

# SEN-12-3.91 Roundabout (PID 120096)

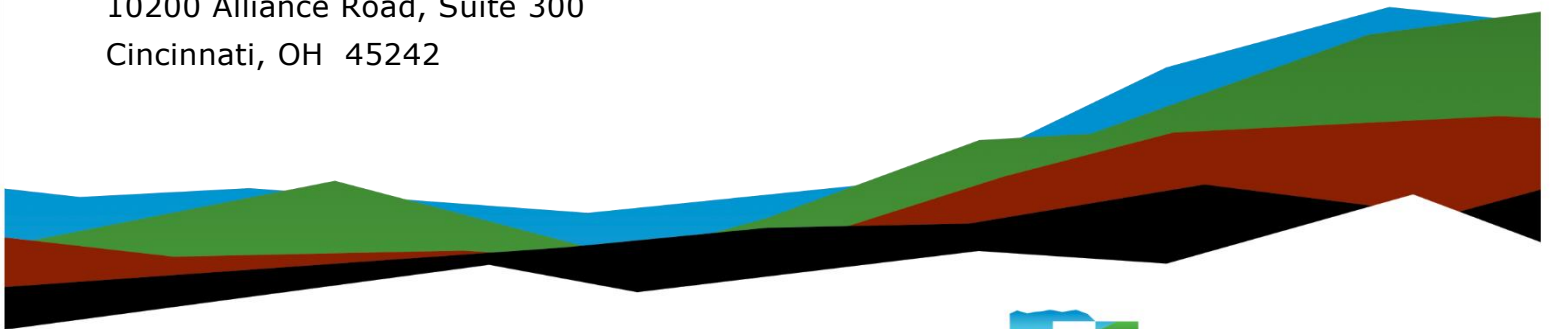
## Roadway Exploration Report

Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043

### Prepared for:

Stantec Consulting Services, Inc.  
10200 Alliance Road, Suite 300  
Cincinnati, OH 45242



Nationwide  
[Terracon.com](https://www.terracon.com)

- Facilities
- Environmental
- Geotechnical
- Materials

**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio  
April 13, 2026 | Terracon Project No. N6255043



April 13, 2026

Stantec Consulting Services, Inc.  
10200 Alliance Road, Suite 300  
Cincinnati, OH 45242

Attn: Jim Swindler – Team Lead | Traffic  
P: (513) 619-6458  
E: Jim.SwindlerJr@stantec.com

Re: Roadway Exploration Report  
SEN-12-3.91 Roundabout (PID 120096)  
Intersection of SR-12 & CR-592  
Jackson Twp., Seneca Co., Ohio  
Terracon Project No. N6255043

Dear Mr. Swindler:

We have completed the scope of Roadway Exploration services for the proposed roundabout construction at the intersection of State Route (SR) 12 and County Road 592 in Jackson Township, Seneca County, Ohio, in general accordance with Terracon Revised Proposal No. PN6255043 dated March 25, 2025. This report presents the findings of our subsurface exploration, laboratory testing results, subgrade analysis, and construction recommendations for the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

**Terracon**

A handwritten signature in blue ink that reads 'David G. Machmer'.

David G. Machmer, P.E.  
Senior Geotechnical Engineer

A handwritten signature in black ink that reads 'Prasad S. Rege'.

Prasad S. Rege, P.E.  
Senior Principal

# Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>Introduction</b> .....	<b>3</b>
<b>Project Description</b> .....	<b>3</b>
<b>Site Location and Description</b> .....	<b>4</b>
<b>Reconnaissance</b> .....	<b>4</b>
<b>General Geology</b> .....	<b>5</b>
<b>Exploration</b> .....	<b>5</b>
Former Exploration .....	5
Field Exploration.....	6
Laboratory Testing Program .....	7
<b>Findings</b> .....	<b>7</b>
Subsurface Profile.....	7
Groundwater.....	8
<b>Analyses and Recommendations</b> .....	<b>9</b>
Subgrade Analysis .....	9
General Subgrade Preparation .....	11
Earthwork Considerations.....	12
Excavation Considerations.....	12
Drainage and Groundwater Considerations.....	13
Light Pole Foundation Considerations .....	13
<b>General Comments</b> .....	<b>14</b>


## Attachments

### Site Location and Exploration Plans

### Exploration and Laboratory Results

### Subgrade Analysis

### Supporting Information

**Note:** This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  Terracon logo will bring you back to this page. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

Refer to each individual Attachment for a listing of contents.

## Executive Summary

This report presents the findings of our subsurface exploration performed for the proposed new roundabout to be constructed at the intersection of State Route (SR) 12 and County Road 592 in Jackson Township, Seneca County, Ohio.

A subsurface exploration was performed in 1974 for original construction of County Road 592. Two borings designated as B-027-0-74 and B-028-0-74 (B-027 and B-028 for this report) performed in the 1974 exploration were located in the area of the proposed roundabout. Information from these borings available, in the Ohio DOT Transportation Information Mapping System (TIMS), is incorporated in this report.

A total of 8 borings, designated as B-001-1-25 through B-008-1-25 (B-001 through B-008 for this report) were performed for the project. The borings were performed on June 12, 2025, to depths between 4 feet and 10 feet below the existing ground surface.

Pavement coring was not performed to collect core samples. Pavement layer thicknesses indicated were measured in the open holes.

The existing pavement sections encountered in Borings B-001 through B-004 consisted of an asphalt pavement layer overlying an aggregate base course. The asphalt pavement layer thickness ranged from about 6 to 12 inches. The aggregate base layer thickness ranged from about 7 to 14 inches. Topsoil was encountered at the ground surface in Borings B-005 through B-008 in thicknesses between 3 and 4 inches.

Fill in thicknesses of 1.3 and 1.4 feet were encountered beneath the pavement in Borings B-001, B-002 and B-003. The fill consisted of stiff silty clay (A-6b) in Borings B-001 and B-002, and loose gravel and stone fragments with sand (A-2-6) in Boring B-003. The native soils beneath the pavement, topsoil and existing fill consisted primarily of cohesive soils including medium stiff to stiff sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Testing of the subgrade soils indicates sulfate content of less than 100 parts per million (ppm), well below the 5,000 ppm threshold considered to be problematic by ODOT with respect to the chemical subgrade stabilization process.

Groundwater was not encountered in any of the borings during drilling or upon completion of drilling.

Based on the results of the subgrade analyses, a CBR value of 5 is recommended for the design of the proposed roadway construction after subgrade remediation measures have been implemented. In general, for the project, the subgrade soils may be stabilized by

**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



either global subgrade improvement by chemical stabilization or by earthwork construction practices such as undercutting and replacement.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **General Comments** should be read to understand the report limitations.

## Introduction

This report presents the results of our subsurface exploration and Roadway Exploration services performed for the proposed new roundabout to be constructed at the intersection State Route 12 (SR-12) and County Road 592 (CR-592) in Jackson Township, Seneca County, Ohio. The purpose of these services was to provide information and geotechnical engineering recommendations related to:

- Subsurface soil conditions
- Short-term groundwater observations
- Subgrade analysis
- Subgrade preparation
- Design and construction recommendations

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the [Site Location and Explorations Plans](#). The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and/or as separate graphs in the [Exploration and Laboratory Results](#) section.

## Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
<b>Project Description</b>	Based on the provided information, the project consists of construction of a new roundabout at the intersection of SR-12 and CR-592 in Jackson Township, Seneca County, Ohio.
<b>Grading/Slopes</b>	Upwards of 8 feet of embankment will be placed to fill in existing ditches at 3 localized locations. Otherwise, cut and fill to develop design grades are anticipated to be relatively nominal in areas of existing pavement and up to $\pm 1.5$ feet elsewhere.

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

## Site Location and Description

The following description of site conditions is derived from our site visit in association with field exploration and our review of the provided plans for the project and the publicly available geologic and topographic maps.

Item	Description
<b>Parcel Information</b>	The project is located at the intersection of SR-12 and CR-592 in Jackson Twp., Seneca Co., Ohio. The intersection is located at Latitude: 41° 10.90' N, Longitude: 83° 22.10' W (approximate). See <a href="#">Site Location</a> .
<b>Existing Improvements</b>	The site is surrounded by agricultural fields and some residential dwellings in all directions.
<b>Current Ground Cover</b>	Asphalt paved roadways, grass covered residential land, soil and cover crop covered agricultural fields
<b>Existing Topography</b>	Shallow drainage ditches border the roadway and otherwise the existing ground is relatively flat within the vicinity of the proposed roundabout with elevations ranging from approximately EL 755 to EL 758 (EGM96 Geoid Datum, from Google Earth™).

## Reconnaissance

At the time of our site reconnaissance visit on May 27, 2025, the project site was observed to be an existing 2-way stop intersection with through traffic on SR-12 and stop sign-controlled traffic on CR-592. The existing roadways were found to be asphalt pavement traversing primarily agricultural and residential properties. Overhead utilities were observed running adjacent to both sides of SR-12 and on south side of the eastern log of CR-592. The existing pavement conditions appeared to be in fair condition with occasional block cracking and longitudinal centerline cracking. Evaluation of the pavement conditions is beyond our scope of services for this project. Terracon can assist with these pavement evaluation services as an additional scope of work upon request.

## General Geology

The project site is located within the Maumee Lake Plains portion of the Huron-Erie Lake Plains section of the Central Lowland physiographic province of Ohio. Based on our review of the Ohio Department of Natural Resources (ODNR) geological maps, the overburden soils consist of Late Wisconsinian-aged, sandy and silty lake-planed moraine. The bedrock underlying the site is comprised of Lockport Dolomite from the Silurian Period.

According to United States Geologic Survey (USGS) mapping, the site is located within an area that is underlain by carbonate rocks buried under no more than 20 feet of glacially derived insoluble sediments in a humid climate and is therefore susceptible to karst conditions. According to ODNR sinkhole mapping, there are no documented or suspected sinkholes or observed karstic conditions within a 4-mile radius of the project site. If ODOT District 2 would like to further evaluate the risk associated with the possible karst features, Terracon can perform a combination of desktop karst study and site reconnaissance to further evaluate the risk.

## Exploration

### Former Exploration

A total of 28 borings were performed in 1974 for construction of CR-592 between US Route 23 and SR-12. Results of this investigation were obtained from the Ohio DOT Transportation Information Mapping System (TIMS). Two borings performed at Stations 150 and 156 of the project (1974 project stationing) were located in the area of the proposed roundabout and information pertaining to these borings is appended and incorporated in this report. The approximate locations of the borings and the reassigned designation are illustrated on the attached [Exploration Plan](#) and summarized in the following table.

**Original Test Boing Summary**

Boring Number	Alignment	Station <sup>1</sup>	Offset (feet)	Dir .	Surface Elevation (feet) <sup>1</sup>	Lat. <sup>1</sup>	Long. <sup>1</sup>	Depth (feet)
B-027	CR 592	144+75	0	-	755.6	41.1818	-83.3701	3.5 <sup>3</sup>
B-028	CR 592	154+25	60	L	756.2	41.1816	-83.3680	7.5 <sup>3</sup>

1. Stationing, ground surface elevations and locations approximated from 1974 plan and profile sheets.
2. Below ground surface.
3. Met with refusal in bedrock.

## Field Exploration

A total of 8 borings, designated as B-001-0-25 through B-008-0-25 (B-001 through B-008 for this report) were performed on June 12, 2025, for the project. The borings were performed to depths between 4 feet and 10 feet below the existing ground surface. The borings were performed in general accordance with Sections 303.3 and 303.4 of the Ohio Department of Transportation (ODOT) Specifications for Geotechnical Explorations (SGE) for evaluation of existing pavement subgrade (Type A) and proposed pavement subgrade (Type B). The approximate locations of the borings are illustrated on the attached [Exploration Plan](#) and summarized in the following table.

**Test Boing Summary**

Boring Number	Alignment	Station	Offset (feet)	Dir.	Surface Elevation (feet) <sup>1</sup>	Lat. <sup>1</sup>	Long. <sup>1</sup>	Depth (feet)
B-001	SR 12	221+75	7	Lt	758.0	41.1804	-83.3707	7.5
B-002	CR 592	146+50	8	Lt	757.0	41.1818	-83.3694	7.5
B-003	SR12	224+92	7	Rt	757.0	41.1823	-83.3667	7.5
B-004	CR 592	156+84	8	Rt	757.0	41.1815	-83.3660	4.3 <sup>3</sup>
B-005	SR12	227+80	74	Rt	756.0	41.1810	-83.3690	10.0
B-006	SR12	229+52	101	Rt	756.0	41.1813	-83.3682	7.6 <sup>3</sup>
B-007	SR12	231+10	44	Rt	755.0	41.1817	-83.3678	7.0 <sup>3</sup>
B-008	SR12	231+60	222	Rt	755.0	41.1813	-83.3673	7.0 <sup>3</sup>

1. The as-drilled boring coordinates and ground surface elevations at the boring locations were estimated from Google Earth™.
2. Below ground surface.
3. Met with refusal in bedrock.

The borings were located in the field prior to drilling operations by Terracon personnel using a handheld GPS unit and by measuring from known features. Test boring coordinates and elevations presented in the preceding table and on the boring logs presented in the [Exploration and Laboratory Results](#) are approximate. The location and elevation information should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were drilled with a track-mounted rotary drill rig utilizing a 3¼-inch I.D. continuous flight hollow stem auger to advance the boreholes between sampling attempts. Intermittent 2.5-foot sampling was performed in Boring B-005 and continuous sampling was performed in the other borings. Borings B-004, B-006, B-007 and B-008 met refusal in bedrock at the depth noted in the previous table.

In the split-barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split-barrel sampler the last 12 inches of the typical total 18-inch

penetration by means of a 140-pound automatic hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is corrected to an equivalent (60 percent) energy ratio (N60) utilizing the hammer efficiency energy ratio which is 87.1% based on recent calibration of the equipment used during our exploration.

In the field, the samples recovered at the boring locations were examined and field logs were prepared indicating the conditions encountered at each location. Representative portions of soil samples obtained from split-barrel samplers during the field exploration were preserved in sealable glass jars.

Following the completion of drilling, the boreholes were backfilled with auger cuttings mixed with bentonite chips. Where borings penetrated the existing pavement surface, the roadway surface was repaired using cold mixed asphalt patch or fast-setting concrete, as appropriate.

## Laboratory Testing Program

As part of the testing program, all samples were examined in the laboratory by our laboratory superintendent. Visual classification was performed on all recovered soil samples in general accordance with ODOT SGE Section 600 Laboratory Testing based on the texture and plasticity of the soils. Atterberg limits, moisture content, grain size analysis, and sulfate content were performed on selected soil samples. The results of lab testing are shown on the boring logs and presented in the [Exploration and Laboratory Results](#) section of this report.

## Findings

Boring logs have been prepared based on the information obtained from the field logs prepared at the time of drilling, the visual examination performed in the laboratory, and the laboratory testing results. Soil classification was performed in general accordance with the current ODOT SGE. The following sections summarize the subsurface conditions encountered in the borings.

### Subsurface Profile

The existing pavement sections encountered in Borings B-001 through B-004 consisted of an asphalt pavement layer overlying an aggregate base course. The asphalt pavement layer thickness ranged from about 6 to 12 inches. The aggregate base layer thickness ranged from about 7 to 14 inches. Topsoil was encountered at the ground surface in Borings B-005 through B-008 in thicknesses between 3 and 4 inches.

Fill in thicknesses of 1.3 feet and 1.4 feet was encountered beneath the pavement in Borings B-001, B-002 and B-003. The fill consisted of stiff sandy clay (A-6b) in Borings B-001 and B-002, and loose gravel and stone fragments with sand in Boring B-003. The native soils beneath the pavement, topsoil and existing fill consisted primarily of cohesive soils including medium stiff to stiff silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Testing of the subgrade soils indicates the sulfate content is less than 100 parts per million (ppm), well below the 5,000-ppm considered to be problematic by ODOT with respect to chemical stabilization.

The table below summarizes the results of sulfate testing performed on subgrade samples. It should be noted that soils with sulfate content greater than 5,000 parts per million (ppm) prohibit subgrade stabilization using chemical stabilization methods according to section 600 of ODOT Geotechnical Design Manual (GDM). None of the test results exceeded the 5,000-ppm sulfate concentration level considered by ODOT to be problematic with respect to chemical stabilization.

### Summary of Sulphate Testing Results

Boring ID	Sample Depth (feet) <sup>1</sup>	Sulfate Concentration (ppm)
B-001	3.0 – 6.0	<100
B-002	3.0 – 6.0	<100
B-003	3.0 – 6.0	<100
B-005	1.0 – 5.0	<100
B-006	0.0 – 3.0	<100
B-007	1.5 – 4.5	<100
B-008	1.5 – 4.5	<100

1. Below ground surface

Bedrock was encountered at depths between 4.0 feet and 9.6 feet beneath the ground surface in Borings B-004 through B-008, corresponding to elevations between 746.4 and 752.1. Bedrock was also encountered between these elevations in the 1974 borings. High resistance to drilling and sampling was experienced, and refusals were met after penetrating short distances in rock.

## Groundwater

Groundwater was not encountered in any of the borings during drilling or upon completion of drilling.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of

groundwater level fluctuations should be considered when developing the design and construction plans for the project.

## Analyses and Recommendations

### Subgrade Analysis

Based on the provided information, it is anticipated that proposed subgrade elevations will generally match the existing subgrade elevations. Upwards of 8 feet of embankment will be placed to fill in existing ditches at 3 localized locations. Otherwise, we expect that minimal cut and fill will be required to establish the proposed final subgrade levels in existing pavement areas and between about 1.5 feet of cut and fill will be required to establish proposed subgrade levels away from the existing pavement. If these assumptions are not consistent with the project plans, please notify Terracon.

The subsurface materials encountered beneath the pavement and topsoil generally consisted of cohesive and granular fill and primarily cohesive native soils. Based on our laboratory testing and the laboratory testing results from the 1974 exploration, the subgrade soils to a depth of up to about 10 feet below the surface have moisture contents ranging from about 9 to 22 percent, with an average moisture content of the subgrade soils across the project area of about 17 percent. The plasticity indices ranged from about 6 to 25, with an average plasticity index of about 15. A summary of the subgrade soils is tabulated on ODOT's [Subgrade Analysis](#) spreadsheet in Attachments section of this report.

**Unstable Subgrade Stabilization:** Generally, subgrade soils with a moisture content exceeding the optimum moisture content of the soil by three or more percentage points, or that have low N-values, are considered to be unstable soils, per ODOT GDM Section 600 guideline. Subgrade conditions meeting these unstable conditions were found at the following locations:

- Subgrade soils with a moisture content exceeding the optimum moisture content of the soil by three or more percentage points were encountered in Borings B-001, B-002, B-003 and B-006.
- Granular soils with  $N_{60} < 15$  and cohesive soils with  $N_{60} < 12$  or  $HP < 2$  tsf were encountered in all the borings except Borings B-005 and B-007.

These unstable soil conditions were found in more than about 30% of the subgrade areas, therefore we recommend that subgrade stabilization using chemical or excavate-and-replace schemes is performed for the entire project (global stabilization). In accordance with Section 605 of ODOT GDM and as indicated in the [Subgrade Analysis](#) spreadsheet, we recommend that the following stabilization schemes can be used:

- Excavate-and-replace (Item 204). Excavate to a minimum depth of 12 inches, replace with Item 712.09 Geotextile fabric Type D at the bottom of the excavation and Item 204 Granular Material Type C.
- Chemical stabilization (Item 206), using Portland cement to a depth of 14 inches. Lime stabilization is not recommended. Appropriate laboratory testing per ODOT Supplemental Specification 1120 should be performed to develop the mixture design for chemical stabilization.

**Unsuitable Subgrade Remediation:** Unsuitable soils were not identified in the test borings and the need for remediation of unsuitable soils is not anticipated.

Because of the moisture sensitive nature of the cohesive soils (A-6a, A-6b, and A-7-6) encountered in the borings, Terracon recommends that construction traffic over the completed subgrades should be minimized.

Based on the results of our subgrade analyses, a CBR value of 5 is recommended for design of the proposed roundabout pavement. The recommended CBR value assumes that the subgrade improvement/stabilization recommended in this report is performed.

Considering the relatively high soil moisture contents encountered in some of the borings, installation of a drainage system consisting of underdrains and ditches is recommended as a practical solution to promote drainage of the subgrade and promote subgrade stability.

The exposed subgrade in areas to receive fill and in areas of undercut should be proofrolled prior to installation of engineered controlled fill to identify possible soft or loose yielding zones. Note that ODOT GDM specifies that Item 204 Granular Material Type B without a geotextile fabric be utilized to backfill undercuts performed in the vicinity of any underdrains.

Alternatively, chemical stabilization using Item 206 (cement) can be used to a depth of 14 inches to stabilize the subgrade for this project. In general, chemical stabilization can be more economical when stabilizing large areas (approximately greater than 1 mile of roadway). Considering the proximity of nearby residences, careful planning will be needed to minimize exposure to cement dust if chemical stabilization is used. Results of subgrade analysis performed per section 600 of ODOT GDM guideline are presented in [Subgrade Analysis](#) in the Attachments section of this report.

The actual depths and limits of undercutting should be determined by the Engineer in the field based on subgrade observations and the results of proofrolling in accordance with ODOT CMS Item 204. Any areas that exhibit rutting, instability, or other indications of soft or loose soils should be over excavated and replaced in accordance with ODOT CMS Item 204. In addition, effective measures to promote drainage of groundwater and surface water should be incorporated into the design (i.e., grading of subgrade and surface, berms, ditches, etc.).

Once the design level drawings (plan and profile) become available, Terracon should be notified to review the proposed horizontal and vertical alignment changes (cut and fill), if planned, and adjust our recommendations, if needed.

## General Subgrade Preparation

Subgrade preparation for the new and reconstructed pavement areas should be performed in accordance with ODOT CMS Items 203 and 204. Prior to subgrade preparation, perform clearing and grubbing, including removal of stumps and roots, in accordance with ODOT CMS Item 201. Remove existing pavement and base materials as well as other structures or obstructions, as necessary, in accordance with ODOT CMS Item 202. The pavement subgrade should be stripped of any topsoil, organics, or other deleterious or unsuitable materials.

New pavement and embankment will be placed over existing ditches at 3 locations. The soil at the bottom of the ditches at these locations must be undercut a minimum 2 feet in the proposed embankment area and for the width of the ditches. Some portions of the undercutting may extend to bedrock and bedrock will not need to be removed. The embankment foundation conditions are considered favorable in that they are expected to consist of bedrock or non-organic cohesive soil with a Liquidity Index (LI) less than 0.7. We anticipate that no more than 10 feet of embankment fill will be placed in the ditches and that the side slopes of the ditch embankment will be sloped no steeper than 2:1 (horizontal to vertical). Based on the foregoing, we predict that the planned embankment will be stable with acceptable amounts of settlement if constructed in accordance with the ODOT standards.

Once the pavement reconstruction areas have been stripped, excavated to the design subgrade elevation or to the design undercut elevation (if applicable), the exposed subgrade should be proofrolled with a heavy piece of construction equipment to verify stability is achieved. It should be noted that fill containing organic materials or other deleterious materials may be encountered at other locations or at lower depths within the pavement alignment that were not disclosed by the borings. The actual depths and limits of undercutting should be determined by the Engineer in the field based on visual observations.

Any fill placed to achieve the final grade of the roadway pavement should follow requirements of ODOT CMS Item 203 and compacted to the specified percentage of the maximum dry density provided by ODOT CMS Item 204. The fill materials should be free of debris, organic materials, and any deleterious materials. No frozen materials should be incorporated into the fill, and no pavement, utilities, or fill should be placed on top of frozen materials.

All potential imported fill materials should be identified and approved by the Engineer prior to placement. Approval requires that moisture-density relationship tests,

hydrometer analysis, and Atterberg limits be determined for each fill material prior to their placement. No particle size larger than two inches in any direction should be placed as fill, and any particle size greater than 3-inches should be broken down to less than 2-inches or removed from the lift. Aggregate base and pavement construction must be performed in accordance with ODOT CMS 300 and 400.

## Earthwork Considerations

All embankment materials should be spread and compacted in accordance with Items 203.06 and 203.07 and subgrade materials should be spread and compacted in accordance with Items 204.07 and 204.03. Frozen materials should not be incorporated into any new fill nor should new fill, pavement materials, or structures be placed on top of frozen materials. Material to be utilized as borrow should be restricted to conform to Items 203.02R and 203.3 for embankment construction and Item 204.2 for subgrade.

Earthwork, including subgrade preparation, should be performed in accordance with respective items in Section 200 of the current ODOT CMS. Consideration may be given to using the in-situ soil or from the local borrow sources. However, the material may require moisture adjustments to achieve proper compaction. Potentially, chemical treatment may be used for any borrow materials and existing embankment soil with high moisture contents. Chemical treatment should be performed in accordance with ODOT Item 205.

## Excavation Considerations

If the excavation depths are greater than 5 feet, the excavation sides will need to be laid back or shored. As a minimum, all excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. Reference to OSHA 29CFR, Part 1926, Subpart P (OSHA P) should be included in the job specifications. In accordance with OSHA P, we estimate that the on-site soils classify as Type C soils and that maximum allowable cut slopes should be not steeper than 1½:1.

The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. Slope heights, slope inclinations and excavation depths should in no case exceed those specified in local, state, or federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Under no circumstances should the information provided in this report be interpreted to mean that Terracon is responsible for construction site safety or the contractor's activities. Construction site safety is the sole responsibility of the contractor, who shall

also be solely responsible for the means, methods, and sequencing of the construction operations.

Where structures, roadways, underground utilities, etc. exist adjacent to or within the zone of influence of the excavations, care must be taken to protect these structures, roadways, underground utilities, etc. from possible damage due to construction activities. If structures and underground utilities are located near an excavation, a pre-construction survey should be conducted on all existing structures and underground utilities located within 100 feet of the excavation. It is the Contractor's responsibility to prevent undermining of existing foundations and prevent any damage to adjacent structures or facilities.

### Drainage and Groundwater Considerations

Groundwater was not encountered in any of the borings during drilling or upon completion of drilling. The contractor is responsible for employing appropriate dewatering methods to control the seepage and facilitate construction, if needed. Terracon recommends that the contractor determine the method of surface water drainage during the construction activities to assess the impact groundwater may have on construction.

During construction, site grading should be developed to direct surface water flow away from, or around, the site. Exposed subgrades should be sloped to provide positive drainage so that saturation of subgrades is avoided. Surface water should not be permitted to accumulate on the site.

Final surrounding grades should be sloped away from the proposed embankments on all sides to prevent ponding of water. Due to the nature of the soil profile, trapped water infiltration or groundwater seepage may be encountered, particularly after periods of precipitation. In such an event, sump and pumping methods may be used for temporary dewatering.

### Light Pole Foundation Considerations

Based on the test boring and laboratory testing results we estimate that the average shear strength of the subsurface soil is 1,400 psf. Therefore, a Special Foundation Design will be required for the light pole foundations. It should be expected that installation of the light pole foundation system will consist of drilled piers which will extend a sufficient depth into bedrock at several locations.

## General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions observed in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and

**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



## Attachments

**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



## Site Location and Exploration Plans

**Contents:**

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.

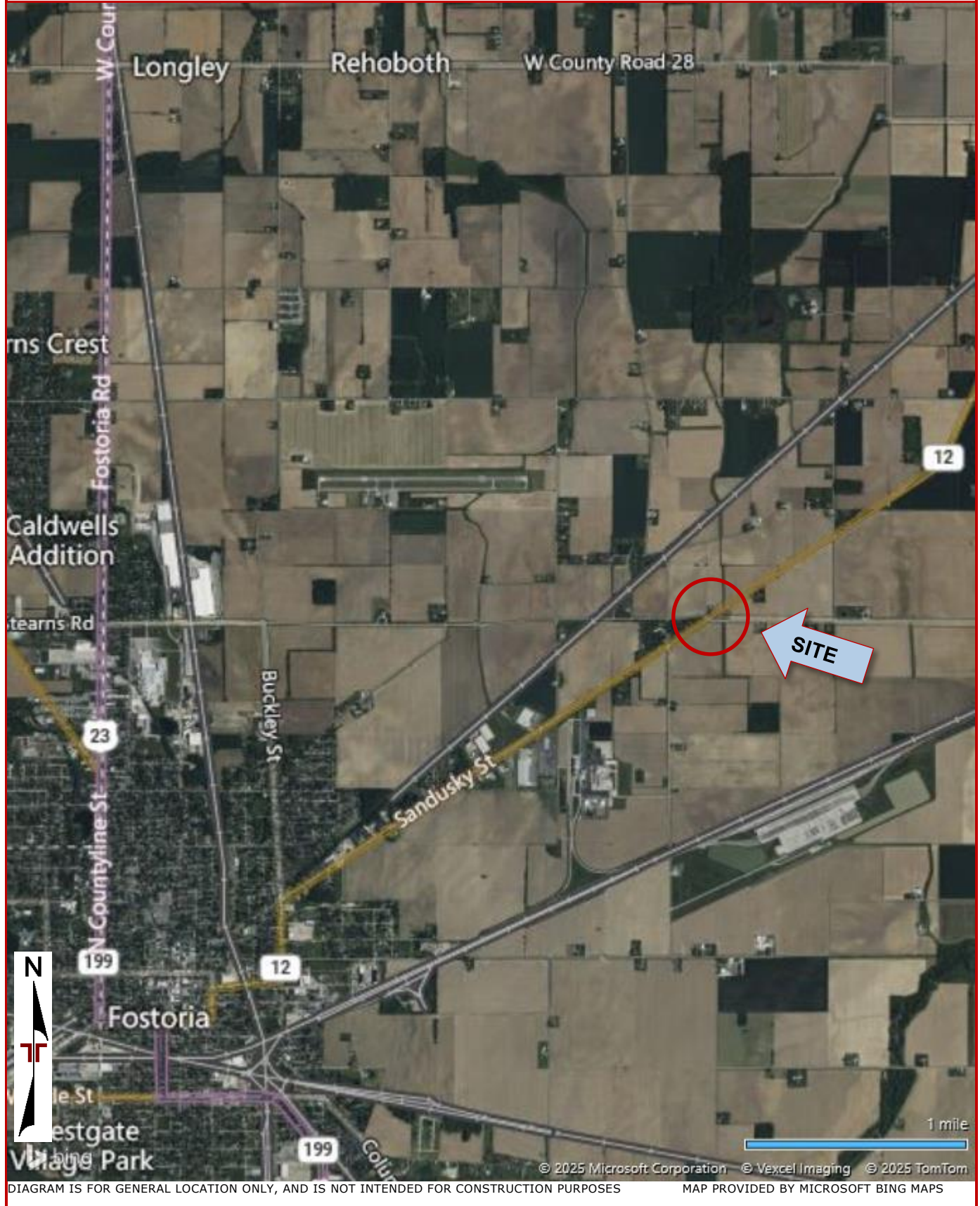
**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



**Site Location**



**Roadway Exploration Report**

SEN-12-3.91 Roundabout (PID 120096) | Jackson Twp., Seneca Co., Ohio

April 13, 2026 | Terracon Project No. N6255043



**Exhibit E – Exploration Plan**

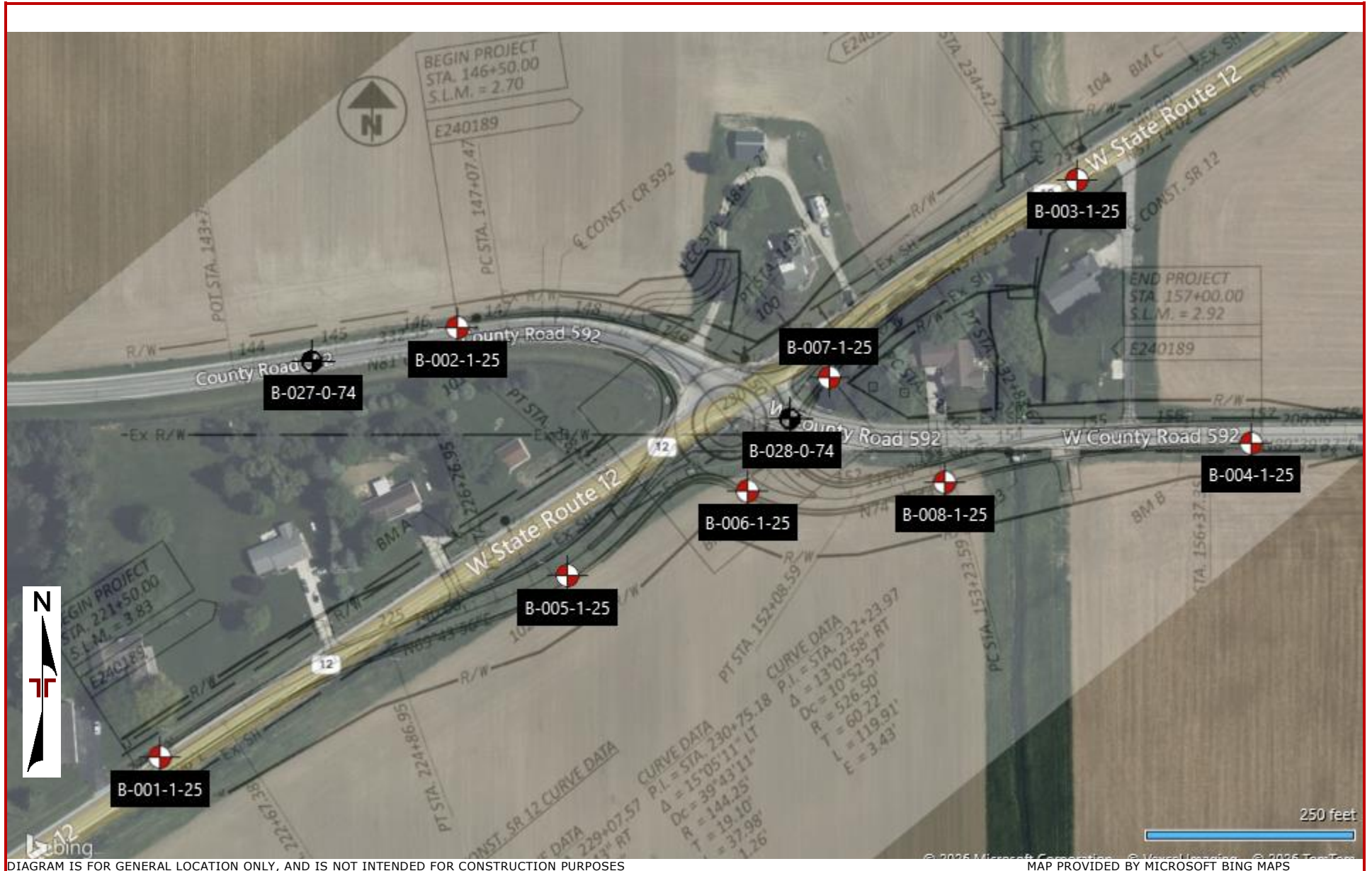


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

## **Exploration and Laboratory Results**

### **Contents:**

Boring Logs B-001-1-25 through B-008-1-25 (8 Pages)  
Atterberg Limits  
Grain Size Distribution (3 pages)  
Sulfate Test Results

Note: All attachments are one page unless noted above.

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC. PROJECTS - SHAREPOINT\16255043 SEN-12

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>221+75, 7' LT.</u>	EXPLORATION ID <u>B-001-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>758.0 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.180495, -83.370773</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT (10")	758.0																		
AGGREGATE BASE (10")	757.2	1																	
	756.3	2	4																
STIFF, DARK GRAY AND BROWN, <b>SILTY CLAY</b> , SOME SAND, TRACE GRAVEL, FILL, MOIST	755.0	3	4	13	56	SS-1	3.75	10	7	16	29	38	38	17	21	21	A-6b (11)	-	
		4	2	10	78	SS-2	3.00	-	-	-	-	-	-	-	-	23	A-7-6 (V)	<100	
MEDIUM STIFF TO STIFF, GRAY, <b>CLAY</b> , SOME SILT, TRACE GRAVEL, TRACE SAND, MOIST		5	2	13	78	SS-3	2.75	-	-	-	-	-	-	-	-	-	A-7-6 (V)	<100	
		6	2	5															
	750.5	7	2	7	72	SS-4	2.25	1	1	8	32	58	42	20	22	21	A-7-6 (13)	-	
		EOB		3															

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\ PROJECTS - SHAREPOINT\16255043 SEN-12

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>146+50, 8' LT.</u>	EXPLORATION ID <u>B-002-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>CR 582</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>757.0 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181899, -83.369481</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	SO <sub>4</sub> ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT (12")	757.0																		
AGGREGATE BASE (7")	756.0	1																	
	755.4	2	4																
STIFF, GRAY, <b>SILTY CLAY</b> , SOME SAND, LITTLE GRAVEL, FILL, MOIST	754.0	3	4	13	44	SS-1	3.50	15	14	13	26	32	38	18	20	22	A-6b (9)	-	
STIFF TO VERY STIFF, GRAY AND BROWN, <b>SANDY SILT</b> , SOME CLAY, TRACE GRAVEL, MOIST		4	3	13	61	SS-2	3.75	-	-	-	-	-	-	-	-	-	16	A-4a (V)	<100
		5	2	12	61	SS-3	3.50	-	-	-	-	-	-	-	-	-	-	A-4a (V)	<100
		6	4																
		7	2	16	78	SS-4	2.75	4	10	18	40	28	27	18	9	16	A-4a (7)	-	
	749.5	EOB	4	7															

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\162525043 SEN-12

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>224+92, 7' RT.</u>	EXPLORATION ID <u>B-003-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>756.0 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.182381, -83.366789</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT (10")	756.0																		
AGGREGATE BASE (10")	755.2	1																	
LOOSE, GRAY AND BROWN, <b>GRAVEL AND STONE FRAGMENTS WITH SAND</b> , LITTLE CLAY, FILL, MOIST	754.3	2	9	10	67	SS-1	-	44	11	11	17	17	35	20	15	16	A-2-6 (1)	-	
STIFF, GRAY AND BROWN, <b>SILT AND CLAY</b> , SOME SAND, TRACE GRAVEL, MOIST	753.0	3	2	9	44	SS-2	2.50	-	-	-	-	-	-	-	-	-	16	A-6a (V)	<100
		4	2	12	67	SS-3	1.50	-	-	-	-	-	-	-	-	-	A-6a (V)	<100	
		5	4	9	61	SS-4	1.75	1	6	19	36	38	30	19	11	21	A-6a (8)	-	
	748.5	6	2																
		7	3	3															
		EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\16255043 SEN-12

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>156+84, 8' RT.</u>	EXPLORATION ID <u>B-004-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>CR 592</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>756.0 (MSL)</u> EOB: <u>4.25 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181521, -83.366033</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT (6")	756.0																	
AGGREGATE BASE (14")	755.5	1																
STIFF, BROWN, <b>SILTY CLAY</b> , SOME SAND, SOME GRAVEL, MOIST	754.3	2	6	10	56	SS-1	2.25	28	19	11	19	23	35	17	18	14	A-6b (4)	-
	752.0	3	3															
SANDSTONE, GRAY, SLIGHTLY WEATHERED, WEAK.	751.8	4	4	-	7	SS-2	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-
		4	50/3"															

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\16255043 SEN-12-

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>227+80, 74' RT.</u>	EXPLORATION ID <u>B-005-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>756.0 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181089, -83.369003</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED		
								GR	CS	FS	SI	CL	LL	PL	PI	WC			ODOT CLASS (GI)	
TOPSOIL (2") VERY STIFF, BROWN, <b>SILTY CLAY</b> , LITTLE SAND, TRACE GRAVEL, MOIST	756.0																			
	755.8	1	4																	
		2	6	8	20	56	SS-1	4.5+	-	-	-	-	-	-	-	-	9	A-6b (V)	<100	
		3																		
HARD, BROWN AND GRAY, <b>SANDY SILT</b> , TRACE TO LITTLE GRAVEL, LITTLE TO SOME CLAY, MOIST		4	4	7	8	22	56	SS-2	4.5+	-	-	-	-	-	-	-	-	A-6b (V)	<100	
	750.0	5																		
		6	13	18	22	58	100	SS-3	4.5+	6	13	24	37	20	22	16	6	12	A-4a (4)	-
		7																		
		8	6	8	50/2"	-	93	SS-4	4.5+	11	12	19	34	24	19	13	6	9	A-4a (5)	-
	746.0	9																		
		10																		

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\16255043 SEN-12-

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>229+52, 101' RT.</u>	EXPLORATION ID <u>B-006-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	PAGE 1 OF 1
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>756.0 (MSL)</u> EOB: <u>7.6 ft.</u>	
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181365, -83.368220</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			ODOT CLASS (GI)
TOPSOIL (2")	756.0		1																
STIFF, BROWN, <b>SILTY CLAY</b> , TRACE GRAVEL, TRACE SAND, MOIST	755.8	1	2	9	44	SS-1	2.75	-	-	-	-	-	-	-	-	-	12	A-6b (V)	<100
		2	4	12	44	SS-2	3.25	-	-	-	-	-	-	-	-	-	-	A-6b (V)	<100
		3	4																
	751.5	4	3	12	44	SS-3	3.25	1	1	4	38	56	40	22	18	20	A-6b (11)	-	
VERY STIFF TO HARD, BROWN, <b>SANDY SILT</b> , SOME CLAY, TRACE GRAVEL, MOIST		5	2	22	89	SS-4	4.5+	7	10	21	38	24	21	15	6	13	A-4a (5)	-	
		6	5	10															
	748.5	7	12	-	100	SS-5	4.5+	-	-	-	-	-	-	-	-	-	10	A-4a (V)	-
		TR	20																
		EOB	50/1"	-	0	SS-6	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	-

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\16255043 SEN-12-

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>231+10, 44' RT.</u>	EXPLORATION ID <u>B-007-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>753.0 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181736, -83.367865</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			ODOT CLASS (GI)
TOPSOIL (4")	753.0		2																
STIFF TO VERY STIFF, BROWN, <b>CLAY</b> , SOME SILT, SOME SAND, TRACE GRAVEL, MOIST	752.7	1	4	15	39	SS-1	4.5+	3	5	21	32	39	50	26	24	17	A-7-6 (15)	-	
		2	5	16	33	SS-2	2.75	-	-	-	-	-	-	-	-	8	A-7-6 (V)	<100	
		3	4	12	28	SS-3	1.50	-	-	-	-	-	-	-	-	-	A-7-6 (V)	<100	
HARD, BROWN, <b>SANDY SILT</b> , SOME CLAY, TRACE GRAVEL	748.5	4	4	32	100	SS-4	4.5+	7	14	21	35	23	21	15	6	11	A-4a (5)	-	
	747.0	5	6	10	12														
<b>SANDSTONE</b> , GRAY, SLIGHTLY WEATHERED, WEAK.	746.0	TR	35	-	38	SS-5	-	-	-	-	-	-	-	-	-	6	Rock (V)	-	
	746.0	EOB	50/2"																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 4/13/26 13:04 - C:\USERS\IDGMACHMERIONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\16255043 SEN-12

PROJECT: <u>SEN-12-3.91 ROUNDABOUT</u>	DRILLING FIRM / OPERATOR: <u>TC / A. FAY</u>	DRILL RIG: <u>MOBILE B-57 #1059</u>	STATION / OFFSET: <u>231+60, 222' RT.</u>	EXPLORATION ID <u>B-008-1-25</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>TC / T. ABALOS</u>	HAMMER: <u>MOBILE AUTOMATIC</u>	ALIGNMENT: <u>SR 12</u>	
PID: <u>120096</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/31/25</u>	ELEVATION: <u>755.0 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>6/12/25</u> END: <u>6/12/25</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>87.1</u>	LAT / LONG: <u>41.181393, -83.367364</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI						
TOPSOIL (2")	755.0		1																		
MEDIUM STIFF TO STIFF, BROWN, <b>CLAY</b> , SOME SILT, LITTLE TO SOME SAND, TRACE GRAVEL, MOIST	754.8	1	3	10	67	SS-1	4.00	1	3	16	33	47	48	23	25	22	A-7-6 (16)	-			
		2	4	12	39	SS-2	2.75	-	-	-	-	-	-	-	-	20	A-7-6 (V)	<100			
		3	4																		
		4	3	9	56	SS-3	2.50	-	-	-	-	-	-	-	-	-	A-7-6 (V)	<100			
		5	2	6	28	SS-4	2.25	2	3	17	32	46	41	21	20	21	A-7-6 (12)	-			
SANDSTONE, GRAY, SLIGHTLY WEATHERED, WEAK.	749.0	TR	2																		
	748.1	EOB	24		9	SS-5	-	-	-	-	-	-	-	-	-	-	Rock (V)	-			
			50/5"																		

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BENTONITE CHIPS; SOIL CUTTINGS

GRAIN SIZE - OH.DOT.GDT - 3/17/26 18:17 - C:\USERS\DMG\CHMER\IONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\N6255043 SEN-12-3.91 ROUNDABOUT - GENERAL\07 WORKING FILES\03 MODELS\N6255043 SEN-12-3.91 ROUND ODO



**OHIO DEPARTMENT OF TRANSPORTATION  
OFFICE OF GEOTECHNICAL ENGINEERING**

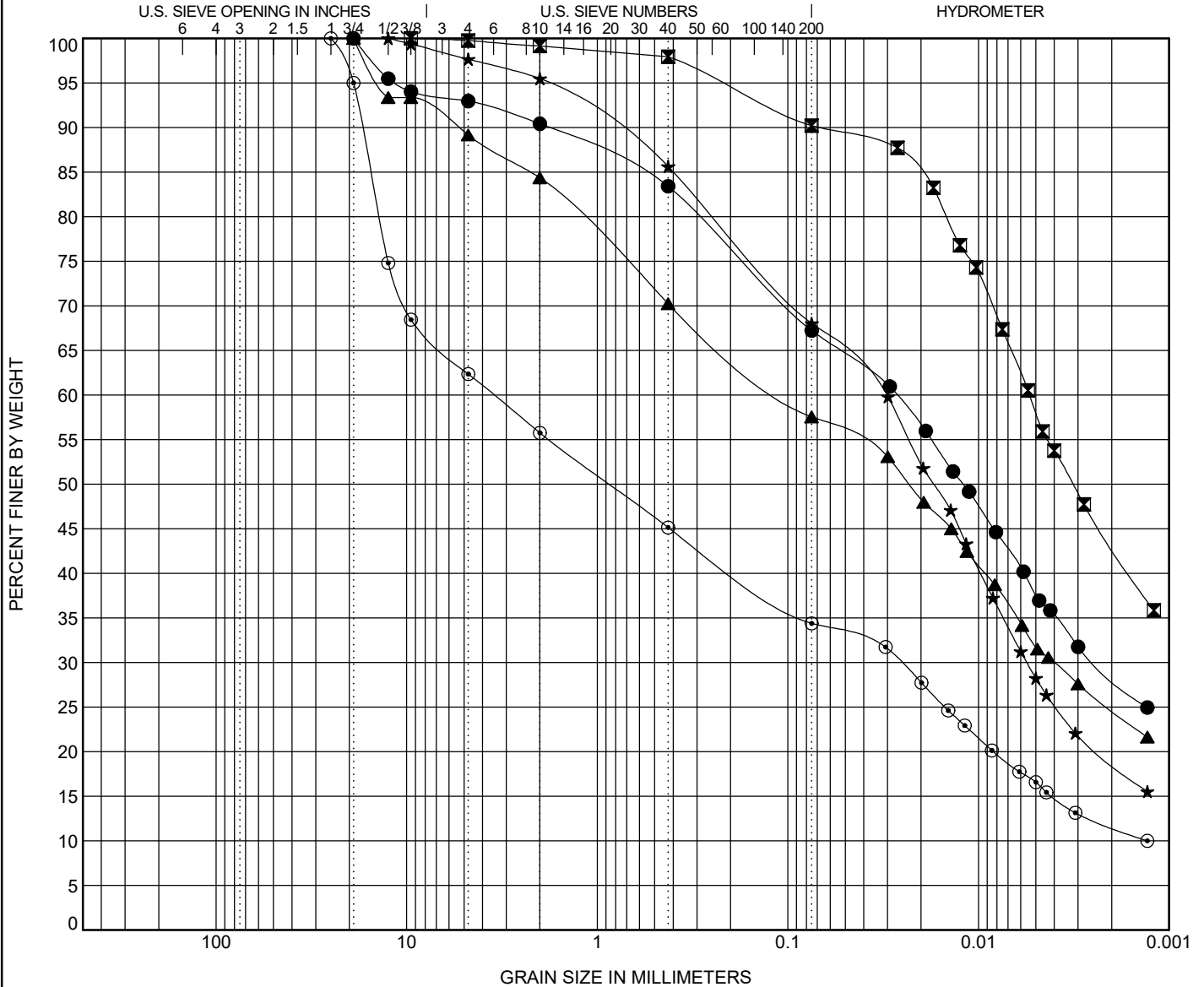
**GRAIN SIZE DISTRIBUTION**

**PROJECT** SEN-12-3.91 ROUNDABOUT

**PID** 120096

**OGE NUMBER** N6255043

**PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification								LL	PL	PI
●	B-001-1-25	1.5	A-6b ~ SANDY LEAN CLAY(CL)								38	17	21
☒	B-001-1-25	6.0	A-7-6 ~ LEAN CLAY(CL)								42	20	22
▲	B-002-1-25	1.5	A-6b ~ SANDY LEAN CLAY(CL)								38	18	20
★	B-002-1-25	6.0	A-4a ~ SANDY LEAN CLAY(CL)								27	18	9
◎	B-003-1-25	1.5	A-2-6 ~ CLAYEY GRAVEL with SAND(GC)								35	20	15
Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-001-1-25	1.5	1.821	0.012	0.002		10	7	16	29	38		
☒	B-001-1-25	6.0	0.068	0.003			1	1	8	32	58		
▲	B-002-1-25	1.5	5.451	0.023	0.004		15	14	13	26	32		
★	B-002-1-25	6.0	0.844	0.017	0.006		4	10	18	40	28		
◎	B-003-1-25	1.5	17.128	0.864	0.025	0.001	44	11	11	17	17	0.14	2683.88

GRAIN SIZE - OH.DOT.GDT - 3/17/26 18:17 - C:\USERS\GMA\CHMER\IONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\N6255043 SEN-12-3.91 ROUNDABOUT - GENERAL\07 WORKING FILES\03 MODELS\N6255043 SEN-12-3.91 ROUND ODO



**OHIO DEPARTMENT OF TRANSPORTATION  
OFFICE OF GEOTECHNICAL ENGINEERING**

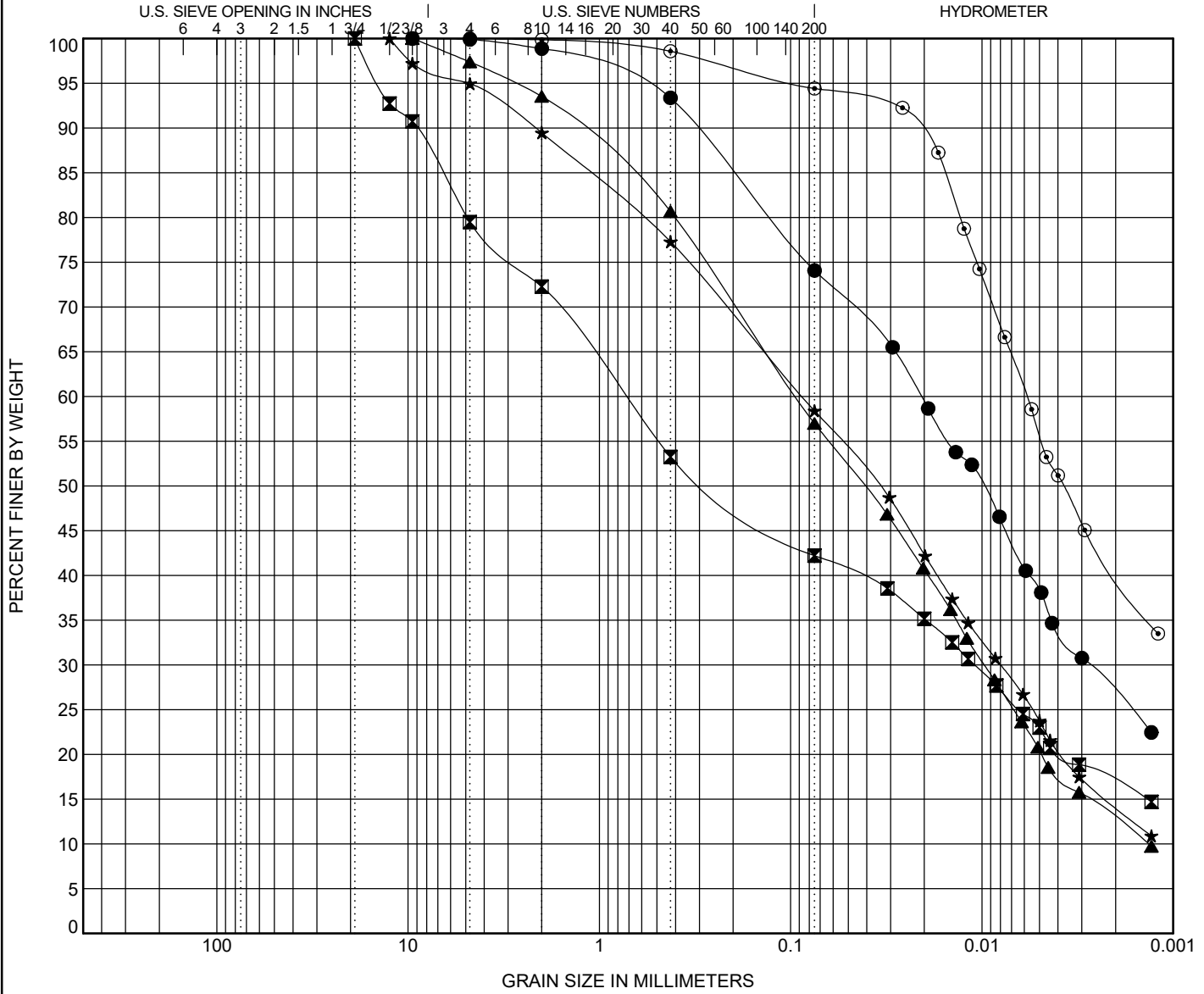
# GRAIN SIZE DISTRIBUTION

**PROJECT** SEN-12-3.91 ROUNDABOUT

**PID** 120096

**OGE NUMBER** N6255043

**PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification	ODOT (Modified AASHTO) ~ USCS Classification										LL	PL	PI
● B-003-1-25 6.0	A-6a ~ LEAN CLAY with SAND(CL)										30	19	11
☒ B-004-1-25 1.5	A-6b ~ CLAYEY SAND with GRAVEL(SC)										35	17	18
▲ B-005-1-25 6.0	A-4a ~ SANDY SILTY CLAY(CL-ML)										22	16	6
★ B-005-1-25 8.5	A-4a ~ SANDY SILTY CLAY(CL-ML)										19	13	6
◎ B-006-1-25 3.0	A-6b ~ LEAN CLAY(CL)										40	22	18
Specimen Identification	D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu		
● B-003-1-25 6.0	0.314	0.01	0.003		1	6	19	36	38				
☒ B-004-1-25 1.5	9.077	0.255	0.011		28	19	11	19	23				
▲ B-005-1-25 6.0	1.307	0.041	0.01	0.001	6	13	24	37	20	0.74	69.14		
★ B-005-1-25 8.5	2.177	0.034	0.008		11	12	19	34	24				
◎ B-006-1-25 3.0	0.021	0.004			1	1	4	38	56				

GRAIN SIZE - OH.DOT.GDT - 3/17/26 18:17 - C:\USERS\GMA\CHMER\IONEDRIVE - TERRACON CONSULTANTS INC\PROJECTS - SHAREPOINT\N6255043 SEN-12-3.91 ROUNDABOUT - GENERAL\07 WORKING FILES\03 MODELS\N6255043 SEN-12-3.91 ROUND ODO



**OHIO DEPARTMENT OF TRANSPORTATION  
OFFICE OF GEOTECHNICAL ENGINEERING**

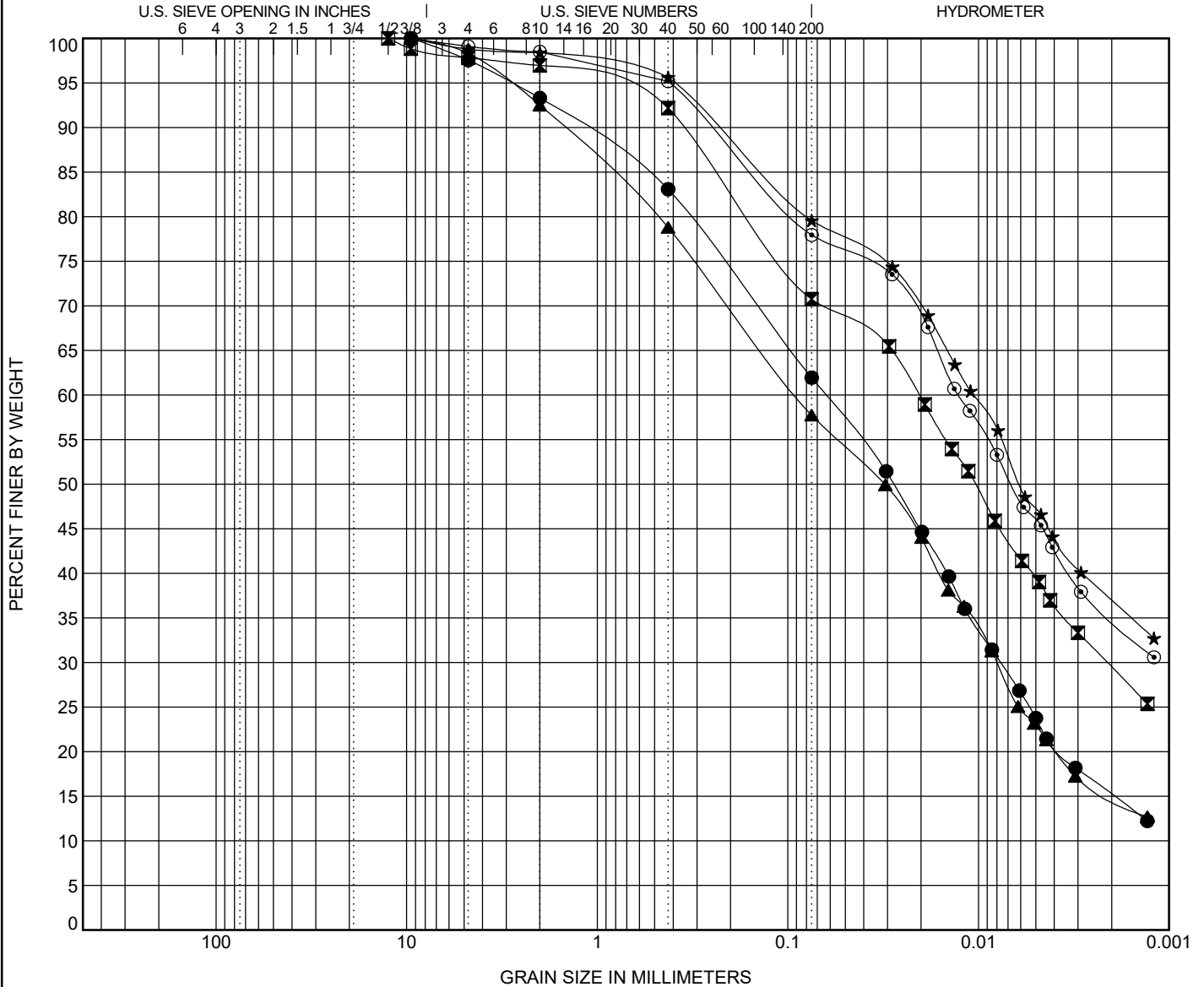
# GRAIN SIZE DISTRIBUTION

**PROJECT** SEN-12-3.91 ROUNDABOUT

**PID** 120096

**OGE NUMBER** N6255043

**PROJECT TYPE** ROADWAY





OHIO DEPARTMENT OF TRANSPORTATION  
OFFICE OF GEOTECHNICAL ENGINEERING

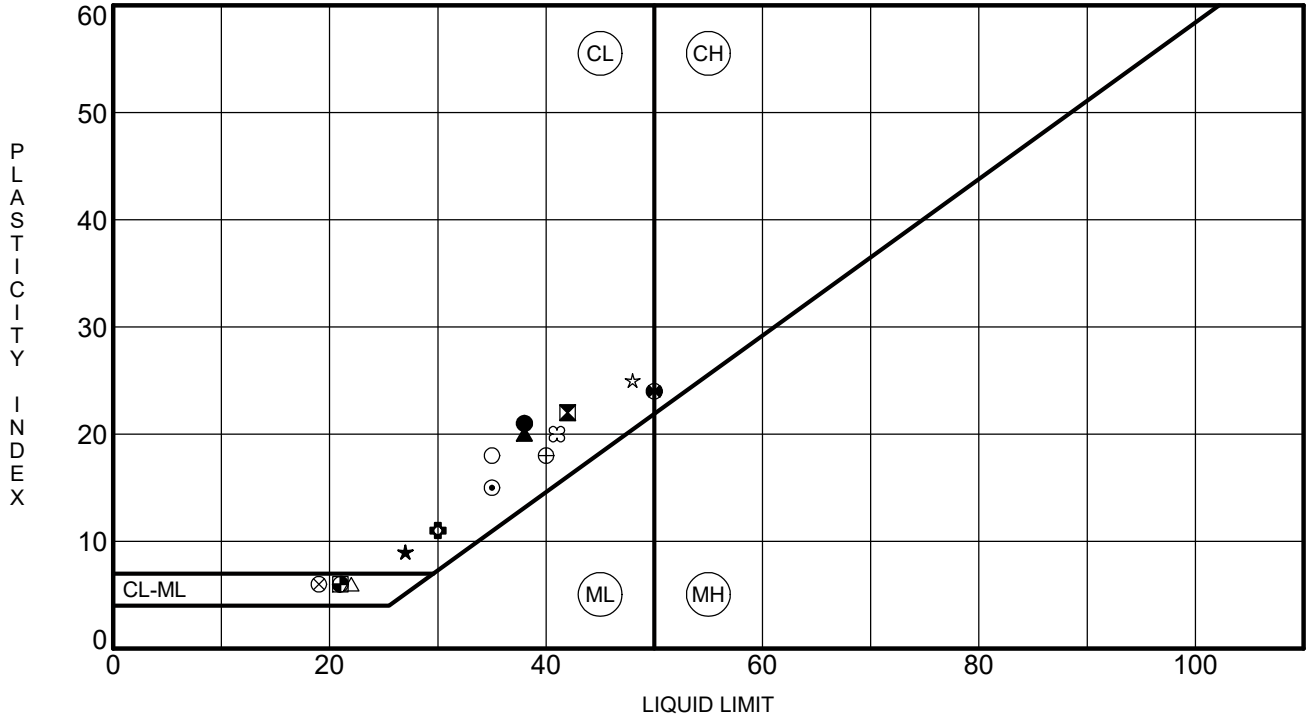
# ATTERBERG LIMITS' RESULTS

PROJECT SEN-12-3.91 ROUNDABOUT

PID 120096

OGE NUMBER N6255043

PROJECT TYPE ROADWAY



Specimen Identification	LL	PL	PI	Fines	Classification	
● B-001-1-25	1.5	38	17	21	67	SANDY LEAN CLAY(CL)
■ B-001-1-25	6.0	42	20	22	90	LEAN CLAY(CL)
▲ B-002-1-25	1.5	38	18	20	58	SANDY LEAN CLAY(CL)
★ B-002-1-25	6.0	27	18	9	68	SANDY LEAN CLAY(CL)
⊙ B-003-1-25	1.5	35	20	15	34	CLAYEY GRAVEL with SAND(GC)
⊕ B-003-1-25	6.0	30	19	11	74	LEAN CLAY with SAND(CL)
○ B-004-1-25	1.5	35	17	18	42	CLAYEY SAND with GRAVEL(SC)
△ B-005-1-25	6.0	22	16	6	57	SANDY SILTY CLAY(CL-ML)
⊗ B-005-1-25	8.5	19	13	6	58	SANDY SILTY CLAY(CL-ML)
⊕ B-006-1-25	3.0	40	22	18	94	LEAN CLAY(CL)
□ B-006-1-25	4.5	21	15	6	62	SANDY SILTY CLAY(CL-ML)
⊕ B-007-1-25	0.0	50	26	24	71	FAT CLAY with SAND(CH)
● B-007-1-25	4.5	21	15	6	58	SANDY SILTY CLAY(CL-ML)
★ B-008-1-25	0.0	48	23	25	80	LEAN CLAY with SAND(CL)
⊗ B-008-1-25	4.5	41	21	20	78	LEAN CLAY with SAND(CL)

---

**Client**

Stantec Consulting Services  
10200 Alliance Road  
Suite 300  
Cincinnati, OH 45242

**Project**

SEN-12-3.91 Roundabout  
State Route 12 & County Road 592  
Fostoria, OH 44830

Project No. N6255043

---

**SUPPLEMENT 1122  
DETERMINING SULFATE CONTENT IN SOILS**

**SAMPLE INFORMATION**

Sample Type:

Bag

Lab Number	Hole Number	Sample Number	Sample Depth	Sulfate Concentration, ppm
4859	B-1	--	3.0	<100
4860	B-2	--	3.0	<100
4861	B-3	--	3.0	<100
4862	B-5	--	1.5	<100
4863	B-6	--	0.0	<100
4864	B-7	--	1.5	<100
4865	B-8	--	1.5	<100

## **Subgrade Analysis**

### **Contents:**

Subgrade Analysis (11 pages)

Note: All attachments are one page unless noted above.

**OHIO DEPARTMENT OF TRANSPORTATION****OFFICE OF GEOTECHNICAL ENGINEERING****PLAN SUBGRADES****Geotechnical Design Manual Section 600****SEN-12-3.91  
120096****Construction of a new roundabout at the four leg intersection of SR-12 and CR-592****Terracon Consultants, Inc.****Prepared By: David G. Machmer, P.E.  
Date prepared: Tuesday, March 17, 2026****David G. Machmer  
Terracon Consultants, Inc.  
12460 Plaza Dr  
Parma, OH 44130  
216-303-7349  
Dave.Machmer@terracon.com****NO. OF BORINGS: 10****NO. OF DCPS: 0**

#	Boring ID	Alignment	Station	Add DCP Test Data Worksheets				Boring EL.	Proposed Subgrade EL	Cut Fill
				Offset	Dir	Drill Rig	ER			
1	B-001-0-25	SR 12	221+75	7	Lt	Mobile B-57 (#1059)	87	758.0	756.5	1.5 C
2	B-002-0-25	CR 592	146+50	8	Lt	Mobile B-57 (#1059)	87	757.0	755.5	1.5 C
3	B-003-0-25	SR12	224+92	7	Rt	Mobile B-57 (#1059)	87	757.0	755.5	1.5 C
4	B-004-0-25	CR 592	156+84	8	Rt	Mobile B-57 (#1059)	87	757.0	755.5	1.5 C
5	B-005-0-25	SR12	227-80	74	Rt	Mobile B-57 (#1059)	87	756.0	755.5	0.5 C
6	B-006-0-25	SR12	229+52	101	Rt	Mobile B-57 (#1059)	87	756.0	755.5	0.5 C
7	B-007-0-25	SR12	231+10	44	Rt	Mobile B-57 (#1059)	87	755.0	755.5	0.5 F
8	B-008-0-25	SR12	231+60	222	Rt	Mobile B-57 (#1059)	87	755.0	755.5	0.5 F
9	B-027-0-74	CR 592	144+75	0	CL	Hand Auger	87	755.6	755.5	0.1 C
10	B-028-0-74	CR 592	154+25	60	Lt	Truck-mounted Auger	87	756.2	755.5	0.7 C





PID: 120096

County-Route-Section: SEN-12-3.91

No. of Borings: 10

Geotechnical Consultant: Terracon Consultants, Inc.

Prepared By: David G. Machmer, P.E.

Date prepared: Tuesday, March 17, 2026

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):	12" 0"
Global Geogrid Average(N60L): Average(HP):	0" 0"

Design CBR	5
---------------	---

% Samples within 3 feet of subgrade			
N <sub>60</sub> ≤ 5	0%	HP ≤ 0.5	0%
N <sub>60</sub> < 12	18%	0.5 < HP ≤ 1	0%
12 ≤ N <sub>60</sub> < 15	30%	1 < HP ≤ 2	3%
N <sub>60</sub> ≥ 20	6%	HP > 2	52%
M+	24%		
Rock	0%		
Unsuitable Soil	0%		

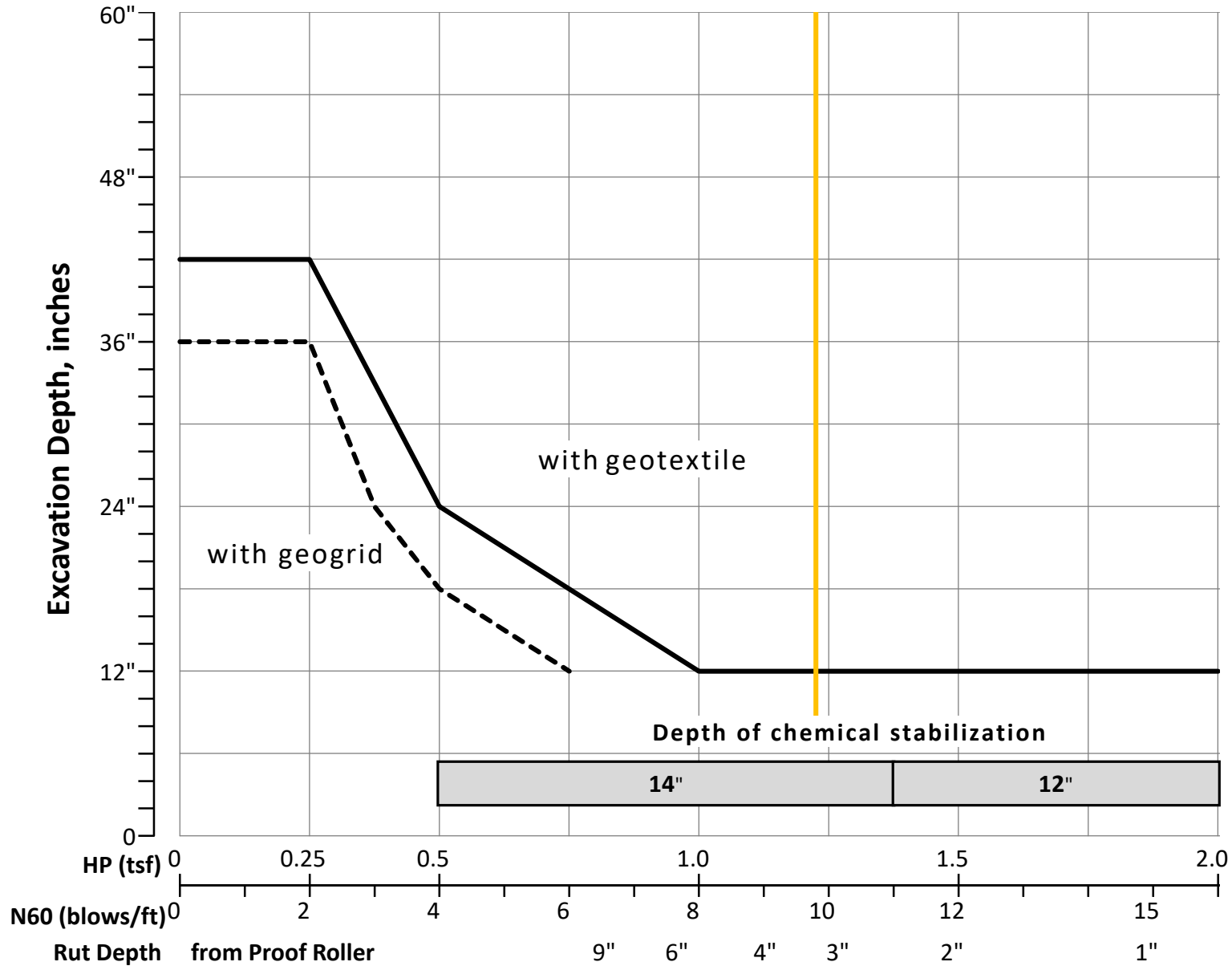
Excavate and Replace at Surface	
Average	12"
Maximum	12"
Minimum	12"

% Proposed Subgrade Surface	
Unstable & Unsuitable	63%
Unstable	63%
Unsuitable (Soil & Rock)	0%

	N <sub>60</sub>	N <sub>60L</sub>	HP	LL	PL	PI	Silt	Clay	P 200	M <sub>C</sub>	M <sub>OPT</sub>	GI
Average	15	10	3.21	35	19	15	31	38	69	17	16	12
Maximum	30	14	4.50	50	26	25	40	69	94	23	23	16
Minimum	6	6	1.50	19	13	6	12	17	34	8	10	1

Classification Counts by Sample																				
ODOT Class	UCF	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	0	0	0	1	0	0	0	7	0	0	5	10	0	11	0	0	34
Percent	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	21%	0%	0%	15%	29%	0%	32%	0%	0%	100%
% Rock   Granular   Cohesive	0%	0%	24%										76%							100%
Surface Class Count	0	0	0	0	0	0	1	0	0	0	1	0	0	2	9	0	6	0	0	19
Surface Class Percent	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	5%	0%	0%	11%	47%	0%	32%	0%	0%	100%

Fig. 600-1 – Subgrade Stabilization



**OVERRIDE TABLE**

Calculated Average	New Values	Check to Override
3.21	0.50	<input type="checkbox"/> HP
9.88	6.00	<input type="checkbox"/> N60L

Average HP —  
Average N<sub>60L</sub> —

The subgrade analysis workbook consists of five worksheets. Each worksheet functions independently. In all of the worksheets the fields are color coded as follows:

- Every yellow highlighted field indicates a field to be entered by the user.
- Every salmon field is to indicate a problem/issue.
- Every gray or green field is a heading/informational field.

**IMPORTANT:** The sequence of filling out the data needs to be followed as outlined below:

1. Cover Sheet: this worksheet is designed for the purpose of entering the project information.

Enter all the following fields:

County-Route-Section	This includes the county, route, section number assigned to the project.
PID	the Project Identification Number
Project Description	See Cover Sheet for list of example details
Geotechnical Consultant	The Geotechnical Consultant performing the analysis.
Prepared By	The preparer of the subgrade analysis
Date prepared	The date the analysis is performed.
Contact Information	Name, address, telephone #, and email address
No. of Borings	Enter the total number of borings (including locations of test pits, hand auger samples, etc.) within the alignment that is being analyzed. This field is a required field.
No. of DCPs	Enter the total number of dynamic cone penetration (DCP) test fields within the alignment that is being analyzed that do NOT have hand auger samples present alongside the exploration. Do NOT include Wildcat DCP explorations in this total. Any hand auger samples should be treated as borings and included with in the boring count.

2. Boring Logs Entry Worksheet: this worksheet has a programming code that will run in the background every time the sheet is activated and will make the sheet unresponsive for less than a minute. The code is designed to read the total number of borings from the cover sheet and generate the needed number of fields.

- a. All yellow highlighted fields are user's entry.
- b. ODOT has developed a text table export from gINT (*GB 1 Borings Log Entry Tab*) that will allow for copy and paste of all highlighted fields with the exception of proposed subgrade elevation. The designer must provide a proposed subgrade elevation in order for the spreadsheet to function properly.
- c. The Cut/Fill field is a calculated field that, based on the difference between the boring elevation and the proposed subgrade elevation, will highlight the cell either gray and adds the letter "C" to the end in a cut situation or highlights the cell in light purple and adds the letter "F" to the end in a fill situation.
- d. Every duplicate boring ID will be highlighted in salmon background and red text.
- e. **IMPORTANT:** After entering all the borings' information, the user must click "Add Subgrade Analysis Entry Fields" button. This will generate all the required fields in the "Subgrade Analysis" Worksheet.

f. **IMPORTANT:** When entering the borings' information, make sure to enter "Hand Auger" in the "Drill Rig" column for soil samples taken for Dynamic Cone Penetration (DCP) Tests and "DCP" for any DCP Tests performed without taking soil samples. This allows the workbook to generate worksheets to enter the gathered DCP data into when the user clicks the "Add DCP Test Data Worksheets" button.

### 3. Subgrade Analysis Worksheet:

- a. The boring number and boring ID is read from the "Boring Logs Entry Worksheet" excluding every boring that has six feet or more of fill.
- b. All yellow highlighted fields are to be entered by the user and salmon highlighted fields indicates a problem or issue.
- c. Every sample that has a Sulfate Content greater than or equal to 3000 will be highlighted in
- d. Unsuitable/Unstable:
  - i. Unsuitable samples that are within 3 feet of the top of subgrade will be highlighted with salmon background and the class will be showing in this field.
  - ii. Unstable Samples that are within 3 feet of top of subgrade will be highlighted with

Criterion	Stabilization Need Check	Text displayed in the
A-1-a, A-1-b, A-3, or A-3a Soil Class	No Stabilization is needed	
$HP \geq 1.875$	No Stabilization is needed	
$N_{60} \geq 15$	No Stabilization is needed	
$1.875 \geq HP \geq 1.5$ and $M_c \geq \text{Opt. } M_c + 3$	Unstable Subgrade	HP & Mc
$15 \geq N_{60} \geq 12$ and $M_c \geq \text{Opt. } M_c + 3$	Unstable Subgrade	$N_{60}$ & Mc
$HP \leq 1.5$	Unstable Subgrade	HP
$N_{60} \leq 12$	Unstable Subgrade	$N_{60}$

iii. The field is formulated to check for HP first and check for  $N_{60}$  second.

- f. Excavate and Replace (Item 204) is going to be calculated based on the subgrade depth for each sample indicating an unsuitable or unstable problem.
- g. Recommendation:
  - i. Geotextile Option is calculated and rounded to a multiple of 3 inches based on the subgrade depth for every sample indicating an unsuitable or unstable problem.
  - ii. GEOGRID Option is only offered in case of unstable subgrade problem and if the geotextile option indicates the need to excavate greater than 12 inches.

**PLEASE NOTE: The Problem, Excavate & Replace, and Recommendation Fields are the responsibility of the Designer. These fields are being enhanced to attempt to capture the ODOT philosophy regarding the subgrade stabilization chart, but are considered still under development. If there are discrepancies between the spreadsheet output and the stabilization chart - the chart governs in conjunction with engineering judgement. Please contact Steve Taliaferro at [stephen.taliaferro@dot.ohio.gov](mailto:stephen.taliaferro@dot.ohio.gov) if you have any questions.**

**PLEASE NOTE: It is the Designer's responsibility to identify the most representative data when samples have been separated into multiple specimen (say 1.5 to 2.3 feet and 2.3 to 3.0 feet). The spreadsheet is not capable at this time of addressing this issue within a direct data export from GINT.**

### 4. Results Summary:

All fields in this sheet are password protected and are either calculated or read from the other worksheets.

The spreadsheet calculates the % unstable and % unsuitable soils based on the number of samples

5. Graph Worksheet:

This worksheet is designed to read the average  $N_{60L}$  and the average HP from the Cover Sheet and plot

Version	Release Date	Author	Updates
N/A	02/01/2006	Bill	
N/A	01/18/2007	Bill	
N/A	02/01/2007	Bill	
9.07	02/15/2007	Bill	
9.09	08/10/2007	Bill	
11.00	07/07/2010	Bill	
12.00	12/13/2011	Bill	
13.00	01/15/2016	Bill	
13.00	08/05/2016	Bill	
14.00	11/14/2017	Amal Mohi	
14.00	11/16/2017	Amal Mohi	
14.20	01/23/2018	Amal Mohi	
14.30	07/20/2018	Amal Mohi	
14.30	09/28/2018	Amal Mohi	
14.40	10/01/2018	Amal Mohi	
14.50	01/18/2019	Amal Mohi	
14.60	02/11/2022	Amal Mohi	
14.70	02/08/2024	Andrew Chudzik	<p>Updated the formula for flagging sulfates so it no longer flagged sulfate entries of "&lt;100". In the "% samples within 6 feet of subgrade" table in the Results Summary tab; adjusted the calculation of % Rock within 6 feet.</p> <p>Adjusted unsuitable soil counts at the surface (within 3 ft of top of subgrade) to include rock as well as adjusted text to clarify which unsuitable materials (soil or rock) were being included in the spreadsheet's calculations. Changed the table header from "% samples within 6 ft of subgrade" to "% samples within 3 feet of subgrade" to reflect this change. Also, adjusted the way N60L is calculated so that refusal blow counts entered as "50/X" do not get counted and artificially lower the N60 values.</p>
14.70	02/16/2024	Andrew Chudzik	<p>Fixed issue where "NP" was being flagged as a soil sample having a Liquid Limit (LL) of &gt; 65. Also, adjusted how recommended cut depths for A-4b material is calculated.</p>
14.70	04/04/2024	Andrew Chudzik	<p>Changed the 861 Geogrid recommendation on the Subgrade Analysis tab to 204 Geogrid to match current construction item standards. Started work on adjusting the Spreadsheet so it can produce Automatic Dynamic Cone Penetration (DCP) Sounding Reports. The Spreadsheet also marks the DCP Sounding Reports with the Design CBR and bottom of subgrade elevation for reference to poor performing soils.</p>
14.70	05/13/2024	Andrew Chudzik	<p>Updated the spreadsheet so it no longer counts hand auger samples taken for DCP explorations toward the Unstable Soils total.</p>
14.70	11/06/2024	Andrew Chudzik	<p>Adjusted the spreadsheet so it creates a number of DCP worksheets based on number of "Hand Auger" entries in the Drill Rig Column in the Boring Logs Entry tab.</p>
14.80	01/17/2025	Andrew Chudzik	<p>Widths for the Station Column in the Boring logs Entry Tab were widened so the information is shown properly.</p>

14.80	06/18/2025	Andrew Chudzik	The cell reporting the percentage of samples with Unsuitable Soil within 3 ft of the subgrade on the Results Summary tab was grabbing its data from the wrong reference row. This was updated to the appropriate reference row.
14.81	07/21/2025	Andrew Chudzik	Removed a left over reference to a different spreadsheet from the calculations in the "Mopt", "GI" and "Unstable" columns within the Subgrade Analysis tab. Added a formula to the title sheet to hide the instructions once a date is entered. Added the Updates tab to the spreadsheet.

## **Supporting Information**

### **Contents:**

- Unified Soil Classification System
- ODOT Quick Reference for Visual Description of Soils
- ODOT Classification of Soils
- Excerpts from TIMS information available for SEN-Jones Road Extension project, transmittal date June 6, 1974, Job Number 02004, 14 pages

Note: All attachments are one page unless noted above.

## Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>				Soil Classification	
				Group Symbol	Group Name <sup>B</sup>
<b>Coarse-Grained Soils:</b> More than 50% retained on No. 200 sieve	<b>Gravels:</b> More than 50% of coarse fraction retained on No. 4 sieve	<b>Clean Gravels:</b> Less than 5% fines <sup>C</sup>	Cu ≥ 4 and 1 ≤ Cc ≤ 3 <sup>E</sup>	GW	Well-graded gravel <sup>F</sup>
		<b>Gravels with Fines:</b> More than 12% fines <sup>C</sup>	Cu < 4 and/or [Cc < 1 or Cc > 3.0] <sup>E</sup>	GP	Poorly graded gravel <sup>F</sup>
			Fines classify as ML or MH	GM	Silty gravel <sup>F, G, H</sup>
		<b>Sands:</b> 50% or more of coarse fraction passes No. 4 sieve	<b>Clean Sands:</b> Less than 5% fines <sup>D</sup>	Fines classify as CL or CH	GC
	Cu ≥ 6 and 1 ≤ Cc ≤ 3 <sup>E</sup>			SW	Well-graded sand <sup>I</sup>
	<b>Sands with Fines:</b> More than 12% fines <sup>D</sup>		Cu < 6 and/or [Cc < 1 or Cc > 3.0] <sup>E</sup>	SP	Poorly graded sand <sup>I</sup>
			Fines classify as ML or MH	SM	Silty sand <sup>G, H, I</sup>
	<b>Fine-Grained Soils:</b> 50% or more passes the No. 200 sieve	<b>Silts and Clays:</b> Liquid limit less than 50	<b>Inorganic:</b>	PI > 7 and plots above "A" line <sup>J</sup>	CL
PI < 4 or plots below "A" line <sup>J</sup>				ML	Silt <sup>K, L, M</sup>
<b>Organic:</b>			$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay <sup>K, L, M, N</sup> Organic silt <sup>K, L, M, O</sup>
			<b>Silts and Clays:</b> Liquid limit 50 or more	<b>Inorganic:</b>	PI plots on or above "A" line
PI plots below "A" line		MH			Elastic silt <sup>K, L, M</sup>
<b>Organic:</b>		$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$		OH	Organic clay <sup>K, L, M, P</sup> Organic silt <sup>K, L, M, Q</sup>
		<b>Highly organic soils:</b>		Primarily organic matter, dark in color, and organic odor	

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

<sup>E</sup>  $Cu = D_{60}/D_{10}$      $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

<sup>F</sup> If soil contains ≥ 15% sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains ≥ 15% gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

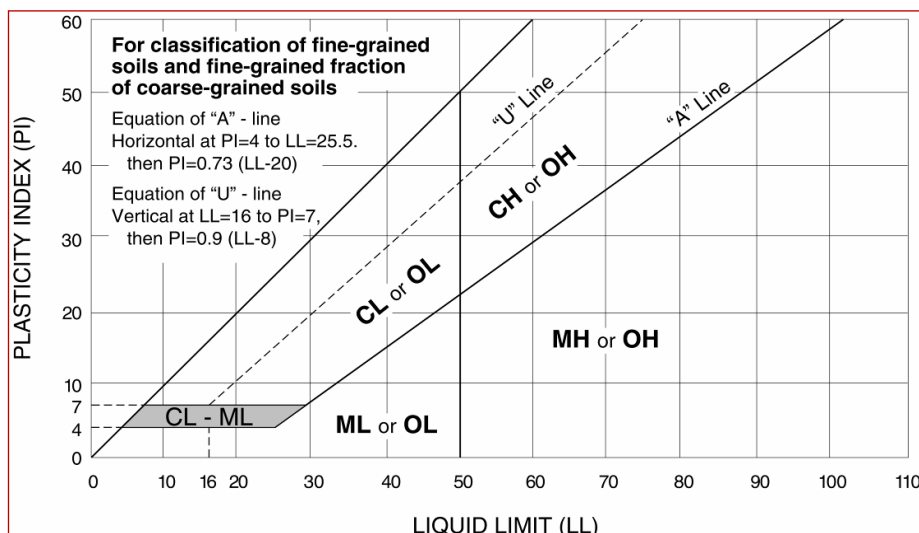
<sup>M</sup> If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup> PI ≥ 4 and plots on or above "A" line.

<sup>O</sup> PI < 4 or plots below "A" line.

<sup>P</sup> PI plots on or above "A" line.

<sup>Q</sup> PI plots below "A" line.



## APPENDIX A.1 - ODOT Quick Reference for Visual Description of Soils

### 1) STRENGTH OF SOIL:

Non-Cohesive (granular) Soils - Compactness	
Description	Blows Per Ft.
Very Loose	≤ 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

### 2) COLOR :

If a color is a uniform color throughout, the term is single, modified by an adjective such as light or dark. If the predominate color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term “mottled”

### 3) PRIMARY COMPONENT

Use **DESCRIPTION** from ODOT Soil Classification Chart on Back

### Cohesive (fine grained) Soils - Consistency

Description	Qu (TSF)	Blows Per Ft.	Hand Manipulation
Very Soft	<0.25	<2	Easily penetrates 2” by fist
Soft	0.25-0.5	2 - 4	Easily penetrates 2” by thumb
Medium Stiff	0.5-1.0	5 - 8	Penetrates by thumb with moderate effort
Stiff	1.0-2.0	9 - 15	Readily indents by thumb, but not penetrate
Very Stiff	2.0-4.0	16 - 30	Readily indents by thumbnail
Hard	>4.0	>30	Indent with difficulty by thumbnail

### 4) COMPONENT MODIFIERS:

Description	Percentage By Weight
Trace	0% - 10%
Little	>10% - 20%
Some	>20% - 35%
“And”	>35%

### 5) Soil Organic Content

Description	% by Weight
Slightly Organic	2% - 4%
Moderately Organic	4% - 10%
Highly Organic	> 10%

### 6) Relative Visual Moisture

Description	Criteria	
	Cohesive Soil	Non-cohesive Soils
<b>Dry</b>	Powdery; Cannot be rolled; Water content well below the plastic limit	No moisture present
<b>Damp</b>	Leaves very little moisture when pressed between fingers; Crumbles at or before rolled to 1/8”; Water content below plastic limit	Internal moisture, but no to little surface moisture
<b>Moist</b>	Leaves small amounts of moisture when pressed between fingers; Rolled to 1/8” or smaller before crumbling; Water content above plastic limit to -3% of the liquid limit	Free water on surface, moist (shiny) appearance
<b>Wet</b>	Very mushy; Rolled multiple times to 1/8” or smaller before crumbles; Near or above the liquid limit	Voids filled with free water, can be poured from split spoon.



# CLASSIFICATION OF SOILS

Ohio Department of Transportation

(The classification of a soil is found by proceeding from top to bottom of the chart. The first classification that the test data fits is the correct classification.)

SYMBOL	DESCRIPTION	Classification		LL <sub>O</sub> /LL × 100*	% Pass #40	% Pass #200	Liquid Limit (LL)	Plastic Index (PI)	Group Index Max.	REMARKS
		AASHTO	OHIO							
	Gravel and/or Stone Fragments	A-1-a			30 Max.	15 Max.		6 Max.	0	Min. of 50% combined gravel, cobble and boulder sizes
	Gravel and/or Stone Fragments with Sand	A-1-b			50 Max.	25 Max.		6 Max.	0	
	Fine Sand	A-3			51 Min.	10 Max.	NON-PLASTIC		0	
	Coarse and Fine Sand	--	A-3a			35 Max.		6 Max.	0	Min. of 50% combined coarse and fine sand sizes
	Gravel and/or Stone Fragments with Sand and Silt	A-2-4				35 Max.	40 Max.	10 Max.	0	
		A-2-5					41 Min.			
	Gravel and/or Stone Fragments with Sand, Silt and Clay	A-2-6				35 Max.	40 Max.	11 Min.	4	
		A-2-7					41 Min.			
	Sandy Silt	A-4	A-4a	76 Min.		36 Min.	40 Max.	10 Max.	8	Less than 50% silt sizes
	Silt	A-4	A-4b	76 Min.		50 Min.	40 Max.	10 Max.	8	50% or more silt sizes
	Elastic Silt and Clay	A-5		76 Min.		36 Min.	41 Min.	10 Max.	12	
	Silt and Clay	A-6	A-6a	76 Min.		36 Min.	40 Max.	11 - 15	10	
	Silty Clay	A-6	A-6b	76 Min.		36 Min.	40 Max.	16 Min.	16	
	Elastic Clay	A-7-5		76 Min.		36 Min.	41 Min.	≤ LL-30	20	
	Clay	A-7-6		76 Min.		36 Min.	41 Min.	> LL-30	20	
	Organic Silt	A-8	A-8a	75 Max.		36 Min.				W/o organics would classify as A-4a or A-4b
	Organic Clay	A-8	A-8b	75 Max.		36 Min.				W/o organics would classify as A-5, A-6a, A-6b, A-7-5 or A-7-6
MATERIAL CLASSIFIED BY VISUAL INSPECTION										
	Sod and Topsoil		Uncontrolled Fill (Describe)		Bouldery Zone		Peat			
	Pavement or Base									

\* Only perform the oven-dried liquid limit test and this calculation if organic material is present in the sample.

1974 ✓ Year 014877

62004 ✓ County Seneca ✓

STORAGE DATA	
Folder	
Section File No.	FEP-265
Record Center No.	10-J-17
Tracings	
Section File No.	FET 286
Record Center No.	11-G-45

Job No. \_\_\_\_\_ Project Sen-Jones Rd ✓  
 Changes \_\_\_\_\_ Ident. Extension  
 \_\_\_\_\_ Soil Profile ✓  
 Proj.No. \_\_\_\_\_ Project Code 0526 ✓

Topo Sheet 541-2-NW & NE ✓

Begin Sta. 10+00 ✓  
 End Sta. 158+00 ✓

	Rev.
Drafting By <u>A.F.</u> ✓	
Comp. Date <u>6-14-74</u> ✓	
Drafting Hrs. <u>43</u>	

Design By A.E. Stilson & Ass. Ltd. ✓ Length 2.80 ✓ Miles

	RECON	AUGER	CORE	DRIVE ROD	RESISTIVITY
By	J.S.M. ✓	J.A.G. ✓			
Dates	<u>5-14-74</u> ✓	<u>5/22 to 24/74</u> ✓			
No. of Holes or Soundings		<u>29</u> ✓			
Footage		<u>191.0'</u> ✓			
Samples Tested		<u>67</u>			

No. of Tracings 6

Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Samples Accounted

Transmittal Date 6/20/74 Revisions \_\_\_\_\_ Refer to \_\_\_\_\_

Length	Auger Data			Core Data			Drive Rod Data		Resistivity
	No. of Holes	Footage	Samples	No. of Holes	Footage	Samples	No. of Soundings	Footage	No. of Locations
<u>2.80</u>	<u>29</u>	<u>191.0</u>	<u>67</u>	—	—	—	—	—	—

B-027-0-74

# FIELD BORING LOG

Project Code

Project Identification

0526

SEN JONES RD EXT

Station

Offset

Co., Rt., Sec. No.

150+00.1

0

Order Code 01

Crew JG S.B. J.S.

Date 5-24-74

Equipment H.A.

Surface Elev. 0

Water Elev.

Depth Feet	Field Number	Description
0.0		FAP 506
1.0	602	DARK BR. SILT CLAY MUD
1.5	603	MUD BR. SILT CLAY W/ STONE FRAGS
5		Refusal Hard Layer
10		
15		
20		
25		
30		

Use reverse side of this sheet for additional notes.

B-028-0-74

## FIELD BORING LOG

Project Code

Project Identification

0526

SEN JONES RD. EXT.

Station

Offset

Co., Rt., Sec. No.

156+00.1

57

Order Code 01

Crew T.G. S.B. J.S.

Date 11-24-74

Equipment T.A.

Surface Elev. (2)

Water Elev.

Depth Feet	Field Number	Description
0.0		<u>FDP SOIL</u>
6.0	21	MOIST MOTTLED CLAY
5	64	
6.0	19	MOIST BR. SANDY SILT CLAY
2.5	65	W/ STONE FRAGS
10		Spud
15		
20		
25		
30		

Use reverse side of this sheet for additional notes.

*Mr Calvin*

Jones Rd Ext

August 2, 1974

W. R. Greisiger

J. M. Carstensen, District Deputy Director

E. J. Schaefer, Engineer of Roadway Design By:

H. E. Marshall

SEN CO - Jones Road Extension

Reference is made to the soil profile for the subject project reported out by our Laboratory June 20, 1974.

It is noted that the surface soils along the line of the proposed improvement will consist predominantly of wet clay soils. These clays are for the most part too unpermeable to be greatly improved by drainage. However, both the wet condition and the low supporting strength can be much improved by lime stabilization. We therefore recommend lime stabilization of the upper 6" of the subgrade. The specification for this work is covered by the attached note which is usually incorporated in the proposal. Since compaction is covered by the lime stabilization no pay item should be set up for subgrade compaction or proof rolling. However we recommend test rolling with a blade grader prior to incorporation of the lime. This can be provided by the following plan note:

TEST ROLLING PRIOR TO LIME STABILIZATION

The subgrade in areas of lime stabilization shall be test rolled after rough grading and prior to the addition of lime, using a grader having a minimum weight of 15 tons. Areas lacking sufficient stability in the opinion of the engineer, shall be treated as soft subgrade. The cost of the test rolling shall be included in the unit price-bid for 203 Excavation and 203 Embankment.

By letter of July 31, Jack Vincent of A. E. Stilson furnished us comments on the available traffic information. The present traffic between U.S. 23 and Buckley Street is 2700 ADT with 600 B and C trucks. This high truck count is due to the presence of a truck terminal just east of the railroad. We have assumed that the 600 B and C trucks will be divided equally and that the volume will double in 20 years. For these conditions the flexible pavement design should be 1" thicker than shown as follows:

Full Depth Asphalt

- 1 1/4" 404 Asphalt Concrete
- 1 1/4" 402 Asphalt Concrete
- 8" 301 Bituminous Aggregate Base
- 6" Lime Stabilized Subgrade

J. M. Carstensen/Attention W. R. Greisiger  
August 2, 1974  
Page 2

If the county wants to consider a rigid design, we suggest the following:

8" 452 Plain Concrete\*  
6" Lime Stabilized

\*Transverse joints should be skewed with the joint at the right pavement edge 4' forward of that at the left edge for a 24' width pavement.

We do not think that the granular course and shallow pipe underdrain are absolutely necessary for the curbed section in the west part of this project. However if this design is a local standard and is strongly defended by the county, we will have no objections to its use.

Please contact us if you have any questions about these recommendations.

E. J. Schaefer  
Engineer  
Roadway Design

By:

\_\_\_\_\_  
H. E. Marshall  
Engineer  
Pavement & Soils

EJS:HEM:mwg

Attachment

cc: Mr. Carstensen/Dist. 2  
Mr. Vincent/A.E. Stilson & Associates  
✓ Mr. Calvin/Test Lab.  
Mr. Bashore/Construction  
Reading File  
File

June 20, 1974

James M. Carstensen, District Deputy Director

W. R. Grelsiger (D&P Engr)

F. M. Williams

Per: R. E. Calvin

Report of Soil Profile Investigation  
SEN-Jones Road Extension  
Issue I

File: 203-1.1  
Seneca

Transmitted herewith are the results of the soil profile investigation made for the Jones Road Extension, Seneca County Issue I project.

Enclosures consist of a set of reproducible cloths of the soil profile investigation report, which are to be included with the plans and a set of prints for your file.

F. M. Williams, P. E.  
Bureau of Testing

Per: R. E. Calvin  
R. E. Calvin, P. E.  
Foundation Exploration Section

REC:drd

Encl.

cc: E. J. Schaefer, Attn: H. E. Marshall  
R. P. Turner, Attn: R. E. Bashore  
J. B. Ellis (no encl.)  
James C. Leahy, Seneca County Engineer (no encl.)  
Alden E. Stilson & Associates, Ltd. (no encl.)  
R. E. Calvin (3)



FOUNDATION EXPLORATION SECTION  
SOIL PROFILE INVESTIGATION RECONNAISSANCE REPORT

PROJECT IDENTIFICATION

SEN-JONES ROAD EXTENSION  
Co., Rt., Sec. No.

Reconn. By J.S. MALRY

Project Code	0526
--------------	------

Dates: 5-14-'74

Job No. 02916

Sheet 1 of 2

Instructions to Reconnaissance Personnel

The Reconnaissance Report for this Soil Profile Investigation shall contain the items listed below:

1. Description of the Project.
2. Geology of area traversed by Project.
3. Description of Topography of Project.
4. General estimate of subsurface conditions.
5. Specific information relative to critical soil conditions.
6. Schedule of Auger Borings
7. Schedule of Core Borings
8. Instructions to Crew Chief
  - a. Special Equipment Required
  - b. Safety Considerations
  - c. Special Instructions

FOUNDATION EXPLORATION SECTION  
SOIL PROFILE INVESTIGATION RECONNAISSANCE REPORTReconn. By L.S. Maxey

PROJECT IDENTIFICATION

Dates: 5-14-74SEN-JONES ROAD EXTENSION

Co., Rt., Sec. No.

Sheet      of     

It is proposed to build 2.78 miles of 24-foot roadway from U.S. Route 23 to S.R. 12 from the intersection of existing Jones Road and U.S. R. 23 in the north edge of Fostoria. Total distance is 2.78 miles.

Alignment lies on the old glaciated Maumee Lake plains with lacustrine silts overlying dense glacial clay till. Glacial drift is reported to be less than 25 feet in thickness.

Bedrock is Niagara dolomite of Silurian age.

No buried valleys are reported.

FOUNDATION EXPLORATION SECTION  
SCHEDULE OF TEST BORINGS

① Check with Co. Engr. @ Tiffin Court House

PROJECT IDENTIFICATION

SEN. JONES RD EXTENSION

Co., Rt., Sec. No.

Reconn. By JS Maxey

Project Code 0526

Dates: 5-14-74

Job No. 02 916

Sheet 1 of 2

ORDER CODE	BORING LOCATIONS			TYPE *			DEPTH	REMARKS
	Boring No.	Station	Offset	TA	HA	PS		
01	1	11+00		☒	L		11	check utilities @ 8.0'
	√2	17+25	10R	L			10	@ 7.0'
	√3	22+00	8R				10	@ 4.0'
	√4	27+00	5R				10	
	√5	32+00	8R				10	
	√6	37+00	5R				10	
	√7	42+00	10R				10	
	√8	47+00	4R				10	
	√9	52+00		☒			10	
	√10	57+00		☒			10	@ 8.0'
	√11	62+00	25L				10	
	√12	67+00	25L				10	@ 4.0'
	√13	72+00	25L				10	@ 5.0'
	√14	77+00	25L				10	@ 4.0'
	√15	82+00	25L				10	@ 5.0'
	√16	87+00	25L				10	@ 4.0'
	√17	96+50	10L				10	✓
	√18	99+50	15L				10	@ 1.0'
	√19	105+00		☒			10	@ Hand Auger in plowed field
	√20	115+00		☒			10	@ 3.5'

\*TA=Truck Mounted Auger HA=Hand Auger PS=Peat Sampler

Note to Driller: PROJECT CODE to be put on MASTER CARDS, SAMPLE CARDS, & FIELD LOGS  
ORDER CODE to be put on SAMPLE CARDS and FIELD LOGS.

**FOUNDATION EXPLORATION SECTION**  
**SCHEDULE OF TEST BORINGS (CONTINUED)**

PROJECT IDENTIFICATION

Project Code **0526**

**SEN JONES RD. EXTENSION**

Co., Rt., Sec. No.

Sheet 2 of 2

ORDER CODE	BORING LOCATIONS				TYPE			DEPTH	REMARKS
	Boring No.	Station	Offset		TA	HA	PS		
01	W21	118+00,		Φ	✓			10	W4.0'
	W22	126+00,		Φ				10	W4.0'
	W23	131+00,		Φ				10	W4.5'
	W24	135+00,	40R					10	W4.0'
	W25	140+00,	40R					10	W3.5'
	W26	145+00,		Φ				10	W6.5'
	W27	150+00,		Φ		B-027-0-74		10	Hand Auger (Plowed)
	W28	156+00,		Φ		B-028-0-74		10	W7.5'
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							
		+							



GENERAL INFORMATION

INTRODUCTION

THIS REPORT CONSISTS OF THE SOILS INVESTIGATION OF 2.8 MILES OF THE PROPOSED JONES ROAD EXTENSION, BEGINNING AT THE JONES ROAD-USR 23 INTERSECTION, EXTENDING EASTWARD AND TERMINATING ON COUNTY ROAD 592, IMMEDIATELY EAST OF THE SR 12 COUNTY ROAD 592 INTERSECTION.

PROPOSED GRADE INDICATES MAXIMUM PROPOSED 2-FOOT CUTS AND 6-FOOT FILL EMBANKMENTS.

GEOLOGY OF THE PROJECT

THE PROJECT IS LOCATED ON THE FLAT, GLACIATED MISSISSIPPI VALLEY PLAIN, IN AN AREA WHERE RELATIVELY THIN GLACIAL DRIFT OVERLIES DOLOMITE BEDROCK, OF SILURIAN AGE.

EXPLORATION

EXPLORATORY BORINGS WERE MADE BY MEANS OF TRUCK-MOUNTED MECHANICAL SOIL AUGER AND HAND AUGER (IN DIFFICULT ACCESS AREAS), BETWEEN MAY 22 AND 24, 1974.

INVESTIGATIONAL FINDINGS

MATERIALS ENCOUNTERED ON THE PROJECT WERE PREDOMINATELY COMPRISED OF SILT CLAYS (A-6A AND A-6B) AND CLAYS (A-7-6), GENERALLY HAVING MOISTURE CONTENTS IN THE LOWER PORTIONS OF THE PLASTIC RANGE.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS-87 SAMPLES TESTED

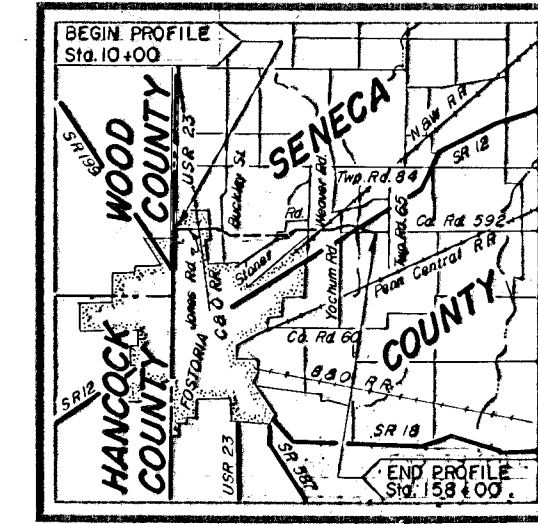
DESCRIPTION	H.R.B. CLASS	OHIO CLASS	% AGG.	% C. SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
STONE FRAGMENTS	A-1-A(0)	A-1-A	63	7	19	9	2	NP	NP	8	1
STONE FRAGMENTS WITH SAND	A-1-B(0)	A-1-B	47	9	24	14	6	20	3	7	3
FINE SAND	A-3(0)	A-3	0	8	83	1	8	NP	NP	18	1
COARSE AND FINE SAND	-----	A-3A	0	3	72	16	9	NP	NP	18	1
SANDY SILT	A-4(3)	A-4A	18	9	28	28	20	24	8	18	8
SILT AND CLAY	A-6(9)	A-6A	8	6	14	30	42	32	13	18	21
SILTY CLAY	A-6(10)	A-6B	6	6	16	29	43	37	17	20	15
CLAY	A-7-6(12)	A-7-6	1	2	9	31	57	44	19	24	19

SOD AND/OR TOPSOIL = X = APPROXIMATE DEPTH  
 BERM MATERIAL  
 AUGER BORING - PLAN VIEW  
 AUGER BORING PLOTTED TO VERTICAL SCALE ONLY

NOTE: FIGURES BESIDE BORINGS INDICATE WATER CONTENT IN PERCENT, e.g., 15

SOIL PROFILE  
 SENECA COUNTY  
 SEN-JONES RD. EXTENSION  
 OHIO DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-TESTING LABORATORY  
 1600 WEST BROAD STREET COLUMBUS, OHIO 43223

NOTE: INFORMATION SHOWN BY THIS SUBGRADE PROFILE WAS OBTAINED SOLELY FOR USE IN ESTABLISHING DESIGN CONTROLS FOR THE PROJECT. THE STATE OF OHIO DOES NOT GUARANTEE THE ACCURACY OF THIS DATA AND IT IS NOT TO BE CONSTRUED AS A PART OF THE PLANS GOVERNING CONSTRUCTION OF THE PROJECT.



LOCATION MAP

Record-J.S.M. 5/14/74  
 Drilling-Auger-J.A.G.  
 5/22/74 to 5/24/74  
 Drafting-A.F. 6/20/74

SUMMARY OF SOIL TEST DATA

NOTE: NP SHOWN IN LIQUID LIMIT AND PLASTICITY INDEX COLUMNS INDICATES THAT THE MATERIAL IS NON-PLASTIC

STATION & OFFSET	DEPTH FROM TO	% AGG	% CS	% FS	% SILT	% CLAY	LL	PI	% WC	SHTL CLASS
11+00 CL	0.5-2.5	0	2	6	37	55	41	18	24	A-7-6*
	2.5-7.0	63	7	19	9	2	NP	NP	8	A-1-A*
	7.0-8.0	41	14	27	13	5	NP	NP	14	A-1-B
17+25 10' RT	1.5-7.0	49	11	16	17	7	20	3	9	A-1-B*
	2.0-4.0	10	12	26	25	28	12	18	18	A-6A*
22+00 3' RT	0.5-2.0	14	9	20	33	24	31	11	22	A-6A*
	2.0-4.0	10	12	26	25	28	12	18	18	A-6A*
	4.0-10.0	0	4	11	39	40	36	18	19	A-6B
27+00 2' RT	0.5-3.0	0	4	12	27	57	50	25	25	A-7-6*
	3.0-8.0	4	6	11	39	40	36	18	19	A-6B
	8.0-10.0	0	3	6	49	46	34	13	16	A-6A
32+00 5' RT	0.5-2.0	0	3	13	37	49	44	15	6	A-7-6*
	2.0-5.0	28	3	8	25	42	42	11	22	A-6B
	5.0-9.0	0	1	11	17	83	48	20	32	A-7-6
37+00 4' RT	0.5-2.5	0	3	21	43	29	40	16	24	A-6B*
	2.5-8.0	19	3	20	28	32	35	15	18	A-6A
	8.0-10.0	6	7	12	27	46	37	14	13	A-6A
42+00 10' RT	0.5-5.0	13	13	19	22	27	35	16	16	A-6B*
	5.0-8.0	19	7	12	23	39	33	15	14	A-6A
	8.0-10.0	5	6	12	29	48	31	15	15	A-6A
47+00 5' RT	0.5-5.0	5	7	28	28	34	34	16	22	A-6B*
	5.0-7.5	0	1	14	28	57	37	16	23	A-6B
	7.5-10.0	6	5	14	29	46	29	13	15	A-6A
52+00 15' RT	0.6-4.0	0	4	14	29	53	37	17	22	A-6B
	4.0-7.0	7	6	13	28	46	36	16	18	A-6B
	7.0-9.0	7	7	13	28	45	32	13	14	A-6A
57+00 CL	0.6-6.0	0	4	12	30	54	41	20	19	A-7-6*
	6.0-8.0	11	7	12	26	44	35	17	15	A-6B
	8.0-10.0	0	3	5	22	25	35	23	9	A-4A
62+00 25' LT	0.5-5.0	8	5	12	25	50	38	17	22	A-6B*
	5.0-8.0	7	7	13	26	47	34	15	16	A-6A
	8.0-10.0	6	4	8	25	57	35	16	15	A-6B
67+00 25' LT	0.5-1.5	0	2	8	36	54	47	15	32	A-7-6*
	1.5-4.0	0	2	9	32	57	41	18	22	A-7-6
	4.0-10.0	0	3	5	33	56	8	NP	19	A-4A
72+00 25' LT	0.5-2.0	0	2	9	27	62	46	23	26	A-7-6*
	2.0-5.0	0	2	10	31	57	43	18	22	A-7-6
	5.0-10.0	0	2	10	33	55	44	17	27	A-7-6
77+00 25' LT	0.5-2.0	4	2	10	25	59	46	21	23	A-7-6
	2.0-4.0	4	2	10	33	55	44	17	27	A-7-6
	4.0-10.0	0	1	9	34	56	47	22	25	A-7-6
82+00 25' LT	0.5-2.0	0	1	9	34	56	47	22	25	A-7-6
	2.0-5.0	0	1	10	29	60	46	23	23	A-7-6
	5.0-10.0	0	2	10	30	58	44	19	23	A-7-6*
87+00 25' LT	0.5-4.0	0	2	12	35	51	40	13	22	A-6A
	4.0-7.5	0	2	8	27	63	43	21	26	A-7-6
	7.5-10.0	28	12	22	28	10	NP	NP	10	A-4A
96+25 15' LT	0.5-2.0	0	2	12	35	51	40	13	22	A-6A
	2.0-7.5	0	2	8	27	63	43	21	26	A-7-6
	7.5-10.0	28	12	22	28	10	NP	NP	10	A-4A
99+50 50' LT	0.5-2.0	0	1	8	39	52	42	15	24	A-7-6*
	2.0-6.0	13	1	7	31	48	42	22	22	A-7-6*
	6.0-7.0	29	10	16	24	21	24	10	12	A-4A
105+00 CL	0.5-2.5	5	3	14	34	44	41	14	29	A-7-6*
	2.5-4.0	0	3	16	32	49	39	16	23	A-6B
	4.0-10.0	0	3	16	32	49	39	16	23	A-6B
110+00 CL	0.8-3.5	9	9	23	24	35	32	12	22	A-6A*
	3.5-10.0	9	16	30	26	19	21	6	15	A-4A*
	10.0-15.0	6	10	23	37	24	29	12	16	A-6A*
118+00 CL	0.8-2.0	6	10	23	37	24	29	12	16	A-6A*
	2.0-4.0	50	3	29	12	6	NP	NP	9	A-1-B*
	4.0-10.0	0	3	16	32	49	39	16	23	A-6B
126+00 CL	0.5-4.0	10	5	23	20	42	35	17	24	A-6B*
	4.0-10.0	13	5	25	30	27	27	9	22	A-4A
	10.0-15.0	30	4	15	24	27	32	14	24	A-6A
131+00 CL	0.8-2.0	13	5	25	30	27	27	9	22	A-4A
	2.0-4.5	30	4	15	24	27	32	14	24	A-6A
	4.5-10.0	0	3	1	55	41	32	13	19	A-6A*
135+00 CL	0.8-1.5	0	3	14	39	44	38	18	23	A-6B
	1.5-4.0	0	3	14	39	44	38	18	23	A-6B
	4.0-10.0	0	3	14	39	44	38	18	23	A-6B
140+00 CL	0.8-3.5	0	2	12	40	46	34	13	24	A-6A*
	3.5-10.0	0	2	12	40	46	34	13	24	A-6A*
	10.0-15.0	0	2	12	40	46	34	13	24	A-6A*
145+08 CL	0.5-5.5	0	5	23	30	42	34	18	18	A-6B*
	5.5-8.0	0	4	7	16	9	NP	NP	13	A-5A
	8.0-10.0	0	4	7	16	9	NP	NP	13	A-5A
150+00 CL	0.4-1.5	0	3	12	37	48	39	14	23	A-6A*
	1.5-3.0	0	3	10	29	58	42	19	23	A-7-6
	3.0-10.0	0	3	10	29	58	42	19	23	A-7-6
156+00 CL	0.8-5.0	0	4	15	12	69	39	19	21	A-6A*
	5.0-7.5	14	7	14	32	33	29	13	19	A-6A
	7.5-10.0	14	7	14	32	33	29	13	19	A-6A

2

Sty -

B-027-0-74  
 150+00 CL  
 B-028-0-74  
 156+00 CL

