GEOTECHNICAL ENGINEERING REPORT
SMART CORRIDOR IMPLEMENTATION
DYNAMIC MESSAGE SIGNS ALONG IL 64
FROM SMITH/KAUTZ RD TO IL 50
PTB 199-002
COOK AND DUPAGE COUNTIES
ILLINOIS

for

Kimley-Horn and Associates, Inc.

111 W Jackson Blvd, Suite 1320

Chicago, IL 60604

Submitted by

Wang Engineering, Inc.

1145 North Main Street

Lombard, IL 60148

Original Report: September 09, 2022
Revised Report: September 30, 2022
December 21, 2022
January 16, 2023
January 17, 2023

Technical Report Documentation Page

<table>
<tr><td colspan="2">1. Title and Subtitle
Geotechnical Engineering Report, DMS Signs along IL 64
West and East of I-355, West of IL 83 and East of I-290</td><td>2. Report Date
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D-91-081-21</td></tr>
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199/002</td><td>7. Existing Structure Number(s)
NA</td><td>8. Proposed Structure Number(s)
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11. Abstract

Four DMS sign structures designated as DMS Location 1 through 4 along IL 64, west and east of I-355, west of IL 83, and east of I-290 are proposed.

Beneath pavement or topsoil, Borings DMS-01, DMS-03 and DMS-05 encountered 2.5 and 7.1 feet of stiff to hard clay to silty clay loam fill material. Below the pavement or fill, Borings DMS-01 and DMS-02 encountered medium stiff to hard silty clay followed by loose to dense sand, gravelly sand to silty loam.

Boring DMS-03 encountered buried topsoil under the fill followed by stiff to hard silty clay. At 31.6 feet bgs, boring encountered loose to very dense silty loam and possible weathered bedrock at 608.8 feet elevation.

Boring DMS-05 encountered stiff to hard silty clay to silty clay loam to the boring termination depth.

Boring DMS-01 encountered groundwater while drilling at an elevation of 694.6 feet and 655.6 feet after the drilling completion. Boring DMS-02 encountered groundwater while drilling at an elevation of 693.6 feet and 677.1 feet after drilling completion. Borings DMS-03 and DMS-04 did not encounter groundwater during drilling.

Based on the results of the subsurface investigation, we recommend the sign structures be supported on drilled shaft foundations. For final drilled shafts design at DMS Location 1 and DMS Location 2, we recommend using lateral soil parameters. Recommended lateral soil modulus and soil strain parameters are provided in the report. IDOT Standard drawing as per IDOT Sign Structure Manual could be used for a sign structure at DMS Location 3 and DMS Location 4.

12. Path to archived file

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Wang Engineering
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GEOTECHNICAL ENGINEERING REPORT
SMART CORRIDOR IMPLEMENTATION
DYNAMIC MESSAGE SIGNS ALONG IL 64
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FOR
KIMLEY-HORN AND ASSOCIATES, INC.

1.0 INTRODUCTION

This report presents foundation recommendations for the design and construction of four Dynamic Message Sign (DMS) structures along IL 64. This investigation was performed for IDOT Contract D-91-081-21. Based on the soil conditions revealed during our subsurface investigation, we are providing geotechnical recommendations for the design of drilled shafts to support the sign structures. A *Site Location Map* is presented as Exhibit 1.

The purpose of this investigation was to characterize the site soil and groundwater conditions, perform geotechnical engineering analyses, and provide recommendations for the design and construction of the proposed DMS structures.

1.1 Proposed Structure

Based on the drawing provided by Kimley-Horn and Associates, Inc (Kimley-Horn), we understand that four cantilever type DMS sing structures designated as DMS Location 1 to DMS Location 4 will be constructed along IL 64. DMS Location 1 and 2 are located west and east of I-355, respectively. DMS Location 3 is located along eastbound of IL 64 and 0.45 miles West of IL 83. DMS Location 4 is located 0.9 miles east of I-290.

2.0 SITE LOCATION

The project area is in Cook and DuPage Counties, Illinois. On the USGS *Lombard and Elmhurst Quadrangle 7.5 Minute Series* map, the project area is located at NW ¼ of Sec. 1, NW ¼ of Sec. 3, SW ¼ of Sec. 31, SE ¼ of Sec 31, Sections 1, and Tier 39, 40 N, Range 10, 11, 12 E of the Third Principal Meridian.

3.0 METHODS OF INVESTIGATION

3.1 Field Investigation

Our subsurface investigation consists of four sign structure borings designated as DMS-01 to DMS-03, and DMS-05, one at each sign structure location. Please note that structure DMS Location 3 initially proposed was canceled and moved to a new location. New DMS Location 3 is 0.45 miles west of IL 83 as shown in *Boring Location Plan* (Exhibit 2) and the reference boring is DMS-05. Borings DMS-01 and DMS-02 were drilled for structures designated as DMS Location 1 and 2, respectively. Boring DMS-03 was drilled for structure designated as DMS Location 4. The borings were drilled by Wang Engineering a Terracon Company (Wang) from August 9, 2022 to January 5, 2023. The as-drilled boring locations were surveyed by Wang with a mapping-grade GPS unit. Boring location data are presented in the *Boring Logs* (Appendix A). While the northing and easting surveyed with the GPS have a good precision (within +/- 6 inches), the elevations do not have always accurate readings. Sometimes the elevations are off by as much as 3 to 4 feet depending on the project location. Thus, boring elevations should be checked against site surveys. The as-drilled boring locations are shown in the *Boring Location Plan* (Exhibit 2).

ATV and Truck-mounted drilling rig, equipped with hollow stem augers, were used to advance and maintain open boreholes to termination depths. Soil sampling was performed according to AASHTO T 206, *"Penetration Test and Split Barrel Sampling of Soils."* The soils were sampled at 2.5-foot intervals to 30 feet, and 5 feet thereafter to boring termination depths. Soil samples collected from each sampling interval were placed in sealed jars and transported to Wang Geotechnical Laboratory in Lombard, Illinois for further examination and laboratory testing.

Field boring logs, prepared and maintained by Wang geologists, include lithological descriptions, visual-manual soil (IDH Textural) classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, and results of Standard Penetration Tests (SPT) recorded as blows per 6 inches of penetration. The SPT N values (N-value), expressed as blows/foot, shown on the *Boring Logs* (Appendix A), is the sum of the second and third blows per 6 inches of penetration. Groundwater observations were made during and at the end of drilling operations. Due to safety considerations, boreholes were backfilled immediately upon completion with soil cuttings and/or bentonite chips, and where necessary, the pavement surface was restored to its original condition.

3.2 Laboratory Testing

All soil samples were tested in the laboratory for moisture content (AASHTO T265). Atterberg limits (AASHTO T89/T90) and particle size analyses (AASHTO T88) tests were performed on selected soil samples. Laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Laboratory Test Results* (Appendix B).

4.0 INVESTIGATION RESULTS

Detailed descriptions of the soil conditions encountered during our subsurface investigation are presented in the attached *Boring Logs* (Appendix A). Please note that strata contact lines represent approximate boundaries between soil types. The actual transition between soil types in the field may be gradual in horizontal and vertical directions.

4.1 General Lithological Profiles

The following sections present the soil conditions encountered during our subsurface investigation. The existing shoulder pavement consists 8-inch thick concrete or 2 to 4-inch thick asphalt over 7 to 10-inch thick concrete. The base consists of sand to sandy gravel or silty clay. Boring DMS-05 encountered 12-inch thick topsoil at the surface.

4.1.1 DMS Location 1 (Boring DMS-01)

Beneath the surface pavement, the boring encountered dense, black and gray sandy gravel base course followed by 2.5 feet thick, stiff black and gray silty clay fill. The silty clay fill has the Unconfined Compressive Strength (Qu) value of 1.9 tsf, and the moisture content value of 22%. Underneath the fill, boring encountered 3.9 feet of natural medium stiff silty clay. At an elevation of 696.2 feet, boring encountered 24.8 feet thick, loose to very dense, brown and gray sand, gravelly sand to loam with SPT-N values of 8 to more than 50 and moisture content values of 13 to 24. Deeper soil at an elevation of 671.4 feet shows medium dense to very dense, gray silty loam with SPT-N values of 27 to more than 50 with moisture content values of 8 to 13%.

4.1.1 DMS Location 2 (Boring DMS-02)

Beneath the surface pavement, the boring encountered very stiff to hard, brown silty clay with a Qu value of 3.6 tsf, and a moisture content value of 21%. At an elevation of 720.8 feet, boring encountered 37.8 feet thick, loose to medium dense, brown gravelly loam with SPT-N values of 7 to 34 and moisture content values of 7 to 13%. Deeper soil at an elevation of 683.1 feet shows stiff to hard, gray silty clay with Qu values of 1.5 to 4.5 tsf and moisture content values of 11%.

4.1.3 DMS Location 3 (Boring DMS-05)

Beneath the topsoil, the boring encountered 7 feet thick, very stiff to hard clay to silty clay loam fill with Qu values of 2 to greater than 4.5 tsf, and moisture content values of 16 to 27%. Underneath the fill to the boring termination depths, boring encountered stiff to hard silty clay to silty clay loam with Qu values of 1.5 to 7.4 tsf and moisture content values of 12 to 18%.

4.1.4 DMS Location 4 (Boring DMS-03)

Beneath the surface pavement, the boring encountered stiff, brown and gray silty clay with Qu values of 1.0 to 1.8 tsf and moisture content values of 25 to 26% followed by 11-inch thick buried topsoil. At an elevation of 644.3 feet, boring encountered 4.1 feet thick, medium dense, brown and gray silt with SPT-N values of 11 and 13 and moisture content values of 20 and 21%. Stiff to hard, gay silty clay encountered at an elevation of 640.2 feet with Qu values of 1.4 to 4.5 tsf and moisture content values of 10 to 19%. A laboratory test result in this layer shows Liquid Limit (L_L) value of 29 and Plastic Limit (P_L) value of 14. Deeper soil at an elevation of 621.4 feet shows loose to very dense, gray silty loam with SPT-N values of 9 to more than 50. A laboratory test result on silty loam layer shows L_L value of 16 and P_L value of 11. Augur refusal and higher blow counts at 608.8 feet elevation shows possible bedrock at 44.7 feet bgs.

4.2 Groundwater Conditions

Boring DMS-01 encountered groundwater while drilling at an elevation of 694.6 feet (11 feet bgs) and 655.6 feet (50 feet bgs) after drilling completion.

Boring DMS-02 encountered groundwater while drilling at an elevation of 693.6 feet (33.5 feet bgs) and 677.1 feet (50 feet bgs) after drilling completion.

Borings DMS-03 and DMS-05 did not encounter groundwater during drilling. Boring DMS-03 recorded dry at the end of drilling. At the end of the drilling, groundwater was not recorded for Boring DMS-05 as rotary mud method was used.

5.0 ANALYSES AND RECOMMENDATIONS

The following sections present the results of our analyses and recommendations for the proposed DMS sign structures.

5.1 Overhead Sign Structures

Based on preliminary drawings, Wang understands that four new DMS sign structures are proposed along IL 64. IDOT Sign Structure Manual (2012) Section 2.2 provides drilled shaft foundation for cantilever sign structure. The schedules provide standard drilled shaft diameter, embedment length, as well as reinforcement details based on the presence of mostly cohesive soil with an average Q_u of greater than 1.25 tsf. No provisions are provided for cohesionless soil.

Based on our evaluation of the soils encountered at the proposed DMS sign locations, the standard foundation schedules established by IDOT Sign Structure Manual (2012) Section 2.2 can be used for the foundation of the proposed sign structures at DMS Location 3 and 4; as shown in Table 1 satisfying IDOT criteria.

Borings encountered mostly granular soil at DMS Locations 1 and 2. Wang recommends site specific design at these locations using lateral soil parameters provided in Table 2 and 3. The final shaft embedment depths may vary depending on actual soils encountered during construction.

Table 1: Sign Structure Standard Foundation Criteria Evaluation Summary

Structure Name	Structure Location	Sign Structure Type	Span Length (feet)	Soil Boring/ Drilled Depth (feet)	Standard Foundation Criteria; Ave. Q_u > 1.25 tsf
DMS Location 1	IL Rte. 64 (North Avenue) West of I-355	Cantilever	NA	DMS-01/50	Mostly Granular
DMS Location 2	IL Rte. 64 (North Avenue) East of I-355	Cantilever	NA	DMS-02/50	Mostly Granular
DMS Location 3	IL Rte. 64 (North Avenue) West of IL 83	Cantilever	NA	DMS-05/50	Criteria Satisfied (Avg. Q_u = 2.95 tsf)
DMS Location 4	IL Rte. 64 (North Avenue) East of I-290	Cantilever	NA	DMS-03/45	Criteria Satisfied (Avg. Q_u = 2.1 tsf)

Table 2: Recommended Soil Parameters for Laterally Loaded Drilled Shaft Analysis at DMS Location 1
Ref. Boring: DMS-01

Soil Type / Layer Elevation	Moist Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Undrained Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
Stiff Silty Clay Fill El. 705.6 to 700.1	120	1900	0	600	0.7
Medium Stiff Silty Clay El. 700.1 to 696.2	120	1200	0	300	0.9
M Dese Sand El. 696.2 to 661.7	115	0	30	50	--
Loose to Very Dense Sand to Gravelly Sand El. 661.7(1) to 671.4	53(2)	0	30	70	--
M Dense to V Dense Silty Loam El. 671.4 to 655.6(3)	58 (2)	3	32	100	--

(1)Groundwater Elevation
(2)Submerged Unit Weight
(3)Boring termination depth

Table 3: Recommended Soil Parameters for Laterally Loaded Drilled Shaft Analysis at DMS Location 2

Ref. Boring: DMS-02

Soil Type / Layer Elevation	Moist Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Undrained Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
V Stiff to Hard SI Clay El. 727.1 to 720.8	120	3600	0	1300	0.5
Loose to M Dense Gravelly Loam El. 720.8 to 687.3	115	0	30	50	--
M Dese to Dense Gravelly Loam El. 687.3[(1)] to 683.1	58[(2)]	0	32	95	--
Stiff to Hard Silty Clay El. 683.1 to 677.1[(3)]	58[(2)]	2000	0	600	0.7

[(1)]Groundwater Elevation
[(2)]Submerged Unit Weight
[(3)]Boring termination depth

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Drilled Shaft Construction

Foundation excavations should be performed in accordance with local, state, and federal regulations. The potential effect of ground movements upon nearby roadways and utilities should be considered on the design and during construction. The drilled shafts for sign structures support should be constructed in accordance with IDOT Standard Specification of Road and Bridge Construction Section 516 (2022), *Drilled Shafts.*

Groundwater was encountered in Borings DMS-01 and DMS-02. In addition, thick layer of granular soils were encountered in the soil borings. Wet method, temporary casing method, or combination of the two will be required for construction of drilled shafts where granular soils and groundwater was encountered in borings during and after drilling. The construction method should be adjusted or changed based on the soil and groundwater conditions encountered during construction of the drilled shafts.

7.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon data obtained from the soil borings performed at the locations indicated on the *Boring Locations Plans* (Exhibit 2). This report does not reflect any variations that may occur between borings or elsewhere on the site, variations whose nature and extent may not become obvious until late in the construction phase. If changes are planned to the proposed improvements, we should be timely informed so that the changes may be reviewed, and our recommendations adjusted accordingly.

It has been a pleasure to work with Kimley-Horn and Associates, Inc. in this project. Please do not hesitate to call if there are any questions, or if we can be of further service.

Respectfully Submitted,

WANG ENGINEERING, INC.

Ramesh KC, P.E.
Geotechnical Engineer

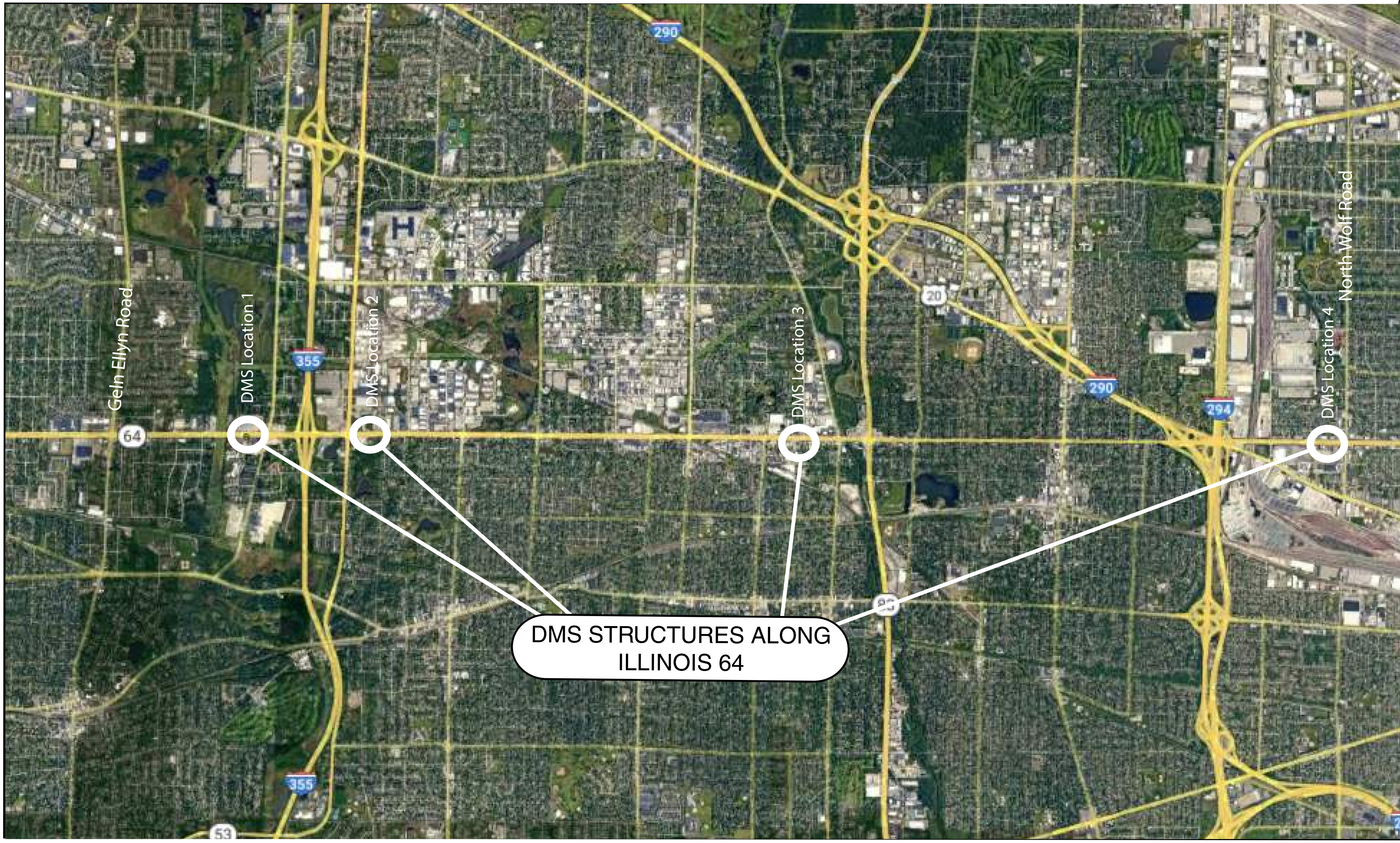
Mohammed (Mike) Kothawala, P.E., D.GE
Sr. Project Manager/Sr. Geotechnical Engineer

REFERENCES

IDOT (2012) *Sign Structure Manual*. Illinois Department of Transportation.

IDOT (2022) *Standard Specifications for Road and Bridge Construction.* Illinois Department of Transportation.

EXHIBITS



Scale

0 1.75 3.5 Mile

SITE LOCATION MAP: DMS STRUCTURES ALONG IL 64, WEST AND EAST OF I-355, WEST OF IL 83, AND EAST OF I-290, COOK AND DUPAGE COUNTIES, ILLINOIS		
SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: RKC CHECKED BY: MAK
Wang Engineering		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR KIMLEY-HORN AND ASSOCIATES, INC		KE225168/ 148-02-01

Legend

- Boring at DMS Location 1
- Boring at DMS Location 2

Scale

0 — 0.25 — 0.5 Mile

BORING LOCATION PLAN: DMS STRUCTURES ALONG IL 64, WEST AND EAST OF I-355, WEST OF IL 83, AND EAST OF I-290, COOK AND DUPAGE COUNTIES, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2-1	DRAWN BY: RKC CHECKED BY: MAK

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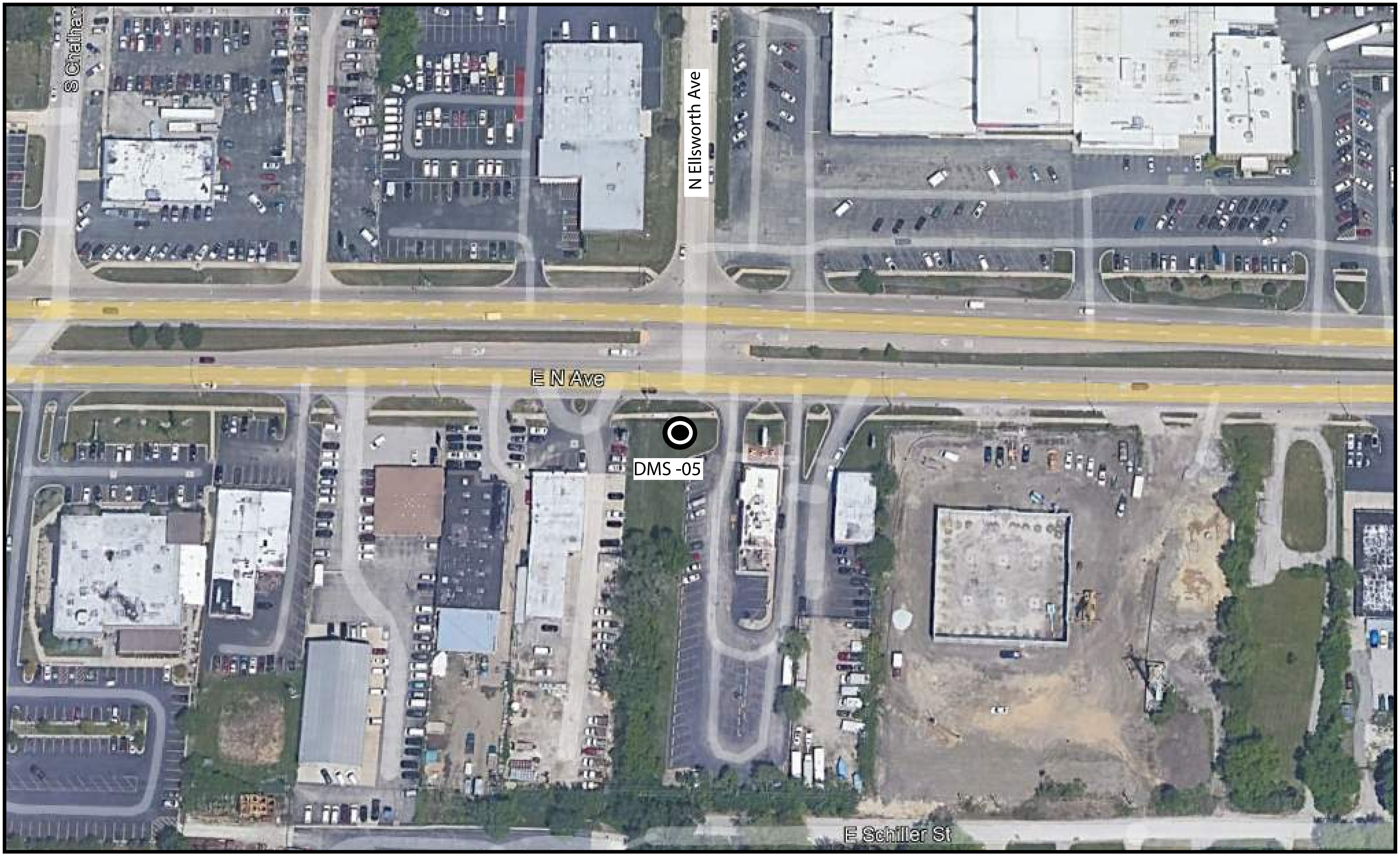

Legend

Boring at DMS Location 3

Scale

0 250 500 feet

BORING LOCATION PLAN: DMS STRUCTURES ALONG IL 64, WEST AND EAST OF I-355, WEST OF IL 83, AND EAST OF I-290, COOK AND DUPAGE COUNTIES, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2-2	DRAWN BY: RKC CHECKED BY: MAK

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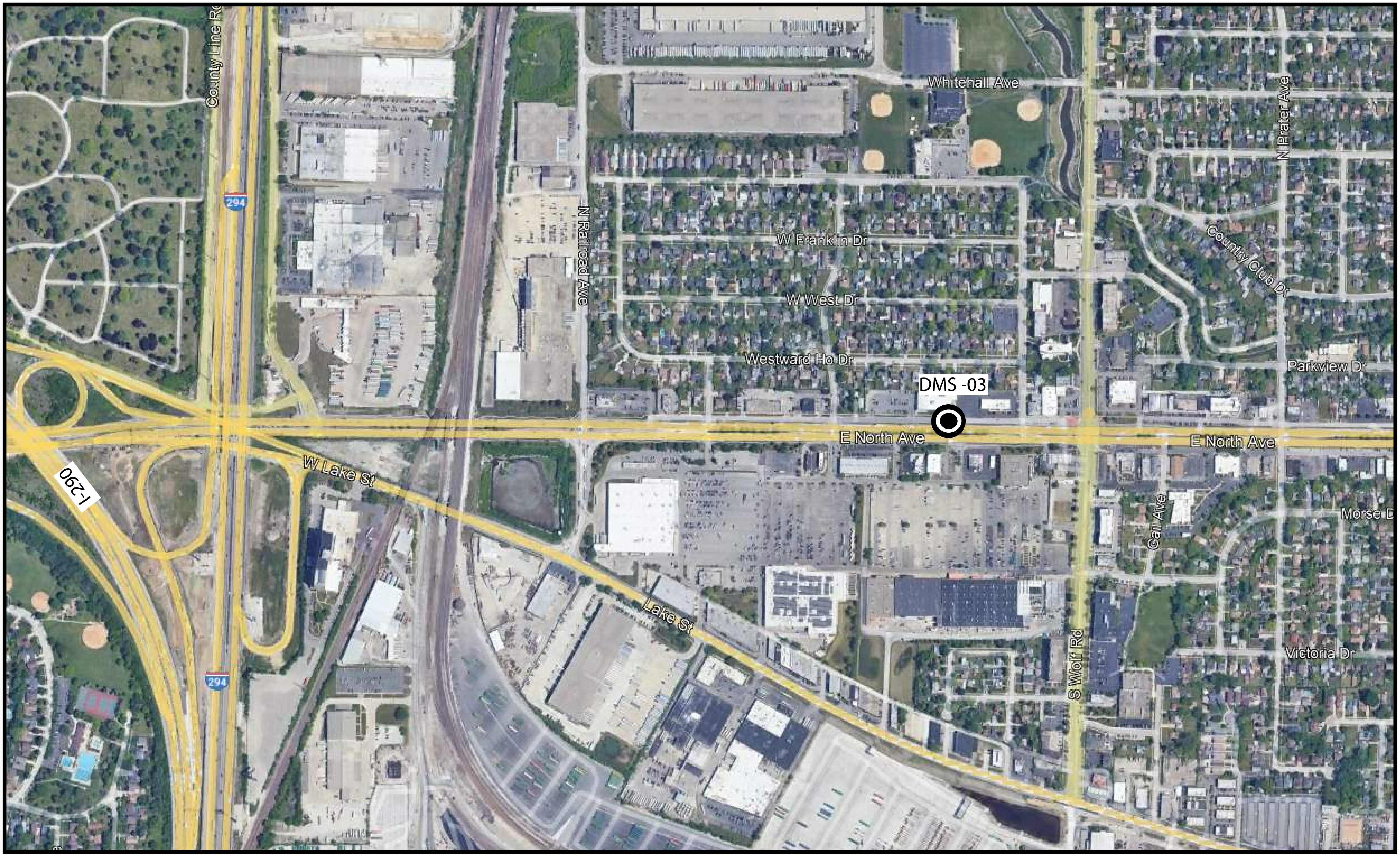

Legend

◉ Boring at DMS Location 4

Scale

0 0.25 0.5 Mile

BORING LOCATION PLAN: DMS STRUCTURES ALONG IL 64, WEST AND EAST OF I-355, WEST OF IL 83, AND EAST OF I-290, COOK AND DUPAGE COUNTIES, ILLINOIS		
SCALE: GRAPHICAL	EXHIBIT 2-3	DRAWN BY: RKC CHECKED BY: MAK
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APPENDIX A

Wang Engineering

LEGEND FOR BORING LOG

Relative Density of Non-Cohesive Soils

N-Blows/ 12 inches	Relative Density Term
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80+	Very Dense

Consistency of Cohesive Soils

Unconfined Compressive Strength Qu, tsf	Consistency Term
<0.25	Very Soft
0.25-0.49	Soft
0.50-0.99	Medium Stiff
1.00-1.99	Stiff
2.00-3.99	Very Stiff
>4.00	Hard

Rock Quality Designation (RQD)

0-25%	Very Poor
25-50%	Poor
50-75%	Fair
75-90%	Good
90-100%	Excelent

SS = Split Spoon
ST = Shelby Tube
SPT = Standard Penetration Test
Q_u = Unconfined Compressive Strength
NP = Non Plastic
P = Pocket Penetrometer
S = Shear failure of sample, Rimac test
B = Bulge failure of sample, Rimac test
SSA = Solid Stem Augers,
HSA = Hollow Stem Augers,

Proportional Terms

Trace	1-9	Percent of Dry Weight
Little	10-19	
Some	20-34	
And	35-50	

Gradation Terminology

Boulders	>200mm
Cobbles	200mm to 75mm
Gravel	75mm to 2mm
Sand	2-0mm to 0.074mm
Silt	0.074mm to 0.002mm
Clay	<0.002mm

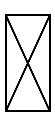
Relative Moisture Conditions

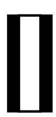
Term	Description
Dry	Dusty, No visible moisture
Damp	Cohesives hard to mold; Granulars do not flow easily
Moist	Cohesives can be molded; Granulars start to stick together
Wet	Cohesives can be very easily molded and sticky; Granulars stick together easily
Saturated	Only granular soils; Water drains freely from sample

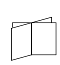
Relative Drilling Resistance (RDR)

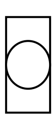
1	No Chatter - Very Easy Drilling
2	No Chatter - Easy Drilling
3	Some Chatter - Moderate Advancement
4	Frequent Chatter - Slow Advancement
5	Constant Chatter - Very Slow Advanement

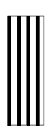
Sample Type Symbols


Split Spoon

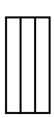

Rock Core

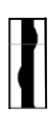

In-situ Vane Shear Test


No Recovery


Shelby Tube

SPT = Standard Penetration Test
N Value is the sum of the second and the third numbers


Geoprobe


Auger Cuttings

(Rev. 05/23/2018)

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BORING LOG DMS-01

WEI Job No.: KE225168

Client: **Kimley-Horn and Associates, Inc.**
Project: **PTB 192-002, IL 64 Smart Corridor Implementation**
Location: **DuPage and Cook Counties, Illinois**

Datum: NAVD 88
Elevation: 705.65 ft
North: 1907649.18 ft
East: 1062554.51 ft
Station: NA
Offset: NA

SOIL AND ROCK DESCRIPTION

Elevation (ft)	Soil and Rock Description	Depth (ft)
705.5	2-inch thick ASPHALT --PAVEMENT--	
704.6	10-inch thick CONCRETE --PAVEMENT--	
702.6	Dense, black and gray SANDY GRAVEL; damp --BASE COURSE--	
	Stiff, black and gray SILTY CLAY, trace gravel; moist --FILL-- --RDR 2-- --offset boring due to obstruction--	5
700.1	Medium stiff to stiff, brown SILTY CLAY, trace gravel; moist --RDR 2--	
696.2	Medium dense to very dense, brown, medium to coarse SAND, trace to little gravel; damp to saturated --RDR 2--	10, 15, 20
682.6	Medium dense, brown GRAVELLY SAND; saturated --RDR 2--	25
680.1	Medium dense, gray, medium to coarse SAND, trace gravel; saturated --RDR 2--	
677.6	Loose, gray LOAM, trace gravel; saturated --RDR 2-- --%Gravel=4.8-- --%Sand=80.9-- --%Silt & Clay=14.3--	30
673.9	Medium dense, gray, medium SAND, trace gravel; saturated --RDR 2--	
671.4	Medium dense to very dense, gray SILTY LOAM, trace to some gravel; moist to saturated --RDR 2--	35, 40, 45
655.6	Boring terminated at 50.00 ft	50

Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
1	20, 25, 9	NP	7
2	23, 4, 4	1.97 B	22
3	3, 3, 3	1.23 B	23
4	3, 6, 4	0.98 S	14
5	4, 8, 10	NP	22
6	8, 4, 7	NP	18
7	3, 4, 6	NP	19
8	34, 30/3"	NP	24
9	34, 15, 15	NP	13
10	6, 8, 8	NP	15
11	23, 8, 11	NP	16
12	14, 4, 4	NP	23
13	5, 12, 15	NP	19
14	6, 14, 11	NP	13
15	24, 16, 8	NP	7
16	45, 32, 18/2"	NP	8

GENERAL NOTES

Begin Drilling: **08-11-2022** Complete Drilling: **08-11-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **20CME55T[81%]**
Driller: **AG&KG** Logger: **A. Scifers** Checked by: **J. Bensen**
Drilling Method: **2.25" ID HSA; backfilled upon completion**

WATER LEVEL DATA

While Drilling: **11.00 ft**
At Completion of Drilling: **50.00 ft**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG DMS-02

WEI Job No.: KE225168

Client: **Kimley-Horn and Associates, Inc.**
Project: **PTB 192-002, IL 64 Smart Corridor Implementation**
Location: **DuPage and Cook Counties, Illinois**

Datum: NAVD 88
Elevation: 727.12 ft
North: 1907961.56 ft
East: 1066762.22 ft
Station: NA
Offset: NA

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
726.3	8-inch thick CONCRETE --PAVEMENT--						
	Very stiff to hard, brown SILTY CLAY, trace gravel; damp to moist --RDR 2--			1	29 6 5	NR	
		5		2	2 3 5	3.61 B	21
720.8	--Qu: 4.50P--						
	Loose to medium dense, brown GRAVELLY LOAM; damp to saturated --RDR 2--			3	4 4 5	NP	12
		10		4	3 6 5	NP	11
	--%Gravel=46.7-- --%Sand=36.8-- --%Silt & Clay=16.5--			5	5 5 6	NP	8
		15		6	4 4 5	NP	7
				7	5 5 4	NP	8
		20		8	3 4 4	NP	10
				9	2 3 4	NP	9
		25		10	3 4 3	NP	7
	--%Gravel=24.3-- --%Sand=64.0-- --%Silt & Clay=11.7--			11	6 6 6	NP	8
		30		12	16 14 11	NP	8
		35		13	4 5 6	NP	13
		40		14	32 22 12	NP	12
683.1	Stiff to hard, gray SILTY CLAY, trace to little gravel; moist --RDR 2--	45		15	15 15 11	> 4.50 P	11
677.1		50		16	11 10 12	1.48 B	11
	Boring terminated at 50.00 ft						

GENERAL NOTES

Begin Drilling **08-10-2022** Complete Drilling **08-10-2022**
Drilling Contractor **Wang Testing Services** Drill Rig **20CME55T[81%]**
Driller **AG&KG** Logger **A. Scifers** Checked by **J. Bensen**
Drilling Method **2.25" ID HSA; backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **33.50 ft**
At Completion of Drilling ▼ **50.00 ft**
Time After Drilling **NA**
Depth to Water **NA**

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BORING LOG DMS-03

WEI Job No.: KE225168

Client: **Kimley-Horn and Associates, Inc.**
Project: **PTB 192-002, IL 64 Smart Corridor Implementation**
Location: **DuPage and Cook Counties, Illinois**

Datum: NAVD 88
Elevation: 653.17 ft
North: 1909057.91 ft
East: 1100605.53 ft
Station: NA
Offset: NA

SOIL AND ROCK DESCRIPTION

Elevation (ft)	Description
652.8	4-inch thick ASPHALT --PAVEMENT--
652.3	7-inch thick CONCRETE --PAVEMENT--
	Stiff, black, gray and brown SILTY CLAY, trace gravel; moist --FILL-- --RDR 2--
645.2	Stiff (1.50P), black SILTY CLAY, trace gravel; moist --BURIED TOPSOIL--
644.3	Medium dense, brown to gray SILT, trace gravel; damp to moist --RDR 2--
640.2	Stiff to hard, gray SILTY CLAY, trace gravel; moist --RDR 2-- --L$_L$(%)=29, P$_L$(%)=14-- --%Gravel=4.9-- --%Sand=13.4-- --%Silt=51.3-- --%Clay=30.5-- --A-6 (10)-- ; --sand seams-- ; --sand seams--
621.4	Loose to very dense, gray SILTY LOAM, trace gravel; damp to wet --RDR 2-- --L$_L$(%)=16, P$_L$(%)=11-- --%Gravel=2.3-- --%Sand=31.8-- --%Silt=53.6-- --%Clay=12.3-- --A-4 (0)-- ; --L$_L$(%)=21, P$_L$(%)=15-- --%Gravel=1.6-- --%Sand=7.8-- --%Silt=75.3-- --%Clay=15.3-- --A-4 (3)--
608.8	WEATHERED BEDROCK
608.2	--AUGER REFUSAL-- Boring terminated at 45.00 ft

Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
1	2, 3, 4	1.50 P	26
2	2, 3, 3	1.00 P	25
3	2, 2, 3	1.80 B	26
4	4, 5, 5	NP	20
5	6, 7, 6	NP	21
6	3, 4, 5	2.05 B	19
7	4, 5, 6	1.39 B	19
8	3, 6, 4	2.74 B	16
9	5, 4, 6	NA	19
10	6, 8, 9	3.28 B	18
11	4, 7, 16	2.21 B	10
12	15, 8, 3	> 4.50 P	10
13	5, 7, 17	NP	14
14	5, 4, 5	NP	18
15	9, 26, 50/2"	NP	13

GENERAL NOTES

Begin Drilling **08-09-2022** Complete Drilling **08-09-2022**
Drilling Contractor **Wang Testing Services** Drill Rig **20CME55T[81%]**
Driller **AG&KG** Logger **A. Scifers** Checked by **J. Bensen**
Drilling Method **2.25" ID HSA; backfilled upon completion**

WATER LEVEL DATA

While Drilling: **DRY**
At Completion of Drilling: **DRY**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG DMS-04

WEI Job No.: KE225168

Client **Kimley-Horn and Associates, Inc.**
Project **PTB 192-002, IL 64 Smart Corridor Implementation**
Location **DuPage and Cook Counties, Illinois**

Datum: NAVD 88
Elevation: 691.44 ft
North: 1908633.17 ft
East: 1090951.58 ft
Station: NA
Offset: NA

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
691.2	3-inch thick ASPHALT --PAVEMENT--					
690.4	10-inch thick CONCRETE --PAVEMENT--		1	16 10 12	NP	6
	Medium dense, gray and brown, medium to caorse SAND to SANDY LOAM, little to some gravel; damp --RDR 2--		2	18 8 5	NP	13
686.4	Medium dense, brown SILT; moist --RDR 2--	5				
684.7	Hard, brown SILTY CLAY, trace gravel; moist --RDR 2--		3	4 3 7	4.00 P	20
682.4	Stiff to very stiff, gray SILTY CLAY, trace gravel; moist --RDR 2--		4	4 5 5	1.56 B	17
		10	5	3 3 4	1.48 B	17
			6	3 4 5	1.31 B	18
	--silt seams--	15	7	3 3 5	1.31 B	18
			8	3 3 4	1.31 B	18
		20	9	3 5 5	1.48 B	16
		25	10	3 5 6	2.13 B	18
			11	3 5 7	1.89 B	17
			12	5 3 6	1.80 B	19
661.4	Boring terminated at 30.00 ft	30				
		35				
		40				
		45				
		50				

GENERAL NOTES

Begin Drilling **12-19-2022** Complete Drilling **12-19-2022**
Drilling Contractor **Wang Testing Services** Drill Rig **17B57T [91%]**
Driller **KG&TC** Logger **A. Scifers** Checked by **R. KC**
Drilling Method **2.25" ID HSA; backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **DRY**
At Completion of Drilling ▼ **DRY**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG DMS-05

WEI Job No.: KE225168

Client: **Kimley-Horn and Associates, Inc.**
Project: **PTB 192-002, IL 64 Smart Corridor Implementation**
Location: **DuPage and Cook Counties, Illinois**

Datum: NAVD 88
Elevation: 682.52 ft
North: 1908314.84 ft
East: 1082177.31 ft
Station: NA
Offset: NA

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
681.5	12-inch thick, black SILT, trace gravel, organic; damp --TOPSOIL--					
679.5	Hard, black to brown SILTY CLAY LOAM, trace gravel; moist --FILL-- --RDR 2--		1	6 5 7	> 4.50 P	16
	Very stiff, black to brown CLAY to SILTY CLAY, trace gravel, metal pieces; moist --FILL-- --RDR 2--	5	2	8 6 7	2.00 P	27
674.5			3	3 4 5	2.30 B	22
	Stiff to hard, brown to gray SILTY CLAY, trace gravel; damp to moist --RDR 2--	10	4	8 9 14	5.99 B	14
			5	6 13 19	7.38 B	17
		15	6	5 11 14	4.76 B	18
			7	5 7 10	1.80 B	17
		20	8	3 4 7	1.48 B	17
659.5			9	4 7 8	1.56 B	19
	Stiff to very stiff, gray SILTY CLAY LOAM, trace gravel; damp to moist --RDR 2-4--	25	10	3 6 8	1.50 P	12
			11	5 15 15	1.77 B	15
		30	12	5 8 13	2.21 B	14
		35	13	6 5 8	1.50 P	13
		40	14	7 9 13	2.87 B	11
	--rig chatter, possible cobbles--					
		45	15	9 9 13	3.53 B	12
	--rig chatter, possible cobbles--					
632.5		50	16	7 16 35	2.05 B	12

Boring terminated at 50.00 ft

GENERAL NOTES

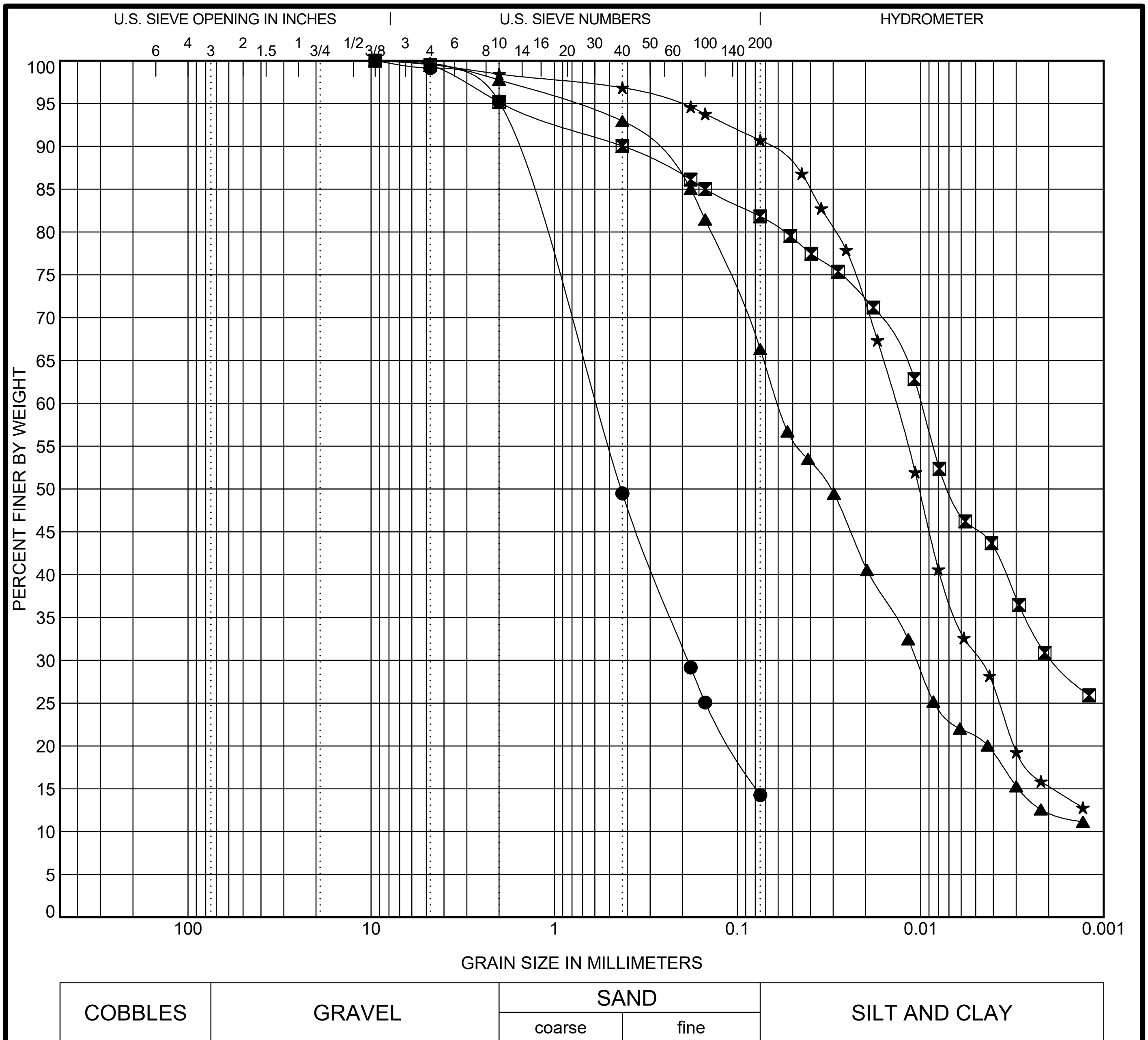
Begin Drilling **01-05-2023** Complete Drilling **01-05-2023**
Drilling Contractor **Wang Testing Services** Drill Rig **D25 ATV [93%]**
Driller **RR&GT** Logger **D. Morken** Checked by **J. Bensen**
Drilling Method **2.25" ID HSA; backfilled upon completion**

WATER LEVEL DATA

While Drilling: **DRY**
At Completion of Drilling: **MUD**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

APPENDIX B



	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	**DMS-01#12**	**28.5 ft**	**Loam**	**NP**	**NP**	**NP**		
⧗	**DMS-03#7**	**16.0 ft**	**Silty Clay**	**29**	**14**	**15**		
▲	**DMS-03#13**	**33.5 ft**	**Silty Loam**	**16**	**11**	**5**		
★	**DMS-03#14**	**38.5 ft**	**Silty Loam**	**21**	**15**	**6**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**DMS-01#12**	**28.5 ft**	**9.5**	**0.607**	**0.187**		**4.8**		**14.3**	
⧗	**DMS-03#7**	**16.0 ft**	**9.5**	**0.01**	**0.002**		**4.9**	**13.4**	**51.3**	**30.5**
▲	**DMS-03#13**	**33.5 ft**	**9.5**	**0.06**	**0.011**		**2.3**	**31.8**	**53.6**	**12.3**
★	**DMS-03#14**	**38.5 ft**	**9.5**	**0.014**	**0.005**		**1.6**	**7.8**	**75.3**	**15.3**

WEI SINCE 1982

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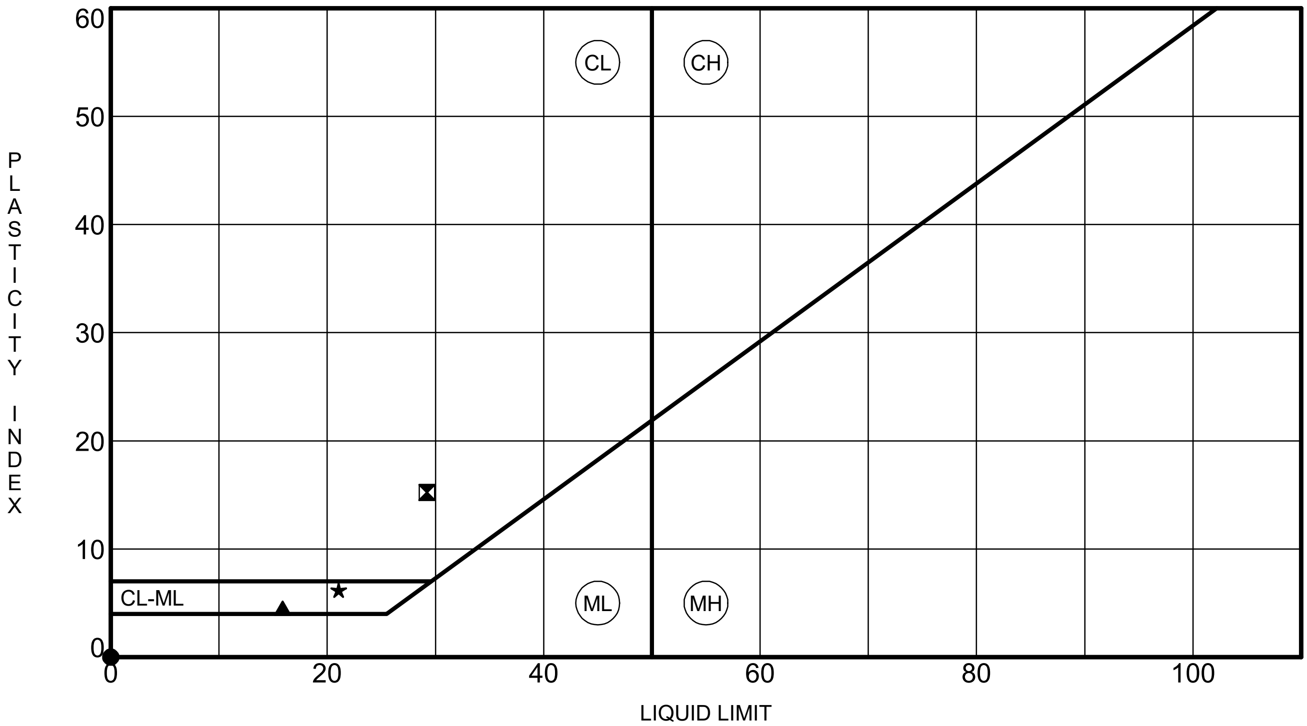
GRAIN SIZE DISTRIBUTION

Project: PTB 192-002, IL 64 Smart Corridor Implementation

Location: DuPage and Cook Counties, Illinois

Number: KE225168



	Specimen Identification		LL	PL	PI	Fines	IDH Classification
●	**DMS-01#12**	**28.5 ft**	**NP**	**NP**	**NP**	**14**	**Loam**
⧗	**DMS-03#7**	**16.0 ft**	**29**	**14**	**15**	**82**	**Silty Clay**
▲	**DMS-03#13**	**33.5 ft**	**16**	**11**	**5**	**66**	**Silty Loam**
★	**DMS-03#14**	**38.5 ft**	**21**	**15**	**6**	**91**	**Silty Loam**

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ATTERBERG LIMITS' RESULTS

Project: PTB 192-002, IL 64 Smart Corridor Implementation

Location: DuPage and Cook Counties, Illinois

Number: KE225168

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Phone (630) 953-9928
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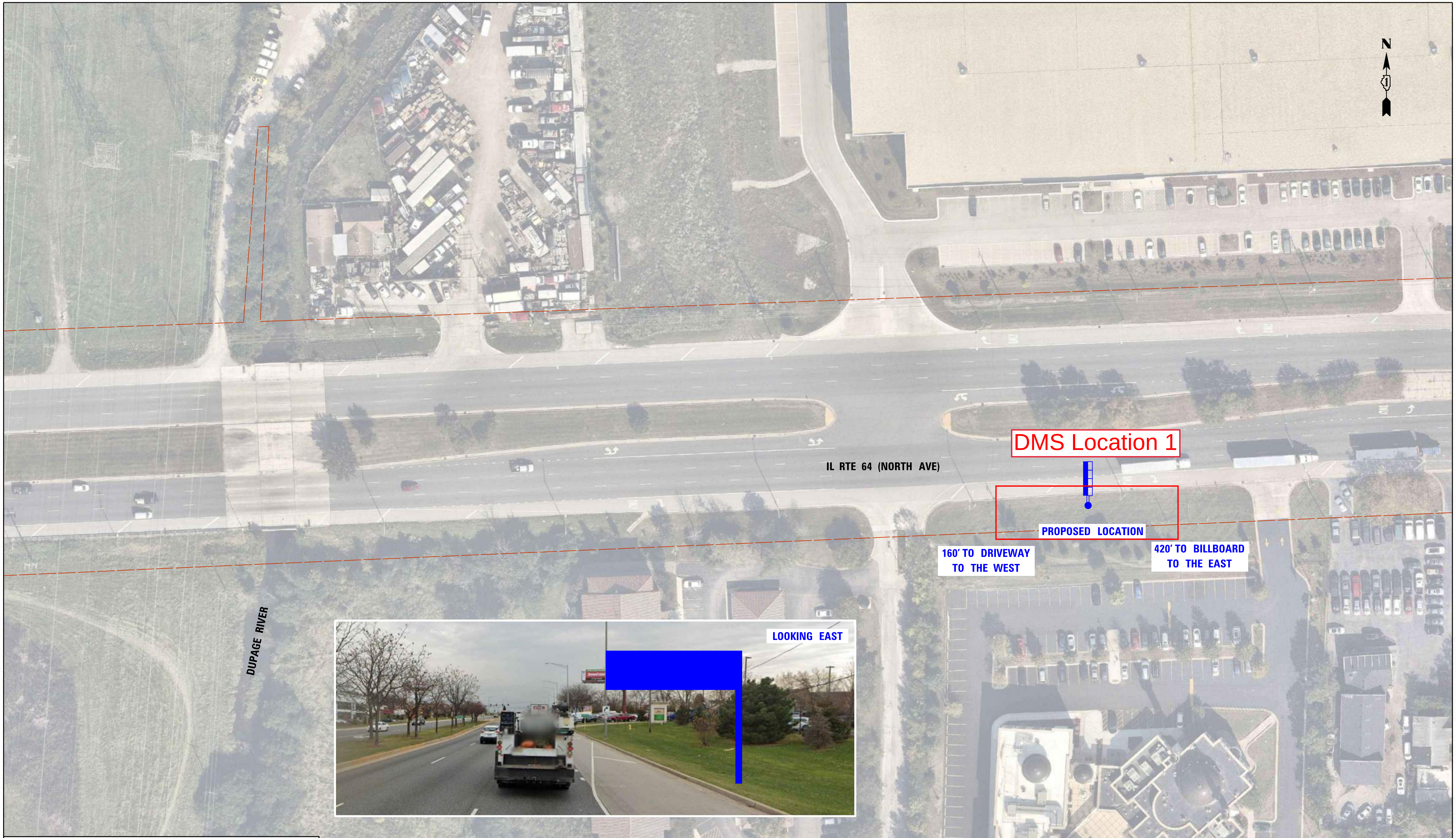
APPENDIX C



NOTE

PROPOSED DMS LOCATIONS ARE APPROXIMATE AND ARE SHOWN FOR DISCUSSION PURPOSES ONLY.

FILE NAME = $FILEL$

Kimley»Horn

4201 WINFIELD ROAD, SUITE 600
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PHONE: 630-487-5550
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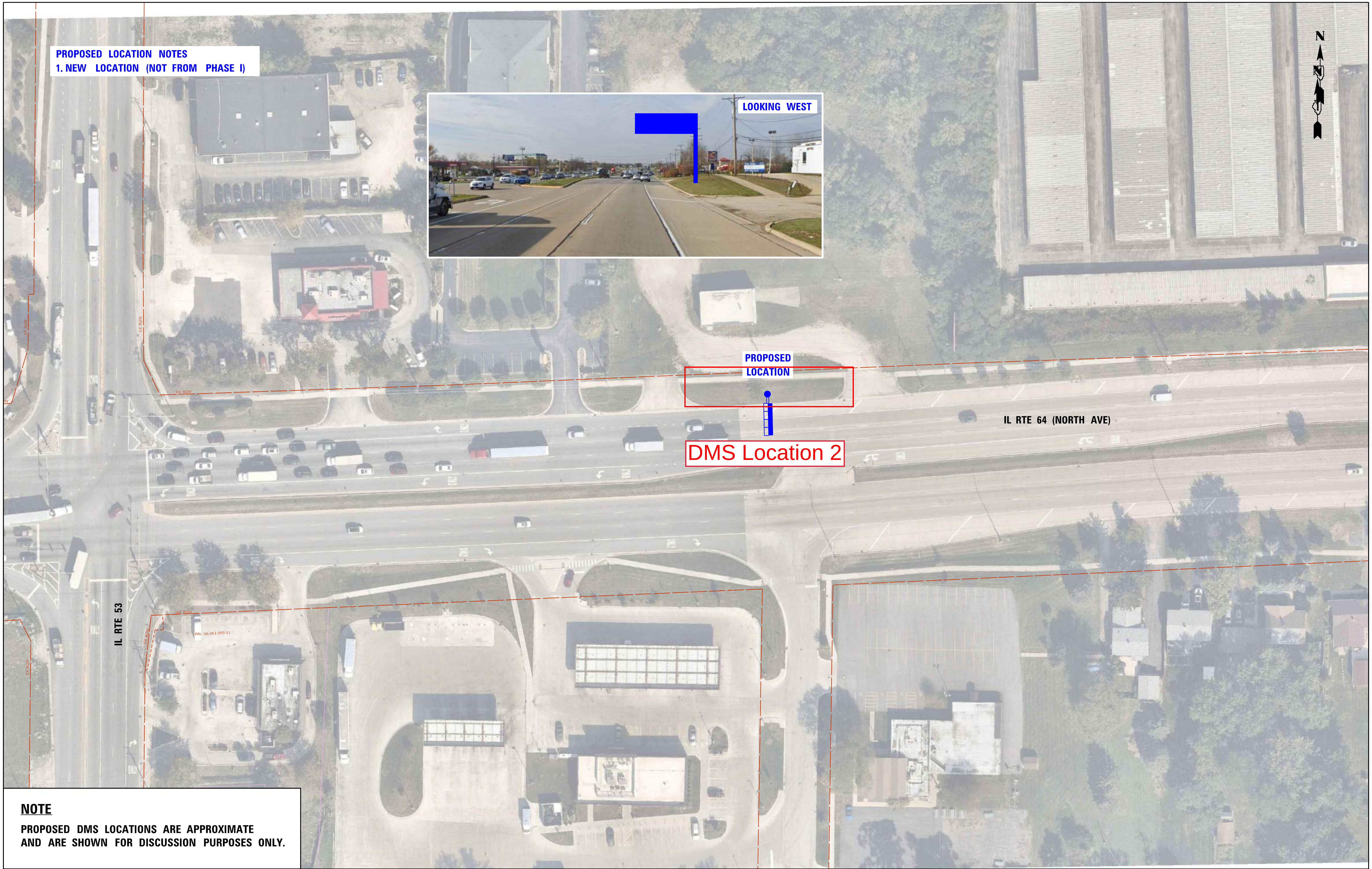
USER NAME =	DESIGNED - AK	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	DRAWN - AK	REVISED -	
PLOT SCALE =	CHECKED - SS	REVISED -	
PLOT DATE =	DATE - 7/20/2022	REVISED -	

PROPOSED DMS LOCATION 1
IL RTE 64 (NORTH AVE) WEST OF I–355

SCALE: 1"=40' | SHEET NO. OF SHEETS | STA. TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
307	2020-263-SUR, SW&TS	COOK		
		CONTRACT NO. 62N33		

FED. ROAD DIST. NO. _ | ILLINOIS | FED. AID PROJECT



NOTE

PROPOSED DMS LOCATIONS ARE APPROXIMATE AND ARE SHOWN FOR DISCUSSION PURPOSES ONLY.

FILE NAME = $FILEL$

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USER NAME =		DESIGNED - AK	REVISED -
		DRAWN - AK	REVISED -
PLOT SCALE =		CHECKED - SS	REVISED -
PLOT DATE =		DATE - 7/20/2022	REVISED -

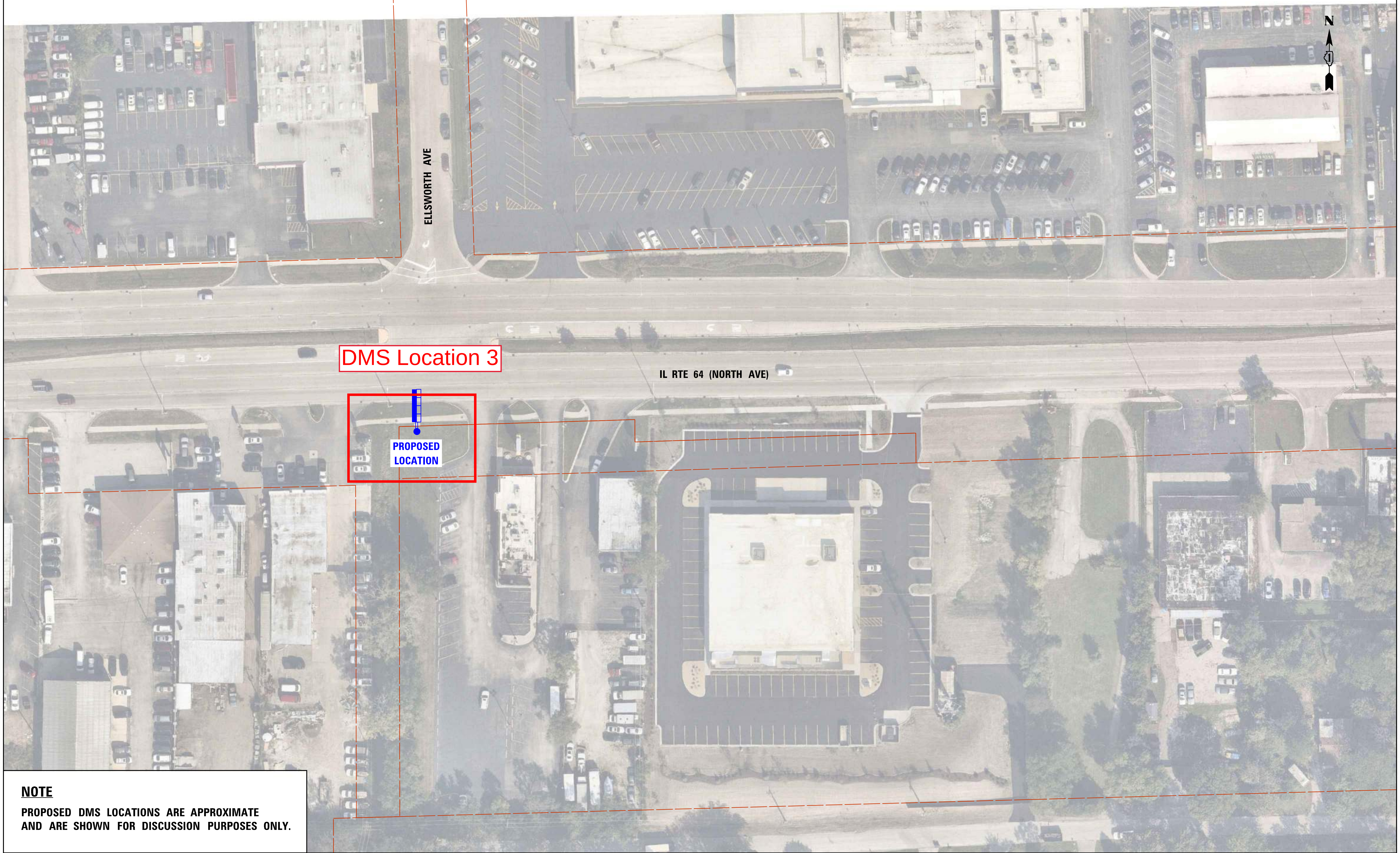
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DMS LOCATION 2
IL RTE 64 (NORTH AVE) EAST OF I–355

SCALE: 1''=40' | SHEET NO. OF SHEETS | STA. TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
307	2020-263-SUR, SW&TS	COOK		
		CONTRACT NO. 62N33		

FED. ROAD DIST. NO. _ | ILLINOIS | FED. AID PROJECT



NOTE

PROPOSED DMS LOCATIONS ARE APPROXIMATE AND ARE SHOWN FOR DISCUSSION PURPOSES ONLY.

FILE NAME = $FILEL$

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USER NAME =	DESIGNED - AK	REVISED -
	DRAWN - AK	REVISED -
PLOT SCALE =	CHECKED - SS	REVISED -
PLOT DATE =	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DMS LOCATION 3
IL RTE 64 (NORTH AVE) WEST OF IL RTE 83

SCALE: 1"=40' | SHEET NO. OF SHEETS | STA. TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
307	2020-263-SUR, SW&TS	COOK		

CONTRACT NO. 62N33

FED. ROAD DIST. NO. _ | ILLINOIS | FED. AID PROJECT

NOTE

PROPOSED DMS LOCATIONS ARE APPROXIMATE AND ARE SHOWN FOR DISCUSSION PURPOSES ONLY.

FILE NAME = $FILEL$

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USER NAME =	DESIGNED - AK	REVISED -
	DRAWN - AK	REVISED -
PLOT SCALE =	CHECKED - SS	REVISED -
PLOT DATE =	DATE - 7/20/2022	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED DMS LOCATION 4
IL RTE 64 (NORTH AVE) EAST OF I–290

SCALE: | SHEET NO. OF SHEETS | STA. TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
307	2020-263-SUR, SW&TS	COOK		
		CONTRACT NO. 62N40		

FED. ROAD DIST. NO. _ | ILLINOIS | FED. AID PROJECT