

TEST HOLE LOGS

EXPLANATION OF SYMBOLS AND TERMS

The symbols and terms used on the test hole logs to summarize the results of the field investigation and the laboratory testing are described on the following sheets.

Soils are classified and described according to their engineering properties and behaviour. The descriptions applied to the various soil units as shown on the logs follow the Unified Soil Classification system with slight modification to recognize inorganic clays to medium plasticity (CI). Such descriptions are judgmental in nature and may differ in detail from that actually encountered in the field. The descriptions noted in the logs from test holes are based solely on inspections of soil and rock samples recovered or cuttings observed. The actual nature of the materials between samples may vary.

Laboratory tests have been performed on the various samples noted, following standard testing procedures or protocol unless otherwise noted. The test results are intended to provide a general indication of some of the engineering properties of the material.

ABBREVIATIONS

w or MC	Moisture content (ASTM D2216)	PP	Pocket Penetrometer
W _p or PL	Plastic limit (ASTM D4318)	γ	Unit weight
W _L or LL	Liquid limit (ASTM D4318)	γ_d	Dry unit weight
I _p or PI	Plasticity Index	ρ	Density
NP	Non-plastic soil	ρ_d	Dry density
SH	Shelby tube sample	q _u	Unconfined compressive strength
AU	Auger sample	C _u	Undrained shear strength
B	Bulk Sample	SO ₄	Concentration of water-soluble sulphates
UD	Undisturbed Sample	TCR	Total Core Recovery
RC	Rock Core Sample	RQD	Rock Quality Index
SPT	Standard Penetration Test	SCR	Solid Core Recovery
VST	Vane Shear Test	FI	Fracture Index
JSI	Jar Slake Index (I _j)		

SIZE RANGES OF SOIL COMPONENTS	
Component	Size Range mm (US Sieve)
Boulders	Over 300 (12 inch)
Cobbles	75 (3 inch) to 300 (12 inch)
Gravel:	
Coarse	19 (3/4 inch) to 75 (3 inch)
Fine	5 (#4) to 19 (3/4 inch)
Sand:	
Coarse	2 (#10) to 5 (#4)
Medium	0.4 (#40) to 2 (#10)
Fine	0.08 (#200) to 0.4 (#40)
Clay and Silt	Less than 0.08 (#200)

SECONDARY CONSTITUENTS	
Term	Percentage
and	35% - 50%
y/ey	20% - 35%
some	10% - 20%
trace	0 - 10%

CONSISTENCY OF FINE GRAINED SOILS			
Term	Undrained Shear Strength (kPa)	SPT N	Description
Very soft	< 12	< 2	Easily penetrated with fist
Soft	12 - 25	2 - 4	Easily penetrated with thumb
Firm	25 - 50	4 - 8	Moderate effort to penetrate with thumb
Stiff	50 - 100	8 - 15	Great effort to indent with thumb
Very Stiff	100 - 200	15 - 30	Easily indented with thumbnail
Hard	> 200	> 30	Effort required to indent with thumbnail

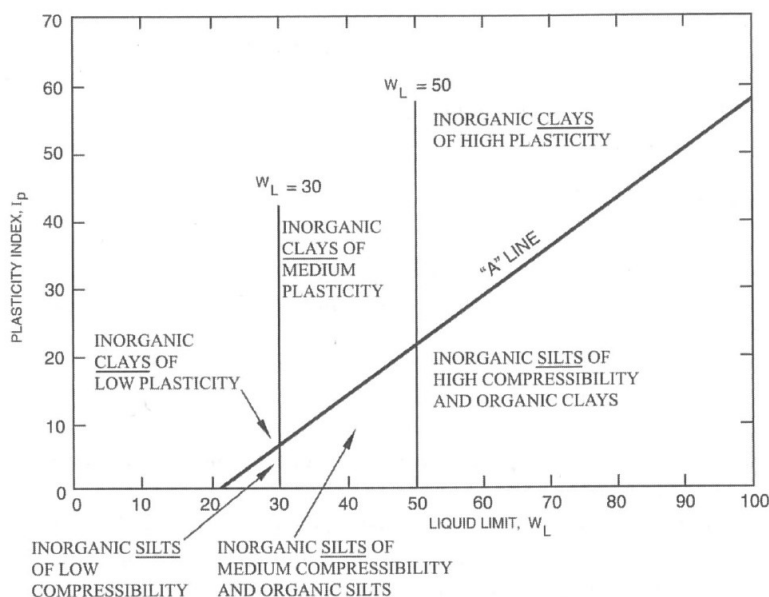
DENSITY OF COARSE GRAINED SOILS		
Term	SPT N	Approx. Relative Density (%)
Very loose	0 - 4	0 - 15
Loose	4 - 10	15 - 35
Compact	10 - 30	35 - 65
Dense	30 - 50	65 - 85
Very Dense	> 50	85 - 100

TEST HOLE LOGS

EXPLANATION OF SYMBOLS AND TERMS

UNIFIED SOIL CLASSIFICATION SYSTEM (MODIFIED)

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils	Strong colour or odor and fibrous texture	
COARSE-GRAINED SOILS MORE THAN HALF BY WEIGHT LARGER THAN 75 µm	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75 mm	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well-graded gravels, gravel-sand mixtures	$C_u = D_{60}/D_{10} > 4$	$C_c = (D_{30})^2 / D_{10} \times D_{60}$ 1 to 3
			GP	Poorly graded gravels, gravel-sand mixtures	Not meeting all above requirements	
		GRAVELS WITH FINES (MORE THAN 12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or $PI < 4$	
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line or $PI > 7$	
	SANDS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75 mm	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well-graded sands, gravelly sands	$C_u = D_{60}/D_{10} > 6$	$C_c = (D_{30})^2 / D_{10} \times D_{60}$ 1 to 3
			SP	Poorly graded sands or gravelly sands	Not meeting all above requirements	
		SANDS WITH FINES (MORE THAN 12% FINES)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or $PI < 4$	
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or $PI > 7$	
FINE-GRAINED SOILS MORE THAN HALF BY WEIGHT SMALLER THAN 75 µm	SILTS BELOW "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		ML	Inorganic silts and very fine sands, rock flour, silty sands of slight plasticity	$LL < 50$	SEE PLASTICITY CHART BELOW
			MH	Inorganic silts, micaceous or diatomaceous, fine sandy or silty soils	$LL > 50$	
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		CL	Inorganic clays of low plasticity, gravelly, sandy, or silty clays	$LL < 30$	
			CI	Inorganic clays of medium plasticity, silty clays	$30 < LL < 50$	
			CH	Inorganic clays of high plasticity	$LL > 50$	
	ORGANIC SILTS AND CLAYS BELOW "A" LINE ON PLASTICITY CHART		OL	Organic silts and organic silty clays of low plasticity	$LL < 50$	
			OH	Organic clays of high plasticity	$LL > 50$	



ROCK CORE LOGGING QUICK REFERENCE SHEET

CORE CONDITION

Total Core Recovery (TCR)

Percentage of drill core recovered, regardless of quality or length, measured relative to the total length of core run

$$TCR = (\text{Total length recovered}) / (\text{total length of core run}) * 100$$

Solid Core Recovery (SCR)

Percentage of drill core recovered at **full diameter**, regardless of length, measured relative to the total length of the core run.

$$SCR = (\text{Length of solid core recovered}) / (\text{total length of core run}) * 100$$

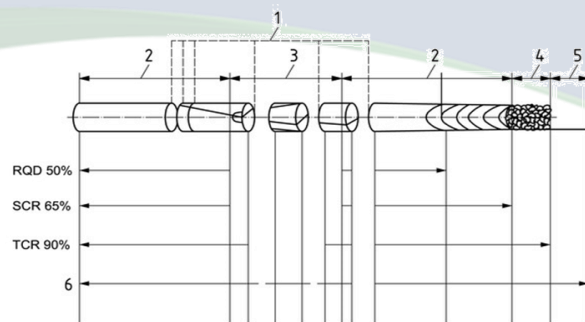
Rock Quality Designation (RQD)

Percentage of solid drill core ≥ 100 mm in length, measured relative to total core run

$$RQD = (\text{Sum of intact pieces } \geq 100 \text{ mm}) / (\text{total length of core run}) * 100$$

Fracture Index (FI)

The number of naturally occurring, discontinuities (physical separation) per metre of rock core. Mechanically induced breaks caused by drilling are not included.



Key

- 1 drilling-induced fractures at least one full diameter
- 2 no single full diameter
- 3 non-intact
- 4 no recovery
- 5 core run
- 6

Description of fracture state of rock cores

- RQD rock quality designation
- SCR solid core recovery
- TCR total core recovery

ROCK TYPE & DESCRIPTION	
TYPE	DESCRIPTION
Sandstone	Coarse-grained texture with visible sand-sized grains and feel for a gritty texture when rubbing the sample between your fingers. Presence of cross-bedding or layering indicative of sedimentary deposition
Siltstone	observe a fine-grained texture with no visible sand-sized grains, and a smooth feel when rubbing the sample between your fingers due to the presence of silt-sized particles. Additionally, siltstone often exhibits a tendency to break into thin, flat layers - fissility
Claystone	Ultra-fine-grained texture with no visible sand or silt-sized grains. Smooth, sometimes slightly sticky feel when rubbing the sample between fingers - dominance of clay-sized particles.
Shale	fine-grained texture with no visible sand-sized grains, tendency to break into thin, flat layers, - fissility. May exhibit a dark color, often gray or black

WEATHERING	
TERM	DESCRIPTION
Fresh	No visible signs of decomposition.
Slightly	Slight discoloration inwards from open fracture.
Moderately	Discoloration throughout. Strength somewhat less than fresh, but cannot be broken by hand or scraped with knife. Texture observed.
Highly	Most minerals somewhat decomposed. Specimens can be broken with hand with effort or shaved with knife. Texture becomes indistinct, fabric preserved
Completely	Minerals decomposed to soil but fabric and structure preserved. Specimens easily crumbles or penetrated
Residual Soil	Advanced state of decomposition resulting in plastic soil. Rock fabric and structure completely destroyed

DISCONTINUITY DATA				SPACING
TYPE	DESCRIPTION	INFILL	DESCRIPTION	
Joint	Stress induced, planar, one or more sub-parallel sets	Clean	Clean, unaltered, unstained discontinuity surface	Ext wide: >6 m
Vein	Mineral infill or healed discontinuity	Partially coated	Partially thin coverage of infill material across the core diameter	Very wide: 2 - 6 m
Fault	Discontinuity with signs of significant movement	Completely coated	Complete thin coverage of infill material across the core diameter	Wide: 600 - 2 m
Bedding	The surface that separates one stratum, layer or bed from another	Filled	Infill material is thick enough to fill the discontinuity surface roughness	Moderate: 200 - 600 mm
Contact	The surface along which one rock type touches another	Stained	Chemical alteration of the discontinuity surface through oxidation, carbonation, and solution and has no coatings or infilling	Close: 60 - 200 mm
DISCONTINUITY ANGLE: Measured angle degree (°) relative to the vertical core axis				Very close: 20 - 60 mm
				Ext close: <20 mm

ROCK STRENGTH			
TERM	GRADE	Unconfined Compressive Strength (MPa)	DESCRIPTION
Extremely Strong	R6	>250	Can only be chipped with hammer, rings when struck
Very Strong	R5	100 - 250	Many hammer blows to fracture
Strong	R4	50 - 100	More than one hammer blow to fracture
Medium strong	R3	25 - 50	Single firm hammer blow to fracture, cannot be cut or peeled by knife
Weak	R2	5 - 25	Shallow indentations can be made with firm hammer blow
Very Weak	R1	1 - 25	Crumbles under firm blows with hammer, can be peeled with knife
Extremely weak	R0	0.25 - 1	Indented with thumbnail

ROCK CORE LOGGING QUICK REFERENCE SHEET

CORE BOX LABELING

Project Name
Project Number
Test Hole No.
Box..... of
Run..... to
Depth:m to m
Date

Project Name
Project No.
Test Hole No.
Box of
Run to
Date
Depth m to m

Project Name, Project No., Test Hole No. Box No., Run No.



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BOREHOLE No : **22BH404**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 777.3m N 5609544 E 415224
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, completely weathered SHALE (Weathered), silty, dry, very soft, low to medium plastic, brownish grey, suspect white sulphate inclusions							777
2		SHALE (Weathered), clayey, trace silt, highly weathered, light brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak	■	AU1	13.3	●			776
3			■	AU2	12.6	●	2.5 m - Sand = 1.7% Silt = 57.1% Clay = 41.2%		775
4		BENTONITE (3.2 m), small seams SHALE (Weathered), "..."	■	AU4	10.7	●	3.2 m - Sand = 20.9% Silt = 25.7% Clay = 53.4%		774
5			■	AU3	13.2	●	3.2 m - LL = 84.4% PL = 23.2% PI = 61.2%		773
6			■	AU5	8.6	●	5.5 m - LL = 53.8% PL = 18% PI = 35.8%		772
7		End of Borehole @6.1 m							771
8									770
9									769
									768

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 774.6m N 5609515 E 415474
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 772.65 m 1.98 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		SHALE (Weathered), clay and silt, some sand, highly weathered, dark brown with oxidation specs, moist, high plastic, extremely weak to hard soil	■	AU1	18.5	●	1 m - Sand = 12.0% Silt = 43.9% Clay = 44.1%	774
2			■	D2				773
3			■	AU2	17.8	●	2.3 m - Sand = 4.4% Silt = 52.5% Clay = 43.2% 2.3 m - LL = 63.0% PL = 24% PI = 39.0% 2.5 m - LL = 56.6% PL = 22.3% PI = 34.3% 4 m - Sand = 2.9% Silt = 54.9% Clay = 42.2%	772
4		...4 m - becoming very weak	■	AU3	16.7	●		771
5								770
6			■	AU4	15.2	●	5.5 m - LL = 74.6% PL = 21.7% PI = 52.9%	769
7		End of Borehole @6.1 m						768
8								767
9								766
								765

Notes:

No seepage or sloughing observed upon completion. 25 slotted PVC pipe installed to a depth of 6.1 m. Backfilled sand and bentonite.

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 774.6m N 5609524 E 415356
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT						
						└─ PLASTIC - LIQUID						
						■ SPT (N) Blows/300 mm						
						10	20	30	40			
						100	200	300	400			
						▲ POCKET PEN (kPa)						
		CLAY TILL, silty, some medium grained sand lenses, moist, firm, medium to high plastic, dark brown, some oxidation staining										774
1		SHALE (Weathered), clay and silt, some sand, highly weathered, dark brown to dark grey mottling, some oxidation staining, moist, high plastic, very weak	■	AU1	14.3		●			1 m - Dispersivity Classification = ND3 % Dispersion = % 1 m - Sand = 7.9% Silt = 39.5% Clay = 52.6%		773
2			■	D1					└─	1 m - EC: 8.8 dS/m 1 m - SAR: 20.2 1 m - pH: 6.8 1.8 m - Sand = 5.2% Silt = 52.1% Clay = 42.8%		772
3			■	AU2	17.5		●			1.8 m - LL = 61.0% PL = 23% PI = 38.0%		771
4			■	AU3	19.0		●			2.5 m - LL = 57.5% PL = 18.9% PI = 38.6%		770
5			■	AU4	16.7		●			4 m - Sand = 3.3% Silt = 50.2% Clay = 46.5% 4 m - LL = 65.7% PL = 21.3% PI = 44.4%		769
6		End of Borehole @6.1 m										768
7												767
8												766
9												765

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

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Reviewed By: T. Curtis



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BOREHOLE No : **22BH405**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 778.2m N 5609550 E 415131
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 773.92 m 4.23 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, some silt, some sand, trace gravel, dry, soft, low to medium plastic, brown, some white precipitates	■	AU1	9.4	●	1 m - LL = 55.6% PL = 14.2% PI = 41.4%		778
2		SHALE (Weathered), silt and clay, trace sand, highly weathered, brown with grey mottling, some oxidation staining, damp, high plastic, extremely weak	■	AU2	14.2	●	2.5 m - Sand = 1.9% Silt = 53.6% Clay = 44.5%		777
3									776
4									775
5		...5.2 m - becoming very weak	■	AU3	11.8	●	4.5 m - LL = 41.9% PL = 16.5% PI = 25.4%		774
6		...5.5 m - becoming some sand	■	AU4	13.9	●	5 m - hard drilling 5.5 m - Sand = 10.5% Silt = 43.9% Clay = 45.6%		773
		End of Borehole @6.1 m							772
7									771
8									770
9									769

Notes:

No seepage and minor sloughing observed upon completion. 25 mm slotted PVC pipe installed to a depth of 6.1 m. Backfilled with sand and bentonite.

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BOREHOLE No : **22BH406**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 777.7m N 5609659 E 415146
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, stiff, dry, medium plastic, greyish brown, some oxidation staining							777
2		SHALE (Weathered), clayey, highly weathered, dark brown, some oxidation staining, damp, high plastic, extremely weak	■	AU1	12.1	●	1 m - LL = 51.8% PL = 19.6% PI = 32.2%		776
3			■	AU2	15.2	●			775
4			■	AU3	13.3	●	4 m - Sand = 1.4% Silt = 49.3% Clay = 49.3%		774
5		BENTONITE (4.5 m), small seams SHALE (Weathered), "..."	■	D1			4 m - LL = 48.8% PL = 17% PI = 31.8%		773
6		...5.5 m - becoming some sand	■	AU4	11.6	●	4.4 m - Sand = 2.0% Silt = 22.7% Clay = 75.3%		772
7		End of Borehole @6.1 m					4.4 m - LL = 137.0% PL = 39% PI = 98.0%		771
8							5.5 m - LL = 44.7% PL = 12.9% PI = 31.8%		770
9									769
									768

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

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BOREHOLE No : **22BH407**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 778.0m N 5609688 E 415026
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, dry, soft, medium plastic, light brown	■	AU1	8.1	●	1 m - Sand = 11.7% Silt = 48.5% Clay = 39.8% 1 m - LL = 37.7% PL = 12.6% PI = 25.1%		777
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, dark brown, some oxidation staining, damp, high plastic, extremely weak, blocky	■	AU2	12.7	●	2.5 m - Sand = 0.9% Silt = 45.1% Clay = 54.0%		776
3									775
4			■	AU3	13.3	●			774
5		...5 m - becoming less weathered, lots of oxidation staining	■	AU4	12.4	●	5.5 m - LL = 55.1% PL = 18.2% PI = 36.9%		773
6		End of Borehole @6.1 m							772
7									771
8									770
9									769

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 778.5m N 5609725 E 414932
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, some silt, some gravel, dry, soft, low to medium plastic, brown	■	AU1	4.5	●	1 m - LL = 31.5% PL = 12.6% PI = 18.9%		778
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, greyish brown, some oxidation staining, damp, medium plastic, extremely weak	■	AU2	14.1	●	2.5 m - Sand = 3.6% Silt = 48.4% Clay = 48.0%		777
3									776
4		...4 m - becoming some sand	■	AU3	19.7	●	4 m - Sand = 15.9% Silt = 48.9% Clay = 35.2%		775
5		End of Borehole @4.3 m					4 m - LL = 43.1% PL = 15.8% PI = 27.3%		774
6							4.3 m - Auger refusal		773
7									772
8									771
9									770
									769

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

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Reviewed By: T. Curtis



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BOREHOLE No : **22BH409**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 778.4m N 5609818 E 414991
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SHALE (Weathered), clay and silt, trace sand, residual soil, greyish brown, some oxidation staining, damp, low plastic, extremely weak	■	AU1	13.4	●	1 m - Sand = 0.9% Silt = 37.4% Clay = 61.7%		778
2									777
3		SHALE (Weathered), clay and silt, trace sand, highly weathered, light brown to dark grey mottling, with oxidation specs, damp, high plastic, very weak	■	AU2	15.3	●	2.5 m - Sand = 0.5% Silt = 43.7% Clay = 55.8% 2.5 m - LL = 54.6% PL = 18% PI = 36.6%		776
4			■	AU3	15.0	●			775
5									774
6			■	AU4	12.3	●	5.5 m - LL = 51.7% PL = 18.6% PI = 33.1%		773
7		End of Borehole @6.1 m							772
8									771
9									770
									769

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH410**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 778.3m N 5609875 E 414853
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
		CLAY TILL, silty, some sand, dry, soft, medium plastic, brown, trace root hairs							778
1		SHALE (Weathered), clay and silt, trace sand, trace gravel, highly weathered, light brown to dark grey mottling, trace oxidation staining, damp, medium plastic, extremely weak to hard soil	■	AU1	14.0	●	1 m - Gravel = 0.2% 1 m - Sand = 8.1% Silt = 38.2% Clay = 53.5%		777
2			■	AU2	17.3	●	1.1 m - LL = 56.3% PL = 16.5% PI = 39.8%		776
3							2.5 m - LL = 55.2% PL = 19.3% PI = 35.9%		775
4			■	AU3	17.0	●	4 m - Sand = 3.7% Silt = 46.8% Clay = 49.5%		774
		End of Borehole @4.3 m					4.3 m - Auger refusal, very tight drilling		773
5									772
6									771
7									770
8									769
9									

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis

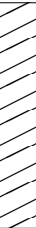
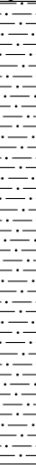
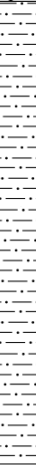


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BOREHOLE No : **22BH411**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 776.9m N 5609882 E 415069
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)	
						● MOISTURE CONTENT							
						┃ PLASTIC - LIQUID							
						■ SPT (N) Blows/300 mm							
						10	20	30	40				
						100	200	300	400				
						▲ POCKET PEN (kPa)							
1		CLAY TILL, some silt, damp, stiff, high plastic, dark brown, trace oxidation staining		AU1		15.0				1 m - Dispersivity Classification = D2 % Dispersion = % 1 m - LL = 54.1% PL = 19% PI = 35.1%		776	
2				SHALE (Weathered), clay and silt, some sand, highly weathered, dark brown, with oxidation specs, damp, medium plastic, extremely weak, trace gypsum crystals		AU2	15.4					2.5 m - Dispersivity Classification = ND3 % Dispersion = % 2.5 m - LL = 48.1% PL = 18% PI = 30.1%	775
3													774
4							AU3	12.9					4 m - Sand = 10.5% Silt = 51.6% Clay = 37.9%
5											772		
6		...5.5 m - becoming high plastic	AU4	16.5				5.5 m - Sand = 9.6% Silt = 52.3% Clay = 38.1%	771				
7		End of Borehole @6.1 m								5.5 m - LL = 54.5% PL = 18% PI = 36.5%		770	
8												769	
9												768	
												767	

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH412**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 775.7m N 5609859 E 415201
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)			
						10 20 30 40 100 200 300 400			
1		CLAY TILL, silty, some sand, residual SHALE (Weathered), damp, firm, medium plastic, dark brown, some oxidation staining							775
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, light brown to dark grey mottling, with oxidation specs, damp, high plastic, extremely weak to hard soil	■	AU1	15.8				774
3		...3 m - bentonite inclusions	■	AU2	20.8		2.5 m - LL = 56.2% PL = 19.2% PI = 37.0%		773
4		...4 m - becoming grey, medium plastic, some sand	■	AU3	11.2		4 m - Sand = 13.6% Silt = 49.8% Clay = 36.6% 4 m - LL = 45.2% PL = 15.5% PI = 29.7%		772
5									771
6		End of Borehole @6.1 m	■	AU4	11.4				770
7									769
8									768
9									767
									766

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis

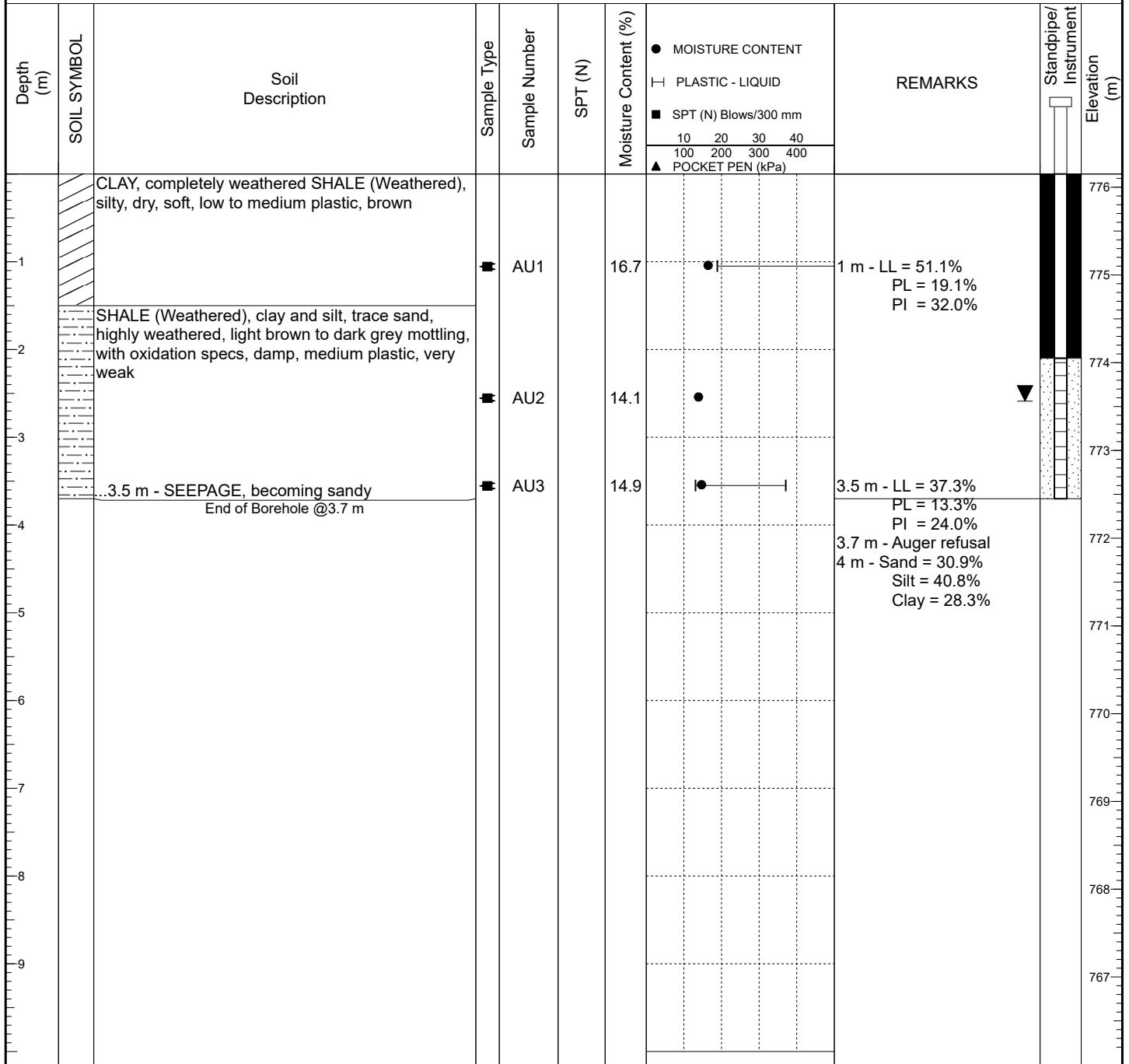


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BOREHOLE No : **22BH413**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 776.2m N 5609941 E 415204
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 773.65 m 2.50 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023



Notes:

Seepage encountered at 3.6 m. 25 mm slotted PVC pipe installed to a depth of 3.7 m. Backfilled with sand and bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH414**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 777.1m N 5609948 E 415065
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		SHALE (Weathered), clay and silt, trace sand, some sand, completely weathered, brown, some oxidation staining, dry, high plastic, extremely weak, suspect white sulphate inclusions, trace bentonite seams	■	AU1	12.1	●	1 m - Sand = 0.7% Silt = 36.8% Clay = 62.5% 1 m - LL = 59.9% PL = 18.1% PI = 41.8%		776
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, light brown to dark grey mottling, with oxidation specs, damp, high plastic, very weak to hard soil, suspect white sulphate inclusions	■	AU2	14.2	●	2.5 m - LL = 55.6% PL = 21.6% PI = 34.0%		775
3									774
4			■	AU3	11.8	●	4 m - Sand = 4.0% Silt = 52.3% Clay = 43.7%		773
5			■	AU4	15.4	●	5.2 m - Auger refusal		772
		End of Borehole @5.2 m							
6									771
7									770
8									769
9									768

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH415**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 778.3m N 5609946 E 414952
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 774.98 m 3.31 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
		CLAY TILL, some silt, trace gravel, dry, soft, low to medium plastic, brown							778
1		SHALE (Weathered), clay and silt, trace sand, highly weathered, dark brown, some oxidation staining, damp, high plastic, very weak	■	AU1	11.5	●	1 m - Sand = 1.3% Silt = 49.6% Clay = 49.1% 1 m - LL = 52.8% PL = 18.4% PI = 34.4%		777
2			■	AU2	14.5	●	2.5 m - Sand = 1.2% Silt = 49.3% Clay = 49.5%		776
3			■	AU3	14.4	●	3.7 m - LL = 57.8% PL = 21.3% PI = 36.5%		775
4		End of Borehole @4.0 m							774
5									773
6									772
7									771
8									770
9									769

Notes:

No seepage or sloughing observed upon completion. 25 mm standpipe installed to 4.0 m. Backfilled with sand and bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH416**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 780.4m N 5609980 E 414828
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, trace cobbles, dry, soft, low to medium plastic, brown	■	AU1	6.9	●	1 m - Gravel = 0.8% 1 m - Sand = 14.5% Silt = 42.0% Clay = 42.7%		780
2		...2 m - becoming residual mudstone					1 m - LL = 46.6% PL = 17.9% PI = 28.7%		779
3		SHALE (Weathered), clay and silt, trace sand, highly weathered, dark brown, some oxidation staining, damp, medium plastic, very weak to hard soil	■	AU2	13.3	●	2.5 m - LL = 57.0% PL = 20.2% PI = 36.8%		778
4			■	AU3	12.4	●	3.2 m - Sand = 5.9% Silt = 45.7% Clay = 48.4%		777
4			■	AU4	13.7	●	3.5 m - Auger refusal; changed auger bit and drilled to 4.6 m		776
5		End of Borehole @4.6 m					4 m - LL = 48.8% PL = 17.7% PI = 31.1%		775
6							4.6 m - Auger refusal		774
7									773
8									772
9									771

Notes:

No seepage or sloughing observed upon completion. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH417**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 775.4m N 5612279 E 415286
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 770.96 m 4.40 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silty, sandy, some gravel, dry, soft, medium plastic, brown	■	AU1	5.8	●	1 m - Dispersivity Classification = D2 % Dispersion = % 1 m - Gravel = 15.5% 1 m - Sand = 27.8% Silt = 32.8% Clay = 23.9%	775
2			■	AU2	8.8	●	1 m - LL = 39.6% PL = 14.7% PI = 24.9%	774
3		SHALE (Weathered), clay and silt, highly weathered, brown, damp, high plastic, extremely weak	■	AU3	15.6	●	2.5 m - LL = 49.3% PL = 17.4% PI = 31.9%	773
4			■	AU4	15.6	●	4 m - LL = 56.2% PL = 19.8% PI = 36.4%	772
5		End of Borehole @5.5 m					5.5 m - Auger refusal	771
6								770
7								769
8								768
9								767
								766

Notes:

No seepage or sloughing observed. 25 mm PVC pipe installed to a depth of 5.5 m. Backfilled with sand and bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH418**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.4m N 5612306 E 415137
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace bedrock fragments, dry, stiff, high plastic, brown, with oxidation specs	■	AU1	7.7	●	1 m - LL = 55.1% PL = 16.6% PI = 38.5%		775
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, mottled dark greyish brown, moist, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU2	12.6	●	2.5 m - Sand = 5.6% Silt = 44.7% Clay = 49.7%		774
3									773
4			■	AU3	15.9	●	4 m - LL = 66.8% PL = 19.6% PI = 47.2%		772
5									771
6			■	AU4	14.0	●	5.5 m - Sand = 1.8% Silt = 45.0% Clay = 53.2%		770
6		End of Borehole @6.0 m							769
7									768
8									767
9									766

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH419**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 776.7m N 5612388 E 415248
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY and SILT, some sand, some gravel, dry, soft, medium plastic, brown, some oxidation staining	■	AU1	7.9	●	1 m - Gravel = 12.2% 1 m - Sand = 10.2% Silt = 41.7% Clay = 35.9% 1 m - LL = 47.6% PL = 16% PI = 31.6%		776
2			■	AU2	13.0	●			775
3		SHALE (Weathered), clay and silt, trace sand, highly weathered, light brown to dark grey mottling, damp, high plastic, extremely weak	■	AU3	11.4	●	4 m - Sand = 8.2% Silt = 50.6% Clay = 41.2%		774
4		...4.5 m - some cobbles	■	AU4	15.3	●	5.5 m - LL = 54.4% PL = 17.9% PI = 36.5%		773
5									772
6		End of Borehole @6.1 m							771
7									770
8									769
9									768
									767

Notes:

No seepage or sloughing observed.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH420**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.4m N 5612330 E 414979
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, bedrock fragments up to 40 mm, dry, firm, low plastic, light brown	■	AU1	5.2	●	1 m - LL = 29.4% PL = 12.4% PI = 17.0%		775
2		SHALE (Weathered), clayey, silty, some sand, completely weathered, dark brown, some oxidation staining, moist, medium plastic, extremely weak to hard soil, finely fissured, blocky, suspect white sulphate inclusions	■	AU2	13.6	●	2.5 m - Sand = 11.6% Silt = 46.6% Clay = 41.8%		774
3									773
4		...4 m - becoming high plastic	■	AU3	17.0	●	4 m - LL = 61.4% PL = 21.2% PI = 40.2%		772
5									771
6		...5.5 m - becoming trace sand	■	AU4	15.5	●	5.5 m - Sand = 1.7% Silt = 54.2% Clay = 44.1%		770
6		End of Borehole @5.9 m					5.9 m - Auger refusal		769
7									768
8									767
9									766

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH421**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 778.0m N 5612444 E 415101
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, moist, stiff, high plastic, and some oxidation staining, suspect white sulphate inclusions, coal specs	■	AU1	12.0	●	1 m - LL = 51.7% PL = 16.8% PI = 34.9%		777
2									776
3		SHALE (Weathered), clayey, silty, trace sand, highly weathered, mottled brown with dark grey, moist, high plastic, extremely weak to hard soil, blocky, oxide specs, suspect white sulphate inclusions	■	AU1	13.6	●	2.5 m - LL = 53.2% PL = 15.3% PI = 37.9%		775
4		4 m - becoming sandy, some clay, trace gravel, medium plastic	■	AU3	8.2	●	4 m - Gravel = 0.3% 4 m - Sand = 34.7% Silt = 46.2% Clay = 18.8%		774
5							4 m - LL = 39.7% PL = 14.2% PI = 25.5%		773
6		End of Borehole @6.0 m	■	AU4	10.8	●			772
7									771
8									770
9									769

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH422**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 777.6m N 5612400 E 414893
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SHALE (Weathered), clay and silt, some bedrock fragments, trace sand, dry, stiff, finely fissured, medium plastic, brown, some oxidation staining	■	AU1	7.2	7.2	1 m - Sand = 7.0% Silt = 43.1% Clay = 49.9% 1 m - Organic Content = 7.7%		777
2		1.6 m - moisture increasing	■	AU2	11.4	11.4	1 m - LL = 46.2% PL = 15.2% PI = 31.0%		776
3			■	AU3	9.8	9.8	2.5 m - Sand = 2.9% Silt = 46.8% Clay = 50.3%		775
4							2.5 m - LL = 49.6% PL = 20.2% PI = 29.4%		774
5		End of Borehole @4.2 m					3.5 m - Sand = 8.8% Silt = 38.0% Clay = 53.2%		773
6							4.2 m - Auger refusal		772
7									771
8									770
9									769
									768

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH423**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2022 COMPLETED 06/21/2022 GROUND ELEVATION 778.1m N 5612450 E 414971
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY, some silt, trace gravel, damp, firm, medium plastic, brown with oxidation specs	■	AU1	7.8	●	1 m - LL = 45.3% PL = 14.5% PI = 30.8%		778
2			■	AU2	10.9	●	2.5 m - LL = 50.6% PL = 17.1% PI = 33.5%		777
3									776
4		SHALE (Weathered), clay and silt, trace sand, highly weathered, brown, damp, medium plastic, extremely weak	■	AU3	9.5	●	4 m - Sand = 7.5% Silt = 43.6% Clay = 48.9% 4 m - LL = 49.5% PL = 16.2% PI = 33.3%		775
5									774
6			■	AU4	8.3	●			773
6.1		End of Borehole @6.1 m							772
7									771
8									770
9									769

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH424**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 778.5m N 5612459 E 414860
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel, some sand, Gravel is fine grained up 15 mm, dry, stiff, medium plastic, brown, some oxidation staining	■	AU1	6.0	●	1 m - Gravel = 18.3% 1 m - Sand = 16.7% Silt = 34.2% Clay = 30.8% 1 m - LL = 45.0% PL = 17.1% PI = 27.9%		778
2		SHALE (Weathered), clay and silt, sandy, trace gravel, completely weathered, brown, some oxidation staining, moist, medium plastic, extremely weak to hard soil	■	AU2	8.1	●	2.5 m - Gravel = 0.7% 2.5 m - Sand = 29.1% Silt = 40.2% Clay = 30.0% 2.5 m - LL = 40.2% PL = 16.7% PI = 23.5%		777
3									776
4			■	AU3	14.6	●			775
5		End of Borehole @4.6 m							774
6									773
7									772
8									771
9									770
									769

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH425**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 779.5m N 5612462 E 414770
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, gravelly, some sand, some silt, Gravel is medium grained up to 60 mm, moist, dry, stiff, medium plastic, brown some oxidation staining, coal specs	■	AU1	8.7	●	1 m - LL = 43.6% PL = 14.8% PI = 28.8%		779
2									778
2.3		2.3 m - 75 mm layer of coal	■	AU2	11.4	●	2.5 m - Gravel = 0.9% 2.5 m - Sand = 10.9% Silt = 44.6%		777
3		SHALE (Weathered), clay and silt, some sand, trace gravel, completely weathered, mottled brown with oxidation staining, moist, medium plastic, extremely weak to hard soil End of Borehole @3.0 m					Clay = 43.6% 2.5 m - LL = 48.0% PL = 16.2% PI = 31.8%		776
4							3 m - Auger refusal		775
5									774
6									773
7									772
8									771
9									770

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH426**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 779.5m N 5612452 E 414668
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, gravelly, some sand, some silt, Gravel is medium to coarse grained, well rounded up to 60 mm, damp, firm, medium plastic, brown with oxidation staining	■	AU1	12.1	●	1 m - Gravel = 58.8% 1 m - Sand = 5.1% Silt = 18.5% Clay = 17.6%		779
2		...2 m - becoming sandy, trace gravel End of Borehole @2.2 m	■	AU2	6.7	●	1 m - LL = 49.7% PL = 18.1% PI = 31.6% 2 m - Gravel = 3.3% 2 m - Sand = 21.3% Silt = 39.6% Clay = 35.8% 2 m - LL = 42.6% PL = 15.4% PI = 27.2% 2.2 m - Auger refusal		778
3									777
4									776
5									775
6									774
7									773
8									772
9									771
									770

Notes:

Burrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH427**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.6m N 5612357 E 414709
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sand, silty, some bedrock fragments, damp, stiff, low plastic, brown, oxide staining	■	AU1	6.0	●	1 m - Sand = 48.4% Silt = 32.3% Clay = 19.3%		775
2		SHALE (Weathered), clayey, silty, trace sand, highly weathered, dark grey, moist, high plastic, extremely weak, blocky, finely fissured, oxide specs, suspect white sulphate inclusions	■	AU2	10.6	●	2.5 m - LL = 50.5% PL = 18.2% PI = 32.3%		774
3									773
4			■	AU3	15.1	●	4 m - LL = 57.8% PL = 19.4% PI = 38.4%		772
5		BENTONITE (4.5 m), 100 mm layer SHALE (Weathered), "..."							771
6		...5.5 m - becoming some sand	■	AU4	12.9	●	5.5 m - Sand = 16.9% Silt = 47.3% Clay = 35.8%		770
7		End of Borehole @6.0 m							769
8									768
9									767
									766

Notes:

Borrow search. 25 mm standpipe installed to 6.0 m. Backfilled with sand and bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH428**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 774.5m N 5612385 E 414576
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SHALE (Weathered), RESIDUAL, clay and silt, trace sand, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, finely fissured	■	AU1	9.5	●	1 m - Sand = 7.7% Silt = 41.1% Clay = 51.2% 1 m - LL = 50.3% PL = 14.5% PI = 35.8%		774
2		...2 m - moisture increasing ...2.2 m - suspect white sulphates	■	AU2	17.6	●	2.5 m - LL = 67.0% PL = 20.7% PI = 46.3%		773
3									772
4			■	AU3	12.9	●			771
5		...5 m - becoming dark grey							770
6		End of Borehole @6.0 m	■	AU4	15.5	●	5.5 m - Sand = 0.8% Silt = 53.8% Clay = 45.4%		769
7									768
8									767
9									766
									765

Notes:

Borrow search. 25 mm standpipe installed to 6.0 m. Backfilled with bentonite chips. Moved 5 m north.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH429**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	06/20/2022	COMPLETED	06/20/2022	GROUND ELEVATION	774.7m N 5612395 E 414479
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, dry, very stiff, medium plastic, brown	■	AU1	8.7	●	1 m - Sand = 6.7% Silt = 45.8% Clay = 47.5%		774
2							1 m - LL = 46.9% PL = 15.6% PI = 31.3%		773
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, damp, medium plastic, extremely weak to hard soil, blocky, finely fissured ...2.2 m - becoming orangish, oxidation staining	■	AU2	7.2	●	2.5 m - LL = 41.5% PL = 14.6% PI = 26.9%		772
4		End of Borehole @3.7 m	■	AU3	10.2	●	3.5 m - Sand = 10.4% Silt = 43.3% Clay = 46.3%		771
5							3.7 m - Auger refusal		770
6									769
7									768
8									767
9									766
									765

Notes:

Borrow search. Backfilled with sand and bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis

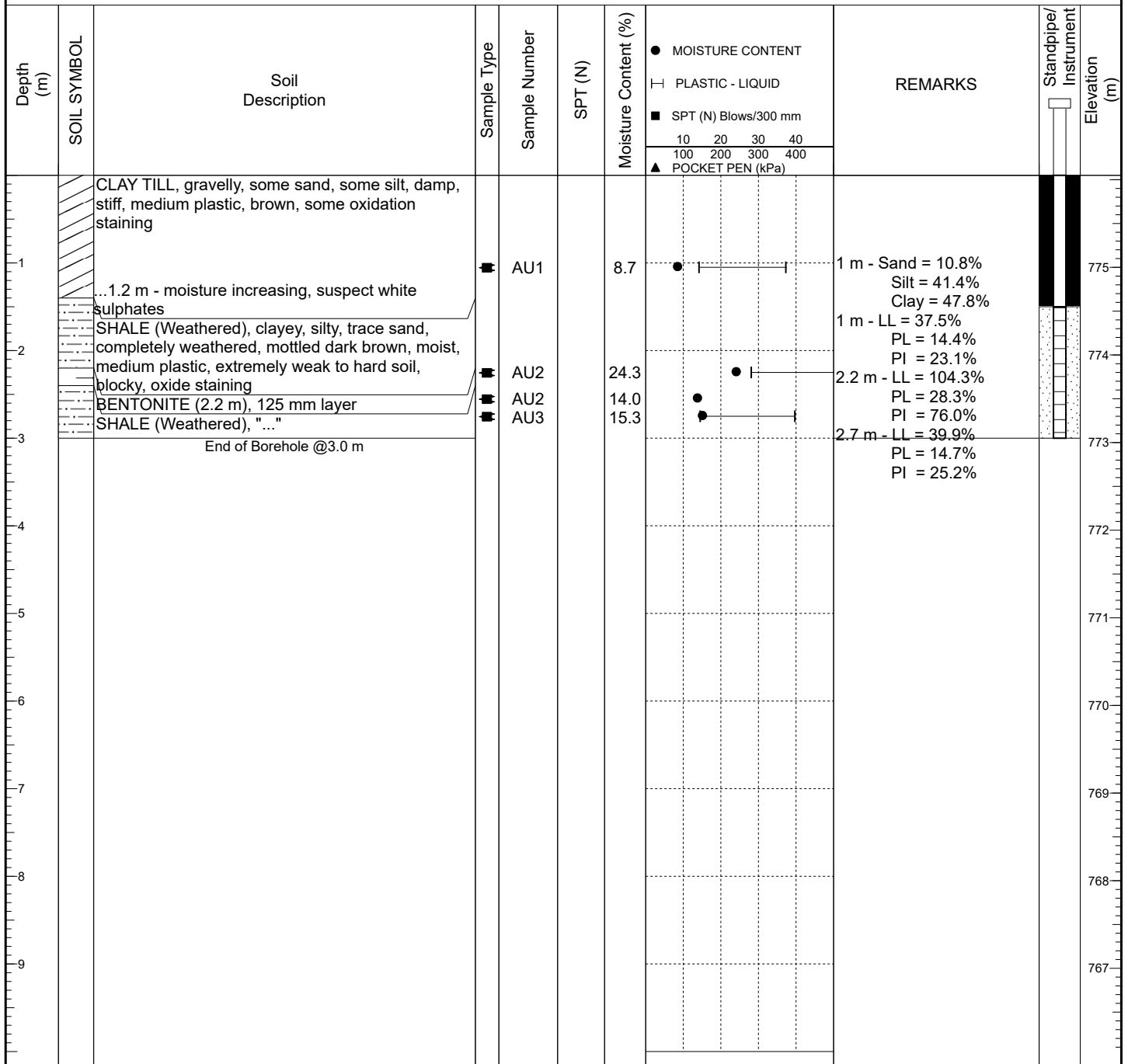


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BOREHOLE No : **22BH430**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 776.0m N 5612462 E 414464
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023



Notes:

Borrow search. 25 mm standpipe installed to 3.0 m. Backfilled with sand and bentonite chips. Moved 10 m west

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH431**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.3m N 5612409 E 414337
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY, silt, some sand, some gravel, moist, soft, medium plastic, brown		AU1	6.3	●	1 m - Sand = 18.1% Silt = 41.7% Clay = 40.2% 1 m - LL = 37.9% PL = 14% PI = 23.9%		775
2		CLAY TILL, some gravel, trace sand, trace silt, Gravel is subangular up to 20 mm, moist, stiff, low to medium plastic, brown, suspect white sulphate inclusions		AU2	10.7	●	2.5 m - Dispersivity Classification = ND3 % Dispersion = % 2.5 m - LL = 51.9% PL = 17.4% PI = 34.5% 3 m - Auger refusal		774
3		End of Borehole @3.0 m							773
4									772
5									771
6									770
7									769
8									768
9									767
									766

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH432**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.7m N 5612466 E 414342
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, sandy, dry, firm, low plastic, light brown, trace suspect white sulphate inclusions	■	AU1	4.5	●	1 m - Sand = 24.6% Silt = 45.6% Clay = 29.8%		775
2		SHALE (Weathered), clayey, silty, trace sand, completely weathered, dark brown, moist, high plastic, extremely weak to hard soil, blocky, oxide staining	■	AU2	13.6	●	1 m - LL = 29.3% PL = 12.1% PI = 17.2%		774
3		End of Borehole @3.0 m					2.5 m - Sand = 8.8% Silt = 42.2% Clay = 49.0%		773
4							2.5 m - LL = 55.7% PL = 16.8% PI = 38.9%		772
5									771
6									770
7									769
8									768
9									767
									766

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH433**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 775.1m N 5612427 E 414202
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silty, sandy, some gravel, gravel is fine grained, subangular up to 15 mm, dry, stiff, high plastic, light orangish brown, with oxidation staining, suspect white sulphate inclusions	■	AU1	4.8	●	1 m - Gravel = 10.3% 1 m - Sand = 31.2% Silt = 32.2% Clay = 26.3%	774
2		SHALE (Weathered), clayey, silty, trace sand, completely weathered, greyish brown, with oxidation specs, moist, high plastic, extremely weak to hard soil, blocky, finely fissured	■	AU2	9.7	●	1 m - LL = 40.1% PL = 16.5% PI = 23.6%	773
3							2.5 m - Sand = 3.6% Silt = 43.7% Clay = 52.7%	772
4			■	AU3	10.5	●	4 m - LL = 50.3% PL = 19.7% PI = 30.6%	771
5		End of Borehole @4.6 m						770
6								769
7								768
8								767
9								766

Notes:

Borrow search. Backfilled with and bentonite chips. 25 mm standpipe to 3.0 m

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH434**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2022 COMPLETED 06/20/2022 GROUND ELEVATION 781.3m N 5612553 E 414905
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, some gravel, Sand is fine grained, Gravel is coarse well rounded up to 35 mm, dry, stiff, medium plastic, brown, some oxidation staining	■	AU1	4.5	●	1 m - Gravel = 17.0% 1 m - Sand = 24.6% Silt = 29.3% Clay = 29.1% 1 m - LL = 44.8% PL = 19.2% PI = 25.6%		781
2			■	AU2	4.6	●			780
3		...2.9 m - becoming fine grained gravel							779
4		...3.4 m - moisture increasing	■	AU3	7.3	●	4 m - Gravel = 4.3% 4 m - Sand = 43.4% Silt = 24.0% Clay = 28.3% 4 m - LL = 45.2% PL = 15.5% PI = 29.7%		778
5		...4.5 m - becoming very hard, suspect bedrock. End of Borehole @4.6 m					4.6 m - Auger refusal		777
6									776
7									775
8									774
9									773
									772

Notes:

Borrow search. Backfilled with bentonite chips.

Logged By: C. Braun

Reviewed By: T. Curtis



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BOREHOLE No : **22BH435**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2022 COMPLETED 06/22/2022 GROUND ELEVATION 779.0m N 5610656 E 414877
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 774.66 m 4.38 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, some completely weathered SHALE (Weathered), dry, firm, high plastic, brown, some oxidation staining	■	AU1	14.0	●	1 m - Sand = 1.2% Silt = 42.0% Clay = 56.8% 1 m - LL = 54.4% PL = 19.1% PI = 35.3%		778
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, light brown to dark grey mottling, yellow oxidation staining, damp, high plastic, extremely weak	■	AU2	11.7	●	2.5 m - Sand = 1.2% Silt = 43.2% Clay = 55.6%		777
3									776
4			■	AU3	12.5	●	4 m - LL = 49.6% PL = 19.9% PI = 29.7%		775
5							5 m - hard drilling from 5 m		774
6		End of Borehole @6.1 m	■	AU4	13.3	●			773
7									772
8									771
9									770

Notes:

Borrow search. 25 mm standpipe installed to 6.0 m. Backfilled with sand and bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH435b**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/27/2022	COMPLETED	07/27/2022	GROUND ELEVATION	769.1m N 5612167 E 414626
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, moist, soft, high plastic, dark brown to grey, suspect white sulphate inclusions, trace gypsum crystals, suspect white sulphate inclusions	■	AU1	15.8	●	0.6 m - Sand = 9.3% Silt = 43.7% Clay = 47.0%		768
2		...2.1 m - some medium grained sand lenses	■	AU2	14.3	●	0.6 m - Organic Content = 5.4% 1.2 m - LL = 56.7% PL = 13.7% PI = 43.0%		767
3		SHALE (Weathered), clayey, silty, completely weathered, light brown to dark grey mottling, some oxidation staining, moist, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	16.9	●			766
4		...4 m - becoming grey	■	AU4	14.4	●			765
5		SHALE, silt and sand, clayey completely weathered, grey, damp, medium plastic, very weak, ground up	■	AU5	12.6	●	3.7 m - LL = 72.1% PL = 19% PI = 53.1%		764
6			■	AU6	12.9	●			763
7			■	AU7	11.0	●	5.2 m - Sand = 33.9% Silt = 39.7% Clay = 26.4%		762
8			■	AU8	8.0	●			761
9		End of Borehole @6.1 m							760

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH436**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	06/22/2022	COMPLETED	06/22/2022	GROUND ELEVATION	778.2m N 5610429 E 414948
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some gravel, completely weathered SHALE (Weathered), dry, firm, high plastic, brown, some oxidation staining, trace gypsum crystals	■	AU1	7.0	●	1 m - Gravel = 16.2% 1 m - Sand = 17.4% Silt = 30.4% Clay = 36.0%		778
2		End of Borehole @2.1 m	■	AU2	8.6	●	1 m - LL = 51.3% PL = 15.6% PI = 35.7% 2.1 m - Auger refusal		777
3									776
4									775
5									774
6									773
7									772
8									771
9									770
									769

Notes:

No seepage or sloughing observed upon completion. 25 mm standpipe installed to 6.1 m. Backfilled with sand and bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH436b**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 769.3m N 5612115 E 415199
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, moist, firm, high plastic, dark brown, suspect white sulphate inclusions, salt lenses, trace gypsum crystals	■	AU1	18.9	●	0.6 m - LL = 65.9% PL = 16.1% PI = 49.8%		769
2			■	AU2	19.0	●	1.2 m - Sand = 10.8% Silt = 35.4% Clay = 53.8%		768
3			■	AU3	19.2	●			767
4		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, moist, high plastic, extremely weak, suspect white sulphate inclusions	■	AU4	12.6	●			766
5			■	AU5	18.1	●	3.7 m - Sand = 6.3% Silt = 47.0% Clay = 46.7%		765
6		4.5 m - becoming grey shale End of Borehole @4.6 m	■	AU6	5.0	●	3.7 m - LL = 85.3% PL = 17.1% PI = 68.2%		764
7							4.6 m - Auger refusal		763
8									762
9									761
									760

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH438**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.3m N 5612003 E 415265
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)
						●	—	■	▲			
							MOISTURE CONTENT					
							PLASTIC - LIQUID					
							SPT (N) Blows/300 mm					
							10 20 30 40					
							100 200 300 400					
							POCKET PEN (kPa)					
1		CLAY TILL, silty, sandy, trace gravel, damp, firm, high plastic, brown to dark brown, suspect white sulphate inclusions, salt lenses	■	AU1	7.1	●				0.6 m - Gravel = 1.0%		768
			■	AU2	10.3	●				0.6 m - Sand = 22.1%		
										Silt = 27.1%		767
										Clay = 49.8%		
2		SHALE (Weathered), silty, clayey, completely weathered, grey, some oxidation staining, moist, high plastic, extremely weak, thinly laminated, suspect white sulphate inclusions, salt lenses	■	AU3	13.7	●				0.6 m - LL = 86.8%		
										PL = 15.7%		766
										PI = 71.1%		
3		...2.5 m - becoming some thinly bedded sandstone layers, with bentonite seams	■	AU4	7.6	●				2.7 m - Sand = 8.3%		
										Silt = 47.5%		765
										Clay = 44.2%		
4			■	AU5	9.1	●				2.7 m - LL = 102.6%		
										PL = 20.3%		764
										PI = 82.3%		
5			■	AU6	11.2	●						763
6			■	AU7	10.9	●						
			■	AU8	14.8	●						762
		End of Borehole @6.1 m										761
7												760
8												759
9												

Notes:

NW Borrow search. Completed as a well. 25 mm standpipe installed to 6.1 m. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH439**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 775.2m N 5612272 E 415433
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT	┤ PLASTIC - LIQUID	■ SPT (N) Blows/300 mm	▲ POCKET PEN (kPa)			
						10 20 30 40		100 200 300 400				
1		CLAY TILL, silt, sandy, trace gravel, damp, firm to stiff, medium plastic, dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.5	●						775
1		...1 m - becoming moist	■	AU2	9.6	●	┤			1.2 m - Gravel = 4.1% 1.2 m - Sand = 22.5% Silt = 45.6% Clay = 27.8% 1.2 m - LL = 49.8% PL = 16% PI = 33.8%		774
2			■	AU3	12.8	●						773
3			■	AU4	13.6	●						772
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak, blocky	■	AU5	16.0	●	┤			3.7 m - Sand = 2.8% Silt = 48.7% Clay = 48.5% 3.7 m - LL = 60.9% PL = 21.3% PI = 39.6%		771
4			■	AU6	17.4	●						770
5			■	AU7	17.4	●						769
6			■	AU8	17.6	●						768
6		End of Borehole @6.1 m										767
7												766
8												765
9												764

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH440**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 774.8m N 5612264 E 415722
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, gravelly, some cobbles, damp, firm, medium plastic, brown, suspect white sulphate inclusions	■	AU1	7.9	●	0.6 m - Gravel = 39.0% 0.6 m - Sand = 16.6% Silt = 22.0% Clay = 22.4%		774
1		...1 m - becoming some gravel	■	AU2	10.3	●			773
2		...1.1 m - becoming moist, some oxidation staining	■	AU3	14.3	●			772
2		...2 m - becoming trace gravel	■	AU4	11.5	●	2.7 m - LL = 61.2% PL = 18.2% PI = 43.0%		771
3		...2.7 m - becoming high plastic	■	AU5	12.3	●			770
4		SHALE (Weathered), clayey, silty, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU6	10.8	●			769
5			■	AU7	12.7	●			768
6			■	AU8	13.0	●	5.8 m - LL = 69.8% PL = 22.9% PI = 46.9%		767
6		End of Borehole @6.1 m							766
7									765
8									
9									

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH441**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 771.5m N 5612271 E 416034
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, damp, firm, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	10.8	●	0.6 m - Sand = 16.0% Silt = 25.9% Clay = 58.1%		771
2			■	AU2	14.1	● ┤	0.6 m - Organic Content = 5.1%		770
3		SHALE (Weathered), clayey, silty, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	12.5	● ┤	1.2 m - LL = 54.5% PL = 16.9% PI = 37.6%		769
4			■	AU4	13.6	●	2.1 m - LL = 57.9% PL = 16.4% PI = 41.5%		768
5			■	AU5	19.2	●			767
6			■	AU6	18.3	●			767
7			■	AU7	15.8	●	5.1 m - Sand = 3.3% Silt = 57.2% Clay = 39.5%		766
8			■	AU8	16.3	●			765
9		End of Borehole @6.1 m							764
									763
									762

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH442**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 769.1m N 5612266 E 416335
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, dry, firm, high plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	11.5	●	1 m - Sand = 8.3% Silt = 50.1% Clay = 41.6% 1 m - LL = 63.2% PL = 14.5% PI = 48.7%		769
2		...2.5 m - becoming trace sand	■	AU2	12.9	●	2.5 m - Sand = 0.6% Silt = 55.1% Clay = 44.3% 2.5 m - LL = 91.0% PL = 23% PI = 68.0%		768
3		SHALE (Weathered), clayey, silty, trace sand, completely weathered, brownish grey, with oxidation specs, damp, high plastic, extremely weak to hard soil	■	AU3	18.9	●	4 m - LL = 83.7% PL = 22.3% PI = 61.4%		767
4		...5.2 m - TRACE SEEPAGE	■	AU4	22.7	●	5.5 m - Sand = 1.3% Silt = 56.5% Clay = 42.2%		766
5		End of Borehole @6.1 m							765
6									764
7									763
8									762
9									761
									760

Notes:

NE Borrow search. Trace seepage encountered at a depth of 5.2 m. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH443**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 768.2m N 5612275 E 416631
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some completely weathered SHALE (Weathered), trace gravel, damp, firm, high plastic, dark brown	■	AU1	22.8		1 m - Gravel = 0.4% 1 m - Sand = 15.1% Silt = 22.0% Clay = 62.5% 1 m - LL = 77.0% PL = 17.6% PI = 59.4%		768
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, brownish grey, trace oxidation staining, damp to moist, high plastic, extremely weak to hard soil, blocky	■	AU2	21.3		2.5 m - Sand = 1.6% Silt = 50.6% Clay = 47.8%		767
3		...3 m - hard drilling							766
4			■	AU3	18.8				765
5		...5 m - SEEPAGE							764
6			■	AU4	23.0		5.5 m - LL = 60.7% PL = 15.7% PI = 45.0%		763
6.1		End of Borehole @6.1 m							762
7									761
8									760
9									759

Notes:

NE Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH446**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 770.3m N 5611890 E 414882
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, moist, firm, medium to high plastic, brown, suspect white sulphate inclusions	■	AU1	17.1	●	0.6 m - Sand = 2.3% Silt = 47.4% Clay = 50.3%		770
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU2	16.6	●	1.2 m - LL = 69.8% PL = 18.6% PI = 51.2%		769
3			■	AU3	15.2	●			768
4			■	AU4	13.2	●	2.7 m - Sand = 5.5% Silt = 51.1% Clay = 43.4%		767
5		3.7 m - trace bentonite seams	■	AU5	24.6	●	3.7 m - Sand = 3.2% Silt = 43.7% Clay = 53.1%		766
6		4.3 m - becoming strong calcified shale End of Borehole @4.4 m	■	AU6	26.4	●	3.7 m - LL = 188.2% PL = 24.4% PI = 163.8%		765
7							4.3 m - Auger refusal 4.3 m - Sand = 2.7% Silt = 56.9% Clay = 40.4%		764
8									763
9									762
									761

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH448**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 774.5m N 5611834 E 415249
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sand, silty, trace gravel, damp, firm, high plastic, brown, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	9.6	●	0.6 m - Gravel = 4.8%		774
			■	AU2	9.1	● ┤	0.6 m - Sand = 35.4%		
							Silt = 30.0%		
							Clay = 29.8%		
2			■	AU3	11.1	●	1.2 m - LL = 64.4%		773
							PL = 16.8%		
							PI = 47.6%		
3		...2.7 m - becoming some sand, no gravel	■	AU4	15.0	● ┤	2.7 m - Sand = 12.6%		772
							Silt = 41.1%		
							Clay = 46.3%		
4			■	AU5	15.5	● ┤	2.7 m - LL = 50.1%		771
							PL = 17.5%		
							PI = 32.6%		
5		SHALE (Weathered), clayey, silty, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, suspect white sulphate inclusions	■	AU6	14.4	●	3.7 m - LL = 53.3%		770
		...4 m - becoming some fine grained sand					PL = 19.6%		
							PI = 33.7%		
6			■	AU7	16.4	●			769
			■	AU8	13.2	●			768
		End of Borehole @6.1 m							767
7									766
8									765
9									

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH449**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.3m N 5611984 E 415375
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)	
						● MOISTURE CONTENT							
						└─ PLASTIC - LIQUID							
						■ SPT (N) Blows/300 mm							
				10	20	30	40						
				100	200	300	400						
				▲ POCKET PEN (kPa)									
1		CLAY TILL, silt. some sand, trace gravel, moist, stiff, high plastic, dark brown to grey, suspect white sulphate inclusions		AU1	16.0	●	└─	0.6 m - LL = 79.9% PL = 19.7% PI = 60.2%					768
				AU2	16.9	●		1.2 m - Sand = 12.8% Silt = 42.4% Clay = 44.8%					767
2	SHALE (Weathered), clayey, silty, completely weathered, grey, some oxidation staining, moist, high plastic, extremely weak, thinly laminated, suspect white sulphate inclusions, trace gypsum crystals		AU3	14.3	●	└─	2.1 m - LL = 92.4% PL = 16.6% PI = 75.8%				766		
			AU4	15.7	●						765		
3													
4			AU5	16.3	●		3.7 m - Sand = 1.0% Silt = 49.5% Clay = 49.5%				764		
			AU6	15.9	●						763		
5			AU7 AU8	16.1 17.3	●								
6		End of Borehole @6.1 m										762	
7												761	
8												760	
9												759	

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH450**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 774.3m N 5612027 E 415726
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, trace cobbles, dry, firm, medium plastic, light brown to brown, suspect white sulphate inclusions	■	AU1	10.1	●	0.6 m - Gravel = 7.4% 0.6 m - Sand = 16.9% Silt = 36.0% Clay = 39.7%		774
2		...1.5 m - becoming damp	■	AU2	8.2	●	1.2 m - LL = 47.2% PL = 12.9% PI = 34.3%		773
3		SHALE (Weathered), clay and silt, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU3	6.7	●			772
4			■	AU4	14.9	●	2.7 m - Gravel = 5.3% 2.7 m - Sand = 16.1% Silt = 37.6% Clay = 41.0%		771
5			■	AU5	18.2	●	3.7 m - LL = 63.5% PL = 18.4% PI = 45.1%		770
6			■	AU6	16.4	●			769
7			■	AU7	17.7	●			768
8			■	AU8	17.8	●			767
9		End of Borehole @6.1 m							766
									765

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH451**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/27/2022	COMPLETED	07/27/2022	GROUND ELEVATION	773.2m N 5612020 E 416009
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sandy, some gravel, dry, firm, medium plastic, light brown, suspect white sulphate inclusions	■	AU1	5.1	●	0.6 m - LL = 37.2% PL = 13.9% PI = 23.3%		773
			■	AU2	11.9	●	1.2 m - Gravel = 11.0% 1.2 m - Sand = 22.2% Silt = 31.3% Clay = 35.5%		772
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	16.0	●	2.1 m - LL = 75.1% PL = 18.8% PI = 56.3%		771
3		...3 m - becoming grey	■	AU4	16.0	●			770
4			■	AU5	17.3	●	3.7 m - Sand = 1.8% Silt = 47.4% Clay = 50.8%		769
5			■	AU6	16.8	●			768
6		...5.5 m - becoming high plastic	■	AU7	17.4	●			767
			■	AU8	25.3	●			766
		End of Borehole @6.1 m							765
7									764
8									
9									

Notes:

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PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 771.4m N 5611950 E 416337
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL AND GRAVEL, some cobbles, silty, damp, firm, low to medium plastic, brown, trace root hairs		AU1	6.6	●	0.6 m - Gravel = 29.5% 0.6 m - Sand = 33.7% Silt = 20.7% Clay = 16.1%		771
2		End of Borehole @1.5 m					1.5 m - Auger refusal due to suspect boulders		770
3									769
4									768
5									767
6									766
7									765
8									764
9									763
									762

Notes:

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BOREHOLE No : **22BH453**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 770.8m N 5611942 E 416626
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, gravelly, some silt, trace clay, poorly graded, fine grained, sub-rounded, damp, loose, brown	■	AU1	4.3	●	0.6 m - LL = 23.9% PL = 12.1% PI = 11.8%		770
		...1 m - becoming some clay, low plastic	■	AU2	4.1	●	1.2 m - Gravel = 18.1% 1.2 m - Sand = 50.2% Silt = 11.1% Clay = 20.6%		769
2		CLAY TILL, silty, some gravel, trace sand, damp, stiff, medium plastic, brown to dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU3	18.6	●	2.1 m - LL = 71.2% PL = 16.1% PI = 55.1%		768
		...2.5 m - becoming some completely weathered mudstone inclusions	■	AU4	17.1	●			768
3		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey, some oxidation staining, moist, high plastic, extremely weak, thinly laminated	■	AU5	18.6	●	3.7 m - Sand = 5.9% Silt = 51.8% Clay = 42.3%		767
4		...4 m - becoming some ground up shale inclusions	■	AU6	15.7	●			766
5		SHALE, clayey, silty, highly weathered, grey, damp, medium to high plastic, very weak, ground up	■	AU7	14.8	●			765
6			■	AU8	14.0	●			765
		End of Borehole @6.1 m							764
7									763
8									762
9									761

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 775.1m N 5611525 E 414969
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some completely weathered mudstone inclusions, some gravel, damp, stiff, high plastic, light brown to dark grey mottling, some oxidation staining, suspect white sulphate inclusions	■	AU1		8.9	1 m - Gravel = 12.9% 1 m - Sand = 16.8% Silt = 30.6% Clay = 39.7% 1 m - Organic Content = 1.3%		775
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak, thinly laminated	■	AU2		14.1	1 m - LL = 53.6% PL = 16.1% PI = 37.5%		774
3							2.5 m - Sand = 8.9% Silt = 44.7% Clay = 46.4%		773
4		...4 m - trace bentonite inclusions	■	AU3		16.6			772
5									771
6			■	AU4		18.7	5.5 m - LL = 70.7% PL = 20.1% PI = 50.6%		770
6		End of Borehole @6.1 m							769
7									768
8									767
9									766

Notes:

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CLIENT	Eastern Irrigation District		PROJECT NAME	Snake Lake Reservoir Expansion					
PROJECT NUMBER	1560-193-00		PROJECT LOCATION	NE 1/4 32-19-16					
DATE STARTED	07/27/2022	COMPLETED	07/27/2022	GROUND ELEVATION	773.4m	N	5611705	E	415487
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.			GROUND WATER ELEVATION / DEPTH					
DRILLING METHOD	6" SSA			DATE GROUND WATER RECORDED					

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Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.0m N 5611676 E 415733
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, trace gravel, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	9.7	●	0.6 m - LL = 49.2% PL = 12.9% PI = 36.3%		767
			■	AU2	7.7	●	1.2 m - Sand = 22.5% Silt = 48.2% Clay = 29.3%		766
2		...2.1 m - trace suspect bentonite seams	■	AU3	13.2	●	2.1 m - LL = 100.0% PL = 14.9% PI = 85.1%		765
		...2.7 m - becoming some completely weathered mudstone	■	AU4	15.0	●			764
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU5	14.8	●	3.7 m - Sand = 1.8% Silt = 55.4% Clay = 42.8%		763
4			■	AU6	14.1	●			762
5			■	AU7	16.2	●			761
6		End of Borehole @6.1 m	■	AU8	17.9	●			759

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 771.4m N 5611669 E 416034
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, gravelly, silty, some cobbles, damp, stiff, low to medium plastic, brown, trace root hairs	■	AU1	6.0	●	0.6 m - Gravel = 17.3% 0.6 m - Sand = 47.5% Silt = 25.3% Clay = 9.9%		771
2		...1.5 m - becoming some to trace gravel	■	AU2	7.4	● ┌─	1.2 m - LL = 33.9% PL = 17.2% PI = 16.7%		770
3		...2 m - becoming medium plastic	■	AU3	17.2	●			769
4		...2.5 m - becoming some completely weathered mudstone inclusions	■	AU4	19.7	●	2.7 m - Sand = 1.9% Silt = 50.1% Clay = 48.0%		768
5		SHALE (Weathered), clayey, silty, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions, trace gypsum crystals	■	AU5	17.6	● ┌─	3.7 m - LL = 67.2% PL = 23.9% PI = 43.3%		767
6		...4.5 m - becoming high plastic, bentonite seams throughout	■	AU6	18.4	●			766
7			■	AU7	23.3	● ┌─	5.2 m - LL = 190.2% PL = 20% PI = 170.2%		765
8			■	AU8	39.5	●			764
9		End of Borehole @6.1 m							763
									762

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 771.9m N 5611673 E 416342
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		GRAVEL, silty, clayey, some sand, some cobbles, well graded, coarse grained, sub-rounded, damp, loose, grey and brown	■	AU1	6.4	●	0.6 m - LL = 46.0% PL = 18.8% PI = 27.2%		771
			■	AU2	4.7	●	1.2 m - Gravel = 29.2% 1.2 m - Sand = 26.0% Silt = 23.5% Clay = 21.3%		770
2		CLAY TILL, gravelly, silty, some sand, moist, stiff, medium plastic, brown, suspect white sulphate inclusions	■	AU3	4.7	●	2.1 m - LL = 43.6% PL = 13.2% PI = 30.4%		769
		...2.5 m - becoming some gravel	■	AU4	5.0	●			768
3		...3 m - becoming some oxidation staining, high plastic	■	AU5	13.8	●	3.7 m - Gravel = 30.1% 3.7 m - Sand = 15.4% Silt = 27.8% Clay = 26.7%		767
4			■	AU6	16.1	●	3.7 m - LL = 57.0% PL = 15.1% PI = 41.9%		766
5		SHALE, clayey, silty, completely weathered, grey, damp, medium plastic, very weak, ground up	■	AU7	13.0	●	5.2 m - Auger refusal		765
		End of Borehole @5.2 m							764
6									763
7									
8									
9									

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.5m N 5611660 E 416636
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)
						●	—	■	▲			
						MOISTURE CONTENT	PLASTIC - LIQUID	SPT (N) Blows/300 mm	POCKET PEN (kPa)			
						10	20	30	40			
						100	200	300	400			
1		CLAY TILL, gravelly, some sand, some silt, some cobbles, moist, firm, high plastic, brown, trace root hairs	■	AU1	4.3	●				0.6 m - Gravel = 75.1% 0.6 m - Sand = 15.3% Silt = 5.1% Clay = 4.5%		768
			■	AU2	16.7	●	—			1.2 m - LL = 55.0% PL = 19.6% PI = 35.4%		767
2		SHALE, silt and clay, trace sand, completely weathered, grey, damp, high plastic, extremely weak, trace clay till inclusions	■	AU3	14.5	●	—			2.1 m - LL = 68.4% PL = 16.3% PI = 52.1%		766
			■	AU4	13.8	●				2.7 m - Sand = 0.5% Silt = 52.4% Clay = 47.1%		765
3			■	AU5	14.0	●	—			3.6 m - LL = 59.4% PL = 17.9% PI = 41.5%		764
4		End of Borehole @3.7 m								3.7 m - Auger refusal		763
5												762
6												761
7												760
8												759
9												

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 777.5m N 5611229 E 414956
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some gravel, damp, stiff, medium plastic, light brown, some oxidation staining, trace gypsum crystals, suspect white sulphate inclusions	■	AU1	16.5	16.5	1 m - Gravel = 7.3% 1 m - Sand = 26.7% Silt = 27.4% Clay = 38.6% 1 m - LL = 44.6% PL = 13.5% PI = 31.1%		777
2									776
3		SHALE (Weathered), clayey, silty, completely weathered, dark brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil	■	AU2	13.4	13.4	2.5 m - LL = 49.5% PL = 12.8% PI = 36.7%		775
4		...4 m - becoming some sand	■	AU3	11.2	11.2	4 m - Sand = 12.5% Silt = 48.2% Clay = 39.3%		774
5		...5 m - becoming high plastic							773
6		End of Borehole @6.1 m	■	AU4	5.8	5.8			772
7									771
8									770
9									769
									768

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 776.7m N 5611233 E 415262
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, some silt, trace clay, poorly graded, fine grained, sub-rounded, damp, loose, light brown							776
		...0.8 m - becoming clayey							
2		CLAY TILL, sand and silt, some gravel, some sand, damp, firm, medium plastic, brown to grey, suspect white sulphate inclusions	■	AU1	6.8	●	1 m - Sand = 39.1% Silt = 36.5% Clay = 24.4%		775
		...1.5 m - becoming trace sand							
3			■	AU2	11.7	■	2.5 m - LL = 43.2% PL = 13.1% PI = 30.1%		774
4		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU3	12.3	●	4 m - Sand = 13.4% Silt = 48.1% Clay = 38.5%		773
5									772
6			■	AU4	11.2	●			771
		End of Borehole @6.1 m							770
7									769
8									768
9									767

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.6m N 5611378 E 415744
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%) ● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)	REMARKS	Standpipe/ Instrument	Elevation (m)
1		CLAY TILL, silt, sandy, gravelly, some cobbles, damp, stiff, high plastic, brown							768
1		End of Borehole @1.1 m	■	AU1	7.2	●	1 m - Auger refusal due to cobbles 1 m - Sand = 30.7% Silt = 37.0% Clay = 32.3% 1 m - LL = 54.8% PL = 14% PI = 40.8%		767
2									766
3									765
4									764
5									763
6									762
7									761
8									760
9									759

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.8m N 5611373 E 416026
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)	
						● MOISTURE CONTENT							
						└─ PLASTIC - LIQUID							
						■ SPT (N) Blows/300 mm							
						10	20	30	40				
						100	200	300	400				
						▲ POCKET PEN (kPa)							
1		CLAY TILL, silt, some sand, trace gravel, dry to damp, firm, high plastic, light brown to brown, suspect white sulphate inclusions, trace coal staining		AU1	9.4	●					0.6 m - Sand = 13.4% Silt = 51.1% Clay = 35.5% 0.6 m - Organic Content = 1.7% 1.2 m - LL = 82.0% PL = 16.8% PI = 65.2% 2.1 m - LL = 85.3% PL = 16.7% PI = 68.6% 3.7 m - Sand = 0.5% Silt = 44.0% Clay = 55.5% 3.7 m - LL = 93.5% PL = 18.1% PI = 75.4%		768
			AU2	12.2	●	└─							767
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions, trace gypsum crystals		AU3	14.2	●	└─						766
3			AU4	13.7	●								765
4			AU5	16.8	●	└─							764
5			AU6	15.6	●								763
6			AU7	17.1	●								762
7			AU8	18.4	●								761
8		End of Borehole @6.1 m										760	
9												759	

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.1m N 5610905 E 414945
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, gravelly, dry, stiff, low to medium plastic, light brown, trace oxidation staining, trace gypsum crystals	■	AU1	3.9	●	1 m - Gravel = 30.8% 1 m - Sand = 19.5% Silt = 21.7% Clay = 28.0% 1 m - LL = 44.9% PL = 16.5% PI = 28.4%		778
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, trace gypsum crystals	■	AU2	16.4	●	2.5 m - LL = 54.7% PL = 21% PI = 33.7%		777
3									776
4			■	AU3	18.9	●	4 m - Sand = 1.5% Silt = 41.2% Clay = 57.3%		775
5									774
6			■	AU4	16.8	●			773
7		End of Borehole @6.1 m							772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH469**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/26/2022	COMPLETED	07/26/2022	GROUND ELEVATION	775.2m N 5610939 E 415253
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		SAND, some silt, trace clay, poorly graded, fine grained, sub-rounded, damp, very loose, light brown	■	AU1		13.3	1 m - Sand = 14.6% Silt = 45.6% Clay = 39.8%		775
2		CLAY TILL, silt, some sand, some gravel, trace sand, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU2		19.1	1 m - LL = 45.8% PL = 13.6% PI = 32.2%		774
3		SHALE (Weathered), clayey, silty, highly weathered, grey, some oxidation staining, damp, high plastic, very weak, thinly laminated, suspect white sulphate inclusions	■	AU3		18.7	2.5 m - LL = 55.2% PL = 14.6% PI = 40.6%		773
4			■	AU4		20.3			772
5			■	AU5		15.4			771
6		SHALE, clay and silt, trace sand, completely weathered, grey, damp, medium plastic, very weak, ground up	■	AU6		18.6	5.8 m - Sand = 2.9% Silt = 48.5% Clay = 48.6%		770
		End of Borehole @6.1 m							769
7									768
8									767
9									766

Notes:

SW Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH470**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 777.2m N 5611071 E 415426
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, trace gravel, trace sand, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	9.9	●	0.6 m - EC: 1.8 dS/m 0.6 m - SAR: 7.7 0.6 m - pH: 8.2 1 m - Gravel = 9.7% 1 m - Sand = 15.2% Silt = 38.9% Clay = 36.2%		777
2		...2.5 m - becoming some completely weathered mudstone inclusions	■	AU2	11.2	● ┌─	2.5 m - LL = 44.3% PL = 13.4% PI = 30.9%		776
3		...3.5 m - becoming some coal staining							775
4			■	AU3	11.9	●			774
5		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak, thinly laminated, suspect white sulphate inclusions	■	AU4	19.0	● ┌─	5.5 m - Sand = 7.4% Silt = 54.2% Clay = 38.4%		773
6		End of Borehole @6.1 m					5.5 m - LL = 60.5% PL = 18.3% PI = 42.2%		772
7									771
8									770
9									769
									768

Notes:

SW Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH471**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 774.2m N 5611071 E 415735
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sand, silty, gravelly, some cobbles, silty, dry, firm, low plastic, light brown	■	AU1	5.8	●	0.6 m - Gravel = 17.0% 0.6 m - Sand = 50.3% Silt = 20.6% Clay = 12.1%		774
			■	AU2	6.5	● ┌─	1.2 m - LL = 29.8% PL = 13.7% PI = 16.1%		773
2		End of Borehole @1.5 m					1.5 m - Auger refusal due to cobbles		772
3									771
4									770
5									769
6									768
7									767
8									766
9									765

Notes:

SE Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH472**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/26/2022	COMPLETED	07/26/2022	GROUND ELEVATION	773.4m N 5611056 E 416022
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		GRAVEL, sandy, some silt, trace clay, well graded, medium grained, Rounded, dry, loose, grey to brown	■	AU1	9.7	●	0.6 m - Gravel = 51.2%		773
			■	AU2	4.2	●	0.6 m - Sand = 26.0%		772
2		CLAY TILL, silt, some sand, trace to some gravel, moist, firm, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	17.6	●	2.1 m - LL = 54.4%		771
			■	AU4	15.3	●	PL = 19.6%		
3							PI = 34.8%		
4			■	AU5	15.7	●	2.7 m - Gravel = 2.9%		770
			■	AU6	14.2	●	2.7 m - Sand = 18.2%		
5		SHALE (Weathered), clayey, silty, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, trace gypsum crystals	■	AU7	19.6	●	Silt = 38.2%		769
			■	AU8	18.5	●	Clay = 40.7%		770
6		End of Borehole @6.1 m					3.7 m - LL = 48.4%		768
							PL = 15.9%		
7							PI = 32.5%		769
8							5.2 m - LL = 69.2%		768
9							PL = 22.3%		767
							PI = 46.9%		766
									765
									764

Notes:

SE Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH473**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 768.0m N 5611072 E 416313
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, some gravel, damp to moist, stiff, medium plastic, dark brown, suspect white sulphate inclusions	■	AU1	8.1	●	0.6 m - Gravel = 30.9% 0.6 m - Sand = 32.1% Silt = 18.3% Clay = 18.7%		767
2		...1.6 m - becoming trace gravel, high plastic	■	AU2	20.9	●			766
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to grey mottling, trace oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU3	17.4	●	2.1 m - Dispersivity Classification = ND3 % Dispersion = % 2.1 m - LL = 71.0% PL = 21.6% PI = 49.4%		765
4			■	AU4	18.4	●			764
5			■	AU5	20.4	├	3.7 m - LL = 61.8% PL = 17.6% PI = 44.2%		763
6			■	AU6	20.6	●			762
7			■	AU7	17.5	●	5.2 m - Sand = 1.3% Silt = 54.7% Clay = 44.0%		759
8		...5.5 m - becoming some ground up shale inclusions					5.8 m - Auger refusal		
9		End of Borehole @5.8 m							

Notes:

SE Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH474**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/27/2022	COMPLETED	07/27/2022	GROUND ELEVATION	767.3m N 5611072 E 416626
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)	
						● MOISTURE CONTENT							
						└─ PLASTIC - LIQUID							
						■ SPT (N) Blows/300 mm							
						10	20	30	40				
						100	200	300	400				
						▲ POCKET PEN (kPa)							
1 2 3 4 5 6		CLAY TILL, silty, some gravel, trace sand, moist, firm to stiff, high plastic, dark brown, suspect white sulphate inclusions		AU1	16.4		●				0.6 m - LL = 70.1% PL = 13.6% PI = 56.5% 1.2 m - Organic Content = 4.4% 2.1 m - Dispersivity Classification = ND3 % Dispersion = % 2.1 m - Sand = 2.5% Silt = 45.1% Clay = 52.4% 3.7 m - Sand = 2.1% Silt = 47.4% Clay = 50.5% 5.2 m - LL = 79.0% PL = 16% PI = 63.0%		767
		...1 m - becoming trace gravel		AU2	18.1		●						766
				AU3	18.3		●						765
				AU4	24.1			●					764
		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, blocky, suspect white sulphate inclusions		AU5	21.9		●						763
				AU6	18.2		●						762
				AU7	14.9		●						761
		...5.6 m - becoming grey shale		AU8	14.9		●						760
		End of Borehole @6.1 m										759	
7												758	
8													
9													

Notes:

SE Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH475**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.5m N 5610638 E 414961
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, dry, stiff, medium plastic, light brown, some oxidation staining	■	AU1	7.3	●	1 m - LL = 49.1% PL = 18.5% PI = 30.6%		778
2		SHALE (Weathered), silt and clay, trace sand, trace gravel, trace cobbles, completely weathered, brownish grey, some oxidation staining, damp, high plastic, extremely weak to hard soil	■	AU2	14.1	●	2.5 m - LL = 53.3% PL = 20.3% PI = 33.0%		777
3		...3 m - becoming grey	■	AU3	16.4	●	3.4 m - Sand = 2.2% Silt = 52.5% Clay = 45.3%		776
4		End of Borehole @3.7 m					3.7 m - Auger refusal		775
5									774
6									773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH476**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 776.6m N 5610631 E 415259
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some gravel up to 50 mm, dry, firm to stiff, medium plastic, light brown, trace oxidation staining, suspect white sulphate inclusions	■	AU1	4.7	●	1 m - LL = 37.8% PL = 13.2% PI = 24.6%		776
2		SHALE (Weathered), silt and clay, trace sand, trace gravel, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	14.9	●	2.5 m - Sand = 6.8% Silt = 46.9% Clay = 46.3%		775
3									774
4		...4 m - trace coal staining	■	AU3	18.4	●	4 m - LL = 69.3% PL = 22.1% PI = 47.2%		773
5		...4.5 m - becoming ground up shale inclusions							772
6		End of Borehole @5.8 m	■	AU4	21.4	●	5.5 m - Sand = 3.7% Silt = 52.1% Clay = 44.2% 5.8 m - Auger refusal		771
7									770
8									769
9									768
									767

Notes:

SW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH477**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 775.8m N 5610682 E 415430
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, gravelly, some sand, some cobbles, dry, firm, medium plastic, light brown	■	AU1	5.1	● └─	0.6 m - LL = 32.7% PL = 13.5% PI = 19.2%		775
2			■	AU2	5.1	●	1.2 m - Gravel = 39.5% 1.2 m - Sand = 14.1% Silt = 24.2% Clay = 22.2%		774
		End of Borehole @2.2 m	■	AU3	3.0	●	2 m - Auger refusal due to cobbles		773
3									772
4									771
5									770
6									769
7									768
8									767
9									766

Notes:

SW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis

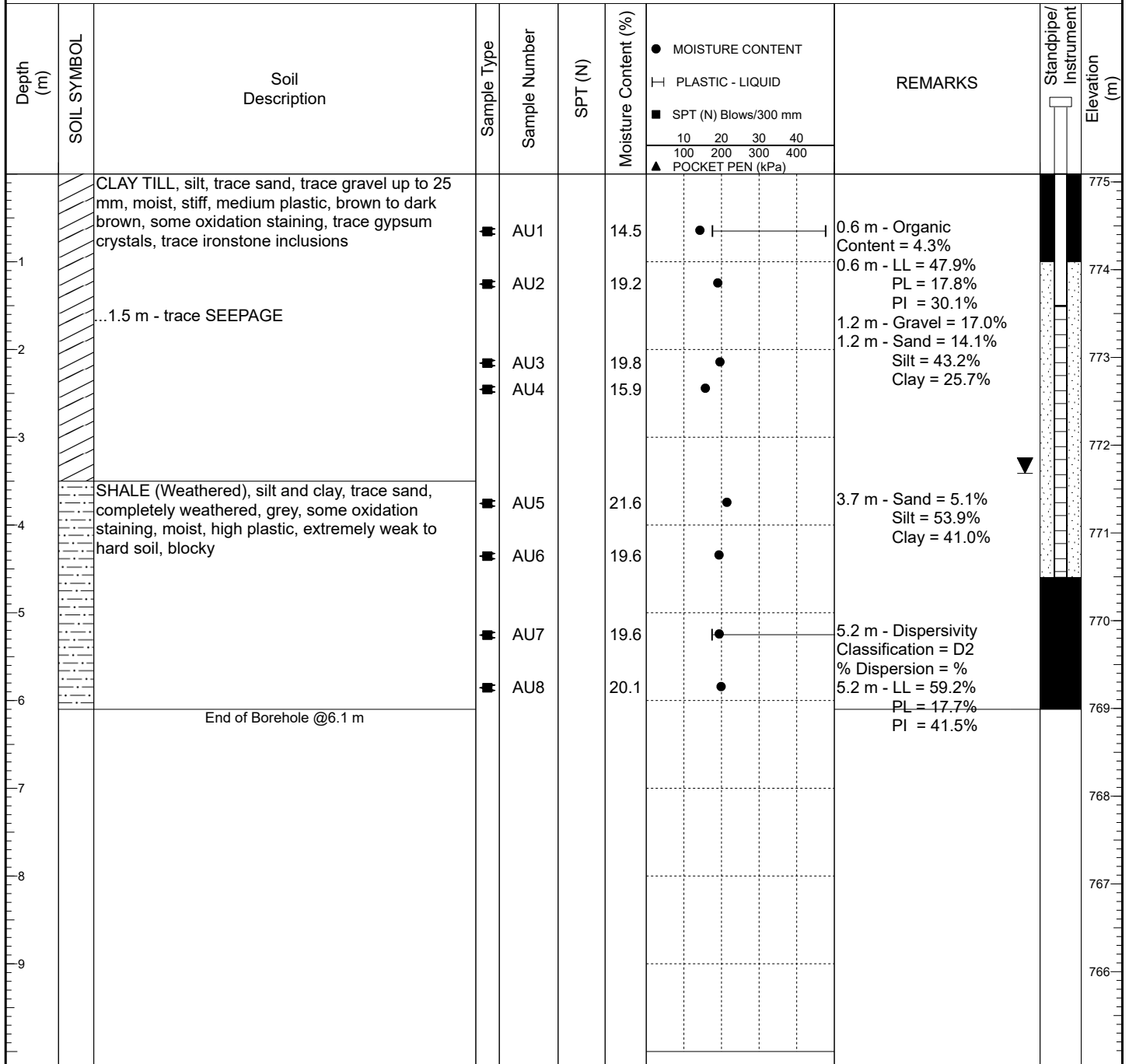


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BOREHOLE No : **22BH478**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 775.1m N 5610666 E 415731
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 771.76 m 3.33 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023



Notes:

SW Borrow search. Backfilled with bentonite chips.

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BOREHOLE No : **22BH479**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/26/2022	COMPLETED	07/26/2022	GROUND ELEVATION	770.1m N 5610677 E 416031
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		SAND, clayey, silty, trace gravel, moist, loose, dark brown, trace root hairs	■	AU1	14.2	●	0.6 m - Sand = 45.3% Silt = 25.4% Clay = 29.3%		769
			■	AU2	14.1	● ┤	1.2 m - LL = 25.9% PL = 17.3% PI = 8.6%		
2		CLAY TILL, silt, trace sand, trace gravel, moist, stiff, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU3	22.3	┤ ●	2.1 m - LL = 53.3% PL = 18.4% PI = 34.9%		768
3		SHALE (Weathered), clay and silt, completely weathered, grey, some oxidation staining, moist, high plastic, extremely weak, thinly laminated	■	AU4	25.4	●	2.7 m - Sand = 8.2% Silt = 47.6% Clay = 44.2%		767
4			■	AU5	21.8	●			766
			■	AU6	21.0	●	4.3 m - LL = 75.7% PL = 20.8% PI = 54.9%		
5		End of Borehole @5.0 m	■	AU7	37.6	●	5 m - Auger refusal		765
6									764
7									763
8									762
9									761

Notes:

SE Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH480**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 770.2m N 5610673 E 416338
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, moist, stiff, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.5	●	0.6 m - LL = 43.4% PL = 11.5% PI = 31.9%		770
			■	AU2	12.8	●	1.2 m - Gravel = 59.8% 1.2 m - Sand = 17.1% Silt = 10.9% Clay = 12.2%		769
2			■	AU3	20.2	●			768
3		SHALE (Weathered), silt and clay, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, medium to high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU4	19.2	●			767
4			■	AU5	20.4	●			766
		...4.5 m - becoming grey	■	AU6	23.4	●	4.3 m - Sand = 2.0% Silt = 53.3% Clay = 44.7%		765
5			■	AU7	21.1	●			764
6			■	AU8	18.7	●			763
		End of Borehole @6.1 m							762
7									761
8									
9									

Notes:

SE Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis

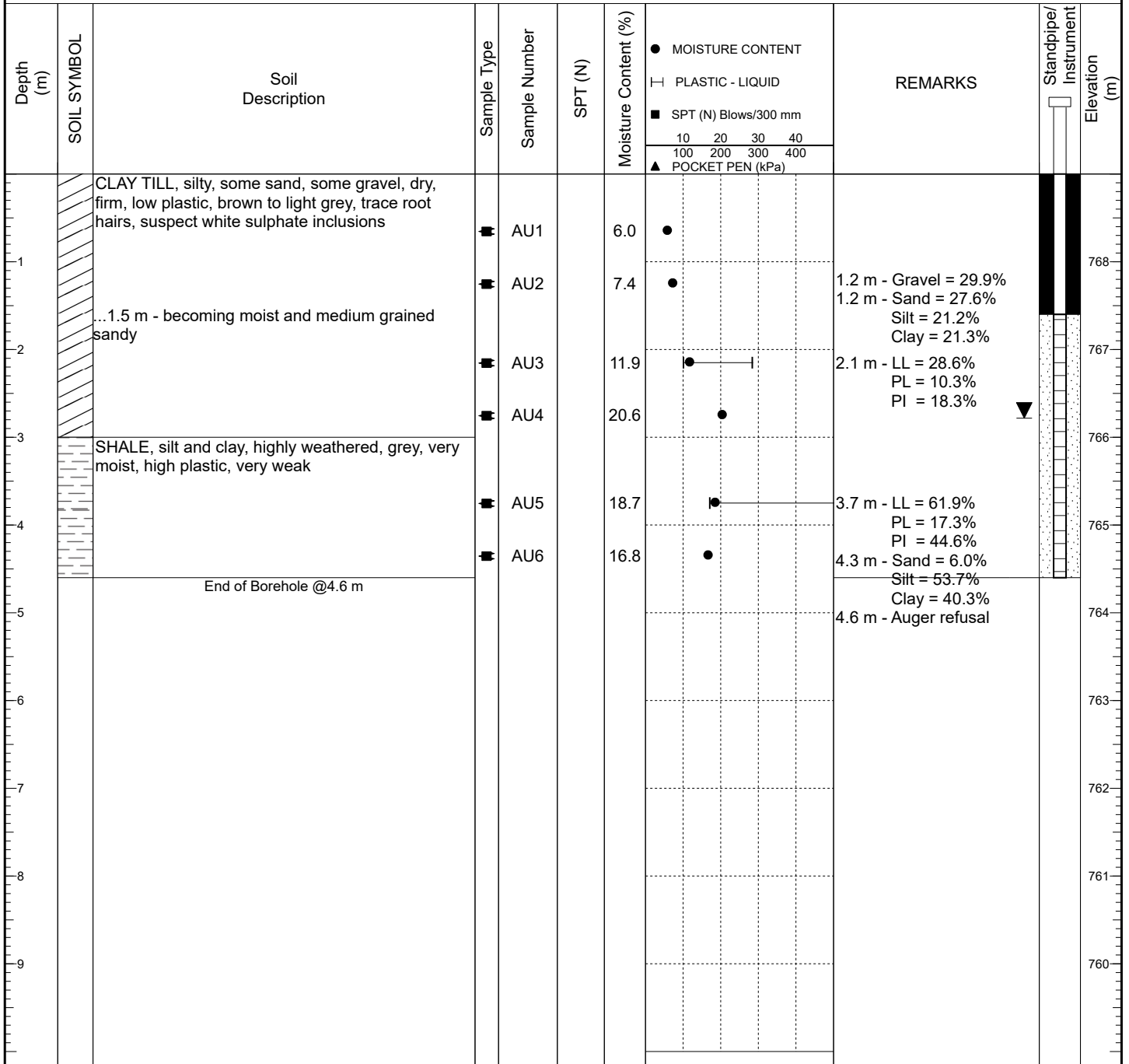


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BOREHOLE No : **22BH481**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/26/2022	COMPLETED	07/26/2022	GROUND ELEVATION	769.0m N 5610679 E 416638
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH	766.30 m	2.70 m	
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED	01/25/2023		



Notes:

SE Borrow search. 25 mm standpipe installed to 4.6 m. Backfilled with sand and bentonite.

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BOREHOLE No : **22BH482**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 777.1m N 5610332 E 414964
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, dry, firm, high plastic, brown, some oxidation staining	■	AU1	15.8	●	1 m - LL = 54.3% PL = 12.8% PI = 41.5%		777
2		SHALE (Weathered), silt and clay, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	21.2	●	2.5 m - Dispersivity Classification = ND3 % Dispersion = % 2.5 m - LL = 51.6% PL = 21.4% PI = 30.2%		776
3									775
4			■	AU3	16.2	●			774
5									773
6		BENTONITE (5.3 m), 40 mm layer SHALE (Weathered), "..." ...5.5 m - becoming some sand	■	AU4	16.2	●	5.5 m - Sand = 14.7% Silt = 45.3% Clay = 40.0% 5.5 m - LL = 49.1% PL = 13.2% PI = 35.9%		772
7		End of Borehole @6.1 m							771
8									770
9									769
									768

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH483**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 775.9m N 5610340 E 415250
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some completely weathered SHALE (Weathered), damp, stiff, high plastic, dark brown, some oxidation staining, trace sand pockets	■	AU1		16.8	1 m - Organic Content = 4.5% 1 m - LL = 58.5% PL = 16.3% PI = 42.2%		775
2		SHALE (Weathered), silt and clay, some sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2		22.2	2.5 m - Dispersivity Classification = D2 % Dispersion = % 2.5 m - LL = 61.9% PL = 19.4% PI = 42.5%		774
3									773
4			■	AU3		20.9	4 m - Sand = 10.0% Silt = 57.2% Clay = 32.8%		772
		End of Borehole @4.3 m					4.3 m - Auger refusal		771
5									770
6									769
7									768
8									767
9									766

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH484**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 774.9m N 5610357 E 415436
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 771.94 m 2.94 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT ┌ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silty, some gravel, trace sand, moist, firm, medium plastic, dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	14.6	●	0.6 m - Sand = 8.6% Silt = 24.7% Clay = 66.7%	774
			■	AU2	20.6	●		773
2		SHALE (Weathered), clay and silt, completely weathered, dark brown to grey mottling, some oxidation staining, moist, high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU3	18.0	●	2.1 m - LL = 56.9% PL = 17.7% PI = 39.2%	772
3			■	AU4	19.3	●		771
4			■	AU5	14.9	●		770
5		BENTONITE (4.1 m), 200 mm layer	■	AU6	12.4	●	4.3 m - LL = 51.2% PL = 13.9% PI = 37.3%	769
		SHALE (Weathered), "..."	■	AU7	16.9	●		768
6		...5 m - becoming grey	■	AU8	15.3	●	5.8 m - Sand = 5.4% Silt = 51.9% Clay = 42.7%	767
		SHALE, clayey, silty, completely weathered, grey, damp, medium plastic, very weak, ground up	■					766
		End of Borehole @6.1 m						765

Notes:

SW Borrow search. 25 mm standpipe installed to 6.1 m. Backfilled with sand and bentonite.

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BOREHOLE No : **22BH485**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 774.8m N 5610374 E 415732
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, gravelly, some cobbles, dry, stiff, medium plastic, light brown to brown, suspect white sulphate inclusions	■	AU1	6.7	●	0.6 m - Gravel = 4.9% 0.6 m - Sand = 46.5% Silt = 28.0% Clay = 20.6%		774
2			■	AU2	7.3	●	0.6 m - EC: 3.4 dS/m 0.6 m - SAR: 10.6 0.6 m - pH: 8.2		773
2		End of Borehole @2.1 m	■	AU3	8.7	●	1.2 m - LL = 40.6% PL = 15.5% PI = 25.1% 2.1 m - Auger refusal		772
3									771
4									770
5									769
6									768
7									767
8									766
9									765

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH486**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 772.6m N 5610376 E 416034
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, gravelly, some cobbles, dry, stiff, low to medium plastic, light brown to brown	■	AU1	6.8	●	0.6 m - LL = 29.4% PL = 12.7% PI = 16.7%		772
			■	AU2	6.8	●	1.2 m - EC: 1.1 dS/m 1.2 m - SAR: 4.9 1.2 m - pH: 7.8 1.5 m - Auger refusal		771
2		End of Borehole @1.5 m							770
3									769
4									768
5									767
6									766
7									765
8									764
9									763

Notes:

SE Borrow search. Backfilled with bentonite.

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 770.8m N 5610378 E 416333
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel, trace sand, damp, firm, high plastic, yellowish brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	9.8	●			770
2		...1.5 m - becoming gravelly with some cobbles	■	AU2	6.4	●	1.2 m - LL = 50.6% PL = 13.2% PI = 37.4%		769
2		End of Borehole @2.1 m	■	AU3	16.1	●	2.1 m - Auger refusal due to cobbles		768
3									767
4									766
5									765
6									764
7									763
8									762
9									761

Notes:

SE Borrow search. Backfilled with bentonite.

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PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 769.0m N 5610376 E 416626
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, trace silt, trace clay, trace gravel, poorly graded, fine grained, sub-rounded, damp, loose, light brown	■	AU1	2.2	●	0.7 m - Gravel = 0.4%		768
			■	AU2	3.4	●	0.7 m - Sand = 83.5%		
2		...1.5 m - becoming medium grained, some clay					Silt = 9.7%		767
			■	AU3	8.7	●	Clay = 6.4%		
3		...2.5 m - becoming moist					1.2 m - Dispersivity		
			■	AU4	15.8	●	Classification = ND4		766
4		...3.5 m - becoming clayey					% Dispersion = %		
			■	AU5	14.5	●	1.2 m - Gravel = 2.6%		
5		CLAY TILL, silty, moist, firm, medium plastic, brown, some oxidation staining, trace gypsum crystals	■	AU6	23.2	●	1.2 m - Sand = 82.0%		765
		SHALE, silt and clay, completely weathered, grey, damp, medium plastic, very weak					Silt = 7.6%		
6			■	AU7	14.3	●	Clay = 7.8%		764
			■	AU8	22.0	┌─●─┐	1.2 m - Organic		
7		...6 m - some ironstone inclusions					Content = 0.6%		763
		End of Borehole @6.1 m					2.1 m - Sand = 77.1%		
8							Silt = 4.0%		762
9							Clay = 18.9%		761
							5.2 m - Sand = 12.9%		760
							Silt = 56.4%		
							Clay = 30.7%		
							5.8 m - LL = 32.0%		
							PL = 11.8%		
							PI = 20.2%		

Notes:

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BOREHOLE No : **22BH489**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 774.9m N 5610064 E 415428
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sand, silty, some gravel, trace sand, dry, firm, high plastic, light brown, suspect white sulphate inclusions	■	AU1	7.7	●	0.6 m - Gravel = 4.1%		774
		...1 m - becoming trace gravel, moist. dark brown	■	AU2	20.9	├	0.6 m - Sand = 39.5%		
							Silt = 23.1%		
							Clay = 33.3%		
2		SHALE (Weathered), clay and silt, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	29.4	●	1.2 m - LL = 59.2%		773
		BENTONITE (1.8 m), 200 mm layer	■	AU4	34.7	●	PL = 16.3%		772
		SHALE (Weathered), "..."					PI = 42.9%		
			■	AU5	22.0	●			771
			■	AU6	21.7	●			770
			■	AU7	11.8	●	5.2 m - LL = 67.1%		
			■	AU8	19.9	●	PL = 19.9%		769
							PI = 47.2%		
		End of Borehole @6.1 m							768
									767
									766
									765

Notes:

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BOREHOLE No : **22BH490**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16
DATE STARTED	07/26/2022	COMPLETED	07/26/2022
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND ELEVATION	773.4m N 5610063 E 415730
DRILLING METHOD	6" SSA	GROUND WATER ELEVATION / DEPTH	
		DATE GROUND WATER RECORDED	

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, sandy, some completely weathered mudstone inclusions, moist, firm, medium plastic, dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	16.4	●	0.6 m - Sand = 10.5% Silt = 25.8% Clay = 63.7%		773
2		SHALE (Weathered), residual soil, clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions, trace gypsum crystals	■	AU2	15.8	●	1 m - EC: 13.0 dS/m 1 m - SAR: 32.6 1 m - pH: 8.5		772
3		...2.7 m - becoming trace sand	■	AU3	15.4	●	1.2 m - Sand = 4.8% Silt = 40.5% Clay = 54.7%		771
4			■	AU4	18.7	●	1.2 m - LL = 74.0% PL = 19.8% PI = 54.2%		770
5			■	AU5	15.8	●	2.1 m - Dispersivity Classification = ND4 % Dispersion = %		769
6			■	AU6	21.5	●	2.1 m - LL = 79.0% PL = 22.9% PI = 56.1%		768
7			■	AU7	17.3	●	2.7 m - Sand = 1.9% Silt = 47.1% Clay = 51.0%		767
8			■	AU8	40.3	●	4.3 m - LL = 78.7% PL = 24.5% PI = 54.2%		766
9		...5.6 m - becoming high plastic and silty with bentonite seams							765
		End of Borehole @6.1 m							764

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH491**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 771.5m N 5610079 E 416036
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, gravelly, some sand, damp, firm, medium plastic, brown, trace gypsum crystals	■	AU1	10.0	●	0.6 m - Sand = 31.3% Silt = 41.8% Clay = 26.9%		771
			■	AU2	7.4	● ┌─	1.2 m - LL = 40.0% PL = 14.6% PI = 25.4%		770
2		SHALE (Weathered), clay and silty, completely weathered, brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	21.7	●			769
			■	AU4	22.0	●			768
3									
4			■	AU5	19.8	●			767
			■	AU6	20.1	●			766
5			■	AU7	19.3	●	5.2 m - LL = 62.8% PL = 19.5% PI = 43.3%		765
6		End of Borehole @5.8 m	■	AU8	17.0	●	5.8 m - Auger refusal		764
7									763
8									762
9									

Notes:

SE Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH492**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 769.6m N 5610072 E 416341
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, clayey, silty, some gravel, poorly graded, medium grained, sub-rounded, damp, loose, brown	■	AU1	5.7	●	0.6 m - Sand = 58.8% Silt = 18.8% Clay = 22.4%		769
2		CLAY TILL, silty, gravelly, trace sand, moist, firm, medium plastic, yellowish brown, some oxidation staining, coal staining, suspect white sulphate inclusions	■	AU2	16.4	┌─	1.2 m - LL = 49.9% PL = 13.1% PI = 36.8%		768
			■	AU3	16.2	●			767
3		SHALE (Weathered), silt and clay, completely weathered, light brown to dark grey mottling, some oxidation staining, moist, high plastic, extremely weak to hard soil, blocky	■	AU4	24.9	●	2.7 m - Sand = 3.0% Silt = 54.1% Clay = 42.9%		766
4			■	AU5	20.9	●			765
5		...4.3 m - trace suspect bentonite seams	■	AU6	20.9	┌─	4.3 m - LL = 102.3% PL = 17.8% PI = 84.5%		764
6		SHALE, clayey, silty, completely weathered, grey, damp, medium plastic, very weak, ground up	■	AU7	16.2	●			763
			■	AU8	15.8	●			762
		End of Borehole @6.1 m							761
									760

Notes:

SE Borrow search. Backfilled with bentonite.

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Reviewed By: T. Curtis



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BOREHOLE No : **22BH493**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 770.2m N 5610086 E 416631
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)	
						● MOISTURE CONTENT							
						└─ PLASTIC - LIQUID							
						■ SPT (N) Blows/300 mm							
						10	20	30	40				
						100	200	300	400				
						▲ POCKET PEN (kPa)							
1		SAND, some silt, some clay, poorly graded, fine grained, sub-rounded, damp, very loose, light brown		AU1	3.6	●					0.6 m - Sand = 79.3% Silt = 6.8% Clay = 13.9%		770
1.2 m - silty, clayey, low plastic		AU2		3.7	●	└─				1.2 m - LL = 17.3% PL = 13.5% PI = 3.8%	769		
SAND AND CLAY TILL, silty, some gravel, poorly graded, medium grained, sub-rounded, damp, loose, brown, some oxidation staining, some coal staining, trace gypsum crystals		AU3		6.7	●					2.1 m - Gravel = 1.8% 2.1 m - Sand = 65.0%	768		
		AU4		7.1	●					Silt = 14.3% Clay = 18.9%			
SHALE (Weathered), clayey, silty, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, medium to high plastic, extremely weak		AU5		13.1		●					767		
		AU6		18.3			●				766		
SHALE, clayey, some silt, highly weathered, grey, damp, medium plastic, very weak, ground up		AU7		17.5			●			5.2 m - LL = 100.4% PL = 16.9% PI = 83.5%	765		
5.2 m - suspect trace bentonite seams		AU8		16.5			●						
6	End of Borehole @6.1 m											764	
7												763	
8												762	
9												761	

Notes:

SE Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH494**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/26/2022	COMPLETED	07/26/2022	GROUND ELEVATION	774.6m N 5609762 E 415420
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, some completely weathered shale inclusions, trace gravel, moist, firm, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	26.6		0.6 m - Sand = 12.5% Silt = 43.6% Clay = 43.9%		774
2			■	AU2	18.6		1.2 m - LL = 52.0% PL = 15.9% PI = 36.1%		773
3		SHALE (Weathered), silt and clay, some sand, completely weathered, grey with oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	16.4				772
4			■	AU4	16.0		2.7 m - Sand = 13.5% Silt = 45.7% Clay = 40.8%		771
5			■	AU5	19.5				770
6			■	AU6	19.3		4.3 m - LL = 58.3% PL = 20.5% PI = 37.8%		769
7			■	AU7	21.6				768
8			■	AU8	18.9				767
9		...5.8 m - becoming ground up shale End of Borehole @6.1 m							766
									765

Notes:

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BOREHOLE No : **22BH495**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 773.4m N 5609781 E 415727
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
	TOPSOIL								
1		SHALE (Weathered), residual soil, clay and silt, trace sand, completely weathered, dark brown to grey mottling, some oxidation staining, moist, high plastic, extremely weak to hard soil, thinly laminated, suspect white sulphate inclusions	■	AU1	25.4		0.6 m - Sand = 4.1% Silt = 39.0% Clay = 56.9%		773
			■	AU2	24.0		1.2 m - LL = 78.3% PL = 15.5% PI = 62.8%		772
2			■	AU3	23.9				771
3			■	AU4	20.9				770
4			■	AU5	22.5				769
5		...4.5 m - becoming some ground up shale inclusions, becoming medium plastic	■	AU6	20.6				768
6		...5.7 m - some bentonite inclusions	■	AU7	18.8		5.2 m - LL = 42.6% PL = 24.7% PI = 17.9%		767
		End of Borehole @6.1 m	■	AU8	39.2				766
7									765
8									764
9									

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 771.9m N 5609767 E 416032
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, dry, firm, high plastic, brown, suspect white sulphate inclusions	■	AU1	14.2	●	0.6 m - Sand = 2.0% Silt = 35.9% Clay = 62.1%		771
2			■	AU2	14.8	●	1.2 m - LL = 70.2% PL = 22.1% PI = 48.1%		770
3			■	AU3	13.4	●			769
4			■	AU4	14.4	●	2.7 m - Sand = 0.5% Silt = 47.4% Clay = 52.1%		768
5			■	AU5	12.6	●	2.7 m - LL = 68.4% PL = 17.6% PI = 50.8%		767
6			■	AU6	14.7	●	4.2 m - LL = 106.7% PL = 19.3% PI = 87.4%		766
7							4.3 m - Auger refusal		765
8									764
9									763
									762

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 770.4m N 5609784 E 416336
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, sandy, some gravel, dry, firm, high plastic, light brown to brown, suspect white sulphate inclusions	■	AU1	11.6	●	0.6 m - Sand = 30.1% Silt = 38.6% Clay = 31.3%		770
			■	AU2	14.4	●	1.2 m - LL = 81.0% PL = 15.8% PI = 65.2%		769
2		SHALE (Weathered), clay and silt, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	16.6	●			768
3			■	AU4	17.8	●			767
4			■	AU5	19.1	●			766
5			■	AU6	21.0	●			765
6		...5.9 m - becoming some ground up shale End of Borehole @6.1 m	■	AU7	17.1	●	5.2 m - LL = 68.5% PL = 18.4% PI = 50.1%		764
7									763
8									762
9									761

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/26/2022 COMPLETED 07/26/2022 GROUND ELEVATION 768.3m N 5609776 E 416635
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, sand, silty, some gravel, some cobbles, trace sand, damp, stiff, medium plastic, brown, suspect white sulphate inclusions	■	AU1	10.0	●	0.6 m - Gravel = 8.8%		768
		...1 m - becoming high plastic, no gravel, trace sand	■	AU2	16.0	● ┤	0.6 m - Sand = 33.6% Silt = 29.1% Clay = 28.5%		767
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU3	19.1	●	1.2 m - LL = 72.4% PL = 22.3% PI = 50.1%		766
3			■	AU4	19.7	●	2.7 m - Sand = 1.0% Silt = 43.6% Clay = 55.4%		765
		...3.3 m - trace suspect bentonite seams							
4			■	AU5	20.1	┤ ●	3.7 m - Sand = 1.2% Silt = 42.0% Clay = 56.8%		764
			■	AU6	21.9	┤ ●	3.7 m - LL = 97.1% PL = 17.7% PI = 79.4%		763
5			■	AU7	18.7	●	4.3 m - LL = 99.2% PL = 15.9% PI = 83.3%		762
6		End of Borehole @6.1 m	■	AU8	18.8	●			761
7									760
8									759
9									

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 783.1m N 5611637 E 414345
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel, damp, firm, high plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	7.9	●	1 m - Dispersivity Classification = ND2 % Dispersion = % 1 m - LL = 52.8% PL = 16.3% PI = 36.5%		783
2		...2.5 m - becoming some completely weathered mudstone	■	AU2	12.8	●	2.5 m - Gravel = 1.8% 2.5 m - Sand = 5.3% Silt = 44.4% Clay = 48.5%		782
3		SHALE (Weathered), silt and clay, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	11.0	●	4 m - Sand = 2.1% Silt = 54.1% Clay = 43.8% 4 m - LL = 41.7% PL = 13.7% PI = 28.0%		781
4			■	AU4	13.9	●			780
5									779
6		End of Borehole @6.1 m							778
7									777
8									776
9									775
									774

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 779.5m N 5611636 E 414440
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, trace gravel, dry, firm, medium plastic, brown, trace oxidation staining, suspect white sulphate inclusions	■	AU1	8.3	●	1 m - LL = 46.6% PL = 16.3% PI = 30.3%		779
2			■	AU2	12.7	●	2.5 m - Sand = 2.7% Silt = 63.1% Clay = 34.2%		778
3		SHALE (Weathered), silt and clay, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, dry, medium plastic, extremely weak to hard soil, ground up	■	AU3	12.9	●	4 m - LL = 42.8% PL = 22.8% PI = 20.0%		777
4			■	AU4	14.1	●	5.2 m - Auger refusal		776
5		End of Borehole @5.2 m					5.5 m - Sand = 5.1% Silt = 50.9% Clay = 44.0%		775
6									774
7									773
8									772
9									771
									770

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 782.7m N 5611510 E 414357
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, trace gravel, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.3	●	1 m - Sand = 12.8% Silt = 43.8% Clay = 43.4%		782
2									781
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, dark brown to grey with oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU2	14.5	●	2.5 m - LL = 50.8% PL = 13.3% PI = 37.5%		780
4			■	AU3	16.0	●	4 m - Sand = 3.6% Silt = 44.4% Clay = 52.0% 4 m - LL = 48.0% PL = 19.4% PI = 28.6%		779
5									778
6			■	AU4	16.4	●	5.5 m - LL = 54.3% PL = 22.4% PI = 31.9%		777
6		End of Borehole @6.1 m							776
7									775
8									774
9									773

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.0m N 5611552 E 414444
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, some silt, trace clay, poorly graded, fine grained, sub-rounded, dry, loose, light brown							
1		CLAY TILL, silty, some sand, some completely weathered shale inclusions, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	1.3	●			780
2									779
3		...3 m - becoming more weathered shale	■	AU2	10.9	●	2.5 m - Sand = 2.2% Silt = 58.6% Clay = 39.2%		778
4									777
4		SHALE (Weathered), silt and clay, some sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	12.3	●	4 m - LL = 42.8% PL = 20.7% PI = 22.1%		776
5									775
6		End of Borehole @6.1 m	■	AU4	13.5	●	5.5 m - Sand = 13.2% Silt = 57.0% Clay = 29.8%		774
7									773
8									772
9									

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 780.3m N 5611525 E 414547
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, dry, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	8.9	●	1 m - Gravel = 1.5% 1 m - Sand = 14.8% Silt = 46.1% Clay = 37.6%		780
2									779
3		SHALE (Weathered), clay and silt, dark brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, thinly laminated, suspect white sulphate inclusions	■	AU2	14.6	●	2.5 m - LL = 50.5% PL = 18.2% PI = 32.3%		778
4		...4 m - some bentonite seams	■	AU3	21.6	●	4 m - Sand = 5.9% Silt = 61.4% Clay = 32.7% 4 m - EC: 8.2 dS/m 4 m - SAR: 17.1 4 m - pH: 7.2 4 m - LL = 63.5% PL = 17.6% PI = 45.9%		777
5									776
6		End of Borehole @6.1 m	■	AU4	13.4	●	5.5 m - LL = 48.1% PL = 17.2% PI = 30.9%		775
7									774
8									773
9									772
									771

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 778.2m N 5611542 E 414652
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, clayey, silty, trace gravel, damp, firm, low to medium plastic, light brown	■	AU1	12.7	●	1 m - LL = 48.8% PL = 15.8% PI = 33.0%		778
2		SHALE (Weathered), clay and silt, trace silt, completely weathered, dark brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, trace suspect white sulphate inclusions	■	AU2	16.0	●	2.5 m - Sand = 1.4% Silt = 47.5% Clay = 51.1%		777
3									776
4			■	AU3	14.1	●	4 m - LL = 50.2% PL = 17.7% PI = 32.5%		775
5		...5 m - becoming very weak, some sand	■	AU4	13.2	●	5.5 m - Sand = 11.0% Silt = 41.2% Clay = 47.8%		774
6		End of Borehole @6.1 m							773
7									772
8									771
9									770
									769

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 775.5m N 5611524 E 414758
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, damp, stiff, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	9.5	●			775
2		SHALE (Weathered), silt and clay, some sand, completely weathered, grey, some oxidation staining, damp, medium plastic, very weak, blocky, suspect white sulphate inclusions ...1.6 m - red ironstone staining	■	AU2	13.6	●	2.5 m - LL = 49.4% PL = 15.6% PI = 33.8%		774
3									773
4			■	AU3	13.9	●	4 m - Sand = 10.9% Silt = 49.6% Clay = 39.5% 4 m - LL = 46.6% PL = 15.2% PI = 31.4% 4.3 m - Auger refusal		772
5		End of Borehole @4.3 m							771
6									770
7									769
8									768
9									767
									766

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 772.1m N 5611541 E 414838
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, damp, stiff, high plastic, brown, some oxidation staining, red ironstone staining	■	AU1	19.5	●	1 m - LL = 55.4% PL = 22.3% PI = 33.1%		772
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak, thinly laminated, trace gypsum crystals, trace quartz crystals	■	AU2	17.7	●	2.5 m - Sand = 5.6% Silt = 63.7% Clay = 30.7% 2.5 m - LL = 50.7% PL = 17.3% PI = 33.4%		771
3		...3.5 m - becoming some ground up shale inclusions	■	AU3	20.9	●	4 m - LL = 65.6% PL = 21.1% PI = 44.5%		770
4		SHALE, silt and clay, some sand, completely weathered, grey, damp, medium plastic, very weak	■	AU4	14.8	●	5.5 m - Sand = 3.6% Silt = 57.6% Clay = 38.8%		769
5		End of Borehole @6.1 m							768
6									767
7									766
8									765
9									764
									763

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 782.4m N 5611410 E 414392
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	4.7	●			782
2		...2 m - becoming damp, stiff, high plastic							781
3		...2.5 m - coal staining	■	AU2	14.5	●	2.5 m - LL = 55.1% PL = 18.6% PI = 36.5%		780
4		SHALE (Weathered), clay and silt, some sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU3	15.1	●	4 m - Sand = 2.4% Silt = 48.8% Clay = 48.8% 4 m - LL = 51.9% PL = 18.5% PI = 33.4%		779
5									778
6			■	AU4	16.4	●	5.5 m - LL = 51.2% PL = 17.6% PI = 33.6%		777
7		End of Borehole @6.1 m							776
8									775
9									774
									773

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 782.8m N 5611426 E 414433
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty sandy, trace gravel, trace sand, dry to damp, stiff, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions, trace coal staining	■	AU1	11.5	●	1 m - LL = 44.2% PL = 16% PI = 28.2%		782
2			■	AU2	11.8	●	2.5 m - Gravel = 7.4% 2.5 m - Sand = 24.4% Silt = 30.6% Clay = 37.6%		781
3									780
4		SHALE (Weathered), silt and clay, some sand, completely weathered, brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU3	13.5	●	4 m - LL = 49.1% PL = 16.7% PI = 32.4%		779
5									778
6		End of Borehole @5.6 m	■	AU4	12.6	●	5.5 m - Sand = 3.4% Silt = 60.5% Clay = 36.1% 5.6 m - Auger refusal		777
7									776
8									775
9									774
									773

Notes:

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BOREHOLE No : **22BH519**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 779.5m N 5611440 E 414531
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, some silt, poorly graded, fine grained, sub-rounded, damp, loose, light brown	■	AU1	12.0	●	1 m - Sand = 11.4% Silt = 46.8% Clay = 41.8%		779
2		CLAY TILL, silty, some sand, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU2	13.0	● ┌─	2.5 m - LL = 45.7% PL = 18.7% PI = 27.0%		778
3		SHALE (Weathered), silt and clay, some sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil	■	AU3	12.8	● ┌─	4 m - Sand = 4.4% Silt = 60.2% Clay = 35.4% 4 m - LL = 46.1% PL = 16.2% PI = 29.9%		777
4			■	AU4	14.4	● ┌─	5.5 m - LL = 45.8% PL = 19.1% PI = 26.7%		776
5									775
6		End of Borehole @6.1 m							774
7									773
8									772
9									771
									770

Notes:

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/25/2022	COMPLETED	07/25/2022	GROUND ELEVATION	781.4m N 5611432 E 414640
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
		SAND, some silt, trace clay, poorly graded, fine grained, sub-rounded, damp, loose, light brown							781
1		CLAY TILL, silty, some sand, some gravel, some completely weathered mudstone inclusions, damp, firm, medium plastic, brown, some oxidation staining	■	AU1	10.1	●	1 m - LL = 38.7% PL = 15.6% PI = 23.1%		780
2									779
3			■	AU2	13.8	●	2.5 m - Gravel = 9.9% 2.5 m - Sand = 9.4% Silt = 39.0% Clay = 41.7%		778
4		SHALE (Weathered), silt and clay, some sand, ironstone inclusions, highly weathered, grey, some oxidation staining, damp, medium plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU3	11.7	●	2.5 m - LL = 51.7% PL = 17.3% PI = 34.4%		777
5									776
6			■	AU4	13.2	●	4 m - LL = 43.0% PL = 13.8% PI = 29.2%		775
7		End of Borehole @6.1 m					5.5 m - Sand = 6.8% Silt = 49.0% Clay = 44.2%		774
8									773
9									772

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 778.8m N 5611432 E 414748
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, silty, some clay, poorly graded, fine grained, sub-rounded, damp, very loose, light brown	■	AU1	3.9	●	1 m - Sand = 61.8% Silt = 24.7% Clay = 13.5%		778
2		CLAY TILL, silty, some sand, trace gravel, damp, stiff, medium plastic, brown, some oxidation staining	■	AU2	10.8	●	2.5 m - LL = 45.6% PL = 15.3% PI = 30.3%		777
3		SHALE (Weathered), silt, clayey, sandy, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak, thinly laminated, trace gypsum crystals	■	AU3	14.0	●	4 m - Sand = 26.2% Silt = 40.0% Clay = 33.8% 4 m - LL = 50.3% PL = 18.4% PI = 31.9%		776
4			■	AU4	13.9	●	5.5 m - LL = 44.2% PL = 17.5% PI = 26.7%		775
5									774
6		End of Borehole @6.1 m							773
7									772
8									771
9									770
									769

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 776.2m N 5611428 E 414842
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, damp, firm to stiff, medium plastic, brown, trace gypsum crystals	■	AU1	13.4	●	1 m - LL = 49.1% PL = 17.4% PI = 31.7%		776
2		SHALE (Weathered), silt and clay, some sand, highly weathered, dark brown to grey, some oxidation staining, damp, medium plastic, very weak, trace gypsum crystals	■	AU2	12.5	●	2.5 m - Sand = 13.2% Silt = 50.6% Clay = 36.2%		775
3									774
4			■	AU3	16.7	●	4 m - LL = 46.5% PL = 20.6% PI = 25.9%		773
5		...4.5 m - fine grained sand lenses, trace sand							772
6			■	AU4	18.1	●	5.5 m - Sand = 3.1% Silt = 52.8% Clay = 44.1%		771
6.1		End of Borehole @6.1 m							770
7									769
8									768
9									767

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 780.5m N 5611332 E 414345
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, moist, firm, medium plastic, dark brown, trace oxidation staining, suspect white sulphate inclusions, trace gypsum crystals, trace salt lenses	■	AU1	14.6	●	1 m - Sand = 13.6% Silt = 29.7% Clay = 56.7%		780
2		SHALE (Weathered), clayey, silty, trace sand, completely weathered, dark brown to grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, trace gypsum crystals	■	AU2	15.3	●	2.5 m - LL = 54.1% PL = 19.2% PI = 34.9%		779
3									778
4			■	AU3	15.4	●	4 m - Sand = 3.8% Silt = 49.2% Clay = 47.0%		777
5		SHALE, clayey, some silt, completely weathered, grey, damp, high plastic, very weak	■	AU4	12.5	●	5.5 m - LL = 55.1% PL = 18.8% PI = 36.3%		776
6		End of Borehole @6.1 m							775
7									774
8									773
9									772
									771

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 782.0m N 5611337 E 414450
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, silty, trace clay, poorly graded, fine grained, sub-rounded, damp, loose, brown	■	AU1	9.4	●	1 m - LL = 51.0% PL = 16.3% PI = 34.7%		781
2		CLAY TILL, silt, some sand, some gravel, damp, firm, high plastic, brown, some oxidation staining, suspect white sulphate inclusions, trace coal staining	■	AU2	13.3	●	2.5 m - Gravel = 1.8% 2.5 m - Sand = 11.9% Silt = 40.9% Clay = 45.4%		780
3		SHALE (Weathered), clay and silt, some sand, completely weathered, brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	13.4	●	4 m - LL = 50.5% PL = 19.7% PI = 30.8%		779
4		...4.5 m - becoming very weak	■	AU4	14.6	●	5.5 m - Sand = 2.4% Silt = 48.7% Clay = 48.9%		778
5									777
6		End of Borehole @6.1 m							776
7									775
8									774
9									773

Notes:

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/25/2022	COMPLETED	07/25/2022	GROUND ELEVATION	779.8m N 5611328 E 414546
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, trace gravel, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	14.6	●	1 m - Sand = 1.9% Silt = 80.9% Clay = 17.2%		779
2		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey with oxidation staining, damp, medium plastic, extremely weak, thinly laminated, suspect white sulphate inclusions	■	AU2	13.3	● ┤	2.5 m - LL = 47.0% PL = 15.9% PI = 31.1%		778
3									777
4			■	AU3	14.9	● ┤	4 m - Sand = 5.6% Silt = 64.5% Clay = 29.9% 4 m - LL = 44.8% PL = 18.6% PI = 26.2%		776
5									775
6			■	AU4	11.9	● ┤	5.5 m - LL = 49.9% PL = 19.2% PI = 30.7%		774
7		End of Borehole @6.1 m							773
8									772
9									771
									770

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.0m N 5611348 E 414666
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, some silt, poorly graded, fine grained, sub- rounded, damp, loose, light brown	■	AU1	11.9	●	1 m - LL = 42.4% PL = 16.7% PI = 25.7%		780
2		CLAY TILL with completely weathered shale, silty, some sand, some gravel, damp, stiff, medium to high plastic, dark brown to dark grey mottling, some oxidation staining	■	AU2	13.1	●	2.5 m - Dispersivity Classification = D2 % Dispersion = % 2.5 m - Sand = 11.1% Silt = 41.0% Clay = 47.9%		779
3									778
4			■	AU3	12.9	●	4 m - LL = 48.6% PL = 16.7% PI = 31.9%		777
5		SHALE (Weathered), clayey, silty, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak, blocky					5.5 m - Sand = 4.3% Silt = 52.5% Clay = 43.2%		776
6		End of Borehole @6.1 m							775
7									774
8									773
9									772

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 780.9m N 5611322 E 414764
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, silty, some clay, poorly graded, fine grained, sub-rounded, dry, very loose, light brown	■	AU1	2.6	●	1 m - Sand = 68.9% Silt = 19.6% Clay = 11.5%		780
2		CLAY TILL, silty, some sand, trace gravel, damp, stiff, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU2	13.2	●	2.5 m - LL = 49.3% PL = 16.9% PI = 32.4%		779
3									778
4			■	AU3	12.6	●	4 m - Sand = 4.0% Silt = 48.7% Clay = 47.3% 4 m - EC: 3.3 dS/m 4 m - SAR: 4.0 4 m - pH: 7.4 4 m - LL = 42.0% PL = 15.9% PI = 26.1%		777
5									776
6		End of Borehole @5.8 m	■	AU4	13.5	●	5.5 m - LL = 42.0% PL = 16.4% PI = 25.6% 5.8 m - Auger refusal due to calcified shale		775
7									774
8									773
9									772
									771

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 777.9m N 5611339 E 414850
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SAND, silty, poorly graded, fine grained, sub-rounded, dry, very loose, light brown	■	AU1	10.3	●	1 m - LL = 42.2% PL = 16.2% PI = 26.0%		777
2		CLAY TILL, silty, some sand, dry, medium plastic, brown, some oxidation staining	■	AU2	14.5	●	2.5 m - Sand = 4.5% Silt = 51.8% Clay = 43.7%		776
3		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU3	12.7	●	3.5 m - LL = 40.3% PL = 19.5% PI = 20.8%		775
4		End of Borehole @3.7 m					3.7 m - Auger refusal due to calcified shale		774
5									773
6									772
7									771
8									770
9									769

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 780.2m N 5611247 E 414340
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%) ● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)	REMARKS	Standpipe/ Instrument	Elevation (m)
1		CLAY TILL, silty, some sand, trace gravel, moist, firm, medium plastic, dark brown, suspect white sulphate inclusions	■	AU1	19.3	●	1 m - Sand = 10.6% Silt = 33.4% Clay = 56.0%		780
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	17.4	●	2.5 m - LL = 56.7% PL = 21.4% PI = 35.3%		779
3									778
4			■	AU3	17.4	●	4 m - Sand = 4.9% Silt = 43.7% Clay = 51.4% 4 m - LL = 55.2% PL = 19.6% PI = 35.6%		777
5		SHALE, clay and silt, trace sand, medium weathered, grey, damp, high plastic, very weak	■	AU4	12.4	●	5.5 m - LL = 57.3% PL = 21.8% PI = 35.5%		776
6		End of Borehole @6.1 m							775
7									774
8									773
9									772
									771

Notes:

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BOREHOLE No : **22BH530**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.0m N 5611240 E 414452
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, moist, firm, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions, trace coal staining, trace gypsum crystals	■	AU1	16.8	●	1 m - LL = 57.9% PL = 13.8% PI = 44.1%		780
2			■	AU2	17.7	●	2.5 m - Gravel = 3.7% 2.5 m - Sand = 18.5% Silt = 36.7% Clay = 41.1%		779
3									778
4		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, thinly laminated, suspect white sulphate inclusions ...3.1 m - trace SEEPAGE	■	AU3	18.2	●	4 m - LL = 54.0% PL = 17.9% PI = 36.1%		777
5									776
6		End of Borehole @6.1 m	■	AU4	15.0	●	5.5 m - Sand = 1.4% Silt = 40.0% Clay = 58.6%		775
7									774
8									773
9									772

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH531**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 780.4m N 5611243 E 414545
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, trace gravel, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	9.6	●	1 m - Sand = 10.1% Silt = 43.0% Clay = 46.9%		780
2		SHALE (Weathered), silt and clay, trace sand, highly weathered, dark brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU2	13.7	●	2.5 m - LL = 47.1% PL = 19.7% PI = 27.4%		779
3									778
4			■	AU3	17.2	●	4 m - Sand = 1.3% Silt = 49.8% Clay = 48.9% 4 m - LL = 52.9% PL = 17% PI = 35.9%		777
5									776
6			■	AU4	15.9	●	5.5 m - LL = 48.7% PL = 16.2% PI = 32.5%		775
6.1		End of Borehole @6.1 m							774
7									773
8									772
9									771

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH532**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 778.6m N 5611253 E 414635
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 774.98 m 3.65 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.7	●	1 m - LL = 41.6% PL = 18.7% PI = 22.9%		778
2		SHALE (Weathered), silt, clayey, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU2	16.1	●	2.5 m - Sand = 2.7% Silt = 65.1% Clay = 32.2%		777
3									776
4			■	AU3	15.2	●	4 m - LL = 53.5% PL = 17.4% PI = 36.1%		775
5									774
6		End of Borehole @6.1 m	■	AU4	16.9	●			773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Standpipe installed to 6.1 m. Backfilled with sand and bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH533**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/21/2022	COMPLETED	07/21/2022	GROUND ELEVATION	780.7m N 5611234 E 414752
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some completely weathered SHALE (Weathered), trace gravel, trace sand, dry, firm, medium plastic, light brown, some oxidation staining	■	AU1	10.7	●	1 m - EC: 5.8 dS/m 1 m - SAR: 6.0 1 m - pH: 7.7 1 m - LL = 45.6% PL = 15.1% PI = 30.5%		780
2									779
3		SHALE (Weathered), clay and silt, sandy, trace gravel, completely weathered, dark brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, trace coal staining, suspect white sulphate inclusions	■	AU2	11.2	●	2.5 m - Gravel = 1.0% 2.5 m - Sand = 26.5% Silt = 35.9% Clay = 36.6%		778
4									777
5									776
6		BENTONITE (5.6 m), 100 mm layer SHALE (Weathered), "..."	■	AU4 AU5	13.7 38.0	●	5.6 m - LL = 107.9% PL = 31% PI = 76.9%		775
7		End of Borehole @6.1 m							774
8									773
9									772
									771

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH534**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 780.5m N 5611229 E 414847
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, some gravel, some completely weathered shale, trace sand, dry, stiff, medium plastic, brown with oxidation specs	■	AU1	10.0	●	1 m - LL = 44.9% PL = 13.8% PI = 31.1%		780
2			■	AU2	12.0	●	2.5 m - Gravel = 7.1% 2.5 m - Sand = 10.6% Silt = 47.7% Clay = 34.6%		779
3									778
4		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, medium, extremely weak, thinly laminated, suspect white sulphate inclusions, trace gypsum crystals	■	AU3	11.2	●	4 m - LL = 46.1% PL = 15.1% PI = 31.0%		777
5			■	AU4	13.8	●	5.5 m - Sand = 3.1% Silt = 40.5% Clay = 56.4%		776
6		End of Borehole @6.1 m							775
7									774
8									773
9									772
									771

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH535**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.5m N 5611127 E 414348
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, trace gravel, damp, stiff, medium plastic, brown, trace oxidation staining	■	AU1	12.2	●	1 m - Sand = 3.6% Silt = 50.1% Clay = 46.3%		781
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU2	17.1	●	2.5 m - LL = 55.0% PL = 18.6% PI = 36.4%		780
3									779
4			■	AU3	17.3	●	4 m - Sand = 2.3% Silt = 44.6% Clay = 53.1% 4 m - LL = 52.4% PL = 17.2% PI = 35.2%		778
5									777
6			■	AU4	15.1	●	5.5 m - LL = 48.5% PL = 18.1% PI = 30.4%		776
6.1		End of Borehole @6.1 m							775
7									774
8									773
9									772

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH536**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.0m N 5611135 E 414452
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel, trace sand, damp to moist, firm, medium plastic, brownish red, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	12.7	●	1 m - LL = 42.3% PL = 13.5% PI = 28.8%		780
2		...1.4 m - 900 mm layer of ironstone staining							779
3		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak, blocky, trace gypsum crystals	■	AU2	13.9	●			778
4			■	AU3	12.3	●	4 m - LL = 53.4% PL = 16.5% PI = 36.9%		777
5									776
6			■	AU4	16.6	●	5.5 m - Sand = 1.4% Silt = 50.6% Clay = 48.0%		775
7		End of Borehole @6.1 m							774
8									773
9									772

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH537**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/25/2022	COMPLETED	07/25/2022	GROUND ELEVATION	781.4m N 5611134 E 414551
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, some gravel, dry, firm, medium plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	11.3	●	1 m - Sand = 4.9% Silt = 54.7% Clay = 40.4%		781
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, dark brown to grey with oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions	■	AU2	10.9	● ┤	2.5 m - LL = 46.7% PL = 16.7% PI = 30.0%		780
3									779
4			■	AU3	11.5	● ┤	4 m - Sand = 2.3% Silt = 57.6% Clay = 40.1%		778
5		...4.5 m - becoming high plastic					4 m - LL = 42.0% PL = 20.8% PI = 21.2%		777
6			■	AU4	24.2	┤ ●	5.5 m - LL = 50.4% PL = 19.3% PI = 31.1%		776
7		End of Borehole @6.1 m							775
8									774
9									773
									772

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH539**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 779.5m N 5611142 E 414784
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, some gravel, dry, firm, medium plastic, light brown with oxidation specs, some gypsum crystals	■	AU1	8.5	●	1 m - Gravel = 4.1% 1 m - Sand = 21.2% Silt = 38.8% Clay = 35.9%		779
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, brown to dark grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, trace coal staining, some gypsum crystals	■	AU2	12.8	●	2.5 m - LL = 48.1% PL = 15.9% PI = 32.2%		778
3									777
4			■	AU3	12.9	●	4 m - Sand = 11.8% Silt = 45.5% Clay = 42.7% 4 m - LL = 50.6% PL = 16.7% PI = 33.9%		776
5									775
6		...5.5 m - some white sulphate inclusions	■	AU4	17.2	●	5.5 m - LL = 54.1% PL = 16.7% PI = 37.4%		774
7		End of Borehole @6.1 m							773
8									772
9									771
									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH540**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/21/2022	COMPLETED	07/21/2022	GROUND ELEVATION	779.7m N 5611128 E 414845
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace gravel, dry, firm, medium plastic, light brown	■	AU1	8.6	●	1 m - LL = 45.4% PL = 16.3% PI = 29.1%		779
2		...1.5 m - becoming some completely weathered shale							778
3		SHALE (Weathered), clay and silt, some sand, trace gravel, completely weathered, dark brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky, trace coal staining	■	AU2	12.8	●	2.5 m - Gravel = 4.3% 2.5 m - Sand = 13.5% Silt = 40.8% Clay = 41.4%		777
4			■	AU3	15.0	●	4 m - LL = 46.5% PL = 14.6% PI = 31.9%		776
5									775
6		...5.6 m - some fine grained sand lenses and quartz crystals	■	AU4	18.5	●	5.5 m - Sand = 18.6% Silt = 53.9% Clay = 27.5%		774
7		End of Borehole @6.1 m							773
8									772
9									771
									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH541**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.1m N 5611030 E 414350
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, trace gravel, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	16.6	●	1 m - Sand = 0.7% Silt = 44.2% Clay = 55.1%		781
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, moist, medium to high plastic, extremely weak, thinly laminated, suspect white sulphate inclusions	■	AU2	16.0	●	2.5 m - LL = 48.8% PL = 18.1% PI = 30.7%		780
3									779
4			■	AU3	17.6	●	4 m - Sand = 2.9% Silt = 40.8% Clay = 56.3% 4 m - LL = 52.1% PL = 19.0% PI = 33.1%		778
5									777
6		SHALE, clay, silty, completely weathered, grey, damp, high plastic, very weak	■	AU4	14.7	●	5.5 m - LL = 51.3% PL = 18.6% PI = 32.7%		776
7		End of Borehole @6.1 m							775
8									774
9									773
									772

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH542**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.1m N 5611037 E 414455
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 777.48 m 3.58 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silty, trace gravel, trace sand, moist, stiff, high plastic, dark brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	18.9	●	1 m - Sand = 2.7% Silt = 52.3% Clay = 45.0%	780
2		1.6 m - medium grained sand lenses SHALE (Weathered), clay and silt, trace sand, highly weathered, grey with oxidation staining, moist, high plastic, extremely weak to hard soil, thinly laminated, suspect white sulphate inclusions, trace gypsum crystals	■	AU2	10.9	●	1 m - LL = 53.3% PL = 16.7% PI = 36.6%	779
3			■	AU3	11.7	●	2.5 m - Sand = 1.3% Silt = 45.6% Clay = 53.1%	778
4			■	AU4	15.8	●	4 m - LL = 52.2% PL = 19.2% PI = 33.0%	777
5								776
6		End of Borehole @6.1 m					5.5 m - Sand = 2.1% Silt = 45.5% Clay = 52.4%	775
7								774
8								773
9								772

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH543**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/25/2022 COMPLETED 07/25/2022 GROUND ELEVATION 781.4m N 5611046 E 414539
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, some gravel, dry, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.0	●	1 m - Gravel = 11.0% 1 m - Sand = 16.3% Silt = 37.8% Clay = 34.9%		781
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, dark brown to grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, suspect white sulphate inclusions	■	AU2	14.8	■	2.5 m - LL = 47.5% PL = 13.8% PI = 33.7%		780
3									779
4			■	AU3	12.3	■	4 m - Sand = 1.7% Silt = 54.2% Clay = 44.1% 4 m - LL = 49.3% PL = 13.6% PI = 35.7%		778
5									777
6			■	AU4	12.9	●	5.5 m - LL = 44.1% PL = 15.5% PI = 28.6%		776
6.1		End of Borehole @6.1 m							775
7									774
8									773
9									772

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH546**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/21/2022 COMPLETED 07/21/2022 GROUND ELEVATION 778.2m N 5611038 E 414839
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%) ● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)	REMARKS	Standpipe/ Instrument	Elevation (m)
1		CLAY TILL, silty, some gravel, damp, stiff, medium plastic, brown, some oxidation staining, trace suspect white sulphate inclusions	■	AU1	10.1	●	1 m - LL = 36.7% PL = 13.2% PI = 23.5%		778
2		SHALE (Weathered), residual soil, clayey, silty, completely weathered, brown with grey mottling, some oxidation staining, damp, medium plastic, extremely weak to hard soil	■	AU2	16.1	●			777
3									776
4			■	AU3	19.4	●	4 m - LL = 44.9% PL = 18.8% PI = 26.1%		775
5									774
6		SHALE, silt and clay, trace sand, completely weathered, grey, trace brown mottling, damp, high plastic, extremely weak, blocky	■	AU4	18.4	●	5.5 m - Sand = 3.1% Silt = 58.2% Clay = 38.7%		773
6.1		End of Borehole @6.1 m							772
7									771
8									770
9									769

Notes:

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BOREHOLE No : **22BH547**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 780.4m N 5610939 E 414336
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)			
						10 20 30 40 100 200 300 400			
1		CLAY TILL, silty, trace gravel, some fine grained sand lenses throughout, damp, stiff, medium plastic, dark brown, some oxidation staining	■	AU1	17.0	●	1 m - Sand = 5.8% Silt = 53.2% Clay = 41.0%		780
2		...2 m - becoming some completely weathered mudstone inclusions	■	AU2	14.3	●	2.5 m - LL = 45.4% PL = 18.4% PI = 27.0%		779
3		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak, blocky							778
4			■	AU3	11.2	●	4 m - Sand = 3.1% Silt = 51.2% Clay = 45.7%		777
5		...5 m - becoming moist ...5.2 m - SEEPAGE	■	AU4	18.3	●	4 m - LL = 49.2% PL = 15.5% PI = 33.7%		776
6		End of Borehole @5.3 m					5 m - LL = 47.9% PL = 17.1% PI = 30.8%		775
7							5.3 m - Auger refusal		774
8									773
9									772
									771

Notes:

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BOREHOLE No : **22BH548**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 780.5m N 5610918 E 414431
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace to some rounded gravel, damp, stiff, high plastic, dark brown, some oxidation staining, trace red staining	■	AU1		17.9	1 m - LL = 60.0% PL = 17% PI = 43.0%		780
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2		17.2	2.5 m - Sand = 2.8% Silt = 48.5% Clay = 48.7% 2.5 m - EC: 9.6 dS/m 2.5 m - SAR: 20.0 2.5 m - pH: 7.0 2.5 m - LL = 51.2% PL = 18.2% PI = 33.0%		778
3									777
4			■	AU3		18.0	4 m - LL = 51.8% PL = 18.3% PI = 33.5%		776
5									775
6			■	AU4		15.3	5.5 m - Sand = 2.2% Silt = 44.3% Clay = 53.5%		774
7		End of Borehole @6.1 m							773
8									772
9									771

Notes:

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/07/2022	COMPLETED	07/07/2022	GROUND ELEVATION	780.0m N 5610926 E 414536
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, sandy, some gravel up to 30 mm, dry, firm, medium plastic, light brown, some oxidation staining	■	AU1	6.2	●	1 m - Gravel = 4.3% 1 m - Sand = 28.0% Silt = 37.3% Clay = 30.4%		779
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, dark brown to grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	16.5	■	2.5 m - LL = 52.4% PL = 17.6% PI = 34.8%		778
3									777
4			■	AU3	17.3	●	4 m - Sand = 2.9% Silt = 47.1% Clay = 50.0% 4 m - LL = 48.8% PL = 14.6% PI = 34.2%		776
5		SHALE, clay, silty, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak, thinly laminated	■	AU4	11.2	●	5.5 m - LL = 56.4% PL = 18.7% PI = 37.7%		775
6		End of Borehole @6.1 m							774
7									773
8									772
9									771

Notes:

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BOREHOLE No : **22BH550**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 780.2m N 5610941 E 414641
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, completely weathered mudstone inclusions, some medium grained sand lenses, trace gravel, damp to moist, stiff, medium plastic, dark brown, grey specs, some oxidation staining, trace gypsum crystals	■	AU1	14.9	●	1 m - LL = 46.4% PL = 15.9% PI = 30.5%		780
2		...2 m - increasing mudstone inclusions	■	AU2	18.4	●	2.5 m - Sand = 4.8% Silt = 44.9% Clay = 50.3%		779
3									778
4		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, trace oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU3	20.3	●	4 m - LL = 52.9% PL = 17.4% PI = 35.5%		777
5									776
6			■	AU4	16.6	●	5.5 m - Sand = 2.2% Silt = 54.4% Clay = 43.4%		775
6.1		End of Borehole @6.1 m							774
7									773
8									772
9									771

Notes:

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BOREHOLE No : **22BH551**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.0m N 5610940 E 414771
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some gravel, trace sand, damp, firm, medium plastic, brown, trace oxidation staining	■	AU1	18.4	●	1 m - Sand = 4.4% Silt = 42.6% Clay = 53.0%		778
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, brownish grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU2	18.2	●	2.5 m - LL = 45.6% PL = 15.2% PI = 30.4%		777
3									776
4			■	AU3	16.4	●	4 m - Sand = 5.5% Silt = 40.0% Clay = 54.5% 4 m - LL = 53.7% PL = 18.3% PI = 35.4%		775
5		...5 m - becoming grey, ground up shale inclusions							774
6		End of Borehole @6.1 m	■	AU4	17.2	●	5.5 m - LL = 49.5% PL = 19.6% PI = 29.9%		773
7									772
8									771
9									770

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.5m N 5610932 E 414849
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, some gravel up to 30 mm, some completely weathered shale inclusions, trace larger cobbles, damp, firm to stiff, medium plastic, dark brown, some oxidation staining	■	AU1	9.3	●	1 m - LL = 32.4% PL = 12.9% PI = 19.5%		779
2			■	AU2	17.0	●	2.5 m - Gravel = 7.5% 2.5 m - Sand = 13.5% Silt = 42.6% Clay = 36.4%		778
3		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU3	16.9	●	4 m - LL = 53.4% PL = 18.4% PI = 35.0%		777
4			■	AU4	18.4	●	5.5 m - Sand = 2.1% Silt = 46.2% Clay = 51.7%		776
5									775
6		End of Borehole @6.1 m							774
7									773
8									772
9									771
									770

Notes:

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PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 780.0m N 5610840 E 414351
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace fine gravel, trace sand lenses, moist, stiff, medium to high plastic, dark brown, some oxidation staining	■	AU1	19.4	●	1 m - Sand = 6.5% Silt = 34.8% Clay = 58.7%		779
2			■	AU2	26.9	┤ ●	2.5 m - Sand = 13.0% Silt = 38.4% Clay = 48.6%		778
3		SHALE, clay and silt, trace sand, highly weathered, grey with oxidation staining, damp, high plastic, extremely weak, thinly laminated					2.5 m - LL = 52.9% PL = 15.3% PI = 37.6%		777
4			■	AU3	15.5	●			776
5									775
6		End of Borehole @6.1 m	■	AU4	17.4	●	5.5 m - LL = 62.2% PL = 19.0% PI = 43.2%		774
7									773
8									772
9									771

Notes:

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.8m N 5610834 E 414445
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, some completely weathered shale inclusions, silty, trace sand, damp, stiff, medium plastic, dark brown, some oxidation staining	■	AU1	17.8	●	1 m - LL = 52.7% PL = 17.5% PI = 35.2%		779
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, thinly laminated, trace gypsum crystals	■	AU2	18.3	●	2.5 m - Sand = 2.3% Silt = 44.8% Clay = 52.9%		778
3									777
4			■	AU3	17.8	●	4 m - LL = 52.3% PL = 19.2% PI = 33.1%		776
5		...5 m - becoming ground up shale inclusions							775
6			■	AU4	16.1	●	5.5 m - Sand = 1.3% Silt = 46.1% Clay = 52.6%		774
		End of Borehole @6.1 m							773
7									772
8									771
9									770

Notes:

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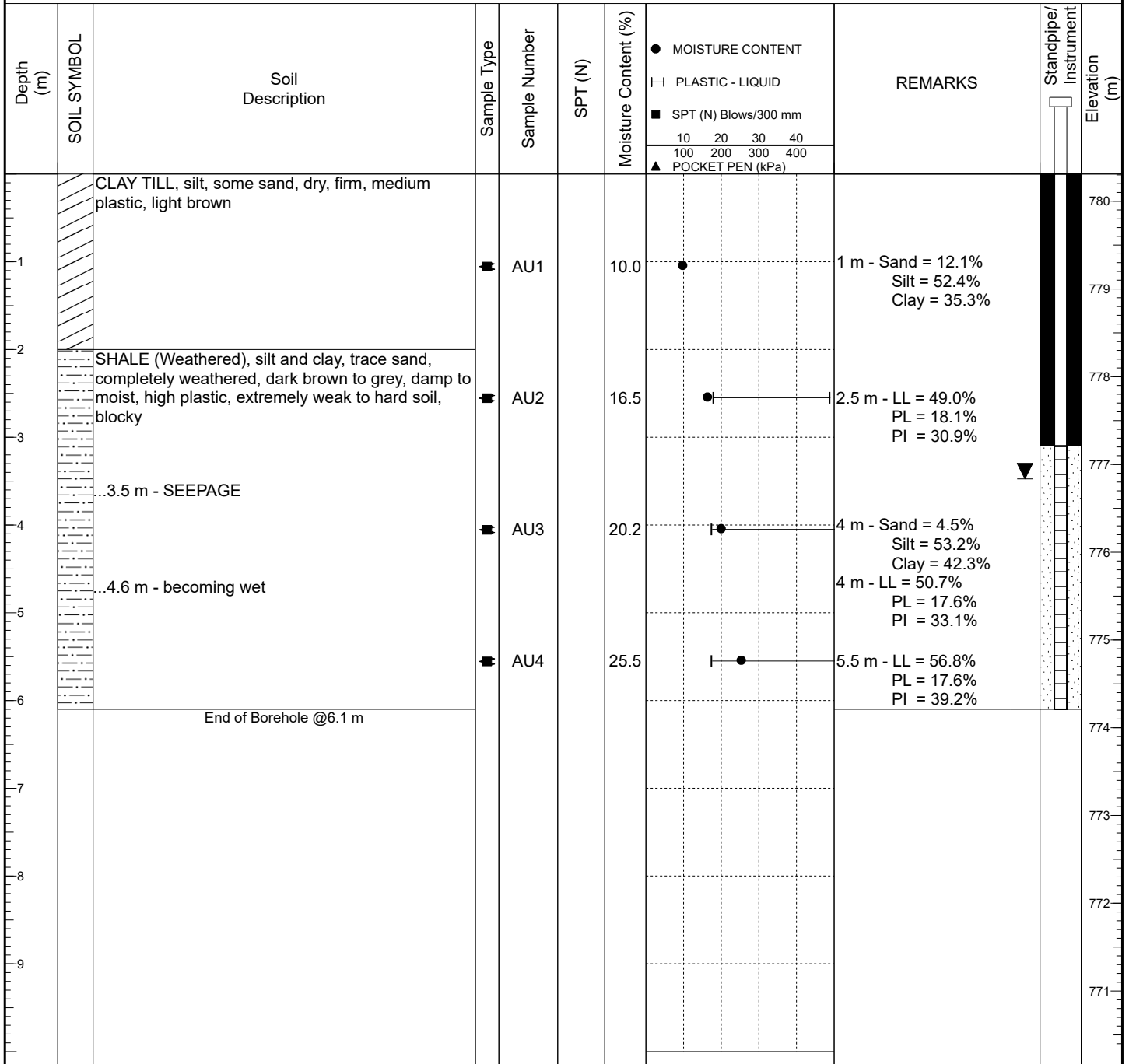


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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 780.3m N 5610840 E 414539
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 776.92 m 3.39 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023



Notes:

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BOREHOLE No : **22BH556**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/07/2022	COMPLETED	07/07/2022	GROUND ELEVATION	778.6m N 5610836 E 414643
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, sandy, moist, stiff, medium plastic, dark brown with light brown sand, trace oxide staining	■	AU1	17.2	●	1 m - LL = 40.5% PL = 11.9% PI = 28.6%		778
2		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey, some oxidation staining, moist, high plastic, very weak, thinly laminated	■	AU2	17.0	●	2.5 m - Sand = 1.9% Silt = 50.3% Clay = 47.8%		777
3		...3.5 m - trace bentonite seams							776
4			■	AU3	19.5	■	4 m - Dispersivity Classification = D2 % Dispersion = % 4 m - Sand = 1.7% Silt = 44.3% Clay = 54.0%		775
5									774
6		SHALE, clay and silt, trace sand, completely weathered, grey, damp, medium plastic, extremely weak to hard soil, ground up	■	AU4	12.2	●	4 m - LL = 51.9% PL = 18.5% PI = 33.4%		773
6		End of Borehole @6.1 m					5.5 m - Sand = 0.7% Silt = 43.9% Clay = 55.4%		772
7									771
8									770
9									769

Notes:

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BOREHOLE No : **22BH557**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.8m N 5610837 E 414745
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, some gravel up to 50 mm, damp, firm, medium plastic, brown							778
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak, finely fissured	■	AU1	18.9	●	1 m - Sand = 4.9% Silt = 43.2% Clay = 51.9%		777
3			■	AU2	18.8	●	2.5 m - LL = 55.7% PL = 16.9% PI = 38.8%		776
4			■	AU3	15.8	●	4 m - Sand = 8.5% Silt = 38.7% Clay = 52.8%		775
5		SHALE, clayey, silty, completely weathered, grey, damp, high plastic, extremely weak, thinly laminated					4 m - LL = 52.3% PL = 17.8% PI = 34.5%		774
6			■	AU4	12.0	●	5.5 m - LL = 54.8% PL = 18.5% PI = 36.3%		773
7		End of Borehole @6.1 m							772
8									771
9									770
									769

Notes:

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PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.4m N 5610838 E 414837
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel up to 30 mm, trace sand, dry, stiff, high plastic, light brown, trace oxidation staining, trace coal staining	■	AU1	12.9	●	1 m - LL = 61.1% PL = 17.6% PI = 43.5%		779
2		...2.3 m - gravelly	■	AU2	8.6	●	2.5 m - Gravel = 9.2% 2.5 m - Sand = 39.0% Silt = 32.0% Clay = 19.8%		778
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil	■	AU3	15.1	●	4 m - LL = 52.3% PL = 18.6% PI = 33.7%		777
4		...4.5 m - becoming highly weathered	■	AU4	16.6	●	5.5 m - Sand = 1.6% Silt = 48.0% Clay = 50.4%		776
5									775
6		End of Borehole @6.1 m							774
7									773
8									772
9									771
									770

Notes:

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BOREHOLE No : **22BH560**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.4m N 5610733 E 414454
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		SHALE (Weathered), clayey, silty, trace medium grained sand lenses, completely weathered to residual soil, dark brown to grey, some oxidation staining, moist, medium plastic, extremely weak to hard soil, blocky, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	20.2	20.2	1 m - Sand = 26.5% Silt = 21.1% Clay = 52.4% 1 m - LL = 47.6% PL = 14.4% PI = 33.2%		779
2			■	AU2	20.9	20.9	2.5 m - Sand = 6.8% Silt = 56.3% Clay = 36.9%		778
3									777
4		...3.5 m - becoming grey, increasing oxidation staining, high plastic, trace sand	■	AU3	19.1	19.1	4 m - LL = 51.4% PL = 20% PI = 31.4%		776
5									775
6		6 m - ground up shale End of Borehole @6.1 m	■	AU4	17.8	17.8	5.5 m - Sand = 2.8% Silt = 48.3% Clay = 48.9%		774
7									773
8									772
9									771
									770

Notes:

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PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.9m N 5610739 E 414553
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, trace gravel, dry, firm, medium plastic, light brown, some oxidation staining	■	AU1	9.8	●	1 m - Dispersivity Classification = ND4 % Dispersion = % 1 m - LL = 42.5% PL = 17.1% PI = 25.4%		779
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU2	19.6	●	2.5 m - Sand = 2.0% Silt = 51.1% Clay = 46.9%		778
3									777
4		3.8 m - TRACE SEEPAGE End of Borehole @3.9 m	■	AU3	19.5	■	3.7 m - LL = 36.6% PL = 18.5% PI = 18.1% 3.9 m - Auger refusal		776
5									775
6									774
7									773
8									772
9									771

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH562**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.5m N 5610739 E 414649
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel up to 30 mm, moist, stiff, medium to high plastic, dark brown, some oxidation staining	■	AU1	19.4	19.4	1 m - LL = 46.8% PL = 10.7% PI = 36.1%		778
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, brownish grey, some oxidation staining, damp, medium plastic, extremely weak to hard soil, blocky	■	AU2	16.7	16.7	2.5 m - Sand = 1.8% Silt = 53.2% Clay = 45.0%		777
3		...3 m - becoming grey							776
4			■	AU3	17.7	17.7	4 m - LL = 47.6% PL = 17.7% PI = 29.9%		775
5		...5 m - becoming grey	■	AU4	13.4	13.4	5 m - Sand = 3.5% Silt = 37.4% Clay = 59.1%		774
5.4		5.4 m - ground up shale							773
5.5		End of Borehole @5.5 m							773
6									772
7									771
8									770
9									769

Notes:

SW Borrow search. Backfilled with bentonite.

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Reviewed By: T. Curtis



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BOREHOLE No : **22BH563**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/07/2022	COMPLETED	07/07/2022	GROUND ELEVATION	778.7m N 5610733 E 414756
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		TOPSOIL - 300 mm							778
1		CLAY TILL, silty, some gravel up to 60 mm, fine grained sand lenses, damp, stiff, medium plastic, dark brown, some oxidation staining, yellow sand, suspect white sulphate inclusions	■	AU1	16.2	●	1 m - Gravel = 25.6% 1 m - Sand = 18.1% Silt = 30.8% Clay = 25.5%		777
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, brownish grey, trace oxidation staining, damp, high plastic, very weak to hard soil, blocky	■	AU2	16.6	●	2.5 m - LL = 54.5% PL = 19.4% PI = 35.1%		776
3									775
4			■	AU3	17.5	●	4 m - Sand = 1.9% Silt = 47.2% Clay = 50.9% 4 m - LL = 52.1% PL = 18.8% PI = 33.3%		774
5		...4.5 m - increasing oxidation staining							773
6			■	AU4	18.2	●	5.5 m - LL = 55.6% PL = 19.7% PI = 35.9%		772
7		End of Borehole @6.1 m							771
8									770
9									769

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH564**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 779.0m N 5610735 E 414862
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace to some gravel up to 30 mm, dry, stiff, high plastic, light brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	7.6	●	1 m - LL = 50.4% PL = 18.2% PI = 32.2%		778
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, brownish grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	17.4	●	2.5 m - Sand = 0.9% Silt = 51.2% Clay = 47.9%		777
3		...3 m - becoming more ground up							776
4			■	AU3	15.2	●	4 m - LL = 51.8% PL = 18.2% PI = 33.6%		775
5		...5.2 m - becoming some sand							774
6		End of Borehole @5.8 m	■	AU4	13.5	●	5.5 m - Sand = 11.2% Silt = 54.8% Clay = 34.0% 5.8 m - Auger refusal		773
7									772
8									771
9									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH567**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 779.8m N 5610634 E 414557
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 776.67 m 3.18 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silt, trace sand, trace gravel, dry, stiff, medium plastic, light brown, trace oxidation specs,	■	AU1	9.1	●	1 m - Gravel = 1.5% 1 m - Sand = 2.5% Silt = 49.5% Clay = 46.5%	779
2		SHALE (Weathered), silt and clay, trace sand, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	16.7	●	2.5 m - LL = 50.9% PL = 19% PI = 31.9%	778
3			■	AU3	15.0	●	3.5 m - Sand = 11.7% Silt = 52.7% Clay = 35.6%	777
4		...3.5 m - becoming some sand ...3.8 m - TRACE SEEPAGE End of Borehole @4.0 m					3.5 m - LL = 50.0% PL = 18.7% PI = 31.3% 4 m - Auger refusal	776
5								775
6								774
7								773
8								772
9								771
								770

Notes:

SW Borrow search. Standpipe installed to 4.0 m. Backfilled with sand and bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH568**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.2m N 5610636 E 414654
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, moist, stiff, high plastic, brown, trace oxidation staining	■	AU1	24.6		1 m - LL = 62.6% PL = 14.3% PI = 48.3%		778
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, brownish grey, some oxidation staining, moist, high plastic, extremely weak to hard soil, blocky	■	AU2	21.3		2.5 m - Sand = 2.6% Silt = 48.0% Clay = 49.4%		777
3		...2.1 m - SEEPAGE							776
4		...3 m - becoming grey							775
5		SHALE, silt and clay, trace sand, highly weathered, grey, damp, high plastic, extremely weak, ground up	■	AU3	27.1		4 m - LL = 60.9% PL = 17.9% PI = 43.0%		774
6			■	AU4	14.8		5.5 m - Sand = 0.4% Silt = 52.0% Clay = 47.6%		773
7		End of Borehole @6.1 m							772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH569**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/07/2022 COMPLETED 07/07/2022 GROUND ELEVATION 778.4m N 5610638 E 414750
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ├ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, trace sand, trace gravel, damp, firm to stiff, medium plastic, brown, some oxidation staining	■	AU1	11.7	●	1 m - Gravel = 1.0% 1 m - Sand = 7.2% Silt = 60.8% Clay = 22.3% 1 m - LL = 47.5% PL = 19.3% PI = 28.2%		778
2		...2 m - ground up mudstone inclusions							777
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	15.9	●	2.5 m - LL = 51.0% PL = 19.4% PI = 31.6%		776
4			■	AU3	16.2	●	4 m - Sand = 6.8% Silt = 49.2% Clay = 44.0% 4 m - LL = 50.5% PL = 19.3% PI = 31.2%		775
5		SHALE, clay and silt, trace sand, highly weathered, grey, damp, high plastic, extremely weak, ground up	■	AU4	11.8	●	5.5 m - LL = 53.4% PL = 18% PI = 35.4%		774
6		End of Borehole @6.1 m							773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH570**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/07/2022	COMPLETED	07/07/2022	GROUND ELEVATION	779.0m N 5610636 E 414844
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, dry, firm to stiff, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	10.1	●	1 m - LL = 41.6% PL = 12.6% PI = 29.0%		778
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	17.7	●	2.5 m - Dispersivity Classification = ND3 % Dispersion = % 2.5 m - Sand = 0.8% Silt = 36.7% Clay = 62.5%		777
3							2.5 m - LL = 64.3% PL = 20.9% PI = 43.4%		776
4			■	AU3	23.5	●	4 m - LL = 51.2% PL = 19.4% PI = 31.8%		775
5		...5 m - becoming more shale inclusions							774
6		End of Borehole @6.1 m	■	AU4	14.9	●	5.5 m - Sand = 4.0% Silt = 51.9% Clay = 44.1%		773
7									772
8									771
9									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH573**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 778.9m N 5610545 E 414547
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY, silty, trace sand, very moist, soft, medium plastic, brown	■	AU1	31.1		1 m - Sand = 3.5% Silt = 36.1% Clay = 60.4%		778
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, brownish grey, some oxidation staining, moist, high plastic, extremely weak, blocky	■	AU2	19.5		2.5 m - LL = 51.1% PL = 15.6% PI = 35.5%		777
3									776
4		...4 m - becoming grey	■	AU3	18.3		4 m - Sand = 4.1% Silt = 43.3% Clay = 52.6% 4 m - LL = 53.6% PL = 17.5% PI = 36.1%		775
5									774
6		End of Borehole @6.1 m	■	AU4	18.9		5.5 m - LL = 55.6% PL = 18.6% PI = 37.0%		773
7									772
8									771
9									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH574**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 778.5m N 5610533 E 414652
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, moist, stiff, medium to high plastic, brown, trace organics, trace bentonite inclusions	■	AU1	18.8	●	1 m - LL = 44.2% PL = 14.2% PI = 30.0%		778
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, moist, medium plastic, very weak to hard soil, thinly laminated	■	AU2	17.9	●	2.5 m - Sand = 2.1% Silt = 47.3% Clay = 50.6%		777
3		...0.8 m - 400 mm ironstone layer							776
4		...1.3 m - high plastic layer	■	AU3	16.2	●	4 m - LL = 51.4% PL = 18.7% PI = 32.7%		775
5			■	AU4	16.5	●	5.5 m - Sand = 1.2% Silt = 38.6% Clay = 60.2%		774
6		End of Borehole @5.8 m					5.8 m - Auger refusal		773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

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Reviewed By: T. Curtis



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BOREHOLE No : **22BH575**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 777.9m N 5610541 E 414745
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, some completely weathered shale inclusions, silty, moist, stiff, medium plastic, greyish brown, sand pockets	■	AU1	21.6	●	1 m - Sand = 3.5% Silt = 35.1% Clay = 61.4%		777
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	18.7	●	2.5 m - LL = 50.5% PL = 19.8% PI = 30.7%		776
3									775
4			■	AU3	12.7	●	4 m - Sand = 4.2% Silt = 42.7% Clay = 53.1% 4 m - LL = 47.5% PL = 17.4% PI = 30.1%		774
5									773
6		SHALE, clay and silt, trace sand, highly weathered, grey, damp, high plastic, extremely weak, thinly laminated	■	AU4	14.9	●	5.5 m - LL = 56.5% PL = 18.9% PI = 37.6%		772
		End of Borehole @6.1 m							
7									771
8									770
9									769
									768

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH576**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 778.6m N 5610538 E 414846
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, dry, firm, medium plastic, brown, some oxidation staining							778
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, brownish grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU1	11.7	●	1 m - LL = 53.6% PL = 16% PI = 37.6%		777
3			■	AU2	14.5	●	2.5 m - Sand = 1.0% Silt = 50.2% Clay = 48.8%		776
4		...3.8 m - trace bentonite inclusions from 3.8 m	■	AU3	18.2	●	4 m - Sand = 2.9% Silt = 41.8% Clay = 55.3% 4 m - LL = 51.5% PL = 20.5% PI = 31.0%		775
5									774
6		...5.6 m - ground up shale inclusions End of Borehole @5.8 m	■	AU4	16.7	●	5.5 m - Sand = 4.1% Silt = 55.7% Clay = 40.2% 5.8 m - Auger refusal		773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

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BOREHOLE No : **22BH580**

PAGE 1 OF 1

CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	07/06/2022	COMPLETED	07/06/2022	GROUND ELEVATION	779.0m N 5610438 E 414647
DRILLING CONTRACTOR	Chilako Drilling Services Ltd.	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, some rounded gravel, up to 15 mm, damp, stiff, medium plastic, greyish brown, some oxidation staining, trace gypsum crystals, coal staining, trace bentonite seams	■	AU1	14.7	●	1 m - LL = 49.7% PL = 14.4% PI = 35.3%		778
2		1.4 m - 200 mm ironstone layer							
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, trace gypsum crystals	■	AU2	18.4	●	2.5 m - Sand = 2.5% Silt = 45.7% Clay = 51.8%		777
3									776
4			■	AU3	16.2	●	4 m - LL = 52.9% PL = 20.1% PI = 32.8%		775
5		4.5 m - heavy oxidation staining	■	AU4	15.6	●	5 m - Sand = 2.1% Silt = 44.6% Clay = 53.3%		774
5		End of Borehole @5.2 m					5.2 m - Auger refusal		
6									773
7									772
8									771
9									770

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH581**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 777.7m N 5610434 E 414753
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, some completely weathered shale inclusions, moist, stiff, medium plastic, dark brown, trace oxidation staining	■	AU1	17.8	●	1 m - Sand = 8.5% Silt = 20.8% Clay = 70.7%		777
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, brownish grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky	■	AU2	17.6	●			776
3									775
4		...3.5 m - increasing oxidation staining	■	AU3	16.6	●	4 m - Sand = 2.4% Silt = 49.1% Clay = 48.5% 4 m - LL = 51.7% PL = 20.1% PI = 31.6%		774
5		...5 m - becoming grey							773
6		SHALE, clay and silt, highly weathered, grey, damp, high plastic, very weak, thinly laminated	■	AU4	14.5	●	5.5 m - LL = 55.8% PL = 17.1% PI = 38.7%		772
7		End of Borehole @6.1 m							771
8									770
9									769
									768

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH585**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 778.2m N 5610336 E 414655
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some gravel, some medium grained sand lenses, some completely weathered shale inclusions, moist, stiff, medium plastic, dark brown, some oxidation staining, trace gypsum crystals	■	AU1	21.2		1 m - Gravel = 6.8% 1 m - Sand = 23.7% Silt = 20.7% Clay = 48.8%		778
2		SHALE (Weathered), silt and clay, trace sand, completely weathered, grey, with oxidation specs, moist, high plastic, very weak to hard soil, trace gypsum crystals	■	AU2	20.5		2.5 m - LL = 53.8% PL = 20.8% PI = 33.0%		777
3									776
4		4 m - bentonite seams 4.2 m - becoming ground up shale End of Borehole @4.3 m	■	AU3	17.4		4 m - Sand = 3.9% Silt = 50.0% Clay = 46.1% 4 m - LL = 52.4% PL = 18.4% PI = 34.0% 4.3 m - Auger refusal		775
5									774
6									773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH586**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 778.5m N 5610330 E 414743
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, some sand, trace gravel, dry to damp, firm, medium plastic, light brown, some oxidation staining	■	AU1	11.3	●	1 m - LL = 49.8% PL = 15% PI = 34.8%		778
2		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak	■	AU2	17.8	●	2.5 m - Sand = 1.7% Silt = 46.6% Clay = 51.7%		777
3									776
4			■	AU3	15.6	●	4 m - LL = 51.4% PL = 21.4% PI = 30.0%		775
5		End of Borehole @4.3 m					4.3 m - Auger refusal		774
6									773
7									772
8									771
9									770
									769

Notes:

SW Borrow search. Backfilled with bentonite.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH587**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/06/2022 COMPLETED 07/06/2022 GROUND ELEVATION 777.7m N 5610330 E 414851
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH 775.08 m 2.60 m
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)		
1		CLAY TILL, silty, dry, firm, low to medium plastic, brown, some oxidation staining, suspect white sulphate inclusions						777
2		SHALE (Weathered), clay and silt, trace sand, highly weathered, grey, some oxidation staining, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, trace suspect white sulphate inclusions	■	AU1	13.5	●	1 m - Sand = 10.4% Silt = 33.0% Clay = 56.6%	776
3		...3 m - hard drilling	■	AU2	16.6	●	2.5 m - LL = 54.9% PL = 19.8% PI = 35.1%	775
4			■	AU3	16.4	●	4 m - Sand = 2.4% Silt = 49.0% Clay = 48.6% 4 m - LL = 50.5% PL = 18.7% PI = 31.8%	774
5								773
6		BENTONITE (5.5 m), 100 mm layer SHALE (Weathered), "..."	■	AU4	36.6	●	5.5 m - LL = 158.1% PL = 35.4% PI = 122.7%	772
7		End of Borehole @6.1 m						771
8								770
9								769
								768

Notes:

SW Borrow search. 25 mm PVC standpipe installed to a depth of 6.1 m.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH588**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/27/2022 COMPLETED 07/27/2022 GROUND ELEVATION 774.4m N 5612096 E 415844
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED 01/25/2023

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, gravelly, some cobbles, dry, firm, medium plastic, brown, suspect white sulphate inclusions	■	AU1	5.2	●	0.6 m - LL = 40.6% PL = 13.3% PI = 27.3%		774
		...1 m - becoming trace to some gravel, no cobbles	■	AU2	8.4	●	1.2 m - Gravel = 4.2% 1.2 m - Sand = 21.1% Silt = 42.4% Clay = 32.3%		773
2		...1.5 m - becoming damp, dark brown	■	AU3	11.0	●	2.1 m - LL = 49.9% PL = 13.2% PI = 36.7%		772
		...2 m - becoming some oxidation staining	■	AU4	12.5	●	2.7 m - Sand = 9.7% Silt = 50.6% Clay = 39.7%		771
3		SHALE (Weathered), clay and silt, trace sand, completely weathered, grey, some oxidation staining, damp, high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU5	16.3	●			770
4			■	AU6	16.3	●			769
5			■	AU7	15.8	●			768
6			■	AU8	16.3	●			767
		End of Borehole @6.1 m							766
7									765
8									
9									

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH589**

PAGE 1 OF 1

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 775.0m N 5612107 E 415586
DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 100 200 300 400 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silt, some sand, trace gravel, damp, firm, medium plastic, brown, some oxidation staining, suspect white sulphate inclusions	■	AU1	12.9	●	0.6 m - Gravel = 2.1%		774
			■	AU2	12.9	● ───────────┐	0.6 m - Sand = 11.2%		
							Silt = 43.3%		
2			■	AU3	15.6	● ───────────┐	Clay = 43.4%		773
			■	AU4	16.6	● ───────────┐	1.2 m - LL = 44.9%		
							PL = 14.2%		
3			■	AU5	13.1	●	PI = 30.7%		
			■	AU6	18.3	●	2.1 m - Sand = 3.0%		772
			■	AU7	17.6	●	Silt = 58.1%		
			■	AU8	18.8	●	Clay = 38.9%		771
							2.1 m - LL = 58.8%		
							PL = 16.4%		770
							PI = 42.4%		
							2.7 m - LL = 62.1%		769
							PL = 18%		
							PI = 44.1%		
4		SHALE (Weathered), clay and silt, trace sand, completely weathered, light brown to dark grey mottling, some oxidation staining, damp, high plastic, extremely weak, blocky, suspect white sulphate inclusions, trace gypsum crystals							
5									
6		End of Borehole @6.1 m							
7									768
8									767
9									766

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis



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BOREHOLE No : **22BH590**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 07/28/2022 COMPLETED 07/28/2022 GROUND ELEVATION 774.7m N 5612325 E 415581
 DRILLING CONTRACTOR Chilako Drilling Services Ltd. GROUND WATER ELEVATION / DEPTH _____
 DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
						● MOISTURE CONTENT ┤ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 ▲ POCKET PEN (kPa)			
1		CLAY TIL, silt, some sand, some gravel, damp, firm to stiff, medium plastic, dark brown, some oxidation staining, suspect white sulphate inclusions, trace gypsum crystals	■	AU1	5.4	●	0.6 m - LL = 32.3% PL = 12.4% PI = 19.9%		774
		...1 m - becoming moist	■	AU2	12.1	●	1.2 m - Gravel = 9.1% 1.2 m - Sand = 18.6% Silt = 36.0% Clay = 36.3%		773
2		...1.5 m - becoming trace gravel	■	AU3	19.4	●	2.1 m - LL = 59.1% PL = 16% PI = 43.1%		772
		...2 m - becoming high plastic, trace sand	■	AU4	21.0	●	2.7 m - Sand = 6.2% Silt = 50.6% Clay = 43.2%		771
3			■	AU5	20.9	●			770
4		SHALE (Weathered), silt and clay, trace sand, highly weathered, grey, some oxidation staining, damp to moist, high plastic, extremely weak, blocky, suspect white sulphate inclusions	■	AU6	19.2	●			769
		...4.5 m - becoming no oxidation staining	■	AU7	18.1	●			768
5			■	AU8	16.6	●			767
6		End of Borehole @6.1 m							766
7									765
8									
9									

Notes:

NW Borrow search. Backfilled with bentonite chips.

Logged By: C. Tams

Reviewed By: T. Curtis

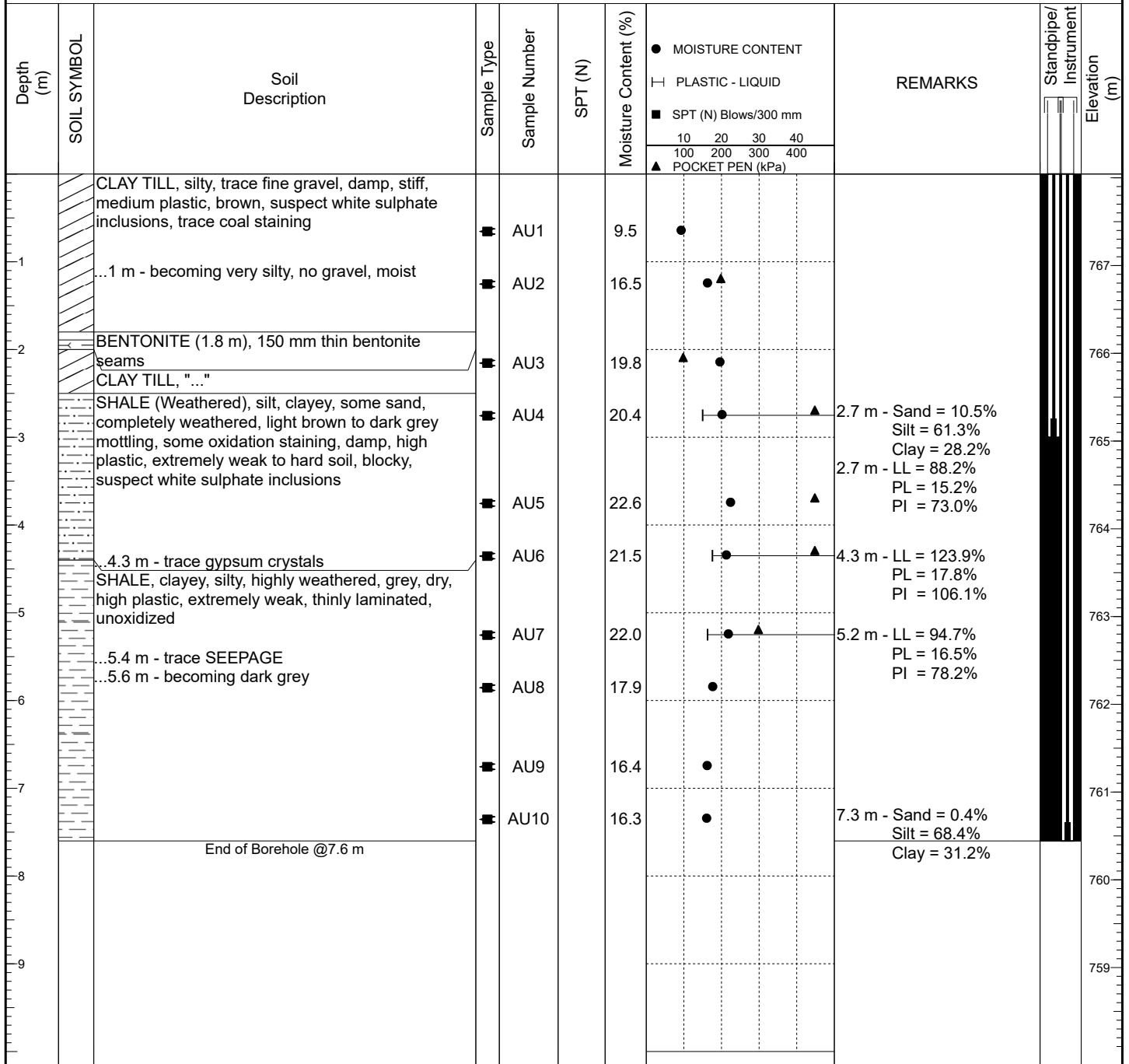


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BOREHOLE No : **22VWP-05**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 09/13/2022 COMPLETED 09/13/2022 GROUND ELEVATION 768.0m N 5611825 E 414850
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
DRILLING METHOD 6" SSA DATE GROUND WATER RECORDED



Notes:

VWP install. 1: 143531, 2: 143385

Logged By: C. Tams

Reviewed By: T. Curtis

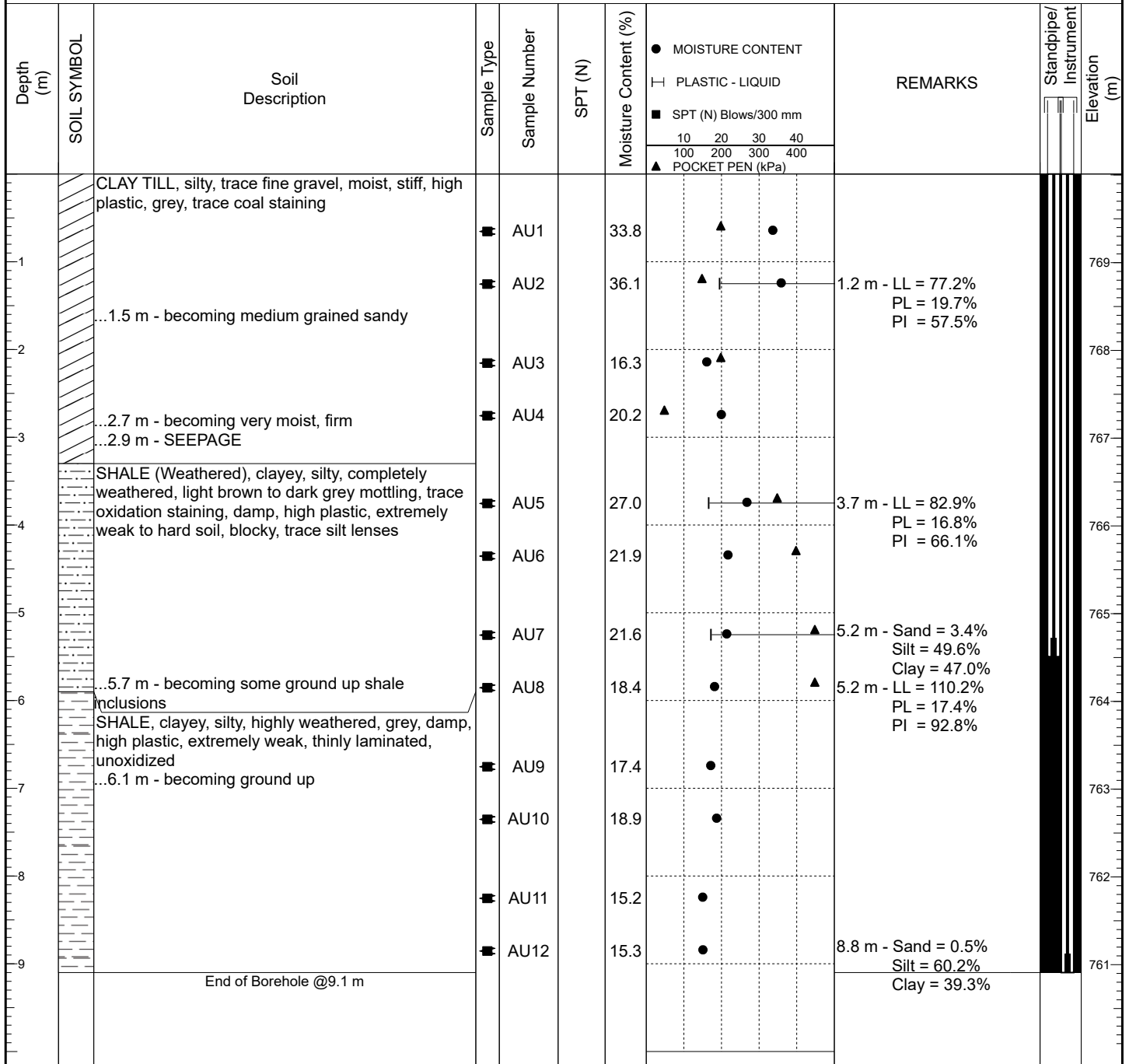


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BOREHOLE No : **22VWP-06**

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CLIENT	Eastern Irrigation District	PROJECT NAME	Snake Lake Reservoir Expansion		
PROJECT NUMBER	1560-193-00	PROJECT LOCATION	NE 1/4 32-19-16		
DATE STARTED	09/13/2022	COMPLETED	09/13/2022	GROUND ELEVATION	770.0m N 5611032 E 415592
DRILLING CONTRACTOR	Val's Drilling	GROUND WATER ELEVATION / DEPTH			
DRILLING METHOD	6" SSA	DATE GROUND WATER RECORDED			



Notes:

VWP install. 1: 143535, 2: 143547. Backfilled with cement grout.

Logged By: C. Tams

Reviewed By: T. Curtis



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COREHOLE No : **23CH702**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/11/2023 COMPLETED 08/11/2023 GROUND ELEVATION 767.62m N 5611494.100 E 416865.300
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		CLAY AND SILT, sandy, gravelly, dry, stiff, low plastic, light brown	AU1						18.2		0 m - Lost circulation and used lots of water this hole. Seismic cap and wire found nearby.
		CLAY TILL, silty, trace sand, trace gravel up to 30 mm, moist, firm, medium plastic, brown, some oxidation staining, trace gypsum crystals, trace white precipitates, trace coal staining	AU2						26.6		1.2 m - Gravel = 0.1%
2		...1.2 m - becoming no gravel, some completely weathered shale inclusions	AU3						22.3		1.2 m - Sand = 6.4% Silt = 42.6% Clay = 50.9%
		SHALE (Weathered), clayey, silty, highly weathered, dark brown to grey mottling, damp, high plastic, extremely weak, blocky, thinly laminated, trace oxidation staining, trace white precipitates, trace gypsum crystals	AU4						24.3		1.2 m - Dispersivity Classification = ND3 % Dispersion = 78%
3		...3.0 m - 270 mm of core loss	RC1		3.05 - 4.57	1	49 82 64	2			2.1 m - Dispersivity Classification = D2 % Dispersion = 45%
		...3.3 m - 200 mm of slough									3.05 m - Switched from 6" SSA to HQ3 Rotary Coring
4		...3.6 m - becoming moderately weathered									
		...3.9 m - 80 mm of crumbled core	RC2		4.57 - 6.09	2	75 93 78	3			
5		SHALE, clayey, silty, unweathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated									
		...4.6 m - 100 mm of core loss									
6		...4.7 m - 100 mm of crumbled core	RC3		6.09 - 7.61	3	89 100 90	2			
		...5.0 m - becoming very weak									
		...5.5 m - some mechanical rubble									
7		...6.4 m - becoming weak									
		...7.0 m - 62° fracture									
		...7.4 m - 42° fracture	RC4		7.61 - 9.13	4	87 100 89	2			
8		...7.6 m - mechanically fractured run									
		...8.3 m - 45° fracture	RC5		9.13 - 10.65	5	93 93 93	1			

Notes:

Target depth of 10 m achieved. Corehole completed as a 50 mm well. Packer test completed after coring.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	7.60	PLAIN
7.60	10.60	SLOTTED

Logged By: C. Tams

Reviewed By: T. Curtis



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COREHOLE No : **23CH702**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/11/2023 COMPLETED 08/11/2023 GROUND ELEVATION 767.62m N 5611494.100 E 416865.300
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.0 m - 500 mm of mechanical rubble										757
		...10.6 m - 100 mm of core loss										
12												756
13												755
14												754
15												753
16												752
17												751
18												750
19												749
												748

Notes:

Target depth of 10 m achieved. Corehole completed as a 50 mm well. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	7.60	PLAIN
7.60	10.60	SLOTTED

Logged By: C. Tams

Reviewed By: T. Curtis



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COREHOLE No : **23CH700**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/07/2023 COMPLETED 08/07/2023 GROUND ELEVATION 779.07m N 5612596.600 E 414519.200
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT □ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa)		
1		TOPSOIL, silty, sandy, some clay, damp, firm, low plastic, brown, trace root hairs	■	AU1							778
2		CLAY TILL, silty, sandy, trace fine gravel, damp, stiff, medium plastic, brown, some white precipitates, trace oxidation staining ...1.5 m - becoming some gravel up to 30 mm	■	AU2							777
3		SHALE (Weathered), clayey, silty, trace sand, highly weathered, grey, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace white precipitates	■	AU3							776
4		...3.2 m - becoming moderately weathered, trace oxidation staining	■	AU4							775
5		...4.3 m - 100 mm of core loss	■	AU5							774
6		...4.6 m - 100 mm bentonite seam	■	RC1	4.27 -	1	72	3		4.27 m - Switched from 6" SSA to HQ3 Rotary Coring	773
7		...5.2 m - 73° fracture	■	AU6	5.79		93				772
8		...5.6 m - some crumbled core	■				80				771
9		...5.8 m - mechanically fractured run, 210 mm of core loss	■	RC2	5.79 -	2	66	4			770
		...6.4 m - trace bentonite inclusions	■		7.31		86				
		...6.9 m - 63° fracture	■				66				
		...7.1 m - some crumbled core	■	RC3	7.31 -	3	80	3			
		...7.3 m - 270 mm of core loss	■		8.83		82				
		...7.9 m - becoming slightly weathered, very weak	■				80				
		...8.1 m - 65° fracture	■								
		SHALE, clayey, silty, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated	■	RC4	8.83 -	4	92	1			
		...8.3 m - 56° fracture	■		10.35		92				

Notes:

Target depth of 14 m achieved. Corehole completed as a well, refer to diagram. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	13.40	PLAIN
13.40	14.91	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH700**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/07/2023 COMPLETED 08/07/2023 GROUND ELEVATION 779.07m N 5612596.600 E 414519.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11		...10.2 m - 120 mm of core loss ...10.6 m - 56° fracture ...10.8 m - bedding fracture, becoming widely spaced fractures ...10.9 m - becoming weak, some thinly bedded sandstone layers		RC5	10.35 - 11.87	5	97 100 97	1				768
12		...11.8 m - trace shell fragments ...12.1 m - 75° fracture		RC6	11.87 - 13.39	6	100 100 100	1				767
13		...13.0 m - 550 mm of very high plastic, extremely weak shale		RC7	13.39 - 14.91	7	100 100 100	1				766
14		...13.6 m - 180 mm of strong calcified shale										765
15		...14.2 m - 78° fracture										764
16												763
17												762
18												761
19												760

Notes:

Target depth of 14 m achieved. Corehole completed as a well, refer to diagram. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	13.40	PLAIN
13.40	14.91	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun

CLIENT	Eastern Irrigation District		PROJECT NAME	Snake Lake Reservoir Expansion	
PROJECT NUMBER	1560-193-00		PROJECT LOCATION	NE 1/4 32-19-16	
DATE STARTED	08/07/2023	COMPLETED	08/08/2023	GROUND ELEVATION	779.05m N 5612605.400 E 414525.400
DRILLING CONTRACTOR	Val's Drilling		GROUND WATER ELEVATION / DEPTH		
CORING TYPE	Other	DIAMETER (mm)	DATE GROUND WATER RECORDED		

[illegible]

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH700B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/07/2023 COMPLETED 08/08/2023 GROUND ELEVATION 779.05m N 5612605.400 E 414525.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			768
12												767
13												766
14												765
15												764
16												763
17												762
18												761
19												760

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH700B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/07/2023 COMPLETED 08/08/2023 GROUND ELEVATION 779.05m N 5612605.400 E 414525.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
21									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			758
22												757
23												756
24												755
25												754
26												753
27												752
28												751
29												750

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH701**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/09/2023 COMPLETED 08/09/2023 GROUND ELEVATION 770.28m N 5612525.300 E 416317.500
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
									● MOISTURE CONTENT H PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		SILT AND SAND, some clay, dry, firm, low plastic, light brown, trace root hairs	■	AU1					3.3 ● H	0.6 m - LL = 17.1% PL = 13% PI = 4.1%		770
2		CLAY TILL, silty, sandy, trace fine gravel, damp, stiff, low to medium plastic, brown, some white precipitates	■	AU2						0.6 m - Sand = 62.5% Silt = 26.4% Clay = 11.1%		769
3		SHALE (Weathered), clayey, silty, some sand, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, some oxidation staining	■	AU3								768
4		3.0 m - 100 mm of core loss	■	AU4								767
5		3.3 m - becoming trace sand, highly weathered		RC1	3.05 - 4.57	1	21 93 63	13		3.05 m - Switched from 6" SSA to HQ3 Rotary Coring		766
6		4.4 m - becoming trace gypsum crystals		RC2	4.57 - 6.09	2	44 90 59	7				765
7		4.6 m - 150 mm of core loss		RC3	6.09 - 7.61	3	61 100 86	5				764
8		5.0 m - some crumbled core		RC4	7.61 - 9.13	4	94 96 95	3				763
9		5.9 m - some crumbled core		RC5	9.13 - 10.65	5	97 100 97	3				762
		6.4 m - becoming moderately weathered										761
		6.8 m - 83° fracture										
		7.0 m - 69° fracture										
		7.1 m - 76° fracture										
		7.4 m - 100 mm of strong shale										
		7.6 m - 60 mm of core loss										
		8.2 m - bedding fracture										
		8.3 m - 65° fracture										
		8.4 m - becoming slightly weathered, very weak, moderately widely spaced fractures										
		9.0 m - 68° fracture										
		9.1 m - becoming grey with trace oxidation staining										
		9.3 m - 78° fracture										
		9.9 m - 82° fracture										

Notes:

Target depth of 27 m achieved. Corehole completed as a well, refer to diagram. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	25.90	PLAIN
25.90	27.37	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH701**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/09/2023 COMPLETED 08/09/2023 GROUND ELEVATION 770.28m N 5612525.300 E 416317.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
		...10.1 m - 64° fracture										760
11		SHALE, silty, clayey, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated		RC6	10.65 - 12.17	6	98 100 98	1				
		...10.6 m - becoming some very thin to thin weakly cemented layers										
12		...10.8 m - 31° fracture										759
		...11.4 m - bedding fracture, becoming widely spaced fractures		RC7	12.17 - 13.69	7	106 106 106	0				758
13		...12.3 m - becoming weak										757
				RC8	13.69 - 15.21	8	99 100 99	1				756
14												
15		...14.7 m - 72° fracture										755
		...15.5 m - 41° fracture		RC9	15.21 - 16.73	9	95 100 96	2				
16												754
		...16.1 m - becoming very weak										
		...16.3 m - 67° fracture										
17		...16.4 m - some crumbled core		RC10	16.73 - 18.25	10	87 100 91	1				753
		...16.8 m - 50 mm of bentonitic inclusions										
		...16.9 m - becoming weak										
18		...17.9 m - 60° fracture										752
		...18.0 m - bedding fracture with some crumbled core		RC11	18.25 - 19.77	11	84 94 84	1				
19		...18.0 m - 420 mm very weak layer										
		...18.2 m - 90 mm of core loss										
		...19.5 m - 65° fracture										751
		...19.6 m - trace shell fragments		RC12	19.77	12	97	1				
		...19.6 m - some crumbled core										

Notes:

Target depth of 27 m achieved. Corehole completed as a well, refer to diagram. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	25.90	PLAIN
25.90	27.37	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH701**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/09/2023 COMPLETED 08/09/2023 GROUND ELEVATION 770.28m N 5612525.300 E 416317.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.6 m - 77° fracture			-		100					750
		...20.8 m - 78° fracture			21.29		97					
			RC13		21.29	13	86	1				749
					-		91					
22		...22.1 m - 69° fracture			22.81		90					748
		...22.7 m - 130 mm of core loss	RC14		22.81	14	88	1				747
23		...23.3 m - bedding fracture			-		88					
		...24.2 m - 180 mm of core loss	RC15		24.33	15	82	3				746
24		...24.5 m - vertical fractures			-		101					
25		...24.7 m - 64° fracture			25.85		84					745
		...25.2 m - 79° fracture										
26		...25.8 m - 130 mm of core loss	RC16		25.85	16	91	1				744
		...26.5 m - bedding fracture			-		91					
27					27.37		91					743
28												742
29												741

Notes:

Target depth of 27 m achieved. Corehole completed as a well, refer to diagram. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	25.90	PLAIN
25.90	27.37	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun

CLIENT	Eastern Irrigation District		PROJECT NAME	Snake Lake Reservoir Expansion	
PROJECT NUMBER	1560-193-00		PROJECT LOCATION	NE 1/4 32-19-16	
DATE STARTED	08/12/2023	COMPLETED	08/14/2023	GROUND ELEVATION	767.74m N 5611502.200 E 416865.900
DRILLING CONTRACTOR	Val's Drilling		GROUND WATER ELEVATION / DEPTH		
CORING TYPE	Other	DIAMETER (mm)	DATE GROUND WATER RECORDED		

[illegible]

Notes:

100 mm PVC well installed to 25.9 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.90	PLAIN
22.90	25.90	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH702B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/12/2023 COMPLETED 08/14/2023 GROUND ELEVATION 767.74m N 5611502.200 E 416865.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			757
12										12 m - Used 10 m3 of water to drill. Seismic cap and wire found nearby. Water seeping out of ground 25 m away. Hole initially bridged off at 12 m, had to be reamed out.		756
13												755
14												754
15												753
16												752
17												751
18												750
19												749
												748

Notes:

100 mm PVC well installed to 25.9 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.90	PLAIN
22.90	25.90	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH702B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/12/2023 COMPLETED 08/14/2023 GROUND ELEVATION 767.74m N 5611502.200 E 416865.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	Legend				REMARKS	Standpipe/ Instrument	Elevation (m)
										● MOISTURE CONTENT	— PLASTIC - LIQUID	■ SPT (N) Blows/300 mm	▲ POCKET PEN (kPa)			
										10	20	30	40			
										50	100	150	200			
21																747
22																746
23																745
24																744
25																743
26																742
27																741
28																740
29																739
																738

Notes:

100 mm PVC well installed to 25.9 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.90	PLAIN
22.90	25.90	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH703**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2023 COMPLETED 06/21/2023 GROUND ELEVATION 767.59m N 5610313.300 E 416850.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm ▲ POCKET PEN (kPa) 10 20 30 40 50 100 150 200		
1		TOPSOIL, sandy, some silt, damp, firm, low plastic, brown, trace root hairs	AU1						5.5		767
2		SAND AND SILT, poorly graded, fine grained, sub-rounded, damp, very loose, brown	AU2						15.0		766
		...1.0 m - becoming moist	SPT1								
3		...2.3 m - SEEPAGE	AU3						20.3		765
		...2.5 m - becoming very moist	AU4						27.8		
4		CLAY TILL, silty, sandy, trace gravel up to 50 mm, very moist, stiff, medium plastic, dark brown	SPT2								764
5		...4.2 m - becoming coarse grained sandy, some gravel	AU5						20.9		763
6		SHALE, silty, clayey, slightly weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated	AU6						24.7		762
7		...4.5 m - 780 mm of core loss	RC1		4.50 - 6.02	1	14 49 46	2			761
8		...5.6 m - 49° fracture	SPT3								760
9		...6.2 m - becoming unweathered	RC2		6.02 - 7.54	2	23 96 69	3			759
		...6.5 m - 73° fracture									758
		...6.7 m - some crumbled core									
		...7.5 m - 60 mm of core loss	RC3		7.54 - 9.06	3	22 100 91	2			
		...7.5 m - becoming some thin weakly cemented layers									
		...7.6 m - 59° fracture									
		...8.2 m - 39° fracture									
		...9.1 m - becoming very weak	RC4		9.06 - 10.58	4	54 100 92	3			
		...9.9 m - 74° fracture									

Notes:

Target depth of 25 m achieved. Packer test completed after coring. Completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	24.10	PLAIN
24.10	25.60	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH703**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2023 COMPLETED 06/21/2023 GROUND ELEVATION 767.59m N 5610313.300 E 416850.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.1 m - 76° fracture										
		...10.6 m - 80 mm of extremely weak core	RC5		10.58	5	61	3				757
		...11.0 m - bedding fracture			-		101					
		...11.2 m - sub-vertical fracture			12.10		72					
		...11.5 m - 55° fracture										756
12		...11.8 m - vertical fracture	RC6		12.10	6	42	1				
		...12.1 m - mechanically fractured run			-		100					
		...12.4 m - 75° fracture			13.62		94					755
13		...13.0 m - 42° fracture										
		...13.1 m - becoming extremely weak										
		...13.6 m - mechanically fractured run	RC7		13.62	7	7	2				754
14		...13.7 m - becoming very weak			-		101					
					15.14		91					
												753
15		...15.3 m - 65° fracture	RC8		15.14	8	21	2				
					-		100					
					16.66		89					752
16		...16.2 m - 75° fracture										
		...16.7 m - 40 mm of crumbled core	RC9		16.66	9	0	1				751
17		...17.0 m - 76° fracture			-		100					
					18.18		93					
												750
18		...17.8 m - 67° fracture	RC10		18.18	10	37	3				
		...18.6 m - bedding fracture			-		100					
19		...18.7 m - some crumbled core			19.70		89					749
		...19.1 m - 67° fracture										
			RC11		19.70	11	26	2				748

Notes:

Target depth of 25 m achieved. Packer test completed after coring. Completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	24.10	PLAIN
24.10	25.60	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH703**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/21/2023 COMPLETED 06/21/2023 GROUND ELEVATION 767.59m N 5610313.300 E 416850.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
21		...20.2 m - 60° fracture			-	100					747
		...20.7 m - 180 mm of very strong calcified shale			21.22	84					
		...20.8 m - 58° fracture		RC12	21.22	12	51	1			746
					-	100					
					22.74	95					
22		...21.9 m - bedding fracture									745
		...22.0 m - 70° fracture									
				RC13	22.74	13	80	1			744
		...22.7 m - 60 mm of core loss			-	96					
		...22.9 m - becoming weak, widely spaced fractures			24.26	91					
		...23.0 m - 80° fracture									743
		...23.8 m - some crumbled core		RC14	24.26	14	33	2			
					-	100					
		...24.6 m - some crumbled core			25.78	94					742
		...25.0 m - 36° fracture									
26											741
27											740
28											739
29											738

Notes:

Target depth of 25 m achieved. Packer test completed after coring. Completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	24.10	PLAIN
24.10	25.60	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/13/2023 COMPLETED 06/14/2023 GROUND ELEVATION 771.21m N 5609474.300 E 416207.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		CLAY, silty, some sand, damp, stiff, medium plastic, light brown	AU1								771
		SHALE (Weathered), clayey, silty, highly weathered, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace white precipitates, trace gypsum crystals	AU2								770
2			SPT1								
			AU3								769
3		...3.3 m - 70° fracture	AU4								
		...3.4 m - some crumbled core	RC1		3.00 -	1	89	4			
4		SHALE, clayey, silty, moderately weathered, dark brown to grey mottling, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	SPT2		4.52		100				768
							93				
5		...4.0 m - 78° fracture	RC2		4.52 -	2	96	3			767
		...5.1 m - horizontal fracture			6.04		97				
6		...5.4 m - 64° fracture					96				766
		...5.6 m - 56° fracture									
7		...5.7 m - 72° fracture									
		...6.0 m - 40 mm of core loss	RC3		6.04 -	3	66	7			765
		...6.2 m - sub-horizontal fracture			7.56		97				
8		...6.4 m - 74° fracture					70				
		...6.5 m - mechanically fractured area									764
9		...6.8 m - 50 mm of crumbled core									
		...7.0 m - 77° fracture									763
		...7.2 m - 60° fracture									
		...7.5 m - 60 mm of core loss	RC4		7.56 -	4	59	3			
		...7.7 m - becoming grey, trace oxidation staining			9.08		84				
		...8.1 m - 34° fracture					70				
		...8.2 m - becoming very weak									
		...8.4 m - 74° fracture									
		...8.6 m - 70° fracture									
		...8.8 m - 240 mm of core loss	RC5		9.08 -	5	80	5			762
		...9.1 m - becoming slightly weathered, weak			10.60		100				
		...9.7 m - 42° fracture					84				
		...9.8 m - 74° fracture									

Notes:

Target depth of 20 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	18.50	PLAIN
18.50	20.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/13/2023 COMPLETED 06/14/2023 GROUND ELEVATION 771.21m N 5609474.300 E 416207.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11		...10.1 m - becoming some very thin weakly cemented layers		RC6	10.60	6	93	2				761
		...10.4 m - 41° fracture			-		100					
		...10.7 m - 75° fracture			12.12		100					760
		...10.8 m - becoming unweathered, widely spaced fractures, unoxidized										
12		...11.4 m - 69° fracture		RC7	12.12	7	100	1				759
		...12.1 m - becoming moderately strong			-		100					
13		...13.0 m - horizontal fracture		RC8	13.64	8	100	1				758
		...13.3 m - horizontal fracture			-		100					
14		...14.1 m - 76° fracture		RC9	15.16	9	76	2				757
		...14.4 m - horizontal fracture			-		84					
15		...15.6 m - 61° fracture		RC10	16.68	10	71	1				756
		...15.7 m - 73° fracture			-		86					
16		...16.2 m - horizontal fracture with extremely weak clay infill		RC11	18.20	11	85	1				755
		...16.4 m - 240 mm of core loss			-		96					
17		...16.7 m - 100 mm of crumbled core		RC12	19.72	12	39	2				754
		...16.8 m - vertical fracture			-		86					
18		...18.0 m - 35° fracture		RC11	18.20	11	85	1				753
		...18.1 m - 60 mm of core loss			-		100					
19		...18.6 m - 25° fracture		RC12	19.72	12	39	2				752
		...19.5 m - 41° fracture			-		86					
		...19.8 m - 200 mm of very strong calcified shale		RC12	19.72	12	39	2				
		...19.9 m - 60 mm of crumbled core			-		86					

Notes:

Target depth of 20 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	18.50	PLAIN
18.50	20.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/13/2023 COMPLETED 06/14/2023 GROUND ELEVATION 771.21m N 5609474.300 E 416207.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
21		...20.1 m - 78° fracture ...20.4 m - sub-horizontal fracture ...20.5 m - 50 mm of extremely weak bentonitic clay ...20.6 m - 620 mm of core loss			- 21.24		59 43				751
22											750
23											749
24											748
25											747
26											746
27											745
28											744
29											743
											742

Notes:

Target depth of 20 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	18.50	PLAIN
18.50	20.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/16/2023 COMPLETED 06/17/2023 GROUND ELEVATION 771.32m N 5609458.400 E 416204.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
		TOPSOIL, silty, sandy, some clay, trace gravel, dry, firm, low plastic, light brown, trace root hairs		AU1								771
1		SHALE, clayey, silty, completely weathered, brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace gypsum crystals, trace white precipitates		AU2								770
2		SHALE, silty, clayey, moderately weathered, brown to dark grey mottling, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals		RC1	1.50 - 3.02	1	63 75 64	1		1.5 m - No samples kept this hole.		769
3		...1.5 m - 380 mm of core loss ...1.9 m - 56° fracture ...3.2 m - 100 mm of mechanical rubble ...3.5 m - 80 mm of mechanical rubble		RC2	3.02 - 4.54	2	62 99 80	2				768
4		...4.5 m - mechanically fractured run		RC3	4.54 - 6.06	3	55 100 95	1				767
5		...6.1 m - 220 mm of core loss		RC4	6.06 - 7.58	4	19 86 46	2				766
6		...7.2 m - becoming slightly weathered, grey		RC5	7.58 - 9.10	5	0 100 66	2				765
7		...7.6 m - mechanically fractured run		RC6	9.10 - 10.62	6	23 89 72	2				764
8		...9.1 m - mechanically fractured run										763
9		...9.4 m - becoming very weak										762

Notes:

Target depth of 25 m achieved. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	16.00	PLAIN
16.00	19.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/16/2023 COMPLETED 06/17/2023 GROUND ELEVATION 771.32m N 5609458.400 E 416204.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
11		...10.4 m - 170 mm of core loss		RC7	10.62 - 12.14	7	89 93 93	1			761
12		...11.2 m - becoming unweathered, widely spaced fractures, unoxidized		RC8	12.14 - 13.66	8	100 100 100	1			760
13		...12.0 m - 100 mm of core loss		RC9	13.66 - 15.18	9	100 100 100	2			759
14		...12.7 m - 62° fracture		RC10	15.18 - 16.70	10	95 105 98	1			758
15		...13.7 m - becoming weak		RC11	16.70 - 18.22	11	93 101 96	1			757
16		...13.8 m - 78° fracture		RC12	18.22 - 19.74	12	91 93 91	1			756
17		...14.0 m - 71° fracture		RC13	19.74	13	67	1			755
18		...14.8 m - 68° fracture									754
19		...15.2 m - becoming some thin weakly cemented layers								19 m - Hole sloughed in - installed well to 19 m.	753
		...15.5 m - 66° fracture									752
		...15.6 m - 44° fracture									
		...17.3 m - 74° fracture									
		...18.6 m - bedding fracture									
		...19.4 m - 150 mm of strong calcified shale									
		...19.6 m - 100 mm of core loss									

Notes:

Target depth of 25 m achieved. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	16.00	PLAIN
16.00	19.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH704B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/16/2023 COMPLETED 06/17/2023 GROUND ELEVATION 771.32m N 5609458.400 E 416204.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.3 m - bedding fracture ...20.4 m - becoming moderately strong ...20.8 m - 450 mm of core loss, recovered on next run ...21.4 m - 100 mm weak layer ...21.5 m - 69° fracture ...21.6 m - becoming very widely spaced fractures		RC14	- 21.26 21.26 - 22.78	14	70 67 126 126 126	1				751
22												750
23				RC15	22.78 - 24.30	15	112 112 112	0				749
24												748
25				RC16	24.30 - 25.82	16	95 95 95	0				747
26		...25.7 m - 80 mm of core loss										746
27												745
28												744
29												743
												742

Notes:

Target depth of 25 m achieved. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	16.00	PLAIN
16.00	19.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH705**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/12/2023 COMPLETED 06/12/2023 GROUND ELEVATION 776.43m N 5609460.700 E 414986.100
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, clayey, sandy, some silt, trace gravel, moist, stiff, medium plastic, brown, trace root hairs	■	AU1							776
		CLAY TILL, sandy, silty, trace fine gravel, moist, very stiff, medium plastic, brown, some oxidation staining, trace gypsum crystals	■	AU2							
2		SHALE (Weathered), clayey, silty, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace white precipitates, trace gypsum crystals	▲	SPT1							775
		...2.0 m - becoming highly weathered, dark grey	■	AU3							
3		...3.4 m - horizontal fracture with some crumbled core	■	AU4							
		SHALE, clayey, silty, highly weathered, grey, damp, high plastic, extremely weak, blocky, closely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	▲	SPT2	3.10 - 4.62	1	82 100 95	5			773
4		...3.8 m - horizontal fracture		RC2	4.62 - 6.14	2	91 100 95	3		3.5 m - Switched to rotary coring	772
5		...3.8 m - 80 mm bentonite seam									
6		...4.2 m - 80° fracture		RC3	6.14 - 7.66	3	71 100 75	4			771
7		...4.4 m - becoming moderately weathered									
8		...4.6 m - 70 mm of mechanical rubble		RC4	7.66 - 9.18	4	9 50 17	20			770
		...4.7 m - 88° fracture									
9		...4.8 m - becoming slightly weathered, very weak, moderately widely spaced fractures, unoxidized		RC5	9.18 - 10.70	5	92 100 95	3			769
		...5.7 m - 84° fracture									
		...6.1 m - 200 mm of slough									
		...6.3 m - 300 mm mechanically fractured area									
		...6.6 m - 53° fracture followed by crumbled core									
		...6.7 m - 51° fracture									
		...6.9 m - 68° fracture									
		...7.0 m - 39° fracture									
		...7.5 m - becoming some thin weakly cemented layers									767

Notes:

Target depth of 15 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	12.20	PLAIN
12.20	15.20	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH705**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/12/2023 COMPLETED 06/12/2023 GROUND ELEVATION 776.43m N 5609460.700 E 414986.100
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
11		...7.7 m - mechanically fractured area ...7.9 m - 360 mm of crumbled core ...8.3 m - 760 mm of core loss ...9.2 m - mechanically fractured run ...9.5 m - 74° fracture ...9.5 m - becoming unweathered, weak ...9.8 m - 73° fracture followed by vertical fractures		RC6	10.70 - 12.22	6	86 96 88	3			766
12		...10.4 m - 63° fracture ...10.5 m - 76° fracture ...11.0 m - 76° fracture ...11.1 m - becoming very silty, moderately strong ...11.8 m - 81° fracture ...11.8 m - 50 mm of crumbled core ...11.9 m - 100 mm of bentonitic clay ...12.0 m - 140 mm of strong calcified shale		RC7	12.22 - 13.74	7	95 100 100	2			765 764
13		...12.2 m - 60 mm of core loss ...12.4 m - 73° fracture ...12.5 m - 40° fracture ...12.6 m - becoming widely spaced fractures ...13.7 m - becoming very clayey, weak ...14.6 m - 74° fracture ...14.9 m - horizontal fracture with some crumbled core ...15.2 m - 60 mm of core loss		RC8	13.74 - 15.26	8	96 96 96	2			763 762 761 760 759 758 757

Notes:

Target depth of 15 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	12.20	PLAIN
12.20	15.20	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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CLIENT	Eastern Irrigation District			PROJECT NAME	Snake Lake Reservoir Expansion				
PROJECT NUMBER	1560-193-00			PROJECT LOCATION	NE 1/4 32-19-16				
DATE STARTED	06/28/2023	COMPLETED	06/28/2023	GROUND ELEVATION	782.50m	N	5611622.400	E	414331.600
DRILLING CONTRACTOR	Val's Drilling			GROUND WATER ELEVATION / DEPTH					
CORING TYPE	HQ3	DIAMETER (mm)	61	DATE GROUND WATER RECORDED					

[illegible]

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH706**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/28/2023 COMPLETED 06/28/2023 GROUND ELEVATION 782.50m N 5611622.400 E 414331.600
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.1 m - bedding fracture with some shell fragments										772
12												771
13												770
14												769
15												768
16												767
17												766
18												765
19												764
												763

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH707**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/28/2023 COMPLETED 06/29/2023 GROUND ELEVATION 770.10m N 5611887.700 E 414881.500
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, sandy, some clay, some silt, trace gravel, damp, firm, low plastic, brown, trace root hairs	AU1						17.2		
		CLAY TILL, silty, some sand, damp, stiff, medium plastic, brown, trace white precipitates	AU2						17.2		
2		SHALE (Weathered), silty, clayey, trace sand, highly weathered, brown to light grey mottling, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	SPT1						18.7		1.2 m - Sand = 4.0% Silt = 44.0% Clay = 52.0%
			AU3						18.7		1.2 m - Dispersivity Classification = D2 % Dispersion = 28%
3			AU4						12.8		2.1 m - Sand = 10.0%
		3.2 m - 60 mm of core loss	SPT2						12.8		Silt = 51.1% Clay = 38.9%
		3.3 m - 160 mm of slough	RC1		3.20 - 4.72	1	80 95 90	1			2.1 m - Dispersivity Classification = ND3 % Dispersion = 104%
4		4.0 m - 120 mm of bentonitic clay									2.7 m - Sand = 7.2% Silt = 67.3% Clay = 25.5%
		4.1 m - 15 mm gypsum crystal									2.7 m - Dispersivity Classification = ND3 % Dispersion = 136%
5		4.2 m - becoming very weak									
		4.3 m - 78° fracture	RC2		4.72 - 6.24	2	97 97 97	2			
6		4.7 m - 40 mm of core loss									
		5.0 m - 80° fracture									
7		6.1 m - 80° fracture									
		6.1 m - becoming no sand	RC3		6.24 - 7.76	3	84 96 93	2			
		6.2 m - 60 mm of core loss									
8		SHALE, silty, clayey, trace sand, slightly weathered, light grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated	RC4		7.76 - 9.28	4	82 95 90	1			
		7.7 m - 73° fracture									
9		7.8 m - 80 mm of core loss									
		7.9 m - becoming weak									
		8.4 m - 69° fracture									
		8.5 m - becoming some thin weakly cemented layers	RC5		9.28 - 10.80	5	64 95 86	1			
		9.0 m - 67° fracture									
		9.3 m - 80 mm of core loss									
		9.4 m - mechanically fractured run									

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	8.50	PLAIN
0.00	3.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH707**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/28/2023 COMPLETED 06/29/2023 GROUND ELEVATION 770.10m N 5611887.700 E 414881.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
		...10.2 m - 29° fracture										760
11												759
12												758
13												757
14												756
15												755
16												754
17												753
18												752
19												751

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	8.50	PLAIN
0.00	3.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH708**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/11/2023 COMPLETED 08/11/2023 GROUND ELEVATION 771.41m N 5611672.200 E 416040.600
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
		CLAY AND SILT, sandy, gravelly, dry, stiff, low plastic, light brown, trace root hairs		AU1					3.8	0.6 m - Gravel = 13.9%	771
1		CLAY TILL, silty, sandy, some fine gravel, damp, stiff, medium plastic, dark brown, some oxidation staining, trace gypsum crystals, trace white precipitates		AU2					16.2	0.6 m - Sand = 56.6%	770
2		... 1.5 m - becoming some completely weathered shale inclusions, trace gravel		AU3					19.5	Silt = 21.1% Clay = 8.4%	770
		SHALE (Weathered), clayey, silty, trace sand, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace white precipitates, trace gypsum crystals		AU4					20.8	1.2 m - Gravel = 0.2%	769
3		... 2.9 m - 520 mm of core loss	RC1		2.90 - 4.42	1	23 66 40	5		1.2 m - Sand = 16.0%	768
4		... 3.4 m - 140 mm of slough	RC2		4.42 - 5.94	2	39 88 49	7		Silt = 39.9% Clay = 43.9%	768
5		... 3.6 m - becoming highly weathered								1.2 m - Dispersivity Classification = ND3	767
		... 3.8 m - some crumbled core								% Dispersion = %	767
6		... 4.2 m - some mechanical rubble	RC3		5.94 - 7.46	3	95 99 77	3		2.1 m - Sand = 2.9%	766
		... 4.4 m - 190 mm of core loss								Silt = 43.5% Clay = 53.6%	766
		... 4.6 m - 450 mm of crumbled core								2.1 m - Dispersivity Classification = ND3	765
7		... 5.1 m - becoming moderately weathered								% Dispersion = %	765
		... 5.2 m - 5 mm gypsum crystals								2.7 m - LL = 71.7%	764
		... 5.5 m - 150 mm of strong calcified shale								PL = 27%	764
		... 6.4 m - 69° fracture								PI = 44.7%	763
8		... 7.5 m - 90 mm of core loss	RC4		7.46 - 8.98	4	89 93 90	2		2.7 m - Dispersivity Classification = D2	763
		... 8.2 m - becoming slightly weathered								% Dispersion = 31%	763
9		... 9.0 m - becoming very weak	RC5		8.98 - 10.50	5	100 100 100	1		2.9 m - Switched from 6" SSA to HQ3 Rotary Coring	762
		SHALE, silty, clayey, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated									

Notes:

Target depth of 10 m achieved. Completed as a 50 mm nested well, shallow well installed 1 m away. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	7.00	PLAIN
0.00	3.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH708**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/11/2023 COMPLETED 08/11/2023 GROUND ELEVATION 771.41m N 5611672.200 E 416040.600
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
		...10.0 m - 52° fracture ...10.2 m - 72° fracture										761
11												760
12												759
13												758
14												757
15												756
16												755
17												754
18												753
19												752

Notes:

Target depth of 10 m achieved. Completed as a 50 mm nested well, shallow well installed 1 m away. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	7.00	PLAIN
0.00	3.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH709**

PAGE 1 OF 2

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/26/2023 COMPLETED 06/26/2023 GROUND ELEVATION 777.39m N 5611051.400 E 415415.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, sandy, some silt, damp, firm, low plastic, brown, trace root hairs	■	AU1					7.1		777
		CLAY, silty, sandy, dry, firm, low plastic, brown	■	AU2					7.1		
2		CLAY TILL, silty, some sand, trace fine gravel, damp, very stiff, medium plastic, brown, some oxidation staining, trace white precipitates	▲	SPT1					6.0		776
		...2.6 m - becoming trace coal staining	■	AU3					6.0		
		...3.0 m - becoming some completely weathered shale inclusions	■	AU4					11.6		775
		SHALE (Weathered), clayey, silty, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak, blocky, thinly laminated, some oxidation staining, trace gypsum crystals	▲	SPT2					11.6	2.1 m - Gravel = 9.2%	
3		...4.2 m - becoming some bentonite inclusions	■	AU5					12.5	2.1 m - Sand = 71.4%	
		...4.4 m - 100 mm bentonite seam	■	AU6					12.5	Silt = 9.3%	
		...4.7 m - 70 mm of core loss	■	SPT3						Clay = 10.1%	
		...4.7 m - 80 mm of slough	▲	RC1	4.67 - 6.19	1	71 95 88	3	13.8	2.1 m - Dispersivity Classification = D2 % Dispersion = 6%	774
		SHALE, silty, clayey, moderately weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	■	RC2	6.19 - 7.71	2	15 97 70	5	13.8	2.7 m - Dispersivity Classification = ND3 % Dispersion = 5%	773
5		...5.2 m - 60° fracture	■						24.2	4.3 m - LL = 60.4%	
		...5.4 m - 74° fracture	■						24.2	PL = 22.8%	
		...6.1 m - 79° fracture	■							PI = 37.6%	
		...6.2 m - 50 mm of core loss	■							4.3 m - Gravel = 0.3%	772
		...6.2 m - 190 mm of slough	■							4.3 m - Sand = 38.6%	
		...6.5 m - becoming slightly weathered	■							Silt = 22.5%	771
		...6.6 m - 75° fracture	■							Clay = 38.6%	
		...7.3 m - 79° fracture	■							4.3 m - Dispersivity Classification = D2 % Dispersion = 23%	770
		...7.5 m - 82° fracture	■								
		...7.6 m - bedding fracture	■								
		...7.9 m - 81° fracture	■								
		...8.2 m - 81° fracture	■								
		...8.5 m - 43° fracture	■								
		...9.0 m - some crumbled core	■								
		...9.1 m - 42° fracture	■								
		...9.4 m - vertical fractures	■							9.23 m - Run 4 - Used ~2000 litres of water	768

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	9.10	PLAIN
0.00	3.40	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH709**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/26/2023 COMPLETED 06/26/2023 GROUND ELEVATION 777.39m N 5611051.400 E 415415.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...9.6 m - becoming unweathered, very weak, unoxidized										767
		...9.9 m - 41° fracture										
		...10.6 m - some crumbled core										
12												766
13												765
14												764
15												763
16												762
17												761
18												760
19												759
												758

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	9.10	PLAIN
0.00	3.40	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH709B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/27/2023 COMPLETED 06/27/2023 GROUND ELEVATION 777.00m N 5611051.600 E 415415.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
1											776
2											775
3											774
4											773
5											772
6											771
7											770
8											769
9											768

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH709B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/27/2023 COMPLETED 06/27/2023 GROUND ELEVATION 777.00m N 5611051.600 E 415415.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			766
12												765
13												764
14												763
15												762
16												761
17												760
18												759
19												758

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH709B**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/27/2023 COMPLETED 06/27/2023 GROUND ELEVATION 777.00m N 5611051.600 E 415415.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE Other DIAMETER (mm) _____ DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
21									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			756
22												755
23												754
24												753
25												752
26												751
27												750
28												749
29												748

Notes:

100 mm PVC well installed to 25 m for pumping test.

Monitoring Installation Pipe Work		
Depth Top	Depth Bottom	Pipe Type
0.00	22.00	PLAIN
22.00	25.00	SLOTTED

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Reviewed By: C. Braun



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COREHOLE No : **23CH710**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/17/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611052.200 E 416322.200
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		CLAY AND SILT, sandy, some gravel, dry, stiff, low plastic, light brown, trace root hairs	■	AU1					16.5	0.6 m - Gravel = 0.7%	767
2		CLAY TILL, silty, sandy, trace fine gravel, moist, stiff, medium to high plastic, dark brown, some oxidation staining, trace white precipitates	■	AU2					21.1	0.6 m - Sand = 27.4%	766
3		...0.7 m - becoming trace sand, no gravel	■	AU3					21.0	Silt = 5.3% Clay = 66.6%	765
4		...1.0 m - becoming some completely weathered shale inclusions	■	AU4					21.3	0.6 m - Dispersivity Classification = ND1 % Dispersion = %	764
5		SHALE (Weathered), clayey, silty, highly weathered, brown to grey mottling, damp, high plastic, extremely weak, blocky, thinly laminated, some oxidation staining, trace white precipitates	■	RC1	3.20 - 4.72	1	66 83 66	2		1.2 m - Sand = 1.8% Silt = 42.2% Clay = 56.0%	763
6		...3.2 m - 260 mm of core loss								1.2 m - Dispersivity Classification = ND3 % Dispersion = 46%	762
7		...3.5 m - 100 mm of slough								2.1 m - Sand = 0.9% Silt = 43.3% Clay = 55.8%	761
8		...3.9 m - becoming trace gypsum crystals								2.1 m - Dispersivity Classification = ND3 % Dispersion = %	760
9		...4.1 m - 40 mm of crumbled core								2.7 m - Sand = 0.8% Silt = 44.2% Clay = 55.0%	759
10		...4.3 m - mechanically fractured area								2.7 m - Dispersivity Classification = ND3 % Dispersion = %	
11		...4.7 m - mechanically fractured run								3.2 m - Switched from 6" SSA to HQ3 Rotary Coring	
12		...5.2 m - 78° fracture									
13		...5.8 m - becoming moderately weathered									
14		...6.2 m - 240 mm of core loss									
15		...6.6 m - 68 mm of core loss									
16		...7.0 m - 62° fracture with 5 mm gypsum crystals									
17		...7.4 m - becoming slightly weathered, very weak									
18		SHALE, silty, clayey, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated	■	RC2	4.72 - 6.24	2	93 100 96	3			
19		...8.2 m - becoming weak									
20		...8.3 m - mechanically fractured area									
21		...9.1 m - 150 mm of core loss									
22		...9.8 m - 40 mm of crumbled core									
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Notes:

Target depth of 10 m achieved. Corehole completed as a 50 mm well, refer to diagram. Shallow well installed 0.5 m away. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH710**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/17/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611052.200 E 416322.200
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11												757
12												756
13												755
14												754
15												753
16												752
17												751
18												750
19												749

Notes:

Target depth of 10 m achieved. Corehole completed as a 50 mm well, refer to diagram. Shallow well installed 0.5 m away. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23CH711

PAGE 1 OF 2

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/13/2023 COMPLETED 06/13/2023 GROUND ELEVATION 771.69m N 5610068.500 E 416031.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT ┌ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, silty, sandy, some clay, trace gravel, dry, firm, low plastic, light brown, trace root hairs	■	AU1							771
1		CLAY AND SILT, silty, dry, firm, low plastic, light brown	■	AU2							
2		CLAY TILL, silty, sandy, some fine gravel, damp, stiff, medium plastic, brown, trace oxidation staining, trace white precipitates	▲	SPT1					3.8 3.8	1.2 m - Gravel = 55.7% 1.2 m - Sand = 42.7%	770
2		...1.5 m - becoming moist, trace gypsum crystals	■	AU3						Silt = 1.0% Clay = 0.6%	
3		...1.8 m - becoming some completely weathered shale inclusions	■	AU4					17.7 17.7	1.2 m - Dispersivity Classification = ND4 % Dispersion = 33%	769
3		SHALE (Weathered), clayey, silty, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak, very closely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	▲	SPT2	3.20 - 4.72	1	12 69 22	20	21.5 21.5	2.1 m - Sand = 95.1%	768
4		...3.2 m - 470 mm of core loss								Silt = 2.7% Clay = 2.2%	
5		...4.7 m - 410 mm of core loss								2.1 m - Dispersivity Classification = ND4 % Dispersion = 86%	767
5		...6.2 m - 50 mm of core loss								2.7 m - Dispersivity Classification = ND3 % Dispersion = 42%	
6		...6.3 m - becoming highly weathered								3.5 m - Switched to rotary coring.	766
6		...6.6 m - 69° fracture									
6		...6.9 m - 51° fracture									
7		...7.0 m - becoming closely spaced fractures									765
7		...7.6 m - 55° fracture									
7		...7.9 m - horizontal fracture									
8		SHALE, clayey, silty, slightly weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, trace oxidation staining, trace gypsum crystals	■	RC3	6.24 - 7.76	3	72 97 84	7			764
8		...8.1 m - 72° fracture									
8		...8.4 m - 57° fracture									
9		...9.0 m - becoming unoxidized									763
9		...9.2 m - 61° fracture									
9		...9.3 m - mechanically fractured run									
9		...9.4 m - 62° fracture									
9		...9.6 m - 52° fracture									
9		...9.7 m - 30 mm of crumbled core									
9		...9.9 m - 53° fracture									762

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23CH711**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/13/2023 COMPLETED 06/13/2023 GROUND ELEVATION 771.69m N 5610068.500 E 416031.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.6 m - 170 mm of core loss										761
12												760
13												759
14												758
15												757
16												756
17												755
18												754
19												753
												752

Notes:

Target depth of 10 m achieved. Packer test completed after coring. Corehole completed as a well, refer to diagram.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type
0.00	3.50	PLAIN
0.00	8.50	PLAIN

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH01

PAGE 1 OF 2

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/29/2023 COMPLETED 06/29/2023 GROUND ELEVATION 777.61m N 5612578.400 E 414227.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, sandy, some silt, some clay, damp, firm, low plastic, brown, trace root hairs	■	AU1								777
		CLAY TILL, silty, some sand, some completely weathered shale inclusions, damp, stiff, medium plastic, dark brown, trace oxidation staining, trace white precipitates	■	AU2								776
2		SHALE (Weathered), silty, clayey, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak, blocky, thinly laminated, some oxidation staining, trace white precipitates, trace gypsum crystals	▲	SPT1								775
		SHALE, clayey, silty, moderately weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	■	AU3								774
3		1.2 m - some yellow oxide specks	■	AU4								773
		2.5 m - becoming ground up	■	RC1	3.00 - 4.52	1	43 92 72	2				772
4		3.0 m - 120 mm of core loss	■	RC2	4.52 - 6.04	2	0 97 86	2				771
		3.1 m - 100 mm of slough	■	RC3	6.04 - 7.56	3	45 99 84	2				770
5		3.6 m - 130 mm of crumbled core	■	RC4	7.56 - 9.08	4	9 97 94	1				769
		4.5 m - 40 mm of core loss	■	RC5	9.08 - 10.60	5	90 103 100	1				768
6		4.6 m - 60 mm of crumbled core	■									
		5.2 m - becoming slightly weathered, very weak	■									
7		5.3 m - 86° fracture	■									
		6.0 m - becoming unweathered, unoxidized	■									
8		6.2 m - becoming some thin weakly cemented layers	■									
		6.9 m - 75° fracture	■									
9		7.0 m - 72° fracture	■									
		7.4 m - 2 mm wide gypsum seam	■									
		7.6 m - 40 mm of core loss	■									
		7.8 m - becoming weak	■									
		8.2 m - 81° fracture	■									
		8.6 m - 64° fracture	■									
		SILTSTONE, some clay, trace fine sand, unweathered, grey, damp, nonplastic, weak, widely spaced	■									

Notes:

Target depth of 15 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH01**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/29/2023 COMPLETED 06/29/2023 GROUND ELEVATION 777.61m N 5612578.400 E 414227.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		fractures, thinly laminated, trace gypsum crystals, trace shell fragments ...9.6 m - trace shell fragments ...10.4 m - some thinly bedded sandstone		RC6	10.60 - 12.12	6	88 100 100	1				767
12				RC7	12.12 - 13.64	7	64 92 78	1				766
13		...12.6 m - 200 mm of crumbled bentonitic clay ...12.8 m - becoming moderately strong		RC8	13.64 - 15.16	8	95 105 104	2				765
14												764
15												763
16												762
17												761
18												760
19												759
												758

Notes:

Target depth of 15 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH02**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/08/2023 COMPLETED 08/08/2023 GROUND ELEVATION 779.80m N 5612565.900 E 414787.100
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, silty, sandy, some clay, damp, firm, low plastic, brown, trace root hairs		ST1								779
		CLAY TILL, silty, sandy, trace fine gravel, damp, stiff, medium plastic, brown, trace oxide specks, trace white precipitates		ST2								778
2		...1.0 m - becoming trace to some gravel up to 40 mm		ST3								777
		...1.5 m - becoming dark brown to grey mottling, some oxidation staining, trace coal specks		AU1								776
3				AU2								775
		...3.0 m - becoming some completely weathered shale inclusions		AU3								774
4		SHALE (Weathered), clayey, silty, trace sand, highly weathered, dark grey, damp, high plastic, extremely weak, blocky, moderately widely spaced fractures, thinly laminated, trace oxidation staining, trace gypsum crystals		AU4	4.45 - 5.97	1	91 97 93	2			4.45 m - Switched from 6" SSA to HQ3 Rotary Coring	773
5		...4.4 m - 40 mm of core loss		RC1								772
		...4.7 m - 84° fracture										771
6		...5.8 m - 200 mm of strong calcified shale		RC2	5.97 - 7.49	2	83 100 95	3				770
		...6.2 m - becoming moderately weathered										
7		...6.7 m - 69° fracture										
		...7.5 m - 30 mm of core loss		RC3	7.49 - 9.01	3	93 98 96	3				
8		...7.8 m - becoming slightly weathered, very weak, trace oxidation staining										
		...8.1 m - 2 mm gypsum lense										
		...8.3 m - 83° fracture										
9		SHALE, clayey, silty, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated		RC4	9.01 - 10.53	4	92 100 92	2				
		...9.0 m - mechanically fractured run										
		...9.3 m - 56° fracture										
		...9.7 m - 73° fracture										

Notes:

Target depth of 15 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH02**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/08/2023 COMPLETED 08/08/2023 GROUND ELEVATION 779.80m N 5612565.900 E 414787.100
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.3 m - some crumbled core ...10.5 m - 60 mm of core loss		RC5	10.53 - 12.05	5	91 96 93	2				769
12		...11.5 m - 57° fracture ...11.7 m - 59° fracture ...11.8 m - shell fragments with organic inclusions		RC6	12.05 - 13.57	6	100 100 100	1				768
13		...11.8 m - becoming some moderately thick sandstone layers ...12.0 m - becoming weak ...12.2 m - 120 mm moderately strong layer										767
14		...13.0 m - bedding fracture ...13.1 m - trace shell fragments		RC7	13.57 - 15.09	7	109 109 109	2				766
15		...14.2 m - 74° fracture ...14.3 m - becoming some bentonitic inclusions ...14.6 m - 50 mm of moderately strong calcified shale ...14.7 m - becoming moderately strong										765
16												764
17												763
18												762
19												761
												760

Notes:

Target depth of 15 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH03**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/09/2023 COMPLETED 08/10/2023 GROUND ELEVATION 770.69m N 5612462.100 E 416366.300
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		CLAY FILL, silty, some sand, damp, stiff, medium plastic, brown									
		CLAY TILL, silty, some sand, trace gravel up to 40 mm, moist, stiff, medium plastic, dark brown, some oxidation staining, trace white precipitates	■	AU1							770
			■	AU2							769
2		SHALE (Weathered), clayey, silty, some sand, completely weathered, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, blocky, trace oxidation staining	■	AU3							768
			■	AU4							767
			■	AU5							766
			■	AU6							765
5		...4.6 m - 460 mm of core loss		RC1	4.57 - 6.09	1	24 83 40	20		4.57 m - Switched from 6" SSA to HQ3 Rotary Coring	764
		...4.9 m - 200 mm of slough									763
		...5.1 m - highly fractured area									762
		...5.7 m - becoming highly weathered									761
		...5.8 m - 63° fracture		RC2	6.09 - 7.61	2	64 100 81	5			
		...7.6 m - 160 mm of core loss		RC3	7.61 - 9.13	3	28 89 66	5			
		...8.0 m - some highly oxidized, crumbled core									
		...8.1 m - 80 mm of strong calcified shale									
		...8.2 m - some concretions									
		...8.4 m - becoming moderately weathered		RC4	9.13 - 10.65	4	58 91 66	3			
		...9.1 m - 140 mm of core loss									
		...9.4 m - becoming slightly weathered									

Notes:

Target depth of 19 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH03**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/09/2023 COMPLETED 08/10/2023 GROUND ELEVATION 770.69m N 5612462.100 E 416366.300
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.1 m - 71° fracture SHAILE, clayey, silty, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated		RC5	10.65 - 12.17	5	97 100 99	2				760
		...10.4 m - sub-vertical fractures										
		...11.5 m - bedding fracture										
12		...11.6 m - mechanically fractured area										759
		...12.2 m - becoming weak		RC6	12.17 - 13.69	6	100 100 100	2				758
13		...13.0 m - 55° fracture										
		...13.5 m - 77° fracture										
14		...13.7 m - becoming widely spaced fractures		RC7	13.69 - 15.21	7	103 106 103	1				757
		...14.3 m - 60° fracture										
15		...15.4 m - 72° fracture		RC8	15.21 - 16.73	8	100 100 100	1				755
16		...16.4 m - 68° fracture										
		...16.6 m - 30 mm of extremely weak clay infill										
17		...16.9 m - 30 mm of bentonitic inclusions		RC9	16.73 - 18.25	9	88 100 90	2				754
		...17.0 m - 270 mm moderately strong layer										753
18		...17.2 m - some mechanical rubble										
		...17.7 m - 77° fracture followed by 400 mm of mechanical rubble										
19		...18.4 m - 84° fracture		RC10	18.25 - 19.77	10	85 88 86	1				752
		...19.5 m - 55° fracture										751
		...19.6 m - 190 mm of core loss										

Notes:

Target depth of 19 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH04**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/10/2023 COMPLETED 08/10/2023 GROUND ELEVATION 770.73m N 5612438.300 E 416352.100
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		CLAY FILL, silty, sandy, damp, stiff, low plastic, brown	■	AU1						0.5 m - Couldn't push Shelby Tube due to loose sloughing fill		770
		CLAY TILL, silty, some sand, trace fine gravel, damp, stiff, medium plastic, dark brown, trace oxide specks, trace white precipitates	■	ST1						1 m - Consolidation Index: 0.24		769
2		SHALE (Weathered), clayey, silty, some sand, residual soil, dark brown to grey mottling, damp, high plastic, extremely weak to hard soil, ground up	■	ST2						Expansion Index: 0.08		768
3		...2.9 m - becoming completely weathered, blocky, trace oxidation staining, trace white precipitates	■	AU2								767
4			■	AU3								766
5		...4.6 m - 80 mm of core loss	■	AU4						4.6 m - Switched from 6" SSA to HQ3 Rotary Coring		765
		...4.7 m - 220 mm of slough	■	RC1	4.60 - 6.12	1	31 95 72	5				764
6		...4.9 m - becoming highly weathered, closely spaced fractures, extremely weak, some oxidation staining, trace gypsum crystals	■	RC2	6.12 - 7.64	2	92 100 92	3				763
7			■	RC3	7.64 - 9.16	3	51 84 58	3				762
8		...7.7 m - 260 mm of mechanical rubble	■	RC4	9.16 - 10.68	4	71 91 79	2				761
9		...8.3 m - 72° fracture										
		...8.5 m - becoming moderately weathered, moderately widely spaced fractures										
		...8.9 m - 250 mm of core loss										
		...9.2 m - 140 mm of core loss										
		...9.3 m - 200 mm of slough										
		...9.5 m - becoming moderately weathered, very weak										

Notes:

Target depth of 19 m achieved. Corehole backfilled with bentonite chips Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH04**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/10/2023 COMPLETED 08/10/2023 GROUND ELEVATION 770.73m N 5612438.300 E 416352.100
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		SHALE, clayey, silty, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated		RC5	10.68 - 12.20	5	89 96 91	2				760
12		...11.3 m - 64° fracture ...11.4 m - some mechanical rubble ...11.7 m - 60° fracture										759
13		...12.0 m - some mechanical rubble ...12.2 m - some mechanical rubble ...12.6 m - 76° fracture		RC6	12.20 - 13.72	6	85 100 89	2				758
14		...13.2 m - 73° fracture		RC7	13.72 - 15.24	7	100 109 100	1				757
15		...14.4 m - 37° fracture										756
16		...15.6 m - becoming weak		RC8	15.24 - 16.76	8	100 100 100	1				755
17		...16.2 m - 130 mm of strong calcified shale ...16.6 m - bedding fracture ...16.8 m - 80 mm of core loss ...16.9 m - 80 mm of bentonitic clay		RC9	16.76 - 18.28	9	95 95 95	2				754
18		...17.4 m - 76° fracture										753
19		...18.0 m - 66° fracture with shell fragments ...18.3 m - 90 mm of core loss		RC10	18.28 - 19.80	10	89 94 89	1				752
		...19.0 m - 70° fracture ...19.6 m - 38° fracture										751

Notes:

Target depth of 19 m achieved. Corehole backfilled with bentonite chips Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH05**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 08/23/2023 COMPLETED 08/23/2023 GROUND ELEVATION 769.16m N 5611866.000 E 416809.000
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
									● MOISTURE CONTENT ─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		SILT, sandy, some clay, damp, stiff, low plastic, light brown, trace root hairs	■	AU1					5.8	●	0.6 m - Gravel = 0.1%	769
2		SAND, some silt, poorly graded, fine grained, sub-rounded, damp, compact, light brown	■	AU2					4.4	●	0.6 m - Sand = 38.7%	768
3		...1.5 m - becoming medium grained, trace fine gravel, trace clay inclusions, some oxidation staining, trace coal staining	■	AU3							Silt = 36.6% Clay = 24.6%	767
4		...2.0 m - becoming moist	■	AU4					8.8	●	1.2 m - Gravel = 0.1%	766
5		...2.8 m - trace SEEPAGE	■	AU5							1.2 m - Sand = 74.3%	765
6		SHALE, clayey, silty, slightly weathered, grey, damp, high plastic, extremely weak, blocky, thinly laminated, trace oxidation staining	■	AU6							Silt = 12.9% Clay = 12.7%	764
7		...3.3 m - becoming unweathered	■	RC1	4.73 - 6.25	1	76 91 85	2			4.73 m - Switched from 6" SSA to HQ3 Rotary Coring	763
8		...4.7 m - 140 mm of core loss		RC2	6.25 - 7.77	2	103 107 103	1				762
9		...4.9 m - becoming very weak, moderately widely spaced fractures		RC3	7.77 - 9.29	3	100 100 100	1				761
10		...5.0 m - mechanically fractured run		RC4	9.29 - 10.81	4	97 97 97	0				760
		...6.5 m - bedding fracture with some shell fragments										
		...6.6 m - becoming widely spaced fractures										
		...9.3 m - 50 mm of core loss										
		...9.6 m - becoming some thin weakly cemented layers										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH05**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/23/2023 COMPLETED 08/23/2023 GROUND ELEVATION 769.16m N 5611866.000 E 416809.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...11.6 m - 58° fracture followed by 90 mm of strong calcified shale		RC5	10.81 - 12.33	5	93 100 95	1				759
12		...11.9 m - becoming weak		RC6	12.33 - 13.85	6	103 103 103	0				758
13												757
14				RC7	13.85 - 15.37	7	96 96 96	0				756
15		...15.4 m - 60 mm of core loss		RC8	15.37 - 16.89	8	100 100 100	0				755
16		...16.1 m - 100 mm of extremely weak bentonitic clay										754
17		...16.2 m - becoming weak		RC9	16.89 - 18.41	9	100 100 100	0				753
18												752
19		...18.4 m - 100 mm of core loss		RC10	18.41 - 19.93	10	87 93 87	0				751
		...18.5 m - 100 mm of slough										750
				RC11		11		0				

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH05**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/23/2023 COMPLETED 08/23/2023 GROUND ELEVATION 769.16m N 5611866.000 E 416809.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
					19.93 - 21.45	104 104						749
21												
		...21.5 m - becoming trace sand		RC12	21.45 - 22.97	12 100	100 100	0				748
22												
		...23.0 m - 50 mm of slough		RC13	22.97 - 24.49	13 97	100 97	0				747
23												
				RC14	24.49 - 26.01	14 98	98 98	0				746
24												
				RC15	26.01 - 27.53	15 111	111 111	0				745
25												
				RC16	27.53 - 29.05	16 97	97 97	0				744
26												
				RC17	29.05 - 30.57	17 92	95 92	0				743
27												
		...29.0 m - 120 mm of core loss										742
28		...29.1 m - 50 mm of slough										741
												740
29												

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH05**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/23/2023 COMPLETED 08/23/2023 GROUND ELEVATION 769.16m N 5611866.000 E 416809.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31												739
32												738
33												737
34												736
35												735
36												734
37												733
38												732
39												731
												730

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH06**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/22/2023 COMPLETED 08/23/2023 GROUND ELEVATION 770.31m N 5611806.000 E 416805.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)				REMARKS	Standpipe/ Instrument Elevation (m)
									●	—	■	▲		
									MOISTURE CONTENT	PLASTIC - LIQUID	SPT (N) Blows/300 mm	POCKET PEN (kPa)		
									10 20 30 40		50 100 150 200			
1		SILT, sandy, trace fine gravel, dry, stiff, low plastic, light brown, trace root hairs	■	AU1										770
2		SAND, some gravel, some silt, trace clay, poorly graded, coarse grained, sub-rounded, moist, compact, brown ...1.5 m - becoming gravelly for 300 mm	■	AU2					3.0	●			1.5 m - Gravel = 2.5%	769
3		...2.4 m - becoming some oxidation staining, trace coal staining ...2.6 m - 60 mm coal seam ...3.1 m - becoming some clay	■	B1					7.0	●			1.5 m - Sand = 79.9%	768
4		CLAY TILL, silty, sandy, some coarse gravel, moist, stiff, high plastic, grey, some oxidation staining, trace coal staining	■	AU3									Silt = 8.0%	767
5		...4.4 m - SEEPAGE ...4.5 m - becoming some completely weathered residual bedrock, trace sand and gravel	■	AU4									Clay = 9.6%	766
6		SHALE, clayey, silty, unweathered, grey, damp, high plastic, extremely weak, blocky, thinly laminated	■	AU5										765
7		...6.2 m - 170 mm of slough ...6.4 m - becoming very weak, widely spaced fractures	■	AU6									6.25 m - Switched from 6" SSA to HQ3 Rotary Coring	764
8		...7.3 m - 49° fracture		RC1	6.25 - 7.77	1	89 99 89	1						763
9		...8.0 m - 65° fracture		RC2	7.77 - 9.29	2	87 93 93	2						762
		...8.8 m - 77° fracture												761
		...9.4 m - 70° fracture ...9.5 m - becoming some thin weakly cemented layers		RC3	9.29 - 10.81	3	100 100 100	1						

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH06

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/22/2023 COMPLETED 08/23/2023 GROUND ELEVATION 770.31m N 5611806.000 E 416805.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.8 m - 80 mm of core loss		RC4	10.81	4	89	1				760
		...11.3 m - 37° fracture			12.33		96					759
12				RC5	12.33	5	104	2				758
		...12.5 m - 62° fracture			13.85		105					757
13							104					757
		...13.5 m - 45° fracture		RC6	13.85	6	97	1				756
14					15.37		99					756
							97					755
15		...14.9 m - 68° fracture		RC7	15.37	7	90	1				755
		...15.2 m - 100 mm of strong calcified shale			16.89		96					754
16		...15.4 m - 60 mm of core loss					92					754
		...15.8 m - 53° fracture										753
		...16.0 m - 480 mm extremely weak, mechanically fractured area										753
		...16.5 m - becoming weak		RC8	16.89	8	92	0				753
17		...16.9 m - 120 mm of core loss			18.41		92					752
		...17.4 m - becoming very weak to weak					92					752
18		...17.8 m - some shell fragments		RC9	18.41	9	100	0				752
					19.93		100					751
19							100					751
				RC10		10		0				

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH06**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/22/2023 COMPLETED 08/23/2023 GROUND ELEVATION 770.31m N 5611806.000 E 416805.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.7 m - some mechanical rubble			19.93 - 21.45	100 100 100						750
22		...21.8 m - 72° fracture ...22.2 m - trace shell fragments		RC11	21.45 - 22.97	11 103 105 103		1				749
23				RC12	22.97 - 24.49	12 96 96 96		0				748
24		...24.1 m - trace shell fragments ...24.4 m - 60 mm of core loss ...24.5 m - 40 mm of slough		RC13	24.49 - 26.01	13 99 99 99		0				746
25												745
26				RC14	26.01 - 27.53	14 100 100 100		0				744
27		...27.3 m - becoming weak		RC15	27.53 - 29.05	15 99 99 99		0				743
28												742
29				RC16	29.05 - 30.57	16 96 96 96		0				741

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH06**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/22/2023 COMPLETED 08/23/2023 GROUND ELEVATION 770.31m N 5611806.000 E 416805.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31		30.5 m - 60 mm of core loss										740
32												739
33												738
34												737
35												736
36												735
37												734
38												733
39												732
												731

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH07

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/22/2023 GROUND ELEVATION 770.77m N 5611741.000 E 416802.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	MOISTURE CONTENT PLASTIC - LIQUID SPT (N) Blows/300 mm POCKET PEN (kPa)	REMARKS	Standpipe/Instrument	Elevation (m)
1		SILT, sandy, trace fine gravel, dry, stiff, low plastic, light brown, trace root hairs ...0.7 m - becoming silt and sand	AU1						5.6		0.6 m - Gravel = 0.1%		770
2		GRAVEL, sandy, silty, trace to some clay, well graded, fine grained, sub-rounded, dry, compact, brown	AU2						2.2		0.6 m - Sand = 26.7%		769
			AU3								Silt = 45.4% Clay = 27.8%		
			AU4								1.2 m - Gravel = 17.2%		
3		...2.4 m - becoming some coal staining ...2.5 m - becoming gravel and coarse grained sand	AU4						5.0		1.2 m - Sand = 57.5%		768
		CLAY TILL, silty, sandy, some gravel, moist, stiff, high plastic, grey, some oxidation staining, trace coal staining	AU5								Silt = 15.7% Clay = 9.6%		
4		...3.3 m - becoming some completely weathered shale inclusions	AU5								2.7 m - Gravel = 20.0%		767
		...4.0 m - becoming gravelly	AU6								2.7 m - Sand = 57.7%		
			AU6								Silt = 12.5% Clay = 9.8%		
5		SHALE, clayey, silty, unweathered, grey, damp, high plastic, extremely weak, blocky, thinly laminated	AU7								4.3 m - Gravel = 36.4%		766
			AU7								4.3 m - Sand = 30.1%		
			AU8								Silt = 18.1% Clay = 15.4%		765
6			AU8								4.3 m - Dispersivity Classification = ND2		
		...6.1 m - 120 mm of core loss	RC1		6.10 - 7.62	1	72 92 74	2			% Dispersion = 10%		764
		...6.2 m - 280 mm of slough									6.1 m - Switched from 6" SSA to HQ3 Rotary Coring		
7		...6.5 m - becoming very weak, moderately widely spaced fractures											
		...7.4 m - becoming trace fine sand											
8		...7.6 m - 80 mm of core loss	RC2		7.62 - 9.14	2	82 95 86	1					763
		...7.8 m - 150 mm of crumbled core											
		...7.9 m - becoming some bedded sandstone layers											
		...8.5 m - 64° fracture											762
9		...8.6 m - becoming widely spaced fractures											
		...9.5 m - becoming trace to no sandstone layers	RC3		9.14 - 10.66	3	100 100 100	1					761

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH07**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/22/2023 GROUND ELEVATION 770.77m N 5611741.000 E 416802.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.4 m - 71° fracture ...10.7 m - becoming some thin weakly cemented layers		RC4	10.66 - 12.18	4	100 100 100	0				760
12				RC5	12.18 - 13.70	5	94 94 94	0				759
13												758
14		...13.6 m - 90 mm of core loss ...13.8 m - trace shell fragments		RC6	13.70 - 15.22	6	100 100 100	1				757
15												756
16		...15.3 m - becoming weak		RC7	15.22 - 16.74	7	101 104 101	1				755
17		...16.4 m - 51° fracture		RC8	16.74 - 18.26	8	104 104 104	0				754
18												753
19		...18.3 m - 80 mm of core loss ...18.4 m - 30 mm of slough		RC9	18.26 - 19.78	9	89 95 89	1				752
		...19.0 m - 30 mm extremely weak layer										
		...19.7 m - 72° fracture		RC10	19.78	10	100	1				751

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH07**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/22/2023 GROUND ELEVATION 770.77m N 5611741.000 E 416802.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.3 m - 87° fracture			- 21.30	100	100					750
			RC11		21.30 - 22.82	11	62 80 67	1				749
22		...21.8 m - 300 mm of core loss										
		...22.1 m - 300 mm of mechanical rubble										
23			RC12		22.82 - 24.34	12	85 97 88	1				748
		...23.5 m - 69° fracture										
24		...23.7 m - 60 mm bentonite seam										747
		...23.8 m - 50 mm of core loss										
		...23.9 m - 100 mm of slough	RC13		24.34 - 25.86	13	97 100 98	1				746
25		...24.0 m - becoming moderately strong										
		...24.9 m - 65° fracture										
		...25.1 m - bedding fracture with some shell fragments										
26			RC14		25.86 - 27.38	14	104 111 105	1				745
		...26.3 m - 49° fracture										
27		...26.5 m - 33° fracture										744
28			RC15		27.38 - 28.90	15	97 100 97	1				743
29		...28.4 m - 53° fracture										742
			RC16		28.90 - 30.42	16	100 100 100	0				741
		...30.0 m - mechanically fractured area										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH07**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/22/2023 GROUND ELEVATION 770.77m N 5611741.000 E 416802.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31												740
32												739
33												738
34												737
35												736
36												735
37												734
38												733
39												732
												731

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH08

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/21/2023 GROUND ELEVATION 767.37m N 5611680.000 E 416800.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		GRAVEL, sandy, silty, well graded, coarse grained, sub-rounded, damp, compact, brown	■	AU1					3.0 ●	0.6 m - Gravel = 51.1%		767
		CLAY TILL, silty, some sand, some coarse gravel, moist, firm, medium plastic, brown, some oxidation staining, trace coal staining	■	AU2						0.6 m - Sand = 31.4%		766
2		...1.5 m - becoming some weathered shale inclusions	■	AU3						Silt = 10.3%		765
		SHALE, silty, clayey, trace sand, slightly weathered, light grey, damp, high plastic, extremely weak, blocky, thinly laminated	■	AU4						Clay = 7.2%		764
3		...3.2 m - 130 mm of core loss		RC1	3.20 - 4.72	1	79 91 81	1		3.2 m - Switched from 6" SSA to HQ3 Rotary Coring		763
		...3.4 m - becoming unweathered, very weak, widely spaced fractures										762
4		...4.2 m - 60° fracture										761
		...4.6 m - some crumbled core		RC2	4.72 - 6.24	2	98 98 98	1				760
5		...4.7 m - mechanically fractured run										759
		...4.9 m - 73° fracture										758
6		...5.7 m - 66° fracture		RC3	6.24 - 7.76	3	80 99 86	1				
		...6.2 m - some mechanical rubble										
7		...6.9 m - 80° fracture										
		...7.6 m - trace shell and ammonite fragments, some mechanical rubble		RC4	7.76 - 9.28	4	102 102 102	1				
8		...7.9 m - 62° fracture										
		...9.0 m - 70° fracture		RC5	9.28 - 10.80	5	102 105 103	1				
9		...9.3 m - becoming weak										
		...9.8 m - 58° fracture										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH08**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/21/2023 GROUND ELEVATION 767.37m N 5611680.000 E 416800.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11		...11.0 m - 69° fracture		RC6	10.80 - 12.32	6	100 100 100	1				757
12		...11.9 m - 20 mm of strong calcified shale		RC7	12.32 - 13.84	7	100 100 100	1				756
13		...13.2 m - 76° fracture										755
14		...13.8 m - 90 mm of extremely weak clay		RC8	13.84 - 15.36	8	94 94 94	0				754
15		...15.3 m - 90 mm of core loss		RC9	15.36 - 16.88	9	103 107 103	1				753
16		...15.8 m - 67° fracture										752
17		...16.2 m - 41° fracture										751
18		...16.4 m - 100 mm of bentonitic clay		RC10	16.88 - 18.40	10	100 100 100	1				750
19		...17.6 m - bedding fracture										749
		...18.9 m - bedding fracture with some clay infill		RC11	18.40 - 19.92	11	106 106 106	1				748
				RC12		12		0				

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH08**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/21/2023 GROUND ELEVATION 767.37m N 5611680.000 E 416800.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21					19.92 - 21.44	98 98 98						747
				RC13	21.44 - 22.96	13 100 100 100		0				746
23		...22.7 m - trace shell fragments		RC14	22.96 - 24.48	14 100 100 100		1				745
		...23.5 m - 76° fracture										744
25		...24.9 m - bedding fracture		RC15	24.48 - 26.00	15 100 100 100		1				743
		...26.2 m - 72° fracture followed by some very weak core		RC16	26.00 - 27.52	16 99 100 99		1				742
28		...27.3 m - 190 mm of slough		RC17	27.52 - 29.04	17 100 100 100		1				741
		...29.0 m - 50 mm of core loss ...29.3 m - trace shell fragments		RC18	29.04 - 30.56	18 97 97 97		0				740
												739
												738

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH08**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/21/2023 COMPLETED 08/21/2023 GROUND ELEVATION 767.37m N 5611680.000 E 416800.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31												737
32												736
33												735
34												734
35												733
36												732
37												731
38												730
39												729
												728

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH09**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/16/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611593.000 E 416793.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		GRAVEL, sandy, silty, trace clay, well graded, sub-rounded, damp, loose, brown, trace organics		B1						0 m - bulk sample from 0m to 2.0 m		767
2		...0.7 m - becoming silty, some clay to clayey, some sand, coal staining										766
		...1.3 m - becoming fine grained gravel, sandy to and sand some silt, trace clay, moist to very moist										
		...1.5 m - seepage, wet										
		...1.9 m - becoming coarse grained gravel, some sand to sandy, some silt, some clay, wet		ST1								
3		SHALE, moderately weathered, grey, damp, medium plastic, very weak, oxide staining		ST2								765
		...3.2 m - 130 mm core loss, potentially due to Shelby tubes		RC1	3.20 - 4.52	1	56 90 56	15		3 m - Consolidation Index: 0.24 Expansion Index: 0.07		764
4		...3.6 m - 320 mm fractured/crumbled core										763
		...4.0 m - 100 mm crumbled core										
		...4.3 m - becoming slightly weathered, very weak to weak		RC2	4.52 - 6.04	2	55 82 51	10				762
5		...4.5 m - 280 mm core lose										761
		...4.8 m - 300 mm fractured/crumbled core										
		...5.2 m - 35° fracture										
		...5.3 m - becoming weak to moderately strong		RC3	6.04 - 7.56	3	93 100 86	2				760
6		...5.9 m - 65° fracture										
		...6.0 m - 160 mm mechanically crumbled core										
		...6.3 m - 100 mm mechanically crumbled core										
		...6.5 m - becoming unweathered, moderately strong		RC4	7.56 - 9.08	4	94 94 90	2				759
7		...7.0 m - 39° fracture										
		...7.2 m - 69° fracture										
		...7.2 m - 29° fracture										
		...7.6 m - becoming weak to moderately strong										
		...7.9 m - 61° fracture										
		...8.5 m - 79° fracture		RC5	9.08 - 10.60	5	100 106 93	2				
		...9.2 m - becoming moderately strong										
		...9.3 m - 45° fracture										
		...9.8 m - 52° fracture										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : **23TH09**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/16/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611593.000 E 416793.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
		...9.9 m - 35° fracture										
11		...10.7 m - 85° fracture		RC6	10.60	6	100	2				757
		...10.9 m - becoming weak			-		100					
					12.12		98					
12		...11.9 m - 82° fracture		RC7	12.12	7	87	2				756
		...12.2 m - becoming moderately strong			-		87					
					13.64		82					
13		...13.2 m - 38° fracture										755
		...13.4 m - 77° fracture followed by 200 mm core loss		RC8	13.64	8	104	1				
14		...13.7 m - becoming weak			-		104					754
					15.16		103					
15		...14.7 m - 100 mm very weak section										753
		...14.8 m - 89° fracture, becoming moderately strong to strong		RC9	15.16	9	95	2				
		...15.2 m - 14° fracture			-		95					
					16.68		79					
16		...15.9 m - becoming moderately strong										752
		...16.6 m - 84° fracture, 80 mm core loss		RC10	16.68	10	95	1				
17					-		100					751
					18.20		92					
18		...17.4 m - 24° fracture										750
		...17.6 m - 89° fracture										
		...17.8 m - mechanical fracturing to 18.2 m		RC11	18.20	11	100	0				
					-		100					
					19.72		100					
19		...19.7 m - becoming weak		RC12	19.72	12	20	1				749

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : **23TH09**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/16/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611593.000 E 416793.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.0 m - mechanically fractured area			-		44					
		...20.4 m - 850 mm of core loss; core bit chewed up run			21.24		20					
		...21.2 m - 90 mm of core loss	RC13		21.24	13	84	1				747
					-		94					
22		...22.2 m - 60 mm of crumbled core			22.76		89					746
		...22.2 m - becoming extremely weak										
23		...22.8 m - becoming very weak	RC14		22.76	14	100	0				745
		...22.9 m - becoming weak			-		100					
					24.28		100					
24			RC15		24.28	15	99	0				744
					-		99					
25					25.80		99					743
26		...26.3 m - 10 mm of extremely weak clay infill	RC16		25.80	16	103	1				742
					-		103					
					27.32		103					
27		...27.0 m - 85° fracture										741
		...27.3 m - 120 mm of core loss	RC17		27.32	17	92	0				
					-		92					
28					28.84		92					740
29			RC18		28.84	18	107	0				739
					-		107					
					30.36		107					

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : **23TH09**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/16/2023 COMPLETED 08/17/2023 GROUND ELEVATION 768.00m N 5611593.000 E 416793.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31												737
32												736
33												735
34												734
35												733
36												732
37												731
38												730
39												729

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : 23TH10

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/14/2023 COMPLETED 08/14/2023 GROUND ELEVATION 769.61m N 5611536.000 E 416794.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, silty, sandy, damp, firm, low plastic, brown, trace root hairs	■	AU1					3.8 ●	0.6 m - Gravel = 0.8%	769
		SAND AND SILT, trace fine gravel, poorly graded, fine grained, sub-rounded, damp, loose, brown	■	AU2						0.6 m - Sand = 56.0%	768
2		...2.0 m - becoming very silty, moist	■	AU3						Silt = 25.6%	
		...2.6 m - trace SEEPAGE	■	AU4						Clay = 17.6%	767
3		...2.8 m - some fine gravel	■	AU5					9.3 ●	3.7 m - Gravel = 20.8%	766
		GRAVEL, and sand, trace silt, trace clay, well graded, fine grained, sub-angular, very moist, loose, dark brown	■	AU6						3.7 m - Sand = 65.3%	765
4		SHALE, clayey, silty, unweathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated	■	RC1	4.62 - 6.14	1	85 88 85	1		Silt = 9.1%	764
5		...4.6 m - 180 mm of core loss								Clay = 4.8%	
		...4.8 m - 50 mm of slough								4.62 m - Switched from 6" SSA to HQ3 Rotary Coring	763
		...5.4 m - 77° fracture									762
6		...6.1 m - 60 mm of core loss		RC2	6.14 - 7.66	2	93 96 93	1			761
		...6.4 m - 73° fracture									760
7		...7.2 m - 72° fracture		RC3	7.66 - 9.18	3	91 100 94	3			
8		...7.7 m - becoming very weak									
		...7.9 m - becoming some thin weakly cemented layers									
		...8.0 m - 51° fracture									
		...8.1 m - 67° fracture									
9		...8.9 m - 74° fracture		RC4	9.18 - 10.70	4	44 84 59	2			
		...9.3 m - 130 mm of strong calcified shale									
		...9.4 m - some crumbled core									
		...9.9 m - 72° fracture									

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH10**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/14/2023 COMPLETED 08/14/2023 GROUND ELEVATION 769.61m N 5611536.000 E 416794.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.2 m - 200 mm of crumbled core ...10.4 m - 250 mm of core loss		RC5	10.70 - 12.22	5	97 100 99	1				759
12		...10.9 m - 80 mm of strong calcified shale ...11.0 m - some crumbled core ...11.2 m - becoming weak		RC6	12.22 - 13.74	6	100 100 100	1				758 757
13												
14		...13.5 m - 67° fracture		RC7	13.74 - 15.26	7	91 99 92	1				756
15		...14.2 m - 79° fracture										755
16		...14.9 m - mechanically fractured area ...15.3 m - 60 mm of core loss		RC8	15.26 - 16.78	8	93 96 95	1				754
17		...15.8 m - 73° fracture		RC9	16.78 - 18.30	9	89 102 97	1				753 752
18		...17.7 m - 80 mm of fractured, strong calcified shale ...17.8 m - becoming very to extremely weak		RC10	18.30 - 19.82	10	95 108 97	2				751
19		...17.9 m - 44° fracture ...18.5 m - some crumbled core ...18.8 m - becoming weak ...19.3 m - 70° fracture ...19.8 m - becoming widely spaced fractures		RC11	19.82	11	100	1				750

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH10**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/14/2023 COMPLETED 08/14/2023 GROUND ELEVATION 769.61m N 5611536.000 E 416794.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.1 m - 61° fracture			- 21.34	100 100						749
22		...21.9 m - 78° fracture		RC12	21.34 - 22.86	12 97 99 97	1					748
23				RC13	22.86 - 24.38	13 99 99 99	1					747
24		...23.9 m - 64° fracture										746
25		...24.2 m - some crumbled core		RC14	24.38 - 25.90	14 81 90 85	1					745
26		...25.1 m - 51° fracture										744
27		...25.8 m - 150 mm of core loss		RC15	25.90 - 27.42	15 78 100 82	3					743
28		...25.9 m - some mechanical rubble										742
29		...26.2 m - 24° fracture		RC16	27.42 - 28.94	16 93 103 93	2					741
		...26.8 m - 19° fracture										740
		...26.9 m - 70° fracture		RC17	28.94 - 30.46	17 101 110 101	2					
		...27.4 m - mechanically fractured run										
		...28.2 m - bedding fracture										
		...29.0 m - trace shell fragments										
		...29.7 m - 73° fracture										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH10**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/14/2023 COMPLETED 08/14/2023 GROUND ELEVATION 769.61m N 5611536.000 E 416794.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31		...30.0 m - some crumbled core										739
32												738
33												737
34												736
35												735
36												734
37												733
38												732
39												731
												730

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips. Packer test completed after coring.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH11**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/15/2023 COMPLETED 08/16/2023 GROUND ELEVATION 764.67m N 5611281.000 E 416785.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		CLAY TILL, silty, trace sand, moist, stiff, high plastic, dark brown, trace white precipitates, trace gypsum crystals	■	AU1								764
		...1.0 m - becoming trace oxidation staining	■	AU2								763
		...1.4 m - becoming very silty, damp										
2			■	AU3								
			■	AU4								762
3		SHALE (Weathered), clayey, silty, highly weathered, dark brown to grey mottling, damp, high plastic, extremely weak, blocky, thinly laminated, some oxidation staining, trace gypsum crystals		RC1	3.13 - 4.65	1	50 72 53	3		3.13 m - Switched from 6" SSA to HQ3 Rotary Coring		761
		...3.1 m - 420 mm of core loss										
		...3.8 m - some crumbled core										
		...3.9 m - becoming slightly weathered										
4		SHALE, silty, clayey, unweathered, grey, damp, high plastic, very weak, moderately widely spaced fractures, thinly laminated		RC2	4.65 - 6.17	2	74 89 74	1				760
		...4.6 m - mechanically fractured run; 170 mm of core loss										759
		...4.8 m - 46° fracture										
5				RC3	6.17 - 7.69	3	96 100 97	1				758
		...6.3 m - 59° fracture										
6												
7		...7.2 m - 56° fracture										
		...7.7 m - 100 mm of core loss		RC4	7.69 - 9.21	4	83 93 88	1				757
8												
		...8.3 m - becoming weak										756
		...8.8 m - 59° fracture										
9				RC5	9.21 - 10.73	5	95 100 95	1				755
		...9.4 m - becoming some thin weakly cemented layers										

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH11**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/15/2023 COMPLETED 08/16/2023 GROUND ELEVATION 764.67m N 5611281.000 E 416785.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.1 m - 76° fracture										
		...10.5 m - 52° fracture										
		...10.8 m - 75° fracture		RC6	10.73 - 12.25	6	99 100 99	2				754
12		...11.6 m - 62° fracture										753
		...12.1 m - 110 mm of strong calcified shale		RC7	12.25 - 13.77	7	91 94 91	1				752
		...12.2 m - 90 mm of core loss										
13		...12.9 m - 60 mm of bentonitic clay										
		...13.3 m - some crumbled core										
14		...14.0 m - becoming widely spaced fractures		RC8	13.77 - 15.29	8	89 93 89	1				751
		...14.1 m - 66° fracture										750
15		...14.8 m - some crumbled core										
		...15.2 m - 100 mm of core loss		RC9	15.29 - 16.81	9	100 100 100	0				749
16		...15.3 m - mechanically fractured run										
17				RC10	16.81 - 18.33	10	100 100 100	0				748
18												747
19				RC11	18.33 - 19.85	11	84 88 84	1				746
		...19.2 m - 46° fracture										
		...19.7 m - 180 mm of core loss										
		...19.8 m - some mechanical rubble		RC12	19.85	12	97	1				745

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH11**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/15/2023 COMPLETED 08/16/2023 GROUND ELEVATION 764.67m N 5611281.000 E 416785.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
21		...20.7 m - 62° fracture			- 21.37		100 97					744
22			RC13		21.37 - 22.89	13	100 100 100	1				743
23		...22.5 m - bedding fracture										742
24		...23.7 m - 90 mm moderately strong layer	RC14		22.89 - 24.41	14	100 100 100	1				741
25		...24.9 m - becoming very weak										740
26		...25.9 m - 300 mm of core loss	RC16		24.41 - 25.93	15	100 100 100	0				739
27		...26.4 m - some mechanical rubble ...26.6 m - 60 mm of strong calcified shale ...27.0 m - becoming weak										738
28		...27.8 m - some mechanical rubble	RC17		25.93 - 27.45	16	79 80 79	1				737
29		...28.7 m - 68° fracture										736
			RC18		27.45 - 28.97	17	103 105 103	1				735
					28.97 - 30.49	18	100 100 100	0				

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH11**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 08/15/2023 COMPLETED 08/16/2023 GROUND ELEVATION 764.67m N 5611281.000 E 416785.900
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
31												734
32												733
33												732
34												731
35												730
36												729
37												728
38												727
39												726
												725

Notes:

Target depth of 30 m achieved. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH12**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/23/2023 COMPLETED 06/23/2023 GROUND ELEVATION 767.78m N 5611071.100 E 416785.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE 6" SSA DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)		
1		TOPSOIL, sandy, gravelly, some silt, moist, loose, brown, organics		AU1							767
		GRAVEL, sandy, trace clay, trace silt, well graded, sub-rounded, damp, loose, light brown, oxide pockets to 5 mm		AU2							
		...1.0 m - becoming trace to some clay, compact		SPT1							766
2		CLAY TILL, silty, , some sand to sandy, trace gravel, damp, very stiff, low to medium plastic, brown, oxide staining, suspect white sulphate inclusions, sand pockets to 25 mm, coal specks		AU3							
		SHALE (Weathered), residual soil to completely weathered, brown and grey, damp, medium plastic, hard soil to extremely weak, blocky, trace gravel, oxide staining, suspect white sulphate inclusions, coal pockets to 10 mm		AU4							765
3		...3.0 m - 420 mm of core loss		RC1	3.00 -	1	27	20			
		...3.4 m - 240 mm crumbled core		SPT2	4.52		72				
		...3.8 m - 400 mm highly fractured and crumbled core					27				764
4		SHALE, grey, damp, medium plastic, extremely weak, blocky, oxide staining, suspect white sulphate inclusions		RC2	4.52 -	2	22	8			
		...4.4 m - becoming highly weathered			6.04 -		98				763
		...4.5 m - becoming very weak to weak			6.04 -		37				
		...4.6 m - 160 mm crumbled core		RC3	6.04 -	3	90	3			762
		...4.8 m - highly fractured core to run termination			7.56		100				761
6		...6.0 m - 150 mm crumbled core					87				
		...6.3 m - 80° fracture		RC4	7.56 -	4	90	3			760
		...6.9 m - 78° fracture, shell fragments			9.08		100				
		...7.3 m - becoming weak, moderately weathered					88				
		...7.5 m - silt and sand content increasing									759
9		...7.7 m - 140 mm crumbled core		RC5	9.08 -	5	95	2			
		...8.2 m - 81° fracture			10.60		100				758
		...8.6 m - 88° fracture					93				
		...9.1 m - 72° fracture									

Notes:

Target depth of 20 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : **23TH12**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/23/2023 COMPLETED 06/23/2023 GROUND ELEVATION 767.78m N 5611071.100 E 416785.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE 6" SSA DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)					REMARKS	Standpipe/ Instrument	Elevation (m)
		...9.4 m - becoming weak to moderately strong								●	MOISTURE CONTENT					
		...9.7 m - 60 mm crumbled core								┌─┐	PLASTIC - LIQUID					
		...10.0 m - horizontal fracture								■	SPT (N) Blows/300 mm					
		...10.8 m - 82° fracture								10	20	30	40			
		...10.9 m - 85° fracture								50	100	150	200			
		...11.4 m - 87° fracture								▲	POCKET PEN (kPa)					
11		...9.4 m - becoming weak to moderately strong		RC6	10.60	6	100	2							757	
		...9.7 m - 60 mm crumbled core			-		100									
		...10.0 m - horizontal fracture			12.12		97									
		...10.8 m - 82° fracture														
		...10.9 m - 85° fracture														
		...11.4 m - 87° fracture													756	
12		...12.1 m - 260 mm mechanically fractured core		RC7	12.12	7	100	0								
					-		100									
					13.64		100									
13				UD2A											755	
				UD2B												
				UD2C												
		...13.5 m - becoming moderately strong to strong		RC8	13.64	8	100	1							754	
14		...13.7 m - 65° fracture			-		100									
					15.16		99									
															753	
15				RC9	15.16	9	100	1								
		...15.4 m - 44° fracture			-		100									
					16.68		95								752	
16		...16.0 m - 84° fracture														
		...16.3 m - 70 mm mechanically crumbled core		RC10	16.68	10	100	1							751	
17					-		100									
					18.20		99									
		...17.7 m - 73° fracture													750	
18				RC11	18.20	11	86	1								
		...18.4 m - 79° fracture			-		86									
					19.72		84								749	
19		...19.1 m - 370 mm mechanically crumbled core														
		...19.5 m - 220 mm core loss													748	

Notes:

Target depth of 20 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: J. Boyd

Reviewed By: C. Braun



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COREHOLE No : **23TH13**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2023 COMPLETED 06/23/2023 GROUND ELEVATION 767.10m N 5610791.200 E 416783.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, sandy, some silt, damp, firm, low plastic, brown, trace root hairs	■ AU1									767
1		SAND, some silt, poorly graded, fine grained, sub-rounded, damp, loose, brown	■ AU2						1.5			766
2		...1.4 m - becoming medium grained	▲ SPT1									
2		...1.5 m - becoming moist	▲ AU3						16.9			765
2		...2.2 m - SEEPAGE										
3		SHALE, silty, clayey, moderately weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining	■ AU4									
3		...3.0 m - 420 mm of core loss	RC1		2.96 -	1	47	0				764
3		...3.4 m - 100 mm of sloughed in sand	SPT2		4.48		72					
4							47					
4		...4.3 m - becoming unweathered, unoxidized	RC2		4.48 -	2	39	3				763
5		...4.5 m - mechanically fractured run			6.00		100					
5		...4.7 m - becoming very weak					57					762
5		...5.0 m - some crumbled core										
6		...5.8 m - vertical fracture	RC3		6.00 -	3	44	2				761
6		...6.0 m - mechanically fractured run	UD1A		7.52		93					
6		...6.2 m - trace shell fragment					72					760
7												
8		...8.2 m - 66° fracture	RC4		7.52 -	4	46	2				759
8		...8.5 m - 200 mm of crumbled core			9.04		82					
8		...8.8 m - 270 mm of core loss					57					
9		...9.5 m - 59° fracture	RC5		9.04 -	5	79	2				758
9					10.56		93					
9			UD2A				88					
9			UD2B									

Notes:

Target depth of 20 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH13**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2023 COMPLETED 06/23/2023 GROUND ELEVATION 767.10m N 5610791.200 E 416783.000
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.2 m - 69° fracture		RC6	10.56 - 12.08	6	49 100 91	2				757
		...11.2 m - 65° fracture										756
12		...11.7 m - 60° fracture		RC7	12.08 - 13.60	7	77 87 74	2				755
		...11.8 m - some crumbled core										
		...12.1 m - 200 mm core loss										
		...12.2 m - becoming weak to medium strong										
13		...12.4 m - 83° fracture		RC8	13.60 - 15.12	8	99 99 94	3				754
		...12.8 m - 75° fracture										
		...12.9 m - 120 mm crumbled and mechanically fractured core										
14		...14.1 m - 65° fracture, shell fragments		RC9	15.12 - 16.64	9	95 95 93	2				753
		...14.4 m - 81° fracture										
		...14.5 m - 65° fracture										
15		...14.8 m - 86° fracture		RC10	16.64 - 18.16	10	99 99 97	2				752
		...15.3 m - horizontal fracture										
16		...16.0 m - 88° fracture		RC11	18.16 - 19.68	11	98 98 98	0				751
		...16.6 m - 81° fracture, followed by 80 mm core loss										
17		...17.0 m - 83° fracture										750
		...18.0 m - 89° fracture										
18		...18.1 m - 20 mm core loss										749
		...18.3 m - potential siltstone layer to 18.55 m										
19												748

Notes:

Target depth of 20 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH14**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2023 COMPLETED 06/22/2023 GROUND ELEVATION 768.17m N 5610569.000 E 416781.700
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, sandy, some silt, damp, firm, low plastic, brown, trace root hairs	■	AU1								768
		SAND, some silt, poorly graded, fine grained, sub-rounded, damp, compact, brown	■	AU2								767
2		CLAY, some silt, some sand, damp, stiff, low plastic, light brown	▲	SPT1								
		...0.8 m - becoming some coarse grained sand, moist, trace oxidation staining	■	AU3					12.5		2.1 m - Gravel = 0.1%	766
3		SAND, silty, trace clay, poorly graded, medium grained, sub-rounded, moist, compact, brown, trace oxidation staining, trace coal staining	■	AU4					21.7		2.1 m - Sand = 84.7%	
		...2.3 m - becoming very moist	▲	SPT2							Silt = 6.6%	765
		...2.5 m - SEEPAGE	■	AU5							Clay = 8.6%	
4		SHALE, silty, clayey, unweathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, blocky, trace oxide staining	■	AU6								764
5		...3.5 m - becoming slightly weathered, unoxidized	■	RC1	4.60 - 6.12	1	18 80 59	4				763
6		...4.6 m - 300 mm of core loss										
		...4.9 m - 80 mm of sloughed in sand and gravel										
7		...5.2 m - some crumbled core										762
		...6.0 m - 69° fracture										
		...6.1 m - 60 mm of crumbled core										761
		...6.2 m - becoming widely spaced fractures										760
8		...7.6 m - 70 mm of crumbled core										
		...8.8 m - 79° fracture										759
		...8.8 m - becoming very weak										
		...9.8 m - 74° fracture										

Notes:

Target depth of 19 m achieved. Packer test completed after coring. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH14**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/22/2023 COMPLETED 06/22/2023 GROUND ELEVATION 768.17m N 5610569.000 E 416781.700
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.8 m - 80° fracture		RC5	10.68	5	90	2				758
		...11.2 m - 75° fracture			12.20		100					757
12		...12.0 m - bedding fracture		RC6	12.20	6	88	2				756
		...12.6 m - 60° fracture			13.72		100					755
13		...13.0 m - 71° fracture					93					754
		...13.5 m - 74° fracture		RC7	13.72	7	80	2				753
14		...13.7 m - mechanically fractured run			15.24		100					752
		...14.3 m - 63° fracture					92					751
15		...14.9 m - 74° fracture		UD1A	15.24	8	49	2				750
		...15.2 m - becoming weak		RC8	16.76		73					749
16		...15.8 m - 71° fracture		UD1B			50					
		...16.1 m - 250 mm of crumbled core		UD1C								
17		...16.4 m - 410 mm of core loss		RC9	16.76	9	59	2				
		...16.9 m - 50° fracture			18.28		88					
18		...17.8 m - 72° fracture followed by some crumbled core		RC10	18.28	10	94	1				
		...18.1 m - 180 mm of core loss			19.80		100					
19		...18.4 m - 71° fracture					97					

Notes:

Target depth of 19 m achieved. Packer test completed after coring. Corehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH15**

PAGE 1 OF 2

CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/20/2023 COMPLETED 06/20/2023 GROUND ELEVATION 769.69m N 5610308.300 E 416777.300
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
									● MOISTURE CONTENT — PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, sandy, some silt, trace clay, damp, firm, low plastic, brown, trace root hairs	■	AU1								769
		SILT, some sand, dry, firm, low plastic, light brown	■	AU2								
2		SAND, silty, trace fine gravel, trace clay, well graded, medium grained, sub-rounded, damp, compact, brown, trace oxidation staining	▲	SPT1					2.8		1.2 m - Gravel = 0.0%	768
			■	AU3					5.6		1.2 m - Sand = 78.7%	
			■	AU4							Silt = 8.3%	
3			▲	SPT2							Clay = 13.0%	767
		SAND AND SILT, some clay, poorly graded, fine grained, sub-rounded, very moist, very loose, brown	■	AU5							2.1 m - Sand = 70.6%	
			▲	SPT3					23.1		Silt = 17.8%	766
4			■	AU6							Clay = 11.6%	
			■	AU7							3.7 m - Sand = 32.6%	765
5		CLAY TILL, silty, some sand, trace fine gravel, moist, firm, high plastic, grey, some oxidation staining	■	AU8							Silt = 51.3%	764
6		...5.4 m - becoming some gravel up to 30 mm, SEEPAGE	■	RC1	6.00 - 7.52	1	0 43 16	10			Clay = 16.1%	
7		SHALE, silty, clayey, moderately weathered, grey, damp, high plastic, extremely weak, closely spaced fractures, thinly laminated	■	SPT4							6.5 m - SPT Refusal - 50 blows for 5"	763
		...6.0 m - 870 mm of core loss										
8		...6.9 m - 200 mm of sloughed in sand and gravel			7.52 - 9.04	2	0 41 9	10			7.5 m - Losing circulation.	762
		...7.5 m - 890 mm of core loss										
9		...8.8 m - 260 mm of slough			9.04 - 10.56	3	0 81 66	10				761
		...9.0 m - 290 mm of core loss										760
		...9.3 m - 40 mm of slough										
		...9.4 m - mechanically fractured and chewed up run										

Notes:

Target depth of 15 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH15**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2023 COMPLETED 06/20/2023 GROUND ELEVATION 769.69m N 5610308.300 E 416777.300
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
11		...11.0 m - becoming unweathered, widely spaced fractures, very weak		RC4	10.56 - 12.08	4	78 100 82	1				759
12		...11.6 m - trace shell fragments										758
		...12.1 m - mechanically fractured run		RC5	12.08 - 13.60	5	15 100 92	1				757
13												
		...13.2 m - 60° fracture		RC6	13.60 - 15.12	6	7 100 100	1				756
14												755
15												754
16												753
17												752
18												751
19												750

Notes:

Target depth of 15 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH16**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2023 COMPLETED 06/20/2023 GROUND ELEVATION 768.75m N 5610031.500 E 416778.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)				REMARKS	Standpipe/ Instrument	Elevation (m)
									●	—	■	▲			
		TOPSOIL, sandy, some silt, trace clay, damp, firm, low plastic, brown, trace root hairs		AU1											
1		SAND, silty, trace fine gravel, trace clay, poorly graded, medium grained, sub-rounded, damp, compact, light brown		AU2				5.5	●				1.2 m - Gravel = 0.1%		768
2			SPT1							■			1.2 m - Sand = 81.6%		767
				AU3									Silt = 7.6% Clay = 10.7%		
3		...2.4 m - becoming moist ...2.5 m - becoming some clay, some oxidation staining		AU4				11.8	●				2.7 m - Sand = 77.3%		766
		CLAY TILL, silty, some sand, moist, stiff, medium plastic, brown, some oxidation staining		SPT2						■			Silt = 10.6% Clay = 12.1%		765
4		SHALE, clayey, silty, slightly weathered, grey, damp, high plastic, extremely weak, closely spaced fractures, thinly laminated		AU5											
5		...4.1 m - becoming moderately weathered, grey, trace oxidation staining		RC1 AU6 SPT3	4.20 - 5.72	1	0 95 72	10					4.8 m - SPT Refusal - 50 blows for 5"		764
6		...4.2 m - 70 mm of core loss ...5.3 m - 200 mm of slough ...5.7 m - becoming unweathered, moderately widely spaced fractures ...6.0 m - mechanically fractured area		RC2	5.72 - 7.24	2	7 84 72	3							763
7		...6.5 m - 59° fracture ...6.8 m - some crumbled core ...7.0 m - 250 mm of core loss ...7.2 m - 120 mm of core loss ...7.4 m - 90 mm of strong calcified shale		RC3	7.24 - 8.76	3	44 92 82	2							762
8		...8.2 m - 51° fracture ...8.3 m - 76° fracture													761
9		...8.9 m - becoming very weak ...9.3 m - 78° fracture ...9.6 m - 79° fracture ...9.9 m - 70° fracture		RC4	8.76 - 10.28	4	41 100 92	3							760
															759

Notes:

Target depth of 15 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH16**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/20/2023 COMPLETED 06/20/2023 GROUND ELEVATION 768.75m N 5610031.500 E 416778.500
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.3 m - mechanically fractured run		RC5	10.28 - 11.80	5	24 100 85	2				758
		...10.9 m - 46° fracture										
12		...11.8 m - 100 mm of core loss		RC6	11.80 - 13.32	6	18 93 84	1				757
		...11.9 m - mechanically fractured run										
		...12.5 m - 64° fracture										756
13				RC7	13.32 - 14.84	7	47 99 82	2				755
		...13.5 m - 40 mm of extremely weak core										
14		...13.6 m - 67° fracture										
		...13.7 m - some crumbled core										
		...14.3 m - 61° fracture										754
15				RC8	14.84 - 16.36	8	76 97 90	1				753
		...15.4 m - 33° fracture										
16		...15.9 m - becoming weak										752
		...16.3 m - 50 mm of core loss										
17												751
18												750
19												749

Notes:

Target depth of 15 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH17

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/15/2023 COMPLETED 06/15/2023 GROUND ELEVATION 773.98m N 5609506.400 E 415577.700
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, clayey, sandy, some silt, trace gravel, moist, stiff, medium plastic, brown, trace root hairs	■	AU1								773
		CLAY TILL, silty, some sand, trace fine gravel, moist, very stiff, medium plastic, dark brown, some oxidation staining	■	AU2								
2		SHALE (Weathered), clayey, silty, highly weathered, grey, damp, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace gypsum crystals	▲	SPT1								772
			■	AU3								
3		...3.0 m - stiff layer	▲	SPT2								771
			■	AU4								
4			▲	SPT3								770
			■	AU5								
5			■	AU6								
			▲	SPT4								769
			■	AU7								
6		...5.6 m - becoming very silty, light grey, ground up	■	AU8	6.00 -	1	45	2				768
		...6.0 m - 120 mm of core loss	■	RC1	7.52		92					
		...6.4 m - some crumbled core	■	SPT4			53					
7		SHALE, clayey, silty, moderately weathered, dark brown to grey mottling, damp, high plastic, extremely weak, closely spaced fractures, thinly laminated, some oxidation staining	■									767
		...6.6 m - becoming unweathered, very weak, moderately widely spaced fractures, unoxidized	■	RC2	7.52 -	2	11	2				
8		...7.0 m - 180 mm of siltstone	■		9.04		96					766
		...7.4 m - 45° fracture	■				82					
9		...7.5 m - mechanically fractured run	■									
		...7.6 m - some crumbled core	■	RC3	9.04 -	3	32	2				765
		...7.7 m - 78° fracture	■		10.56		94					
		...8.0 m - 72° fracture	■				89					
		...9.0 m - mechanically fractured run	■									
		...9.2 m - 62° fracture	■									
		...9.4 m - 21° fracture	■									

Notes:

Target depth of 24 m achieved. Packer test completed after coring. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH17**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/15/2023 COMPLETED 06/15/2023 GROUND ELEVATION 773.98m N 5609506.400 E 415577.700
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		...10.5 m - 90 mm of core loss		RC4	10.56	4	84	1				763
		...10.7 m - 260 mm of bentonitic clay			-		100					
		...11.0 m - bedding fracture			12.08		97					
		...11.3 m - becoming very silty, weak, widely spaced fractures										
12		...11.8 m - bedding fracture with extremely weak clay infill		RC5	12.08	5	100	1				762
		...12.1 m - becoming some thin weakly cemented layers			-		100					
		...12.2 m - 80° fracture			13.60		100					
13												761
				RC6	13.60	6	100	1				760
14		...14.0 m - 83° fracture			-		100					
					15.12		100					
15				RC7	15.12	7	95	1				759
					-		99					
					16.64		97					
16		...16.2 m - 77° fracture										758
				RC8	16.64	8	100	1				757
17		...17.1 m - 37° fracture			-		100					
		...17.4 m - trace shell fragments			18.16		97					
18				RC9	18.16	9	96	1				756
					-		107					
					19.68		103					
19		...19.5 m - 69° fracture		RC10	19.68	10	89	1				755

Notes:

Target depth of 24 m achieved. Packer test completed after coring. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH17**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/15/2023 COMPLETED 06/15/2023 GROUND ELEVATION 773.98m N 5609506.400 E 415577.700
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...20.2 m - 61° fracture		RC11	21.20	11	97 97	0				753
22					22.72		100 100 100					752
23				RC12	22.72	12	93 100 95	1				751
24		...23.8 m - 57° fracture										750
25												749
26												748
27												747
28												746
29												745

Notes:

Target depth of 24 m achieved. Packer test completed after coring. Corehole backfilled with bentonite chips.

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : 23TH18

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/16/2023 COMPLETED 06/16/2023 GROUND ELEVATION 775.15m N 5609497.800 E 415305.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT ┌─ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
1		TOPSOIL, clayey, sandy, some silt, trace gravel, moist, stiff, medium plastic, brown, trace root hairs	ST1	AU1								775
		CLAY TILL, silty, trace sand, trace fine gravel, moist, stiff, medium plastic, dark brown, trace white precipitates	ST2	AU2						1 m - Consolidation Index: 0.16 Expansion Index: 0.04		774
		...0.9 m - becoming trace coarse grained sand inclusions	ST3									
2		SHALE (Weathered), clayey, silty, highly weathered, dark brown to grey mottling, moist, high plastic, extremely weak to hard soil, blocky, thinly laminated, some oxidation staining, trace gypsum crystals	AU3									773
3		SHALE, clayey, silty, highly weathered, grey, damp, high plastic, extremely weak, moderately widely spaced fractures, thinly laminated, some oxidation staining, trace gypsum crystals	AU4	RC1	2.90 - 4.42	1	61 71 63	2		2.9 m - 440 mm core loss		772
4		...3.5 m - becoming moderately weathered		RC2	4.42 - 5.94	2	57 92 72	3				771
5		...3.7 m - 35° fracture										770
		...4.2 m - bedding fracture										
		...4.4 m - 120 mm of core loss										
		...4.5 m - 180 mm of core loss										
6		...5.0 m - 53° fracture		RC3	5.94 - 7.46	3	36 102 93	3				769
		...5.2 m - 180 mm brown layer with some gypsum crystals										
		...5.4 m - some crumbled core										
		...5.9 m - mechanically fractured run										
7		...6.5 m - 77° fracture										768
		...6.6 m - becoming slightly weathered, trace oxidation staining		RC4	7.46 - 8.98	4	30 100 81	3				767
8		...7.3 m - 78° fracture										
		...7.5 m - mechanically fractured run										
		...7.8 m - 72° fracture										
		...7.8 m - becoming unweathered, very weak, unoxidized										
		...8.0 m - becoming some thin weakly cemented layers		RC5	8.98 - 10.50	5	73 100 93	2				766
9		...8.4 m - 85° fracture										
		...8.7 m - 71° fracture										
		...9.4 m - 260 mm of bentonitic clay										
		...9.6 m - 180 mm of very strong										

Notes:

Target depth of 25 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH18**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
 PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
 DATE STARTED 06/16/2023 COMPLETED 06/16/2023 GROUND ELEVATION 775.15m N 5609497.800 E 415305.400
 DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
 CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/Instrument	Elevation (m)
									● MOISTURE CONTENT □ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
11		calcified shale ...9.7 m - 26° fracture ...9.8 m - becoming very silty, weak, widely spaced fractures ...11.0 m - bedding fracture ...11.5 m - 66° fracture		RC6	10.50 - 12.02	6	93 100 95	1				765
12				RC7	12.02 - 13.54	7	100 100 100	0				764
13		...13.3 m - 57° fracture		RC8	13.54 - 15.06	8	95 99 97	1				763
14				RC9	15.06 - 16.58	9	75 92 84	1				762
15		...15.6 m - 73° fracture		RC10	16.58 - 18.10	10	99 107 105	1				761
16		...16.3 m - 68° fracture ...16.5 m - 120 mm Of core loss ...16.8 m - bedding fracture		RC11	18.10 - 19.62	11	91 100 94	1				760
17				RC12	19.62 - 21.14	12	76 98 93	1				759
18		...18.7 m - some mechanical rubble ...18.8 m - 74° fracture										758
19		...19.7 m - 31° fracture with extremely weak clay infill										757
												756

Notes:

Target depth of 25 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun



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COREHOLE No : **23TH18**

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CLIENT Eastern Irrigation District PROJECT NAME Snake Lake Reservoir Expansion
PROJECT NUMBER 1560-193-00 PROJECT LOCATION NE 1/4 32-19-16
DATE STARTED 06/16/2023 COMPLETED 06/16/2023 GROUND ELEVATION 775.15m N 5609497.800 E 415305.400
DRILLING CONTRACTOR Val's Drilling GROUND WATER ELEVATION / DEPTH _____
CORING TYPE HQ3 DIAMETER (mm) 61 DATE GROUND WATER RECORDED _____

Depth (m)	SOIL SYMBOL	Soil Description	Sample Type	Sample Number	Run Depth (m)	Run Number	RQD TCR SCR	Fracture Index (#/m)	Moisture Content (%)	REMARKS	Standpipe/ Instrument	Elevation (m)
									● MOISTURE CONTENT └ PLASTIC - LIQUID ■ SPT (N) Blows/300 mm 10 20 30 40 50 100 150 200 ▲ POCKET PEN (kPa)			
21		...21.0 m - 79° fracture		RC13	21.14 - 22.66	13	77 82 82	0				755
22		...22.4 m - 280 mm of core loss		RC14	22.66 - 24.18	14	61 95 67	1				754
23		...23.4 m - bedding fracture										753
24		...23.7 m - vertical fracture through rest of core run		RC15	24.18 - 25.70	15	79 100 86	1				752
25		...24.1 m - 80 mm of core loss										751
26		...24.2 m - vertical fracture continuing for 200 mm										750
27												749
28												748
29												747
												746

Notes:

Target depth of 25 m achieved. Borehole backfilled with bentonite chips

Monitoring Installation Pipe Work

Depth Top	Depth Bottom	Pipe Type

Logged By: C. Tams

Reviewed By: C. Braun