2017 GEOTECHNICAL CONSULTANT WORKSHOP • JUNE 7, 2017













OHIO DEPARTMENT OF TRANSPORTATION

OGE ITEMS OF NOTE

Christopher Merklin, Administrator, Office of Geotechnical Engineering

OGE ITEMS OF NOTE

- Research
  - Condition Evaluation of In-Service Chemically Stabilized Subgrades in a High Sulfate Environment (12/26/17)
    - Ohio University and Resource International, Inc.
  - Validation and Calibration of Finite Element of Forces in Wingwalls (3/1/18)
    - Ohio University and E.L. Robinson Engineering
  - Understanding the Soil Plugging Mechanism in LDOEPP (4/30/18)
    - Case Western Reserve University

OGE ITEMS OF NOTE

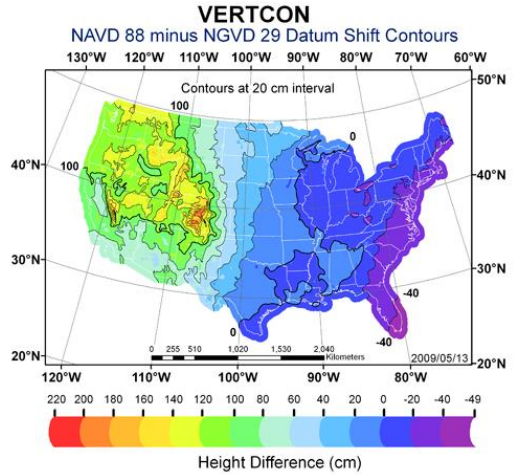
- Research (cont.)
  - Pile Driving Setup for Ohio Soils (7/1/20)
    - University of Dayton, E.L. Robinson Engineering, et al
      - Analysis of Setup Behavior
      - Formulating Pile Setup Prediction

OGE ITEMS OF NOTE

- Exploration Identification Numbering – still a challenge
  - X-ZZZ-W-YY
    - Do not repeat ZZZ-W combinations
    - YY is plan year, not year drilled
      - Also used to identify different phases of exploration
      - B-001-0-15; B-001-1-17
    - Correctly renumber historic explorations
      - B-1 1969 B-001-0-69
      - NB-56 2000 N-056-0-00

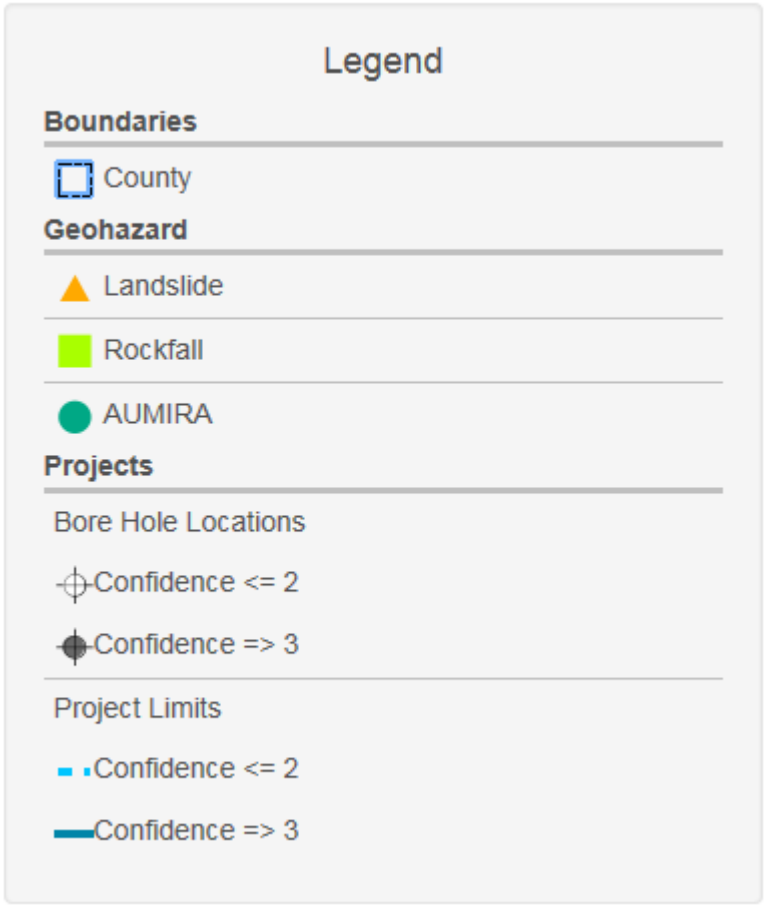
OGE ITEMS OF NOTE

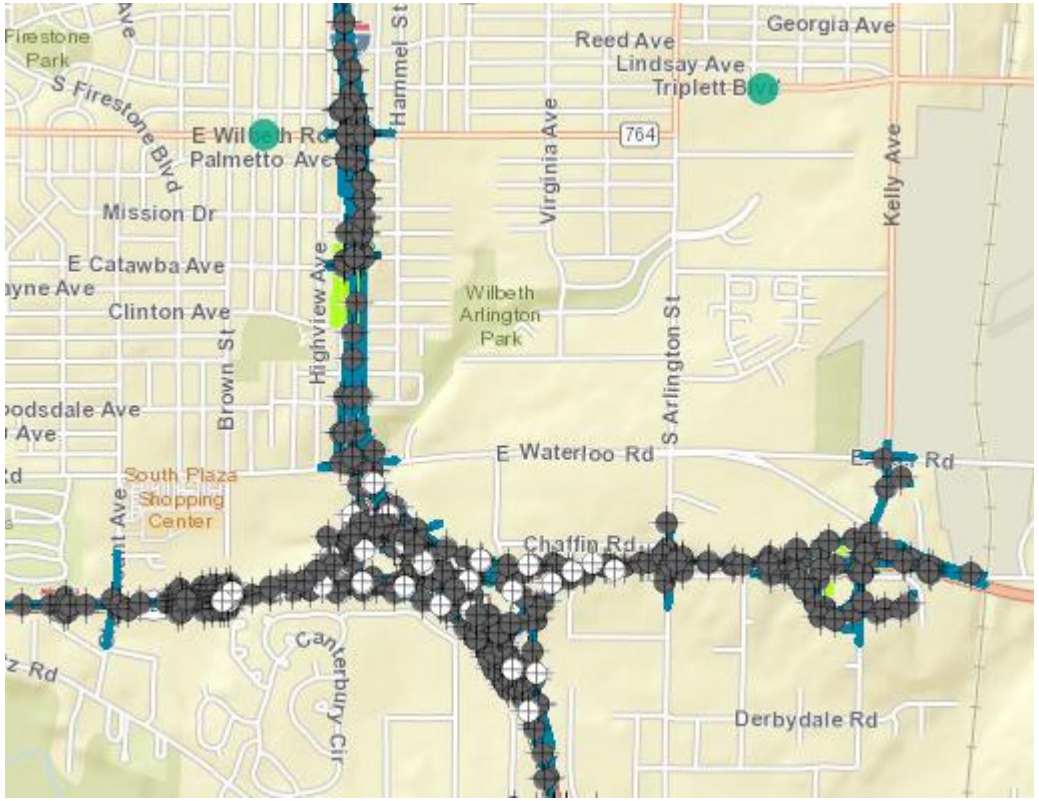
- Historic Information – Still gets left out
  - Find it (in TIMS) and include as appropriate
  - If nothing found, say so
  - TIMS location targets for planning level use
    - Use plan sheets to locate for project level use
  - Soil classifications may not be on logs
    - KEEP LOOKING
  - May need to correct elevations (vertcon)
    - NAVD88 vs NGVD29



OGE ITEMS OF NOTE

- Use the historic and inventoried data





OGE ITEMS OF NOTE

- Soil and Rock Classification Class
  - Two classes per year, spring and fall
  - http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/LTAP/Pages/default.aspx

OGE ITEMS OF NOTE

- NHI-132079; Subsurface Investigation Qualification
  - Retake every 5 years?
  - NDA Requirement; **not an ODOT or FHWA requirement**

OGE ITEMS OF NOTE

- Evaluation of SPT Calibration by Energy Testing
  - Collect calibration information
    - 15 of 24 pre-qualified Field Exploration Companies responded so far
  - Manufacturers' input
  - Calibration companies' input

  - Procedural changes, if any, by January 2018

OGE ITEMS OF NOTE

- Lab Rate Change
  - Effective July 2017 version of SGE
  - Collaborative effort between ACEC and ODOT
  - Rates from 13 pre-qualified labs considered (90% of the work)
  - Last revised January 2015
- Plan Going Forward
  - Revise in two years based on Rate of Inflation (CPI)
  - Revise in four years based on pre-qualified lab survey

OGE ITEMS OF NOTE

	Test	Unit				
Soil Testing			**New Rate**	**ODOT current rate**	**VARIANCE**	
	Complete Classification	each	$165	$160	($5)	-3.03%
	Water Content Test and Visual Description	each	$13	$12	($1)	-7.69%
	Particle Size Analysis - Sieve Only	each	$69	$57	($12)	-17.39%
	Particle Size Analysis - Sieve and 2-hour Hydrometer	each	$95	$88	($7)	-7.37%
	Liquid Limit Test	each	$42	$40	($2)	-4.76%
	Plastic Limit Test	each	$39	$37	($2)	-5.13%
	Organic Content by Loss on Ignition	each	$52	$50	($2)	-3.85%
	Soil Unconfined Compression Test	each	$82	$78	($4)	-4.88%
	Unconsolidated-Undrained Triaxial Compression Test	1 point	$183	$183	$0	0.00%
	Consolidated-Undrained Triaxial Compression Test (with pore pressure measurement)	3 points	$960	$930	($30)	-3.13%
	One-Dimensional Consolidation Test	each	$550	$500	($50)	-9.09%
	Specific Gravity Test	each	$66	$63	($3)	-4.55%
	Direct Shear Test	3 points	$528	$510	($18)	-3.41%
	Sulfate Content in Soils, Colorimetric Method	each	$102	$99	($3)	-2.94%
Rock Testing						
	Unconfined Compressive Strength of Intact Rock Core Specimen	each	$99	$96	($3)	-3.03%
	Slake Durability of Shales and Similar Weak Rocks	each	$229	$222	($7)	-3.06%
	Determination of the Point Load Strength Index of Rock	each	$66	$64	($2)	-3.03%
	Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression	each	$266	$229	($37)	-13.80%

OGE ITEMS OF NOTE

- Revised GB1 Spreadsheet
  - Hand Penetrometer input
  - Organized data entry and data summary
  - Average value stabilization graph

- Some engineering involved!

OGE ITEMS OF NOTE

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Subgrade Analysis

V. 14.00 7/21/2017

#	Boring	Sample	Sample Depth From	Sample Depth To	Subgrade Depth From	Subgrade Depth To	Standard Penetration N_{60}	Standard Penetration N_{60L}	HP (tsf)	Physical Characteristics LL	PL	PI	% Silt	% Clay	P200	Moisture M_C	Moisture M_{OPT}	Ohio DOT Class	Ohio DOT GI	Sulfate Content (ppm)	Problem Unsuitable	Problem Unstable	Undercuts Unsuitable	Undercuts Unstable	Recommendation
1	B	1	1.0	2.5	-0.2	1.3	20		3.7	24	16	8	35	20	55	11	11	A-4a	4	237					Geotextile Option:
	001-0	2	2.5	3.1	1.3	1.9	6			NP	NP	NP	77	18	95	23	11	A-4b	8	250	A-4b	N_{60} & Mc	7"	7"	23"
	16	3	3.1	4.0	1.9	2.8	6		0.7	49	19	30	38	43	81	20	18	A-7-6	18			HP		11"	
		4	4.0	5.0	2.8	3.8	7	6	0.7							19	18	A-7-6	14						
2	B	1	1.5	3.0	0.2	1.7	14		3.2	29	18	11	50	46	96	19	14	A-6a	8	144		N_{60} & Mc		18"	Geotextile Option:
	002-0	2	3.0	3.7	1.7	2.4	28		2.5	26	17	9	50	42	92	20	12	A-4b	8		A-4b	Mc	8"		29"
	16	3	3.7	4.5	2.4	3.2	28			NP	NP	NP	19	6	25	12	8	A-3a	0						
		4	4.5	6.0	3.2	4.7	42	14								4	8	A-3a	0						
3	B	1	1.5	3.0	-0.1	1.4	16			NP	NP	NP	81	12	93	22	11	A-4b	8	162	A-4b	Mc	17"		Geotextile Option:
	003-0	2	3.0	4.5	1.4	2.9	11			22	19	3	72	25	97	21	14	A-4b	8		A-4b	N_{60} & Mc	18"	18"	35"
	16	3	4.5	6.0	2.9	4.4	8		1.7							22	14	A-6a	8						
		4	6.0	7.5	4.4	5.9	13	8	1.2							20	14	A-6a	8						
4	B	1	1.0	2.5	-1.2	0.3	11		1.5	26	16	10	34	22	56	14	11	A-4a	4	59		HP & Mc		4"	Geotextile Option:
	004-0	2	2.5	4.0	0.3	1.8	8		2	34	19	15	31	31	62	18	14	A-6a	7			N_{60} & Mc		18"	36"
	16	3	4.0	5.5	1.8	3.3	10		2.5							17	14	A-6a	8			N_{60} & Mc		14"	GEOGRID Option:
		4	5.5	7.0	3.3	4.8	30	8	2.5							17	14	A-6a	8						24"
5	B	1	1.0	2.5	-1.0	0.5	28									4	6	A-1-b	0	121					
	005-0	2	2.5	4.0	0.5	2.0	8			NP	NP	NP	9	4	13	4	6	A-1-b	0						
	16	3	4.0	5.5	2.0	3.5	10			NP	NP	NP	6	4	10	4	6	A-1-b	0						
		4	5.5	7.0	3.5	5.0	6	6								4	6	A-1-b	0						
6	B	1	1.0	2.5	-0.7	0.8	66			NP	NP	NP	15	6	21	4	6	A-1-b	0	92					
	006-0	2	2.5	4.0	0.8	2.3	13			NP	NP	NP	20	8	28	7	8	A-3a	0						
	16	3	4.0	5.5	2.3	3.8	4		1.2							19	14	A-6a	8						
		4	5.5	7.0	3.8	5.3	7	4	0.5							63		A-8a	20						
7	B	1	1.0	2.5	-0.4	1.1	30			NP	NP	NP	13	6	19	5	6	A-1-b	0	104					
	007-0	2	2.5	4.0	1.1	2.6	7		1.5	23	15	8	14	10	24	10	10	A-2-4	0			HP		18"	
	16	3	4.0	5.5	2.6	4.1	3		0.2	49	27	22				30		A-8b	20						
		4	5.5	7.0	4.1	5.6	4	3	0.2							23		A-8a	20						
8	B	1	1.0	2.5	-0.5	1.0	25			25	15	10	12	11	23	7	10	A-2-4	0	146					
	008-0	2	2.5	4.0	1.0	2.5	8			NP	NP	NP	15	8	23	5	6	A-1-b	0						
	16	3	4.0	5.5	2.5	4.0	6									13	10	A-2-6	2						
		4	5.5	7.0	4.0	5.5	13	6	2							22	14	A-6a	8						
9	B	1	2.0	2.5	0.9	1.4	23			18	14	4	16	8	24	6	6	A-1-b	0	131					
	009-0	2	2.5	4.0	1.4	2.9	13			26	17	9	22	13	35	13	10	A-2-4	0			N_{60} & Mc		18"	
	16	3	4.0	5.5	2.9	4.4	11		1.2							35	14	A-6a	8						
		4	5.5	7.0	4.4	5.9	18	11								10	6	A-1-b	0						

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Subgrade Analysis

V. 14.00 7/21/2017

PID:
Alignment:
County-Route-Section:
No. of Borings: 11
No. of Rigs: 1

Geotechnical Consultant:
Prepared By:
Date prepared:

Rig	A																								
ER	B4																								

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

Undercut Stabilization Options	
Global Geotextile (N_{60L}, HP)	12", 12"
Global Geogrid (N_{60L}, HP)	N/A, N/A

Design CBR	8

% Borings			
$N_{60L} \leq 5$	5%	HP ≤ 0.5	7%
$N_{60L} < 12$	20%	0.5 ≤ HP < 1	7%
$12 \leq N_{60L} < 15$	2%	1 ≤ HP < 2	14%
$N_{60L} \geq 20$	0%	HP ≥ 2	25%
M+	20%		
Rock	20%		
Unsuitable	20%		

Under Cut at Surface	
Average	8"
Maximum	12"
Minimum	4"

% Surface	
Unstable & Unsuitable	0%
Unstable	0%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	16	8	1.83	28	17	11	30	17	46	14	10	5
Maximum	66	18	3.70	49	27	30	81	46	97	63	18	20
Minimum	3	3	0.20	18	13	3	6	3	9	3	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-3	A-3 a	A-2-4	A-2-5	A-2-6	A-2-7	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	13	0	3	3	0	1	0	4	4	0	11	0	0	2	2	1	44
Percent	0%	0%	30%	0%	7%	7%	0%	2%	0%	9%	9%	0%	25%	0%	0%	5%	5%	2%	100%
% Rock|Cohesive|Granular	0%	55%									45%								100%
Surface Class Count	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
Surface Class Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%

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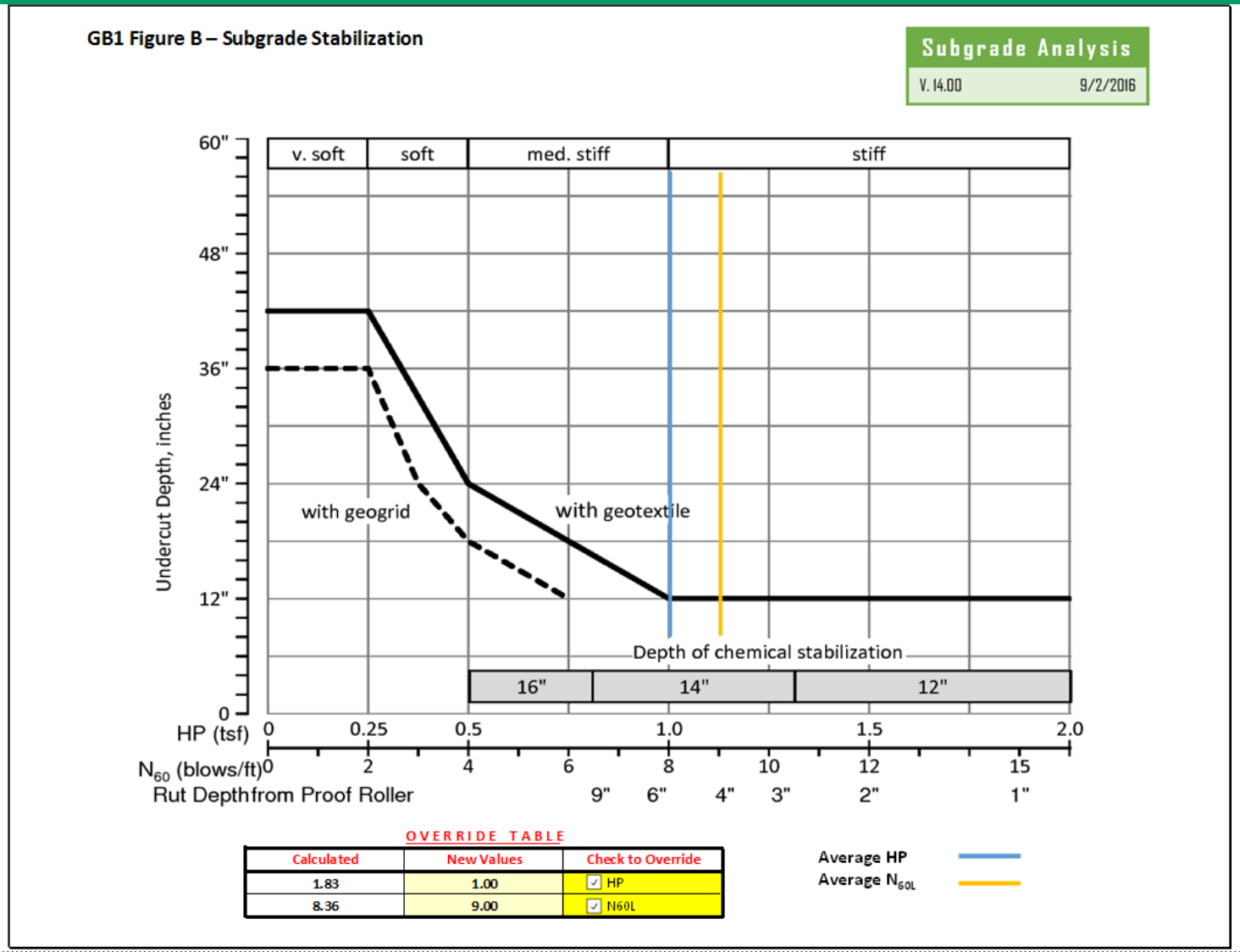

QUESTIONS