 C
9	B-024-0-20	EAST AVENUE	18585	12	Lt	SIMCO	85	1155.2	1153.9	1.3 C
10	B-025-0-20	EAST AVENUE	19023	16	Lt	SIMCO	85	1157.1	1156.0	1.1 C
11	B-026-0-20	EAST AVENUE	19379	14	Rt	SIMCO	85	1155.0	1154.0	1.0 C
12	B-027-0-20	EAST AVENUE	19730	13	Rt	SIMCO	85	1154.4	1153.0	1.3 C
13	B-028-0-20	EAST AVENUE	20153	10	Lt	SIMCO	85	1148.0	1146.9	1.1 C
14	B-029-0-20	EAST AVENUE	20491	14	Lt	SIMCO	85	1146.5	1145.4	1.1 C
15	B-030-0-20	EAST AVENUE	20945	23	Rt	SIMCO	85	1135.6	1134.7	0.9 C
16	B-031-0-20	EAST AVENUE	21301	23	Lt	SIMCO	85	1131.4	1130.6	0.8 C
17	B-032-0-20	EAST AVENUE	21658	20	Lt	SIMCO	85	1135.9	1135.0	0.9 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	SS-1	2.0	3.5	0.7	2.2	10		2	NP	NP	NP	40	17	57	12	11	A-4a	4	100		N_{60}		12"	Undercut 12"
	016-0	SS-2	3.5	5.0	2.2	3.7	6		1.25	23	16	7	32	9	41	17	11	A-4a	1						
	20	SS-3	5.0	6.5	3.7	5.2	8		1.25							17	10	A-4a	8						
		SS-4	6.5	8.0	5.2	6.7	3	3	1.25							14	10	A-4a							
2	B	SS-1	1.0	2.5	-0.1	1.4	8		3.5	22	15	7	30	9	39	15	10	A-4a	1	200		N_{60} & Mc		12"	Undercut 12"
	017-0	SS-2	2.5	4.0	1.4	2.9	11		2.5	26	17	9	40	17	57	18	12	A-4a	4			N_{60} & Mc			
	20	SS-3	4.0	5.5	2.9	4.4	14		2.5							16	10	A-4a	8						
		SS-4	5.5	7.0	4.4	5.9	28	8	2.5							21	10	A-4a	8						
3	B	SS-1	2.0	3.5	0.7	2.2	23		1.25	NP	NP	NP	62	8	70	24	11	A-4b	7	100	A-4b	HP & Mc	27"	12"	Undercut 27"
	018-0	SS-2	3.5	5.0	2.2	3.7	7		1							36	10	A-4b	8						
	20	SS-3	5.0	6.5	3.7	5.2	10		2.5	37	27	10	40	21	61	20	22	A-4a	5						
		SS-4	6.5	8.0	5.2	6.7	11	7	2							21	10	A-4a							
4	B	SS-1	1.0	2.5	0.1	1.6	13		2	NP	NP	NP	43	5	48	18	11	A-4a	3	100		N_{60} & Mc		12"	Undercut 12"
	019-0	SS-2	2.5	4.0	1.6	3.1	10		2.25							16	10	A-4a	8			N_{60} & Mc			
	20	SS-3	4.0	5.5	3.1	4.6	17		2.5	23	17	6	39	14	53	12	12	A-4a	4						
		SS-4	5.5	7.0	4.6	6.1	18	10	4.5							14	10	A-4a	8						
5	B	SS-1	1.0	2.5	-0.4	1.1	10		4.25	23	17	6	38	24	62	24	12	A-4a	5	100		N_{60} & Mc		12"	Undercut 12"
	020-0	SS-2	2.5	4.0	1.1	2.6	10		4	20	14	6	39	25	64	29	10	A-4a	6			N_{60} & Mc			
	20	SS-3	4.0	5.5	2.6	4.1	14		2	31	23	8	47	13	60	21	18	A-4a	5						
		SS-4	5.5	7.0	4.1	5.6	10	10	2.5								10	A-4a	8						
6	B	SS-1	1.0	2.5	-0.1	1.4	21			23	15	8	30	8	38	5	10	A-4a	1	100					
	021-0	SS-2	2.5	4.0	1.4	2.9	6									13	10	A-4a	8			N_{60} & Mc			
	20	SS-3	4.0	5.5	2.9	4.4	3			24	18	6	42	21	63	16	13	A-4a	6						
		SS-4	5.5	7.0	4.4	5.9	4	3									10	A-4a	8						
7	B	SS-1	1.0	2.5	0.1	1.6	13		3.5							17	10	A-4a	8	100		N_{60} & Mc		12"	Undercut 37"
	022-0	SS-2	2.5	4.0	1.6	3.1	7		2	32	23	9	61	24	85	25	18	A-4b	8		A-4b	N_{60} & Mc	37"		
	20	SS-3	4.0	5.5	3.1	4.6	7		2.5							21	10	A-4a	8						
		SS-4	5.5	7.0	4.6	6.1	11	7	1	29	19	10	35	17	52	15	14	A-4a	3						
8	B	SS-1	1.0	2.5	-0.4	1.1	10									12	14	A-6a	10	100		N_{60}		12"	Undercut 15"
	023-0	SS-2	2.5	4.0	1.1	2.6	7		1.5	26	15	11	38	18	56	15	14	A-6a	5			HP		15"	
	20	SS-3	4.0	5.5	2.6	4.1	10		1.25							15	14	A-6a	10						
		SS-4	5.5	7.0	4.1	5.6	6	6	1	19	14	5	41	8	49	12	10	A-4a	3						
9	B	SS-1	1.0	2.5	-0.3	1.2	10		4	29	16	13	53	19	72	18	14	A-6a	9	100		N_{60} & Mc		12"	Undercut 12"
	024-0	SS-2	2.5	4.0	1.2	2.7	10		1	26	17	9	30	8	38	14	12	A-4a	1			HP			
	20	SS-3	4.0	5.5	2.7	4.2	10		2.5							21	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
		SS-4	5.5	7.0	4.2	5.7	7	7	1.5							16	10	A-4a	8						
10	B	SS-1	1.0	2.5	-0.1	1.4	10		2.5							16	14	A-6a	10	100		N_{60}		12"	Undercut 12"
	025-0	SS-2	2.5	4.0	1.4	2.9	6		2	27	14	13	39	20	59	15	14	A-6a	6			N_{60}			
	20	SS-3	4.0	5.5	2.9	4.4	4		2	27	18	9	39	19	58	16	13	A-4a	5						
		SS-4	5.5	7.0	4.4	5.9	3	3	2																
11	B	SS-1	1.0	2.5	0.0	1.5	20		4.5	26	15	11	30	11	41	9	14	A-6a	1	360					
	026-0	SS-2	2.5	4.0	1.5	3.0	4		1	34	20	14	16	18	34	18	10	A-2-6	1			HP & Mc			
	20	SS-3	4.0	5.5	3.0	4.5	8		3							13	10	A-2-6	4						
		SS-4	5.5	7.0	4.5	6.0	10	4								12	10	A-2-6	4						
12	B	SS-1	1.0	2.5	-0.3	1.2	18		4	25	15	10	52	27	79	15	10	A-4b	8	200	A-4b	Mc			Undercut 32"
	027-0	SS-2	2.5	4.0	1.2	2.7	14			NP	NP	NP	64	3	67	15	11	A-4b	6		A-4b	N_{60} & Mc	32"		
	20	SS-3	4.0	5.5	2.7	4.2	7									15	10	A-4b	8						
		SS-4	5.5	7.0	4.2	5.7	17	7	1.75							16	10	A-4a	8						
13	B	SS-1	1.0	2.5	-0.1	1.4	13		4	25	12	13	36	13	49	16	14	A-6a	4	100					
	028-0	SS-2	2.5	4.0	1.4	2.9	6		2							22	14	A-6a	10			N_{60} & Mc			
	20	SS-3	4.0	5.5	2.9	4.4	4		2.25	38	26	12	32	26	58	37	21	A-6a	5						
		SS-4	5.5	7.0	4.4	5.9	6	4	1.5							17	14	A-6a	10						
14	B	SS-1	1.0	2.5	-0.1	1.4	8		3	21	13	8	27	7	34	11	10	A-2-4	0	100		N_{60}		12"	Undercut 12"
	029-0	SS-2	2.5	4.0	1.4	2.9	10		1.5							10	10	A-2-4	0			HP			
	20	SS-3	4.0	5.5	2.9	4.4	15		2.5							12	10	A-2-4	0						
		SS-4	5.5	7.0	4.4	5.9	7	7	2.5	25	17	8	44	24	68	10	12	A-4a	7						
15	B	SS-1	1.0	2.5	0.1	1.6	13		3	26	22	4	53	25	78	21	17	A-4b	8	100	A-4b	N_{60} & Mc	20"	12"	Undercut 20"
	030-0	SS-2	2.5	4.0	1.6	3.1	6		1.5	25	18	7	24	13	37	13	13	A-4a	0			HP			
	20	SS-3	4.0	5.5	3.1	4.6	11		1.75							12	10	A-4a	8						
		SS-4	5.5	7.0	4.6	6.1	28	6	1							16	10	A-4a	8						
16	B	SS-1	1.0	2.5	0.3	1.8	10		1.5	31	16	15	67	24	91	15	14	A-6a	10	100		HP		12"	Undercut 39"
	031-0	SS-2	2.5	4.0	1.8	3.3	4		2.25	32	24	8	53	26	79	27	19	A-4b	8		A-4b	N_{60} & Mc	39"		
	20	SS-3	4.0	5.5	3.3	4.8	4		1							11	10	A-4b	8						
		SS-4	5.5	7.0	4.8	6.3	7	4	3							23	16	A-6b	16						
17	B	SS-1	1.0	2.5	0.1	1.6	6		1.5	27	23	4	51	24	75	15	18	A-4b	8	100	A-4b	HP	19"	18"	Undercut 19"
	032-0	SS-2	2.5	4.0	1.6	3.1	6		1.75	22	17	5	36	15	51	15	12	A-4a	3			HP & Mc			
	20	SS-3	4.0	5.5	3.1	4.6	8		1.5							13	10	A-4a	8						
		SS-4	5.5	7.0	4.6	6.1	8	6	1							13	10	A-4a	8						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

PID: PID 112869

County-Route-Section: SUM-E. AVE. (CR 630) - Phase 1
No. of Borings: 17

Geotechnical Consultant: CTL ENGINEERING INC
Prepared By: Edited by HMK
Date prepared: 5/24/2023

Chemical Stabilization Options		
320	Rubblize & Roll	No
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	14''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L): Average(HP):	18'' 0''
Global Geogrid Average(N60L): Average(HP):	12'' 0''

Design CBR	7

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	13%	HP ≤ 0.5	0%
$N_{60} < 12$	75%	0.5 < HP ≤ 1	12%
$12 \leq N_{60} < 15$	10%	1 < HP ≤ 2	37%
$N_{60} \geq 20$	7%	HP > 2	40%
M+	26%		
Rock	0%		
Unsuitable	15%		

Excavate and Replace at Surface	
Average	0''
Maximum	0''
Minimum	0''

% Proposed Subgrade Surface	
Unstable & Unsuitable	95%
Unstable	76%
Unsuitable	18%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	10	6	2.20	27	18	9	41	17	58	17	12	6
Maximum	28	10	4.50	38	27	15	67	27	91	37	22	16
Minimum	3	3	1.00	19	12	4	16	3	34	5	10	0

Classification Counts by Sample																		
ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	0	3	0	3	0	0	0	38	10	0	12	1	0	0	0	0	67
Percent	0%	0%	0%	4%	0%	4%	0%	0%	0%	57%	15%	0%	18%	1%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	66%									34%								100%
Surface Class Count	0	0	0	2	0	1	0	0	0	16	9	0	10	0	0	0	0	0	38
Surface Class Percent	0%	0%	0%	5%	0%	3%	0%	0%	0%	42%	24%	0%	26%	0%	0%	0%	0%	0%	100%

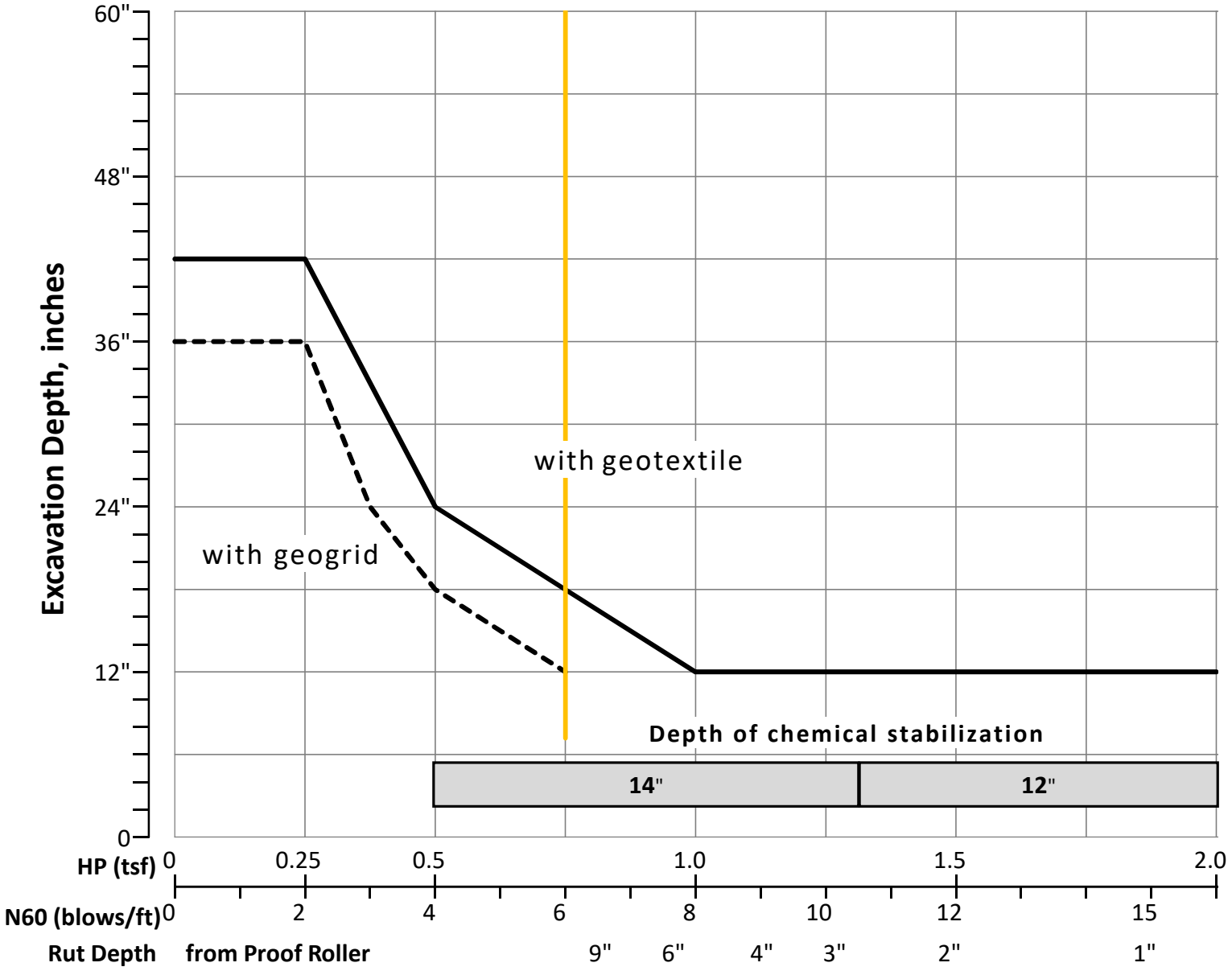
OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

GB1 Figure B –

Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
2.20	2.00	☐ HP
6.00	6.00	☐ N60L

Average HP

Average N_{60L}

APPENDIX D

- **DESIGN CHECKLISTS**

I. Geotechnical Design Checklists	
Project: SUM-EAST AVENUE (CR 630)	**PDP Path:**
PID: 112869	**Review Stage: Stage 1**

Checklist	Included in This Submission
II. Reconnaissance and Planning	Y
III. A. Centerline Cuts	N
III. B. Embankments	N
III. C. Subgrade	Y
IV. A. Foundations of Structures	N
IV. B. Retaining Wall	N
V. A. Landslide Remediation	N
V. B. Rockfall Remediation	N
V. C. Wetland or Peat Remediation	N
V. D. Underground Mine Remediation	N
V. E. Surface Mine Remediation	N
V. F. Karst Remediation	N
VI. A. Soil Profile	Y
VI. D. Geotechnical Reports	Y

II. Reconnaissance and Planning Checklist

C-R-S: SUM-EAST AVENUE (CR 630)	PID: 112869	Reviewer: MK	Date: 6/25/2021

Reconnaissance		(Y/N/X)	Notes:
1	Based on Section 302.1 in the SGE, have the necessary plans been developed in the following areas prior to the commencement of the subsurface exploration reconnaissance:		
	Roadway plans	Y	
	Structures plans		
	Geohazards plans		
2	Have the resources listed in Section 302.2.1 of the SGE been reviewed as part of the office reconnaissance?	Y	
3	Have all the features listed in Section 302.3 of the SGE been observed and evaluated during the field reconnaissance?	Y	
4	If notable features were discovered in the field reconnaissance, were the GPS coordinates of these features recorded?	X	Notable features were not discovered

Planning - General		(Y/N/X)	Notes:
5	In planning the geotechnical exploration program for the project, have the specific geologic conditions, the proposed work, and historic subsurface exploration work been considered?	Y	
6	Has the ODOT Transportation Information Mapping System (TIMS) been accessed to find all available historic boring information and inventoried geohazards?	Y	
7	Have the borings been located to develop the maximum subsurface information while using a minimum number of borings, utilizing historic geotechnical explorations to the fullest extent possible?	Y	
8	Have the topography, geologic origin of materials, surface manifestation of soil conditions, and any other special design considerations been utilized in determining the spacing and depth of borings?	Y	
9	Have the borings been located so as to provide adequate overhead clearance for the equipment, clearance of underground utilities, minimize damage to private property, and minimize disruption of traffic, without compromising the quality of the exploration?	Y	

II. Reconnaissance and Planning Checklist

Planning - General	(Y/N/X)	Notes:
10 Have the scaled boring plans, showing all project and historic borings, and a schedule of borings in tabular format, been submitted to the District Geotechnical Engineer?	Y	
The schedule of borings should present the following information for each boring:		
a. exploration identification number	Y	
b. location by station and offset	Y	
c. estimated amount of rock and soil, including the total for each for the entire program.	Y	
Planning – Exploration Number	(Y/N/X)	Notes:
11 Have the coordinates, stations and offsets of all explorations (borings, probes, test pits, etc.) been identified?	Y	
12 Has each exploration been assigned a unique identification number, in the following format X-ZZZ-W-YY, as per Section 303.2 of the SGE?	Y	
13 When referring to historic explorations that did not use the identification scheme in 12 above, have the historic explorations been assigned identification numbers according to Section 303.2 of the SGE?	X	Historic explorations are not available

II. Reconnaissance and Planning Checklist

Planning – Boring Types		(Y/N/X)	Notes:
14	Based on Sections 303.3 to 303.7.6 of the SGE, have the location, depth, and sampling requirements for the following boring types been determined for the project?		
	Check all boring types utilized for this project:		
	Existing Subgrades (Type A)		
	Roadway Borings (Type B)	Y	
	Embankment Foundations (Type B1)		
	Cut Sections (Type B2)		
	Sidehill Cut Sections (Type B3)		
	Sidehill Cut-Fill Sections (Type B4)		
	Sidehill Fill Sections on Unstable Slopes (Type B5)		
	Geohazard Borings (Type C)		
	Lakes, Ponds, and Low-Lying Areas (Type C1)		
	Peat Deposits, Compressible Soils, and Low Strength Soils (Type C2)		
	Uncontrolled Fills, Waste Pits, and Reclaimed Surface Mines (Type C3)		
	Underground Mines (C4)		
	Landslides (Type C5)		
	Rockfall (Type C6)		
	Karst (Type C7)		
	Proposed Underground Utilities (Type D)		
	Structure Borings (Type E)		
	Bridges (Type E1)		
	Culverts (Type E2 a,b,c)		
	Retaining Walls (Type E3 a,b,c)		
	Noise Barrier (Type E4)		
	CCTV & High Mast Lighting Towers (Type E5)		
	Buildings and Salt Domes (Type E6)		

III.C. Subgrade Checklist

C-R-S: SUM-EAST AVENUE (CR 630)	**PID:** 112869	**Reviewer:** MK	**Date:** 6/25/2021

If you do not have any subgrade work on the project, you do not have to fill out this checklist.

Subgrade	(Y/N/X)	Notes:
1 Has the subsurface exploration adequately characterized the soil or rock according to Geotechnical Bulletin 1: Plan Subgrades (GB1)?	Y	
a. Has each sample been visually classified and inspected for the presence of gypsum? Has a moisture content been performed on each sample?	Y	
b. Has mechanical classification (Plastic Limit (PL), Liquid Limit (LL), and gradation testing) been done on at least two samples from each boring within six feet of the proposed subgrade?	Y	
c. Has the sulfate content of at least one sample from each boring within 3 feet of the proposed subgrade been determined, per Supplement 1122, Determining Sulfate Content in Soils?	Y	
d. Has the sulfate content of all samples that exhibit gypsum crystals been determined?	X	Not encountered
e. Have A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b soils within the top 3 feet of the proposed subgrade been mechanically classified?	Y	
2 If soils classified as A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b, or having a LL>65, are present at the proposed subgrade (soil profile), do the plans specify that these materials need to be removed and replaced or chemically stabilized?	Y	
a. If these materials are to be removed and replaced, have the station limits, depth, and lateral limits for the planned removal been provided?	Y	
3 If there is any rock, shale, or coal present at the proposed subgrade (C&MS 204.05), do the plans specify the removal of the material?	X	Not encountered
a. If removal of any rock, shale, or coal is required, have the station limits, depth, and lateral limits for the planned removal of the material at proposed subgrade been provided?	X	Not encountered

III.C. Subgrade Checklist

Subgrade	(Y/N/X)	Notes:
4 In accordance with GB1, do the SPT (N_{60})/HP values and existing moisture contents for the proposed subgrade soils indicate the need for subgrade stabilization?	Y	
a. If removal and replacement is applicable, has the detail of subgrade removal been shown on the plans, including depth of removal, station limits, lateral extent, replacement material, and plan notes (Item 204 - Subgrade Compaction and Proof Rolling)?	Y	
b. If chemical stabilization is applicable, has the detail of this treatment been shown on the plans, including depth, percentage of chemical, station limits, lateral extent, and plan notes?	Y	
Indicate type of chemcial stabilization specified:		
cement stabilization	Y	
lime stabilization		
5 If removal and replacement has been specified, do the plans include Plan Note G121 from L&D3?	Y	
6 If drainage or groundwater is an issue with the proposed subgrade, has an appropriate drainage system (e.g., pipe, underdrains) been provided?	Y	
7 Has an appropriate quantity of Proof Rolling (C&MS 204.06) and has Plan Note G111 from L&D3 been included in the plans?	Y	
8 Has a design CBR value been provided?	Y	

VI.A. Soil Profile Checklist

C-R-S: SUM-EAST AVENUE (CR 630)	PID: 112869	Reviewer: MK	Date: 6/23/2021

General Presentation	(Y/N/X)	Notes:
1 Has an electronic copy of all geotechnical submissions been provided to the District Geotechnical Engineer (DGE)?	X	Stage 1 - Submitted to Prime Consultant
2 Have the cadd files been prepared using the appropriate version of the ODOT CADD standards?	Y	
3 Has the geotechnical specification (title and date) under which the work was performed been clearly identified on every submission (reports, plans, etc.)?	Y	
4 Has the first complete version of all documents being submitted been labeled as 'Draft'?	Y	
5 Subsequent to ODOT's review and approval, has the complete version of the revised documents being submitted been labeled as 'Final'?	X	Stage 1 - Submitted to Prime Consultant
a. Have the C-R-S, PID number, and product title been included in the folder name?	Y	
6 If the project includes structures, have all structure explorations been presented together under the same cover sheet? (Do not create separate Structure Foundation Exploration Sheets)	X	Does not include structure
7 Has a scale of 1"=1' been used for cover sheets, laboratory test data sheets, and boring log sheets, if applicable?	Y	
8 Based on the project length, has the correct horizontal scale been used to plot the project data?	Y	1"=50'
Check scale used:		
1" = 5', 10', 20', 25', 40', or 50' for projects 1500' or less (use largest scale appropriate to present entire plan on one sheet)		
1" = 50' projects greater than 1500'		
9 Has a scale of 1" = 10' been utilized for the vertical scale of the project data?	Y	
10 If the project includes structures, has the plan and profile view been shown at the same scale as the Site Plan for the proposed structure(s), when possible?	X	Does not include structure

VI.A. Soil Profile Checklist

General Presentation	(Y/N/X)	Notes:
11 If the project includes culverts, have the plan and profile been presented along the flowline of the culvert?	X	Not applicable
12 Have the cross-sections been plotted at a scale of 1" = 10' (preferred) or 1" = 20' (for higher or wider slopes)?	X	Not applicable
Cover Sheet	(Y/N/X)	Notes:
13 Has the following general information been provided on the cover sheet:		
a. Brief description of the project, including the bridge number of each bridge involved in the plan set, if any?	X	Not applicable
b. Brief description of historic geotechnical explorations referenced in this exploration? State if no historic records are available.	X	No historical records available
c. Generalized information about the geology of the project area, including terrain, soil origin, bedrock types, and age?	Y	
d. Brief presentation of geological and topographical information derived from the field reconnaissance? Include comments on structure and pavement conditions.	Y	
e. Brief presentation of test boring and sampling methods? Include date of last calibration and drill rod energy ratio as a percent for the hammer systems used.	Y	
f. Summary of general soil, bedrock, and groundwater conditions, including a generalized interpretation of findings?	Y	
g. A statement of which version (date) of the SGE specification the exploration was performed in accordance with?	Y	
h. Statement of where geotechnical reports are available for review?	Y	
i. Initials of personnel and dates they performed field reconnaissance, subsurface exploration and preparation of the soil profile?	Y	

VI.A. Soil Profile Checklist

Cover Sheet	(Y/N/X)	Notes:
14 Has a Legend been provided?	Y	
15 Have the following items been included in the Legend:		
a. Symbols and usual descriptions for only the soil and bedrock types presented in the Soil Profile, as per the Soil and Rock Symbology Chart in Appendix D of the SGE?	Y	
b. All miscellaneous symbols and acronyms, used on any of the sheets, defined?	Y	
c. The number of soil samples for each classification that were mechanically classified and visually described in the current exploration?	Y	
16 Has a Location Map, showing the beginning and end stations for the project, been shown on the cover sheet, sized per the L&D3 Manual?	Y	
17 Have the station limits for each plan and profile sheet for projects with multiple alignments, or greater than 1500', been identified in a table?	Y	
18 Have the station limits for any cross section sheets been identified in the same table?	N	
19 Has a list of any structures for which structure foundation explorations been performed been identified in the same table?	N	
20 If sampling and testing for a scour analysis was performed, has this data been shown in tabular form?	X	Not Applicable
21 Has a summary table of test data for all roadway and subgrade boring samples been shown?	Y	
22 If borings from previous subsurface explorations are being used, has that data been shown in a separate table?	X	Previous subsurface exploration was not available
23 In the summary table, has the data been displayed by roadway and subgrade boring in ascending stationing order for each roadway?	Y	
24 Have the centerline or baseline station, offset, and exploration identification number been provided for each boring presented in the table?	Y	

VI.A. Soil Profile Checklist

Cover Sheet	(Y/N/X)	Notes:
25 For each sample, has the following information been provided in the summary table:		
a. Sample depth interval?	Y	
b. Sample number and type?	Y	
c. N_{60}?	Y	
d. Percent recovery?	Y	
e. Hand Penetrometer?	Y	
f. Percentage of aggregate, coarse sand, fine sand, silt, and clay size particles?	Y	
g. Liquid limit, plastic limit, plasticity index, and water content, all rounded to the nearest percent or whole number?	Y	
h. ODOT classification and Group Index?	Y	
i. Visual description of samples not mechanically classified, including water content, and estimated ODOT classification with 'Visual' in parentheses?	Y	
j. Sulfate Content test results?	Y	
26 Have all undisturbed test results been displayed in graphical format on the sheet prior to the plan and profile sheets?	X	Undisturbed sample was not needed
Surface Data	(Y/N/X)	Notes:
27 Has the following information been shown on each roadway plan drawing:		
a. Existing surface features described in Section 702.5.1?	Y	
b. Proposed construction items, as described in Section 702.5.2?	Y	
c. Project and historic boring locations, with appropriate exploration targets and exploration identification numbers?	X	Historic borings were not available
d. Notes regarding observations not readily shown by drawings?	N	
28 Have the existing ground surface contours been presented?	Y	
29 If cross sections are to be developed for stationing covered on a plan sheet, has an index for the appropriate cross section sheets been included on the plan sheet?	X	No embankment

VI.A. Soil Profile Checklist

Subsurface Data	(Y/N/X)	Notes:
30 Has all the subsurface data been presented in the form of a profile along the centerline or baseline, and on cross sections where applicable?	Y	
31 Have the graphical boring logs been correctly shown, as follows:		
a. Location and depth of boring indicated by a heavy dashed vertical line?	Y	
b. Exploration identification number above the boring?	Y	
c. Logs indicate soil and bedrock layers with symbols 0.4” wide and centered on the heavy dashed vertical line where possible?	Y	
d. Bedrock exposures with 0.4” wide symbols, but without a heavy dashed vertical line?	X	Bedrock was not encountered
e. Soil and bedrock symbols as per ODOT Soil and Rock Symbology chart (SGE - Appendix D)?	Y	
f. Historical borings shown in same manner with the exploration identification number above the boring?	X	Historic borings were not available
32 Have the proposed groundline and existing groundline been shown on the profile view, according to ODOT CADD standards?	Y	
33 Have the locations of the proposed structure foundation elements been shown on the profile view?	X	No Structures
34 Have the offsets from centerline or baseline been indicated above the borings in the profile view?	Y	
35 Have borings located immediately adjacent to the centerline or baseline and considered representative of centerline or baseline subsurface conditions been referenced directly to the centerline or baseline?	Y	
36 Have offset borings in or near the same elevation interval of a centerline or baseline boring been plotted either on a cross section or immediately above or below the centerline boring in a box containing an elevation scale?	Y	

VI.A. Soil Profile Checklist

37	Have cross-sections been developed to show subsurface conditions disclosed by a series of borings drilled transverse to centerline or baseline?	Y	

VI.A. Soil Profile Checklist

Subsurface Data	(Y/N/X)	Notes:
38 Have the existing and proposed groundlines been displayed on cross section sheets according to ODOT CADD standards?	Y	
39 Have bedrock exposures shown on the cross sections been plotted along the contour of the cross section?	X	Bedrock not encountered
40 Has the following information been provided adjacent to the graphical logs or bedrock exposure:		
a. Thickness, to the nearest inch, of sod/topsoil or other shallow surface material written above the boring (with corresponding symbology at top of log)?	Y	
b. Moisture content, to nearest whole percent, with the bottom of the text aligned with the bottom of the sample? Label this column as 'WC' at bottom of the boring.	Y	
c. N_{60}, aligned with the bottom of sample? Label column as 'N_{60}' at bottom of boring.	Y	
d. Free water indicated by a horizontal line with a 'w' attached, and water level at the end of drilling indicated by an open equilateral triangle, point down?	Y	
e. Complete geologic description of each bedrock unit, including unit core loss, unit RQD, SDI, and compressive strength test results? (Do not present geologic descriptions for structure borings for which this information is presented on the boring logs as described in 703.3)	X	Rock coring was not obtained
f. Visual description of any uncontrolled fill or interval not adequately defined by a graphical symbol?	Y	
g. Organic content with modifiers, per 603.5?	X	Not Encountered
h. Designate a plastic soil with moisture content equal to or greater than the liquid limit minus three with a 1/8" solid black circle adjacent to the moisture content?	X	Not encountered
i. Designate a non-plastic soil with moisture content exceeding 25% or exceeding 19% but appearing wet initially, with a 1/8" open circle with a horizontal line through it adjacent to the moisture content?	Y	
j. The reason for discontinuing a boring prior to reaching the planned depth indicated immediately below the boring?	X	No such conditon encountered

VI.A. Soil Profile Checklist

Boring Logs	(Y/N/X)	Notes:
41 Have the boring logs of all structure borings, all geohazard borings, and any roadway borings drilled in the vicinity of the structures or geohazard been shown on the boring log sheets following the plan and profile sheets? (Create the logs in accordance with 703.3)	Y	
42 Have the boring logs been developed by integrating the driller's field logs, laboratory test data, and visual descriptions?	Y	
43 Has the following boring information been included in the heading of each boring log:		
a. Exploration identification number?	Y	
b. Project designation (C-R-S) and PID?	Y	
c. Structure File Number (if applicable) and project type.	Y	
d. Centerline or baseline name, station, offset, and surface elevation?	Y	
e. Coordinates?	Y	
f. Method of drilling?	Y	
g. Date started and date completed?	Y	
h. Method and material (including quantity) used for backfilling or sealing, including type of instrumentation, if any?	Y	
i. Date of last calibration and drill rod energy ratio (ER) in percent for the hammer system(s) used?	Y	
44 Has the following boring information been included in each boring log:		
a. A depth and elevation scale?	Y	
b. Indication of stratum change?	Y	
c. Description of material in each stratum?	Y	
d. Depth of bottom of boring?	Y	
e. Depth of boulders or cobbles, if encountered?	Y	
f. Caving depth?	Y	
g. Water level observations?	Y	
h. Artesian water level and height of rise?	X	Not Encountered
i. Heaving sand?	X	Not Encountered
j. Cavities or other unusual conditions?	X	Not Encountered
k. Depth interval represented by sample?	Y	
l. Sample number and type?	Y	
m. Percent recovery for each sample?	Y	
n. Measured blow counts for each 6 inches of drive for split spoon samples?	Y	
o. N_{60} to the nearest whole number?	Y	

VI.A. Soil Profile Checklist

p. Hand penetrometer?	Y	

VI.A. Soil Profile Checklist

Boring Logs	(Y/N/X)	Notes:
q. Particle-size analysis?	Y	
r. Liquid limit, plastic limit, plasticity index?	Y	
s. Water content?	Y	
t. ODOT soil classifications, with "V" in parentheses for those samples that are not mechanically classified?	Y	
u. Top of bedrock and bedrock descriptions?	X	Bedrock not encountered
v. Run rock core percent recovery?	X	Bedrock not encountered
w. Run RQD?	X	Bedrock not encountered
x. Unit rock core percent recovery?	X	Bedrock not encountered
y. Unit RQD?	X	Bedrock not encountered
z. SDI, if applicable?	X	Bedrock not encountered
aa. Rock compressive strength test results, if applicable?	X	Bedrock not encountered

VI.B. Geotechnical Reports

C-R-S: SUM-EAST AVENUE (CR 630)	PID: 112869	Reviewer: MK	Date: 5/25/2023

General		(Y/N/X)	Notes:
1	Has an electronic copy of all geotechnical submissions been provided to the District Geotechnical Engineer (DGE)?	X	Submitted to Prime Consultant
2	Has the first complete version of a geotechnical report being submitted been labeled as 'Draft'?	Y	
3	Subsequent to ODOT's review and approval, has the complete version of the revised geotechnical report being submitted been labeled 'Final'?	Y	
4	Has the boring data been submitted in a native format that is DIGGS (Data Interchange for Geotechnical and Geoenvironmental) compatable? gINT files may be used for this.	Y	
5	Does the report cover format follow ODOT's Brand and Identity Guidelines Report Standards found at http://www.dot.state.oh.us/brand/Pages/default.aspx ?	Y	
6	Have all geotechnical reports being submitted been titled correctly as prescribed in Section 705.1 of the SGE?	Y	
Report Body		(Y/N/X)	Notes:
7	Do all geotechnical reports being submitted contain the following:		
a.	an Executive Summary as described in Section 705.2 of the SGE?	Y	
b.	an Introduction as described in Section 705.3 of the SGE?	Y	
c.	a section titled "Geology and Observations of the Project," as described in Section 705.4 of the SGE?	Y	
d.	a section titled "Exploration," as described in Section 705.5 of the SGE?	Y	
e.	a section titled "Findings," as described in Section 705.6 of the SGE?	Y	
f.	a section titled "Analyses and Recommendations," as described in Section 705.7 of the SGE?	Y	
Appendices		(Y/N/X)	Notes:
8	Do all geotechnical reports being submitted contain all applicable Appendices as described in Section 705.8 of the SGE?	Y	

VI.B. Geotechnical Reports

9	Do the Appendices present a site Boring Plan showing all boring locations as described in Section 705.8.1 of the SGE?	Y	

VI.B. Geotechnical Reports

Appendices		(Y/N/X)	Notes:
10	Do the Appendices include boring logs and color pictures of rock, if applicable, as described in Section 705.8.2 of the SGE?	X	Not Encountered
11	Do the Appendices include reports of undisturbed test data as described in Section 705.8.3 of the SGE?	X	Undisturbed sample was not needed
12	Do the Appendices include calculations in a logical format to support recommendations as described in Section 705.8.4 of the SGE?	Y	

Jason, CTL Dispositions are in Red Below.

ODOT-OGE reply to CTL Dispositions are in green below.

Chaney, Matthew

From: Merklin, Christopher
Sent: Friday, November 26, 2021 9:03 AM
To: Powell, Thomas
Cc: Taliaferro, Stephen; Chaney, Matthew
Subject: RE: SUM-EAST AVE [PID: 112869] --- Phase 2 / Stage 1 Plan Review

Categories: Comments

Tom:

As requested, we have reviewed the geotechnical portion of the subject project, SUM-East Avenue (PID 112869), Phase 2, Stage 1. We have made comments in the documents (Stage 1 plans, Soil Profile, and Draft Geotechnical Report). This is my first bluebeam review, so please make sure that my comments exist in the documents. To summarize, and in addition to the comments made in the Bluebeam Session, our design comments are presented below:

Do not artificially reduce the design CBR from 7 to 5; use 7 (this same comment was made for Phase 1). This will only be applicable if the pavement is fully reconstructed, which the plans currently show a widening on both sides and mill/fill of existing.

CTL, The reduction of CBR from 7 to 5 is not artificial, it is based on the Min GI plus the Standard Deviation. Based on our experience with large data range, it is not advisable to use the average value. From the stand point of liability and in order to reduce potential localized subgrade failure associated with high CBR design value, CTL has reservation in using a CBR of 7. A design CBR is needed for the Widening, CTL recommends a design CBR of 5.

We continue to disagree with CTL's method for determining the design CBR and recommend they use the result for Design CBR calculated in the Subgrade Analysis spreadsheet which is 7. The design CBR represents the average soaked lab CBR of the soil type(s) encountered in the subgrade based on Group Index value; not the in-situ strength (stiffness) of the soil. The in-situ CBR may be less than 7 in some locations, but the concept of stabilizing the subgrade (as described in GDM Chapter 600 and programmed into the Subgrade Analysis spreadsheet) by excavating 1-ft and replacing with stone, is to increase the in-situ CBR to the design CBR value at the top of subgrade (top of the stone) where necessary for proper support of the pavement.

As part of the mill/fill option, the Geotechnical report presents the possibility to rubblize and roll the underlying intermittently present concrete pavement and using a design CBR of 3. We don't think partial rubblize and roll is feasible and we're not sure how or why the design CBR of 3 was developed. Furthermore, the consultant didn't address if rubblize and roll is possible, using the guidance in GB1. The plans do not include details for performing rubblize and roll. Regardless, we will assume rubblize and roll will not be performed.

CTL, The CBR of 3, as indicated in our report, is based on correlation with existing SPT data. It represents existing subgrade conditions. The purpose of providing this value is for the design team to take it into consideration when evaluating rehabilitation options. Although GB1 indicated No Rubblize option (poor/unstable subgrades), this is a limitation where it does not allow a design section based on Low CBR (poor subgrades) and existing rubberized

concrete. This maybe a mute subject since it was not considered, however, CTL prefer to keep in the report for completeness in the evaluation process…

There is no point in designing or considering rubblize and roll if we can't rubblize the concrete due to inadequate subgrade support. The average N60L value of ≥ 12 is considered necessary by our design standards to allow for adequate support for the rubblizing process. If it's less than that, don't consider it. Regardless, rubblize and roll is not be considered (concrete pavement is not shown in the existing typical sections) and should be removed from the report.

As noted, the Stage 1 plans show a 2-ft widening on the left and a 4-ft widening on the right, with mill/fill rehabilitation of the existing pavement and repairs as needed. We assume that is how the project will ultimately be designed, but we offer the following additional comments:

- We agree with others that a 2-ft widening will be difficult to construct well and ensure compaction and stability.

CTL, we anticipate that the subgrade preparation/improvement to extend 1 foot beyond the pavement, this may allow miniature self-propelled compaction equipment.

No comments.

- If existing pavement is milled/filled, we recommend a global 12" excavate/replace with 304 (for drainage) placed on 204-fabric in the widened portions on both sides. These small width sections will not be able to be proof rolled, and the subgrade soil is considered to be about 50% unstable/unsuitable, thus the recommended global application. Therefore, the Item 204-Subgrade Compaction and Proof Rolling plan note on sheet 12 is unnecessary with either option is used (can't proof roll the small widening, global chemical does not require the proof rolling note).

CTL, We have on many occasions experienced pavement deflecting/pumping after milling during construction/asphalt placement. This has caused delays and substantial additional coast. In our opinion, a proofroll should still be performed on milled section prior to filling. The proofroll at this stage can also go over narrow widened section since for most part the grades are almost even with the pavement. The loaded truck can straddle over milled pavement and the widening.

Proof rolling a milled asphalt surface is a practice of which we and the Office of Pavements are unaware. We defer to the District to consider doing this on this project. Item 204 Proof Rolling is not performed with a loaded truck. If the District wants to include proof rolling using a loaded truck, an APP note will need to be developed and included.

- If complete reconstruction is designed, we agree with global 14" cement stabilization.

CTL. Agree.

- For the partial pavement repair detail, a 204-fabric underlying the base should be adequate; Special-Geogrid does not seem necessary.

CTL, Since undercut per GB1 for most part exceed 12 inches, it is our opinion to keep Geogrid as needed in an effort to reduce undercut that are more than 12 inches.

We continue to think that a 204 fabric will be adequate.

Please send any questions regarding the geotechnical content of the project or these comments (along with the Bluebeam comments).

Christopher Merklin, P.E.
Administrator
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