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**ABBREVIATED  
STRUCTURE GEOTECHNICAL REPORT  
ILLINOIS ROUTE 102 OVER  
RYANS CREEK CULVERT  
EXISTING SN: 099-0170, PROPOSED SN: 099-0918  
SECTION (111N-B) B-R, CONTRACT NO. 60V28  
WILL COUNTY, ILLINOIS**

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**for**

**AES Services, Inc.**

**111 S. Wacker Drive**

**Suite 3910**

**Chicago, Illinois 60606**

**(312) 235-6783**

**submitted by**

**Mohammed Kothawala, P.E., D.GE**

**(630) 953-9928 ext. 1036/mkothawala@wangeng.com**

**Wang Engineering, Inc.**

**1145 North Main Street**

**Lombard, IL 60148**

**Original: July 24, 2017  
Revised: October 4, 2017**

<b>Original Report Date:</b> <u>7/24/2017</u>	<b>Proposed SN:</b> <u>099-0918</u>	<b>Route:</b> <u>Illinois Route 102 (FAP 631)</u>
<b>Revised Date:</b> <u>10/4/2017</u>	<b>Existing SN:</b> <u>099-0170</u>	<b>Section:</b> <u>(111N-B)B-R</u>
<b>Geotechnical Engineer:</b> <u>Wang Engineering, Inc., Lombard, IL</u>		<b>County:</b> <u>Will</u>
<b>Structural Engineer:</b> <u>AES Services, Inc., Chicago, IL</u>		<b>Contract:</b> <u>60V28</u>

**Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing):**

The existing bridge (SN 099-0170), carrying Illinois Route 102 over Ryans Creek near Station 741+56.61, will be removed and replaced with a new multi-celled box culvert (SN 099-0918). The *General Plan and Elevation* drawing (Exhibit 1) provided by AES Services, Inc. (AES) on October 3, 2017, indicates the proposed box culvert will consist of an 16-foot wide by 9-foot high cell flanked by two 9-foot wide by 9-foot high cells. The multi-cell box culvert will be cast-in-place and will be embedded 12 inches into the natural creek bed and will have upstream and downstream invert elevations of 567.6 and 567.5 feet, respectively. The proposed culvert will have 23 feet long L-type wingwalls parallel to the roadway at both ends along with stone riprap at each culvert end. The *Plan and Profile* drawing (Exhibit 2), provided by AES and dated July 20, 2017, indicates the pavement sections and shoulders between Stations 741+00 and 744+00 will be reconstructed. There is no change in grade anticipated. This report provides geotechnical recommendations for the design and construction of the proposed multi-cell box culvert.

**Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot):**

The existing boring data includes two borings, designated as BSB-01 and BSB-02, which were drilled as part of the subsurface investigation performed in March of 2015. The borings were drilled along the shoulders at the locations shown in Exhibit 3. The borings were drilled to depths of up to 70.5 feet. A rock core collected from Boring BSB-02 revealed strong dolostone rock with a Rock Quality Designation (RQD) of 45%. The borings sampled up to 9 feet of cohesive and granular fill consisting of very soft, clay loam and loose, sandy loam underlain by 2 to 5 feet of medium dense to dense, brown and gray sandy gravel followed by up to 50 feet of very stiff to hard, greenish-gray silty clay loam to silty loam resting on dolostone bedrock (Exhibit 4). The bedrock was encountered at an approximate elevation of 518.1 feet or approximately 60 feet below the ground surface (bgs). While drilling, the groundwater was measured at depths of 6.5 to 9.0 feet bgs (elevations of 569.7 to 572.9 feet) within the sandy gravel layer.

**Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary:**

The existing grade will be maintained and no new fill will be added. Settlement is anticipated to be less than 1.0 inch which is acceptable for construction of the culvert. As per the IDOT Culvert manual, horizontal wingwalls are limited to 16.0 feet in length. If longer walls are required, L-type cantilever wingwalls may be used. The wingwalls are proposed to be L-type cantilever wingwalls. The subsurface investigation revealed the foundation soils consist of very stiff to hard silty clay loam to silty loam which will provide sufficient bearing resistance and a stable working platform. We recommend the wingwall footings be designed for a maximum factored bearing resistance of 4,000 psf considering a resistance factor of 0.45, as per AASHTO LRFD Bridge Design Specifications.

**Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary:**

No additional fill will be placed. We estimate the wingwalls will have a factor of safety against global instability meeting the IDOT minimum requirement of 1.5.

**Indicate at each substructure, the 100-year and 200-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations:**

As per the All Bridge Designers Memo 14.2-Revised Scour Design Policy, design scour elevations are not required for closed bottom box culverts.

**Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable:**

As per the IDOT Geotechnical Manual, seismic data is not required for box culverts.

**Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary factored unit side and tip resistance values shall be indicated when drilled shafts are proposed:**

The construction of the precast or cast-in-place concrete multi-cell box culvert is feasible.

**Calculate the estimated water surface elevation and determine the need for cofferdams (type 1 or 2), and seal coat:**

Water was encountered while drilling at elevations of 569.7 to 572.9 feet within the sandy gravel layer above the estimated culvert base. This granular layer is considered saturated and will be encountered during excavation for the proposed culvert. No cofferdam will be required; however temporary dewatering of the excavations will be required. Any soil allowed to soften in standing water should be removed and replaced with compacted aggregate material as per the IDOT Bridge Manual.

**Assess the need for sheeting or soil retention or temporary construction slope and provide recommendation for other construction concerns:**

Based on the drawings provided by AES, the proposed culvert will be constructed utilizing a full detour. Therefore, we do not anticipate the need for temporary support along the roadway. Temporary slopes across the roadway should be graded at a slope of 1:3 (V: H) or a stable slope. As per the attached global stability analysis (Exhibits 5 and 6), a slope graded at 1:3 (V: H) will have a factor of safety meeting the IDOT minimum requirement of 1.5. If an open excavation across the roadway is not feasible, a temporary soil retention system will be required.

Stage construction is required across the roadway to keep creek water flow. Excavation depth from the stream bed (El. 568.58) to bottom of bedding layer (El. 565.0) will be about 3.5 feet. Temporary support will be required to retain this excavation plus normal water above stream bed. Based on soil conditions, we estimate cantilever steel sheet piling designed in accordance with the IDOT *Design Guide 3.13.1* (2012a) is not feasible for the necessary retained height and the IDOT pay item *Temporary Soil Retention System* will be required.

**BENCH MARK:**

Set a RR Spike in the first power pole NE of the box culvert.  
 Elevation NGVD 88: 577.14  
 Northing: 1665597.386;  
 Easting: 1054179.948

**EXISTING STRUCTURE:**

Structure 099-0170 was built in 1929 as a reinforced concrete slab bridge. The superstructure is comprised of precast channel beams with a 5" reinforced concrete wearing surface. The back to back abutment length is 23'-5". The contractor shall remove and replace it with a 16-foot wide by 9-foot high cell flanked by two 9-foot wide by 9-foot high cells utilizing stage construction. Traffic will be detoured during the construction. Stage Construction is utilized to avoid the need for additional ROW or temporary easement to divert water flow during construction.

**SALVAGE:**

No Salvage.

**NOTES:**

Precast option is not allowed.

**HIGHWAY CLASSIFICATION:**

F.A.P Rte. 631 - U.S. Rte. 102  
 Functional Class: Minor Arterial  
 ADT : 2450 (2015)  
 DHV : 245  
 ADTT% : 14 %  
 Design Speed : 60 m.p.h.  
 Posted Speed : 55 m.p.h.

**DESIGN SPECIFICATIONS**

2014 AASHTO LRFD Bridge Design Specifications,  
 7th edition with 2015 & 2016 interims

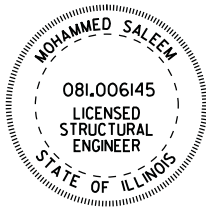
**LOADING HL-93**

Allow 50#/sq. ft. for future wearing surface.

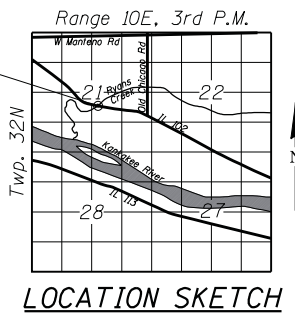
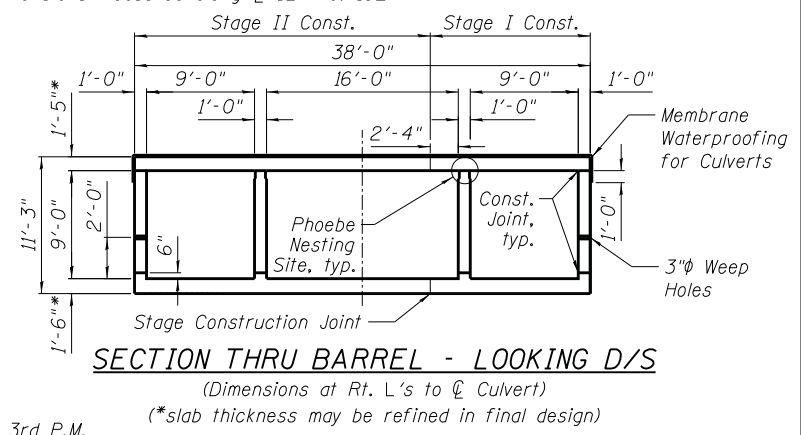
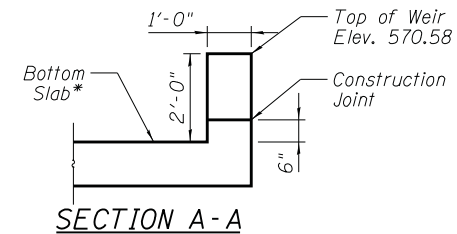
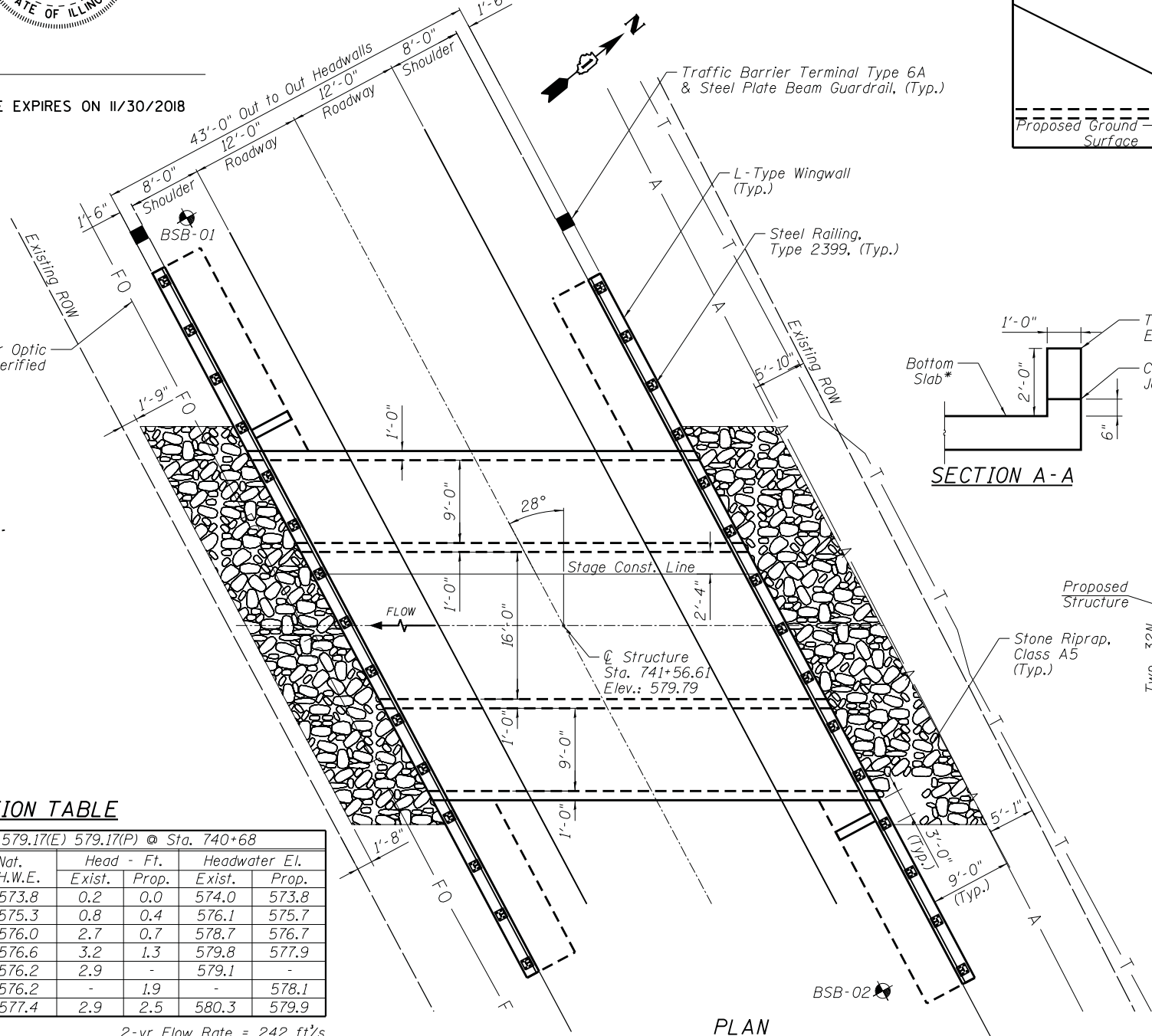
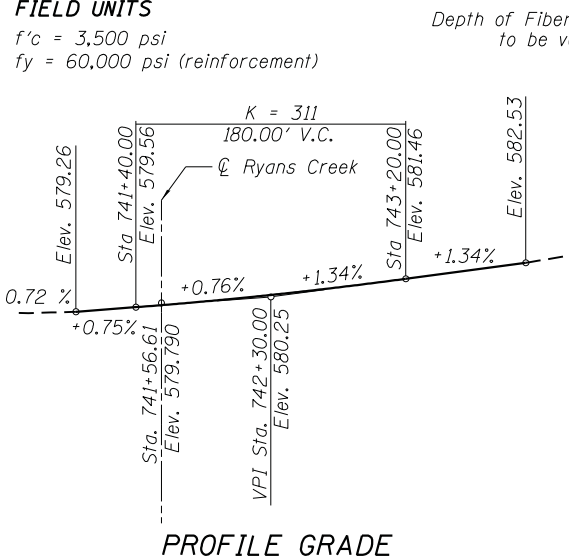
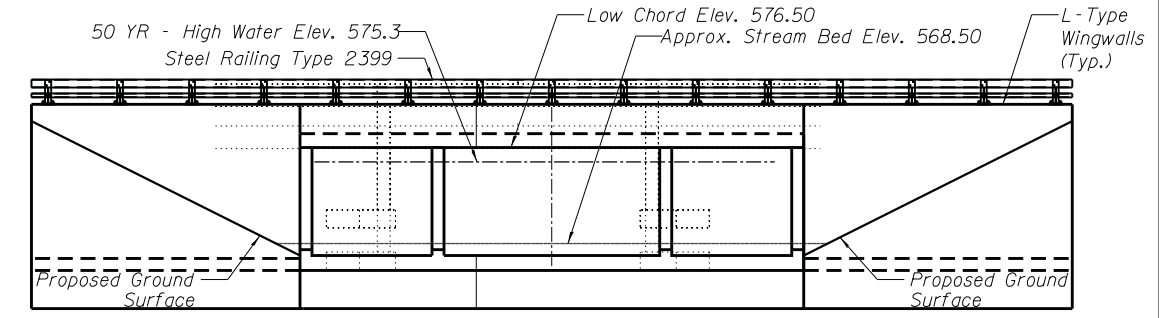
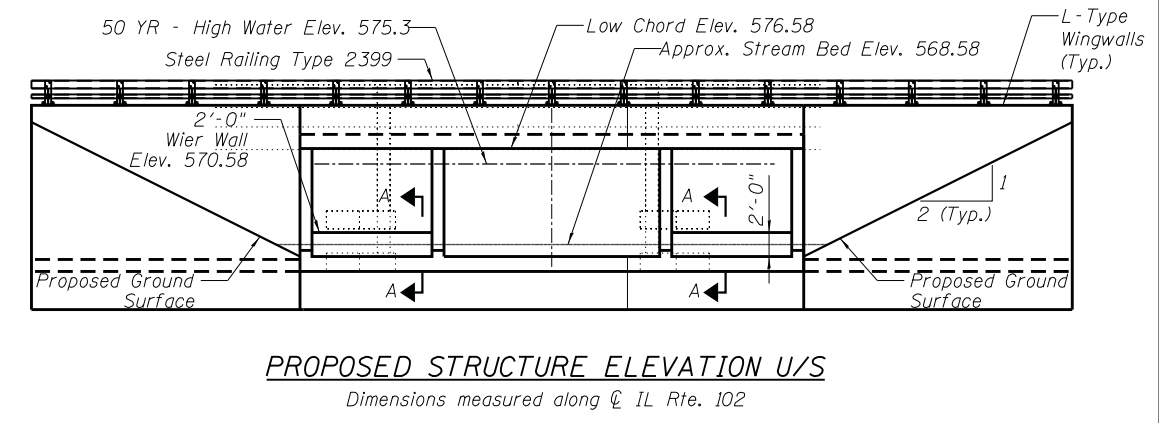
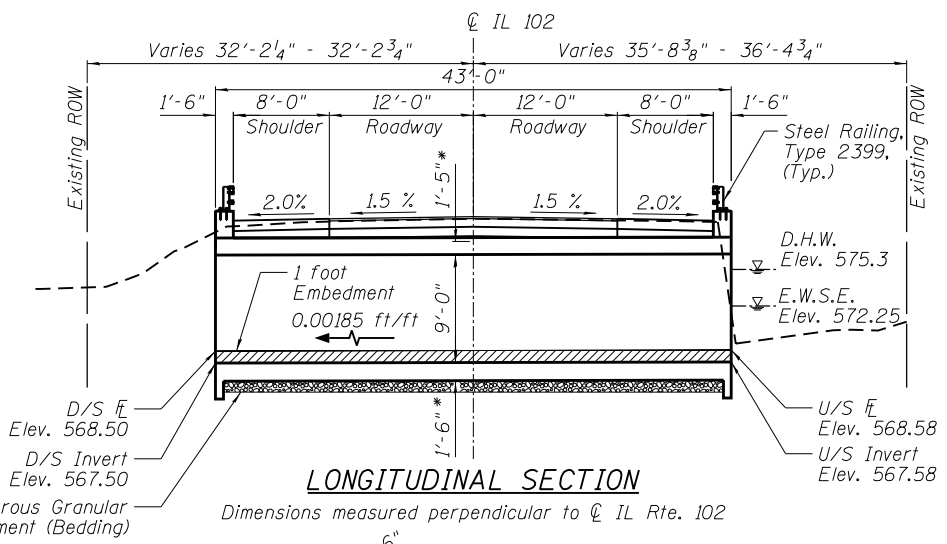
**DESIGN STRESSES**

**FIELD UNITS**

$f'c = 3,500$  psi  
 $f_y = 60,000$  psi (reinforcement)



DATE  
 LICENSE EXPIRES ON 11/30/2018



**GENERAL PLAN AND ELEVATION  
 US ROUTE 102 OVER RYANS CREEK  
 F.A.P. ROUTE 631  
 SECTION (111N-B)B-R  
 WILL COUNTY  
 STATION 741+56.61  
 STRUCTURE NO. 099-0918**

**WATERWAY INFORMATION TABLE**

Drainage Area = 6.59 sq.mi. Low Grade Elev. 579.17(E) 579.17(P) @ Sta. 740+68

Flood	Freq. Yr.	Q C.F.S.	Opening Sq. Ft.		Nat. H.W.E.	Head - Ft.		Headwater El.	
			Exist.	Prop.		Exist.	Prop.	Exist.	Prop.
Design	10	408	96	157	573.8	0.2	0.0	574.0	573.8
Base	50	866	126	207	575.3	0.8	0.4	576.1	575.7
Scour Design Check	100	1250	140	231	576.0	2.7	0.7	578.7	576.7
Ex. Overtop	200	1700	152	250	576.6	3.2	1.3	579.8	577.9
Pr. Overtop	130	1375	164	-	576.2	-	2.9	579.1	-
Max. Calc.	360	2100	-	250	576.2	-	1.9	-	578.1
	500	2375	164	250	577.4	2.9	2.5	580.3	579.9

2-yr Flow Rate = 242 ft<sup>3</sup>/s

FILE NAME : AES Services, Inc.  
 111 S. Wacker Drive, Suite 3910  
 Chicago, IL 60606  
 Ph: 312-23-6783

USER NAME =	DESIGNED - AM, AWM	REVISOR -
PLOT SCALE =	CHECKED - MS	REVISOR -
PLOT DATE =	DRAWN - AM, AWM	REVISOR -
	CHECKED - MS	REVISOR -

**STATE OF ILLINOIS  
 DEPARTMENT OF TRANSPORTATION**

**GENERAL PLAN & ELEVATION  
 STRUCTURE NO.: 099-0170**

GENERAL PLAN AND ELEVATION: ILLINOIS ROUTE 102 OVER RYANS CREEK, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL **EXHIBIT 1** DRAWN BY: A. Hamad  
 CHECKED BY: M. Kothawala

**Wang Engineering**  
 1145 N. Main Street  
 Lombard, IL 60148  
 www.wangeng.com

FOR AES SERVICES, INC. **199-01-05**

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
631	(111N-B)B-R	WILL	37	21

CONTRACT NO. 60V28  
 ILLINOIS FED. AID PROJECT

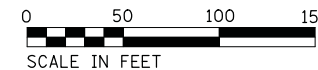
**NOTES**

REFER TO STANDARD 630301 FOR DIMENSIONS OF SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS.

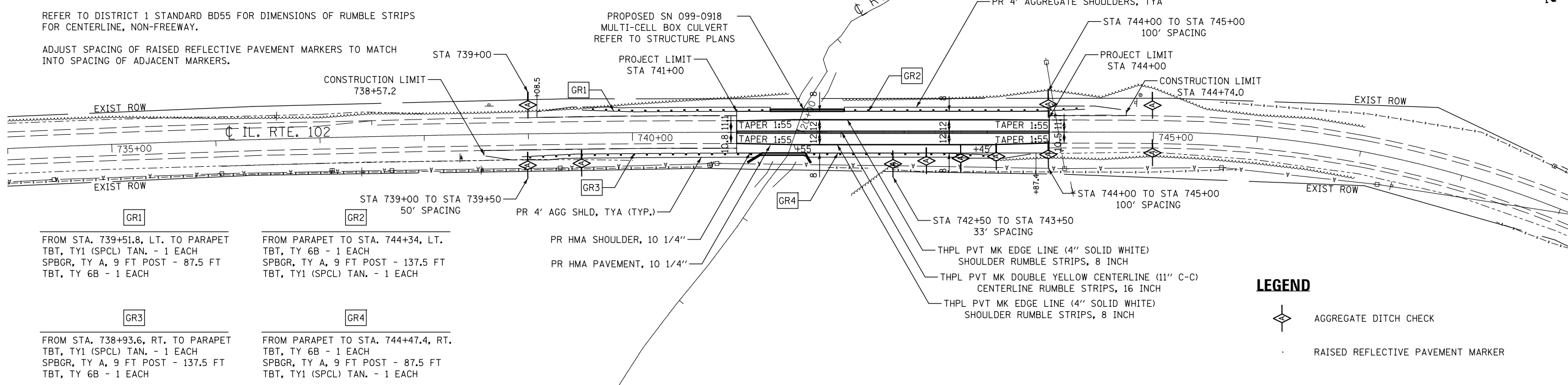
REFER TO STANDARD 642006 FOR DIMENSIONS OF SHOULDER RUMBLE STRIPS. MATCH INTO ADJACENT RUMBLE STRIPS.

REFER TO DISTRICT 1 STANDARD BD55 FOR DIMENSIONS OF RUMBLE STRIPS FOR CENTERLINE, NON-FREEWAY.

ADJUST SPACING OF RAISED REFLECTIVE PAVEMENT MARKERS TO MATCH INTO SPACING OF ADJACENT MARKERS.



PLAN	SURVEYED	DATE
	PLOTTED	
	ALIGNED	
	CHECKED	
	NO. _____	
	FILE NAME	



**GR1**  
FROM STA. 739+51.8, LT. TO PARAPET  
TBT, TY1 (SPCL) TAN. - 1 EACH  
SPBGR, TY A, 9 FT POST - 87.5 FT  
TBT, TY 6B - 1 EACH

**GR2**  
FROM PARAPET TO STA. 744+34, LT.  
TBT, TY 6B - 1 EACH  
SPBGR, TY A, 9 FT POST - 137.5 FT  
TBT, TY1 (SPCL) TAN. - 1 EACH

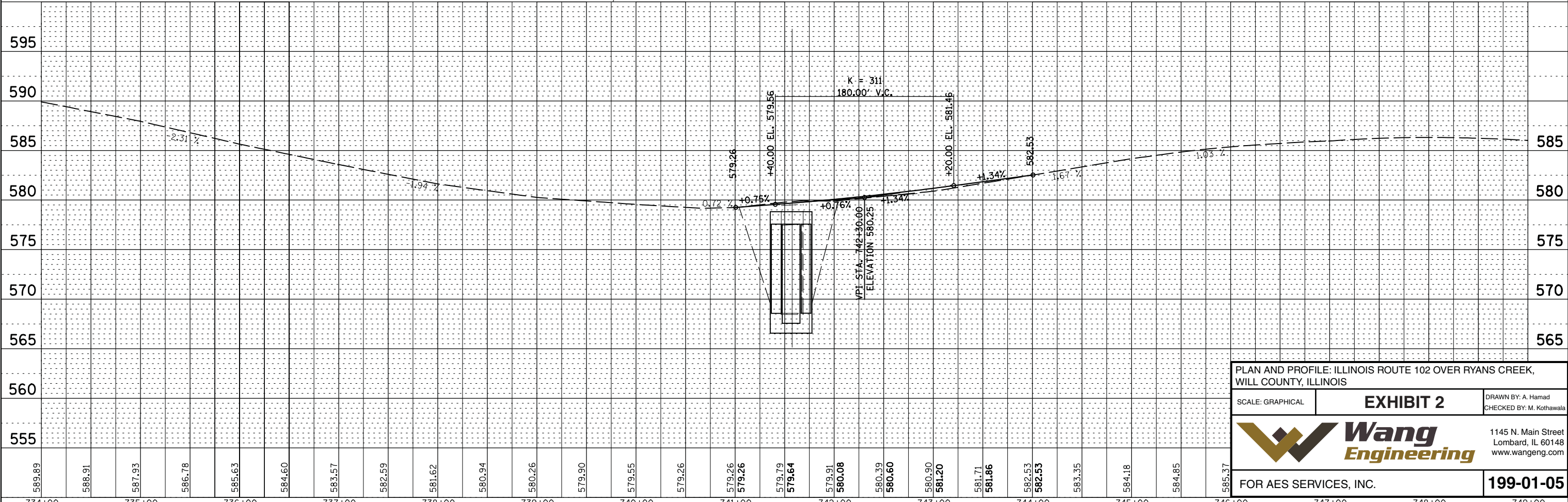
**GR3**  
FROM STA. 738+93.6, RT. TO PARAPET  
TBT, TY1 (SPCL) TAN. - 1 EACH  
SPBGR, TY A, 9 FT POST - 137.5 FT  
TBT, TY 6B - 1 EACH

**GR4**  
FROM PARAPET TO STA. 744+47.4, RT.  
TBT, TY 6B - 1 EACH  
SPBGR, TY A, 9 FT POST - 87.5 FT  
TBT, TY1 (SPCL) TAN. - 1 EACH

**LEGEND**

- AGGREGATE DITCH CHECK
- RAISED REFLECTIVE PAVEMENT MARKER

PROFILE	SURVEYED	DATE
	PLOTTED	
	GRADES CHECKED	
	STRUCTURE	
	NOTATIONS CHKD	
	NO. _____	



PLAN AND PROFILE: ILLINOIS ROUTE 102 OVER RYANS CREEK, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL      **EXHIBIT 2**      DRAWN BY: A. Hamad  
CHECKED BY: M. Kothawala

1145 N. Main Street  
Lombard, IL 60148  
www.wangeng.com

FOR AES SERVICES, INC.      **199-01-05**

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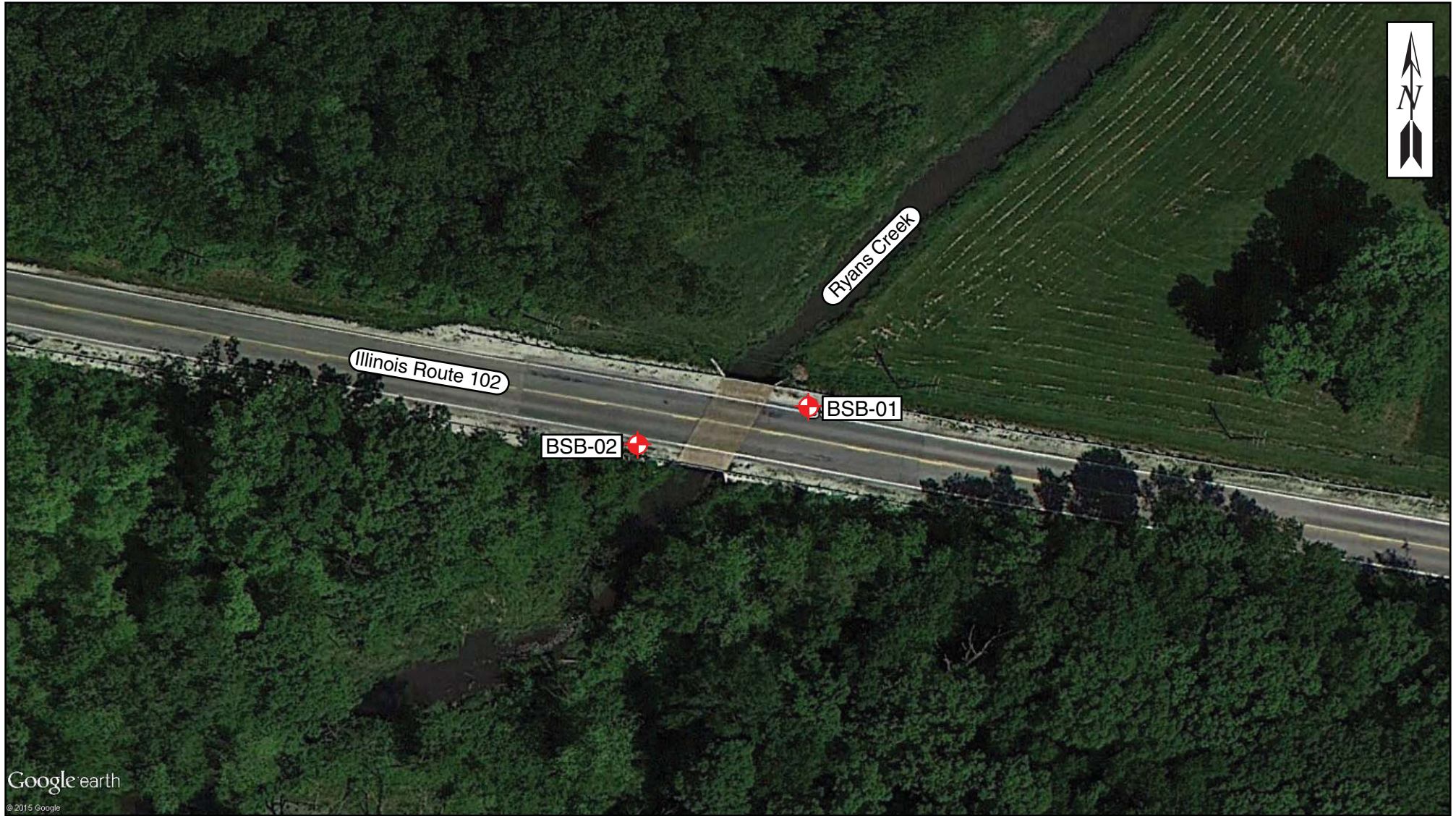


USER NAME = untitled	DESIGNED - JNH	REVISED -
	DRAWN - JNH	REVISED -
PLOT SCALE = 100.0000' / in.	CHECKED - KMB	REVISED -
PLOT DATE = 7/21/2017	DATE - 7/20/17	REVISED -

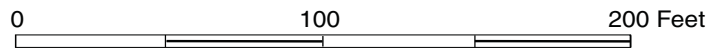
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION


ILLINOIS ROUTE 102 OVER RYANS CREEK	
PLAN AND PROFILE	
SCALE: 1"=50'	SHEET 1 OF 1 SHEETS
STA. 734+00	TO STA. 749+10

F.A.P. RTE. 631	SECTION (111N-B)B-R	COUNTY WILL	TOTAL SHEETS 15	SHEET NO. 12
CONTRACT NO. 60V28			ILLINOIS FED. AID PROJECT	



Google earth  
© 2015 Google



**Legend**  
 Soil Boring

BORING LOCATION PLAN: ILLINOIS ROUTE 102 OVER RYANS CREEK,  
WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL

**EXHIBIT 3**

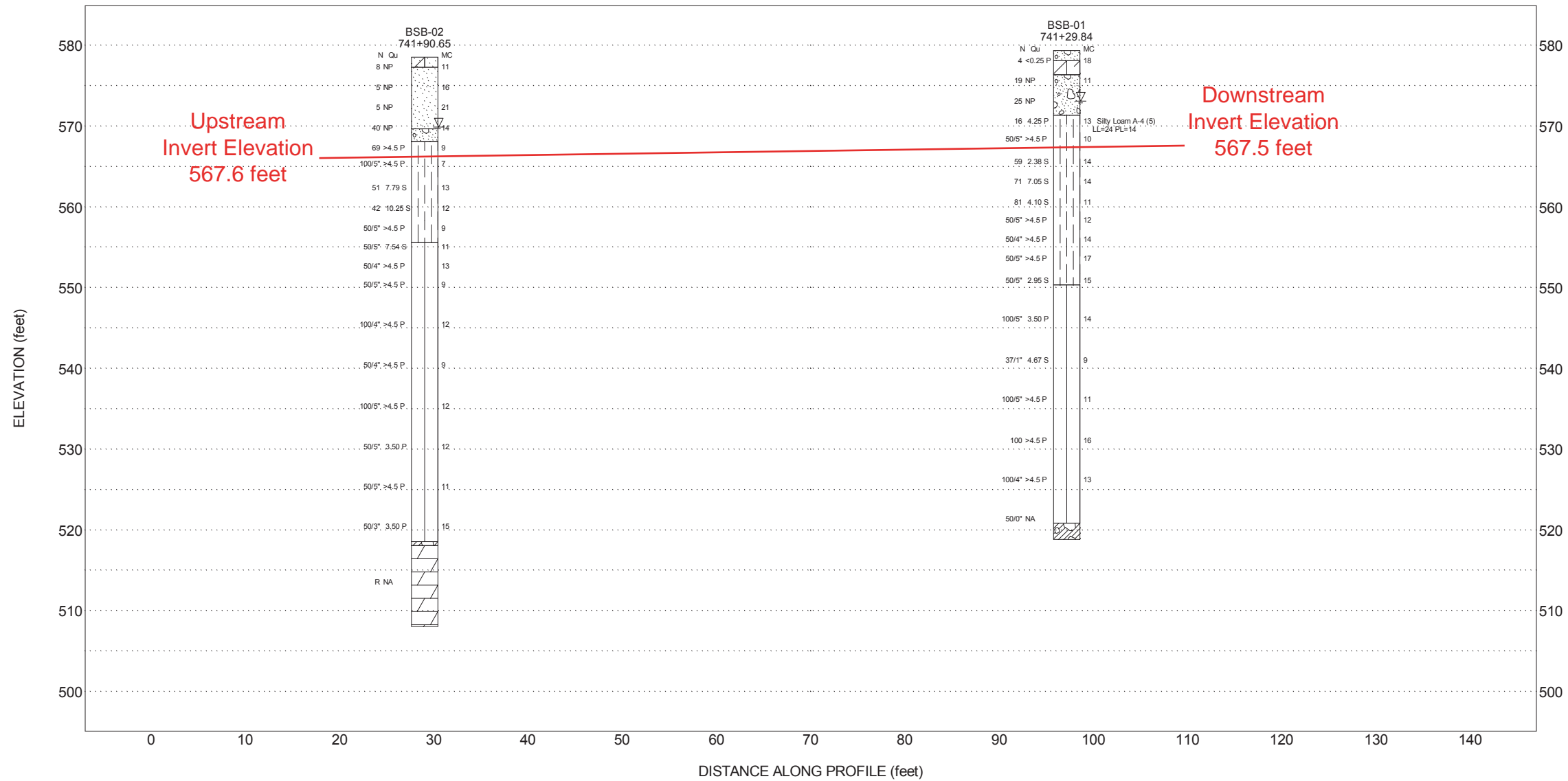
DRAWN BY: A. Hamad  
CHECKED BY: M. Kothawala



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FOR AES SERVICES, INC.

**199-01-05**

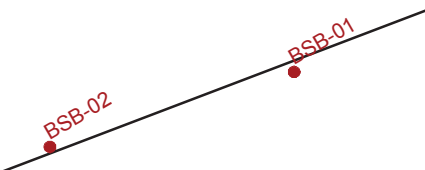


Upstream  
Invert Elevation  
567.6 feet

Downstream  
Invert Elevation  
567.5 feet

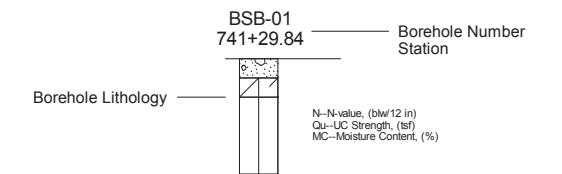
**Lithology Graphics**

- |                             |               |                                 |                                 |
|-----------------------------|---------------|---------------------------------|---------------------------------|
| Gravelly sand, sandy gravel | IDH Clay Loam | IDH Silty Clay, Silty Clay Loam | IDH Silt, Silty Loam            |
| Weathered bedrock           | IDH Loam      | IDH Sand, Sandy Loam            | Dolomite or Dolomitic Limestone |

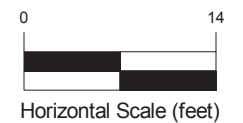


Site Map Scale 1 inch equals 50 feet

**Explanation:**



- Water Level Reading at time of drilling.
- Water Level Reading 24-hr after drilling or at end of drilling



Vertical Exaggeration: 1x

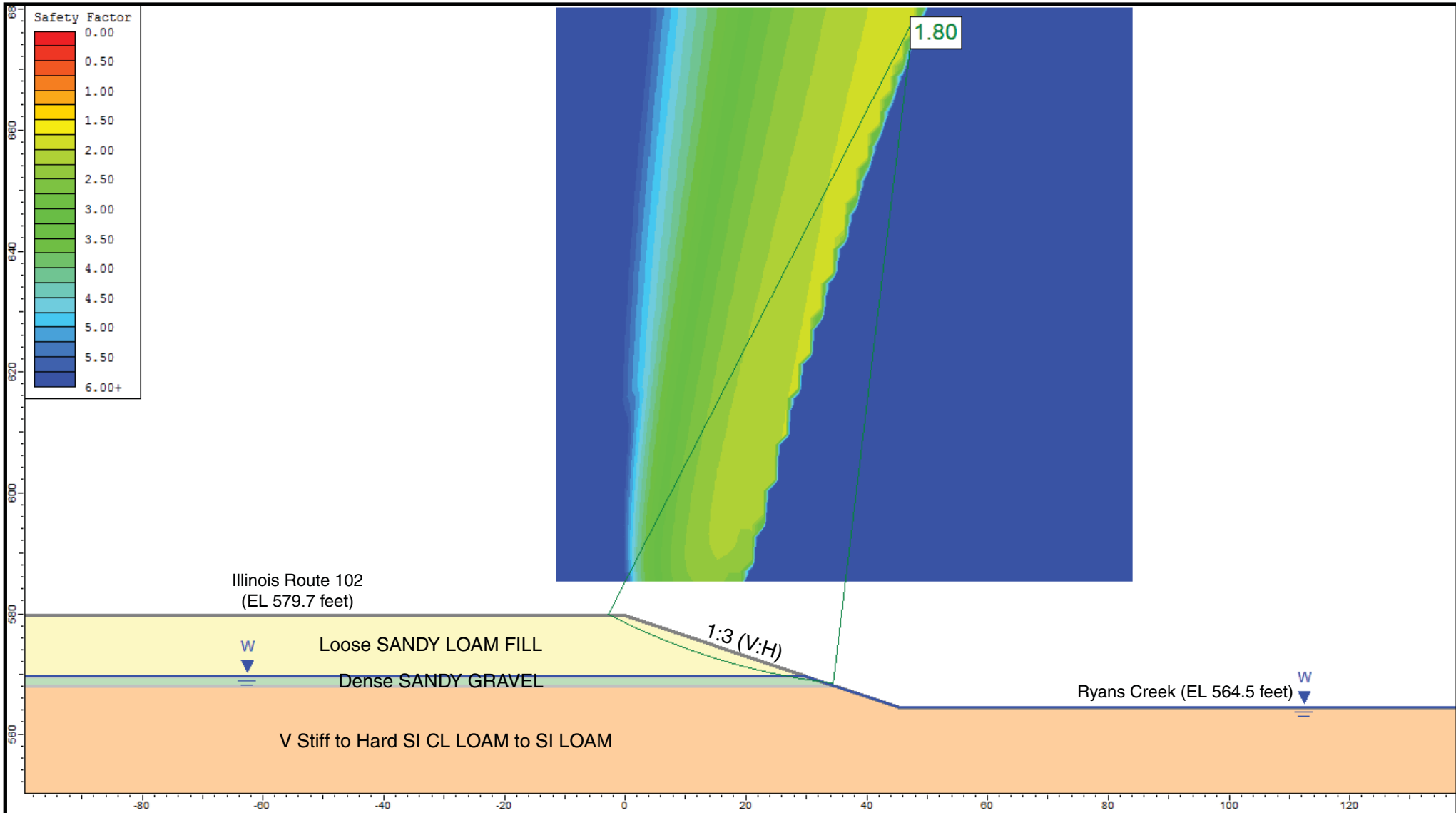
**Wang Engineering, Inc.**  
1145 N Main Street  
Lombard, IL 60148

**Illinois Route 102 Over Ryans Creek  
Subsurface Data Profile**



IL Route 102 over Ryans Creek  
Wesley Township, Will County, IL

JOB NUMBER	PLATE NUMBER
255-24-02	EXHIBIT 4



Undrained Analysis for Slope East of Ryans Creek  
Reference Borings: BSB-02

Layer ID	Description	Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	Loose SANDY LOAM FILL	110	0	30
2	Dense SANDY GRAVEL	115	0	36
3	V Stiff to Hard SI CL LOAM to SI LOAM	120	4500	0

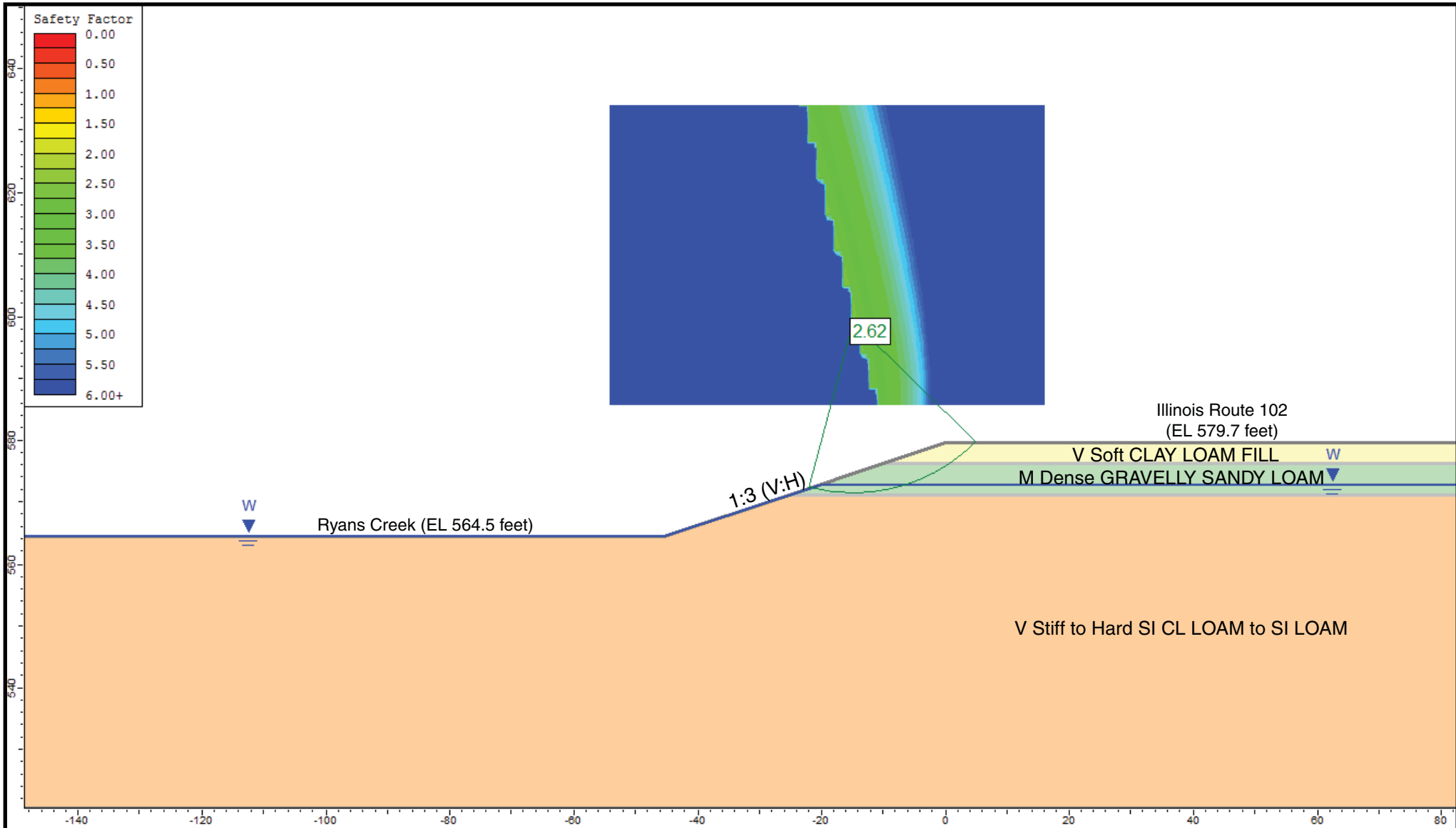
GLOBAL STABILITY ANALYSIS: ILLINOIS ROUTE 102 OVER RYANS CREEK, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL | EXHIBIT 5 | DRAWN BY: A. Hamad  
CHECKED BY: M. Kothawala

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Lombard, IL 60148  
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FOR AES SERVICES, INC. | 199-01-05





Undrained Analysis for Slope West of Ryans Creek  
Reference Borings: BSB-01

Layer ID	Description	Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	V Soft CLAY LOAM FILL	110	250	0
2	M Dense GRAVELLY SANDY LOAM	115	0	34
3	V Stiff to Hard SI CL LOAM to SI LOAM	120	4300	0

GLOBAL STABILITY ANALYSIS: ILLINOIS ROUTE 102 OVER RYANS CREEK, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL | EXHIBIT 6 | DRAWN BY: A. Hamad  
CHECKED BY: M. Kothawala



**Wang Engineering**  
1145 N. Main Street  
Lombard, IL 60148  
www.wangeng.com

FOR AES SERVICES, INC. | 199-01-05



wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

# BORING LOG BSB-01

WEI Job No.: 255-24-02

Client: **Stantec**  
 Project: **IL Route 102 over Ryans Creek**  
 Location: **Wesley Township, Will County, IL**

Datum: NAVD 88  
 Elevation: 579.35 ft  
 North: 1665593.51 ft  
 East: 1054130.76 ft  
 Station: 741+29.84  
 Offset: 16.74 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	578.1	15-inch thick GRAVELLY SAND; moist															
		--SHOULDER--			1	4 2 2	<0.25 P	18						11	50/5"	>4.5 P	17
	576.3	Very soft, brown and black CLAY LOAM, sand lenses, trace wood fragments															
		--FILL--			2	8 12 7	NP	11		550.3	Very stiff to hard, greenish-gray SILTY LOAM; horizontally bedded shale	30		12	42 50/5"	2.95 S	15
		Medium dense, brown GRAVELLY SANDY LOAM to LOAM; moist	5								--WEATHERED SHALE BEDROCK--						
					3	8 17 8	NP										
	571.3	Very stiff to hard, greenish-gray SILTY CLAY LOAM to SILTY LOAM			4	4 7 9	4.25 P	13						13	100/5"	3.50 P	14
			10														
					5	33 50/5"	>4.5 P	10									
					6	16 31 28	2.38 S	14						14	63 37/1"	4.67 S	9
			15														
					7	25 28 43	7.05 S	14									
					8	27 31 50	4.10 S	11						15	100/5"	>4.5 P	11
			20														
					9	43 50/5"	>4.5 P	12									
					10	37 50/4"	>4.5 P	14						16	100	>4.5 P	16
			25														

### GENERAL NOTES

Begin Drilling **03-12-2015** Complete Drilling **03-12-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55**  
 Driller **R & J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **4.0" OD CFA to 10'; Mud rotary to bedrock;**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling **6.50 ft**  
 At Completion of Drilling **NA**  
 Time After Drilling **NA**  
 Depth to Water **NA**

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

WANGENGINC 2552402.GPJ WANGENG.GDT 9/6/17



wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

# BORING LOG BSB-01

WEI Job No.: 255-24-02

Client: **Stantec**  
 Project: **IL Route 102 over Ryans Creek**  
 Location: **Wesley Township, Will County, IL**

Datum: NAVD 88  
 Elevation: 579.35 ft  
 North: 1665593.51 ft  
 East: 1054130.76 ft  
 Station: 741+29.84  
 Offset: 16.74 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			55		17	180/4"	>4.5 P	13									
	520.8	--WEATHERED DOLOSTONE BEDROCK--			18	50/0"											
	518.8	--HARD DRILLING-- --Possible Cobbles--															
		Boring terminated at 60.50 ft															

### GENERAL NOTES

Begin Drilling **03-12-2015** Complete Drilling **03-12-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55**  
 Driller **R & J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **4.0" OD CFA to 10'; Mud rotary to bedrock;**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **6.50 ft**  
 At Completion of Drilling  $\blacktriangledown$  **NA**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

# BORING LOG BSB-02

WEI Job No.: 255-24-02

Client: **Stantec**  
 Project: **IL Route 102 over Ryans Creek**  
 Location: **Wesley Township, Will County, IL**

Datum: NAVD 88  
 Elevation: 578.56 ft  
 North: 1665573.47 ft  
 East: 1054065.49 ft  
 Station: 741+90.65  
 Offset: 14.32 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	577.3	15-inch thick, brown LOAM, little gravel; moist									--WEATHERED SHALE BEDROCK--						
		--SHOULDER--			1	5 4 4	NP	11						11	39 50/4"	>4.5 P	13
		Loose, brown and black SANDY LOAM, trace gravel, clay lenses; moist			2	2 2 3	NP	16						12	50/5"	>4.5 P	9
		--FILL--	5		3	2 2 3	NP	21						13	100/4"	>4.5 P	12
	569.7	Dense, brown and gray SANDY GRAVEL; wet	10		4	10 22 18	NP	14						14	50/4"	>4.5 P	9
	568.1	Hard, greenish-gray SILTY CLAY LOAM to SILTY LOAM			5	20 29 40	>4.5 P	9						15	100/5"	>4.5 P	12
					6		>4.5 P	7						7	13 17 34	7.79 S	13
			15		7		>4.5 P	7						8	12 16 26	10.25 S	12
					8		>4.5 P	9						9	29 43 50/5"	>4.5 P	9
			20		9		>4.5 P	9						10	22 50/5"	7.54 S	11
	555.6	Very stiff to hard, greenish-gray SILTY LOAM; horizontally bedded SHALE	25		10		7.54 S	11						16	50/5"	3.50 P	12

### GENERAL NOTES

Begin Drilling **03-13-2015** Complete Drilling **03-13-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55**  
 Driller **R & J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **4.0" OD CFA to 10'; Mud rotary to bedrock;**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **8.90 ft**  
 At Completion of Drilling  $\nabla$  **NA**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

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wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
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# BORING LOG BSB-02

WEI Job No.: 255-24-02

Client: **Stantec**  
 Project: **IL Route 102 over Ryans Creek**  
 Location: **Wesley Township, Will County, IL**

Datum: NAVD 88  
 Elevation: 578.56 ft  
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 Station: 741+90.65  
 Offset: 14.32 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			55		17	50/5"	>4.5 P	11									
		--HARD DRILLING--															
			60		18	50/3"	3.50 P	15									
	518.6	<b>WEATHERED DOLOSTONE BEDROCK</b>															
	518.1	--HARD DRILLING-- --Possible Cobbles--															
		Strong, gray, rock mass quality, highly weathered, close fractured DOLOSTONE, 2-inch spaced fresh joints, horizontal, oblique and vertical joints with soft infilling, slightly rough hard joint wall															
		--Run #1: 60.5 to 70.5 feet-- --RECOVERY =100%-- --RQD = 45%--															
			65		1												
			70														
	508.1	Boring terminated at 70.5 ft															
			75														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **03-13-2015** Complete Drilling **03-13-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55**  
 Driller **R & J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **4.0" OD CFA to 10'; Mud rotary to bedrock;**  
**backfilled upon completion**

While Drilling  $\nabla$  **8.90 ft**  
 At Completion of Drilling  $\nabla$  **NA**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

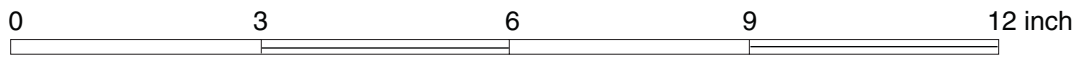
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Run #1

TOP



BOTTOM



Boring BSB-02:  
Run #1: EL. 518.1 to 508.1 feet  
RECOVERY = 100 %  
RQD = 45 %

BEDROCK CORE: ILLINOIS ROUTE 102 OVER RYANS CREEK,  
WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL

**EXHIBIT**

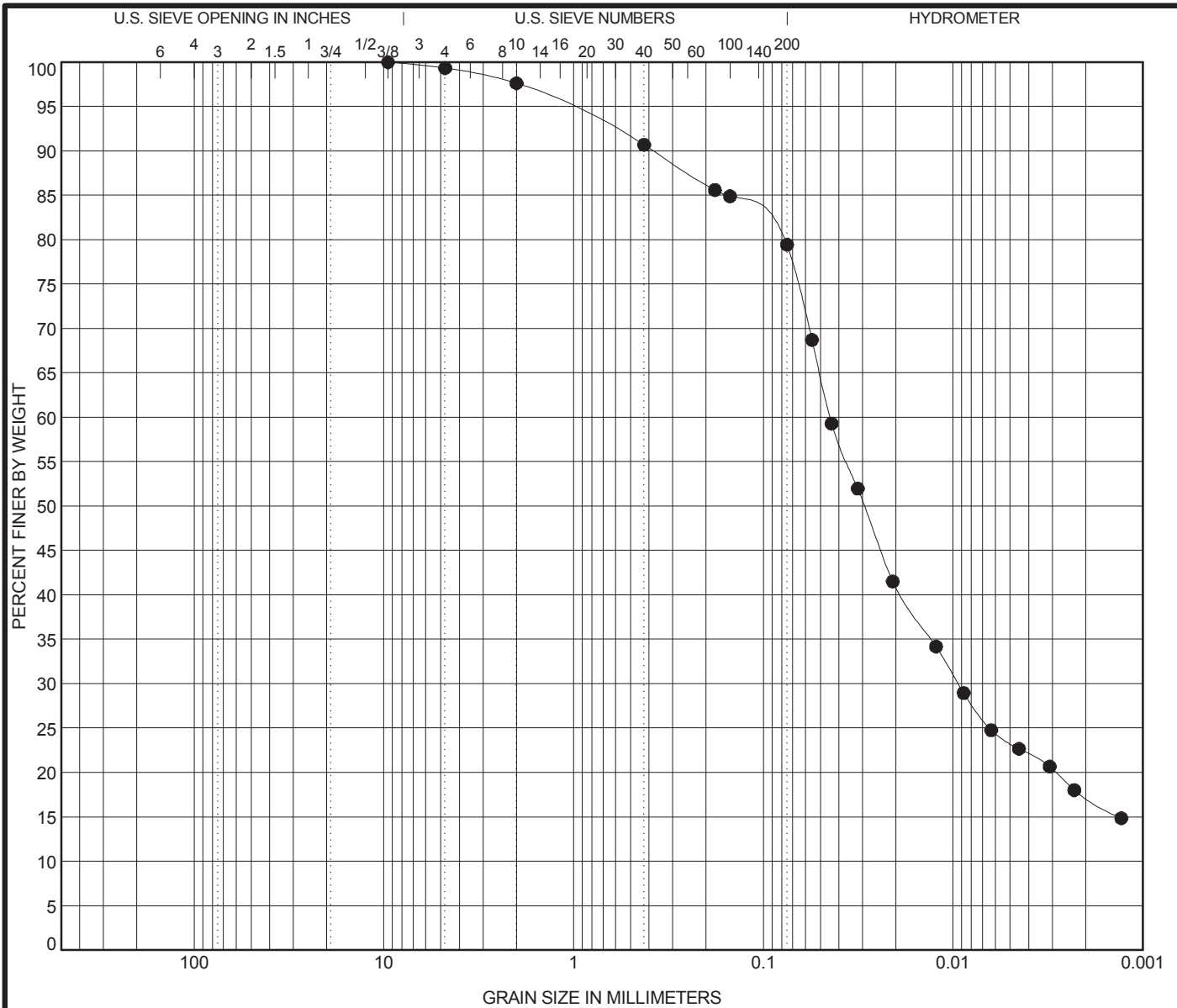
DRAWN BY: A. Hamad  
CHECKED BY: M. Kothawala



1145 N. Main Street  
Lombard, IL 60148  
www.wangeng.com

FOR AES SERVICES, INC.

199-01-05



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification	IDH Classification	LL	PL	PI	Cc	Cu
● BSB-01#4 8.5 ft	<b>Silty Loam</b>	<b>24</b>	<b>14</b>	<b>10</b>		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BSB-01#4 8.5 ft	<b>9.5</b>	<b>0.044</b>	<b>0.009</b>		<b>2.4</b>	<b>18.7</b>	<b>61.7</b>	<b>17.2</b>

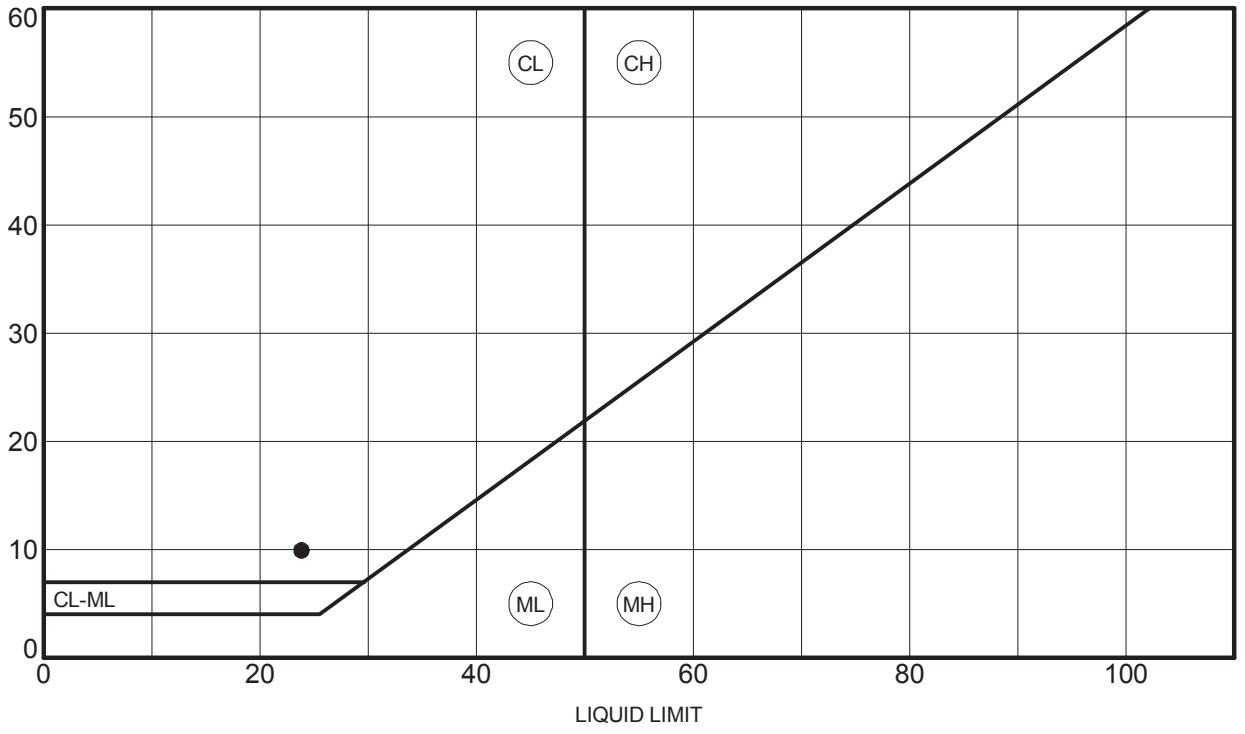


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 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

**GRAIN SIZE DISTRIBUTION**  
 Project: IL Route 102 over Ryans Creek  
 Location: Wesley Township, Will County, IL  
 Number: 255-24-02

WEI GRAIN SIZE IDH 2552402.GPJ US LAB.GDT 6/30/17

P L A S T I C I T Y  
I N D E X



Specimen Identification	LL	PL	PI	Fines	IDH Classification
● BSB-01#4                  8.5 ft	<b>24</b>	<b>14</b>	<b>10</b>	<b>79</b>	<b>Silty Loam</b>



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### ATTERBERG LIMITS' RESULTS

Project: IL Route 102 over Ryans Creek  
Location: Wesley Township, Will County, IL  
Number: 255-24-02

WEI ATTERBERG LIMITS IDH 2552402.GPJ US LAB.GDT 6/30/17