Date: 12/20/17

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
0		7.5YR 4/6 Brown		✓			10	90	tr		x	x	x	x	x	10	Y			Y	x		x				x				x	x		x	x						SP	Poorly graded sand w/gravel 90% F-C sand, 10% gravel F-C, subangular to subrounded, medium sand QFM, trace silt,
2																																											
3		7.5YR 3/3 dark brown	x					90	tr		x	x	tr				x			x	x		x				x				x	x		x	x						SP	Poorly graded sand, 100% F-M sand, well sorting, subangular to subrounded, QFA trace silt
4		10YR 4/4 dark yellowish brown	x					100	tr		x	x	x				x			x	x		x				x				x	x		x	x						SP	Poorly graded sand, 100% F-C sand, well sorted, subangular to subrounded QFA, trace silt
6		10YR 4/6 dark yellowish brown	x					100			x	x	x				x			x	x		x				x				x	x		x	x						SP	Poorly graded sand, 100% F-C sand, well sorted subangular to subrounded, QFA.
10.4		10YR 5/8 yellowish brown	x					100	tr		x	x	x				x			x	x		x				x				x	x		x	x						SP	Poorly graded sand, 100% F-C sand, well sorted, subangular QFA, trace interbeds of silt

Drilling Contractor: Cascade

Drilling Rig Type: [illegible] 600 T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Conex - MW-4D

Date: 2/20/14

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-40

Name: Soldier

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
10.4 – 13.2		7.5YR 5/4 brown	X					100+			X	X	XX				X			XX				X				X			X		X		X						SP	Poorly graded sand, 100% F-M Sand, well sorted, subangular to subrounded QA, trace silt in matrix
13.2 – 16		10YR 6/4 light yellowish brown	X					98	2		X	X					X			X				X				X			X		X		X						SP	Poorly graded sand, 100% F-M Sand, well sorted subangular, QFA, 2% silt
16 – 21.4		10YR 5/4 yellowish brown	X					100	XF		X	X					X			XX				X				X			X		X		X						SP	Poorly graded sand, 100% F-M Sand, well sorting, subangular to subrounded QFA, trace silt, predom Quartz
21.4 – 23		10YR 6/3 pale brown	X					90	10		X	X					X			X				X				X			X		X		X						SP-SM	Poorly graded sand w/silt, 90% sand F-M, well sorted, subrounded QFA, 10% silt predominantly fine sand,
23 – 27		10YR 5/4 yellowish brown	X					100	XF		X	XF					X			XX				X				X			X		X		X						SP	Poorly graded sand, 100% F Sand, subangular to subrounded, well sorted, QFA, trace silt

Drilling Contractor: Cascade

Drilling Rig Type: Pleasant 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex - MW-4

Date: 12/20/19

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobota

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
27 – 37.4		10YR 5/3 Brown	X					100		1F	X	X					X			X			X				X				X	X		X		X						SP	Poorly graded sand, 100% F-M sand, well sorted, subangular, QFA, trace silt
37.4 – 41.1		7.5YR 6/3 light brown		X				100	1F		X	X	X				X	X		X	X		X				X				X	X	X	X		X						SP	Poorly graded sand, 100% F-C sand, well sorted, subangular to subrounded, QFMA, trace silt
41.1 – 49		7.5YR 5/4 brown			X			95	5		X	X					X			X	X		X			X					X	X	X	X		X						SP	Poorly graded sand, 95% F-M sand well sorted, subangular to subrounded, QFMA, 5% silt
49 – 59.7		10YR 5/4 yellowish brown			X			100			X	X	X						X	X	X		X			X					X	X	X	X		X						SW	Well graded sand, 100% F-C sand, poorly sorted, subangular to subrounded, QFMA
59.7 – 61.6		10YR 5/3 Brown			X			95	5		X	X	X				X			X	X		X				X				X	X	X	X		X						SP	Poorly graded sand, 95% sand F-C, well sorted, subangular to subrounded, QFMA, 5% silt, random F-M sand, high mica content

Drilling Contractor: [illegible]

Drilling Rig Type: [illegible]

Drilling Method: Sonic

Sampling Method:

Descriptive Location: [illegible] MW-4D

Date: 2/21/14

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
61.6 (65.)		10YR 5/3 brown			X			X+	95	5	X	X	X	X		5			X	X	X		X			X				X	X	X	X		X						SW	well graded sand, 95% F-C sand, poorly sorted, subangular to subrounded, QFMA, 5% silt, trace gravel
69.2		10YR 5/3 brown			X			25	75	tr	X	X	X	X	X	9		X	X		X	X		X			X				X	X	X	X		X						SP	Poorly graded sand w/ gravel, 75% F-C sand, 25% F-C gravel, medium sorting, subang to subrounded, QFMA trace silt grad. (w/ S:)
87		10YR 5/3 brown			X			95	5		X							X			X			X			X				X	X	X	X		X						SP	Poorly graded sand, 95% V. fine sand, well sorted, subangular, QFMA, 5% silt
89.2		10YR 6/4 Light Yellowish brown			X		5	95	tr		X	X	X	X	5	X		X			X	X		X			X				X	X		X		X						SP	Poorly graded sand, 95% F-C sand, well sorted, subangular to subrounded, 5% fine gravel, trace silt QFA
90.6'		10YR 5/4 Yellowish Brown			X			25	75	tr	X	X	X	X		16		X			X	X		X			X				X			X		X						SP	Poorly graded sand w/ gravel, 75% F-C sand, Medium sorting, subangular to subrounded, 25% F-C gravel, QA Chert

Drilling Contractor: Cascade

Drilling Rig Type: Pigsonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex - MW-4D

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-40

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
90.6 92		10YR 5/4 ~~light~~ yellowish Brown		X			5	95	tr		X	X	X	X	5		X			X	X			X			X				X	X	X	X		X					SP	Poorly graded sand, 95% sand F-C, Subangular to subrounded, well sorted 5% gravel QFMA, trace silt
97		7.5YR 6/4 Light Brown		X			60	40			X	X	X	X	X	13	X			X	X			X			X				X	X	X	X		X					GP	Poorly graded gravel w/sand 60% gravel, F-C, Mod sort, Subangular to subrounded, F-C sand 40% QFA
100		10YR 5/4 Yellowish brown		X			80	20	tr			X	X	X	X	5%	X			X	X	X	X	X			X				X	X		X	X						GP	Poorly graded gravel, 80% F-C gravel, 20% M-C sand medium sorting, subangular to subrounded, QFA, trace silt, Sand subangular, 7% gravel round
105.5		10yR 6/6 brownish yellow		X			40	55	5		X	X	X	X	X	53		X	X	X	X			X			X				X	X		X		X					SW	Well graded sand w/gravel 55% F-C sand, 40% gravel F-C, medium to poor sorting, QFA, 5% silt
108.5		7.5YR 6/4 light Brown		X			5	95	tr		X	X	tr	X		18	X	X		X	X			X			X				X	X	X	X	X						SP	Poorly graded sand, 95% predom. F-M, C sand well sorted, subangular to subrounded, 5% F-C gravel, trace silt

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-4D

Date: 1/5/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobdeu

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content			Particle % Dist.					Grain Size			Grain Size			Sorting			Grain Shape				Plasticity				Cementation				Mineral Composition						Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
			Dry	Moist	Saturated	Cobbles	Gravel	Sand	Silt	Clay	Fine	Medium	Coarse	Fine	Coarse	Max	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	Low	Medium	High	None	Weak	Moderate	Strong	Quartz	Feldspar	Mica	Amphibole	Evaporites	Other					
108.5		7.5YR 6/4 light brown			X		tr	100 tr			X	X		X	6		X			X	X			X			X			X	X	X	X	X	X					SP	Poorly graded sand, 100% F-M sand, well sorted, subangular to subrounded, trace gravel & silt QFMA
113.5		7.5YR 5/3 Brown		X				100 tr			X						X			X	X			X			X			X	X	X	X	X	X					SP	Poorly graded sand, 100% very fine to fine sand, well sorted, subangular to subrounded, QFMA trace silt
122.7		5Y 6/3 Pale Olive	X				5	95	X					X			X				X				X		X			X	X				X					CH	Fat clay, 95% clay, medium plasticity, 5% medium sand, subrounded Quartz
125.0		10YR 5/6 Yellowish brown		X			90	5	5		X	X					X				X				X		X			X	X	X	X	X	X					SP	Poorly graded sand, 90% F-M sand, subrounded, well sorted, low plasticity, QMA, 5% silt, 5% clay
127.		5Y 6/3 Pale Olive	X				tr	100	X								X				X				X		X			X	X		X							CH	Fat clay, 100% clay, medium plasticity, trace sand, subrounded, QM fine sand
128.6																																									

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-4D

Date: 1/7/14

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sabaka

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content			Particle % Dist.					Grain Size			Grain Size			Sorting			Grain Shape				Plasticity				Cementation				Mineral Composition						Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
			Dry	Moist	Saturated	Cobbles	Gravel	Sand	Silt	Clay	Fine	Medium	Coarse	Fine	Coarse	Max	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	Low	Medium	High	None	Weak	Moderate	Strong	Quartz	Feldspar	Mica	Amphibole	Evaporites	Other						
128.6		10YR 6/6 Brownish yellow	X					90	10		X	X					X	X		X				X				X				X	X			X					SP-SM	Poorly graded sand w/silt 90% sand F-M, well sorted, subangular, predominantly Quartz, QM, 10% silt
130.1																																										
130.7		5Y 7/3 pale yellow	X					95	5		X						X			X				X				X				X	X	X	X						SP	Poorly graded Sand, 95% very fine to fine, subangular, well sorted, 5% silt, QMA high mica content
131.7		10YR 6/6 Brownish yellow		X				100 tr			X	X					X	X		X	X			X				X				X	X	X	X	X					SP	Poorly graded Sand, 100% F-M sand, well to medium sorting, subangular to subrounded, QFMA, trace silt
132.4		2.5Y 7/3 pale brown	X					90	10		X						X			X				X				X				X	X	X	X	X					SP-SC	Poorly graded Sand w/clay 90% very fine to fine sand, subangular, low plasticity QMA, 10% clay & Oxidation in layers
137		7.5YR 6/3 light brown		X				tr	100		X	X	X	X		6	X			X	X	X		X				X				X	X		X	X					SP	Poorly graded Sand, 100% F-C sand, well sorted, angular to subrounded, trace gravel & silt, QFA layer of clay with shells

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-4D

Date: 1/7/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaponies	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
137 151.1		10YR 7/4 very pale Brown			x			90	10		x	x					x					x	x	x				x			x			x	x							SP-SM	Poorly graded sand w/ silt F-C Sand, well sorted, subrounded to round, Predominantly round Quartz, 10% silt
153.0		10YR 6/4 light yellowish Brown		x				85	15		x	x						x			x	x		x			x				x		x	x	x						SM	Silty Sand, 85% F-M Sand, subangular to subrounded, medium sorting low plasticity, QMA 15% silt
155		2.5Y 6/2 light Brownish gray		x				95	5		x	x	x				x				x	x		x			x				x		x	x	x						SP	Poorly graded Sand 95% F-C sand, well sorted subangular to subrounded, low plasticity 5% clay, QMA high mica content
157		10YR 6/4 Light yellowish Brown		x			10	85	5	x	x	x	x	x	34		x	x		x	x			x			x				x	x	x	x	x						SP	Poorly graded sand, 85% F-C sand, medium sorting, subangular to subrounded none to low plasticity, 10% F-C gravel, 5% clay oxidation
161.8		7.5YR 6/6 Reddish Yellow			x		10	90	+5	x	x	x	x	x	29		x			x	x			x			x				x	x	x	x	x						SP	Poorly graded sand, 90% F-C sand, medium sorting, subangular to subrounded, 10% F-C gravel, QFMA trace silt oxidation

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Lemax MW-4D

Date: 1/7/14

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sabolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
161.5		10YR 6/3 Pale Brown			X			55	35	10	X	X	X	X	X	55	X			X	X			X						X	X	X	X	X						GP-GC	Poorly graded gravel w/clay and sand, 55% F-C gravel, 35% F-C sand, poorly sorted, subangular to subrounded, low plasticity, 10% clay, QFMA, Rounded clasts of gravel
168.4		10YR 4/4 dark yellowish brown		X				90	10		X						X				X			X				X			X	X	X							SP-SM	Poorly graded sand w/silt, 90% very fine to fine sand, well sorted, subrounded, 10% silt, QMA
177.1		10YR 5/8 yellowish Brown	X					tr	100		X						X				X					X					X	X								CH	Fat clay, 100% clay high plasticity, trace fine sand quartz and muscovite. 166.4 - 177 transition silt to clay
179.1		7.5YR 5/3 Brown		X				75	25		X	X			X	15	X			X				X	X			X			X	X	X	X						SC	Clayey sand, 75% F-M sand, subangular, well sorted, low to medium plasticity, 25% clay, trace chert gravel (<5mm), QMA
180.6		7.5YR 6/3 Light Brown			X			95	5		X	X	X				X			X	X			X				X			X	X	X	X						SP	Poorly graded sand, 95% F-C sand, well sorted, angular to subangular, 5% silt, QFMA, Predominately Quartz

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600 T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Clonex MW-4D

Date: 1/8/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolewski

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
180.8		10YR 5/3 Brown		X				85	15		X	X						X		X			X			X			X		X	X	X								SM	Silty Sand, 85% sand F-M, Medium sorting, Subangular, low Plasticity, QMA, 15% silt, predominantly fine grained
183																																											
189		10YR 6/2 Light Brownish grey			X			95	5		X	X	X				X			X	X			X			X			X	X	X	X	X							SP	Poorly graded Sand, 95% F-M Sand, well sorted, Subangular to Subrounded 5% silt, QFMA Coarser grains 187-189
217		10YR 4/6 dark yellowish Brown		X				95	5		X						X			X	X			X			X			X	X	X	X	X							SP	Poorly graded Sand, 95% fine sand, Subangular to subrounded, well sorted, 5% silt, QFA predominantly dark colored minerals-amphibole
218.6		7.5YR 4/2 Brown			X			100+			X						X			X		X		X			X			X	X	X	X	X							SP	Poorly graded Sand, 100% fine sand, well sorted, weak cementation clasts, trace silt, QFA, Subrounded higher Quartz content
222.3		7.5YR 4/6 Strong brown		X				95	5		X						X			X	X			X			X			X	X	X	X	X							SP	Poorly graded sand, 95% fine sand, well sorted, Subangular to subrounded, weak cemented clasts, 5% silt, QFA, abundant dark minerals. faint rusty color

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: MW-4D

Date: 1/8/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-40

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
222.3		2.5Y 4/3 Olive Brown			X			100+r			X						X				X X			X				X				XX		X		X						Poorly graded sand, 100% fine sand, well sorted, subangular to sub rounded, weak cemented clasts, QFA, trace silt, abundant dark minerals
227																																											
227		5Y 6/4 Pale Olive	X						10								r								X			X															Silt, 100% silt, dense, low plasticity, horizontal dark oxidized laminations in first half foot
234																																											
234		5Y 6/3 Pale Olive	r						90 10		r r r						r				r r				r			r															Poorly graded sand w/ silt, 10% F-M sand, medium sorting, subangular to subrounded, 10% silt
235.6																																											
235.6		2.5Y 5/3 Light Olive Brown		X				r 100			x x x			x		6	x x				x x				x				x				x	xx	r								Poorly graded sand, 100% F-C sand (Predom M-C), medium-well sorting, subangular to sub rounded, trace fine gravel, QFMA
237.0																																											
237.0		7.5YR 5/3 Brown			X			10 90+r			x x x			x x		35	r r				x x				x				x				x	x x x								Poorly graded sand, 90% F-C (Pred M-C) sand, 10% F-C gravel, medium to poorly sorted, subangular sand, subrounded gravel, QFMA, trace silt
241																																											

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-40

Date: 6/8/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moist	Saturated	Particle % Dist.: Cobbles	Gravel	Sand	Fines: Silt	Clay	Grain Size: Sand: Fine	Medium	Coarse	Grain Size: Gravel: Fine	Coarse	Max	Sorting: Well	Medium	Poor	Grain Shape: Angular	Sub-Angular	Sub-Rounded	Rounded	Plasticity: None	Low	Medium	High	Cementation: None	Weak	Moderate	Strong	Mineral Composition: Quartz	Feldspar	Mica	Amphibole	Evaporites	Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
241.		2.5Y 6/3 Light yellowish brown			X			15	85	X	X	X	X	X	26			X		X	X		X			X				X	X	X	X		X					SW	well graded sand w/gravel, 85% F-C sand, poorly sorted, subangular to subrounded, QFMA, 15% F-C gravel (subrounded)
242.4																																										
		2.5Y 6/3 Light yellowish Brown			X			95	5	X	X						X			X	X			X				X				X	X	X	X		X					SP	Poorly graded sand, 95% F-M sand, well sorted, subangular to subrounded, 5% silt, QFMA, abundance of [illegible]
247																																										
		10YR 6/3 Pale Brown			X			100		X	X						X			X				X				X				X	X	X	X		X					SP	Poorly graded sand, 100% F-M (predominantly M) sand, well sorted, QFMA trace silt
254.7																																										
		5Y 6/3 Pale Olive			X			50	40	10	X	X	X	X	X	38			X		X	X			X				X				X	X	X	X		X					GP-GC	Gravel with clay and sand, 50% F-C gravel, 40% F-C sand, 10% clay subangular to subrounded low plasticity, QFMA
260																																										
		5Y 5/3 Olive	X						100								X								X	X		X														ML	Silt, 100% silt, low to medium plasticity, dense,
267																																										

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex - MW-4D

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Soleder

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
267 268.6		5Y 5/3 Olive		X				65	35		X						X				X			X							X		X			X						SM	Silty sand, 65% fine sand, subrounded, m. well sorted, 35% silt, low plasticity, QM
272.7		5Y 5/2 Olive Gray		X				41	95	5	X	X	X	X	6		X			X	X			X				X				X	X	X	X	X						SP	Poorly graded sand, 95% F-C sand, medium sorting, subangular to subrounded, 5% silt, trace subrounded gravel, QFMA, coarser grained sand
282.5		5Y 6/2 Light Olive gray			X			15	80	5	X	X	X	X	<3	4	X	X		X	X			X				X				X	X	X	X	X						SP	Poorly graded sand w/gravel, 80% F-C sand, medium to poor sorting, subangular to subrounded, 15% F-C gravel predominantly fine, QFMA
284.5		2.5Y 6/3 Light yellowish Brown			X			5	90	5	X	X	X	X	7		X			X	X			X				X				X	X	X	X	X						SP	Poorly graded sand, 90% F-C Sand, medium sorting, subangular to subrounded, 5% fine gravel, 5% clay
287		5Y 6/3 Pale Olive						40	50	10	X	X	X	X	40		X	X		X	X			X				X				X	X	X	X	X						SP-SC	Poorly graded sand w/clay and gravel, 50% F-C sand, 40% F-C gravel, 10% clay Medium sorting, subangular to subrounded, QFMA, low plasticity

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 8000T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex - MW-4D

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobsdow

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
287		5Y 6/3 Pale Olive	X					75	15	10							X							X			X				X	X									CL	Clay, 100% clay, low to medium plasticity, dense, trace mica & quartz sand with laminations of clay
292.8		5Y 4/2 Olive Gray																																								
245.1		2.5Y 5/2 Grayish Brown	X				5	70		25	X	X	X	X	X	40	X	X			X	X			X	X		X				X	X	X	X		X					SC	Clayey sand, F-C sand 70%, 25% clay, 5% F-C gravel, well to medium sorting, subangular to subrounded, low to medium plasticity, QFMA
248.3		2.5Y 6/3 light yellowish brown		X			5	85		10				X	X	55	X				X	X			X	X		X				X	X	X	X		X					SP-SC	Poorly graded sand w/clay, 85% F-C sand, random medium grained, 10% clay, 5% F-C gravel, well sorted, subangular to subrounded, none to low plasticity, QFMA
299		5Y 4/4 Olive	X					45	55		X						X			X				X				X				X	X	X	X							ML	Sandy silt, 55% silt, 45% fine sand, subangular low plasticity, QMA
300.1		5Y 6/3 Pale Olive			X		15	75		10	X	X	X	X	X	60	X			X	X			X			X				X	X	X	X	X	X					SP-SC	Poorly graded sand w/clay and gravel, 75% F-C sand, random medium grained, F-C gravel, subangular to subrounded, low plasticity, QFMA Well rounded cobbles from silt stone

Drilling Contractor:

Drilling Rig Type:

Drilling Method:

Sampling Method:

Descriptive Location:

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolew

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
300.9 304.6		5Y 6/3 Pale Olive		X				95	5		X	X					X			X	X			X			X				X	X	X	X		X					SP	Poorly graded sand, 95% F-M Sand, 5% Clay, well sorted, Subangular to subrounded, QFMA
307		5Y 6/3 Pale Olive		X				95	5		X	X	X				X			X	X			X			X				X	X	X	X		X					SP SC	Poorly graded sand with clay, 95% F-C sand, 5% clay, well sorted, subangular to sub rounded, QFMA trace gravel
310.1		2.5Y 6/3 light yellowish brown		X				95	5		X	X	X	X	6		X			X	X			X			X				X	X	X	X		X					SP	Poorly graded sand, 95% F-C sand, 5% clay, well sorted, subangular to subrounded, QFMA
313		10YR 4/2 dark grayish brown		X				95	5		X	X	X				X			X	X			X			X				X	X	X	X		X					SP	Poorly graded sand, 95% F-C sand, 5% silt, well sorted, subangular to subrounded QFMA, high mica content
317		2.5Y 6/3 Pale Olive						95	5		X	X	X	X	X	90	X			X				X			X				X	X	X	X		X					SP	Poorly graded sand, 85% F-C Sand, 10% F-C gravel, 5% clay, medium sorting, subangular, QFMA, Large siltstones and mudstones subrounded.

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-4D

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Sobolewski

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
317		5Y 6/3 Pale Olive			X			15	85	tr	X	X	X	X	X	35	X			X	X			X			X				X	X	X	X		X					SP	Poorly graded sand w/gravel, 85% F-C sand, F-C gravel 15%, trace Silt, medium sorting subangular to subrounded QFM,
322.1																																										
324.8		5Y 6/4 Pale Olive	X					20	10	70	X	X		X	X	17	X	X		X						X		X			X	X	X			X					CL	Gravelly lean clay, 70% clay, 20% F-C gravel, 10% F-C sand, Subangular, medium Plasticity, QFM
327		5Y 5/3 Olive	X							100							X									X	X						X							CH	Fat clay, 100% clay medium to high Plasticity, thin rusty laminations, trace mica
328.3		5Y 5/2 Olive Gray		X	X			95		5	X						X				X	X		X	X		X				X	X	X	X		X				SP	Poorly graded sand, 95% fine sand, well sorted, Subangular to subrounded, none to low plasticity, QFM, 5% clay, high mica and dark
339.1		10Y 6/4 Pale Olive	X							100							X									X	X											D		CH	Fat clay, 100% clay medium plasticity

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Core-MW-4D

Date: 1/9/15

BOREHOLE LITHOLOGICAL LOG

Well Number/Name: MW-4D

Name: J. Jobolen

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content: Dry	Moisture Content: Moist	Moisture Content: Saturated	Particle % Dist.: Cobbles	Particle % Dist.: Gravel	Particle % Dist.: Sand	Particle % Dist.: Fines: Silt	Particle % Dist.: Fines: Clay	Grain Size: Sand: Fine	Grain Size: Sand: Medium	Grain Size: Sand: Coarse	Grain Size: Gravel: Fine	Grain Size: Gravel: Coarse	Grain Size: Gravel: Max	Sorting: Well	Sorting: Medium	Sorting: Poor	Grain Shape: Angular	Grain Shape: Sub-Angular	Grain Shape: Sub-Rounded	Grain Shape: Rounded	Plasticity: None	Plasticity: Low	Plasticity: Medium	Plasticity: High	Cementation: None	Cementation: Weak	Cementation: Moderate	Cementation: Strong	Mineral Composition: Quartz	Mineral Composition: Feldspar	Mineral Composition: Mica	Mineral Composition: Amphibole	Mineral Composition: Evaporites	Mineral Composition: Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Comment
331 332		5Y 5/2 olive gray	X					90	10		X						X			X				X	X			X			X	X	X	X							SP-SM	Poorly graded sand with silt 90% fine sand, 10% silt well sorted, QMA, high mica content and Quartz

Drilling Contractor: Cascade

Drilling Rig Type: Prosonic 600T

Drilling Method: Sonic

Sampling Method:

Descriptive Location: Cemex MW-4D