MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

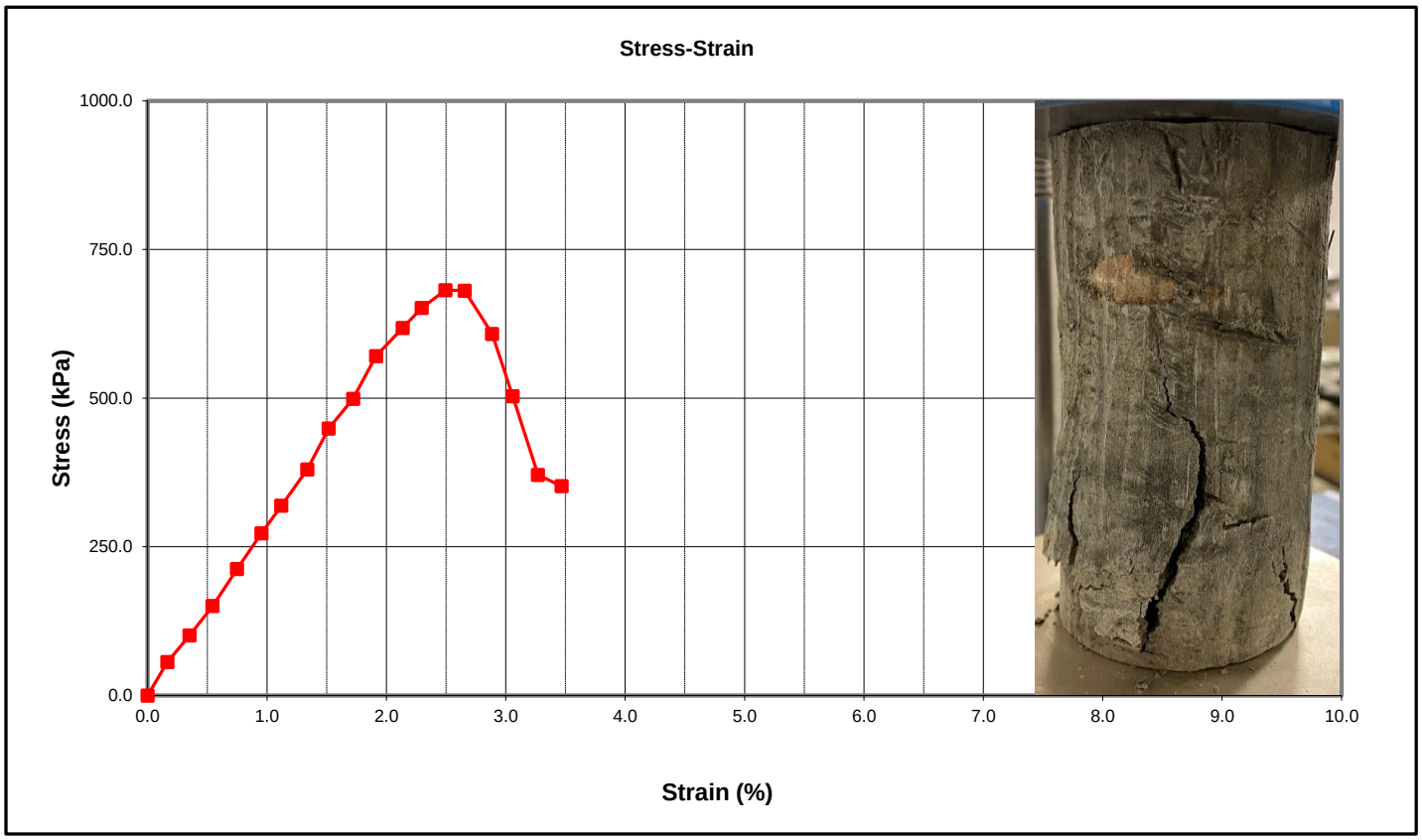
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC6
Project No.:	1560-193-00	**Borehole No.:**	22CH112
Owner:	Eastern Irrigation District	**Depth:**	11.2m
File No.:	UCS - 21	**Test Date:**	November 10, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2002	kg/m^3	Peak Stress:	682	kPa
Specimen Dry Density:	1588	kg/m^3	Strain at Peak Stress:	2.5	%
Moisture Content:	26.04	%	Rate of Strain:	0.4	%/min
Average Height:	156.30	mm	Diameter:	75.12	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: - Mudstone Geomaterial.
- 20mm oxidized rock in sample.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

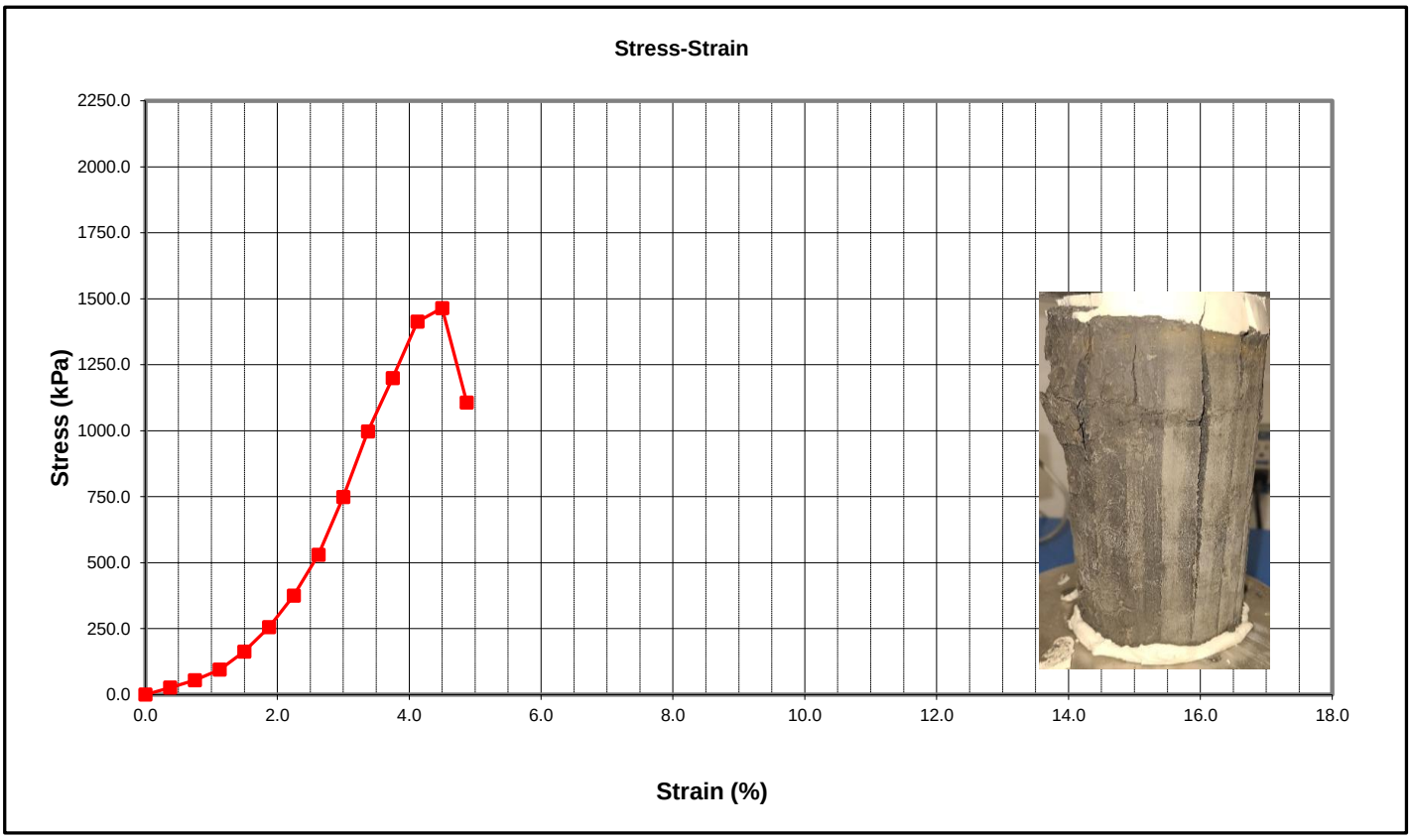
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD2
Project No.:	1560-193-00	**Borehole No.:**	22CH117
Owner:	Eastern Irrigation District	**Depth:**	14.7m
File No.:	UCS - 03	**Test Date:**	June 3, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	1972	kg/m^3	Peak Stress:	1465	kPa
Specimen Dry Density:	1718	kg/m^3	Strain at Peak Stress:	4.5	%
Moisture Content:	14.76	%	Rate of Strain:	0.7	%/min
Average Height:	178.02	mm	Diameter:	77.2	mm
			Height to Diameter:	2.3:1	

Soil Description: CH



Comments: Shale Geomaterial , Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

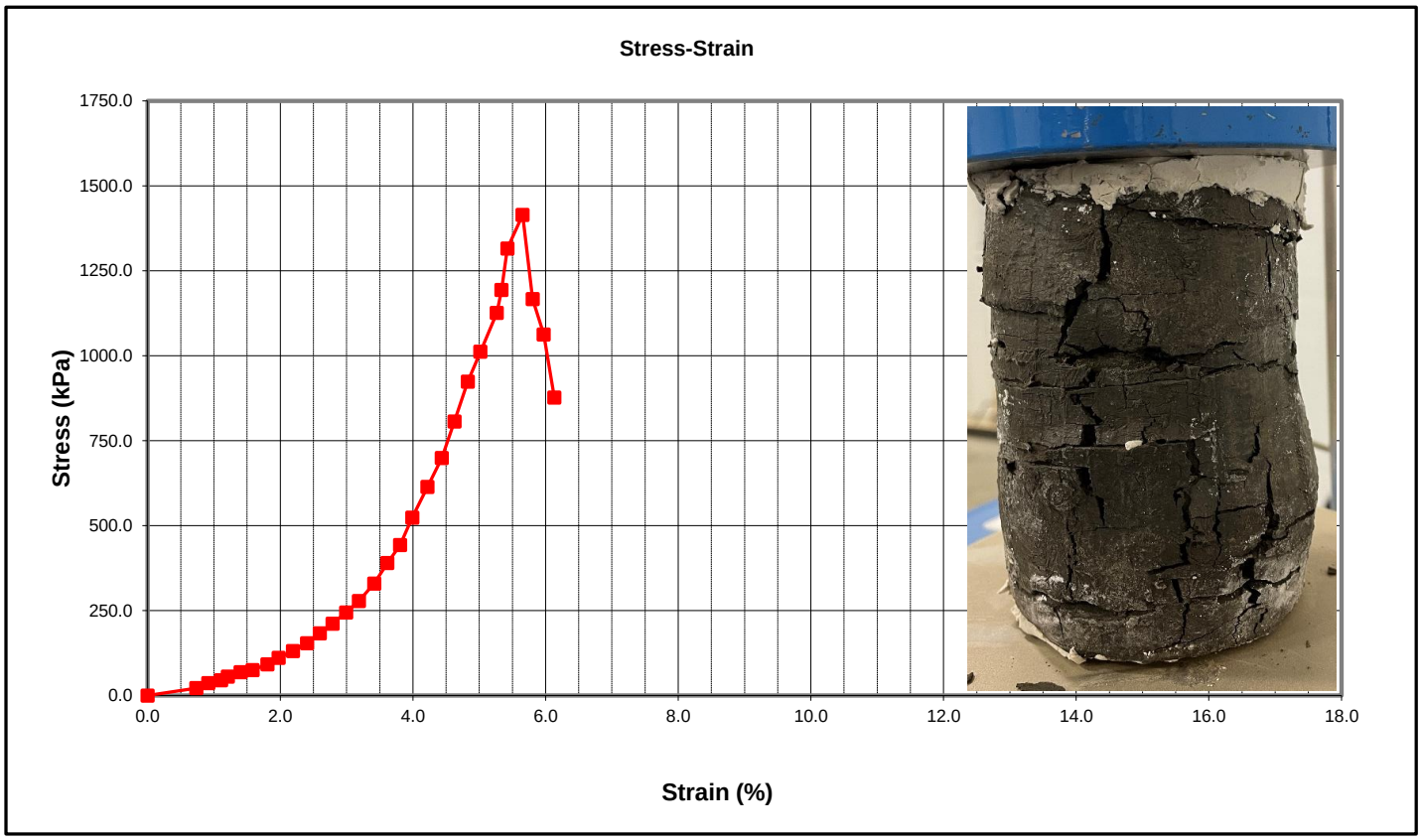
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD4
Project No.:	1560-193-00	**Borehole No.:**	22CH119
Owner:	Eastern Irrigation District	**Depth:**	23.96m
File No.:	UCS - 10	**Test Date:**	August 29, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2164	kg/m^3	Peak Stress:	1416	kPa
Specimen Dry Density:	1965	kg/m^3	Strain at Peak Stress:	5.7	%
Moisture Content:	10.13	%	Rate of Strain:	0.9	%/min
Average Height:	125.57	mm	Diameter:	76.54	mm
			Height to Diameter:	1.6:1	

Soil Description: CH



Comments:
- Shale Geomaterial, Capped with plaster of paris
- Sample speciman dimensions outside of specified range due to poor sample quality.
- Visible horizontal fissures throughout sample prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

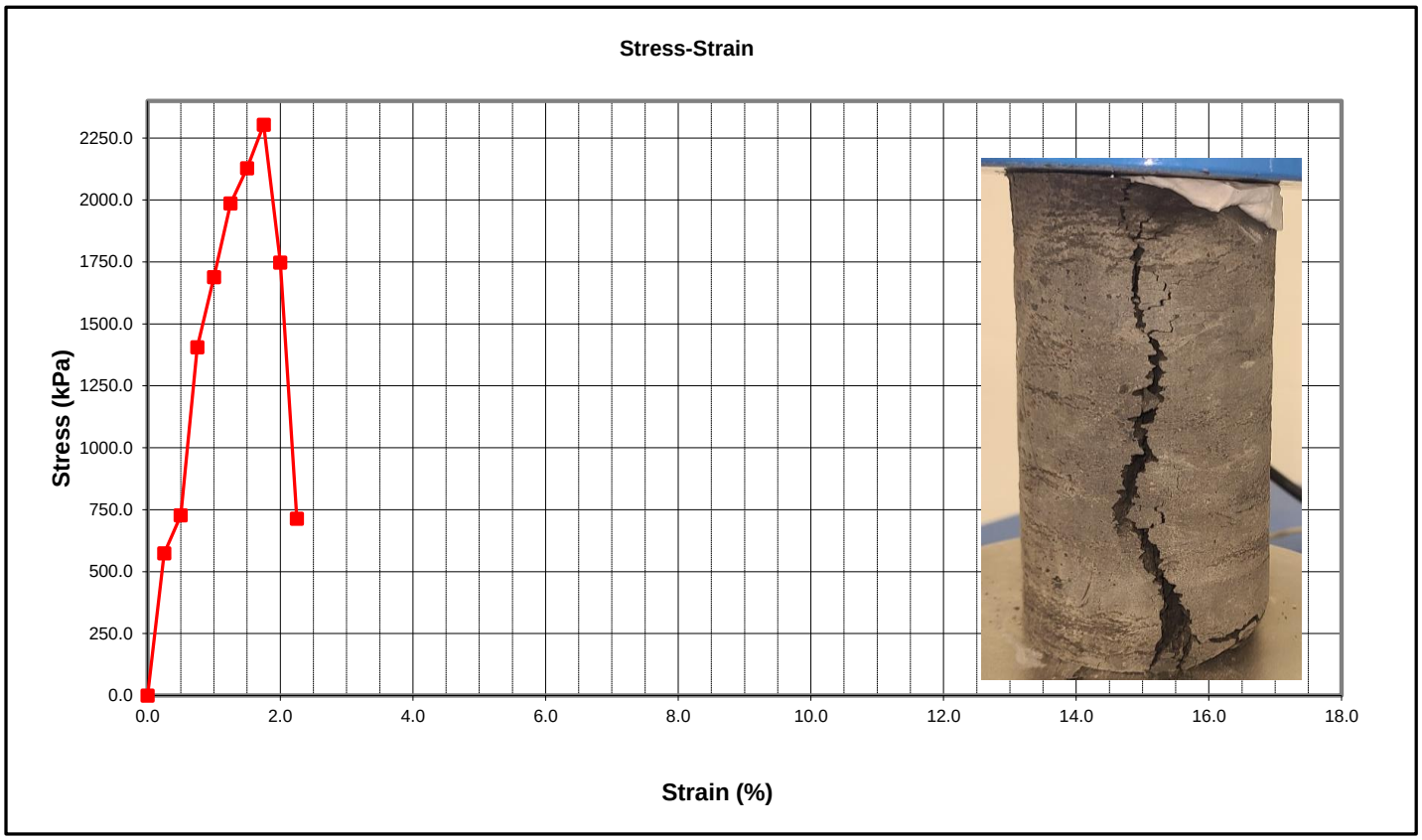
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD5
Project No.:	1560-193-00	**Borehole No.:**	22CH120
Owner:	Eastern Irrigation District	**Depth:**	21.94-22.16 m
File No.:	UCS - 08	**Test Date:**	June 27, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2224	kg/m^3	Peak Stress:	2304	kPa
Specimen Dry Density:	2021	kg/m^3	Strain at Peak Stress:	1.8	%
Moisture Content:	10.06	%	Rate of Strain:	0.5	%/min
Average Height:	128.17	mm	Diameter:	60.24	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
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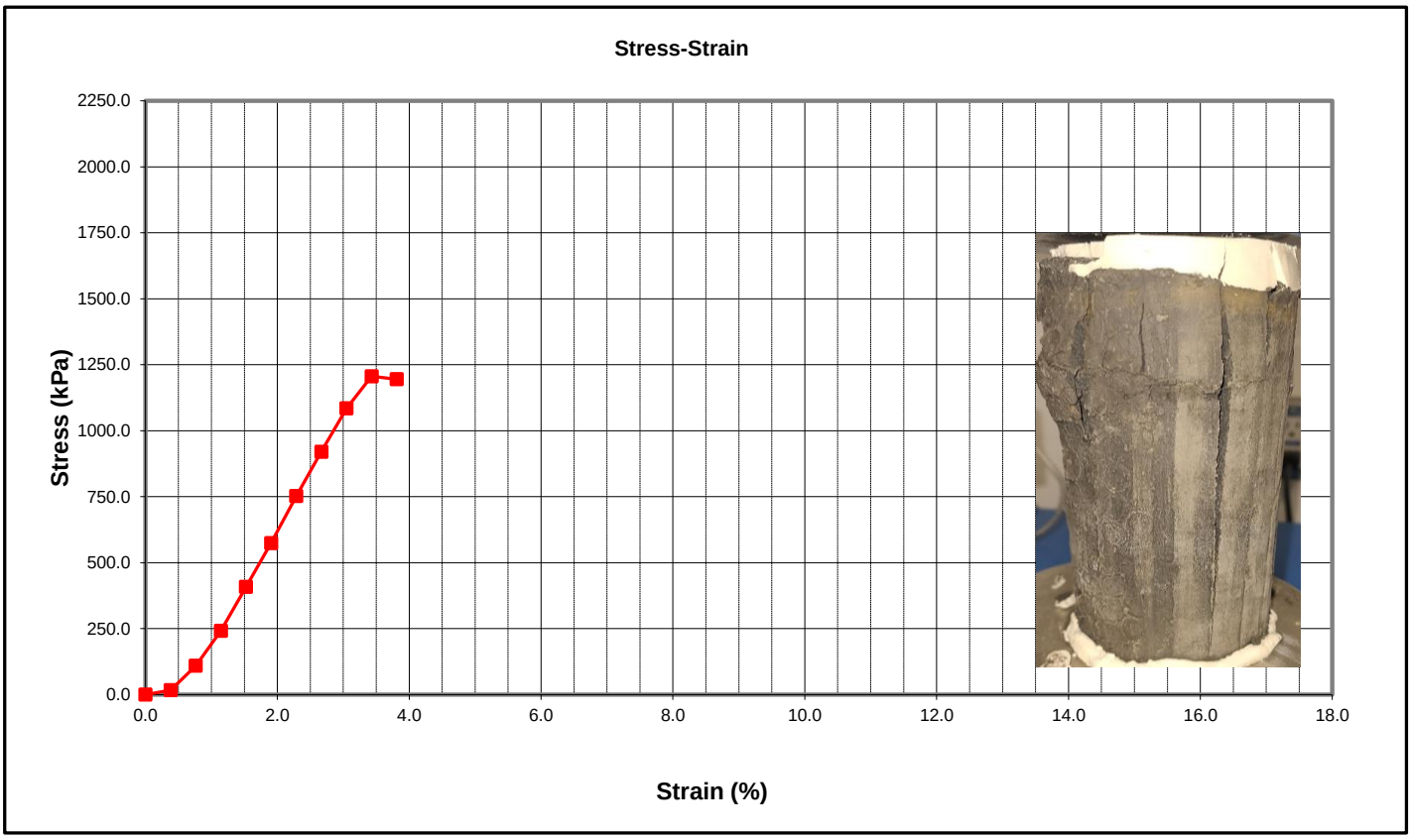
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC4
Project No.:	1560-193-00	**Borehole No.:**	22CH122
Owner:	Eastern Irrigation District	**Depth:**	9.3m
File No.:	UCS - 02	**Test Date:**	June 3, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2187	kg/m^3	Peak Stress:	1206	kPa
Specimen Dry Density:	1934	kg/m^3	Strain at Peak Stress:	3.4	%
Moisture Content:	13.07	%	Rate of Strain:	0.8	%/min
Average Height:	145.17	mm	Diameter:	77.08	mm
			Height to Diameter:	1.9:1	

Soil Description: CH



Comments: Shale Geomaterial , Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

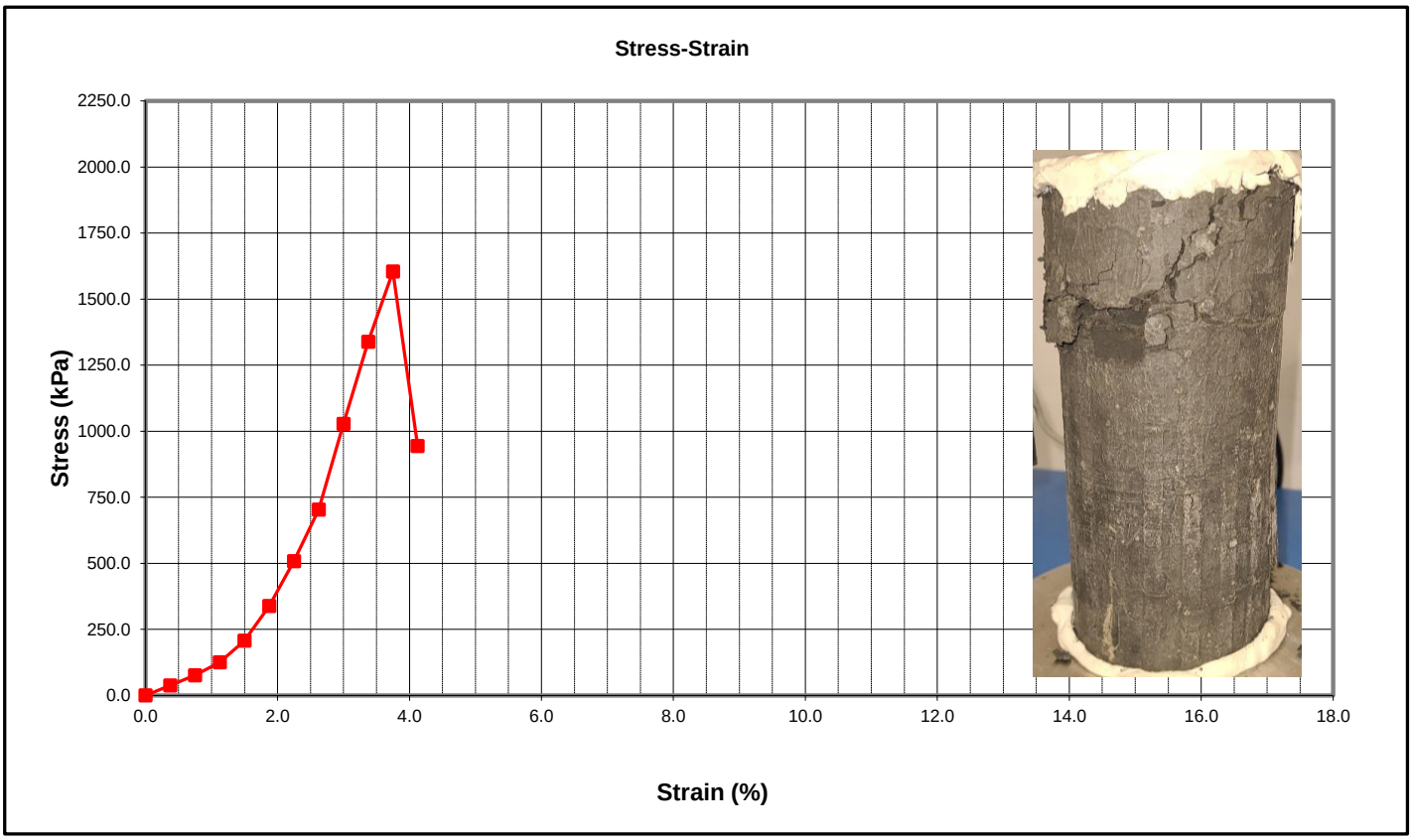
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD2
Project No.:	1560-193-00	**Borehole No.:**	22CH122
Owner:	Eastern Irrigation District	**Depth:**	24.5m
File No.:	UCS - 04	**Test Date:**	June 3, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2198	kg/m^3	Peak Stress:	1604	kPa
Specimen Dry Density:	1961	kg/m^3	Strain at Peak Stress:	3.8	%
Moisture Content:	12.08	%	Rate of Strain:	0.7	%/min
Average Height:	181.38	mm	Diameter:	77.32	mm
			Height to Diameter:	2.3:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

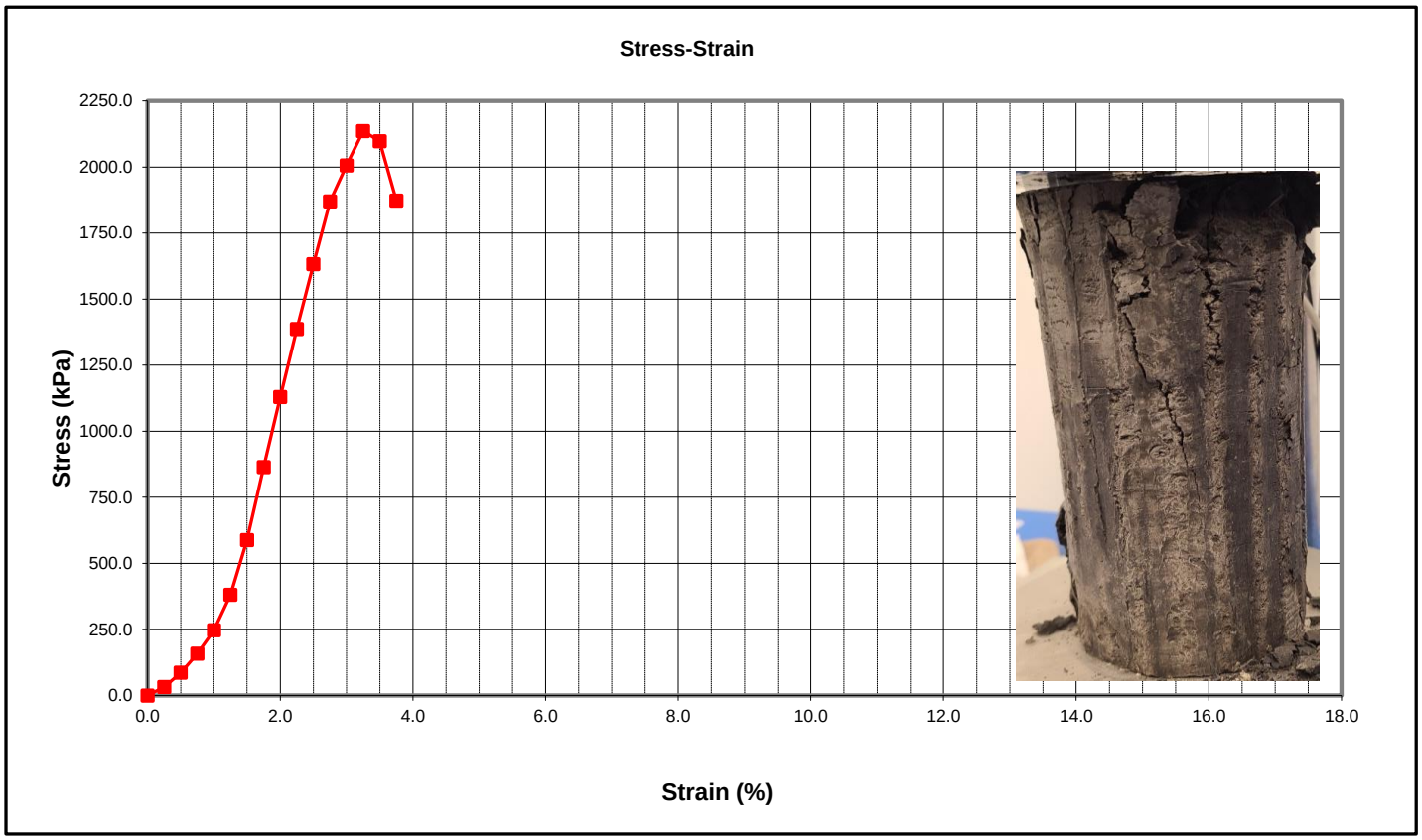
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD4
Project No.:	1560-193-00	**Borehole No.:**	22CH123
Owner:	Eastern Irrigation District	**Depth:**	26.3m
File No.:	UCS - 01	**Test Date:**	May 26, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2185	kg/m^3	Peak Stress:	2136	kPa
Specimen Dry Density:	2037	kg/m^3	Strain at Peak Stress:	3.3	%
Moisture Content:	7.29	%	Rate of Strain:	0.5	%/min
Average Height:	158.49	mm	Diameter:	77.75	mm
			Height to Diameter:	2:1	

Soil Description: CH



Comments: Shale Geomaterial

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

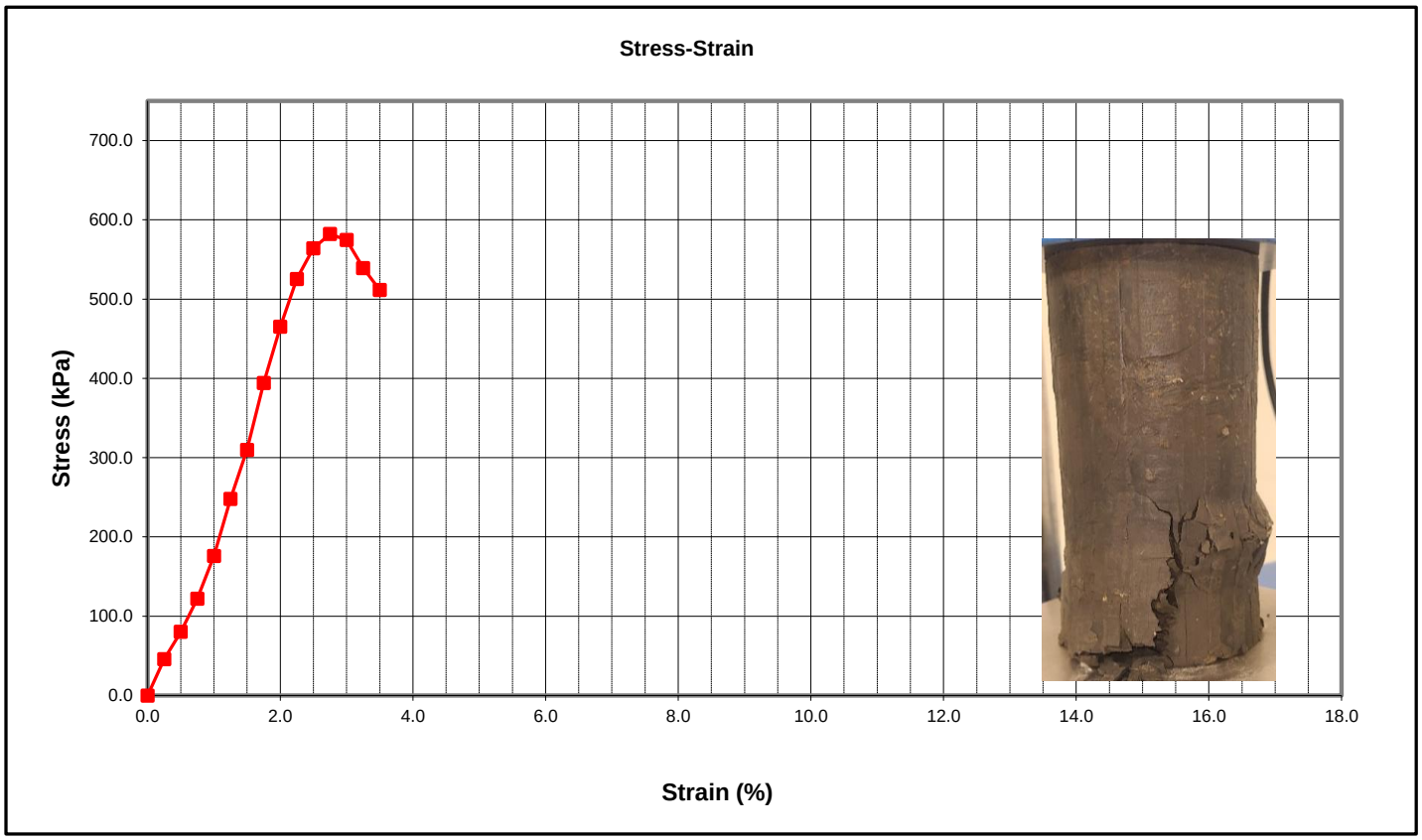
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD2
Project No.:	1560-193-00	**Borehole No.:**	22CH124
Owner:	Eastern Irrigation District	**Depth:**	9.5m
File No.:	UCS - 05	**Test Date:**	June 24, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2122	kg/m^3	Peak Stress:	582	kPa
Specimen Dry Density:	1862	kg/m^3	Strain at Peak Stress:	2.8	%
Moisture Content:	13.99	%	Rate of Strain:	0.5	%/min
Average Height:	163.95	mm	Diameter:	77.3	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

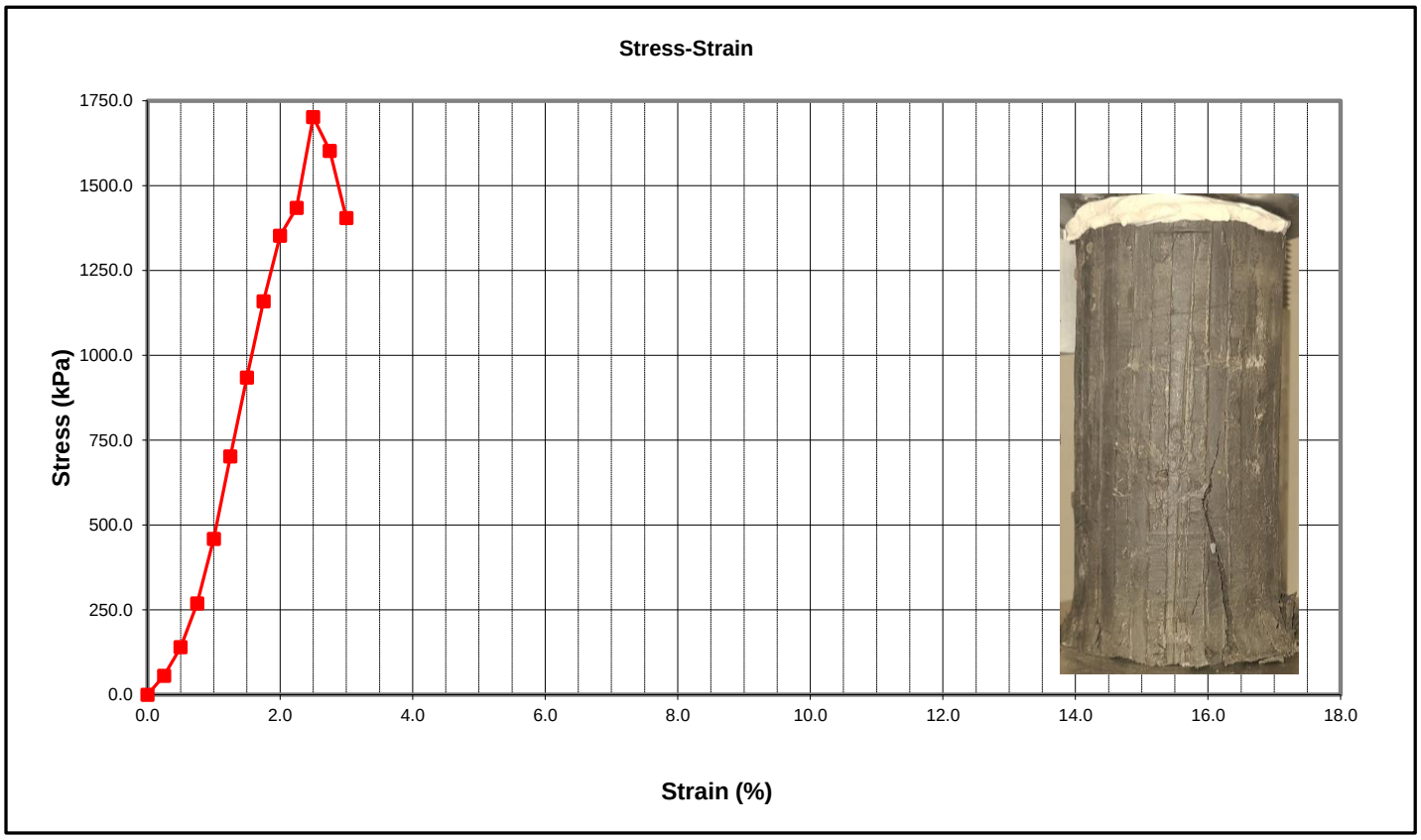
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD4
Project No.:	1560-193-00	**Borehole No.:**	22CH126
Owner:	Eastern Irrigation District	**Depth:**	21.99-22.2m
File No.:	UCS - 06	**Test Date:**	June 24, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2224	kg/m^3	Peak Stress:	1702	kPa
Specimen Dry Density:	2036	kg/m^3	Strain at Peak Stress:	2.5	%
Moisture Content:	9.22	%	Rate of Strain:	0.5	%/min
Average Height:	170.32	mm	Diameter:	77.53	mm
			Height to Diameter:	2.2:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

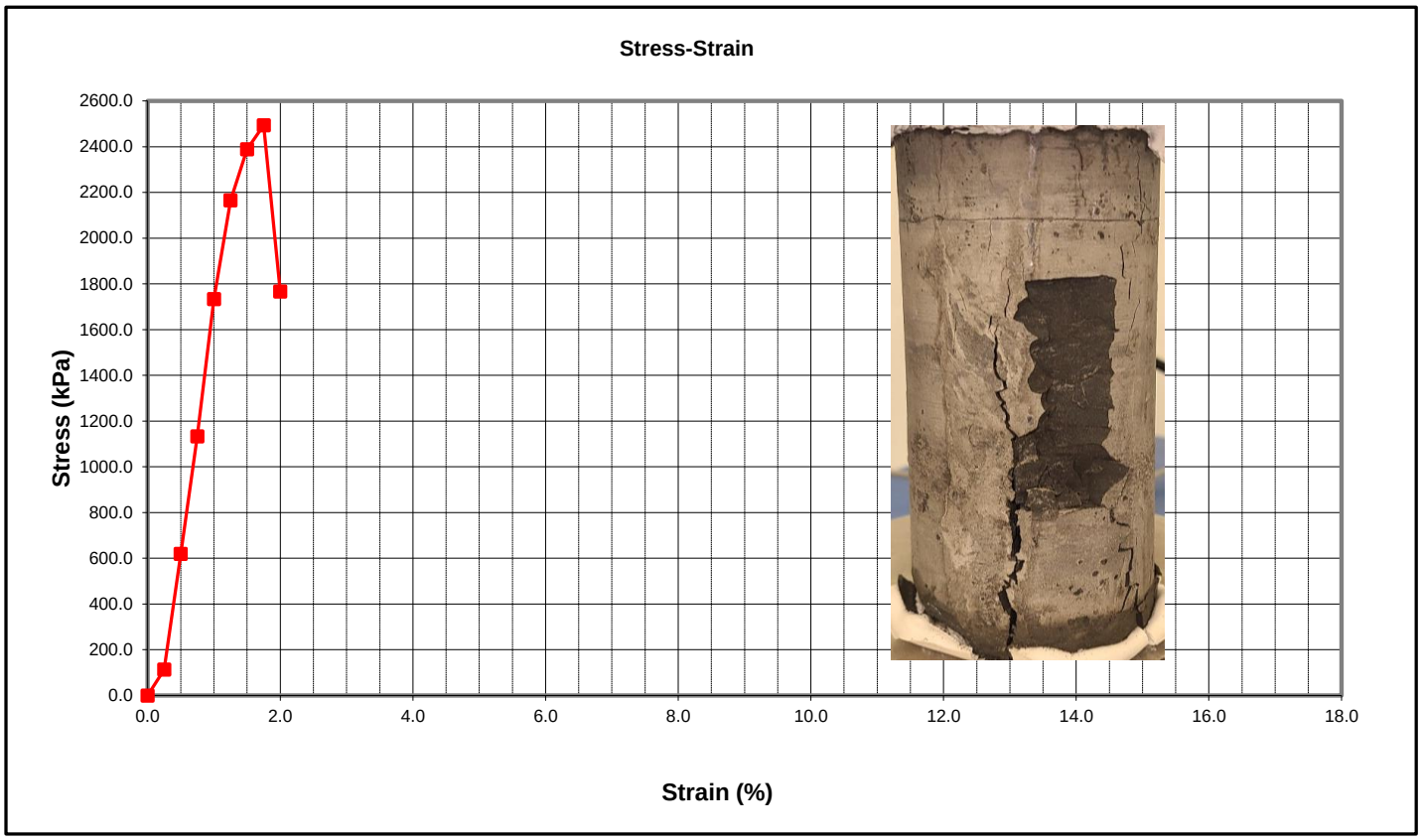
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC10
Project No.:	1560-193-00	**Borehole No.:**	22CH136
Owner:	Eastern Irrigation District	**Depth:**	16.8m
File No.:	UCS - 07	**Test Date:**	July 13, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2135	kg/m^3	Peak Stress:	2494	kPa
Specimen Dry Density:	1900	kg/m^3	Strain at Peak Stress:	1.8	%
Moisture Content:	12.38	%	Rate of Strain:	0.5	%/min
Average Height:	131.62	mm	Diameter:	61.21	mm
			Height to Diameter:	2.2:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

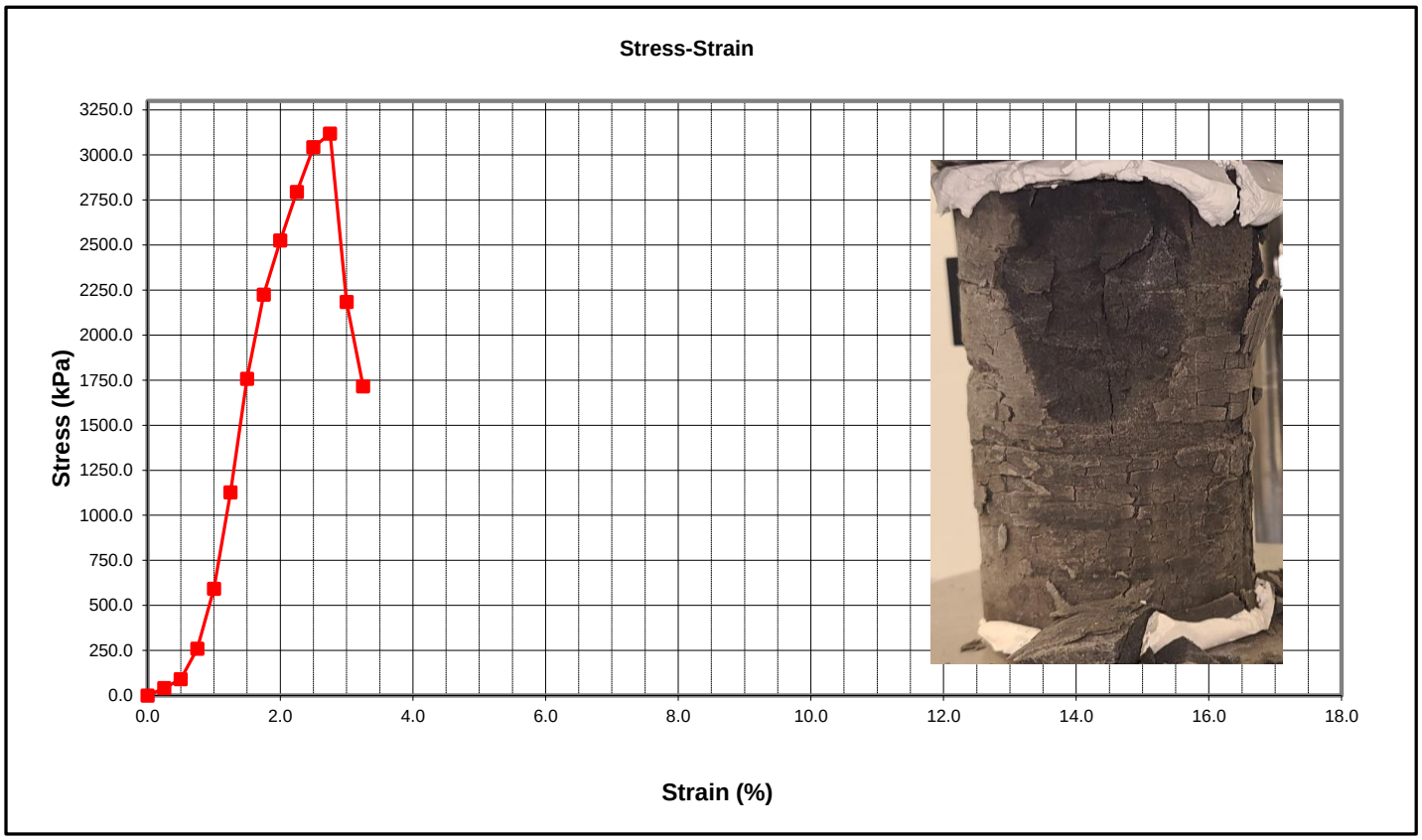
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC10
Project No.:	1560-193-00	**Borehole No.:**	22CH136
Owner:	Eastern Irrigation District	**Depth:**	16.8m
File No.:	UCS - 09	**Test Date:**	June 27, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2254	kg/m^3	Peak Stress:	3119	kPa
Specimen Dry Density:	1953	kg/m^3	Strain at Peak Stress:	2.8	%
Moisture Content:	15.40	%	Rate of Strain:	0.5	%/min
Average Height:	105.34	mm	Diameter:	60.07	mm
			Height to Diameter:	1.8:1	

Soil Description: CH



Comments: Shale Geomaterial,sample contained 2 horizontal fractures, Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

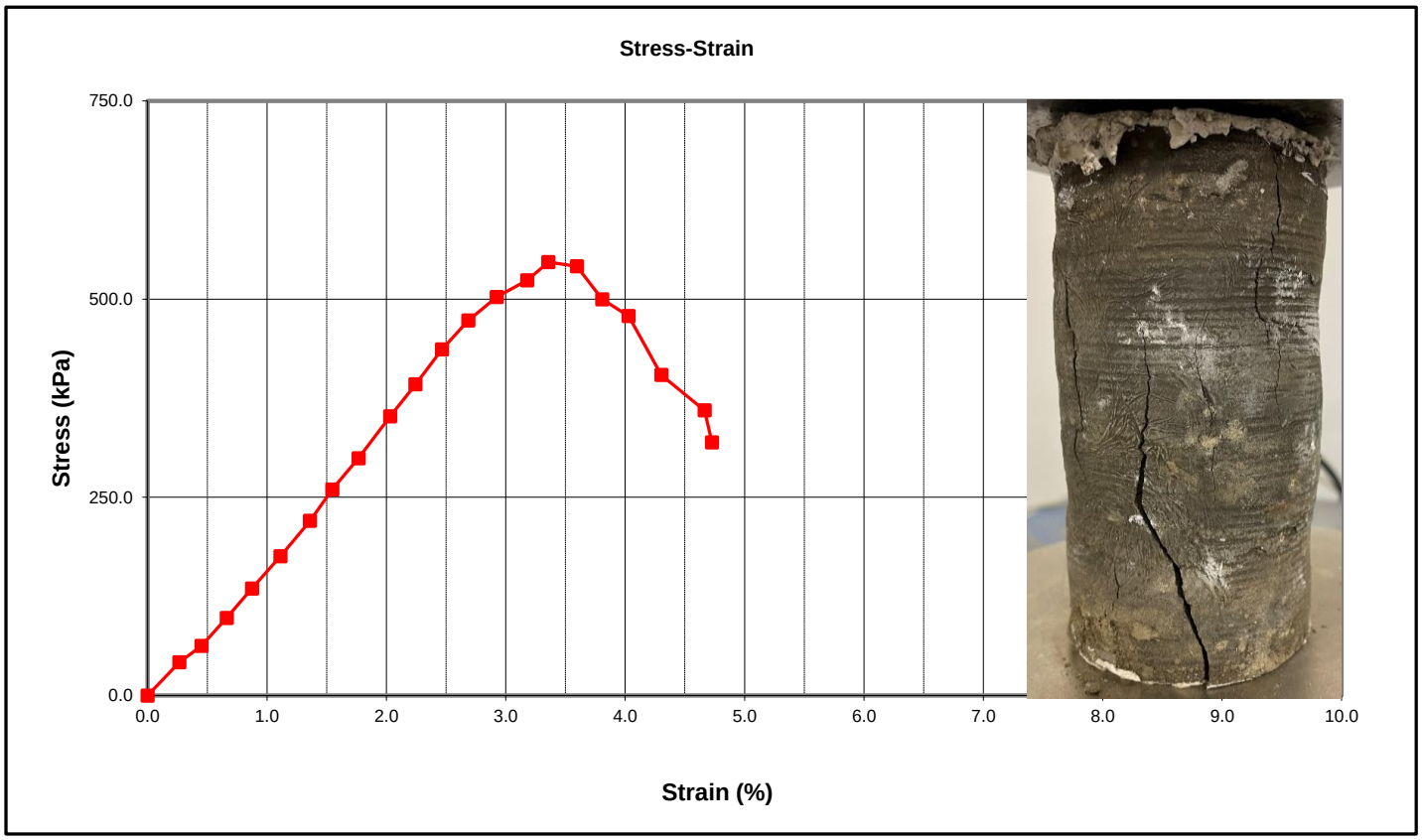
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD1
Project No.:	1560-193-00	**Borehole No.:**	22CH202
Owner:	Eastern Irrigation District	**Depth:**	6.41 m
File No.:	UCS - 23	**Test Date:**	November 10, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2203	kg/m^3	Peak Stress:	547	kPa
Specimen Dry Density:	1924	kg/m^3	Strain at Peak Stress:	3.4	%
Moisture Content:	14.47	%	Rate of Strain:	0.5	%/min
Average Height:	113.19	mm	Diameter:	55.12	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: - Shale Geomaterial, Capped with plaster of paris.
- Horizontal fissures visibile prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

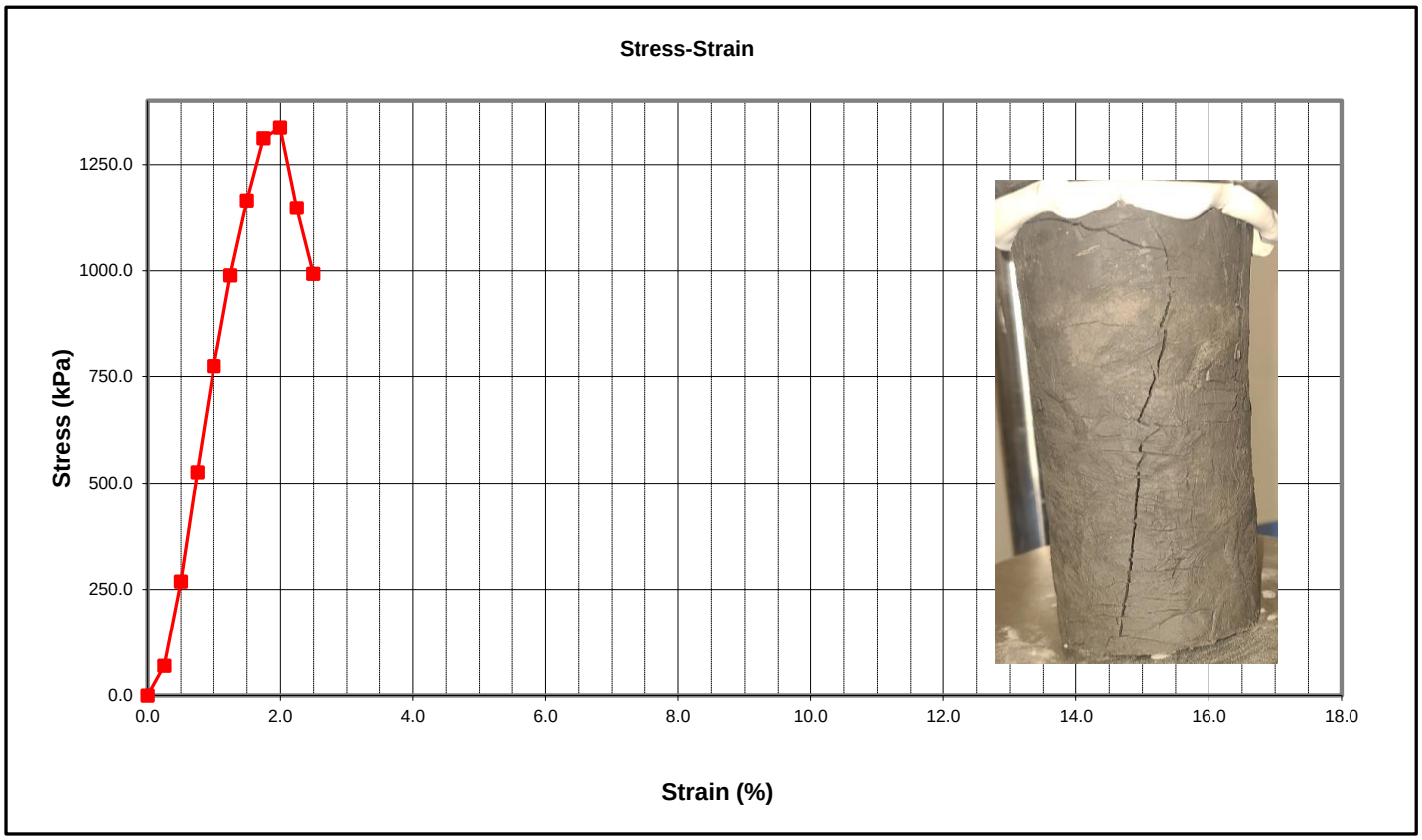
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD6
Project No.:	1560-193-00	**Borehole No.:**	22CH203
Owner:	Eastern Irrigation District	**Depth:**	28m
File No.:	UCS - 06	**Test Date:**	June 24, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2210	kg/m^3	Peak Stress:	1337	kPa
Specimen Dry Density:	2021	kg/m^3	Strain at Peak Stress:	2.0	%
Moisture Content:	9.32	%	Rate of Strain:	0.5	%/min
Average Height:	129.80	mm	Diameter:	61.69	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

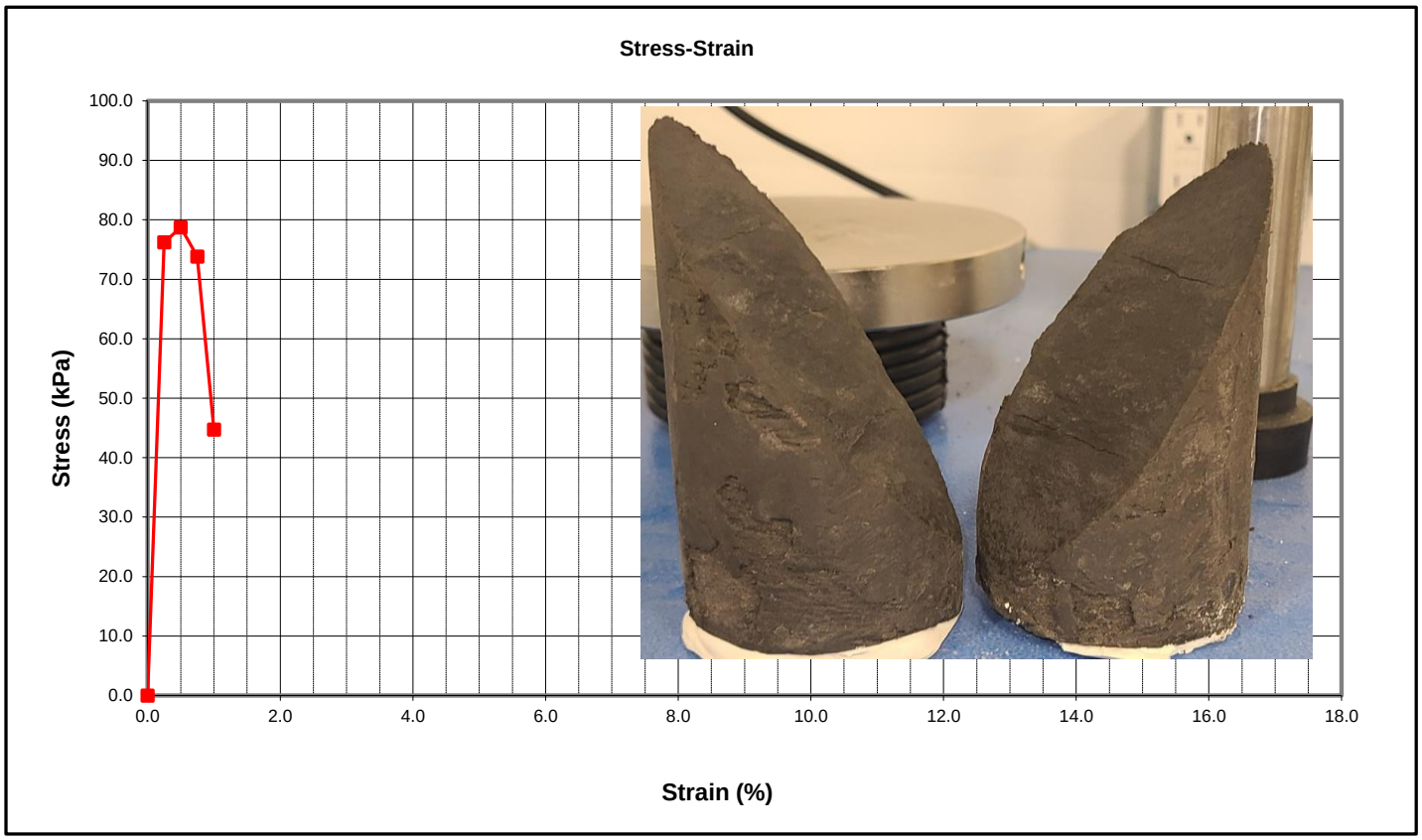
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	204RC6
Project No.:	1560-193-00	**Borehole No.:**	22CH204
Owner:	Eastern Irrigation District	**Depth:**	13m
File No.:	UCS - 4	**Test Date:**	July 11, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2162	kg/m^3	Peak Stress:	79	kPa
Specimen Dry Density:	1904	kg/m^3	Strain at Peak Stress:	0.5	%
Moisture Content:	13.57	%	Rate of Strain:	0.5	%/min
Average Height:	127.24	mm	Diameter:	61.23	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris,had a pre-existing fracture which was not noticeable prior to testing,resulted in rapid failure.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

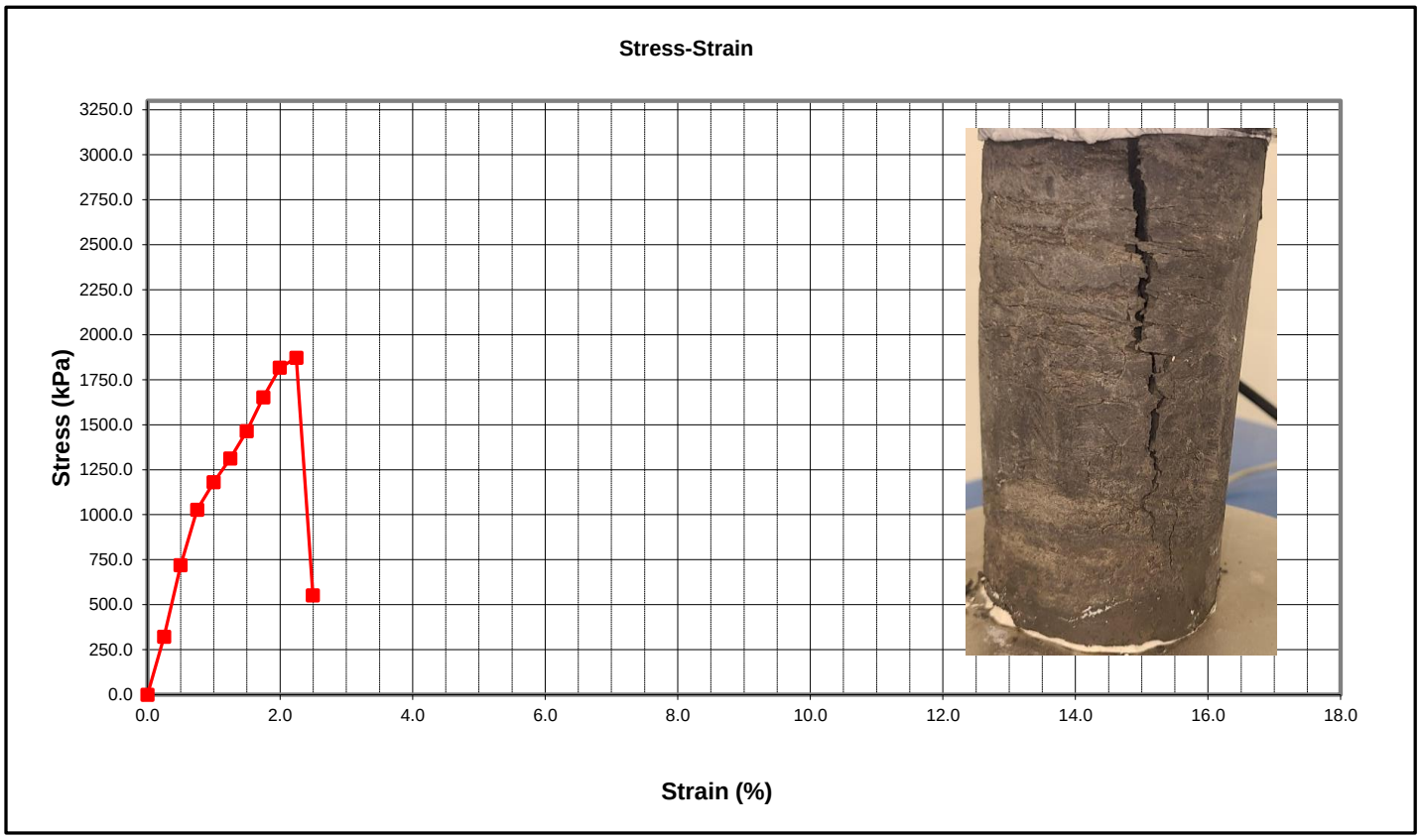
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	204UD2
Project No.:	1560-193-00	**Borehole No.:**	22CH204
Owner:	Eastern Irrigation District	**Depth:**	11.2m
File No.:	UCS - 02	**Test Date:**	July 11, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2235	kg/m^3	Peak Stress:	1872	kPa
Specimen Dry Density:	1976	kg/m^3	Strain at Peak Stress:	2.3	%
Moisture Content:	13.11	%	Rate of Strain:	0.5	%/min
Average Height:	127.92	mm	Diameter:	61.23	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

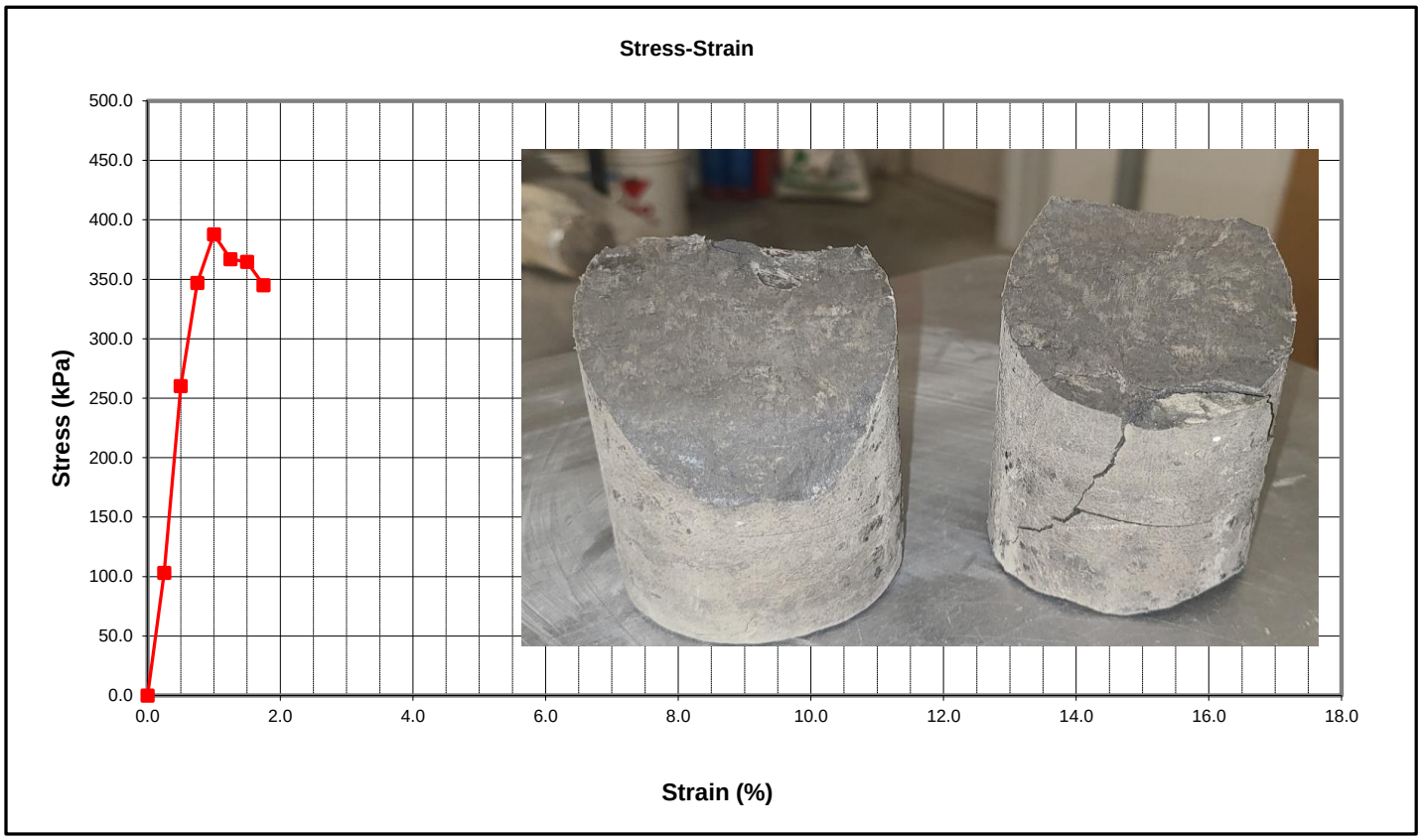
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	208UD1
Project No.:	1560-193-00	**Borehole No.:**	22CH208
Owner:	Eastern Irrigation District	**Depth:**	8.8m
File No.:	UCS - 03	**Test Date:**	July 11, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2207	kg/m^3	Peak Stress:	387	kPa
Specimen Dry Density:	1970	kg/m^3	Strain at Peak Stress:	1.0	%
Moisture Content:	12.06	%	Rate of Strain:	0.5	%/min
Average Height:	134.59	mm	Diameter:	61.2	mm
			Height to Diameter:	2.2:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris,had a pre-existing fracture which was not noticeable prior to testing,resulted in rapid failure.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

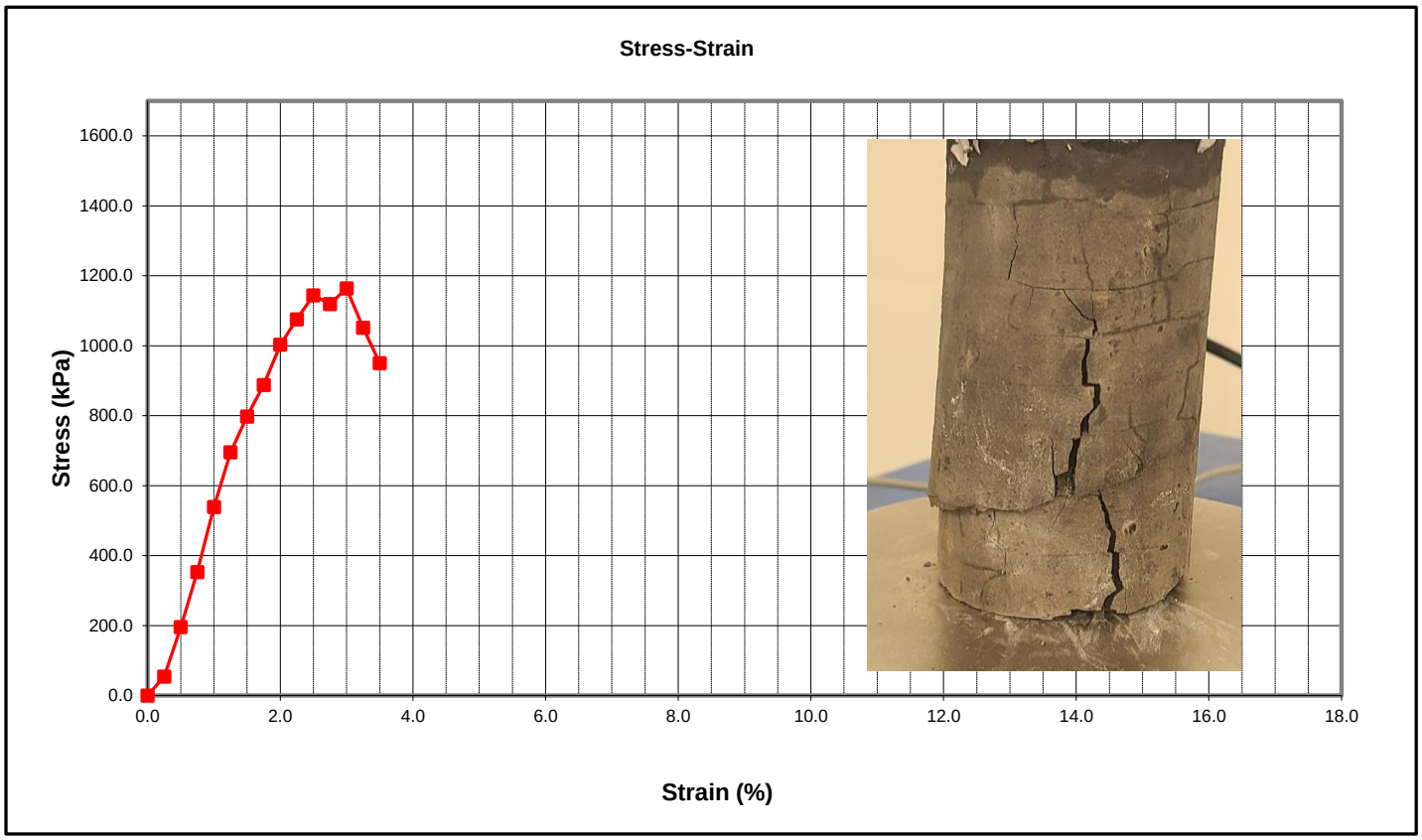
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	210UD3
Project No.:	1560-193-00	**Borehole No.:**	22CH210
Owner:	Eastern Irrigation District	**Depth:**	11.6m
File No.:	UCS - 06	**Test Date:**	July 13, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2128	kg/m^3	Peak Stress:	1164	kPa
Specimen Dry Density:	1884	kg/m^3	Strain at Peak Stress:	3.0	%
Moisture Content:	12.94	%	Rate of Strain:	0.5	%/min
Average Height:	125.21	mm	Diameter:	61.23	mm
			Height to Diameter:	2:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

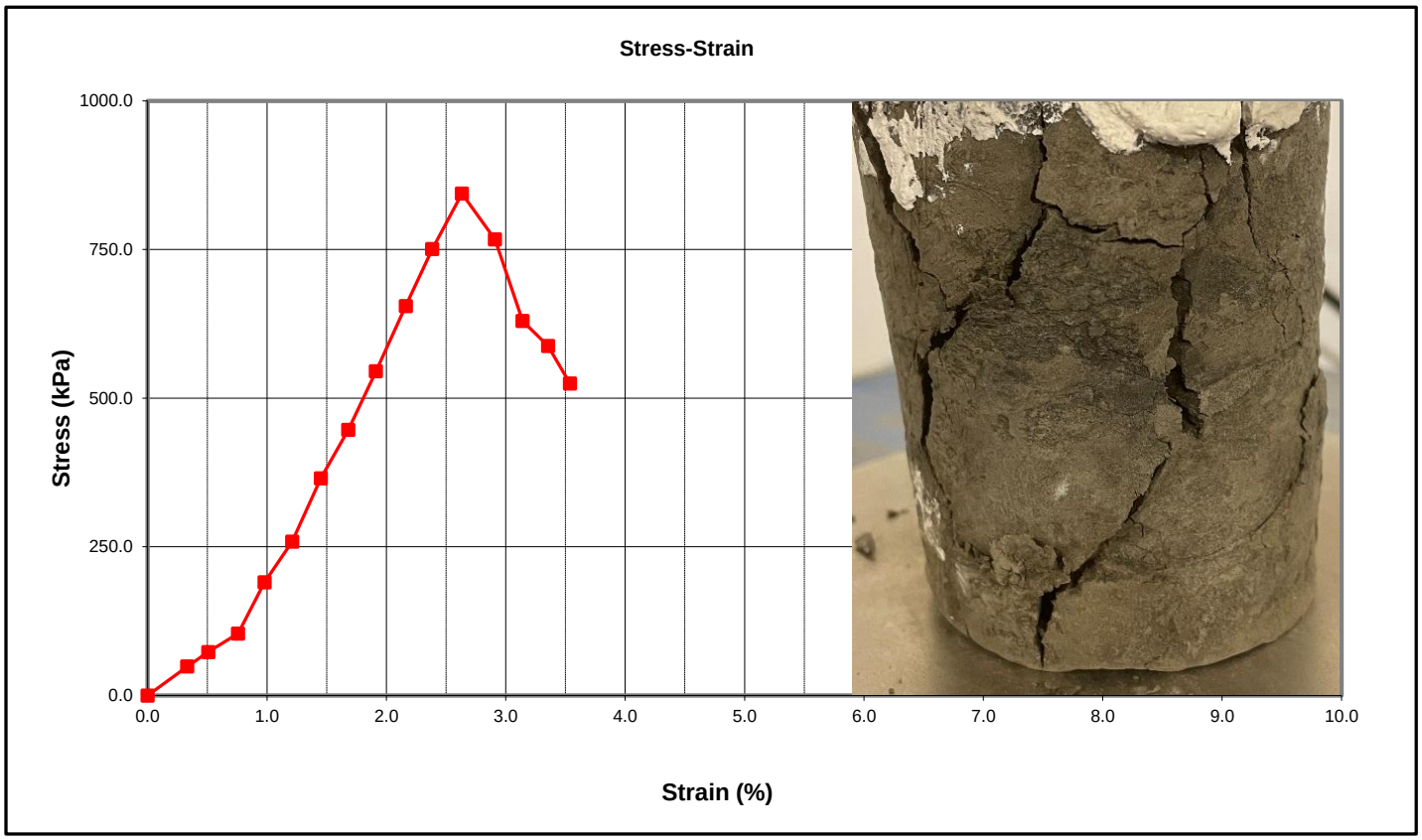
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD1
Project No.:	1560-193-00	**Borehole No.:**	22CH211
Owner:	Eastern Irrigation District	**Depth:**	6.04m
File No.:	UCS - 24	**Test Date:**	November 10, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2188	kg/m^3	Peak Stress:	844	kPa
Specimen Dry Density:	1962	kg/m^3	Strain at Peak Stress:	2.6	%
Moisture Content:	11.53	%	Rate of Strain:	0.5	%/min
Average Height:	108.25	mm	Diameter:	60.35	mm
			Height to Diameter:	1.8:1	

Soil Description: CH



Comments:
- Shale Geomaterial, Capped with plaster of paris.
- Horizontal fissures visibile prior to testing.
- Sample speciman dimensions outside of specified range due to poor sample quality.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

MPE Engineering Ltd.
#122, 103 Marquis Court
Saskatoon, SK S7P 0C4
Tel: (306) 668-1966

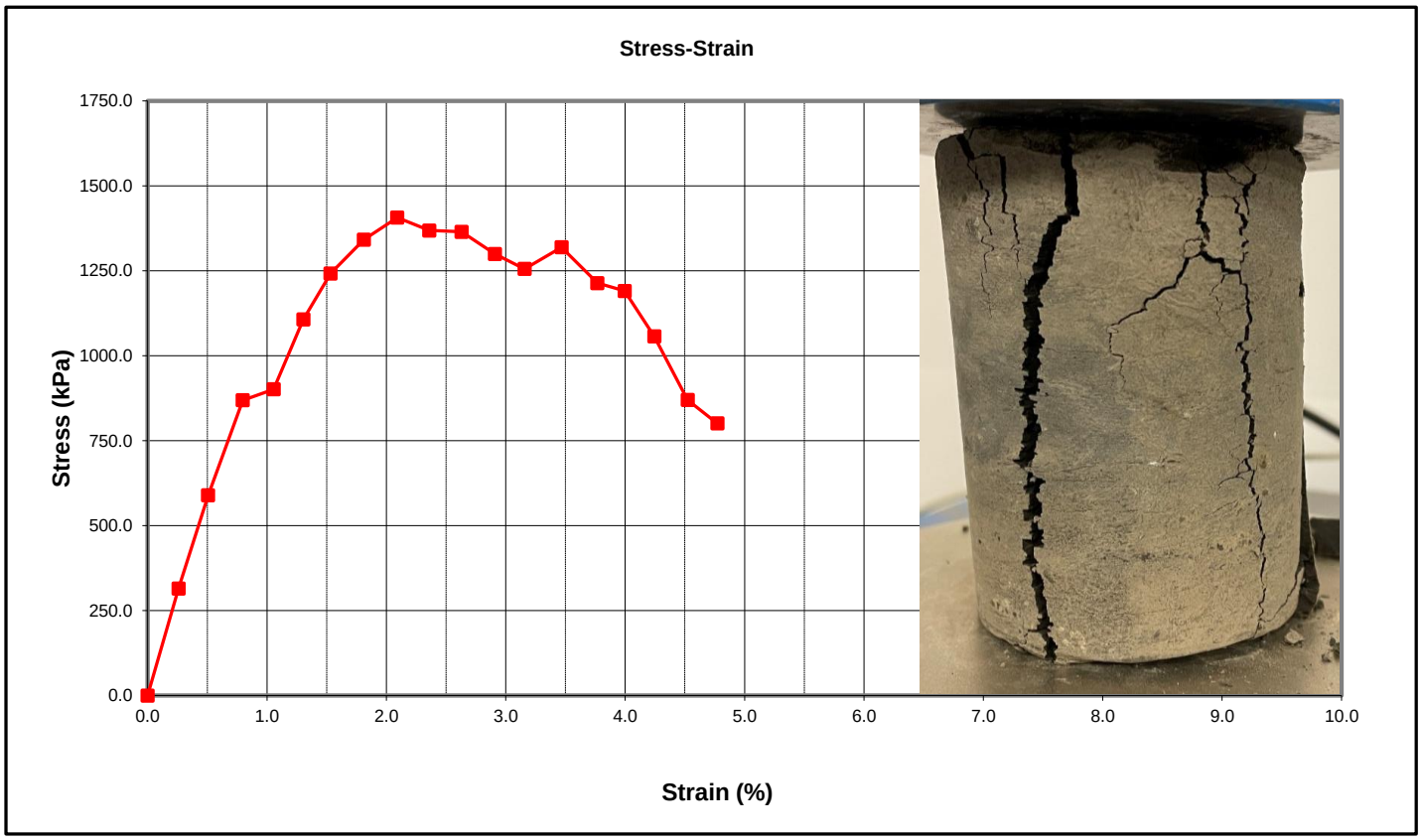
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD4
Project No.:	1560-193-00	**Borehole No.:**	22CH211
Owner:	Eastern Irrigation District	**Depth:**	18.2m
File No.:	UCS - 20	**Test Date:**	November 10, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2228	kg/m^3	Peak Stress:	1407	kPa
Specimen Dry Density:	1991	kg/m^3	Strain at Peak Stress:	2.1	%
Moisture Content:	11.89	%	Rate of Strain:	0.5	%/min
Average Height:	96.61	mm	Diameter:	60.28	mm
			Height to Diameter:	1.6:1	

Soil Description: CH



Comments:
- Shale Geomaterial.
- Sample speciman dimensions outside of specified range due to poor sample quality.
- Visible horizontal fissures throughout sample prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

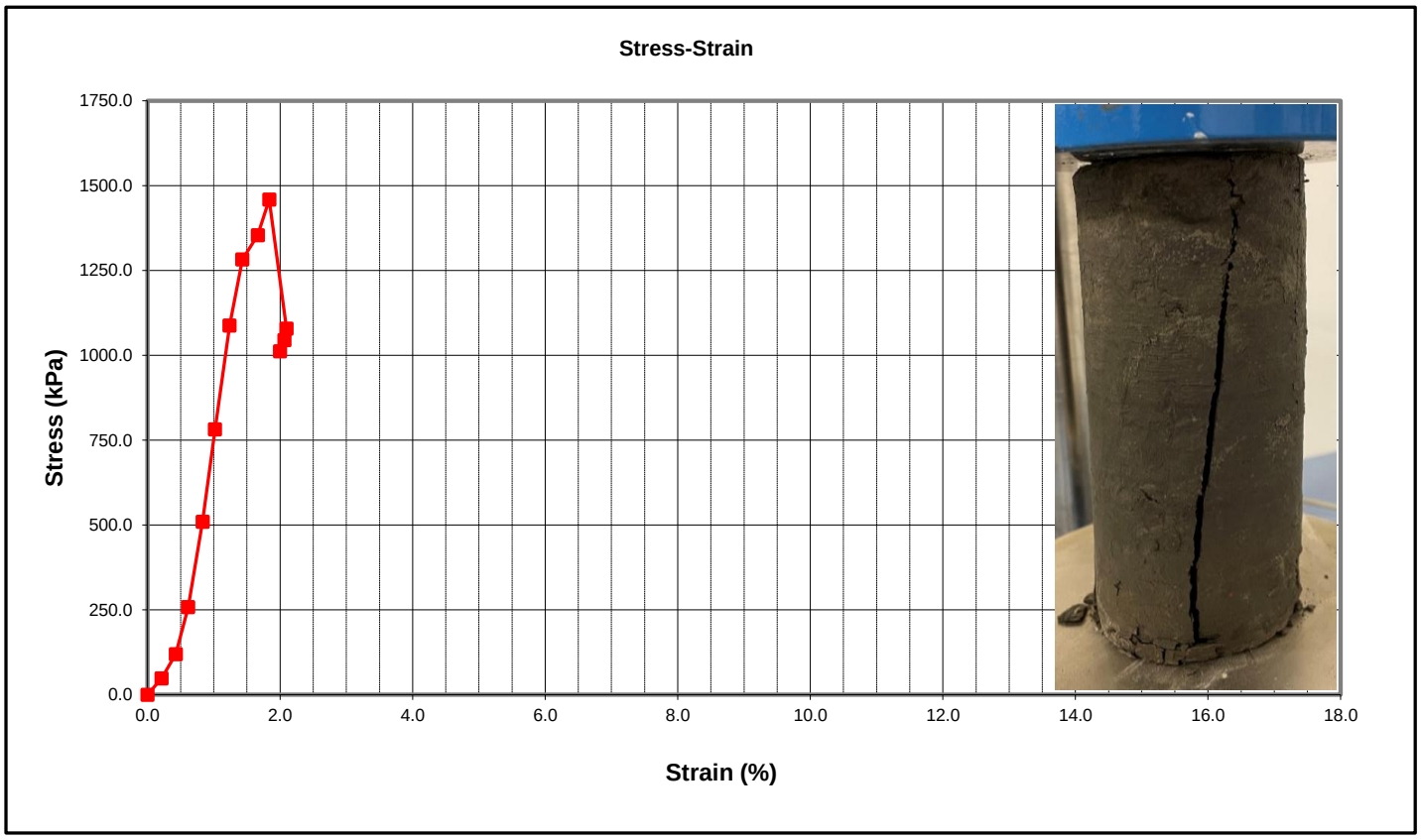
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD3
Project No.:	1560-193-00	**Borehole No.:**	22CH213
Owner:	Eastern Irrigation District	**Depth:**	14.65m
File No.:	UCS - 11	**Test Date:**	August 29, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2217	kg/m^3	Peak Stress:	1459	kPa
Specimen Dry Density:	2035	kg/m^3	Strain at Peak Stress:	1.8	%
Moisture Content:	8.95	%	Rate of Strain:	0.4	%/min
Average Height:	150.18	mm	Diameter:	60.82	mm
			Height to Diameter:	2.5:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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#122, 103 Marquis Court
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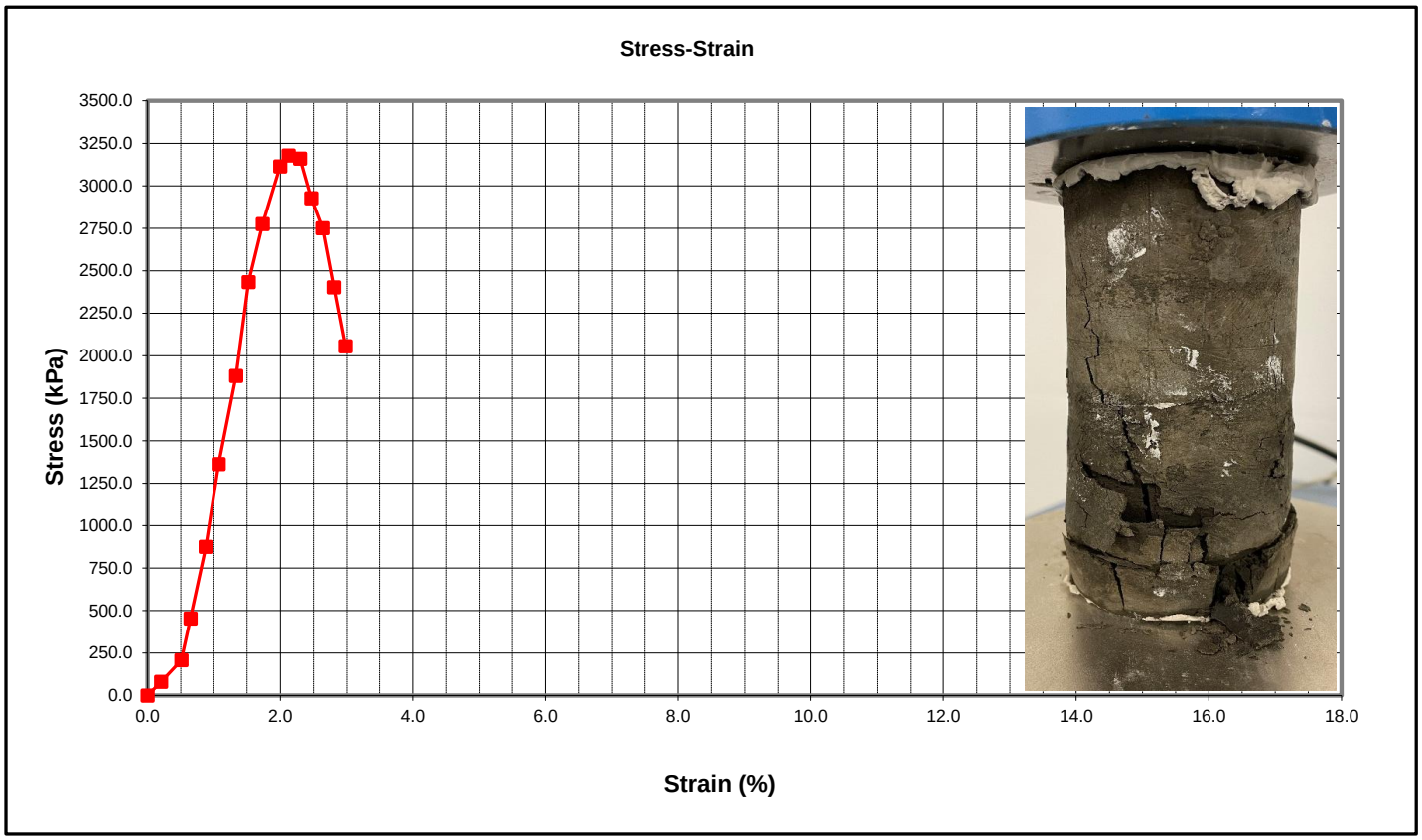
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD10
Project No.:	1560-193-00	**Borehole No.:**	22CH213
Owner:	Eastern Irrigation District	**Depth:**	39.26m
File No.:	UCS - 12	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2326	kg/m^3	Peak Stress:	3179	kPa
Specimen Dry Density:	2178	kg/m^3	Strain at Peak Stress:	2.1	%
Moisture Content:	6.76	%	Rate of Strain:	0.5	%/min
Average Height:	117.59	mm	Diameter:	60.05	mm
			Height to Diameter:	2:1	

Soil Description: CH



Comments: - Shale Geomaterial, Capped with plaster of paris.
- Visible horizontal fissures throughout sample prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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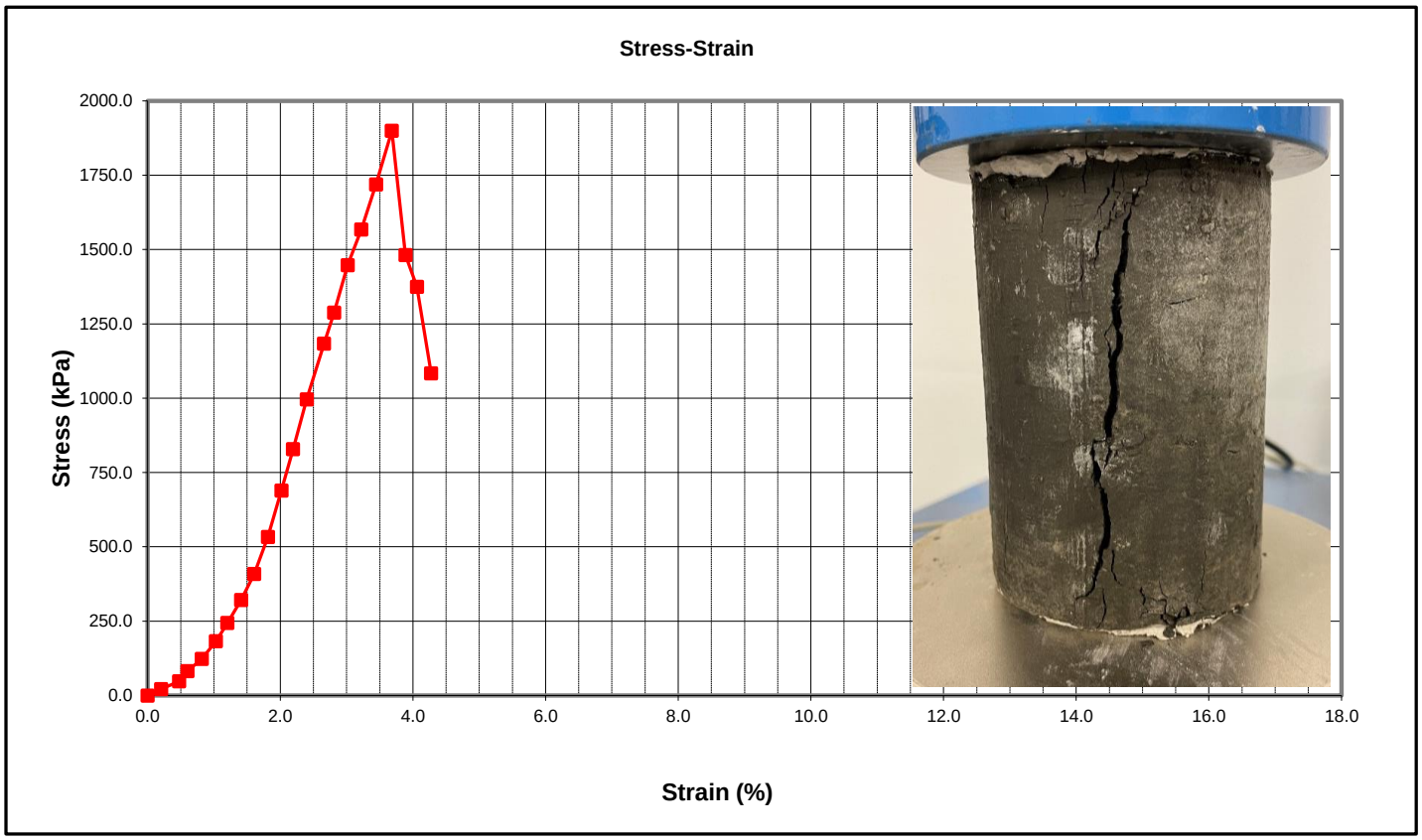
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC11
Project No.:	1560-193-00	**Borehole No.:**	22CH217
Owner:	Eastern Irrigation District	**Depth:**	22.0m
File No.:	UCS - 13	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2243	kg/m^3	Peak Stress:	1899	kPa
Specimen Dry Density:	2071	kg/m^3	Strain at Peak Stress:	3.7	%
Moisture Content:	8.31	%	Rate of Strain:	0.5	%/min
Average Height:	126.31	mm	Diameter:	76.57	mm
			Height to Diameter:	1.6:1	

Soil Description: CH



Comments: - Shale Geomaterial, Capped with plaster of paris
- Sample speciman dimensions outside of specified range due to multiple horizontal breaks in sample.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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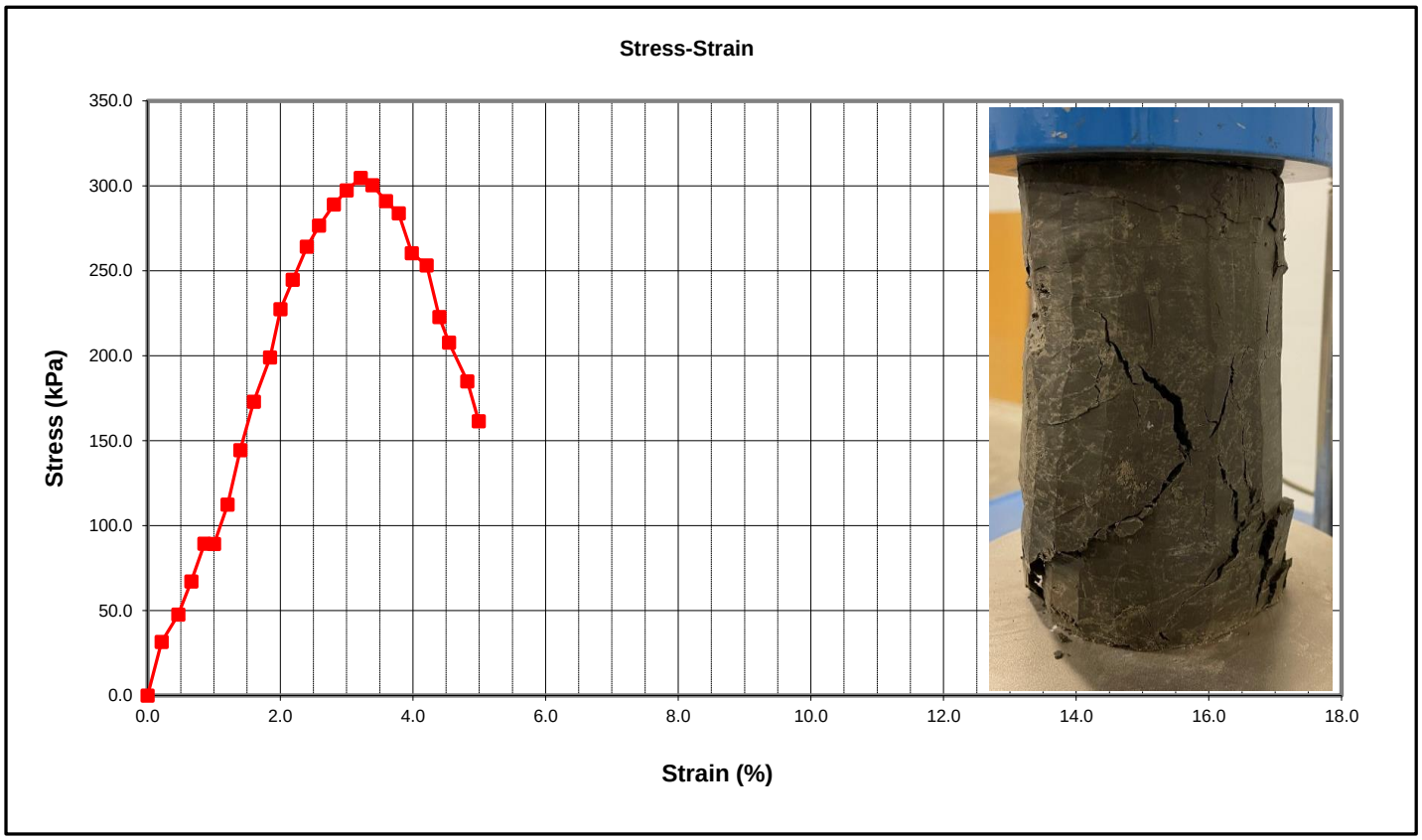
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC5
Project No.:	1560-193-00	**Borehole No.:**	22CH219
Owner:	Eastern Irrigation District	**Depth:**	13.3m
File No.:	UCS - 14	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	1939	kg/m^3	Peak Stress:	305	kPa
Specimen Dry Density:	1621	kg/m^3	Strain at Peak Stress:	3.2	%
Moisture Content:	19.57	%	Rate of Strain:	0.5	%/min
Average Height:	151.64	mm	Diameter:	75.17	mm
			Height to Diameter:	2:1	

Soil Description: CH



Comments: - Shale Geomaterial.
- Bentonite seams, waxy texture, brittle.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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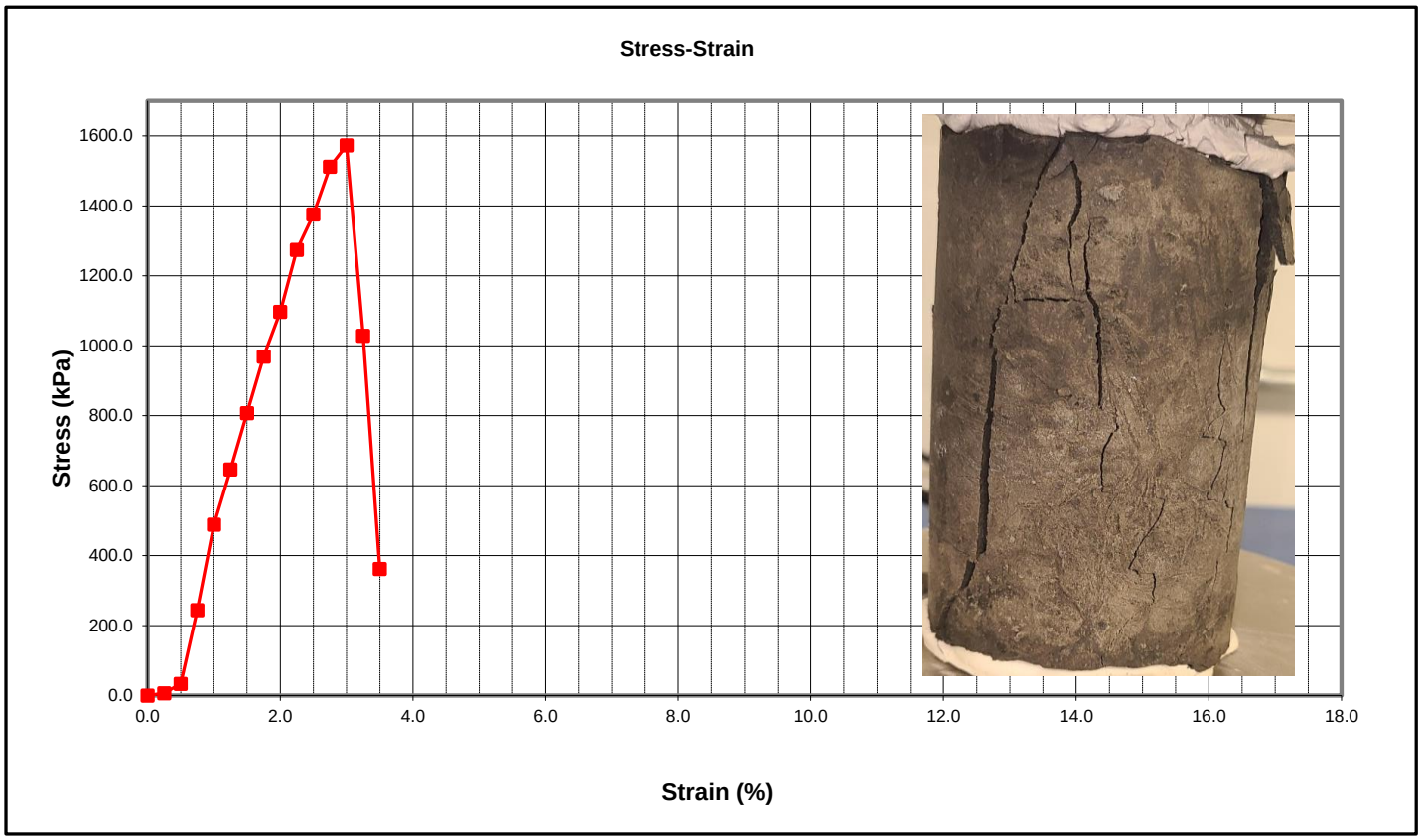
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	220UD1
Project No.:	1560-193-00	**Borehole No.:**	22CH220
Owner:	Eastern Irrigation District	**Depth:**	7.28m
File No.:	UCS - 05	**Test Date:**	July 12, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2269	kg/m^3	Peak Stress:	1573	kPa
Specimen Dry Density:	2016	kg/m^3	Strain at Peak Stress:	3.0	%
Moisture Content:	12.57	%	Rate of Strain:	0.5	%/min
Average Height:	109.03	mm	Diameter:	60.23	mm
			Height to Diameter:	1.8:1	

Soil Description: CH



Comments: Shale Geomaterial, Capped with plaster of paris.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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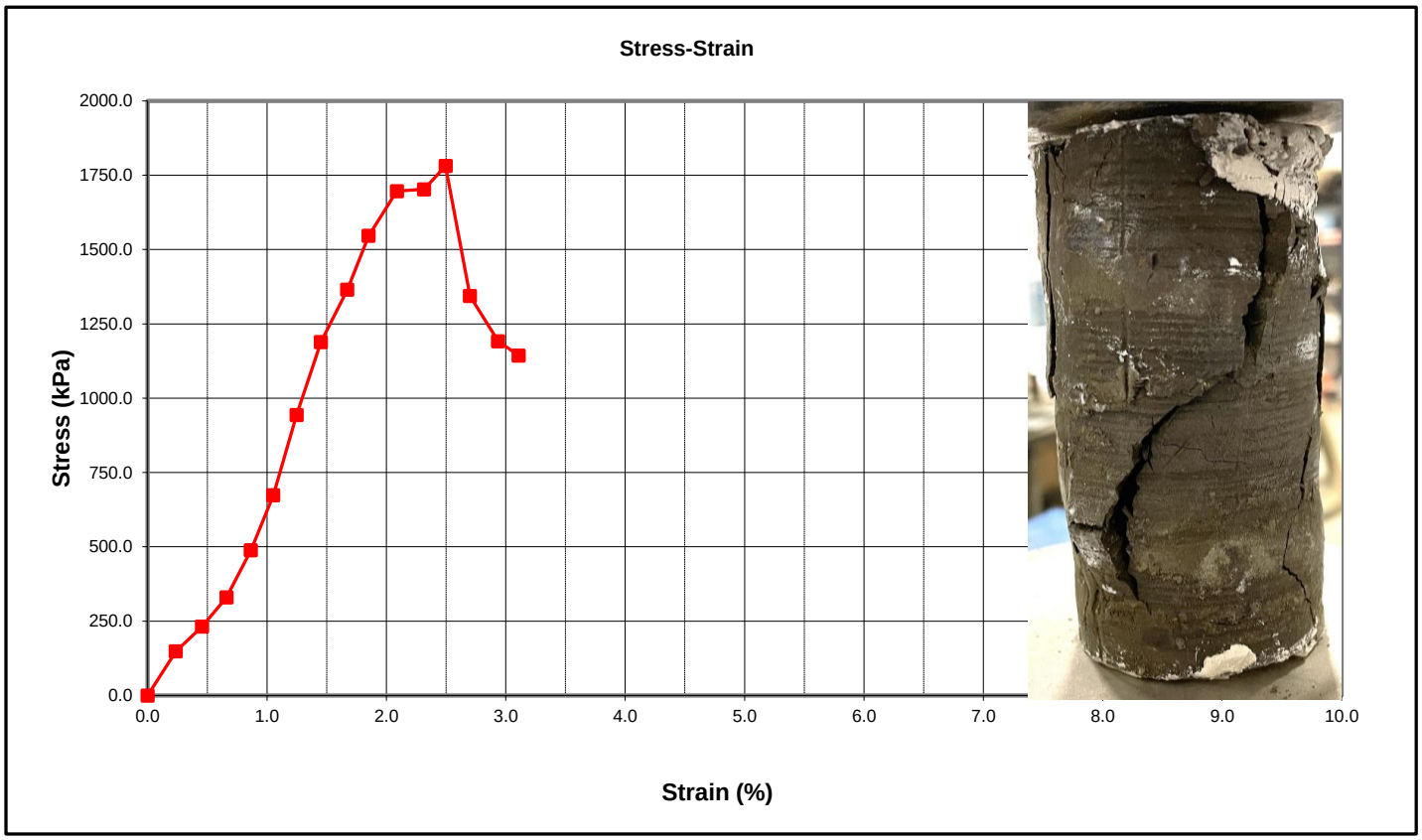
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD5
Project No.:	1560-193-00	**Borehole No.:**	22CH222
Owner:	Eastern Irrigation District	**Depth:**	22.0m
File No.:	UCS - 22	**Test Date:**	November 10, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2210	kg/m^3	Peak Stress:	1781	kPa
Specimen Dry Density:	1986	kg/m^3	Strain at Peak Stress:	2.5	%
Moisture Content:	11.25	%	Rate of Strain:	0.5	%/min
Average Height:	122.60	mm	Diameter:	61.63	mm
			Height to Diameter:	2:1	

Soil Description: CH



Comments: - Shale Geomaterial, Capped with plaster of paris.
- Visible horizontal fissures throughout sample prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

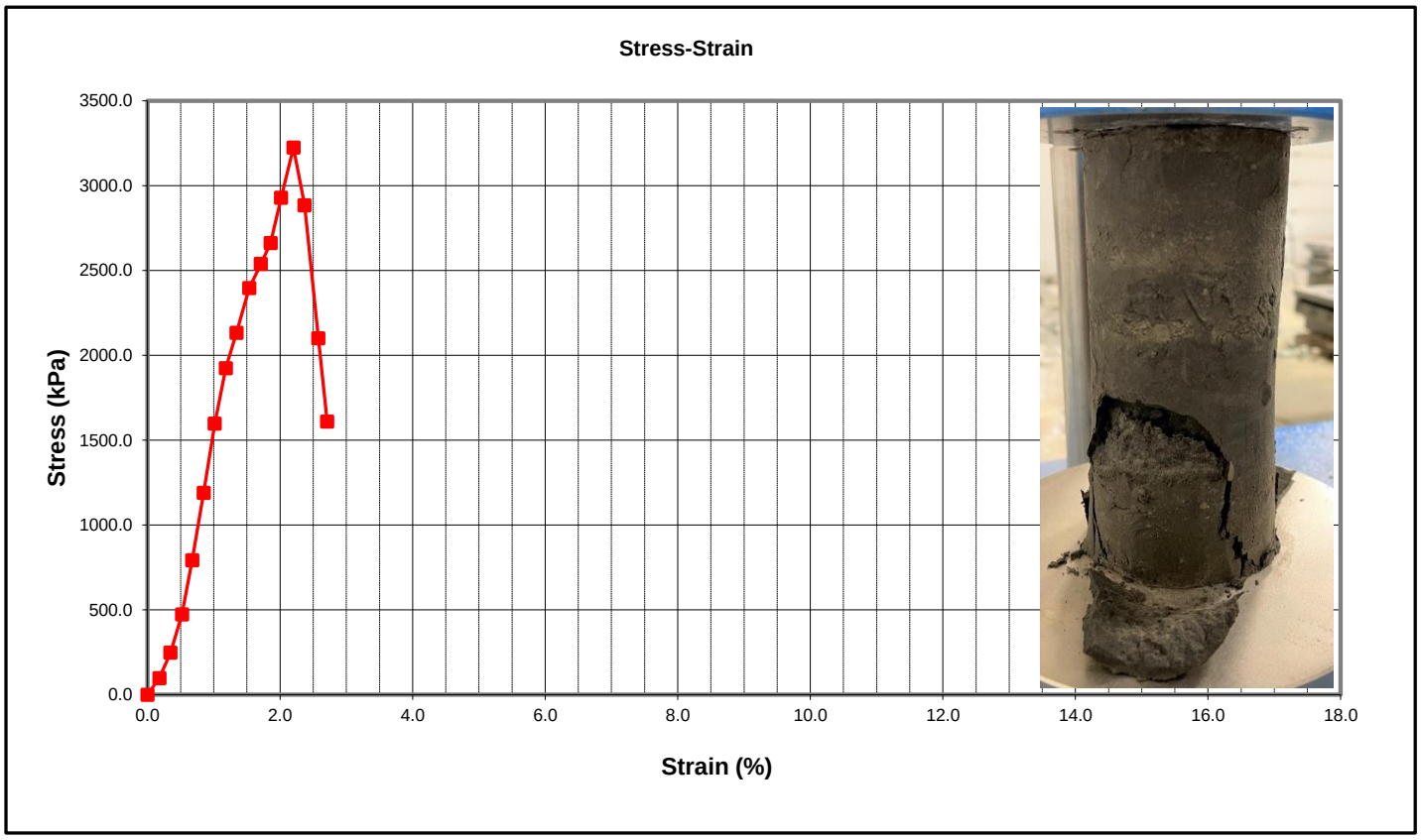
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD4
Project No.:	1560-193-00	**Borehole No.:**	22CH310
Owner:	Eastern Irrigation District	**Depth:**	19.6m
File No.:	UCS - 15	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2268	kg/m^3	Peak Stress:	3225	kPa
Specimen Dry Density:	2096	kg/m^3	Strain at Peak Stress:	2.2	%
Moisture Content:	8.20	%	Rate of Strain:	0.3	%/min
Average Height:	149.78	mm	Diameter:	60.52	mm
			Height to Diameter:	2.5:1	

Soil Description: CH



Comments: - Shale Geomaterial.

Checked By: _____
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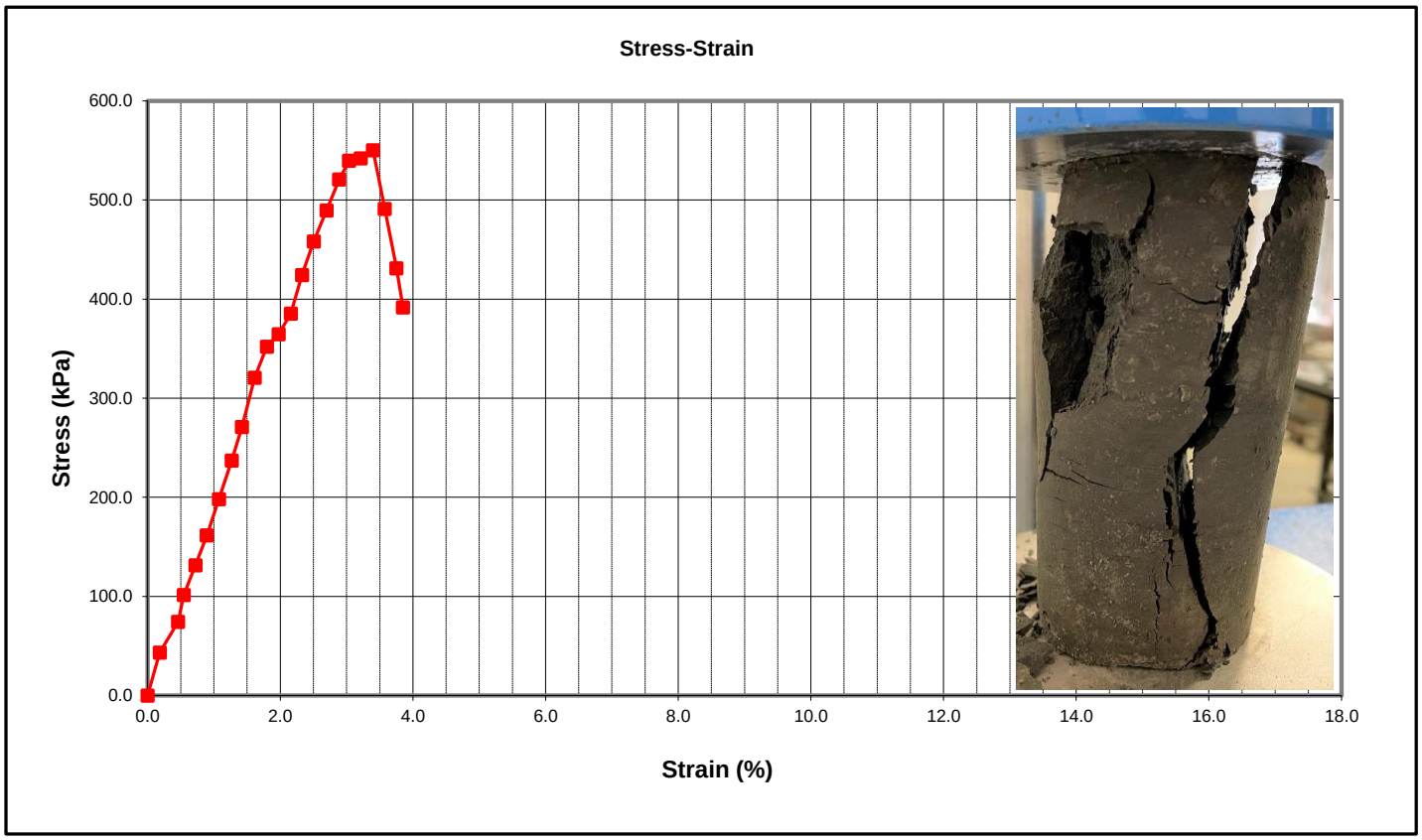
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC5
Project No.:	1560-193-00	**Borehole No.:**	22CH311
Owner:	Eastern Irrigation District	**Depth:**	9.5m
File No.:	UCS - 16	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2137	kg/m^3	Peak Stress:	550	kPa
Specimen Dry Density:	1895	kg/m^3	Strain at Peak Stress:	3.4	%
Moisture Content:	12.74	%	Rate of Strain:	0.5	%/min
Average Height:	141.28	mm	Diameter:	61.25	mm
			Height to Diameter:	2.3:1	

Soil Description: CH



Comments: - Siltstone Geomaterial.

Checked By: _____
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Tel: (306) 668-1966

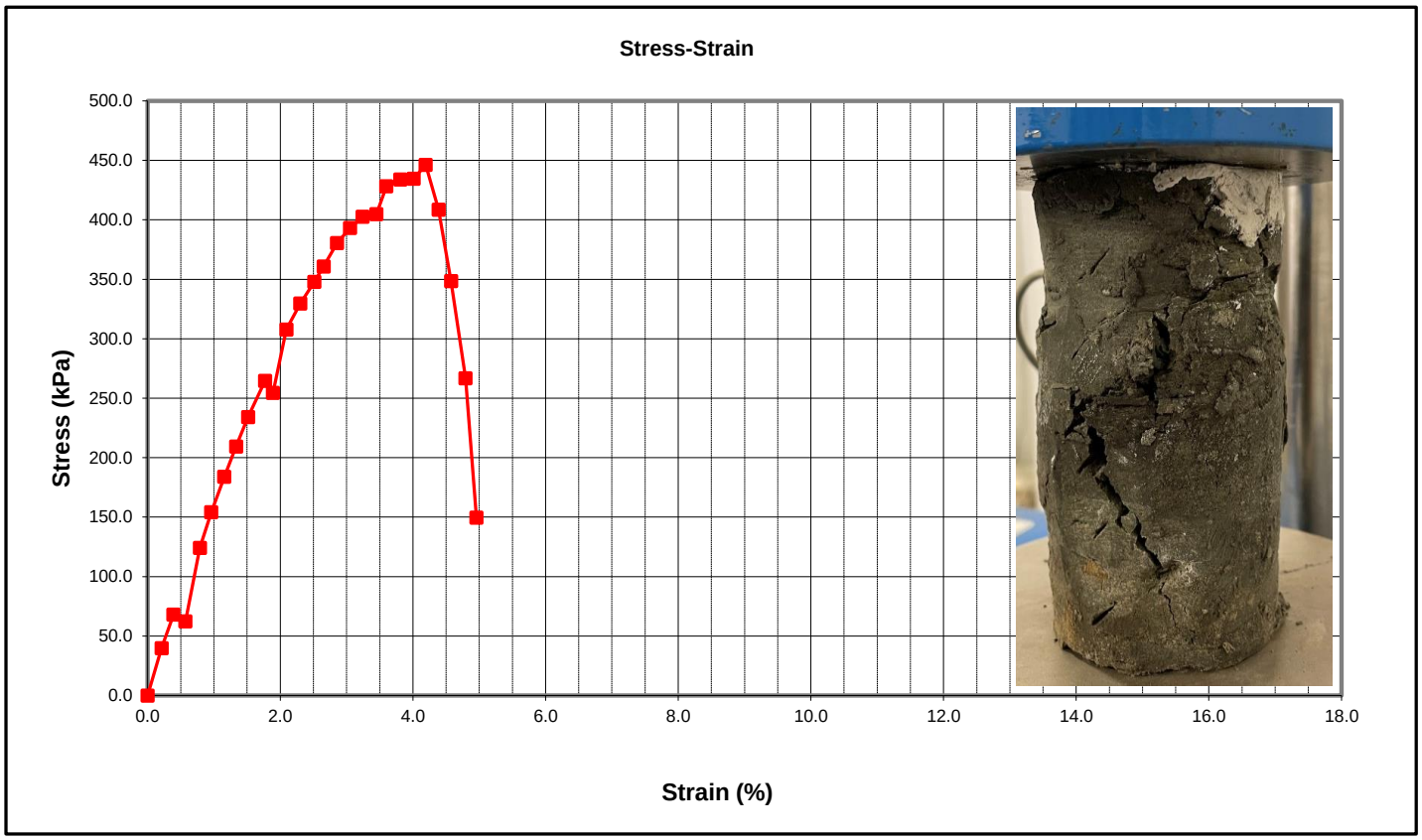
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC4
Project No.:	1560-193-00	**Borehole No.:**	22CH312
Owner:	Eastern Irrigation District	**Depth:**	8.0m
File No.:	UCS - 17	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	1962	kg/m^3	Peak Stress:	446	kPa
Specimen Dry Density:	1669	kg/m^3	Strain at Peak Stress:	4.2	%
Moisture Content:	17.58	%	Rate of Strain:	0.4	%/min
Average Height:	133.33	mm	Diameter:	60.34	mm
			Height to Diameter:	2.2:1	

Soil Description: CH



Comments:
- Siltstone Geomaterial, Capped with plaster of paris.
- Bentonite seams, waxy texture.
- Sample was received in disturbed condition.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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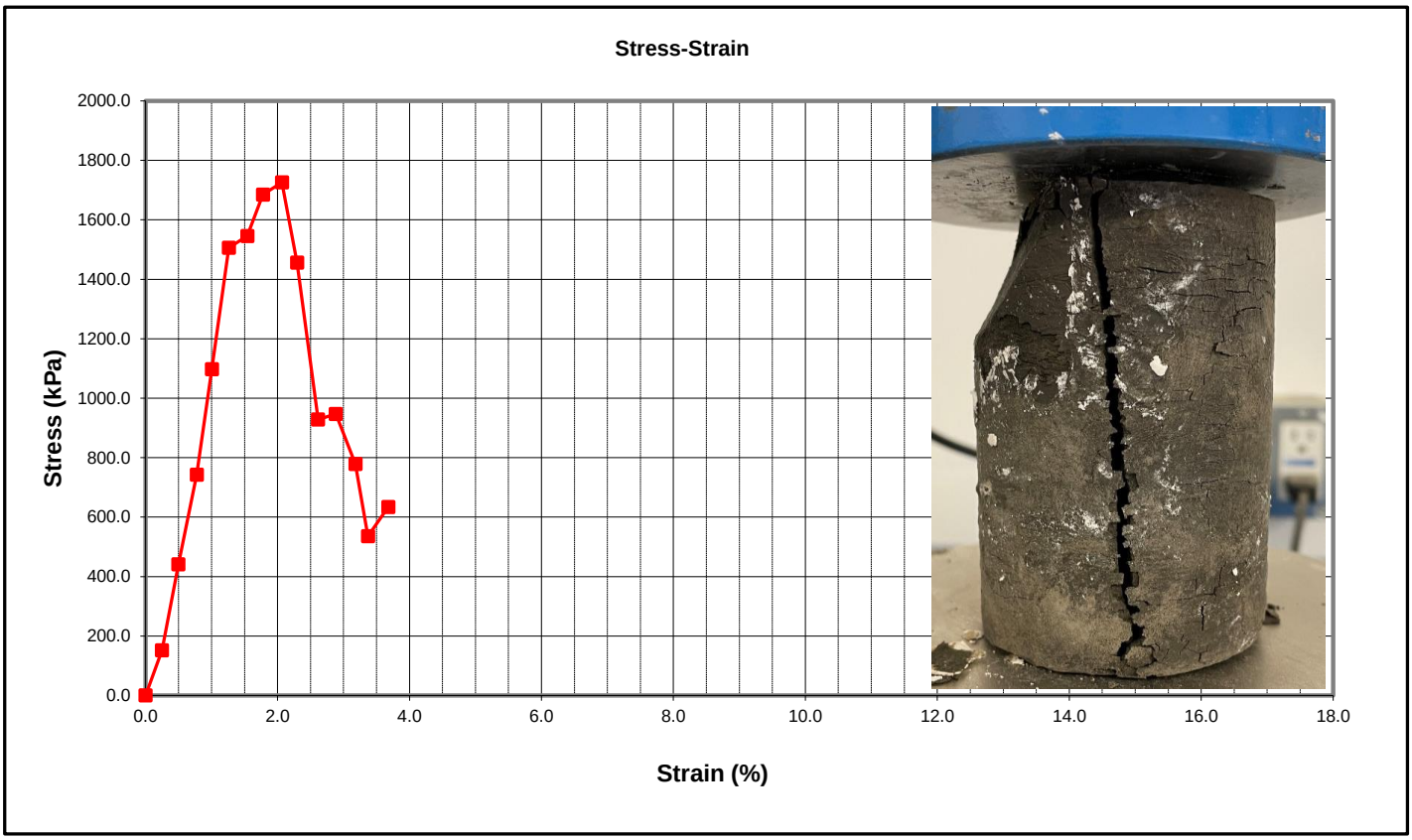
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	UD5
Project No.:	1560-193-00	**Borehole No.:**	22CH315
Owner:	Eastern Irrigation District	**Depth:**	15.7m
File No.:	UCS - 18	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2222	kg/m^3	Peak Stress:	1726	kPa
Specimen Dry Density:	2056	kg/m^3	Strain at Peak Stress:	2.1	%
Moisture Content:	8.10	%	Rate of Strain:	0.5	%/min
Average Height:	100.56	mm	Diameter:	60.61	mm
			Height to Diameter:	1.7:1	

Soil Description: CH



Comments:
- Shale Geomaterial, Void filled plaster of paris.
- Sample was received in disturbed condition with void on top edge of sample.
- Sample speciman dimensions outside of specified range due to multiple horizontal breaks in sample prior to testing.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

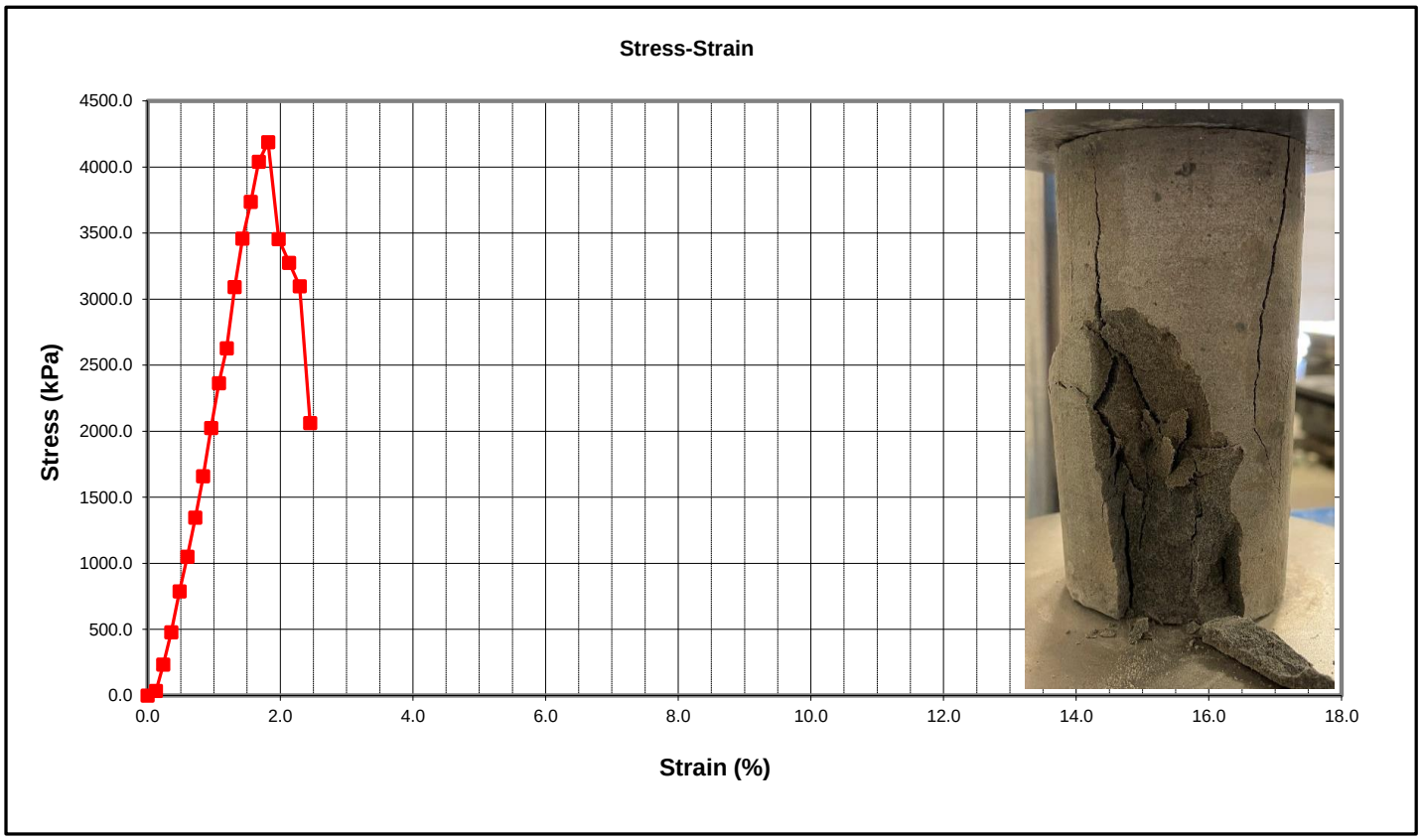
Unconfined Compressive Strength

Project:	Snake Lake Reservoir Expansion	**Sample No:**	RC7
Project No.:	1560-193-00	**Borehole No.:**	22CH319
Owner:	Eastern Irrigation District	**Depth:**	14.4m
File No.:	UCS - 19	**Test Date:**	August 30, 2022

Tested in accordance with ASTM D2166

Specimen Wet Density:	2322	kg/m^3	Peak Stress:	4187	kPa
Specimen Dry Density:	2180	kg/m^3	Strain at Peak Stress:	1.8	%
Moisture Content:	6.50	%	Rate of Strain:	0.2	%/min
Average Height:	126.51	mm	Diameter:	60.12	mm
			Height to Diameter:	2.1:1	

Soil Description: CH



Comments: - Siltstone Geomaterial.

Checked By: _____
Chris McRae, B.Sc., P.Eng.

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Tel: (306) 668-1966

One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH118
Owner:	EID	**Sampled By:**	C.Braun
File No.:	ODC-01	**Date Sampled:**	10-Jun-22

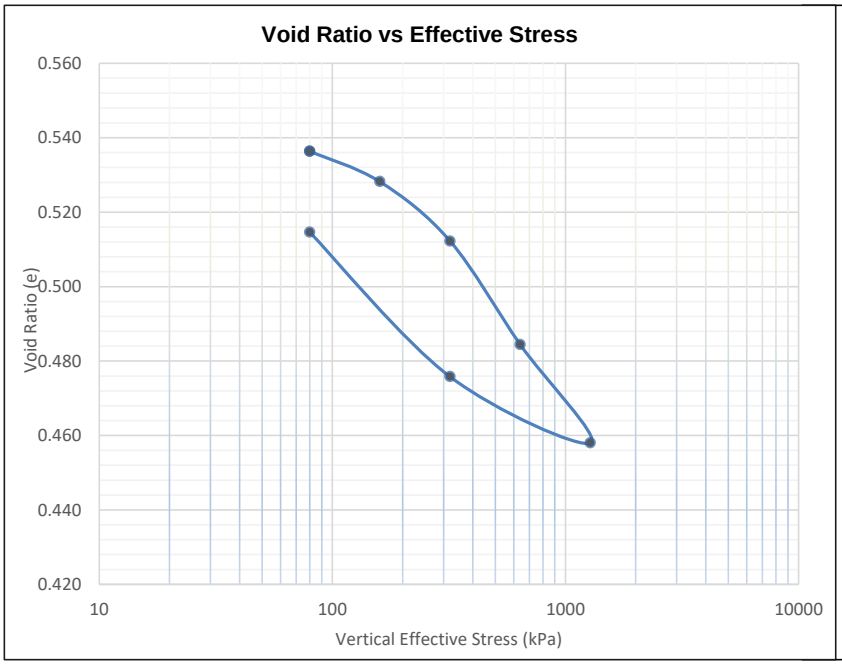
Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).

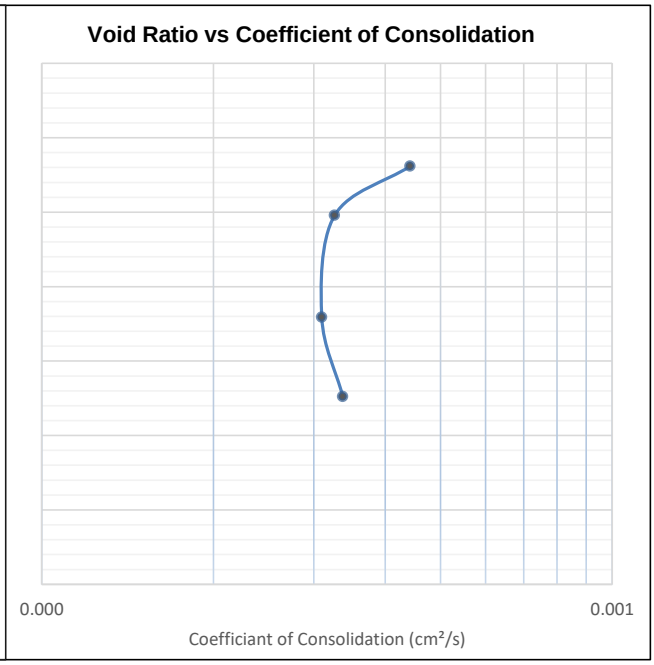
Equipment ID:	HM-353	**Test Date:**	05-Jul-22	**Soil Structure:**	Undisturbed
Device Type:	Gilson Load Frame	**Tested By:**	A.Antony	**Sample Depth:**	3.8m
Sample Type:	Mudstone	**Test Method:**	**B**	**Cons. Test #:**	UD2-222CH118
Soil Description:	CI	Inorganic clays of medium plasticity, silty clays			

Sample Parameters	Initial	Final
Moisture Content (%)	14.21	20.94
Weight (g)	163.18	172.80
Thickness (mm)	25.50	25.05
Area (m²)	0.0031670	0.0031670
Dry Density (kg/m³)	1769	1801
Wet Density (kg/m³)	2021	2179
Void Ratio (e)	0.54	0.51
Deg. Of Saturation (%)	72.03	111.84
Specific Gravity* (g/cm³)	2.718	

*Assumed Value

Load Increment (kPa)	Deformation (mm)	Duration (hrs)
80.0	0.026	72
160.0	-0.162	24
320.0	-0.270	24
640.0	-0.460	24
1280.0	-0.430	24
320.0	0.300	24
80.0	0.630	24





Preconsolidation Pressure (kPa) : Not Determined
Consolidation Index : 0.06
Expansion Index : 0.04

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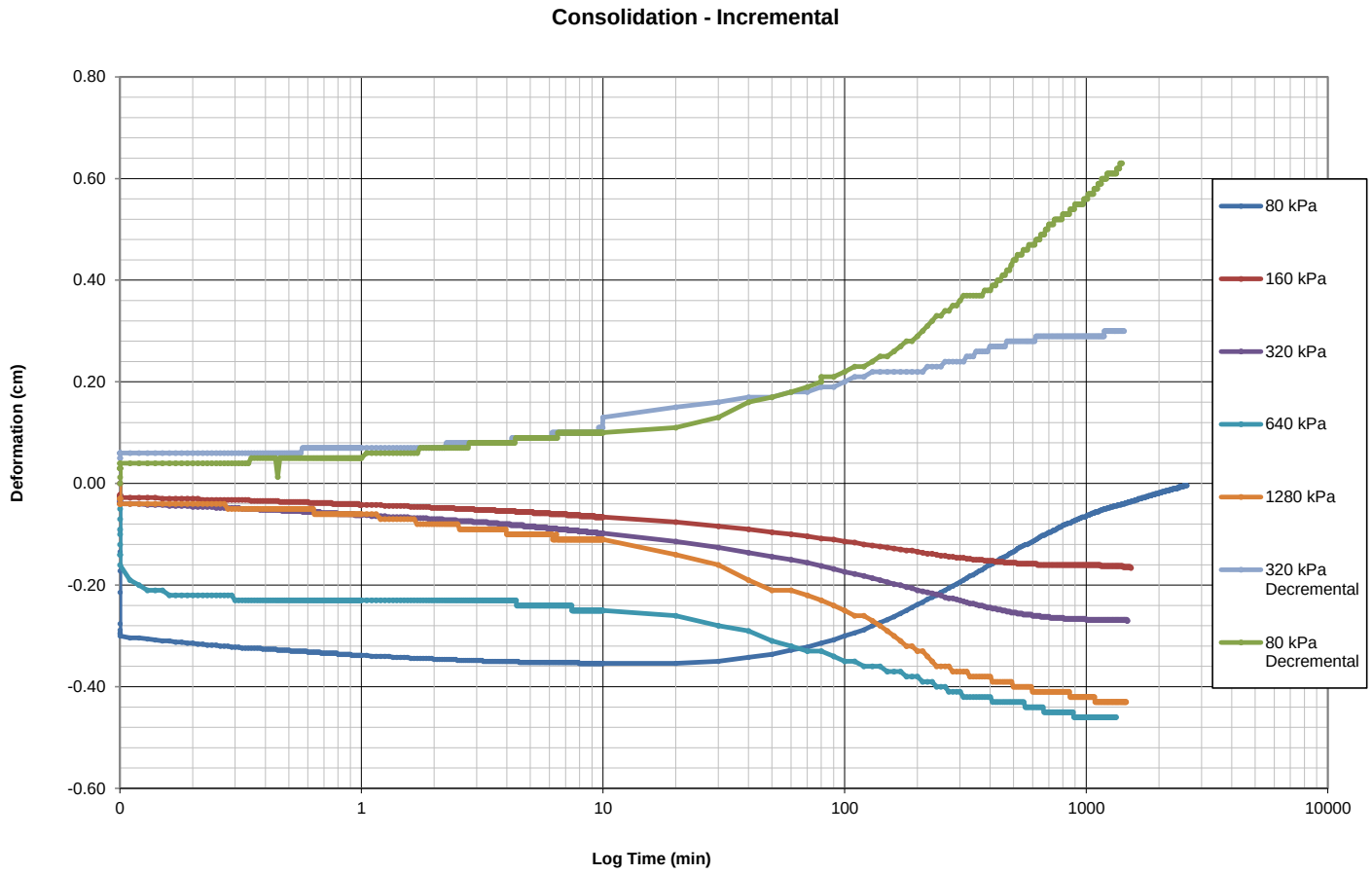
One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH118
Owner:	EID	**Sampled By:**	C.Braun
File No.:	ODC-01	**Date Sampled:**	10-Jun-22

Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).



Load Increment (kPa)	Void Ratio (e_{50})	Coefficient of Consolidation (cm^2/s)
160.0	0.532	4.43E-04
320.0	0.519	3.26E-04
640.0	0.492	3.10E-04
1280.0	0.470	3.37E-04

Comments:

- Sample inundated with tap water during consolidation.
- Sample swell observed at 80 kPa from -0.360mm to 0.00mm
- Pre-consolidation Index not determined.

Checked By: _____

Chris McRae, B.Sc, P.Eng.

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Saskatoon, SK S7P 0C4
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One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	218ST1
Project No.:	1560-193-00	**Source:**	22BH218
Owner:	EID	**Sampled By:**	C.Tams
File No.:	ODC-03	**Date Sampled:**	15-Jul-22

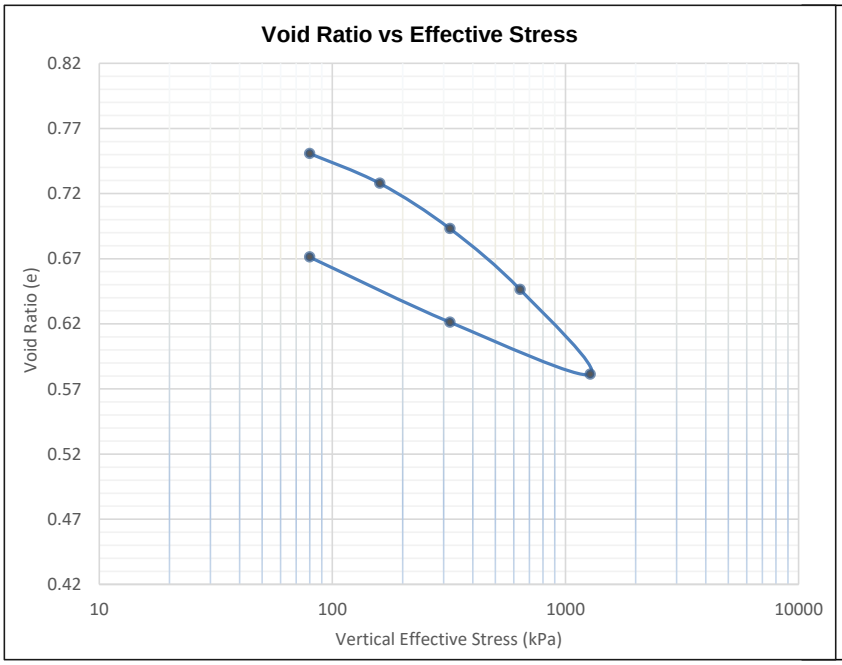
Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).

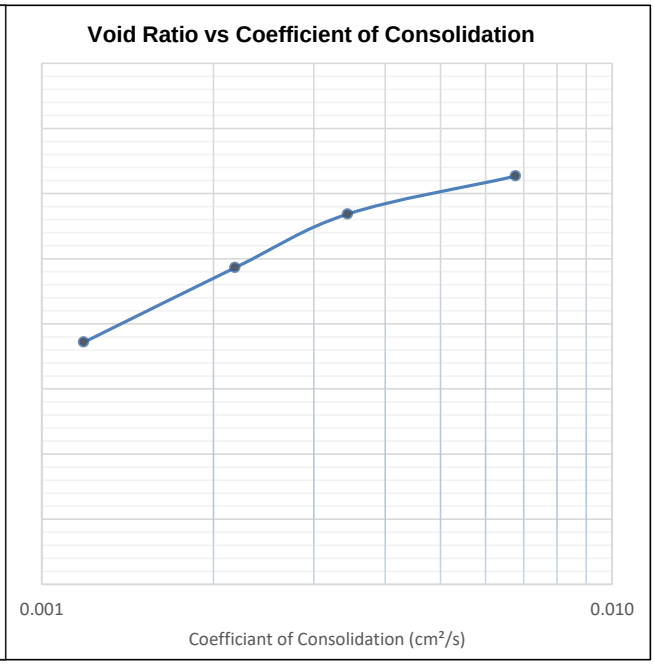
Equipment ID:	Black	**Test Date:**	18-Aug-22	**Soil Structure:**	Undisturbed - Shelby Tube
Device Type:	Gilson Load Frame	**Tested By:**	B.Tataryn	**Sample Depth:**	3.0m - 3.5m
Sample Type:	Mudstone (Hard Soil)	**Test Method:**	**B**	**Cons. Test #:**	22BH218-ST1
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters	Initial	Final
Moisture Content (%)	23.97	29.70
Weight (g)	128.16	134.09
Thickness (mm)	21.49	20.29
Area (m²)	0.0031670	0.0031670
Dry Density (kg/m³)	1519	1609
Wet Density (kg/m³)	1883	2087
Void Ratio (e)	0.79	0.69
Deg. Of Saturation (%)	82.54	117.11
Specific Gravity* (g/cm³)	2.718	

*Assumed Value

Load Increment (kPa)	Deformation (mm)	Duration (hrs)
80.0	-0.469	24
160.0	-0.281	24
320.0	-0.419	24
640.0	-0.566	24
1280.0	-0.769	24
320.0	0.498	24
80.0	0.584	24





Preconsolidation Pressure (kPa) : 200
Consolidation Index : 0.18
Expansion Index : 0.08

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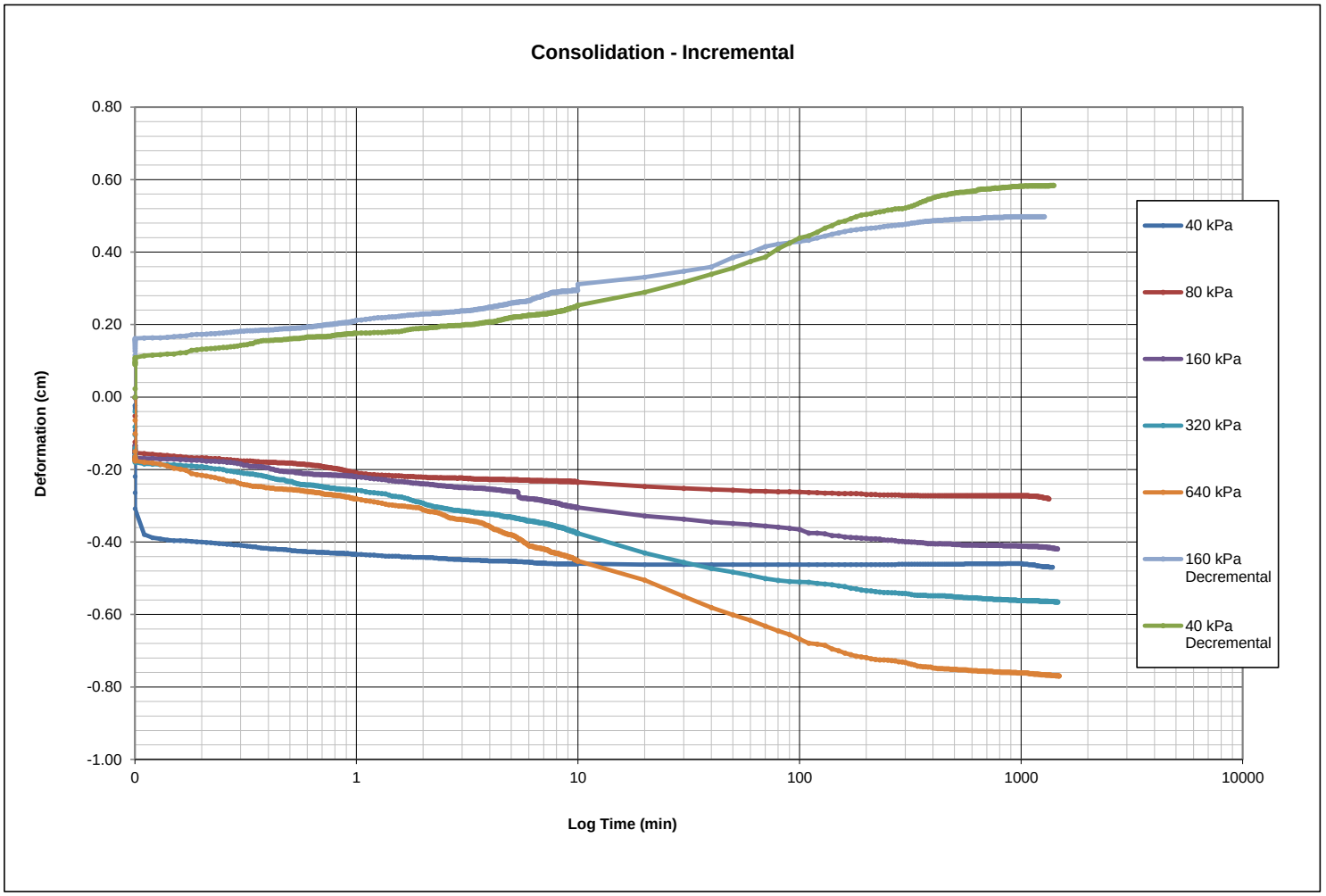
One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	218ST1
Project No.:	1560-193-00	**Source:**	22BH218
Owner:	EID	**Sampled By:**	C.Tams
File No.:	ODC-03	**Date Sampled:**	15-Jul-22

Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).



Load Increment (kPa)	Void Ratio (e_{50})	Coefficient of Consolidation (cm^2/s)
160.0	0.733	6.78E-03
320.0	0.704	3.44E-03
640.0	0.663	2.18E-03
1280.0	0.606	1.19E-03

Comments:

- Sample inundated with tap water during consolidation.

Checked By: _____

Chris McRae, B.Sc, P.Eng.

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Tel: (306) 668-1966

One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	1SH1
Project No.:	1560-193-00	**Source:**	22BH223
Owner:	EID	**Sampled By:**	C.Braun
File No.:	ODC-02	**Date Sampled:**	27-Jun-22

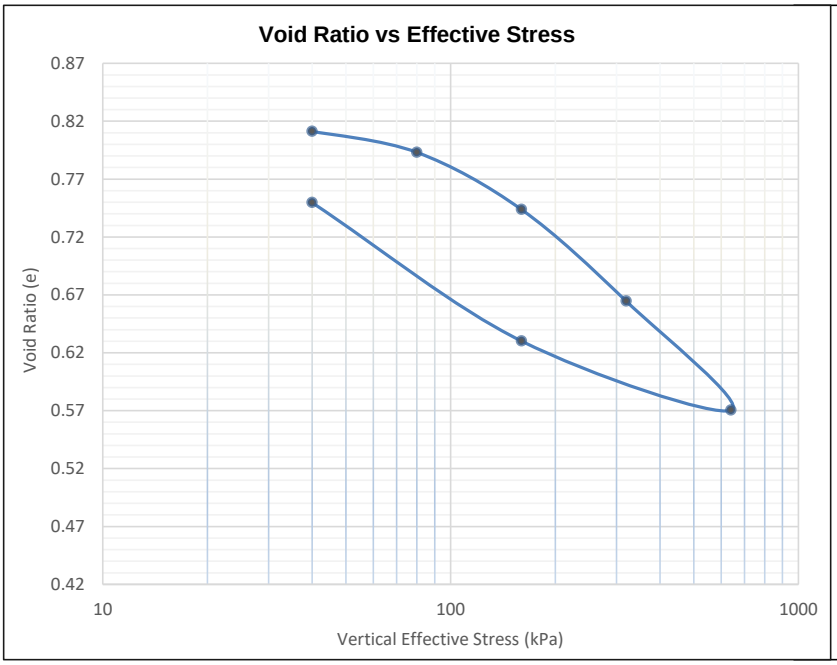
Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).

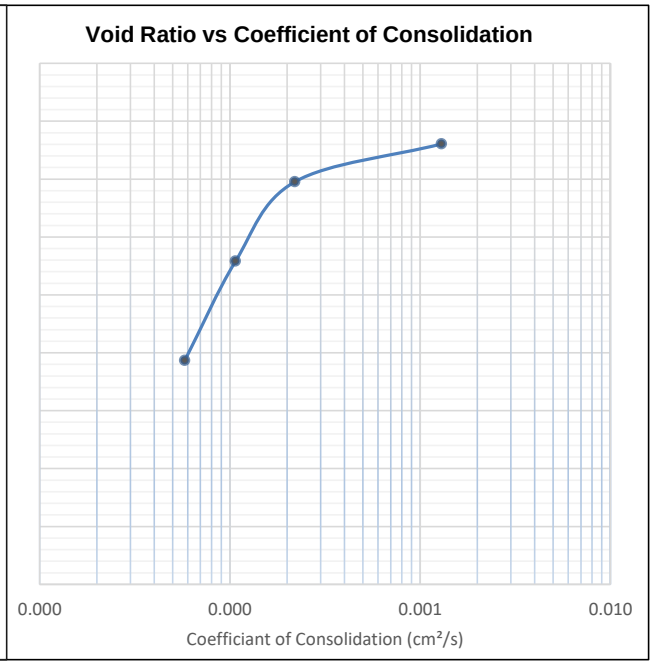
Equipment ID:	Blue	**Test Date:**	18/Jul/22	**Soil Structure:**	Undisturbed
Device Type:	U-Test Load Frame	**Tested By:**	B.Tataryn	**Sample Depth:**	1.5 m - 1.8 m
Sample Type:	Mudstone (Hard Soil)	**Test Method:**	**B**	**Cons. Test #:**	22BH223-1SH1
Soil Description:	CI Inorganic clays of medium plasticity, silty clays				

Sample Parameters	Initial	Final
Moisture Content (%)	27.97	33.96
Weight (g)	121.64	127.33
Thickness (mm)	20.00	19.21
Area (m²)	0.0031670	0.0031670
Dry Density (kg/m³)	1501	1562
Wet Density (kg/m³)	1920	2093
Void Ratio (e)	0.81	0.74
Deg. Of Saturation (%)	93.73	124.78
Specific Gravity* (g/cm³)	2.718	

*Assumed Value

Load Increment (kPa)	Deformation (mm)	Duration (hrs)
40.0	0.001	72
80.0	-0.179	24
160.0	-0.547	24
320.0	-0.878	42
640.0	-0.935	24
160.0	0.562	34
40.0	1.313	24





Preconsolidation Pressure (kPa) : 130
Consolidation Index : 0.30
Expansion Index : 0.15

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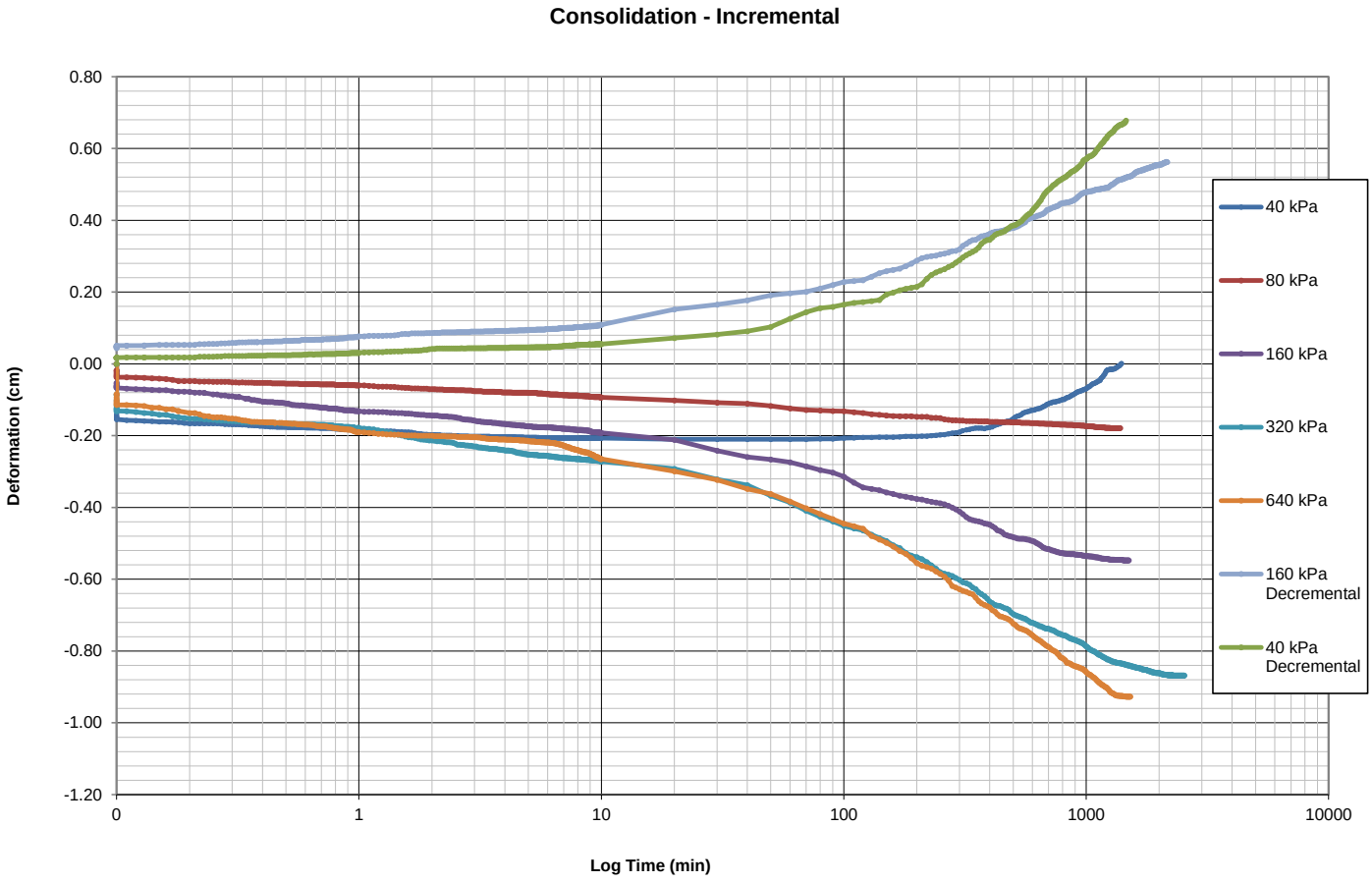
One Dimensional Consolidation Test Report

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	1SH1
Project No.:	1560-193-00	**Source:**	22BH223
Owner:	EID	**Sampled By:**	C.Braun
File No.:	ODC-02	**Date Sampled:**	27-Jun-22

Tested in accordance with ASTM D 2435-03 (One Dimensional Consolidation Properties of Soils Using Incremental Loading).



Load Increment (kPa)	Void Ratio (e_{50})	Coefficient of Consolidation (cm²/s)
80.0	0.800	1.30E-03
160.0	0.768	2.19E-04
320.0	0.699	1.07E-04
640.0	0.613	5.79E-05

Comments:

- Sample inundated with tap water during consolidation.
- Sample swell observed at 40 kPa, consolidating to -0.210 mm before swelling back to +0.001 mm during the stage.

Checked By: _____

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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-01	**Date Sampled:**	11-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	14-Jul-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	A.Antony	**Sample Depth:**	16.93-17.11 m
Sample Type:	Shale	**Direct Shear Test #:**	273, 274, 276	**Consolidation Test #:**	121
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

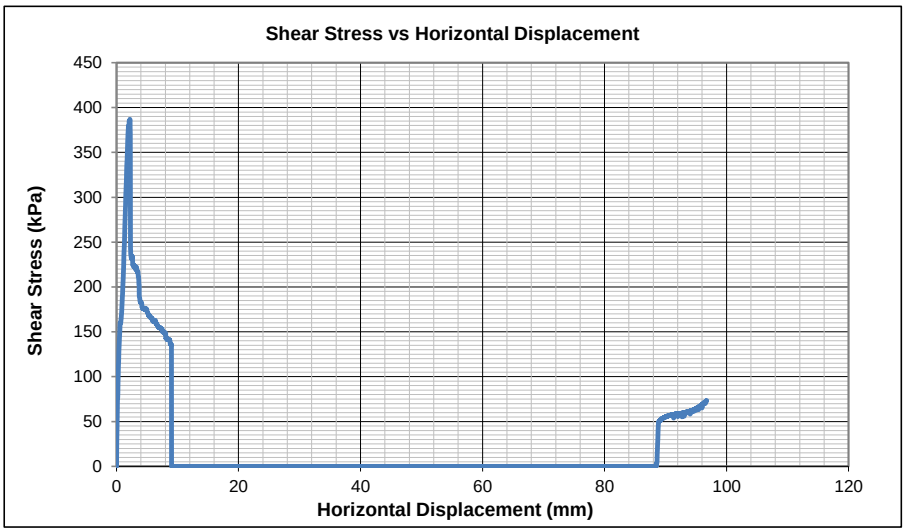
Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	12.46	18.35
Weight (g)	128.84	135.59
Thickness (mm)	20.76	20.05
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	1952	2021
Wet Density (kg/m³)	2195	2391
Void Ratio (e)	0.39	0.34
Deg. Of Saturation (%)	87.08	146.09
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	0.707
Normal Stress at Peak (kPa)	**250**
Shear Load at Peak (kN)	1.09
Shear Stress at Peak (kPa)	**387**
Displacement at Peak (mm)	2.19
Residual Load at Failure (kN)	139
Residual Stress at Failure (kPa)	49.2
Displacement at Residual (mm)	88.9
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	96.8



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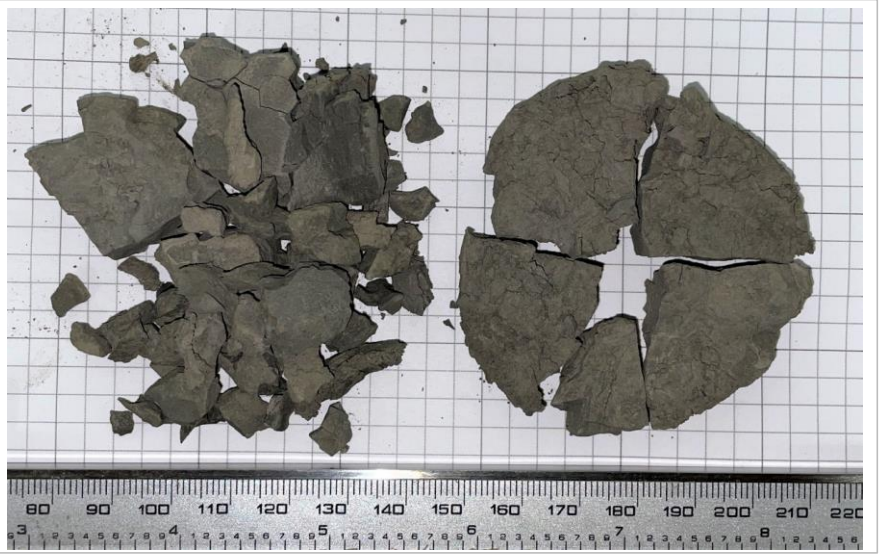

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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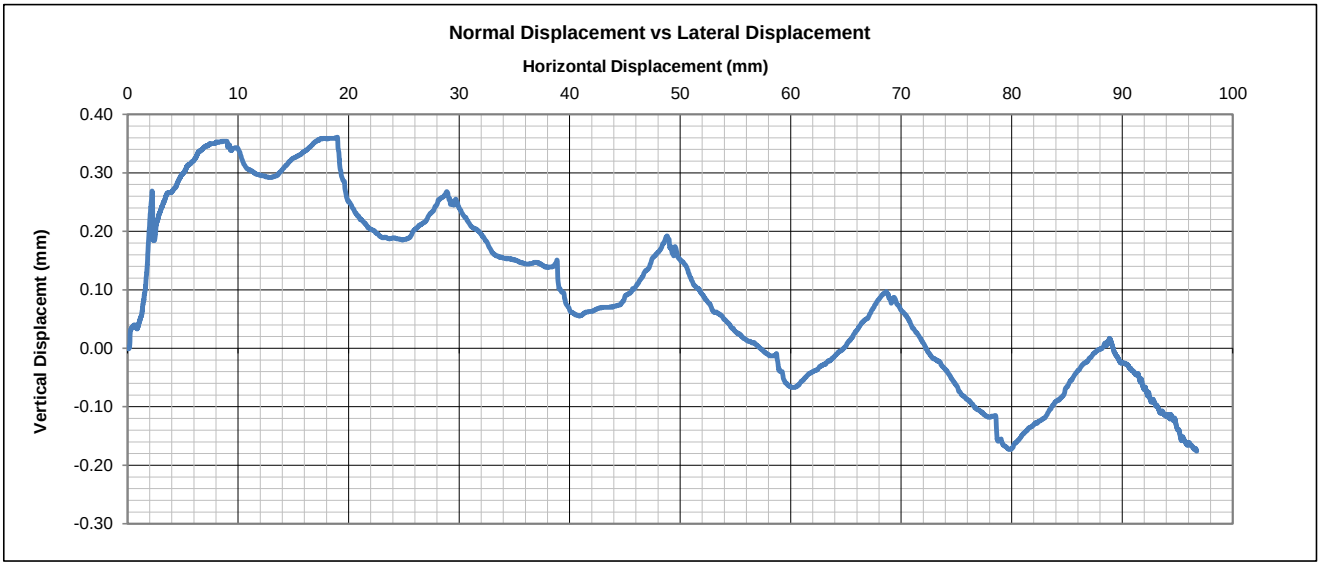
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-01	**Date Sampled:**	11-Jun-22

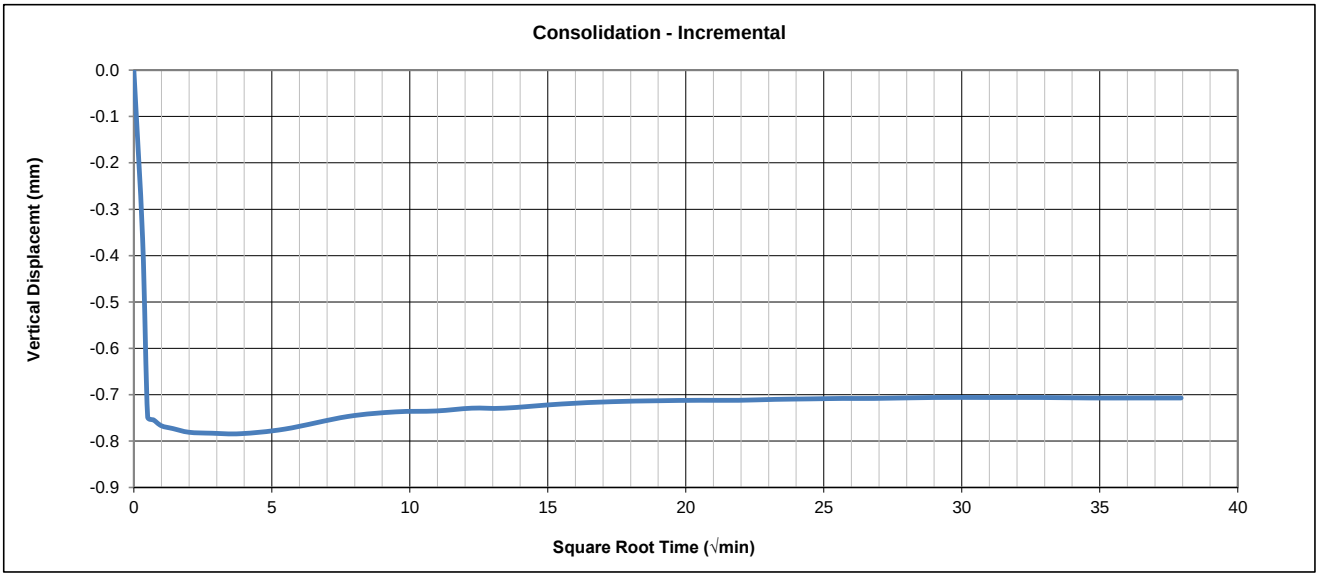
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	0.707
Normal Stress (kPa)	250

Total Normal Displacement (mm)	0.71
Duration of Applied Load (hrs)	24



Checked By: _____

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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-02	**Date Sampled:**	11-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	21-Jul-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	16.93-17.11 m
Sample Type:	Shale	**Direct Shear Test #:**	277, 278, 279	**Consolidation Test #:**	122
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	8.68	10.01
Weight (g)	111.87	113.24
Thickness (mm)	17.85	16.44
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	2040	2215
Wet Density (kg/m³)	2217	2437
Void Ratio (e)	0.33	0.22
Deg. Of Saturation (%)	71.70	121.71
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	1.55
Normal Stress at Peak (kPa)	**550**
Shear Load at Peak (kN)	2.01
Shear Stress at Peak (kPa)	**710**
Displacement at Peak (mm)	1.62
Residual Load at Failure (kN)	648
Residual Stress at Failure (kPa)	229
Displacement at Residual (mm)	75.0
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	77.4

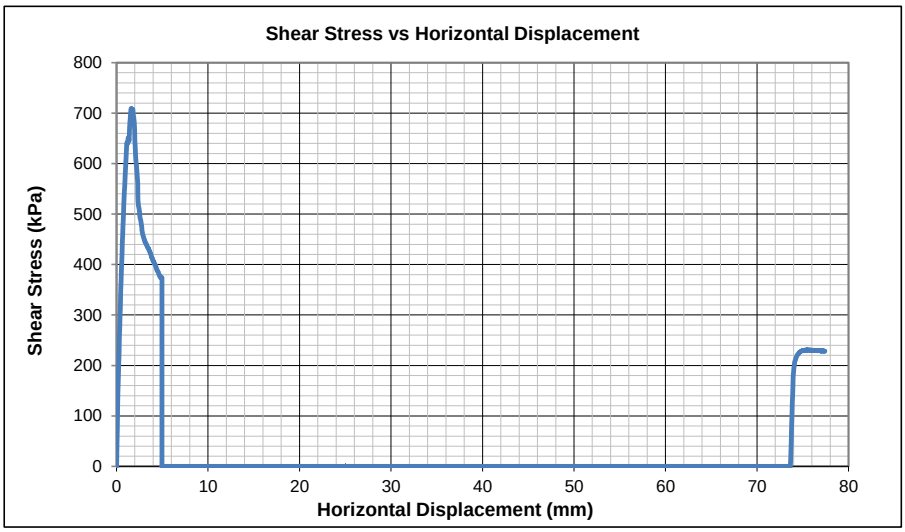

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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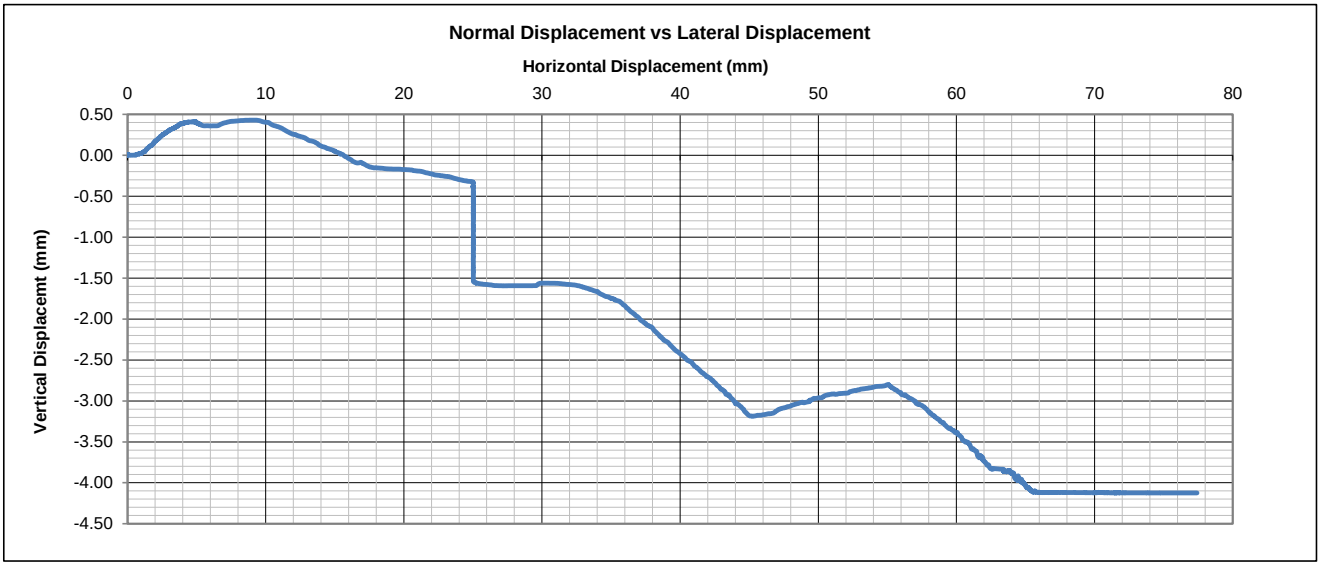
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-02	**Date Sampled:**	11-Jun-22

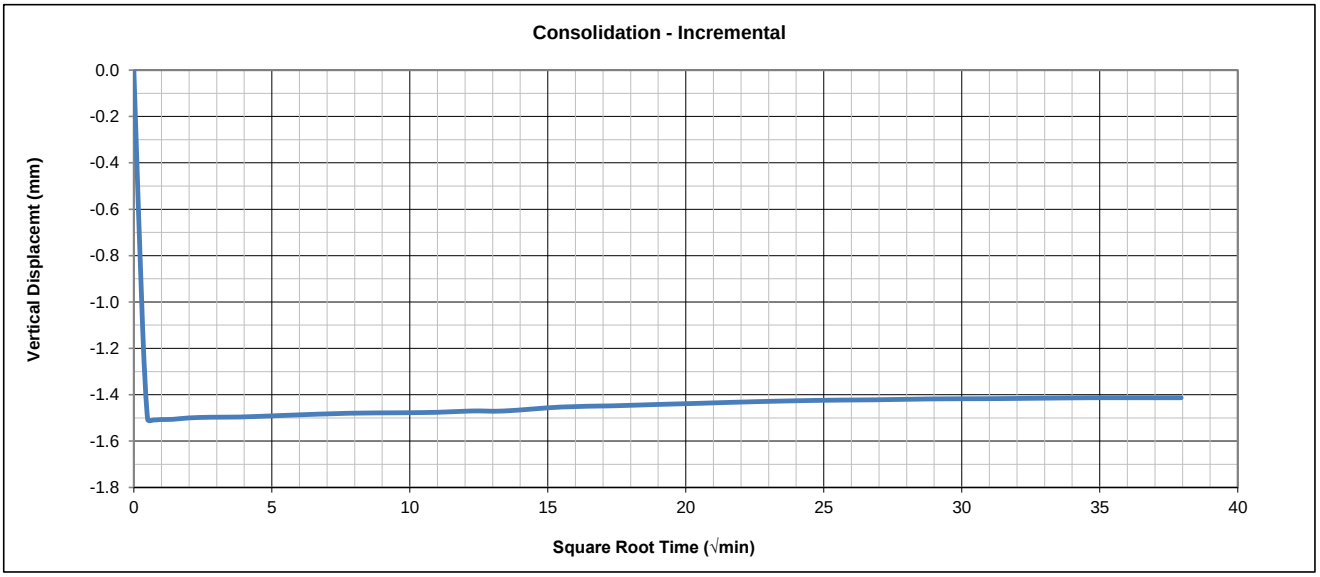
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	1.55
Normal Stress (kPa)	550

Total Normal Displacement (mm)	1.41
Duration of Applied Load (hrs)	24



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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-03	**Date Sampled:**	11-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	25-Jul-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	16.93-17.11 m
Sample Type:	Shale	**Direct Shear Test #:**	280,281,282	**Consolidation Test #:**	123
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	8.68	15.16
Weight (g)	136.03	144.14
Thickness (mm)	21.75	20.91
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	2035	2117
Wet Density (kg/m³)	2212	2438
Void Ratio (e)	0.33	0.28
Deg. Of Saturation (%)	71.11	147.12
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	2.26
Normal Stress at Peak (kPa)	**800**
Shear Load at Peak (kN)	2.58
Shear Stress at Peak (kPa)	**914**
Displacement at Peak (mm)	1.55
Residual Load at Failure (kN)	566
Residual Stress at Failure (kPa)	200
Displacement at Residual (mm)	62.1
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	69.3

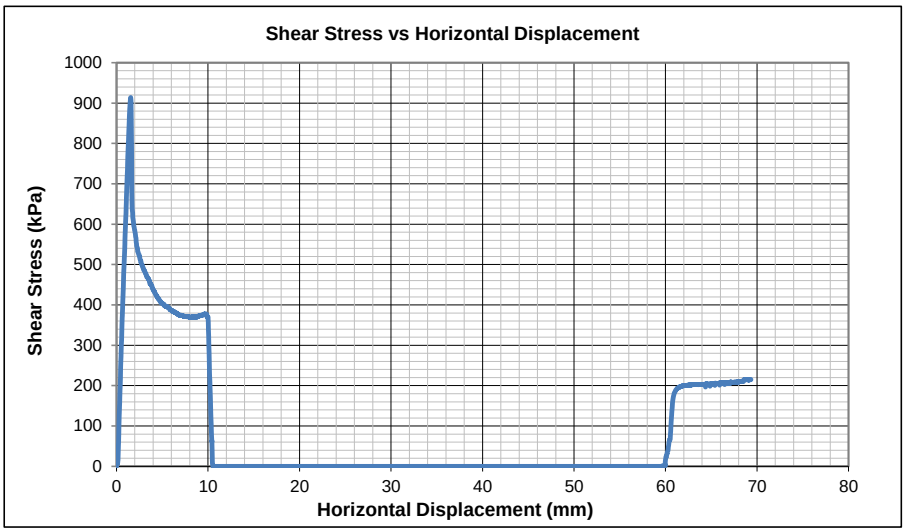
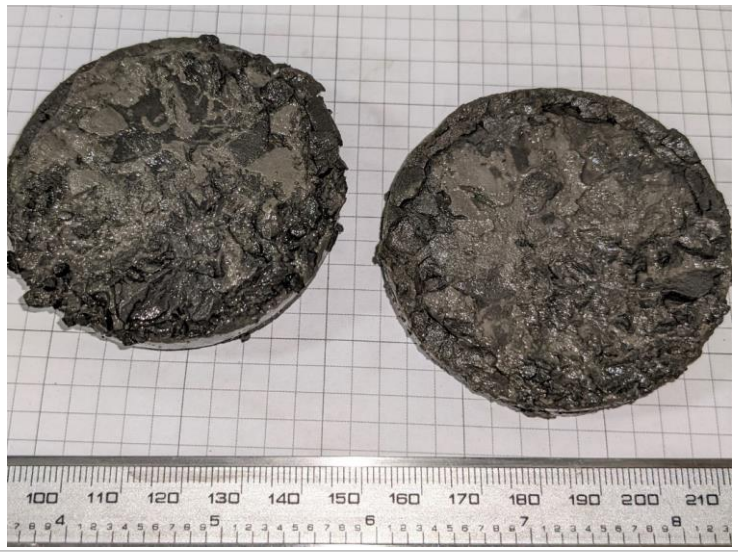


Photo Description



Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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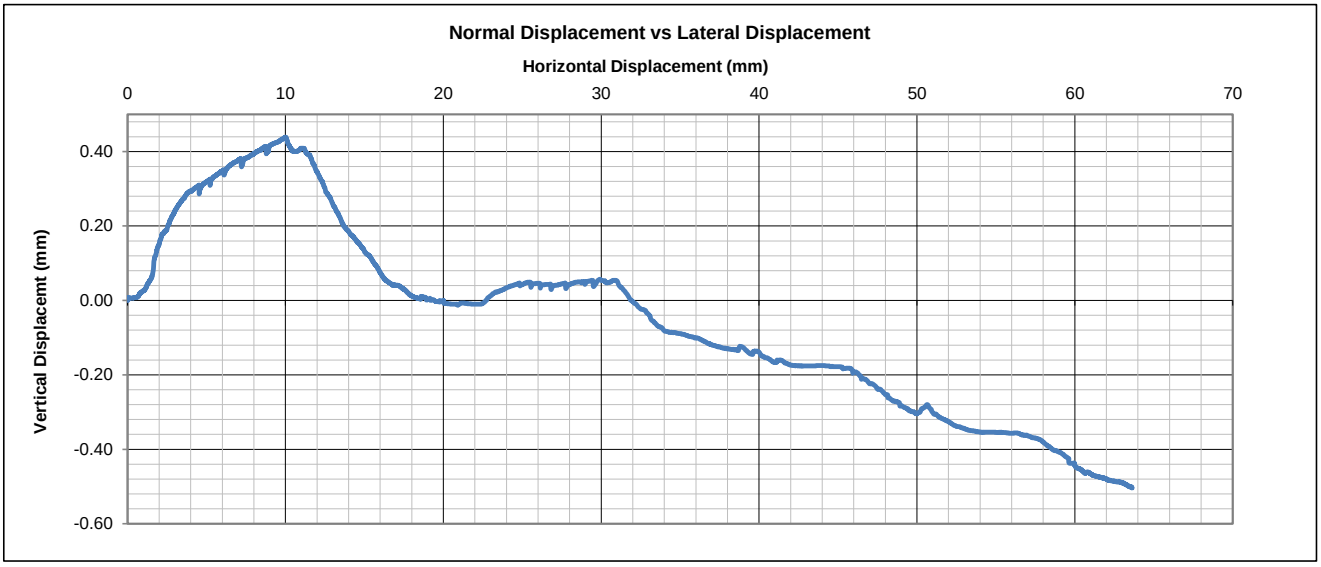
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-03	**Date Sampled:**	11-Jun-22

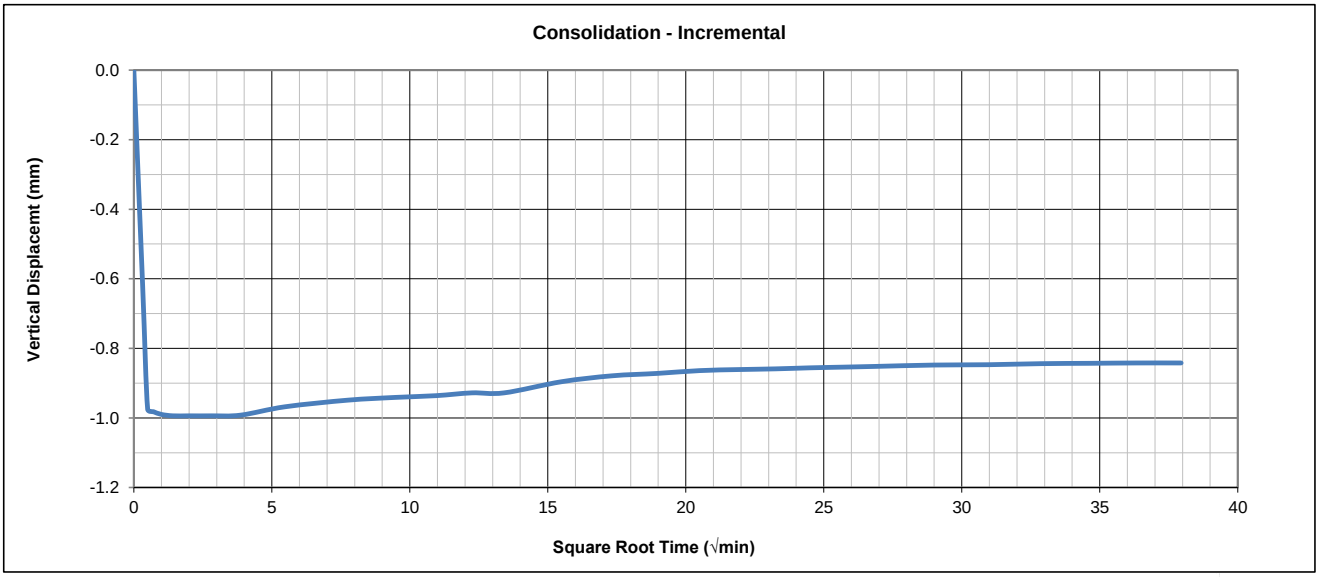
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	2.26
Normal Stress (kPa)	800

Total Normal Displacement (mm)	0.84
Duration of Applied Load (hrs)	24



Checked By: _____

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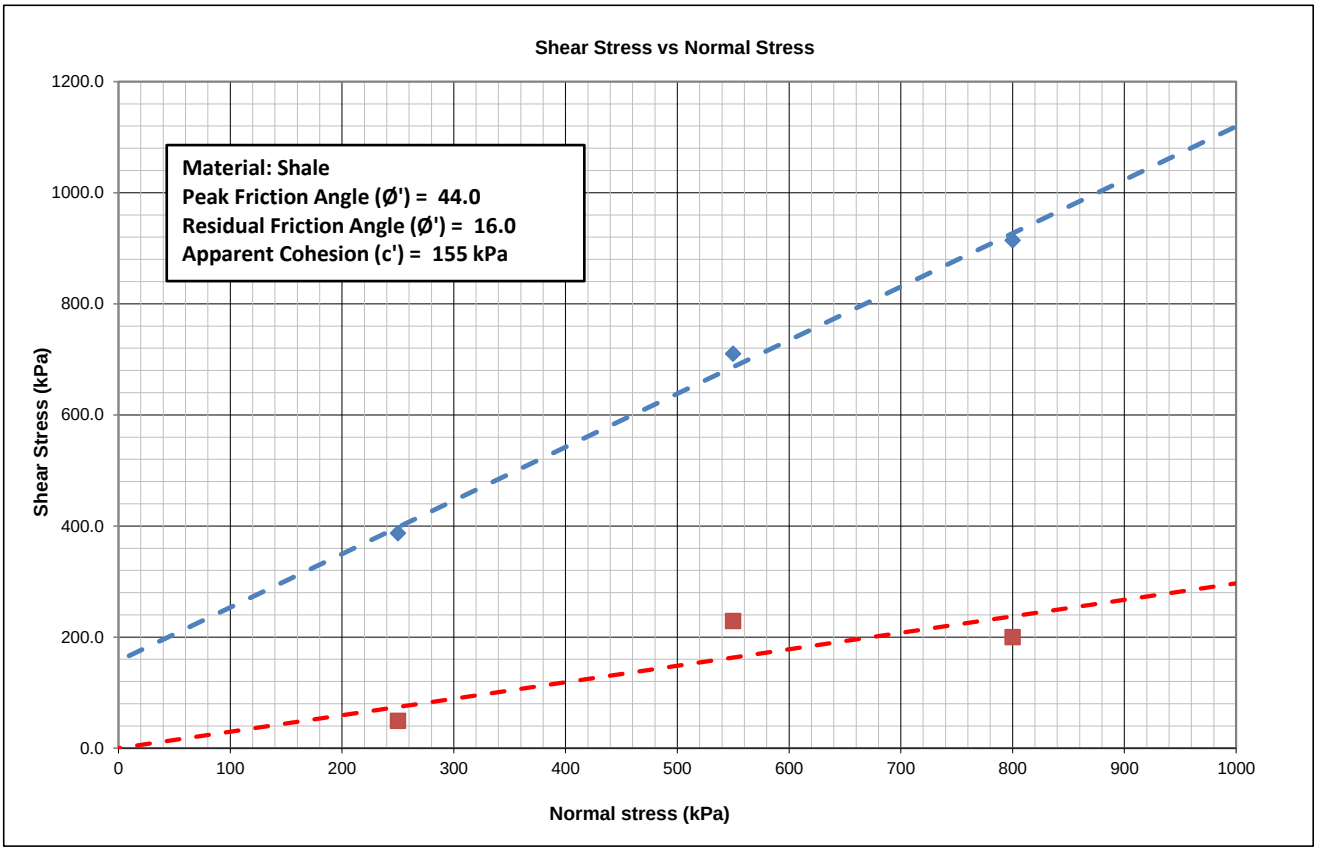
DIRECT SHEAR TEST SUMMARY

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD4
Project No.:	1560-193-00	**Source:**	22CH202 @ Depth 16.93m - 17.11m
Owner:	EID	**Sampled By:**	J.Boyd
Material Type:	Shale	**Date Sampled:**	11-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Test ID	Normal Stress (kPa)	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)	Notes
DS-01	250.0	387.0	49.2	
DS-02	550.0	710.0	229.0	
DS-03	800.0	914.0	200.0	
-				
-				
-				
-				
-				
-				



Comments:

- All samples inundated with tap water during testing.
- Friction angle rounded to nearest whole degree.
- Cohesion rounded to nearest 5 kPa.

Prepared By: _____

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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH207
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-04	**Date Sampled:**	17-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	04-Aug-22	**Soil Structure:**	Undisturbed-Rock Core
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	12.4 m
Sample Type:	Shale	**Direct Shear Test #:**	285	**Consolidation Test #:**	124
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	10.82	15.89
Weight (g)	134.58	140.74
Thickness (mm)	21.66	20.54
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	1983	2091
Wet Density (kg/m³)	2198	2423
Void Ratio (e)	0.37	0.30
Deg. Of Saturation (%)	80.12	145.77
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	0.565
Normal Stress at Peak (kPa)	**200**
Shear Load at Peak (kN)	0.865
Shear Stress at Peak (kPa)	**306**
Displacement at Peak (mm)	1.62
Residual Load at Failure (kN)	-
Residual Stress at Failure (kPa)	-
Displacement at Residual (mm)	-
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	10.2

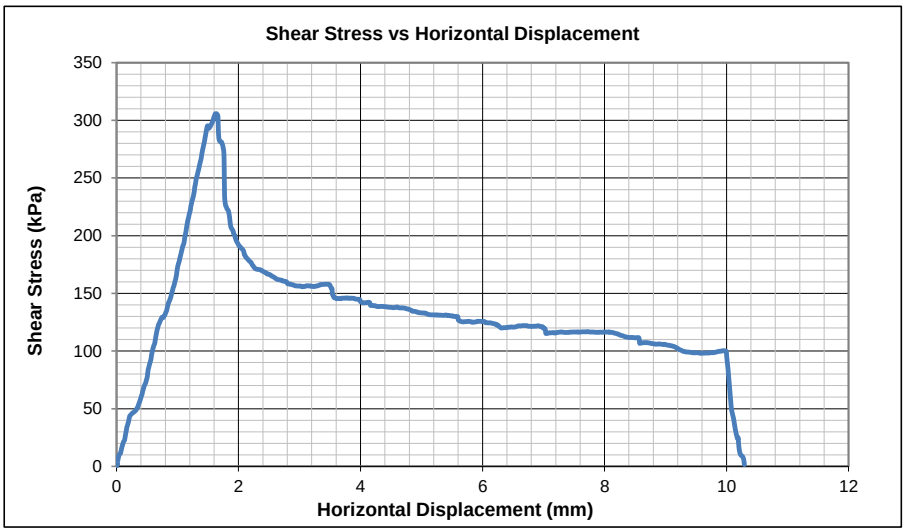

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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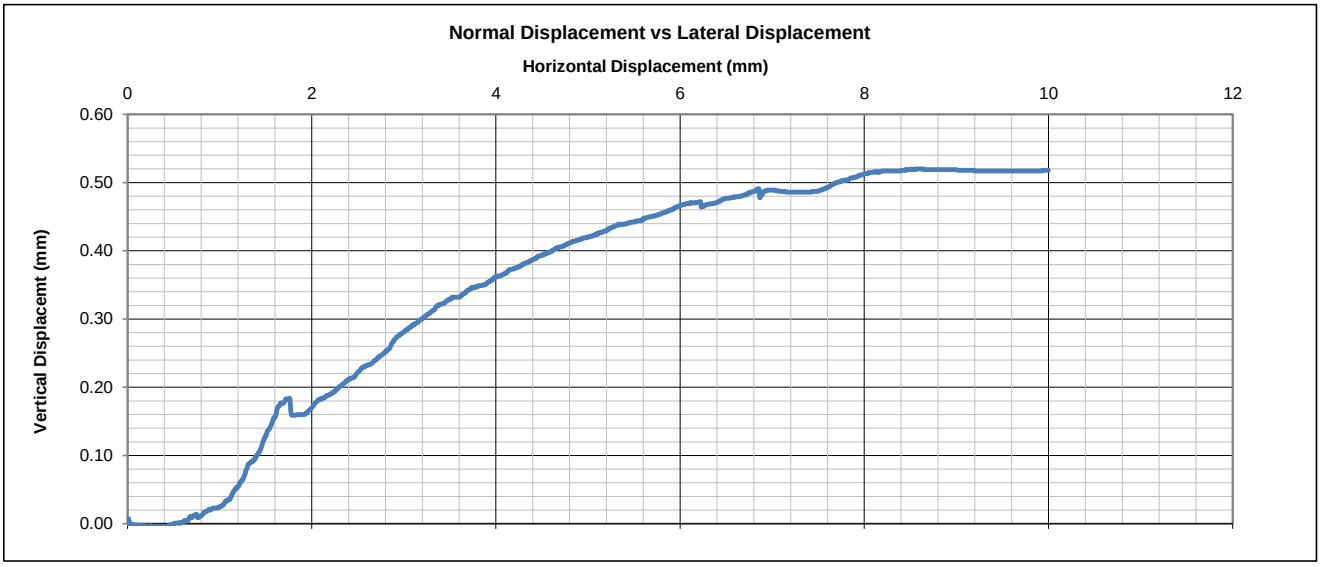
Tel: (306) 668-1966

DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH207
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-04	**Date Sampled:**	17-Jun-22

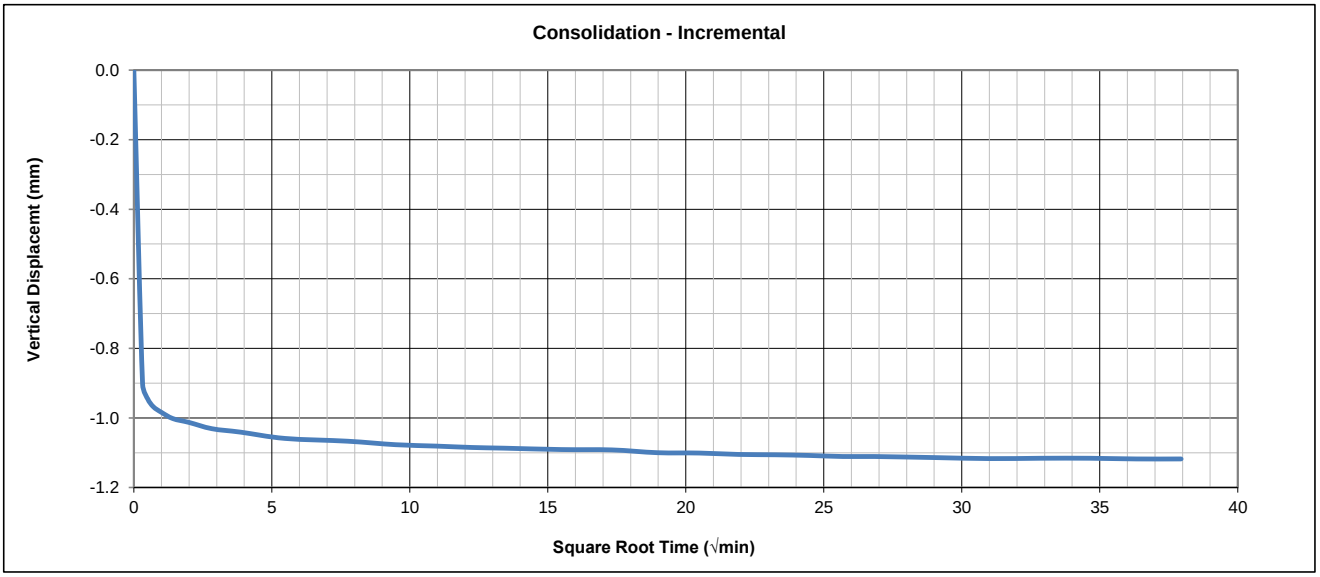
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	0.565
Normal Stress (kPa)	200

Total Normal Displacement (mm)	1.12
Duration of Applied Load (hrs)	24



Checked By: _____

Chris McRae B.Sc, P.Eng.

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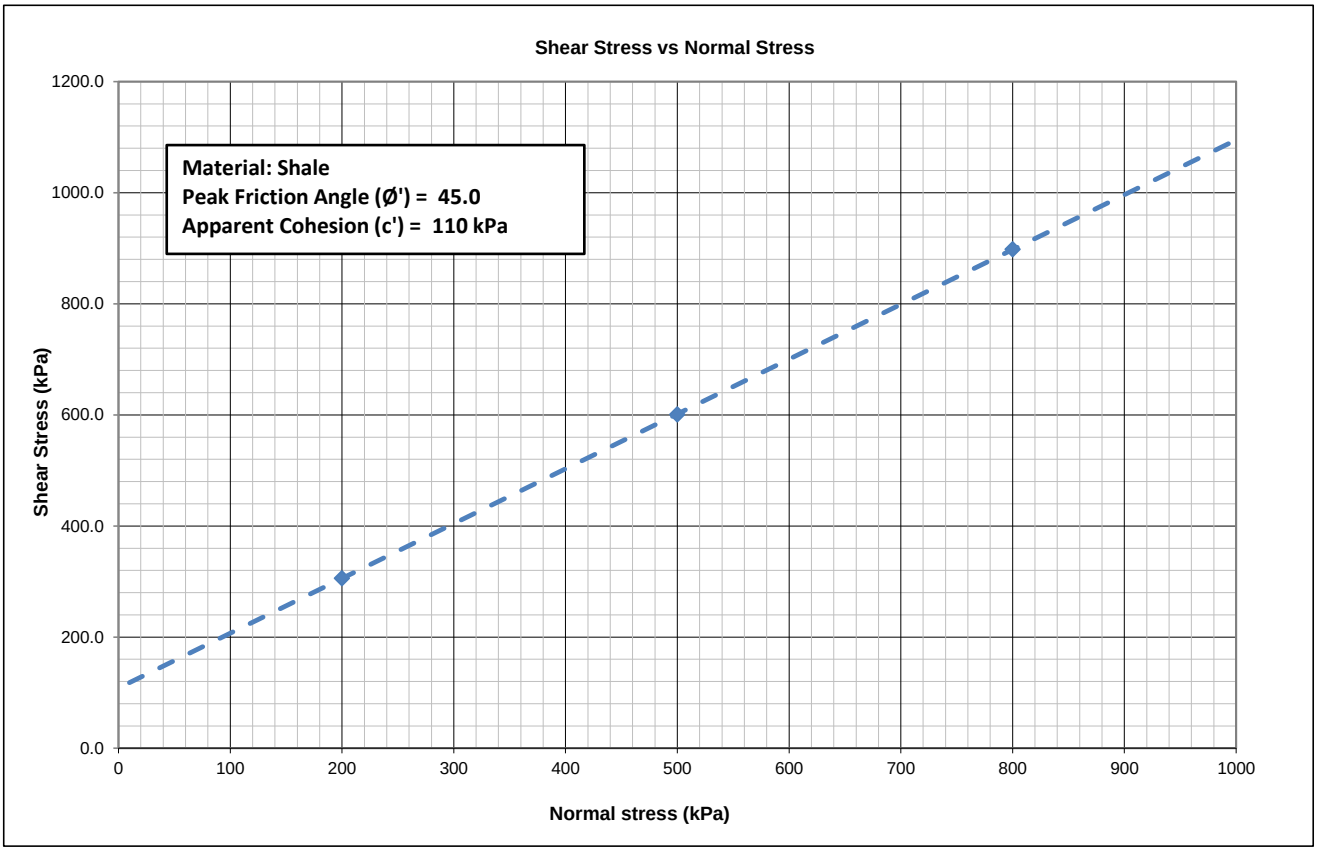
Tel: (306) 668-1966

DIRECT SHEAR TEST SUMMARY

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH07 @ Depth 12.4m
Owner:	EID	**Sampled By:**	J.Boyd
Material Type:	Shale	**Date Sampled:**	17-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Test ID	Normal Stress (kPa)	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)	Notes
DS-04	200.0	306.0		
DS-05	500.0	601.0		
DS-06	800.0	898.0		
-				
-				
-				
-				
-				
-				



Comments:

- All samples inundated with tap water during testing.
- Friction angle rounded to nearest whole degree.
- Cohesion rounded to nearest 5 kPa.

Prepared By:

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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH207
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-05	**Date Sampled:**	17-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	11-Aug-22	**Soil Structure:**	Undisturbed-Rock Core
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	12.4 m
Sample Type:	Shale	**Direct Shear Test #:**	286	**Consolidation Test #:**	125
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	9.27	14.65
Weight (g)	146.57	153.80
Thickness (mm)	23.38	22.59
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	2029	2100
Wet Density (kg/m³)	2217	2408
Void Ratio (e)	0.33	0.29
Deg. Of Saturation (%)	75.01	137.11
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	1.41
Normal Stress at Peak (kPa)	**500**
Shear Load at Peak (kN)	1.70
Shear Stress at Peak (kPa)	**601**
Displacement at Peak (mm)	1.42
Residual Load at Failure (kN)	-
Residual Stress at Failure (kPa)	-
Displacement at Residual (mm)	-
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	10.3

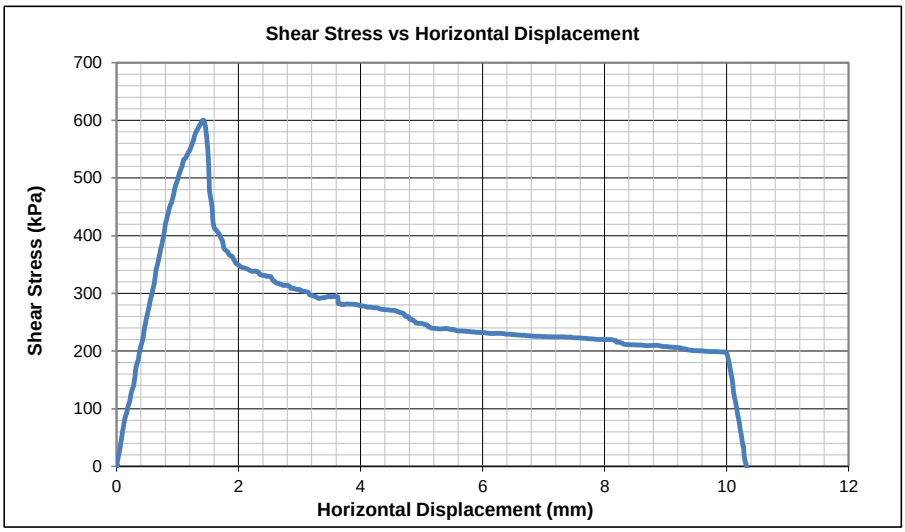

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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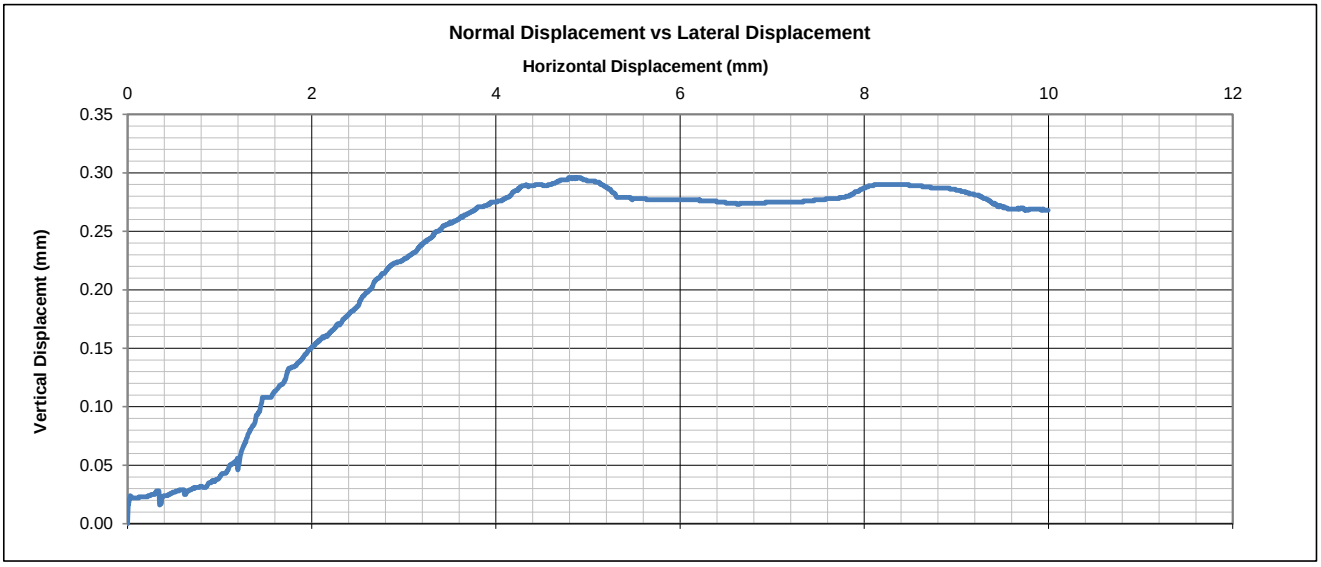
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH207
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-05	**Date Sampled:**	17-Jun-22

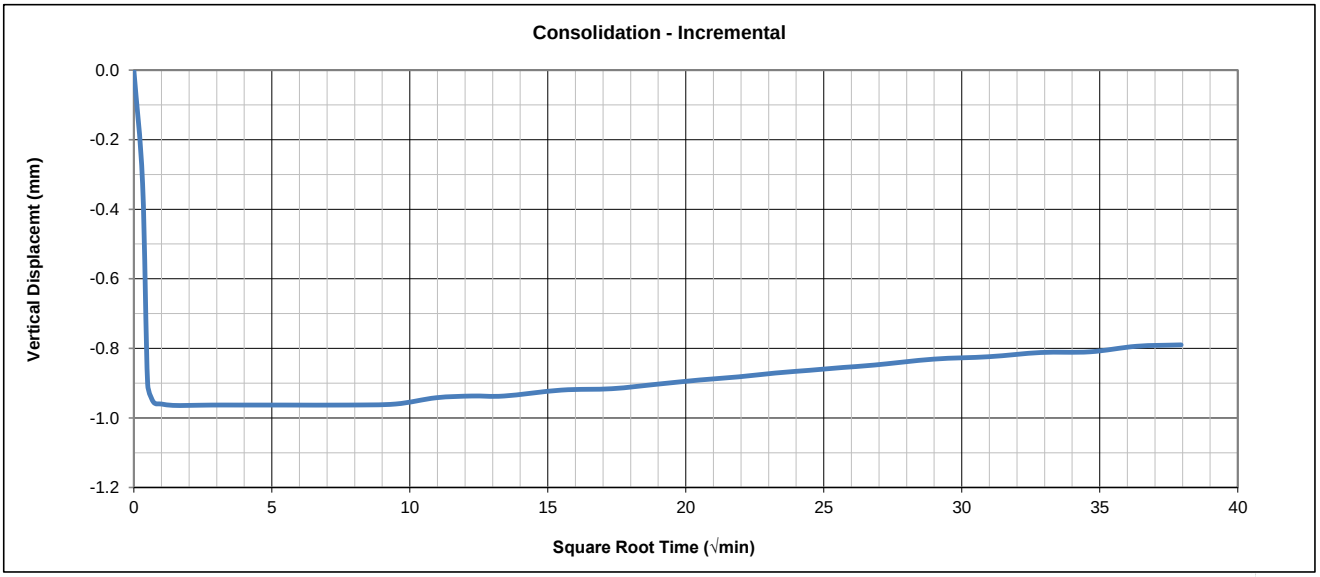
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	1.41
Normal Stress (kPa)	500

Total Normal Displacement (mm)	0.790
Duration of Applied Load (hrs)	24



Checked By: _____

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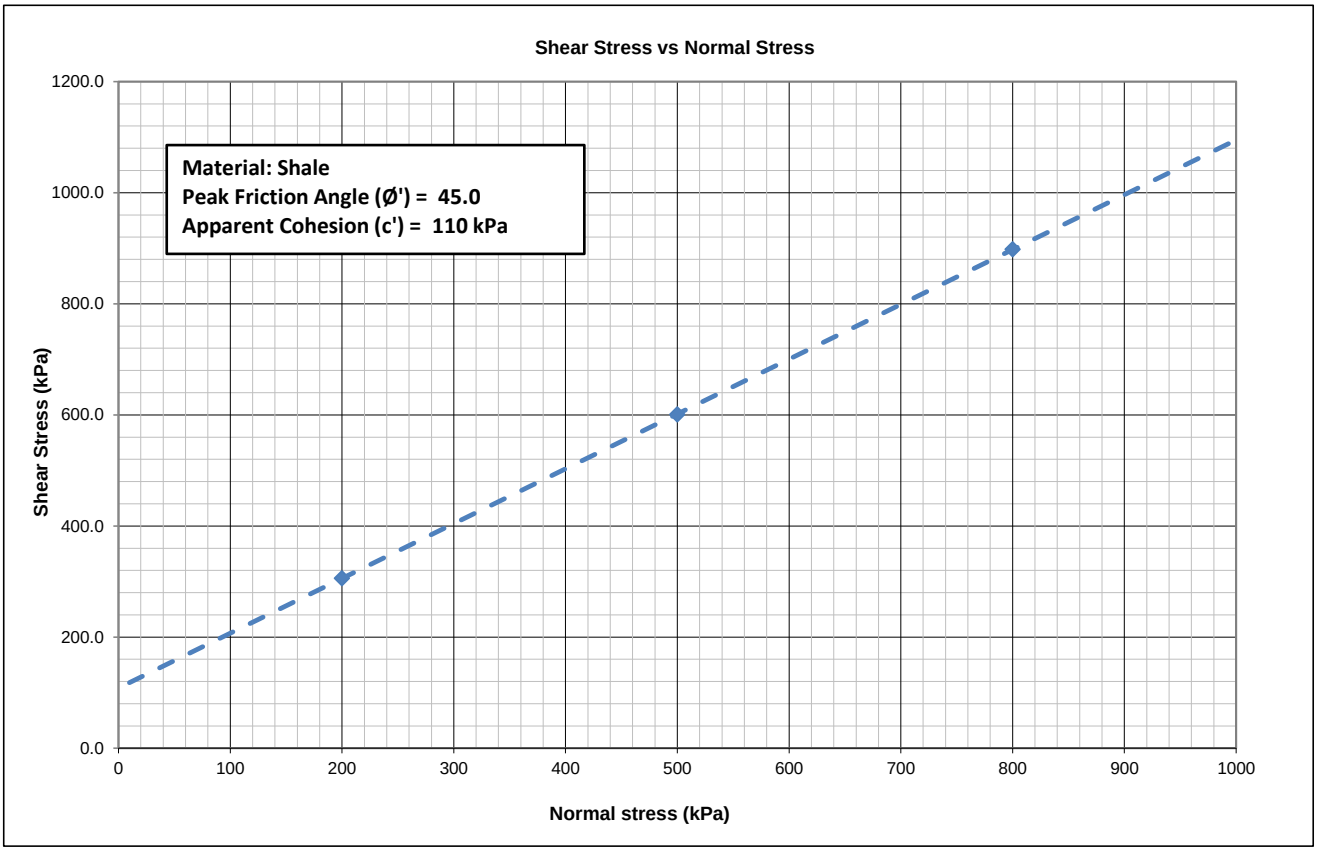
DIRECT SHEAR TEST SUMMARY

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	RC6
Project No.:	1560-193-00	**Source:**	22CH07 @ Depth 12.4m
Owner:	EID	**Sampled By:**	J.Boyd
Material Type:	Shale	**Date Sampled:**	17-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Test ID	Normal Stress (kPa)	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)	Notes
DS-04	200.0	306.0		
DS-05	500.0	601.0		
DS-06	800.0	898.0		
-				
-				
-				
-				
-				
-				



Comments:

- All samples inundated with tap water during testing.
- Friction angle rounded to nearest whole degree.
- Cohesion rounded to nearest 5 kPa.

Prepared By:

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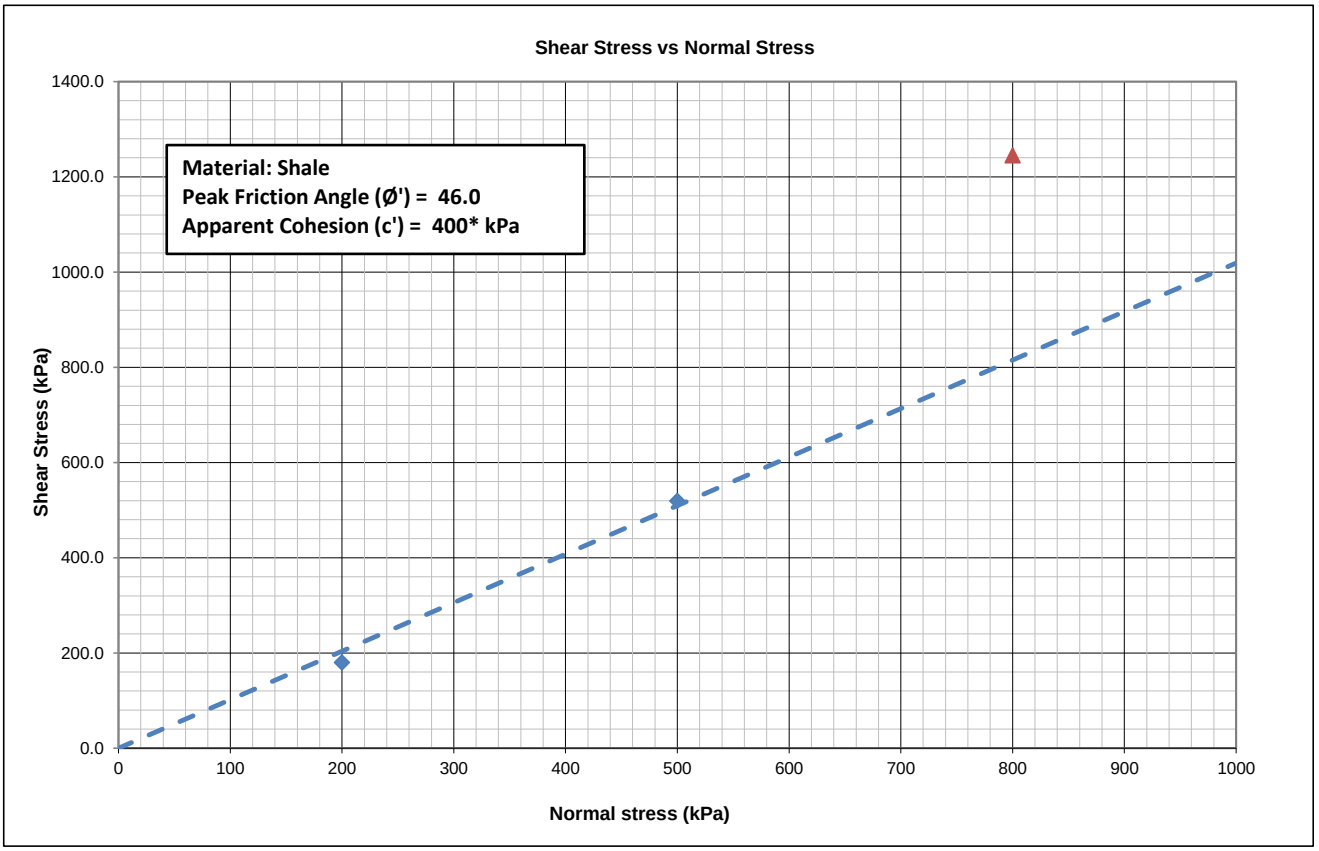
DIRECT SHEAR TEST SUMMARY

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221 @ Depth 10.0m
Owner:	EID	**Sampled By:**	J.Boyd
Material Type:	Shale	**Date Sampled:**	23-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Test ID	Normal Stress (kPa)	Peak Shear Stress (kPa)	Residual Shear Stress (kPa)	Notes
DS-07	200.0	180.0		*failed on pre-existing shear plane.
DS-08	500.0	519.0		*failed on pre-existing shear plane.
DS-09	800.0	1245.0		
-				
-				
-				
-				
-				
-				



Comments:

- All samples inundated with tap water during testing.
- Friction angle rounded to nearest whole degree.
- Cohesion rounded to nearest 5 kPa.
- *Apparent Cohesion based on single point at 800 kPa Normal Stress
- Points 1 (200 kPa) and 2 (500 kPa) failed on apparent pre existing shear planes.

Prepared By:

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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-07	**Date Sampled:**	23-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	22-Aug-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	10.0 m
Sample Type:	Shale	**Direct Shear Test #:**	289	**Consolidation Test #:**	127
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	10.21	15.09
Weight (g)	135.56	141.56
Thickness (mm)	22.02	21.49
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	1976	2024
Wet Density (kg/m³)	2177	2329
Void Ratio (e)	0.37	0.34
Deg. Of Saturation (%)	74.60	120.90
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	0.565
Normal Stress at Peak (kPa)	**200**
Shear Load at Peak (kN)	0.508
Shear Stress at Peak (kPa)	**180**
Displacement at Peak (mm)	1.32
Residual Load at Failure (kN)	-
Residual Stress at Failure (kPa)	-
Displacement at Residual (mm)	-
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	9.42

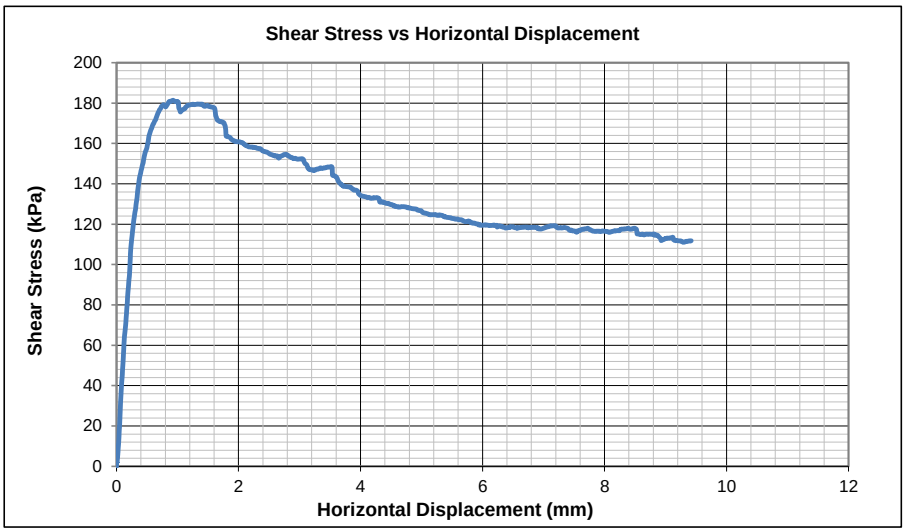

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.
- **Possible shear plane in sample prior to shearing.

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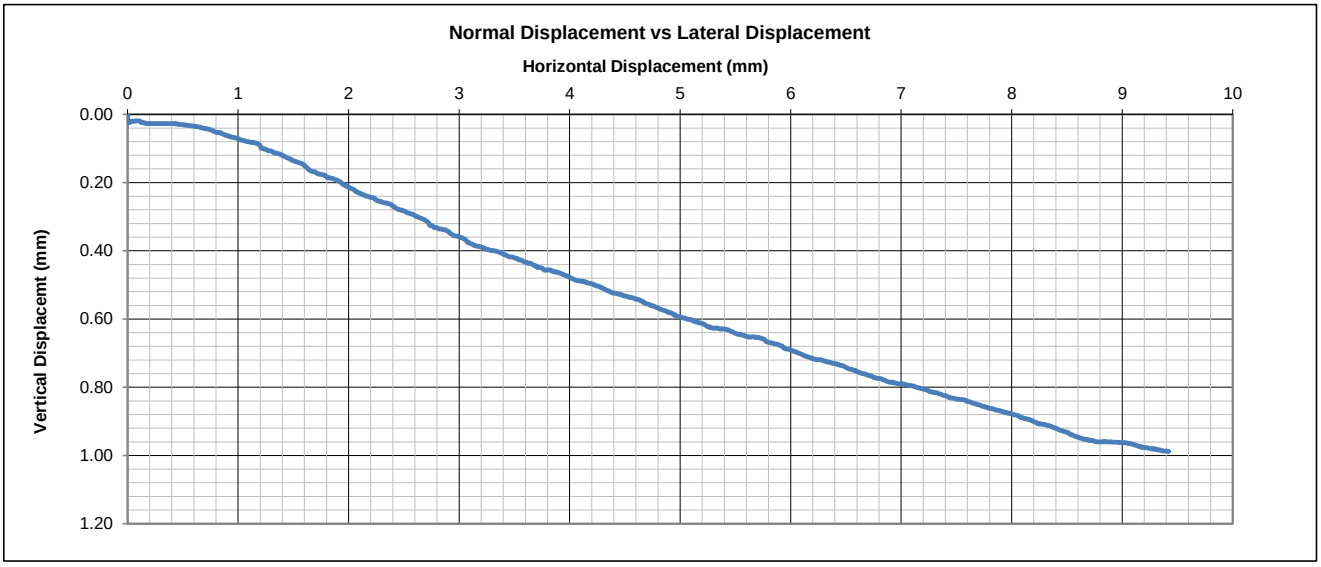
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-07	**Date Sampled:**	23-Jun-22

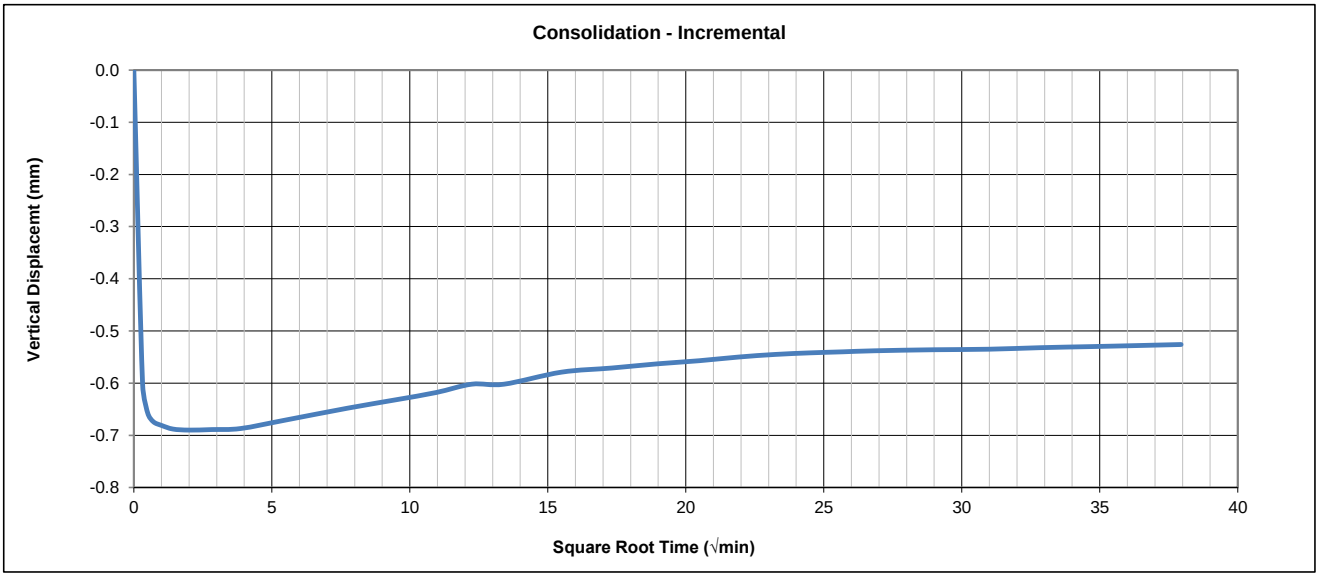
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	0.565
Normal Stress (kPa)	200

Total Normal Displacement (mm)	0.526
Duration of Applied Load (hrs)	24



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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-08	**Date Sampled:**	23-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	25-Aug-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	10.0 m
Sample Type:	Shale	**Direct Shear Test #:**	291	**Consolidation Test #:**	128
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	12.23	13.34
Weight (g)	141.60	142.99
Thickness (mm)	22.59	21.61
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	1975	2065
Wet Density (kg/m³)	2217	2340
Void Ratio (e)	0.37	0.31
Deg. Of Saturation (%)	89.30	115.94
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	1.41
Normal Stress at Peak (kPa)	**500**
Shear Load at Peak (kN)	1.47
Shear Stress at Peak (kPa)	**519**
Displacement at Peak (mm)	0.811
Residual Load at Failure (kN)	-
Residual Stress at Failure (kPa)	-
Displacement at Residual (mm)	-
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	10.2

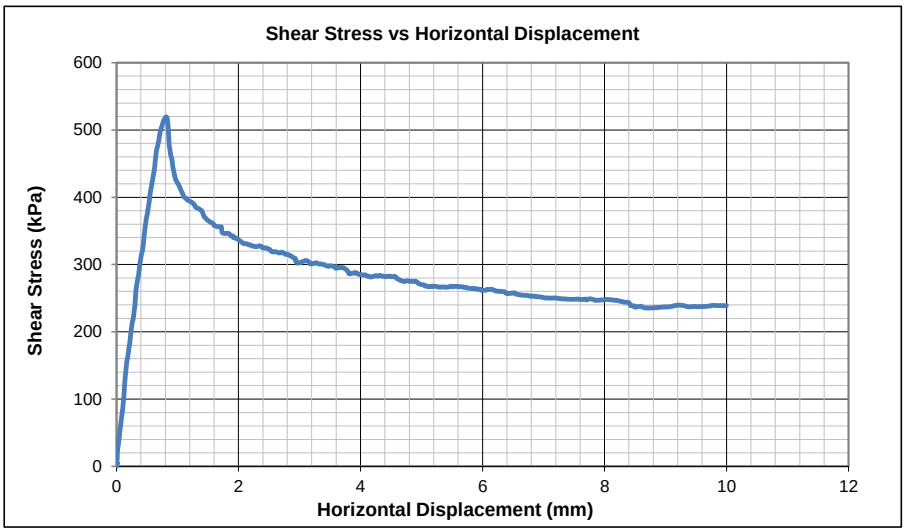

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.
- ** Possible shear plane in sample prior to shearing.

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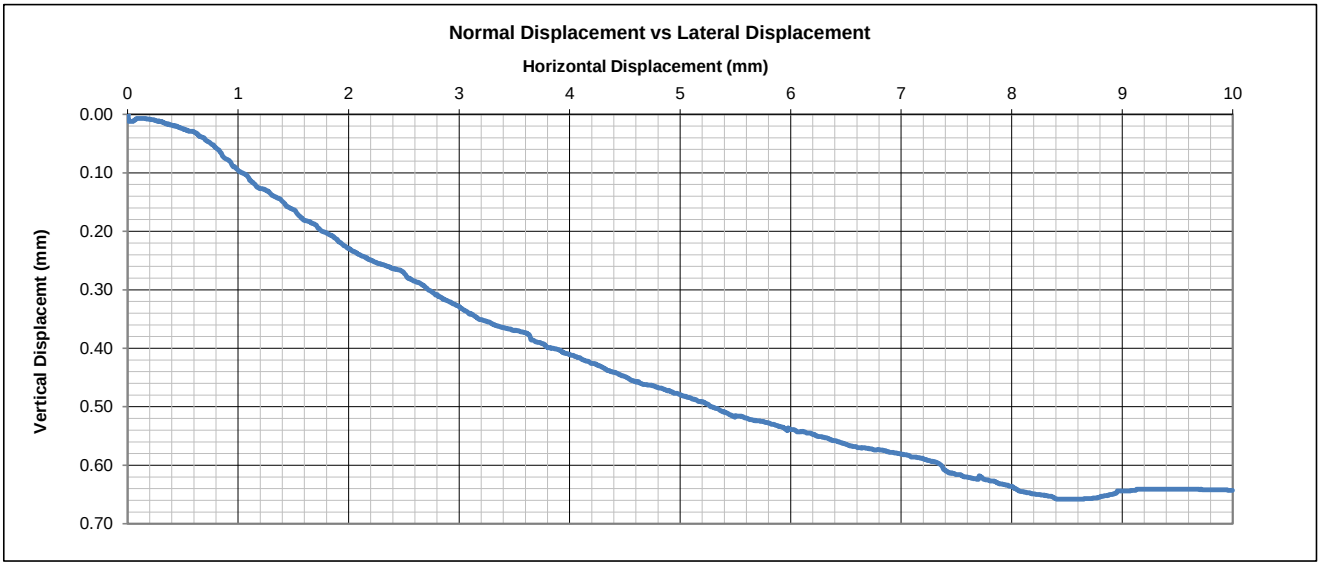
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-08	**Date Sampled:**	23-Jun-22

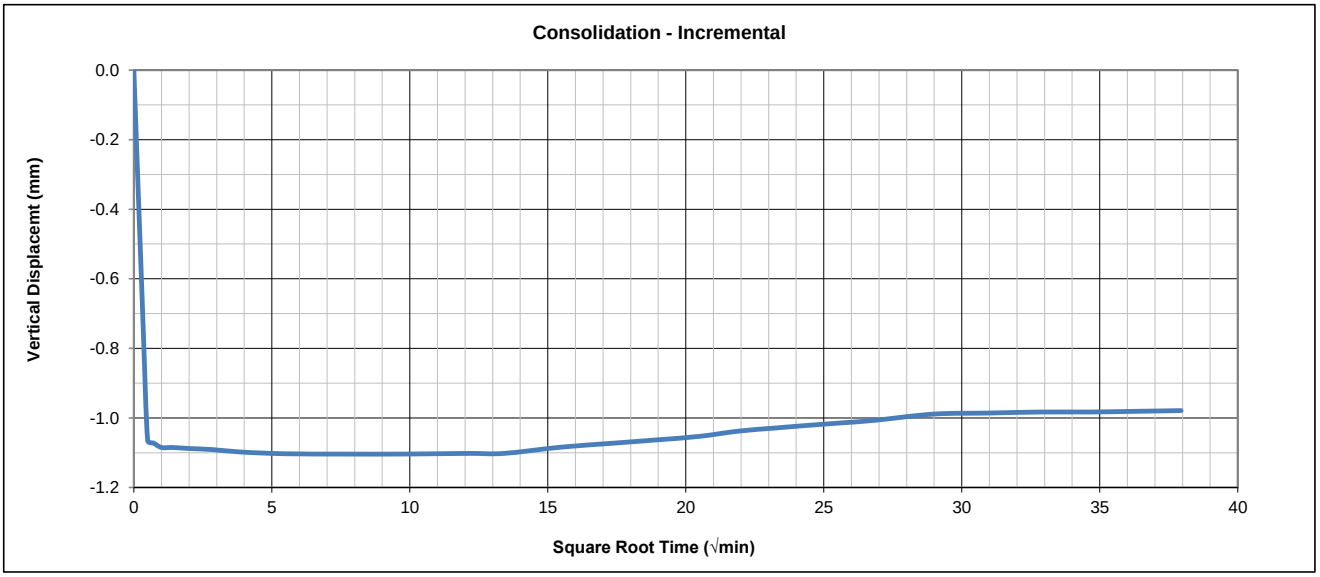
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	1.41
Normal Stress (kPa)	500

Total Normal Displacement (mm)	0.979
Duration of Applied Load (hrs)	24



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DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-09	**Date Sampled:**	23-Jun-22

Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.

Equipment ID:	21/000184	**Test Date:**	29-Aug-22	**Soil Structure:**	Undisturbed
Device Type:	UTS-2060	**Tested By:**	B.Tataryn	**Sample Depth:**	10.0 m
Sample Type:	Shale	**Direct Shear Test #:**	292	**Consolidation Test #:**	129
Soil Description:	CH	Inorganic clays of high plasticity, fat clays			

Sample Parameters

	Initial	Pre-Shear
Moisture Content (%)	8.49	13.97
Weight (g)	156.86	164.78
Thickness (mm)	25.38	24.31
Area (m²)	0.002827	0.002827
Dry Density (kg/m³)	2015	2103
Wet Density (kg/m³)	2186	2397
Void Ratio (e)	0.34	0.29
Deg. Of Saturation (%)	66.82	131.52
Specific Gravity* (g/cm³)	2.708	

*Assumed value

Direct Shear Parameters

Normal Load at Peak (kN)	2.26
Normal Stress at Peak (kPa)	**800**
Shear Load at Peak (kN)	3.52
Shear Stress at Peak (kPa)	**1245**
Displacement at Peak (mm)	2.01
Residual Load at Failure (kN)	-
Residual Stress at Failure (kPa)	-
Displacement at Residual (mm)	-
Shear Rate (mm/min)	0.0035
Total Lateral Displacement (mm)	10.0

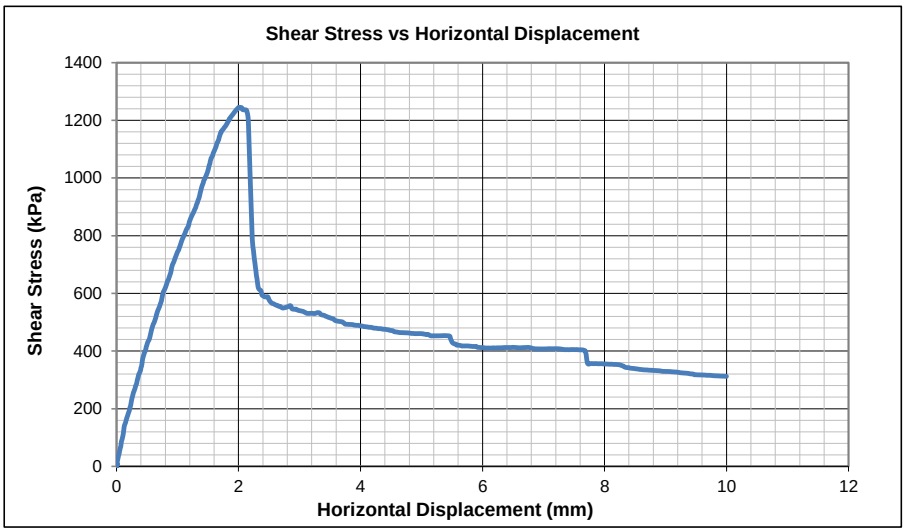

Photo Description

Comments:

- Sample inundated with tap water during consolidation and shearing.
- Degree of Saturation exceeds 100% due to assumed specific gravity and shape of direct shear box.

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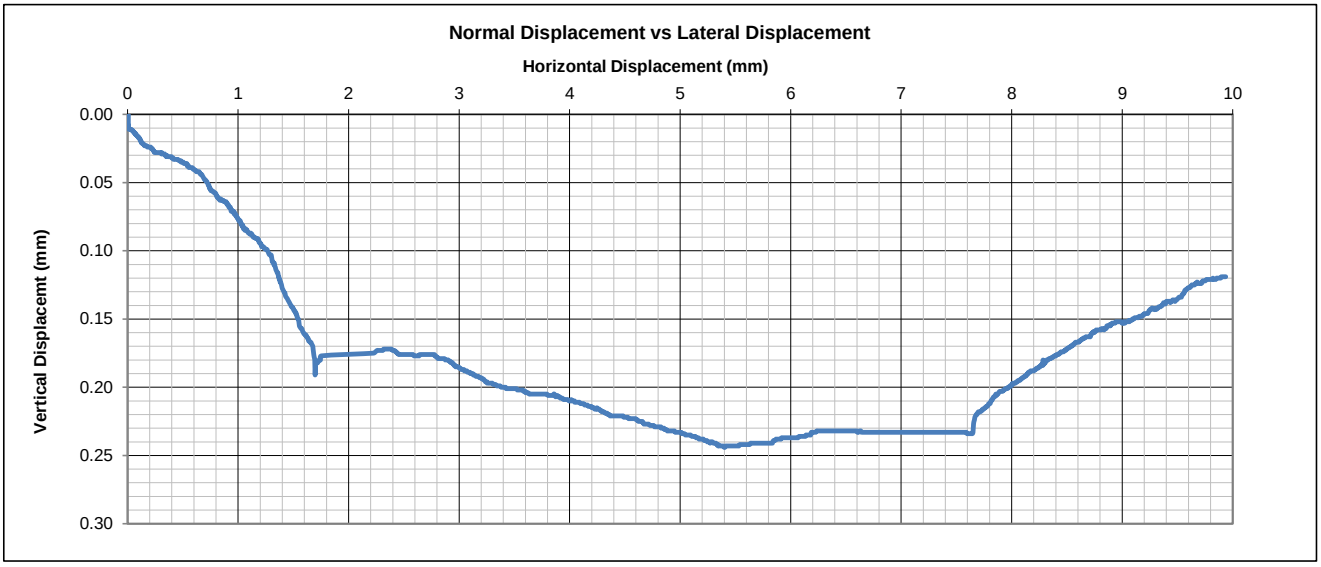
DIRECT SHEAR AND RESIDUAL TEST REPORT

Project:	Snake Lake Reservoir Expansion	**Sample ID:**	UD2
Project No.:	1560-193-00	**Source:**	22CH221
Owner:	EID	**Sampled By:**	J.Boyd
File No.:	DS-09	**Date Sampled:**	23-Jun-22

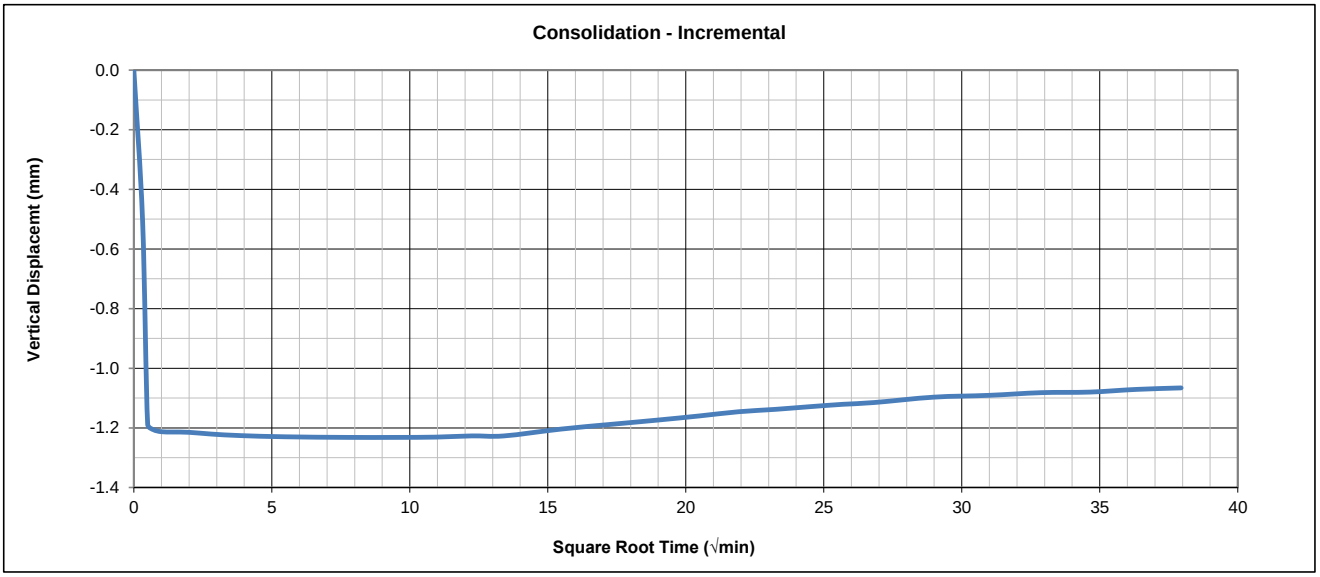
Tested in accordance with ASTM D3080/D3080M-11 (Standard test Method for Direct Shear Test of Soil Under Consolidated Drained Conditions).
Area correction not applied unless requested by client.



Consolidation Test Parameters

Normal Load (kN)	2.26
Normal Stress (kPa)	800

Total Normal Displacement (mm)	1.07
Duration of Applied Load (hrs)	24



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