Roadway Geotechnical Report

Oakton Street and Gross Point Road at I-94
IDOT PTB 195-019
Cook County, Illinois

Prepared for

Illinois Department of Transportation (IDOT)
Contract Number: P-91-467-16

Project Design Engineer Team
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October 25, 2021

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Oakton Street and Gross Point Road at I-94
Cook County, Illinois
IDOT PTB 195-019

Dear Mr. Amini:

Attached is a copy of the Roadway Geotechnical Report for the above referenced project. The report provides a description of the site investigation, site conditions and construction recommendations. The site investigation for the roadway reconstruction included advancing eight (8) soil borings to depths ranging from 10 to 124 feet.

Should you have any questions or require additional information, please call us at 630-994-2600.

Sincerely,

Thomas E. Kasang, P.E.
Project Engineer

Ala E Sassila, Ph.D., P.E.
Principal

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1.0 INTRODUCTION

GSG Consultants, Inc. (GSG) completed a geotechnical investigation for the roadway reconstruction project on Oakton Street and Gross Point Road near the Villages of Skokie and Morton Grove in Cook County, Illinois. The purpose of the investigation was to explore the subsurface conditions, to determine engineering properties of the subsurface soil, and to develop design and construction recommendations for the project. The general project limits are shown in **Exhibit 1**.

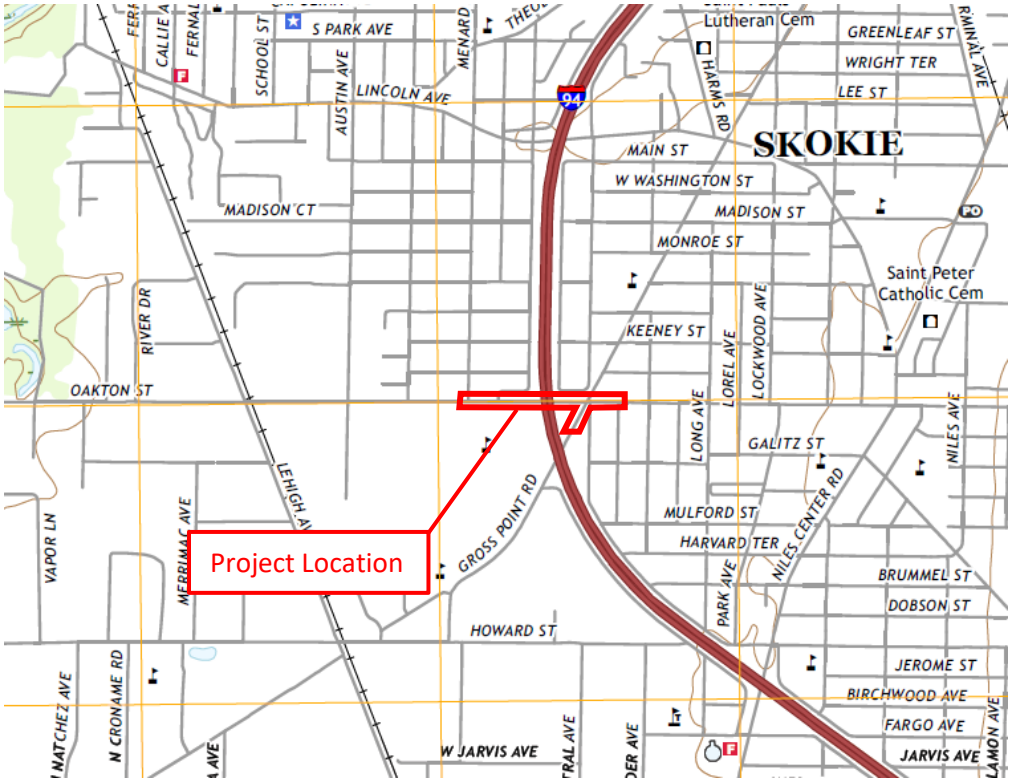


Exhibit 1 – Project Location Map
(Source: USGS Topographic Maps, usgs.gov)

1.1 Proposed Project Information

Based on design information and drawings provided by the prime consultant Atlas Engineering Group, Ltd. (Atlas) (dated 12/04/2019) (**Appendix A**), the proposed project will include reconstructing and raising the profile grade of Oakton Street near the intersection with I-94;

reconstructing Gross Point Road at the intersection with Oakton Street and Central Avenue; constructing 7-foot and 10-foot wide shared-use bicycle and pedestrian paths on the north and south sides of the Oakton Street bridge, respectively; and the replacement of traffic signals at the intersection of Oakton Street, Central Avenue, and Gross Point Road. These improvements are part of the overall project to replace the Oakton Street bridge over I-94, which will be discussed in a separate report. The improvements addressed in this report will include the following:

- Reconstruction of Oakton Street from Station 13+00 to 33+00
- Reconstruction of Gross Point Road extending 330 feet south from Oakton Street
- Construction of shared-use bicycle and pedestrian paths on the north and south sides of the Oakton Street bridge
- Traffic sign structures at the intersection of Oakton Street, Central Avenue, and Gross Point Road

Across the project limits, the proposed profile will be relatively consistent with the existing roadway profile. It is anticipated that minimal cut and fill (less than 3 feet) would be required for the majority of the proposed reconstruction of Oakton Street and Gross Point Road. Up to 6 feet of new embankment fill will be required for the shared-use bicycle and pedestrian path along Oakton Street. The proposed roadway drainage systems will maintain the existing drainage patterns and will include replacing the existing drainage system of the Oakton Street bridge.

1.2 Regional Geology

GSG reviewed several published documents to determine the regional geological setting in the area. The site is in Cook County, in Morton Grove and Skokie, Illinois. The surficial geologic deposits in this area are typically glacial drift deposited during the Wisconsin Glacial Age and sediments deposited by the various high-level states of Lake Michigan. The subsurface profile in the area consists of deposits of silty clay, sand, silt, and gravel extending to approximately 90 to 130 feet below ground surface, at which point bedrock is encountered. The bedrock consists of the Silurian System, Niagaran Series, which consists of dolomite that varies from extremely argillaceous, silty and cherty to exceptionally pure.

1.3 Climate Conditions

The geotechnical field exploration was performed between August 25 and 31, 2021. The climate conditions for the months of March to June are summarized in **Table 1**. The data in this table was obtained from the National Weather Service Forecast Office website for Chicago, Illinois and the surrounding area. The data was evaluated to determine any effects of temperature and precipitation on the water table level and soil moisture content that was encountered at the site at the time the borings were performed.

For the months included in the study, the precipitation rate was higher in June and August, but below average in May and July. The average monthly temperatures were higher than the average in the months of June, July, and August, and was lower in May. It is our opinion that the climatic conditions for the site at the time the exploration was performed did not have a direct impact on the soil moisture contents or water table levels that were recorded during the field exploration.

Table 1 – Climate Conditions

Date (M-Y)	Precipitation (in.)		Temperature (°F)	
	Total	Departure	Average	Departure
May – 2021	1.79	-2.70	60.2	-0.4
June – 2021	6.78	+2.68	74.3	+3.7
July – 2021	1.90	-1.81	74.4	+1.0
August – 2021	4.51	+0.26	77.1	+3.3

2.0 SITE SUBSURFACE EXPLORATION PROGRAM

This section describes the subsurface exploration program and laboratory testing program completed as part of this project. The subsurface exploration program was performed in accordance with applicable IDOT geotechnical manuals and procedures.

2.1 Subsurface Exploration Program

The subsurface soil investigation was conducted between August 25 and 31, 2021, and included obtaining five (5) pavement cores and advancing a total of four (4) subgrade soil borings (SGB) to depths of 10 feet. An additional two (2) borings were completed to depths of 25 and 40 feet for the proposed traffic signal structures. At the existing Oakton Street bridge abutments, two (2) bridge borings were completed to depths of 110 and 124 feet for the proposed bridge replacement. The borings were primarily completed through the existing pavement on Oakton Street and Gross Point Road. Boring TSP-02 was drilled through the parkway off Oakton Street. The soil boring locations were selected by GSG based on the preliminary design plans provided by Atlas and approved by Atlas, then completed at locations based on field conditions and site accessibility. The coordinates and existing ground surface elevations shown on the soil boring logs were obtained by GSG using handheld surveying equipment. The coordinates and surface elevation of boring TSP-02 were estimated using internet resources. The as-drilled locations of the soil borings are shown on the Soil Boring Location Map and Subsurface Profile (**Appendix B**). **Table 2** presents a list of the borings completed along with their location information.

Table 2 – Summary of Subsurface Exploration Borings

Boring ID	Location	Station	Offset (ft) / Direction	Depth (ft)	Surface Elevation (ft)
BSB-01	Oakton Street	23-40	20.6 LT	112.0	634.1
BSB-03	Oakton Street	26+41	19.9 RT	124.0	634.3
SGB-01	Oakton Street	13+23	34.9 RT	10.0	624.4
SGB-02	Oakton Street	21+20	19.2 LT	10.0	627.9
SGB-03	Oakton Street	30+53	23.2 RT	10.0	624.2
SGB-04	Gross Point Road	50+98	23.2 LT	10.0	629.6
TSP-01	Gross Point Road	52+95	39.9 LT	40.0	627.2
TSP-02	Oakton Street	30+20	46.5 LT	25.0	626.0**

* Existing Oakton Street Stationing
** Estimated from Google Earth

The soil borings were drilled using a GeoProbe and truck mounted Diedrich D-50 drill rig, equipped with 3¼-inch I.D. hollow stem augers and an automatic hammer. Soil sampling was performed according to AASHTO T 206, "Penetration Test and Split Barrel Sampling of Soils." Soil samples were obtained at 2.5-foot intervals to the boring termination depths in the SGB borings and boring TSP-02; to a depth of 25 feet below grade in the TSP-01 and then 5-foot intervals to the boring termination depth; and to depths of 30 feet in borings BSB-01 and BSB-03 and then 5-foot intervals to the boring termination depths. Water level measurements were made in each boring when evidence of free groundwater was detected on the drill rods or in the samples. The boreholes were also checked for free water immediately after auger removal, and before filling the open boreholes with soil cuttings and surface patching with asphalt.

GSG's field representative inspected, visually classified and logged the soil samples during the subsurface exploration activities and performed unconfined compressive strength tests on cohesive soil samples using a calibrated Rimac compression tester and a calibrated hand penetrometer in accordance with IDOT procedures and requirements. Representative soil samples were collected from each sample interval and were placed in jars and returned to the laboratory for further testing and evaluation.

2.2 Laboratory Testing Program

All samples were inspected in the laboratory to verify the field classifications. A laboratory testing program was undertaken to characterize and determine engineering properties of the subsurface soils encountered in the area. The following laboratory tests were performed on representative soil samples:

- Moisture content ASTM D2216 / AASHTO T-265
- Particle Size Analysis ASTM D422 / AASHTO T-88

The laboratory tests were performed in accordance with test procedures outlined in the IDOT Geotechnical Manual (2020), and per ASTM and AASHTO requirements. Based on the laboratory test results, the soils encountered were classified according to the AASHTO and the Illinois Division of Highways (IDH) classification systems. The results of the laboratory testing program are included in the Laboratory Test Results **(Appendix D)** and are also shown along with the field test results in the Soil Boring Logs **(Appendix C)**.

2.3 Existing Pavement Conditions

A summary of the pavement thicknesses from the pavement cores is shown in **Table 3**. Several pavement cores were taken adjacent to the boring locations completed along Oakton Street and Gross Point Road. The photographs of the pavement cores are included in the **Pavement Core Exhibits (Appendix E)**.

Table 3 – Pavement Core Summary

Pavement Core ID	Location	Nearest Major Intersection	Asphalt Thickness / Overlay (inches)	Concrete Thickness (inches)	Total Thickness (inches)
PCB-01	Oakton Street	300 feet west of Menard Avenue	3.0	10.5	13.5
PCB-02	Oakton Street	275 feet east of Mango Avenue / Frontage Road	1.5	9.0	10.5
PCB-03	Oakton Street	SE Corner of Oakton Street and Luna Avenue	3.0	9.5	12.5
PCB-04	Gross Point Road	250 feet SW of Oakton Street	14.0	0	14.0
PCB-05	Gross Point Road	250 feet NE of Oakton Street	12.0	0	12.0

2.4 Subsurface Conditions

This section provides a brief description of the soils encountered in the borings performed in the vicinity of the proposed improvements. Variations in the general subsurface soil profile were noted during the drilling activities. Detailed descriptions of the subsurface soils are provided in the soil boring logs and are shown graphically in the Boring Location Plan & Subsurface Profiles. The soil boring logs provide specific conditions encountered at each boring location and include soil descriptions, stratifications, penetration resistance, elevations, location of the samples, and laboratory test data. Unless otherwise noted, soil descriptions indicated on boring logs are visual identifications. The stratifications shown on the boring logs represent the conditions only at the actual boring locations and represent the approximate boundary between subsurface materials; however, the actual transition may be gradual.

Oakton Street

Borings SG-01 thru SGB-03, BSB-01, and BSB-03 were drilled along Oakton Street. Borings BSB-01 and BSB-03 were drilled through the existing pavement on the bridge approaches for the Oakton Street bridge over I-94. Borings SGB-01 and SGB-02 were performed on Oakton Street west of I-94. Boring SGB-03 was performed on Oakton Street east of I-94. The surface elevations of the borings ranged between 624.2 and 634.3 feet.

Borings BSB-01, BSB-03, SGB-01, and SGB-03 initially noted 2.5 to 3 inches of asphalt over 6.5 to 10 inches of concrete. Boring SGB-02 initially encountered 14 inches of asphalt. Boring SGB-03 noted 8 inches of aggregate base course beneath the pavement materials.

Beneath the pavement layers, the borings noted existing fill soils extending to depths between 3.5 and 13.5 feet below existing grade (elevation 618.4 to 623.3 feet). The existing fill soils were primarily granular in nature, consisting of brown and gray sand. Layers of clay fill soils were noted beneath the pavement layers in boring SGB-01 and SGB-03 (elevation 618.4 to 623.6 feet), and in borings BSB-01 and BSB-03 between the depths of 8.5 and 13.5 feet below existing grade (elevation 620.6 and 625.8 feet). Cobbles were noted at a depth of 3.5 feet below grade in boring SGB-01. Beneath the existing fill soils, native brown to gray medium dense granular soils (sand and silty sand) were encountered to the termination depths in borings SGB-02 and SGB-03, and to depths of 16 feet below existing grade in borings BSB-01 and BSB-03 (elevation 618.1 to 618.3 feet). Beneath the fill soils in boring SGB-01, very soft to soft brown and black clay loam was encountered to the boring termination depth. Beneath the native sands in borings BSB-01 and BSB-03, stiff to hard gray silty clay and silty clay loam soils were encountered to depths of 100 and 107 feet below grade (elevation 527.3 to 534.1 feet), followed by weathered limestone to the boring termination depths.

The native granular soils (sand and silty sand) had SPT blow count 'N' values between 14 and 29 blows per foot (bpf). The gray silty clay had unconfined compressive strength values ranging between 1.0 and 5.83 tsf. The unconfined compressive strength values of the brown and black clay loam in boring SGB-01 ranged between 0.0 tsf and 0.5 tsf.

Goss Point Road

Boring SGB-04 was performed on Gross Point Road approximately 240 feet southwest of Oakton Street. Borings TSP-01 and TSP-02 were performed at the intersection of Oakton Street, Gross

Point Road, and Central Avenue. Boring SGB-04 initially noted 2.5 inches of asphalt over 8 inches of concrete. Boring TSP-01 was drilled through the existing pavement on Gross Point Road, and initially noted 5.5 inches of asphalt, over 5.5 inches of concrete, over 4 inches of aggregate base course. Boring TSP-02 was drilled through the grass parkway on Oakton Street.

Beneath the pavement layers, the borings noted existing fill soils to depths between 3.5 and 8.5 feet below grade (elevation 618.7 to 622.5 feet). These soils consisted of sand fill over silty clay fill in boring SGB-04, silty clay fill in boring TSP-01, and sand fill in boring TSP-02. Sand seams were noted within the existing fill soils at a depth of 7 feet in borings SGB-04 and TSP-01. Beneath the fill soils, loose to medium dense brown to gray granular soils (sand, silty sand, and loam) were encountered to depths of 10.5 and 13.5 feet below grade (elevation 613.7 to 615.5 feet) in borings TSP-01 and TSP-02, and to the boring termination depth in boring SGB-04. Beneath the native granular soils in borings TSP-01 and TSP-02, soft to hard gray silty clay was noted and extended to the boring termination depth in TSP-01 and to 24 feet in boring TSP-02. Sand seams were noted in the borings within the gray silty clay soils at depths of 16.5 and 24 feet, respectively. Beneath the gray silty clay in boring TSP-02, very soft gray clay loam was then noted to the boring termination depth.

The SPT blow count 'N' values of the native granular soils ranged between 8 and 28 blows per foot (bpf). The unconfined compressive strength values of the gray silty clay ranged between 0.4 tsf and 5.8 tsf, and the values generally decreased with depth. The unconfined compressive strength values of the gray clay loam in boring TSP-02 was 0.2 tsf.

2.5 Groundwater Conditions

Water levels were checked in each boring to determine the general groundwater conditions present at the site and were measured while drilling and after each boring was completed. Groundwater was noted in boring TSP-01 at a depth of 13.5 feet (elevation 613.7 feet). Groundwater was not encountered during or immediately after drilling in the remaining borings.

Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level to be between elevations 613.7 and 620.5 feet. Perched water may also be present within the fill materials observed in the borings. Water level readings were made in the boreholes at times and under conditions shown on the boring logs and stated in the text of this report. However, it should be noted that fluctuations in groundwater level may occur due to

variations in the rainfall, other climatic conditions, or other factors not evident at the time measurements were made and reported herein.

3.0 GEOTECHNICAL ANALYSES AND RECOMMENDATIONS

This section provides GSG's geotechnical analysis and recommendations for the design of the proposed roadway improvements based on the results of the field exploration, laboratory testing, and geotechnical analysis.

3.1 Settlement

Based on the preliminary plans provided by Atlas (**Appendix A**), the proposed profile will be relatively consistent with the existing roadway profile. It is anticipated that minimal cut and fill (less than 3 feet) would be required for the majority of the proposed reconstruction of Oakton Street and Gross Point Road. The anticipated settlement caused by up to 3 feet of new fill material is expected to be negligible. Up to 6 feet of new fill will be required to construct the shared-use bicycle and pedestrian paths. It is anticipated that the settlement of the shared-use paths will be on the order of 1 inch or less.

3.2 Slope Stability

IDOT requires that slope stability analysis be performed in areas where the cut or fill heights will exceed 15 feet in height. For the proposed reconstruction, the proposed grades will generally match existing grade. Near the Oakton Street bridge over I-94, the proposed embankment side slopes for the widening are anticipated to be less than 15 feet; therefore, no slope stability analysis was required for this report.

3.3 Drainage Characteristics

The drainage characteristics of the site were evaluated per the IDOT Geotechnical Manual (2020), Section 6.3.4.1, based on the subgrade soil type and moisture condition, depth of water table, project topography, the anticipated profile grade line, and depth and grade of drainage ditch along the roadways. Based on the proposed profile, the roadway reconstruction for Oakton Street and Gross Point Road will be supported on subgrade soils consisting of granular existing fill materials. These soils primarily consisted of brown and gray sand. Clay fill soils were noted at the subgrade depth in borings SGB-01, SGB-03, and TSP-01.

Based on the preliminary plans and existing conditions, GSG anticipates that the proposed drainage will consist of an enclosed drainage system with curb and gutter and shallow ditches with slopes greater than 0.5%. GSG utilized Table 6.3.4.1-1, Drainage Classification in the IDOT

Geotechnical Manual, to assign the drainage classes for the site. The drainage class should be taken as Poor to Fair along Oakton Street and Gross Point Road.

3.4 Frost Susceptibility

The frost susceptibility of the subgrade soils was evaluated per Section 6.3.2.2.3 of the IDOT Geotechnical Manual. The maximum anticipated frost penetration depth below pavement in northern Illinois is 45 to 60 inches for extreme weather conditions. The frost susceptibility was evaluated for the soils encountered that would be within the proposed roadway subgrade. The frost class for the subgrade soils in these areas was assigned using Table 6.3.2.2.3-1, Frost Susceptibility Classification of Soils, in the IDOT Geotechnical Manual. The subgrade soils along the proposed improvement area were found to have a Frost Class of F2 (low to medium frost susceptibility) for the granular fill soils and a Frost Class of F3 (high) for the clay fill soils.

Perched water could be present in the upper soil layers, particularly the existing granular fill materials and any confined granular layers. Water trapped in the soil layers closer to the pavement section is susceptible to frost action and should be considered when designing the proposed roadway. Treatment measures, such as maintaining proper drainage of the subgrade soils through underdrains could be considered.

3.5 Subgrade Support Rating

The subgrade support rating (SSR) was determined based on the physical properties of in-situ soils present beneath the proposed pavement section. The SSR includes three categories (poor, fair, and granular), and are used to determine the depth of soil treatment to provide a stable working platform that is required to prevent excessive rutting, and moisture related problems during construction activities. Granular soils have the highest rating and provide a stable working platform that may require less than a 12-inch improved subgrade layer, while poor subgrade may require more than 12 inches to provide stable subgrade during construction activities. The anticipated subgrade soils encountered in most of the borings at the proposed roadway grades were generally granular, consisting of sand fill. These soils have a Subgrade Support Rating (SSR) of Granular. The clay fill soils encountered at the site have a SSR of Fair.

3.6 Illinois Bearing Ratio

The Illinois Bearing Ratio (IBR) is a measure of the support provided by the roadbed soils for the new pavement. As the proposed pavements will predominately bear on granular existing fill soils,

it is recommended that an IBR value of five (5) be used for the roadway pavement design where granular fill soils are present. It is recommended that an IBR value of three (3) be used for the roadway pavement design where clay fill soils are present.

3.7 Organic Content

Typically, soils with an organic content in excess of 10 percent are considered unsuitable to remain below proposed pavement areas. Based on the soil borings, it is not anticipated that highly organic soils will be encountered in subgrade soils for the proposed roadway.

4.0 GEOTECHNICAL ROADWAY DESIGN RECOMMENDATIONS

This section provides GSG's geotechnical recommendations for the design of the proposed roadway based on the results of the field exploration, laboratory testing, and geotechnical analysis. The proposed pavement section should be designed according to the IDOT Mechanistic Pavement Design (MPD). IDOT policy requires providing a minimum of 12 inches of improved subgrade beneath the pavement section to ensure a stable construction platform. Subgrade improvements including any undercuts or compaction of existing soils should be completed to the proposed elevations in the design plan and in accordance with the Subgrade Treatment and Recommendation Section of this report.

4.1 Subgrade Preparation

It is our understanding that the existing roadway is to be completely reconstructed. It is recommended that all existing pavement, base course, and topsoil be stripped within the limits of the proposed improvements. Based on the pavement thicknesses encountered in the borings and pavement cores, it is anticipated that pavement stripping depths of asphalt and/or concrete materials will be approximately 10 to 14 inches. Undercuts of the subgrade soils and backfilling should be based on the recommendations provided in this report, and field evaluation of the materials encountered during construction. Any unstable or unsuitable materials encountered during construction activities should be removed and replaced with compacted structural fill.

4.2 Subgrade Treatment and Recommendations

The suitability of the existing subgrade soils for the proposed reconstruction were evaluated in terms of frost susceptibly, stability, settlement, and drainage. The evaluation included determining the presence of unstable, compressible deposits, low-strength soils, high organic content soils, and soils with high-moisture content immediately below the proposed pavement section.

No areas requiring treatment were identified in the area of the proposed reconstruction. The roadway subgrade should be proof-rolled using heavy equipment or heavily loaded tandem axle dump truck with a minimum gross weight of 25 tons to check for deflection or rutting. Areas with excessive rutting and deflection shall be evaluated using a dynamic cone penetrometer (DCP) and static cone penetrometer (SCP) to determine the depth of required treatment in accordance with Article 301.04 of the SSRBC and the undercut guidelines in the IDOT Subgrade Stability Manual (2016). Poor soils encountered during proof rolling should be removed and replaced with

approved structural fill. Approved structural fill includes IDOT Porous Granular Embankment (PGE), or suitable borrow materials, as specified in the Borrow Material and Compaction Requirements section of this report. It is also recommended that a woven geotechnical fabric be placed at the base of any undercuts. The geotextile fabric should consist of a woven material meeting the requirements of Section 1080.02 of the IDOT SSRBC (2016) and should be placed in accordance with Section 210 of the IDOT SSRBC (2016). The geotextile fabric should be placed under the full width of the proposed pavement area.

4.3 Drainage Recommendation

The drainage classification of Poor to Fair should be used for the project design. The overall groundwater depth is assumed deeper than the anticipated frost depth of 45 to 60 inches for the northern Illinois region. However, pavement systems could become saturated following periods of precipitation. The proposed subgrade and pavement should have proper surface grading to prevent water from accumulating and ponding. GSG recommends installing lateral and longitudinal underdrain systems as recommended in Section 6.3.4.2 of the IDOT Geotechnical Manual to maintain the subgrade from deteriorating. These underdrains should be installed at undercut areas and low points in the roadway profile, and along the edge of pavement throughout the roadway improvement.

4.4 Traffic Signals Foundations

GSG understands that new traffic signal structures will be installed at the intersections of Oakton Street, Gross Point Road, and Central Avenue. Based on estimated mast arm lengths, **Table 4** summarizes design requirements for the depth and diameter of foundations per the IDOT Highway Standard 878001-11 (**Appendix F**).

Table 4 – Proposed Traffic Signal Structure Summary

Mast Arm Length[1] (feet)	Anticipated Foundation Depth[2]	Anticipated Foundation Diameter[2]
30.0	13’ 6”	30”
	11- 0”	36”
40.0	13’ 0”	36”

[1] Estimated length
[2] Based on IDOT Highway Standard 878001-11.

The soils encountered in boring TSP-01 consisted of clay fill soils to 8.5 feet below grade, followed by medium dense brown and gray silty sand to 13.5 feet, and then stiff to hard gray silty clay to the boring termination depth. In boring TSP-02, fill and native granular soils were noted to a depth of 10.5 feet below grade, followed by soft to medium stiff gray silty clay to a depth of 24 feet below grade, and then very soft gray clay loam to the boring termination depth. The upper granular soils in borings TSP-01 and TSP-02 have the potential for caving in during drilled shaft construction. It is recommended that that the drilled shafts for these locations be installed using a temporary casing.

The soils information provided in **Table 5** summarizes soil parameters at each boring location to be used for the foundation design of each foundation for each traffic signal. The average cohesive strengths at each location represent the straight averages of the cohesive layers. Based on the presence of granular soils at boring locations TSP-01 and TSP-02, the Bureau of Bridges and Structures should be contacted to verify that the proposed foundation details can be applied or provide a revised design.

Table 5 – Soils Summary Information Table Data

Structure and Boring ID	+Soil Type within Anticipated Foundation Depth	Soil Consistency	Average Strength within Foundation Depth (Qu in tsf)	Depth Range of Granular Soils Noted (ft below ground)
TSP-01	Cohesive/Granular	Very Stiff	2.0	8.5 – 13.5
TSP-02	Cohesive/Granular	Soft to Very Stiff	2.5	0 – 10.5

+ Foundation depths of 11 to 13.5 ft based on IDOT Highway Standard 878001-11 for mast arms of 30 and 40 ft

Soils must be visually inspected at each location to match those identified in the boring logs; if different soils are encountered during construction the engineer must be notified to provide a revised design. The lateral resistance of the upper 3.5 feet of soils in the frost penetration zone should be neglected in design.

4.5 Lateral Earth Pressure and Loading

Drilled shafts for the proposed structure are normally loaded laterally by wind forces. The ability of the shaft to resist the wind loads is dependent on the passive pressures that develop in the

soils along the shaft and the shaft diameter. Lateral loads on the drilled shafts should be analyzed for the maximum moments and lateral deflections. Software such as L-Pile are normally used to determine the required shaft depth to resist the lateral loads, the actual maximum moment and the anticipated shaft deflection. If the shaft deflection is excessive or if the embedment is inadequate to provide "fixity", the shaft embedment could be increased to help address these issues. The shaft diameter should be increased if the deflection or the maximum moment is higher than the shaft designed resistance. **Tables 6a and 6b** present recommended drained soil parameters for use in the drilled shafts lateral load analysis.

Table 6a– Lateral Soil Parameters (Long term/Drained) – TSP-01

Depth Range (Elevation, feet)	Soil Description	Drained Friction Angle	Lateral Earth Pressure Coefficient (Long Term/Drained)			L-Pile Parameters	
			Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At-Rest Earth Pressure Coefficient (K_o)	Soil Modulus k_{py} (pci)	Horizontal Strain Factor E_{50}
	New Engineered Clay Fill	25	0.41	2.46	0.58	500	0.007
	New Engineered Granular Fill	30	0.33	3.00	0.50	90	N/A
1-8.5 (626.0-618.5)	FILL: Brown and Black Silty Clay	26	0.39	2.56	0.56	1,000	0.005
8.5-13.5 (618.5-613.5)	Brown and Gray Medium Dense Silty Sand	41	0.21	4.81	0.34	60	N/A
13.5-23.5 (613.5-603.5)	Gray Very Stiff to Hard Silty Clay	28	0.36	2.77	0.53	2,000	0.004
23.5-40 (603.5-587.0)	Gray Stiff to Very Silty Clay	28	0.36	2.77	0.53	500	0.007

Table 6b– Lateral Soil Parameters (Long term/Drained) – TSP-02

Depth Range (Elevation, feet)	Soil Description	Drained Friction Angle	Lateral Earth Pressure Coefficient (Long Term/Drained)			L-Pile Parameters	
			Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At-Rest Earth Pressure Coefficient (K_o)	Soil Modulus k_{py} (pci)	Horizontal Strain Factor E_{50}
	New Engineered Clay Fill	25	0.41	2.46	0.58	500	0.007
	New Engineered Granular Fill	30	0.33	3.00	0.50	90	N/A
0-3.5 (626.0-622.5)	FILL: Brown Sand	30	0.33	3.00	0.50	90	N/A
3.5-5.5 (622.5-620.5)	Brown Medium Dense Sand	39	0.23	4.40	0.37	90	N/A
5.5-10.5 (620.5-615.5)	Gray Medium Dense Loam	42	0.20	5.04	0.33	90	N/A
10.5-18.5 (615.5-607.5)	Gray Very Silty Clay	28	0.36	2.77	0.53	1,000	0.005
18.5-25.0 (607.5-601.0)	Gray Very Soft to Medium Stiff Silty Clay / Clay Loam	25	0.41	2.46	0.58	30	0.02

5.0 CONSTRUCTION CONSIDERATIONS

All work performed for the proposed project should conform to the requirements in the IDOT Standard Specifications for Road and Bridge Construction (SSRBC, 2016) and the IDOT Subgrade Stability Manual (2005). Any deviation from the requirements in the manuals above should be approved by the design engineer.

5.1 Site Preparation

Any topsoil present within the improvement limits should be stripped and stockpiled as per Section 211.03 of the IDOT Standard Specifications for Road and Bridge Construction (SSRBC). The topsoil should be separated from other materials being stockpiled onsite for reuse or haul off. Base course aggregate, if any, encountered at the site should be evaluated to determine suitability for reuse as general fill. The contractor should not mix the existing base course materials with existing subgrade soils during the stripping and stockpiling activities.

5.2 Pavement Subgrade Preparation

The stability of the subgrade should be evaluated immediately after excavation and prior to placement of base aggregate in the field in accordance with the IDOT Subgrade Stability Manual (2005) to determine if additional treatment is required. The subgrade soils inspection should include visual inspection and performing a proof roll using heavy equipment or heavily loaded tandem axle dump truck with a minimum gross weight of 25 tons to check for deflection or rutting. Areas with excessive rutting and deflection shall be evaluated using a dynamic cone penetrometer (DCP) and static cone penetrometer (SCP) to determine the depth of required treatment in accordance with the IDOT Subgrade Stability Manual (2005) and IDOT SSRBC (2015), Section 301. The subgrade should be prepared in accordance with Section 301, Subgrade preparation, of the IDOT SSRBC (2016).

Treatment for unstable and unsuitable soils encountered during proof rolling and subgrade evaluation may include the use of a geotextile fabric, removal and replacement with approved structural fill for small areas. Subgrade improvements should be based on the recommendations in the Subgrade Treatment and Recommendations Section of this report or based on field evaluation of the materials during construction. Field evaluation of the subgrade soils should be conducted in accordance with the procedures outlined in the IDOT Geotechnical Manual and Subgrade Stability Manual, and under the supervision of a licensed geotechnical engineer.

5.3 Existing Utilities

Before proceeding with construction, all existing underground utility lines that will interfere with construction should be completely relocated from beneath the proposed construction areas. Where possible, existing utility lines that are to be abandoned in place should be removed and/or plugged with a minimum of 2 feet of cement grout. All excavations resulting from underground utilities removal activities should be cleaned of loose and disturbed materials, including all previously placed backfill, and backfilled with suitable fill materials in accordance with the requirements of this section. During the clearing and stripping operations, positive surface drainage should be maintained to prevent the accumulation of water.

5.4 Site Excavations

Site excavations are expected to encounter various types of soils as described in the Subsurface Exploration section of this report. The contractor will be responsible to provide a safe excavation during the construction activities of the project. All excavations should be conducted in accordance with applicable federal, state, and local safety regulations, including, but not limited to the Occupational Safety and Health Administration (OSHA) excavation safety standards. Excavation stability and soil pressures on temporary shoring are dependent on soil conditions, depth of excavations, installation procedures, and the magnitude of any surcharge loads on the ground surface adjacent to the excavation. Excavation near existing structures and underground utilities should be performed with extreme care to avoid undermining existing structures. Excavations should not extend below the level of adjacent existing foundations or utilities unless underpinning or other support is installed. It is the responsibility of the contractor for field determinations of applicable conditions and providing adequate shoring for all excavation activities.

5.5 Borrow Material and Compaction Requirements

If borrow material is to be used for onsite construction, it should conform to Section 204 “Borrow and Furnish Excavations” of the latest IDOT Construction Manual. GSG recommends that subgrade preparation, and structural fill placement and compaction be inspected by a GSG geotechnical engineer to verify the type and strength of soil materials present at the site and their conformance with the geotechnical recommendations in this report.

The fill material should be free of organic matter and debris and should be placed and compacted in accordance with Section 205, Embankment, of the IDOT SSRBC (2016). Earth-moving

operations should be avoided during excessively cold or wet weather to avoid freezing of softening subgrade soils. Fill should be placed in lifts and compacted according to Section 205, Embankment (IDOT, 2016). Backfill materials for undercut areas should be placed in 8 inches loose lifts and should be compacted to 95% of the maximum dry density as determined by AASTHO T 99, Standard Proctor Method.

5.6 Groundwater Management

It is anticipated that the long-term groundwater level to be between elevations 613.7 and 620.5 feet. Perched water may be encountered within the existing fill materials encountered across the project corridor. GSG does not anticipates groundwater related issues for the proposed improvements. If rainwater run-off or groundwater is accumulated at the base of excavations, the contractor should remove accumulated water using conventional sump pit and pump procedures and maintain a dry and stable excavation. The location of the sump should be determined by the contractor based on field conditions. During earthmoving activities at the site, grading should be performed to ensure that drainage is maintained throughout the construction period. Water should not be allowed to accumulate in the foundation area either during or after construction. Undercut and excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater or surface run-off. Grades should be sloped away from the excavations to minimize runoff from entering.

If water seepage occurs during excavations or where wet conditions are encountered such that the water cannot be removed with conventional sumping, we recommend placing open grade stone similar to IDOT CA-7 to stabilize the bottom of the excavation below the water table. The CA-7 stone should be placed to 12 inches above the water table, in 12-inch lifts, and should be compacted with the use of a heavy smooth drum roller or heavy vibratory plate compactor until stable. The remaining portion of the excavation beneath the footings should be backfilled using approved structural fill.

5.7 Drilled Shaft Construction

Delete

Drilled shaft construction should be completed ~~in accordance~~ according to Section 516, Drilled Shafts, in the IDOT Standard Specification for Road and Bridge Construction. During dry construction of a drilled shaft, water should be removed from the base of the drilled shaft base prior to placing any concrete. The placement method of concrete for the drilled shaft foundation should be based on the amount of water present at the base of the shaft just prior to placing the

concrete. Concrete may be placed using the free fall method, provided less than 2 inches of water is present at the base of the shaft at the time the concrete is being placed. If more than 2 inches of water is present, a tremie should be used in an effort to displace the water to the surface for removal. GSG recommends that the caisson concrete be ready on site as drilled shaft excavation is completed, so that the concrete can be placed immediately after completing the drilled shaft excavation. This will reduce the potential of water accumulation in the bottom of the shaft. Bottom cleanliness of the drilled shaft excavation should be observed from the ground surface with the use of flood light or down-hole camera. Workers should not enter the shaft to manually clean the base of the shaft due to safety reasons.

6.0 LIMITATIONS

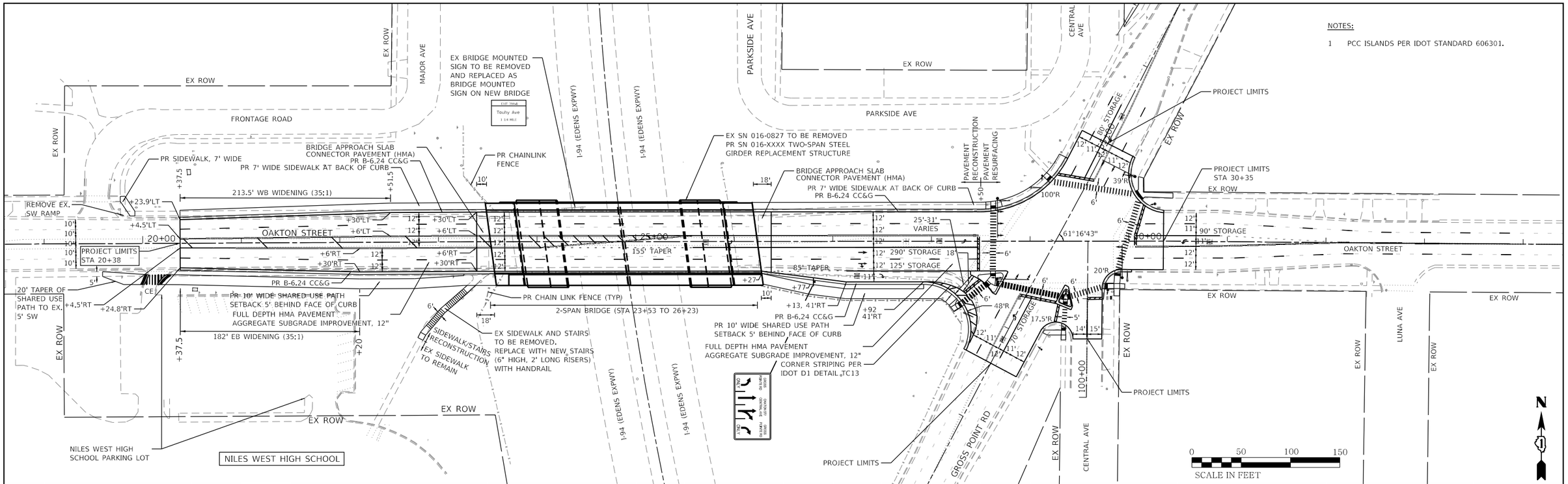
This report has been prepared for the exclusive use of Illinois DOT (IDOT) and its Design Section Engineer. The recommendations provided in the report are specific to the project described herein and are based on the information obtained from the soil borings located within the project limits. The analyses performed and the recommendations provided in this report are based on subsurface conditions determined at the location of the borings. This report does not reflect all variations that may occur between boring locations or at some other time, the nature and extent of which may not become evident until during the time of construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and review the recommendations presented herein.

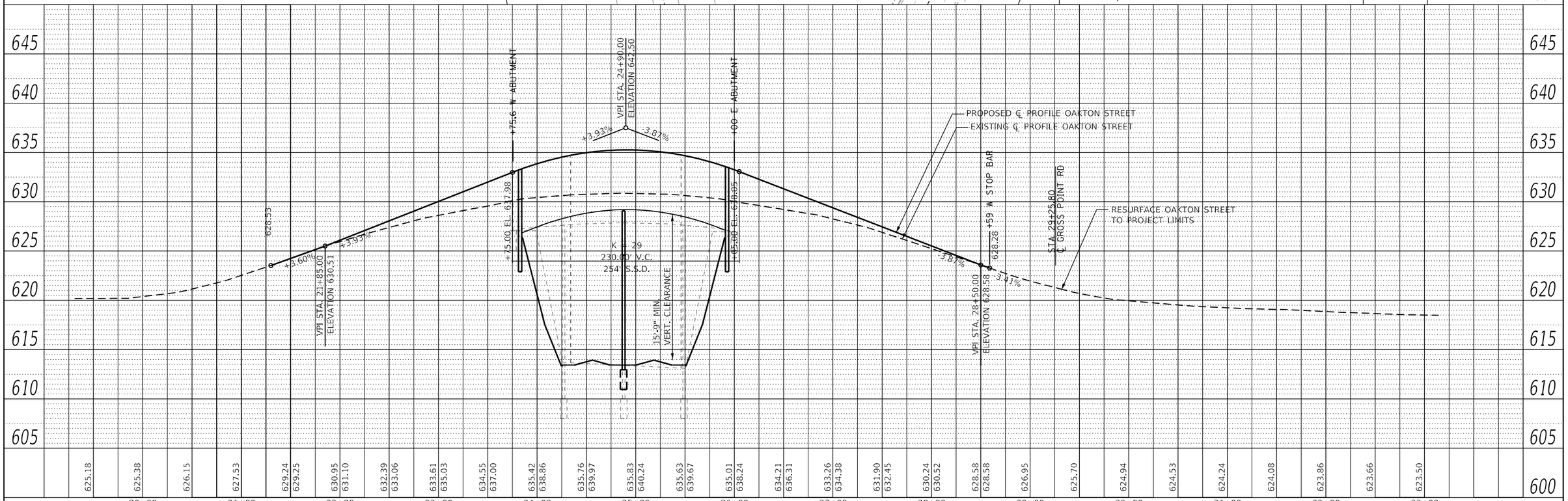
APPENDIX A

PRELIMINARY PLANS

NOTES:

1 PCC ISLANDS PER IDOT STANDARD 606301.





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PROFILE — SURVEYED / PLOTTED / ALIGNMENT CHECKED / RAIL NOTED / STRUCTURE NOTATNS CHKD / NOTE BOOK / NO. / BY / DATE

Hampton, Lenzini and Renwick, Inc.
Civil Engineers • Structural Engineers
Land Surveyors • Environmental Services
HLR 184.000909
380 SHEPARD DRIVE
ELGIN, ILLINOIS 60123
847.697.6700 www.hlrengineering.com
ILLINOIS PROFESSIONAL DESIGN FIRM LS / PE / SE CORPORATION

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	DRAWN – DSS	REVISED –	
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PLOT DATE = $DATE$	DATE – 12/4/19	REVISED –	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

I-94 (EDENS EXPWY) AT OAKTON STREET
PLAN AND PROFILE E-5.1.1

SCALE: 1"=50' | SHEET OF SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	1	1
		CONTRACT NO.		
		ILLINOIS	FED. AID PROJECT	

APPENDIX B

SOIL BORING LOCATION PLAN AND SUBSURFACE PROFILES

N

0 80 160 240

SCALE IN FEET

WARREN STREET

MAJOR AVENUE

PARKSIDE AVENUE

CENTRAL AVENUE

OAKTON STREET BRIDGE OVER I-94
EXISTING BRIDGE SN: 016-0827
PROPOSED BRIDGE SN: 016-8301

FRONTAGE ROAD

PARKSIDE AVENUE

OAKTON STREET

PCB-1

SGB-01

SGB-02

PCB-2

BSB-01

BSB-03

TSP-01

PCB-5

TSP-02

PCB-3

SGB-03

I-94 (SB)

I-94 (NB)

SGB-04

PCB-4

GROSS POINT ROAD

CENTRAL AVENUE

LEGEND

- SGB/BSB BORING LOCATION
- TSP BORING LOCATION
- PCB BORING LOCATION

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GSG CONSULTANTS, INC.
735 E. REMINGTON RD, SCHAUMBURG, IL 60173
TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019

OAKTON STREET AND GROSS POINT ROAD AT I-94
BORING LOCATION PLAN

SCALE: ___ 1:80 | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	6	1
		CONTRACT NO. P-91-467-16		
	ILLINOIS	FED. AID PROJECT		

LEGEND

PAVEMENT	FILL: SAND / GRAVEL	SANDY CLAY / LOAM
BASE COURSE	SILTY CLAY	CLAYEY SAND / SILT
TOPSOIL	SAND	ORGANIC SILTY CLAY
FILL: CLAY / SILTY CLAY	SILT / SILTY LOAM	BEDROCK

670 660 650 640 630 620 610 600 590 580 570 560 550 540 530 520 510 500 490

EXISTING GROUND
LINE ℄ OAKTON STREET

SGB-01
13+23.08
34.90ft RT
EL.
624.36
623.61 2.5 inches of Asphalt
6.5 inches of Concrete
Brown, Moist
FILL: SILTY CLAY, with sand and gravel
618.36
Very Soft to Soft
Brown and Black, Moist
CLAY LOAM, trace gravel (CL-S)
614.36
End of Boring

D	N	Qu	w%
	7		5
	2		13
	5		
	2	0.5 P	16
	2	0.0 P	21
	10		

MATCH LINE STA: 13+50-18+25

MATCH LINE STA: 20+00

13+00 13+25 13+50-18+25 18+50 18+75 19+00 19+25 19+50 19+75 19+75 20+00

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019
OAKTON STREET AT I-94
BORING LOCATION PROFILE

SCALE: AS NOTED | SHEET 1 OF 5 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	6	2
		CONTRACT NO. P-91-467-16		
	ILLINOIS	FED. AID PROJECT		

LEGEND

PAVEMENT	FILL: SAND / GRAVEL	SANDY CLAY / LOAM
BASE COURSE	SILTY CLAY	CLAYEY SAND / SILT
TOPSOIL	SAND	ORGANIC SILTY CLAY
FILL: CLAY / SILTY CLAY	SILT / SILTY LOAM	BEDROCK

EXISTING GROUND
LINE ℄ OAKTON STREET

PROPOSED GROUND
LINE ℄ OAKTON STREET

MATCH LINE STA: 20+00

BSB-01
23+39.51
20.60ft LT

	El.	D	N	Qu	w%
3 Inches of Asphalt	634.11	0	12		10
Brown, Moist FILL: SAND	628.11	5	17		10
Gray, Wet FILL: SANDY CLAY LOAM	625.61	5	13	2.5 P	17
Gray and Black, Moist to Very Moist FILL: CLAY LOAM Medium Dense	620.61	10	13	2.5 P	14
Brown, Wet SAND (SP)	618.11	15	18		25
		20	29		20
			18	1.5 P	22
Stiff to Hard Gray, Moist SILTY CLAY (CL/ML)		20	16	5.83 B	15
			17	5.0 B	15
		25	14	5.0 B	19
	605.61		13	3.75 B	21
Medium Dense Gray, Wet SAND (SP)			17		24
	600.61	30	50		
			6	1.67 B	20
		35			
			6	2.08 B	18
		40			
			10	2.08 B	21
		45			
			9	2.92 B	24
		50			
			17	3.0 P	13
		55			
			8	2.08 B	15
		60			
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			15	3.33 B	16
		65			
			21	3.75 B	21
		70			
			18	4.58 B	14
		75			
			23	4.17 B	18
		80			
			30	5.0 B	23
		85			
		90			
		95			
	534.11	100			
LIMESTONE, highly weathered		105			
LIMESTONE, moderately weathered	524.11	110			
End of Boring	522.11				

670 660 650 640 630 620 610 600 590 580 570 560 550 540 530 520 510 500 490

19+75 20+00 20+25 20+50 20+75 21+00 21+25 21+50 21+75 22+00 22+25 22+50

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019
OAKTON STREET AT I-94
BORING LOCATION PROFILE
SCALE: AS NOTED | SHEET 2 OF 5 SHEETS | STA. | TO STA.

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	ILLINOIS	FED. AID PROJECT		

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BASE COURSE	SILTY CLAY	CLAYEY SAND / SILT
TOPSOIL	SAND	ORGANIC SILTY CLAY
FILL: CLAY / SILTY CLAY	SILT / SILTY LOAM	BEDROCK

PROPOSED GROUND LINE ℄ OAKTON STREET

EXISTING GROUND LINE ℄ OAKTON STREET

BSB-03
26+40.68
19.91ft RT

EL

3 inches of Asphalt 634.26
8 inches of Concrete 633.35
Brown and Gray, Moist to Wet FILL: SAND
Gray, Moist 625.76
FILL: CLAY LOAM 623.26
Medium Dense Brown, Wet SAND (SP)
Stiff 618.26
Gray, Moist SILTY CLAY (CL/ML) 615.76
Medium Dense Gray, Wet SAND (SP) 613.26
Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)
539.26
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)
527.26
LIMESTONE, highly weathered
511.76
LIMESTONE, moderately weathered 510.26
End of Boring

D	N	Qu	w%
	18		16
	27		10
5	12		13
	8	1.5 P	16
10	18		19
	26		16
15	19	1.0 P	19
	21		22
20	14	4.58 B	16
	14	4.58 B	16
25	11	2.92 B	17
	9	2.92 B	18
30	7	1.67 B	23
35	9	2.08 B	19
40	9	2.5 B	21
45	10	2.92 B	21
50	8	1.67 B	17
55	10	2.92 B	20
60	13	2.5 B	15
65	20	3.75 B	17
70	23	5.0 B	13
75	39	5.0 S	12
80	21	3.75 B	18
85	9	1.67 S	27
90	45	5.0 S	10
95	100+	3.75 B	10
100	100+		NR
105	100+		17
110			
115			
120			

MATCH LINE STA: 28+75

670 660 650 640 630 620 610 600 590 580 570 560 550 540 530 520 510 500 490

26+25 26+50 26+75 27+00 27+25 27+50 27+75 28+00 28+25 28+50 28+75

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019
OAKTON STREET AT I-94
BORING LOCATION PROFILE

SCALE: AS NOTED | SHEET 3 OF 5 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	6	4
		CONTRACT NO. P-91-467-16		
	ILLINOIS	FED. AID PROJECT		

LEGEND

PAVEMENT	FILL: SAND / GRAVEL	SANDY CLAY / LOAM
BASE COURSE	SILTY CLAY	CLAYEY SAND / SILT
TOPSOIL	SAND	ORGANIC SILTY CLAY
FILL: CLAY / SILTY CLAY	SILT / SILTY LOAM	BEDROCK

670 660 650 640 630 620 610 600 590 580 570 560 550 540 530 520 510 500 490

MATCH LINE STA: 28+75

EXISTING GROUND LINE ℄ OAKTON STREET

TSP-02
30+20.20
46.50ft LT

EL | D | N | Qu | w%

- Brown, Moist FILL: SAND
- Medium Dense Brown, Wet SAND (SP) — 620.50
- Medium Dense Gray, Moist to Very Moist SILTY SAND (SM) — 615.50
- Soft to Very Stiff Gray, Moist to Very Moist SILTY CLAY, trace sand (CL/ML) — 607.00
- Very Soft Gray, Moist CLAY LOAM (CL-S) — 601.00
- End of Boring

SGB-03
30+53.36
23.20ft RT

EL | D | N | Qu | w%

- 2.5 Inches of Apshalt
- 10 Inches of Concrete
- 8 Inches of Aggregate Base Course
- Brown and Black, Moist FILL: SILTY CLAY, with sand — 620.69
- Medium Dense Brown, Moist SAND (SP) — 618.19
- Medium Dense Gray, Wet SILTY SAND (SM) — 613.69
- End of Boring

28+75 29+00 29+25 29+50 29+75 30+00 30+25 30+50 30+75 31+00 31+25

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TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019
OAKTON STREET AT I-94
BORING LOCATION PROFILE

SCALE: AS NOTED | SHEET 4 OF 5 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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		CONTRACT NO. P-91-467-16		
	ILLINOIS	FED. AID PROJECT		

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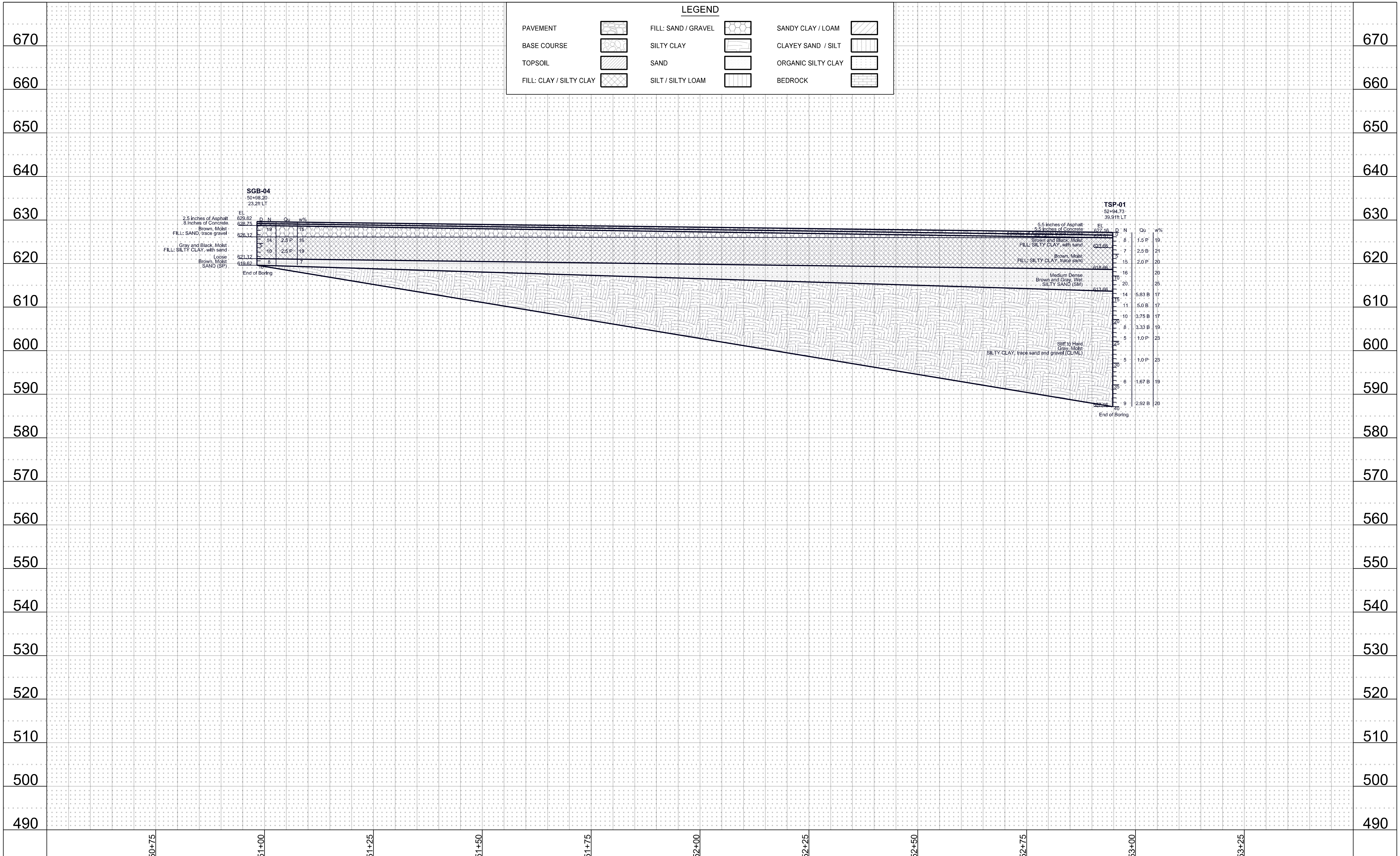

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GSG CONSULTANTS, INC.
735 E. REMINGTON RD, SCHAUMBURG, IL 60173
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 195-019
GROSS POINT AT I-94
BORING LOCATION PROFILE

SCALE: AS NOTED | SHEET 5 OF 5 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	6	6
		CONTRACT NO. P-91-467-16		

ILLINOIS | FED. AID PROJECT

APPENDIX C

SOIL BORING LOGS

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/27/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0264864, **Longitude** -87.7692392

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-01
Station 23+40
Offset 20.60ft LT
Ground Surface Elev. 634.11 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				3 inches of Asphalt 8 inches of Concrete
633.20				
	4			Brown, Moist FILL: SAND
	5 7		10	
	4			
	8 9		10	
-5				
628.11				
	4			Gray, Wet FILL: SANDY CLAY LOAM
	6 7		17	
625.61				
	6			Gray and Black, Moist to Very Moist FILL: CLAY LOAM
	7 6	2.5 P	14	
-10				
	4			
	8 10		25	
620.61				
	10			Medium Dense Brown, Wet SAND (SP)
	13 16		20	
-15				
618.11				
	5			Stiff to Hard Gray, Moist SILTY CLAY (CL/ML) Sand seam at 17 feet
	8 10	1.5 P	22	
	9			
	7 9	5.8 B	15	
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				Stiff to Hard Gray, Moist SILTY CLAY (CL/ML) *(continued)*
	5			
	7 10	5.0 B	15	
	4			
	5 9	5.0 B	19	
-25				
	4			
	6 7	3.8 B	21	
605.61				
	6			Medium Dense Gray, Wet SAND (SP)
	10 7		24	
-30				
600.61				
	2			Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)
	2 4	1.7 B	20	
-35				
	2			
	3 3	2.1 B	18	
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/27/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0264864, **Longitude** -87.7692392

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-01
Station 23+40
Offset 20.60ft LT
Ground Surface Elev. 634.11 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			
	3		
-45	5 5	2.1 B	21
	3		
-50	4 5	2.9 B	24
	12		
-55	6 11	3.0 P	13
	3		
-60	3 5	2.1 B	15

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			
	5		
-65	6 9	3.3 B	16
	6		
-70	8 13	3.8 B	21
	6		
-75	8 10	4.6 B	14
	6		
-80	10 13	4.2 B	18

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/27/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0264864, **Longitude** -87.7692392

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-01
Station 23+40
Offset 20.60ft LT
Ground Surface Elev. 634.11 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*
550.61				
	5			Hard
	12	5.0	23	Gray, Moist
-85	18	B		SILTY CLAY LOAM, trace gravel (ML/CL)
-90				Hole cave-in at 45 feet. Blind drill after 85 feet to boring termination depth.
-95				
534.11 -100				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				LIMESTONE, highly weathered
-105				
524.11 -110				LIMESTONE, moderately weathered
522.11				Auger refusal at 112 feet End of Boring
-115				
-120				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/26/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0263719, **Longitude** -87.7681311

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-03
Station 26+41
Offset 19.90ft RT
Ground Surface Elev. 634.26 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				3 inches of Asphalt 8 inches of Concrete
				633.35
	8			Brown and Gray, Moist to Wet FILL: SAND
	6 12		16	
	5			
-5	11 16		10	
	4			
	6 6		13	
				625.76
	4			Gray, Moist FILL: CLAY LOAM
-10	4 4	1.5 P	16	
				623.26
	3			Medium Dense Brown, Wet SAND (SP)
	8 10		19	
	8			
-15	12 14		16	
				618.26
	6			Stiff Gray, Moist SILTY CLAY (CL/ML)
	5 14	1.0 P	19	
				615.76
	11			Medium Dense Gray, Wet SAND (SP)
-20	12 9		22	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				613.26
	6			Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)
	6 8	4.6 B	16	
	5			
-25	6 8	4.6 B	16	
	4			
	5 6	2.9 B	17	
	3			
-30	5 4	2.9 B	18	
	3			
-35	3 4	1.7 B	23	
	3			
-40	4 5	2.1 B	19	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/26/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0263719, **Longitude** -87.7681311

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-03
Station 26+41
Offset 19.90ft RT
Ground Surface Elev. 634.26 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			
	3		
-45	3 6	2.5 B	21
	3		
-50	4 6	2.9 B	21
Sand and gravel seam at 50 feet			
	4		
-55	4 4	1.7 B	17
	4		
-60	5 5	2.9 B	20
-65	6 7	2.5 B	15
	6		
-70	8 12	3.8 B	17
	7		
-75	9 14	5.0 B	13
	18		
-80	17 22	5.0 S	12

Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/26/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0263719, **Longitude** -87.7681311

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-03
Station 26+41
Offset 19.90ft RT
Ground Surface Elev. 634.26 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter N/A ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)* Sand and gravel seam at 80 feet
	8			
-85	9 12	3.8 B	18	
	4			
-90	4 5	1.7 S	27	
	12			
539.26 -95	19 26	5.0 S	10	
	50/5"			Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)
-100		3.8 B	10	
	50/1"			Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*
-105			NR	
527.26	50/2"			LIMESTONE, highly weathered
-110			17	
-115				Blind drill after 110 feet
-120				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/26/21

ROUTE Oakton Street **DESCRIPTION** Bridge Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0263719, **Longitude** -87.7681311

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. SN 016-8301
Station N/A

BORING NO. BSB-03
Station 26+41
Offset 19.90ft RT
Ground Surface Elev. 634.26 **ft**

Surface Water Elev. N/A **ft**
Stream Bed Elev. N/A **ft**

Groundwater Elev.:
First Encounter N/A **ft**
Upon Completion N/A **ft**
After N/A **Hrs.** N/A **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
LIMESTONE, highly weathered *(continued)*				
511.76				
LIMESTONE, moderately weathered				
Auger refusal at 124 feet 510.26				
End of Boring				
	-125			
	-130			
	-135			
	-140			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/25/21

ROUTE Oakton Street **DESCRIPTION** Subgrade Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,

Latitude 42.0263335, **Longitude** -87.7729801

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO

DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. N/A
Station N/A

BORING NO. SGB-01
Station 13+23
Offset 34.90ft RT
Ground Surface Elev. 624.36 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
2.5 inches of Asphalt 6.5 inches of Concrete 623.61				
Brown, Moist FILL: SILTY CLAY, with sand and gravel	4 4 3		5	
Cobbles at 3.5-5 feet	3 1 1		13	
-5 618.36				
Very Soft to Soft Brown and Black, Moist CLAY LOAM, trace gravel (CL-S)	2 1 1 1	0.5 P	18	
	1 1	0.0 P	21	
614.36 -10 End of Boring				
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/25/21

ROUTE Oakton Street **DESCRIPTION** Subgrade Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,

Latitude 42.0264824, **Longitude** -87.7700476

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO

DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. N/A
Station N/A

BORING NO. SGB-02
Station 21+20
Offset 19.20ft LT
Ground Surface Elev. 627.88 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				14 inches of asphalt
626.72				
	4			Brown, Moist to Wet
	8		17	FILL: SAND, trace gravel and clay
	8			
	4			
	5		14	
-5	5			
	4			
	7		13	
	9			
619.38				
	7			Medium Dense
	9		18	Gray, Wet
	7			SAND (SP)
617.88 -10				
				End of Boring
-15				
-20				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/25/21

ROUTE Oakton Street **DESCRIPTION** Subgrade Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,

Latitude 42.0263580, **Longitude** -87.7666132

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO

DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. N/A
Station N/A

BORING NO. SGB-03
Station 30+53
Offset 23.20ft RT
Ground Surface Elev. 624.19 **ft**

Surface Water Elev. N/A **ft**
Stream Bed Elev. N/A **ft**

Groundwater Elev.:
First Encounter None **ft**
Upon Completion N/A **ft**
After N/A **Hrs.** N/A **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2.5 inches of Apshalt 10 inches of Concrete 8 inches of Aggregate Base Course		5		
622.49		3 6	1.5 P	21
Brown and Black, Moist FILL: SILTY CLAY, with sand				
620.69		5		
Medium Dense Brown, Moist SAND (SP)		6 8		14
	-5			
618.19		7		
Medium Dense Gray, Wet SILTY SAND (SM)		8 10		20
		5		
		7 8		24
614.19	-10			
End of Boring				
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/25/21

ROUTE Gross Point Road **DESCRIPTION** Subgrade Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,

Latitude 42.0257208, **Longitude** -87.7676803

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO

DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. N/A
Station N/A

BORING NO. SGB-04
Station 50+98
Offset 23.20ft LT
Ground Surface Elev. 629.62 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2.5 inches of Asphalt 8 inches of Concrete 628.75				
Brown, Moist FILL: SAND, trace gravel		4 6 13		15
626.12				
Gray and Black, Moist FILL: SILTY CLAY, with sand		8 6 8	2.5 P	16
	-5	3		
Sand seam at 7 feet		4 6	2.5 P	19
621.12				
Loose Brown, Moist SAND (SP)		3 5 3		7
619.62	-10			
End of Boring				
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/25/21

ROUTE Gross Point Road **DESCRIPTION** Traffic Sign Boring **LOGGED BY** EH

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,

Latitude 42.0262189, **Longitude** -87.7673970

COUNTY COOK **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 96

STRUCT. NO. N/A
Station N/A

BORING NO. TSP-01
Station 52+95
Offset 39.90ft LT
Ground Surface Elev. 627.16 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 613.7 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				5.5 inches of Asphalt 5.5 inches of Concrete
	3			4 inches of Aggregate Base Course
625.91				
	3	1.5	19	Brown and Black, Moist
	5	P		FILL: SILTY CLAY, with sand
623.66				
	3			Brown, Moist
	4	2.5	21	FILL: SILTY CLAY, trace sand
-5	3	B		
	5			
	6	2.0	20	
	9	P		Sand seam at 7 feet
618.66				
	6			Medium Dense
	9		20	Brown and Gray, Wet
-10	7			SILTY SAND (SM)
	6			
	9		25	
	11			
613.66 ▼				
	4			Stiff to Hard
	6	5.8	17	Gray, Moist
-15	8	B		SILTY CLAY, trace sand and gravel (CL/ML)
	4			
	4	5.0	17	
	7	B		
	3			
	5	3.8	17	
-20	5	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Stiff to Hard Gray, Moist
	3			SILTY CLAY, trace sand and gravel
	4	3.3	19	(CL/ML) *(continued)*
	4	B		
	2			
	4	1.0	23	Sand seam at 24 feet
-25	1	P		
	4			
	3	1.0	23	
-30	2	P		
	WOH			
	2	1.7	19	
-35	4	B		
	3			
	4	2.9	20	
587.16 -40	5	B		

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultanrts, Inc.

SOIL BORING LOG

Date 8/31/21

ROUTE Oakton Street **DESCRIPTION** Traffic Sign Boring **LOGGED BY** DM

SECTION Oakton Street at I-94 **LOCATION** Skokie and Morton Grove, IL, **SEC.** , **TWP.** Niles, **RNG.** ,
Latitude 42.0265500, **Longitude** -87.7667333

COUNTY COOK **DRILLING RIG** GeoProbe 7822DT **HAMMER TYPE** AUTO
DRILLING METHOD HSA **HAMMER EFF (%)** 92

STRUCT. NO. N/A
Station N/A

BORING NO. TSP-02
Station 30+20
Offset 46.50ft LT
Ground Surface Elev. 626.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

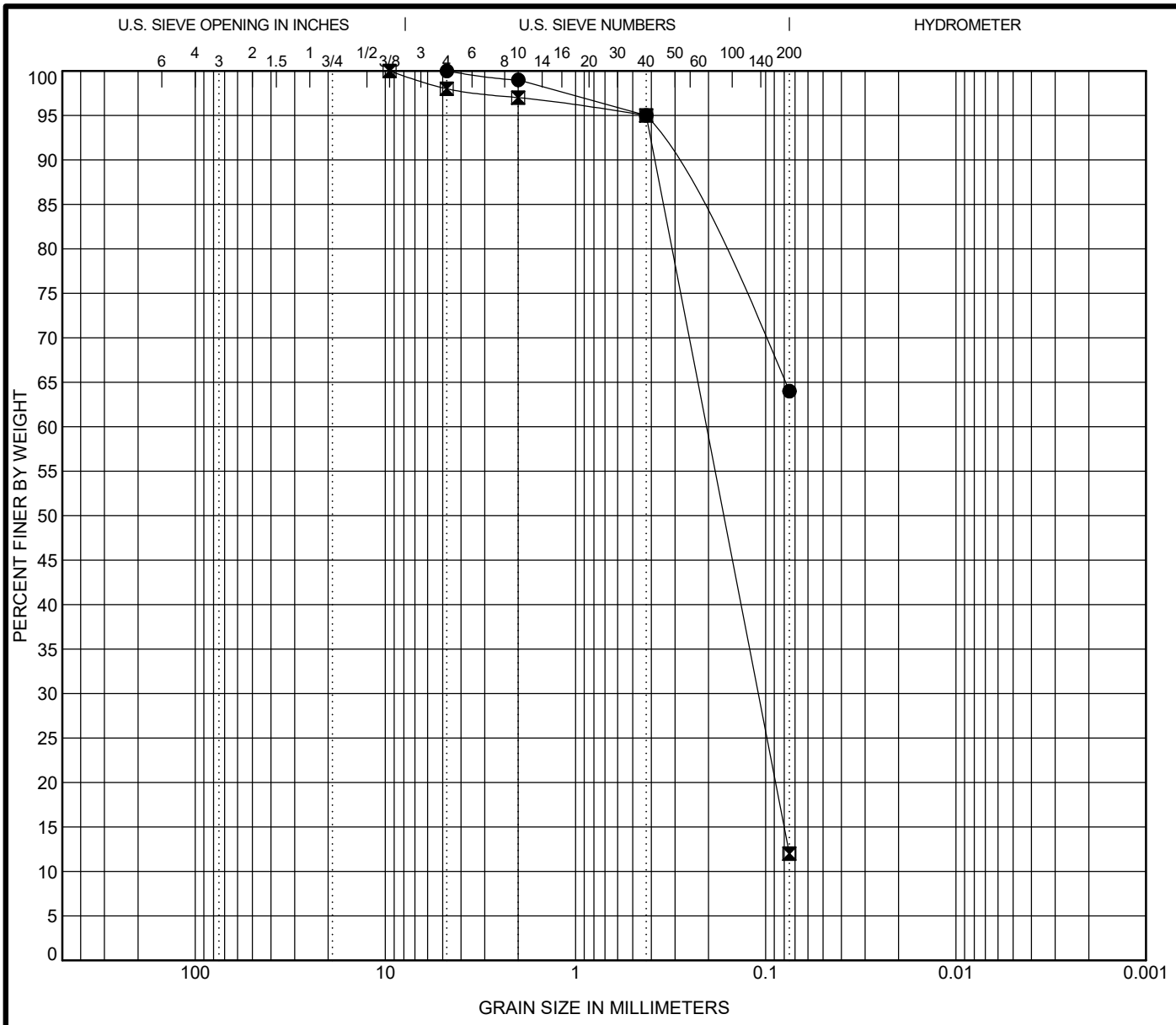
DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Brown, Moist
				FILL: SAND
	3			
	5		7	
	5			
622.50				
	7			Medium Dense
				Brown, Wet
	6		19	SAND (SP)
-5	6			
620.50				
				Medium Dense
				Gray, Moist to Very Moist
	5			LOAM (ML-S)
	12		21	
	13			
	5			
	13		18	
-10	15			
615.50				
				Very Stiff
	3			Gray, Moist to Very Moist
	4	2.5	16	SILTY CLAY, trace sand (CL/ML)
	4	B		
	3			
	4	4.0	15	
-15	4	B		
	4			
	5	3.3	16	Sand seam at 16.5 feet
	5	B		
607.50				
	3			Soft to Medium Stiff
	4	0.4	17	Gray, Moist to Very Moist
-20	4	B		SILTY CLAY, trace sand (CL/ML)

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Soft to Medium Stiff
				Gray, Moist to Very Moist
	5			SILTY CLAY, trace sand (CL/ML)
				(continued)
	3	0.8	29	
	4	B		
602.00				
	2			
	2	0.2	20	Very Soft
-25	4	B		Gray, Moist
601.00				CLAY LOAM (CL-S)
				End of Boring
-30				
-35				
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

APPENDIX D

LABORATORY TEST RESULTS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**SGB-01**	**6.00**	**CLAY LOAM**					
⊠	**SGB-02**	**6.00**	**SAND**				**0.81**	**2.84**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**SGB-01**	**6.00**	**4.75**				**0.0**	**36.0**	**64.0**	
⊠	**SGB-02**	**6.00**	**9.5**	**0.205**	**0.109**		**2.0**	**86.0**	**12.0**	

GSG Consultants, Inc
735 Remington Road
Schaumburg, IL 60173
(630) 994-2600
Fax: (312) 733-5612

GRAIN SIZE DISTRIBUTION

Route: Oakton Street

Section: Oakton Street over I-94

County: COOK

APPENDIX E

PAVEMENT CORE EXHIBITS

PCB-01 –Pavement Core

Core Location	Asphalt Thickness (in.)	Concrete Thickness (in.)	Total Thickness (in.)
Oakton Street 300 feet west of Menard Avenue	3.0	10.5	13.5

*Pictures of the core measurements may differ from measured values

PCB-02 –Pavement Core

Core Location	Asphalt Thickness (in.)	Concrete Thickness (in.)	Total Thickness (in.)
Oakton Street 275 feet east of Mango Avenue / Frontage Road	1.5	9.0	10.5

*Pictures of the core measurements may differ from measured values

PCB-03 –Pavement Core

Core Location	Asphalt Thickness (in.)	Concrete Thickness (in.)	Total Thickness (in.)
SE corner of Oakton Street and Luna Avenue	3.0	9.5	12.5

*Pictures of the core measurements may differ from measured values

PCB-04 –Pavement Core

Core Location	Asphalt Thickness (in.)	Concrete Thickness (in.)	Total Thickness (in.)
Gross Pointe Road, 250 feet southwest of Oakton Street	14.0	0	14.0

*Pictures of the core measurements may differ from measured values

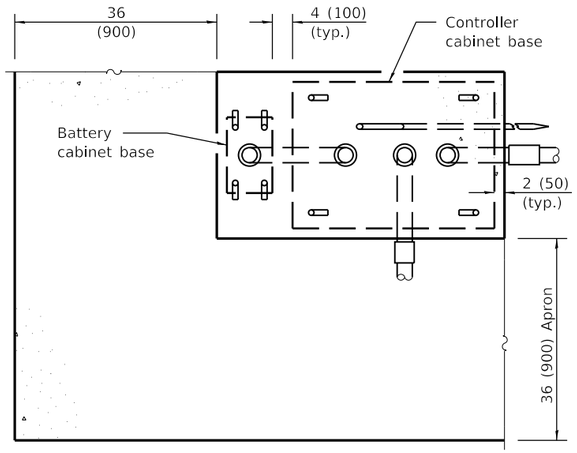
PCB-05 –Pavement Core

Core Location	Asphalt Thickness (in.)	Concrete Thickness (in.)	Total Thickness (in.)
Gross Pointe Road, 250 feet northeast of Oakton Street	12.0	0	12.0

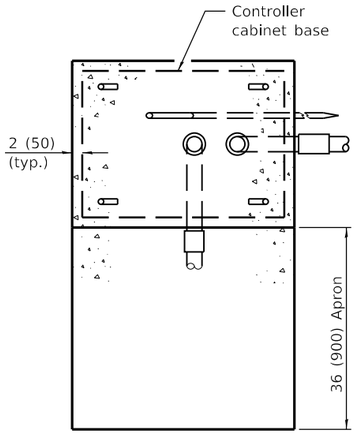
*Pictures of the core measurements may differ from measured values

APPENDIX F

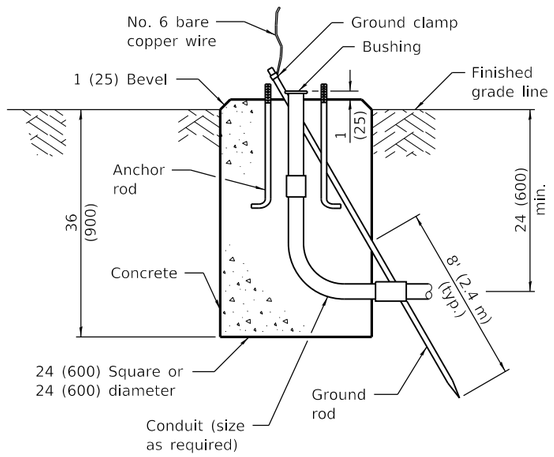
IDOT HIGHWAY STANDARD 878001-11



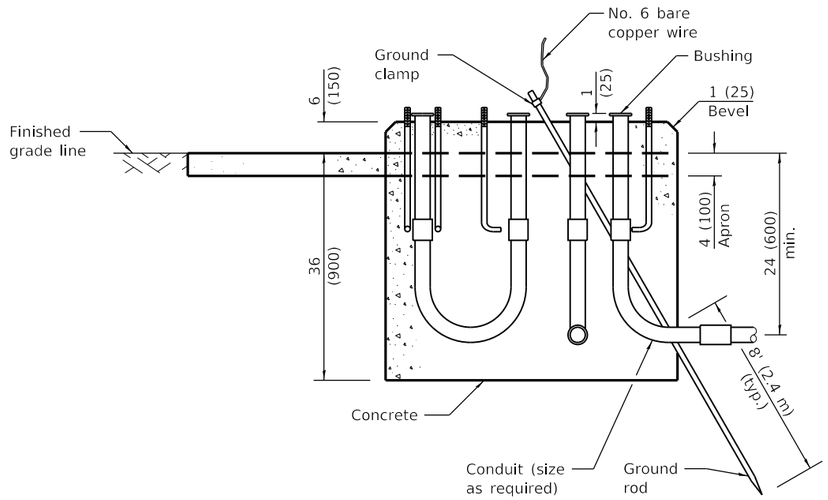
TOP VIEW



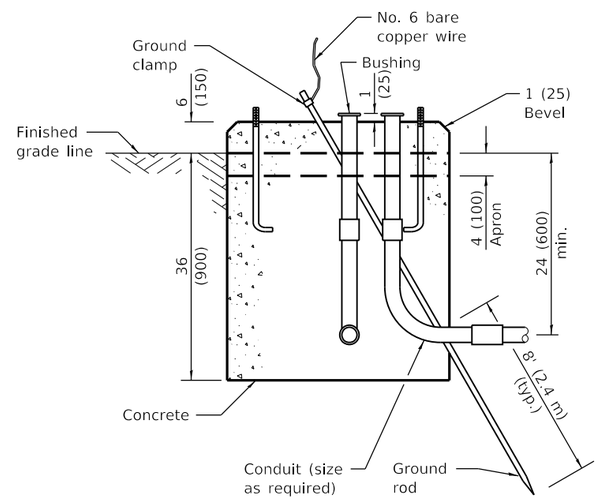
TOP VIEW



TYPE A



TYPE C
FOR GROUND MOUNTED
CONTROLLER CABINET
AND UPS BATTERY CABINET



TYPE D
FOR GROUND MOUNTED
CONTROLLER CABINET

All dimensions are in inches (millimeters)
unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2021
ENGINEER OF OPERATIONS

APPROVED January 1, 2021
ENGINEER OF DESIGN AND ENVIRONMENT

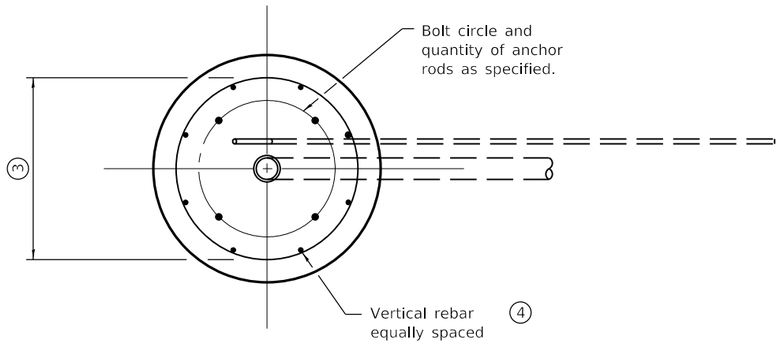
ISSUED 1-1-02

DATE	REVISIONS
1-1-21	Revised anchor rod end in
	Type E detail.
1-1-15	Revised TYPE E detail.

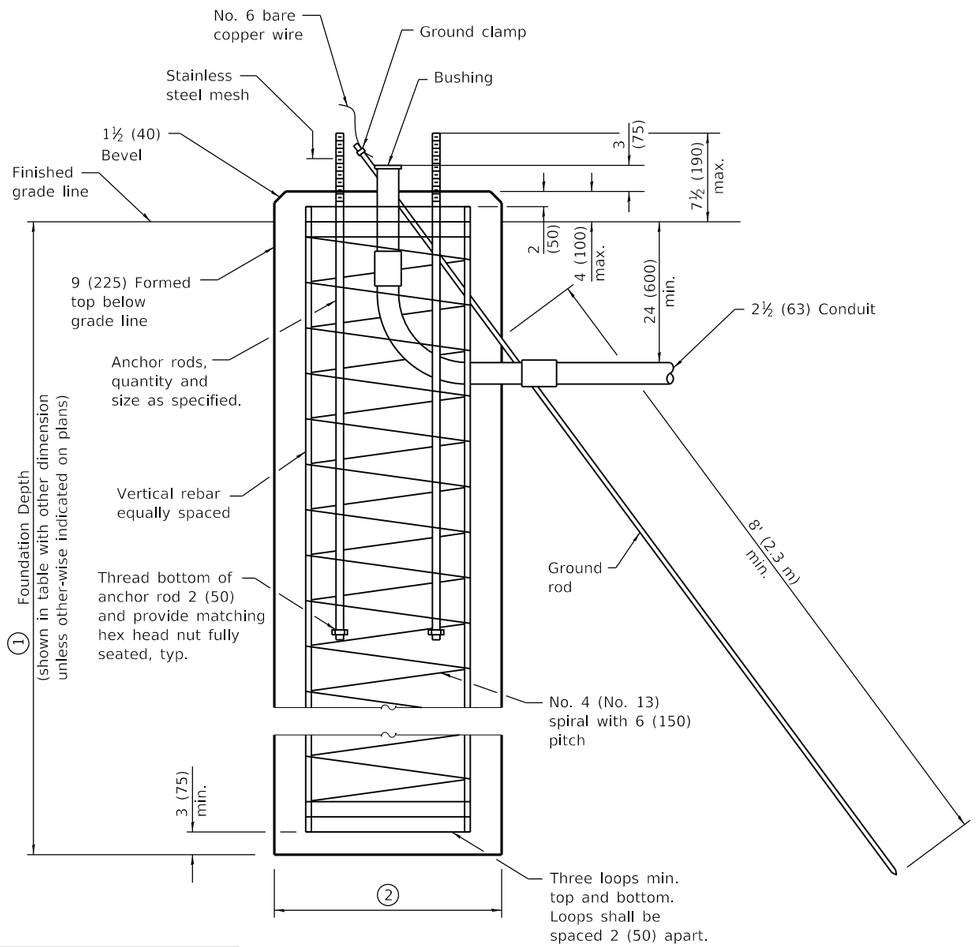
CONCRETE FOUNDATION DETAILS

(Sheet 1 of 2)

STANDARD 878001-11



TOP VIEW



TYPE E

Mast Arm Length	1 Foundation Depth *	2 Foundation Diameter	3 Spiral Diameter	4 Quantity of Rebars	Size of Rebars
Less than 30' (9.1 m)	10'-0" (3.0 m)	30 (750)	24 (600)	8	6 (19)
Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)	13'-6" (4.1 m)	30 (750)	24 (600)	8	6 (19)
	11'-0" (3.4 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)	13'-0" (4.0 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)	15'-0" (4.6 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 56' (16.8 m) and less than 65' (19.8 m)	21'-0" (6.4 m)	42 (1060)	36 (900)	16	8 (25)
Greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)	25'-0" (7.6 m)	42 (1060)	36 (900)	16	8 (25)

* For standard and combination mast arm assemblies. Foundation depths for standard dual mast arms with the longest arm length upto and including 55' (16.8 m) shall be increased by 1' (0.3 m) of that shown in the table, based on the longer of the two arms.

These foundation depths are for sites which have cohesive soils (clayey silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.0 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

Illinois Department of Transportation

PASSED January 1, 2021
ENGINEER OF OPERATIONS

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ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-02

CONCRETE FOUNDATION DETAILS

(Sheet 2 of 2)

STANDARD 878001-11