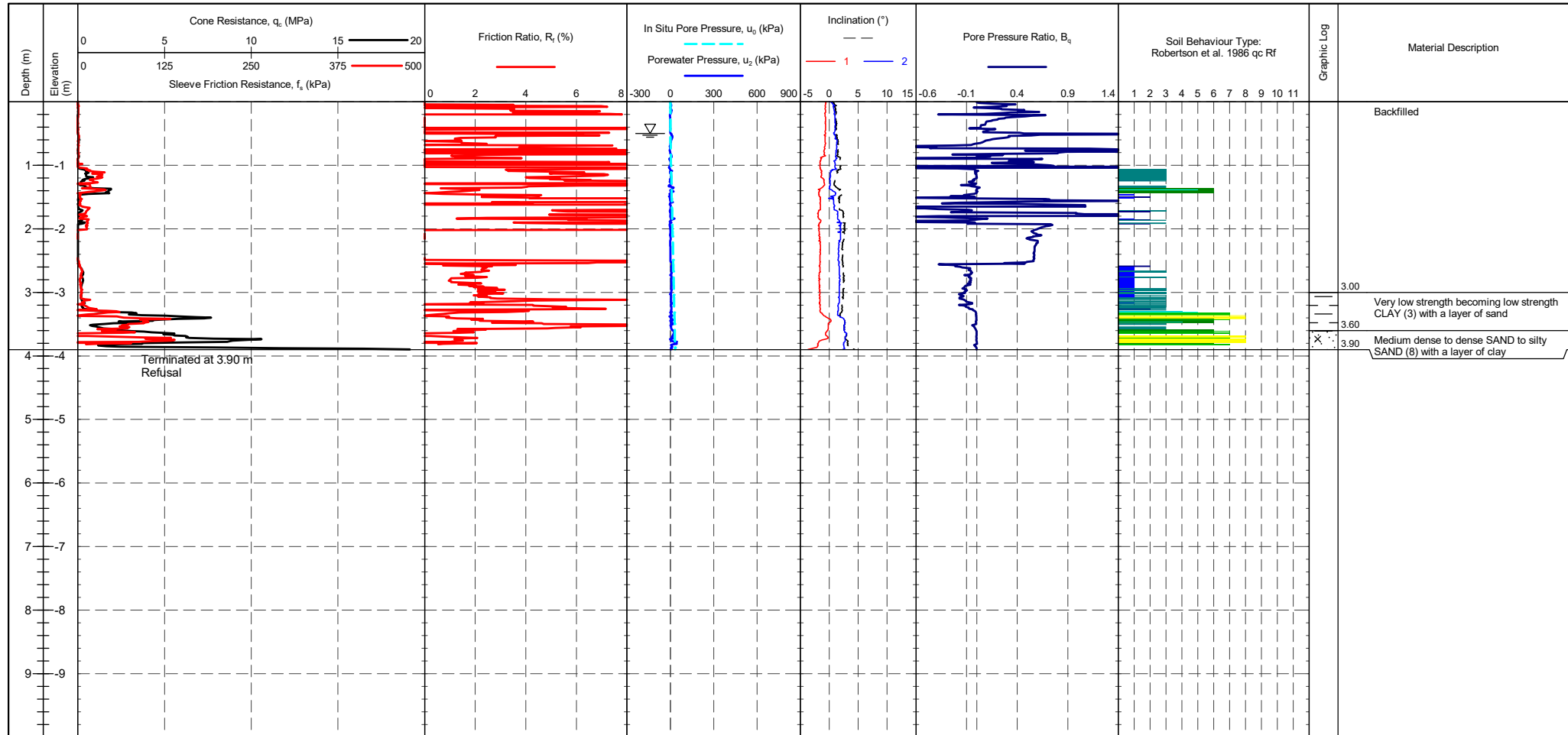


PointID	CPTU05
---------	---------------

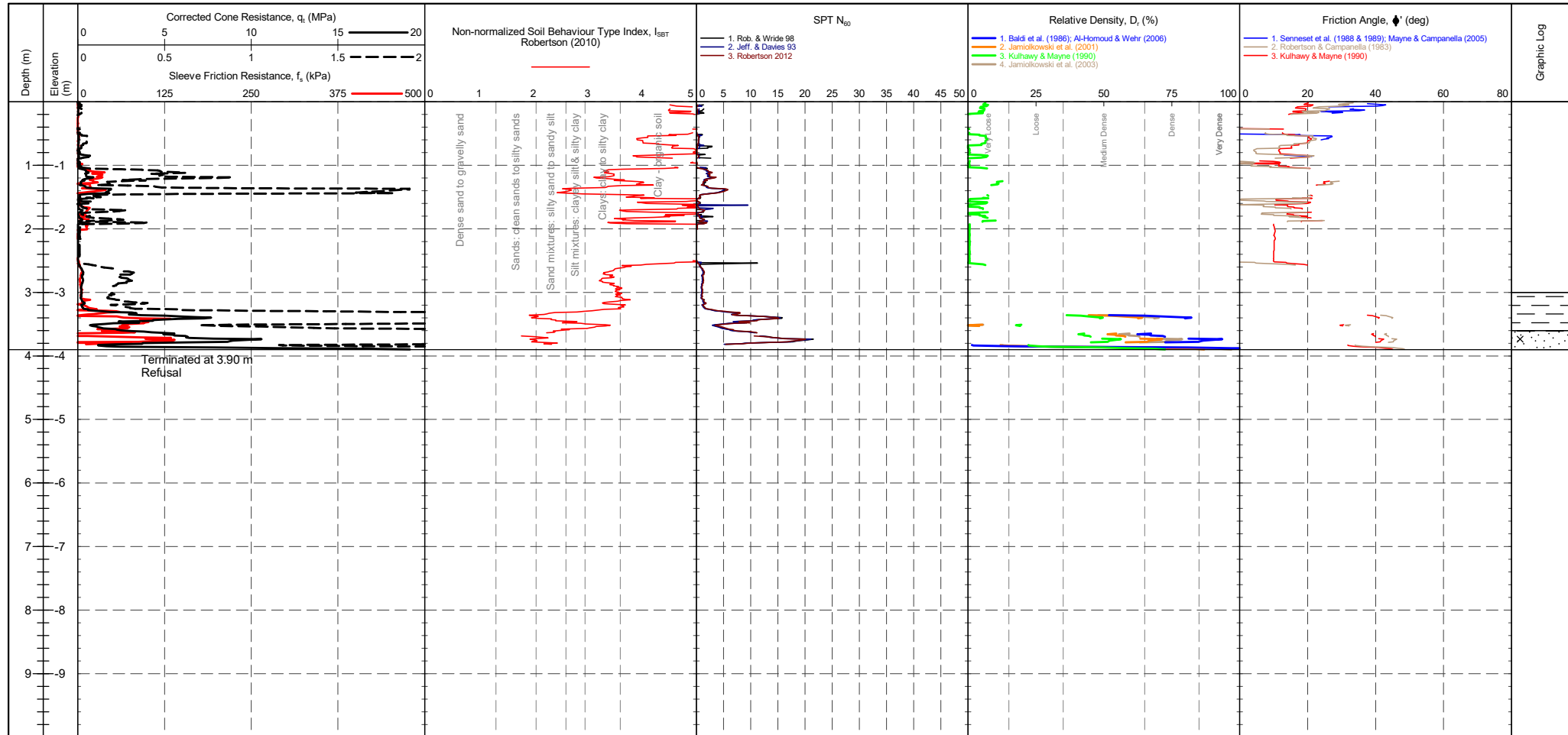
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test stopped due to buckling rods.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 10/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	---



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 257 mV 256 mV -0.011 MPa Sleeve : 263 mV 261 mV -0.001 kPa Pore Pressure 2 : 322 mV 322 mV 0 kPa X-Y Inclinator : 2502 mV 2502 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
---	---	---	--	---------------------------------------

PointID
CPTU05

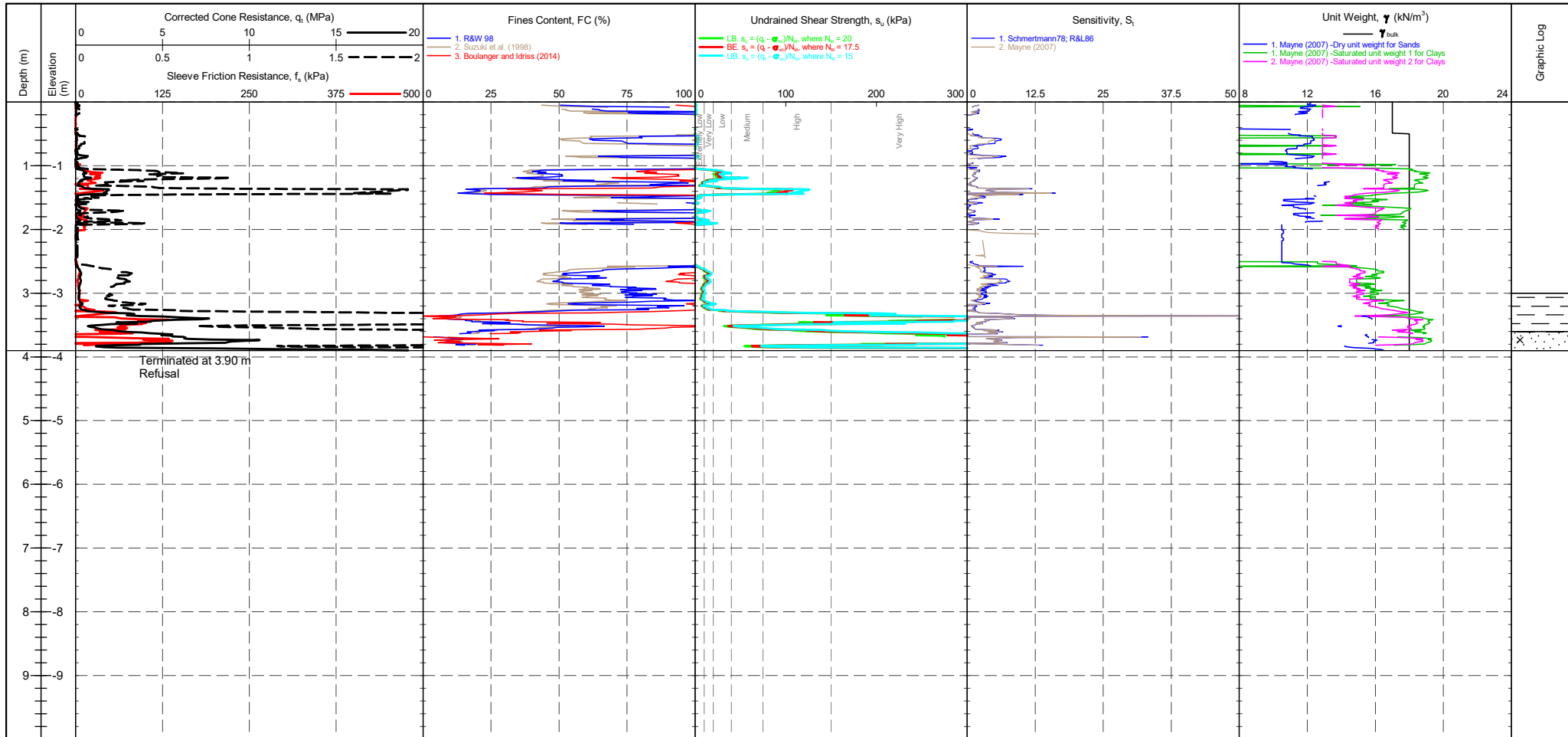
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test stopped due to buckling rods.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 10/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	--	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 257 mV / 256 mV Sleeve: 263 mV / 261 mV Pore Pressure 2: 322 mV / 322 mV X-Y Inclinator: 2502 mV / 2502 mV	CPTU ZERO VALUES Difference: -0.011 MPa / -0.001 kPa / 0 kPa	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																				
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																				
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35																																				
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																				
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																				
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																				

PointID
CPTU05

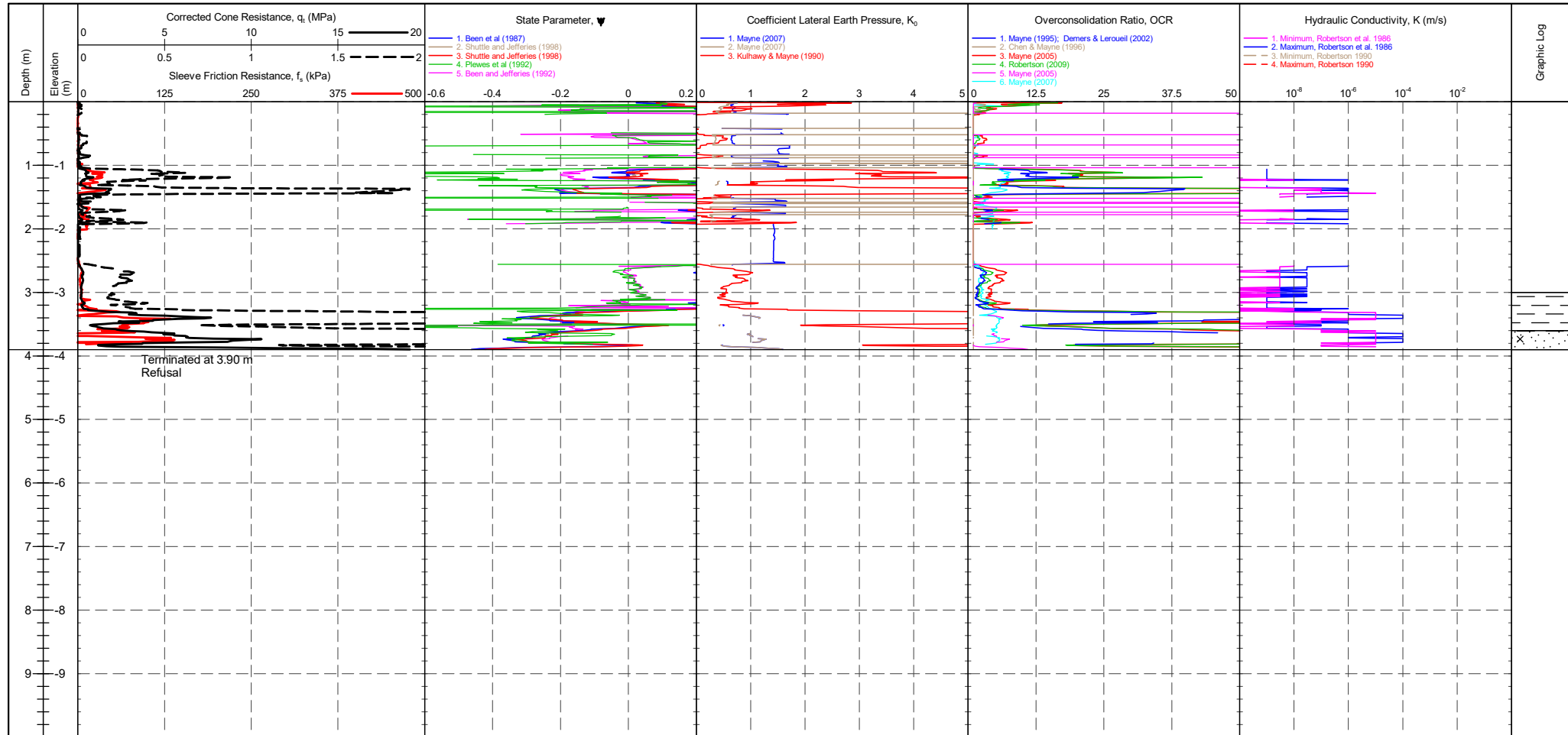
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test stopped due to buckling rods.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 10/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	--	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 257 mV Sleeve: 263 mV Pore Pressure 2: 322 mV X-Y Inclinator: 2502 mV	CPTU ZERO VALUES Post: 256 mV Difference: -0.011 MPa Post: 261 mV Difference: -0.001 kPa Post: 322 mV Difference: 0 kPa Post: 2502 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
--	--	--	---	--	---	---------------------------------------

PointID
CPTU05

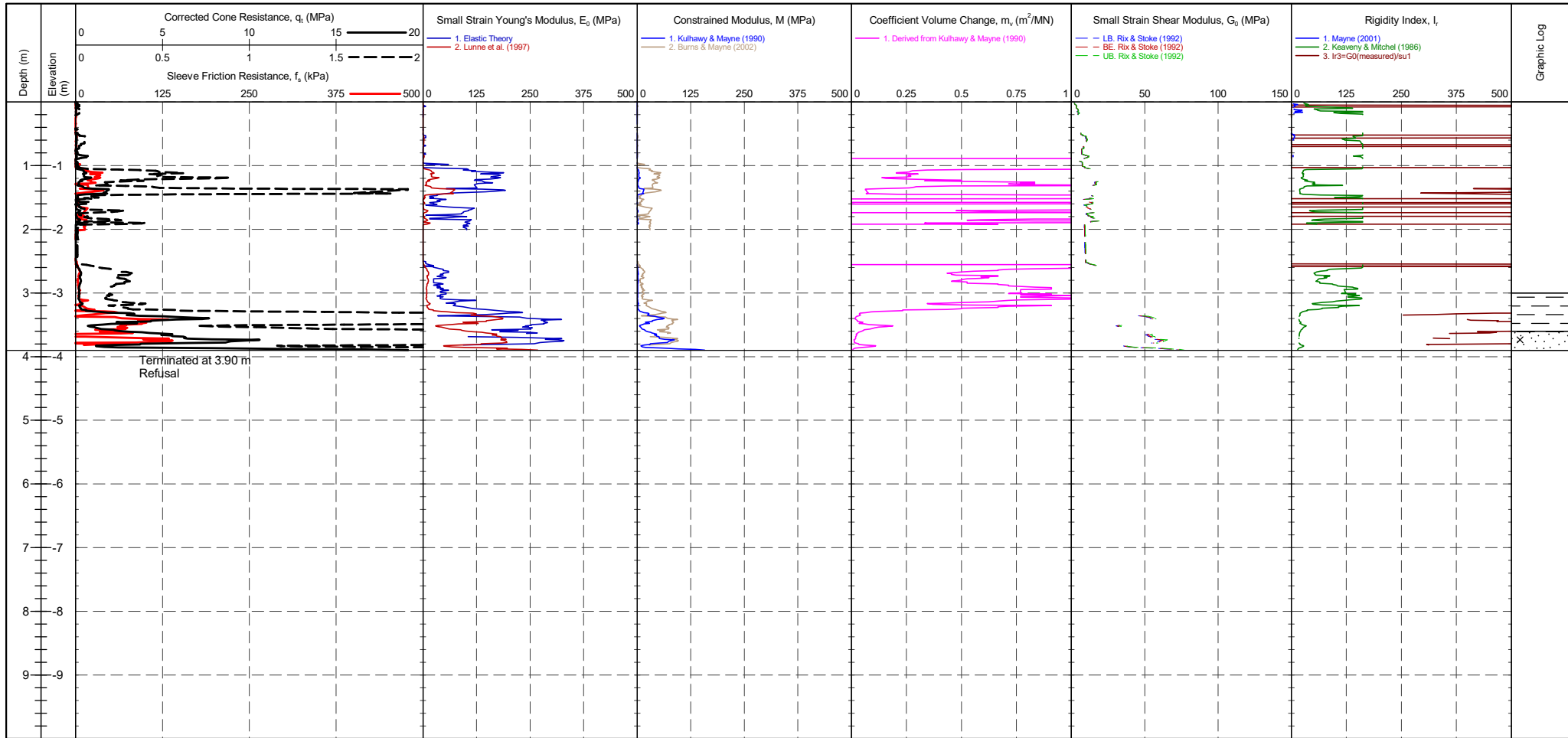
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test stopped due to buckling rods.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 10/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	---



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 257 mV 256 mV -0.011 MPa Sleeve 263 mV 261 mV -0.001 kPa Pore Pressure 2 322 mV 322 mV 0 kPa X-Y Inclinator 2502 mV 2502 mV	Groundwater Level Dissipation Test
--	---	---	---------------------------------------

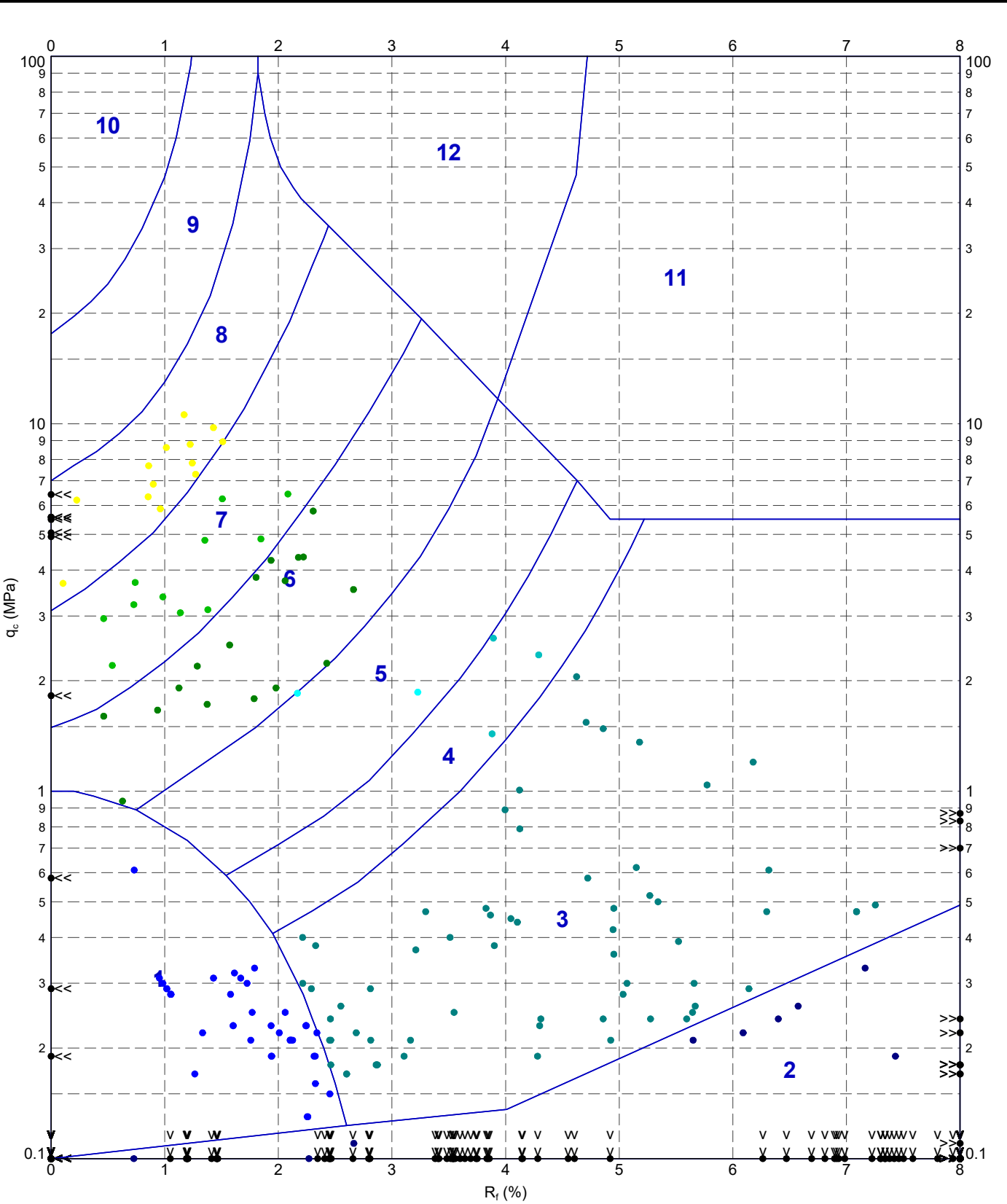
PointID
CPTU05

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test stopped due to buckling rods.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 10/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	--	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>257 mV</td> <td>256 mV</td> <td>-0.011 MPa</td> </tr> <tr> <td>Sleeve</td> <td>263 mV</td> <td>261 mV</td> <td>-0.001 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>322 mV</td> <td>322 mV</td> <td>0 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2502 mV</td> <td>2502 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	257 mV	256 mV	-0.011 MPa	Sleeve	263 mV	261 mV	-0.001 kPa	Pore Pressure 2	322 mV	322 mV	0 kPa	X-Y Inclinator	2502 mV	2502 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	257 mV	256 mV	-0.011 MPa																				
Sleeve	263 mV	261 mV	-0.001 kPa																				
Pore Pressure 2	322 mV	322 mV	0 kPa																				
X-Y Inclinator	2502 mV	2502 mV																					

20628-ADVANCED REPORT INSTITUSI 2.02.1 LIB - LUISA.GLB Graph CPT ROBERTSON ET AL. 86 OC VS. RF AAP 1230390 BARRY WATERFRONT COLLEGE HSP CONSULTING.GPJ <<DrawingFile>> 16/10/2023 16:47 10.03.00.09 Dargel Lab and In Situ Tool - DGD [Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI2.02.2 2017-07-10



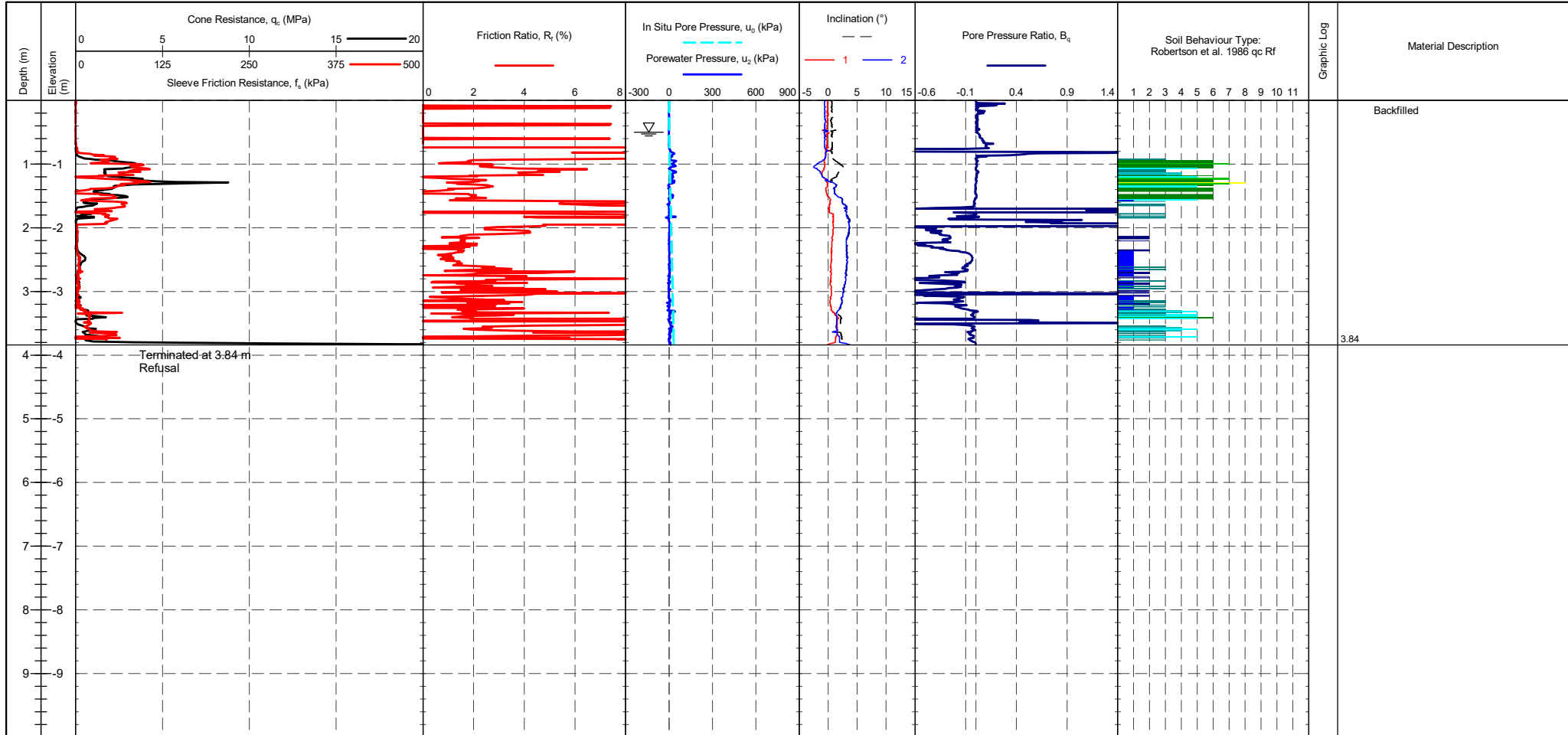
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE	DRAWN		DATE	
	HSP Consulting Laura Jones Barry		DATE		16/10/2023
	Barry Waterfront College		DATE		16/10/2023
	Robertson et al. 1986 qc vs. Rf - CPTU05		SCALE		Not To Scale
		PROJECT No		FIGURE No	
		1230390		A4	

PointID	CPTU05T2
---------	-----------------

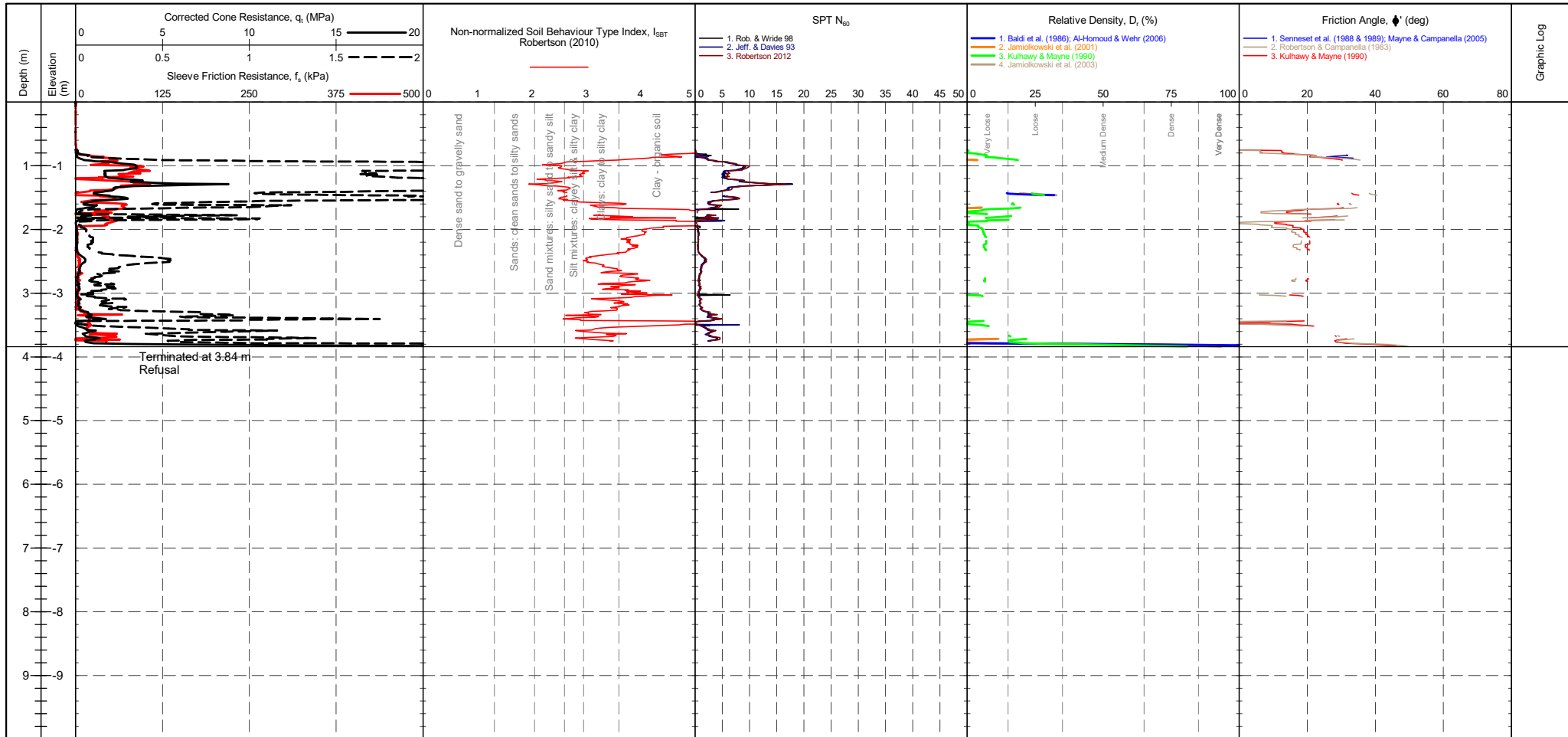
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	--	---



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 255 mV 256 mV 0.011 MPa Sleeve 261 mV 262 mV 0.001 kPa Pore Pressure 2 325 mV 329 mV 0.001 kPa X-Y Inclinator 2531 mV 2528 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
---	---	---	---	---------------------------------------

PointID
CPTU05T2

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--

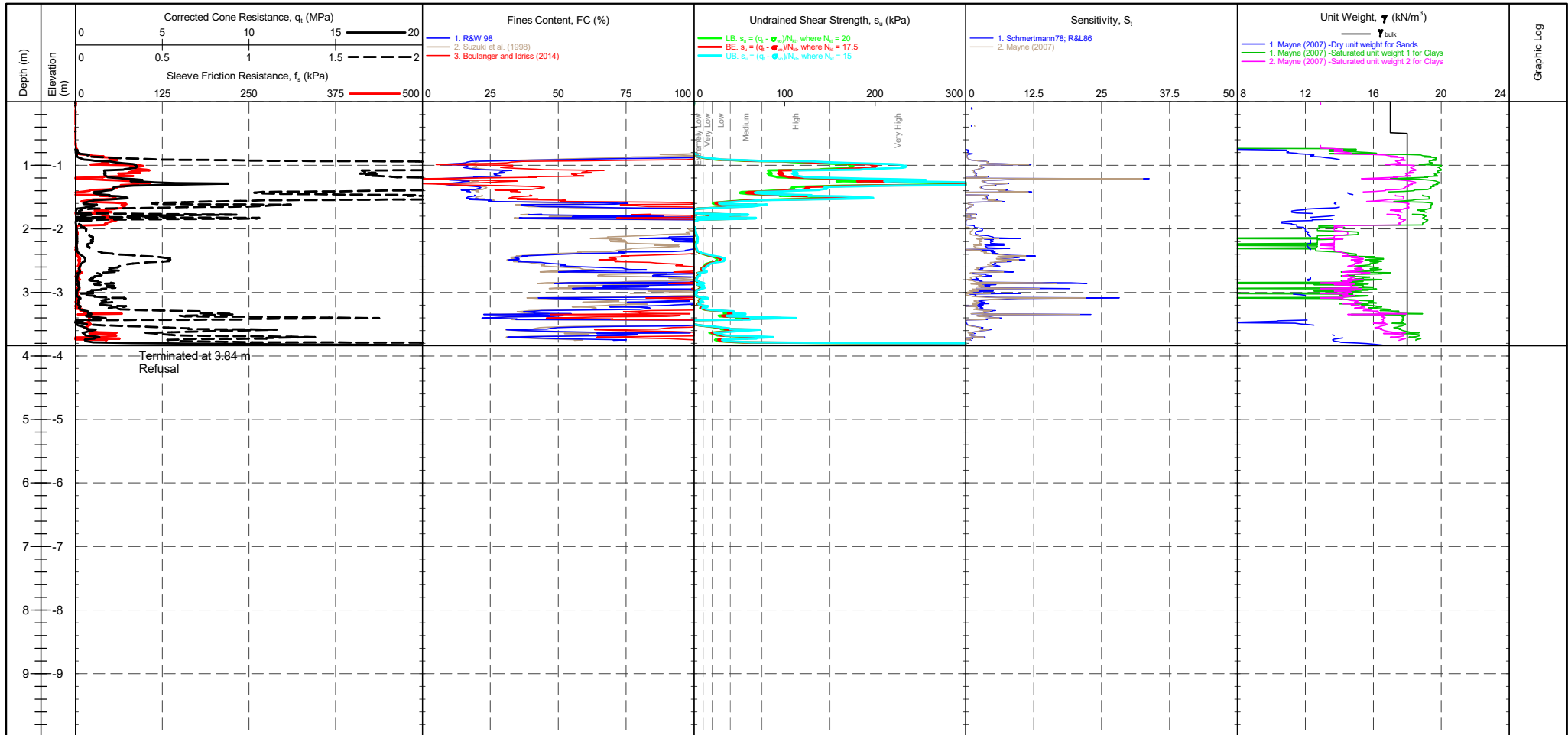


CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 255 mV Sleeve : 261 mV Pore Pressure 2 : 325 mV X-Y Inclinometer : 2531 mV	Post : 256 mV Difference : 0.011 MPa 0.001 kPa 0.001 kPa 2528 mV	CPTU ZERO VALUES GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12	<table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)																																					
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																					
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35																																					
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																					
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																					
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																					

PointID

CPTU05T2

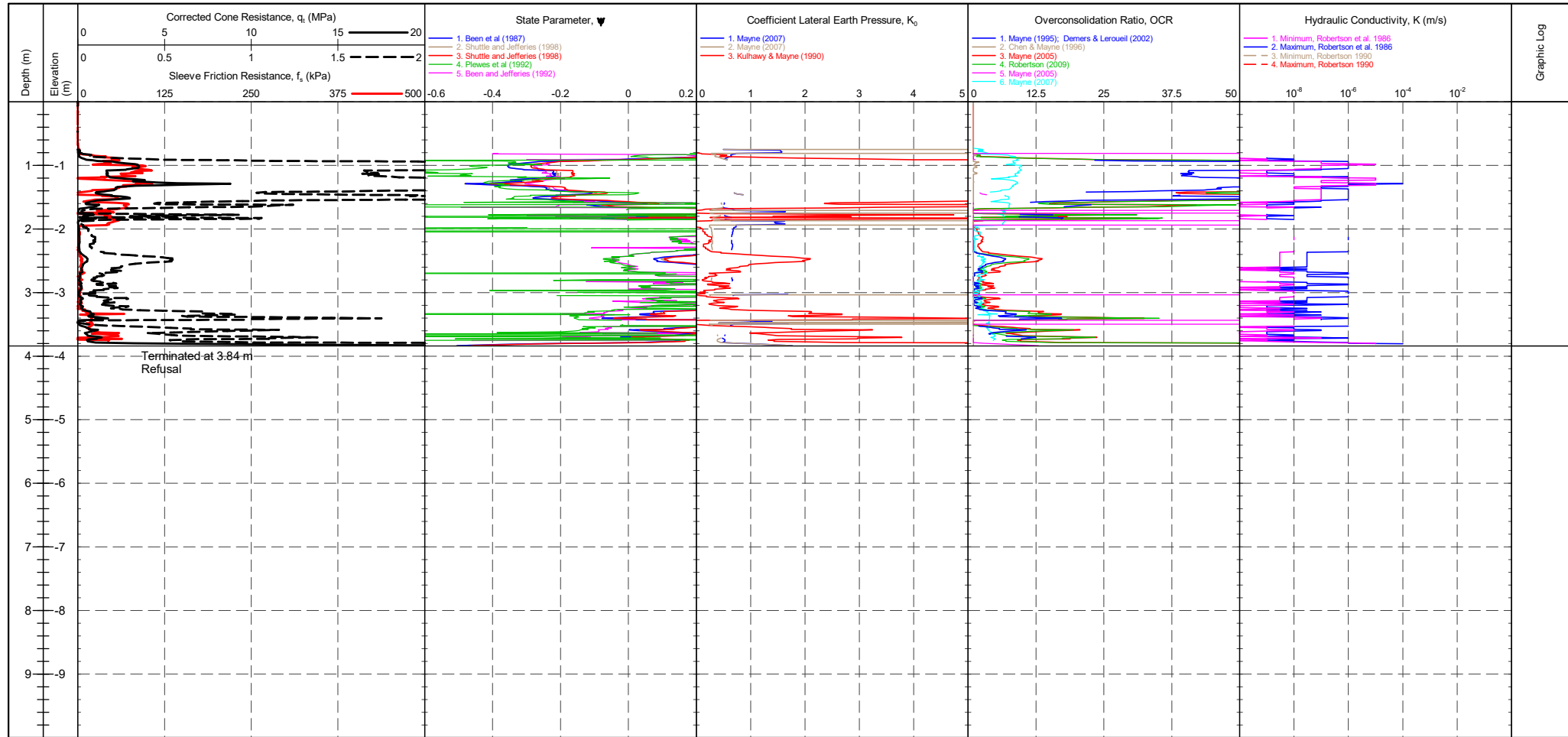
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 255 mV Sleeve: 261 mV Pore Pressure 2: 325 mV X-Y Inclinator: 2531 mV	CPTU ZERO VALUES Post: 256 mV Difference: 0.011 MPa 262 mV 0.001 kPa 329 mV 0.001 kPa 2528 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
--	--	--	---	--	---	---------------------------------------

PointID
CPTU05T2

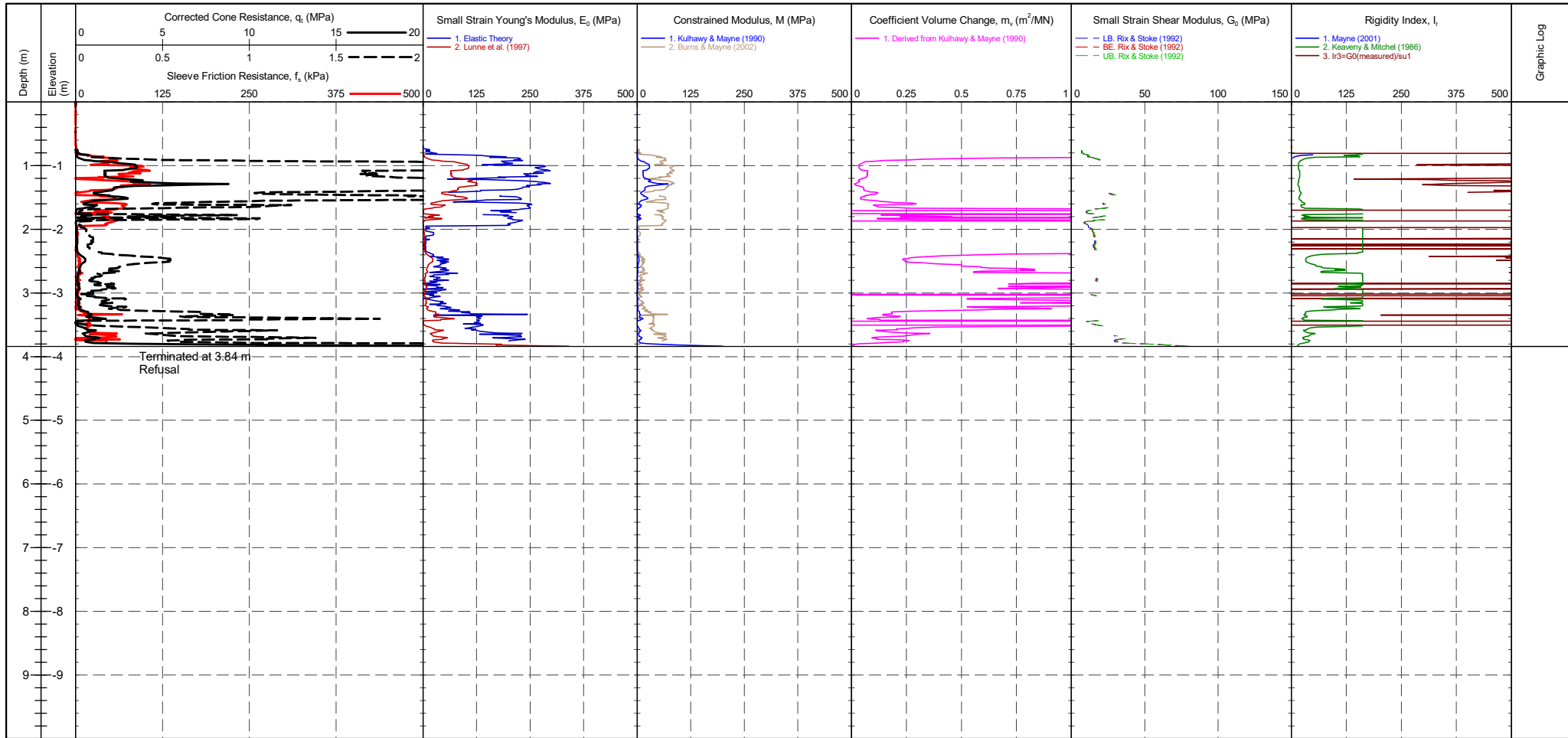
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 255 mV 256 mV 0.011 MPa Sleeve 261 mV 262 mV 0.001 kPa Pore Pressure 2 325 mV 329 mV 0.001 kPa X-Y Inclinator 2531 mV 2528 mV	Groundwater Level Dissipation Test
--	--	---	---------------------------------------

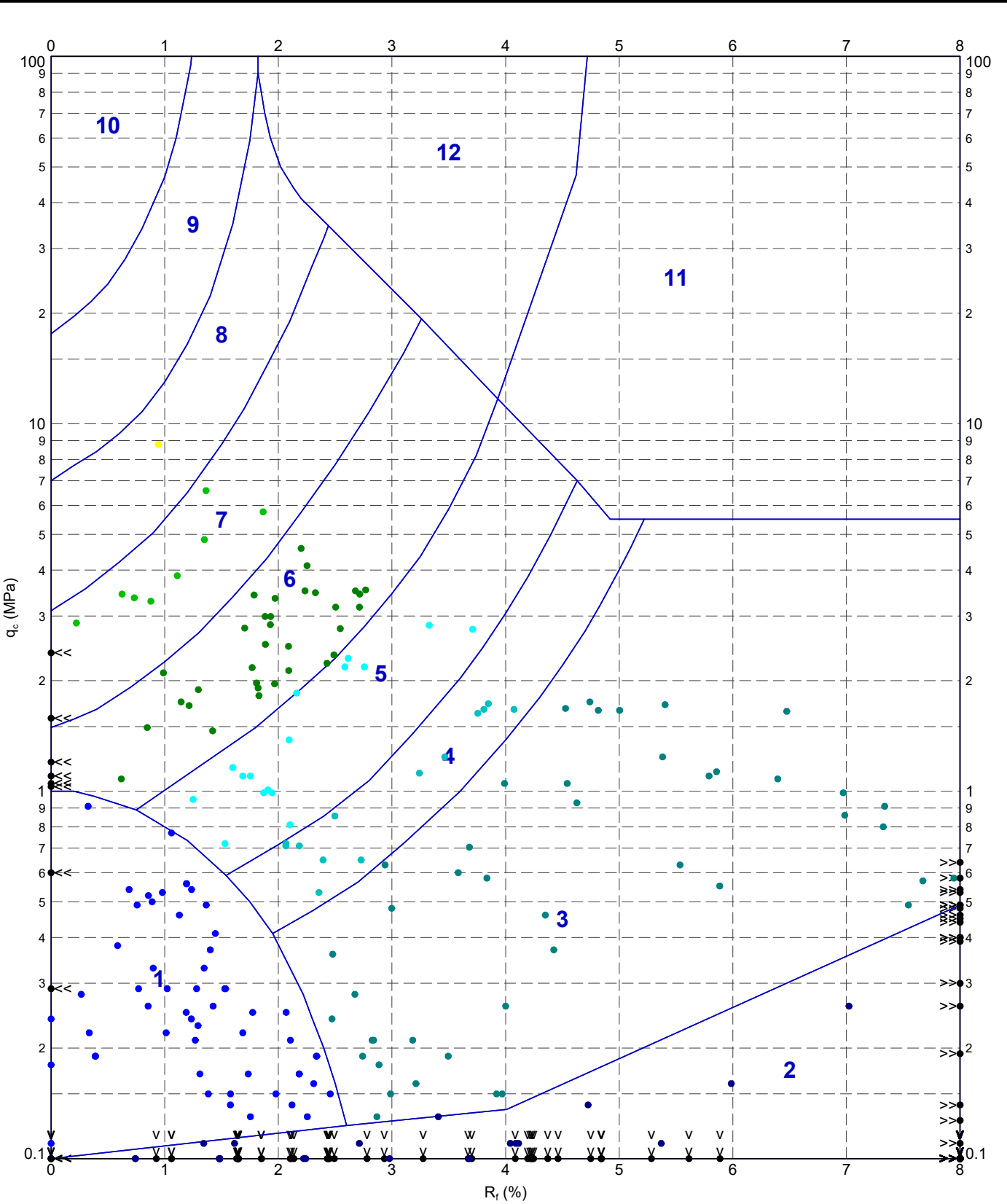
PointID
CPTU05T2

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>255 mV</td> <td>256 mV</td> <td>0.011 MPa</td> </tr> <tr> <td>Sleeve</td> <td>261 mV</td> <td>262 mV</td> <td>0.001 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>325 mV</td> <td>329 mV</td> <td>0.001 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2531 mV</td> <td>2528 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	255 mV	256 mV	0.011 MPa	Sleeve	261 mV	262 mV	0.001 kPa	Pore Pressure 2	325 mV	329 mV	0.001 kPa	X-Y Inclinator	2531 mV	2528 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	255 mV	256 mV	0.011 MPa																				
Sleeve	261 mV	262 mV	0.001 kPa																				
Pore Pressure 2	325 mV	329 mV	0.001 kPa																				
X-Y Inclinator	2531 mV	2528 mV																					

20628-ADVANCED REPORT INSTITUSI 2.02.1 LIB - LUISA.GLB Graph CPT ROBERTSON ET AL. 86 OC VS. RF AAP 1230390 BARRY WATERFRONT COLLEGE HSP CONSULTING.GPJ <<DrawingFile>> 16/10/2023 16:48 10.03.00.09 Dargel Lab and In Situ Tool - DGD [Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI2.02.0 2017-07-10



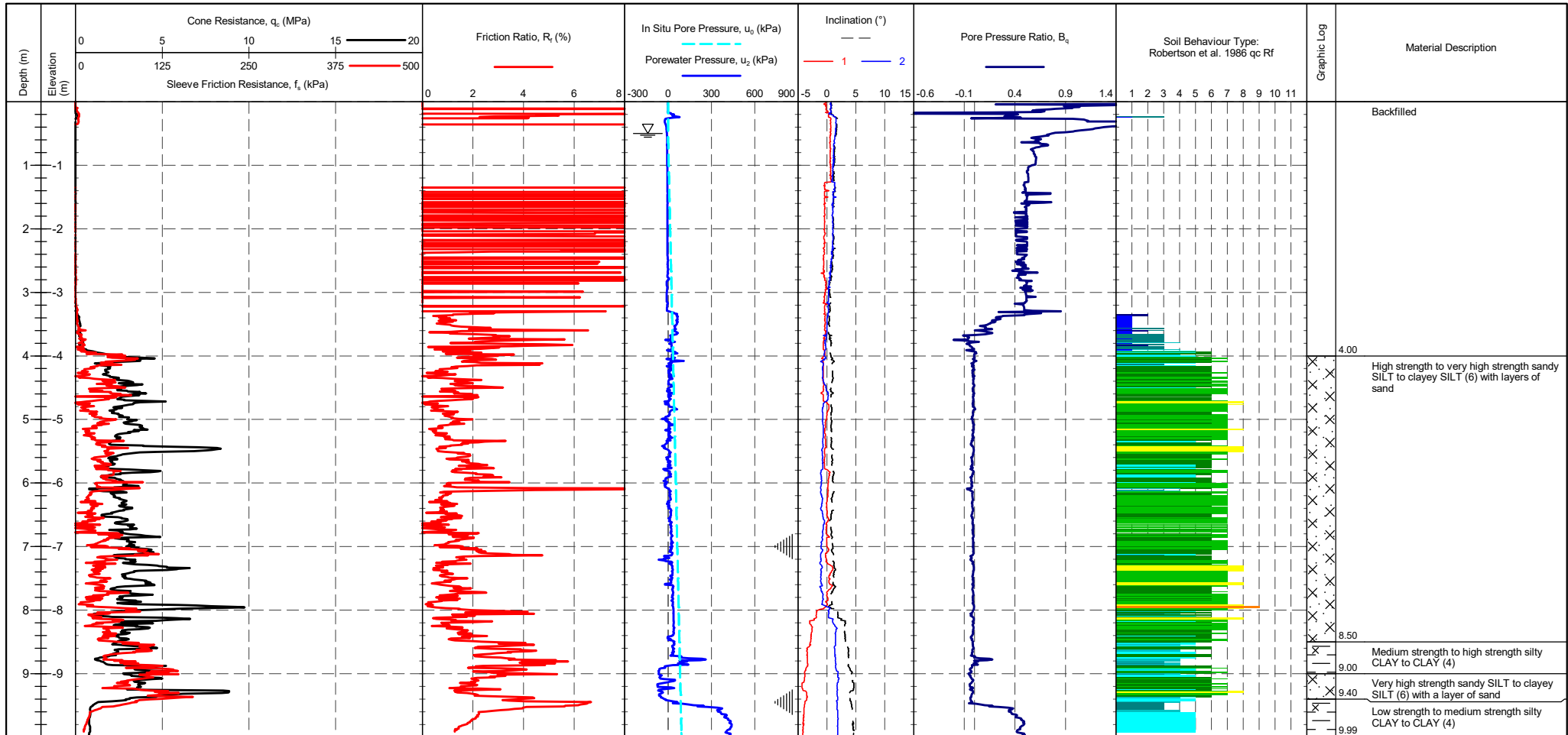
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE HSP Consulting Laura Jones Barry Barry Waterfront College Robertson et al. 1986 qc vs. Rf - CPTU05T2	DRAWN DATE 16/10/2023	
	CHECKED DATE 16/10/2023	SCALE Not To Scale	A4
	PROJECT No 1230390	FIGURE No	
	Roberton et al. 1986 qc vs. Rf - CPTU05T2		

PointID
CPTU05T3

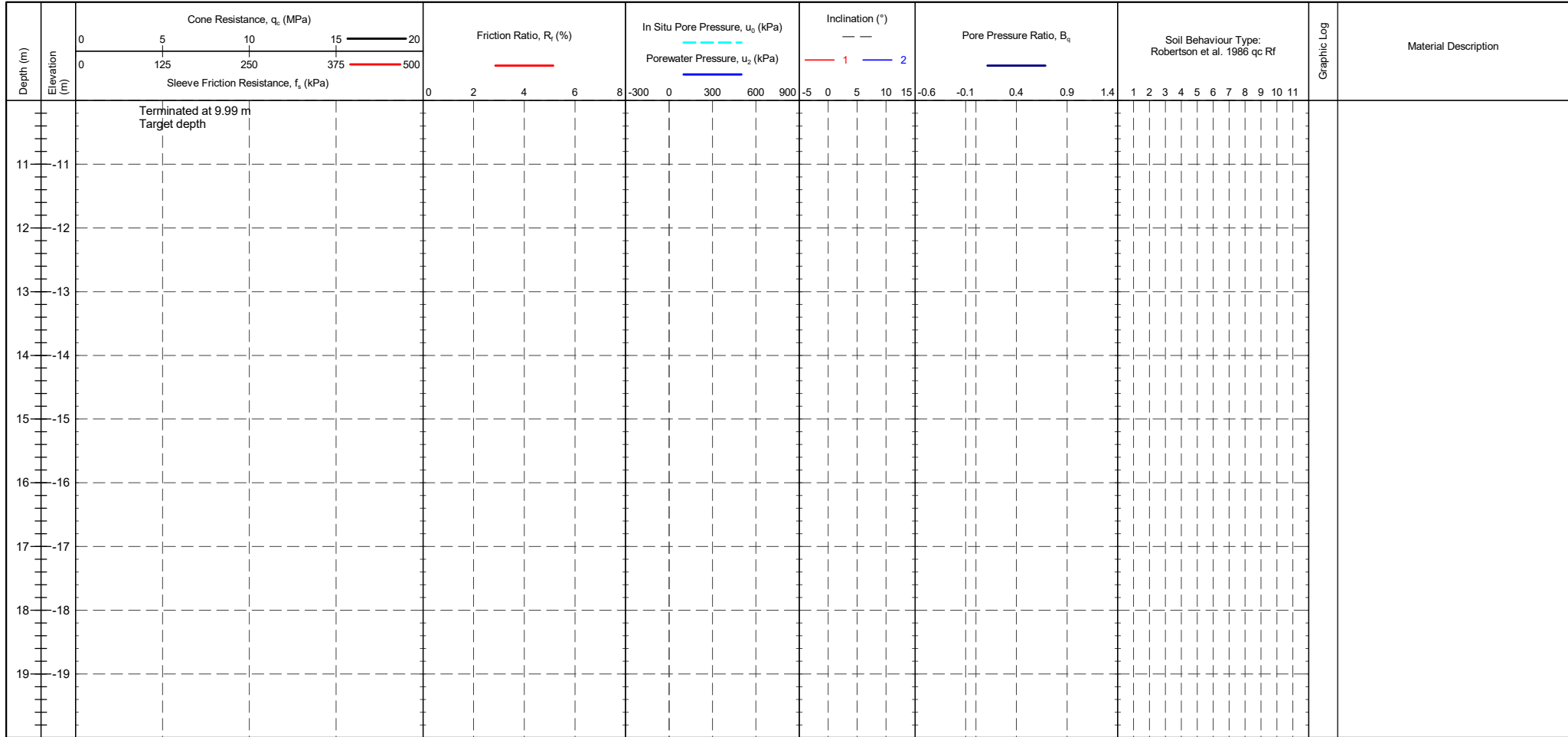
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	--	---



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 256 mV 253 mV -0.034 MPa Sleeve : 263 mV 261 mV -0.001 kPa Pore Pressure 2 : 340 mV 326 mV -0.004 kPa X-Y Inclinator : 2516 mV 2430 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
---	---	--	--	---------------------------------------

PointID
CPTU05T3

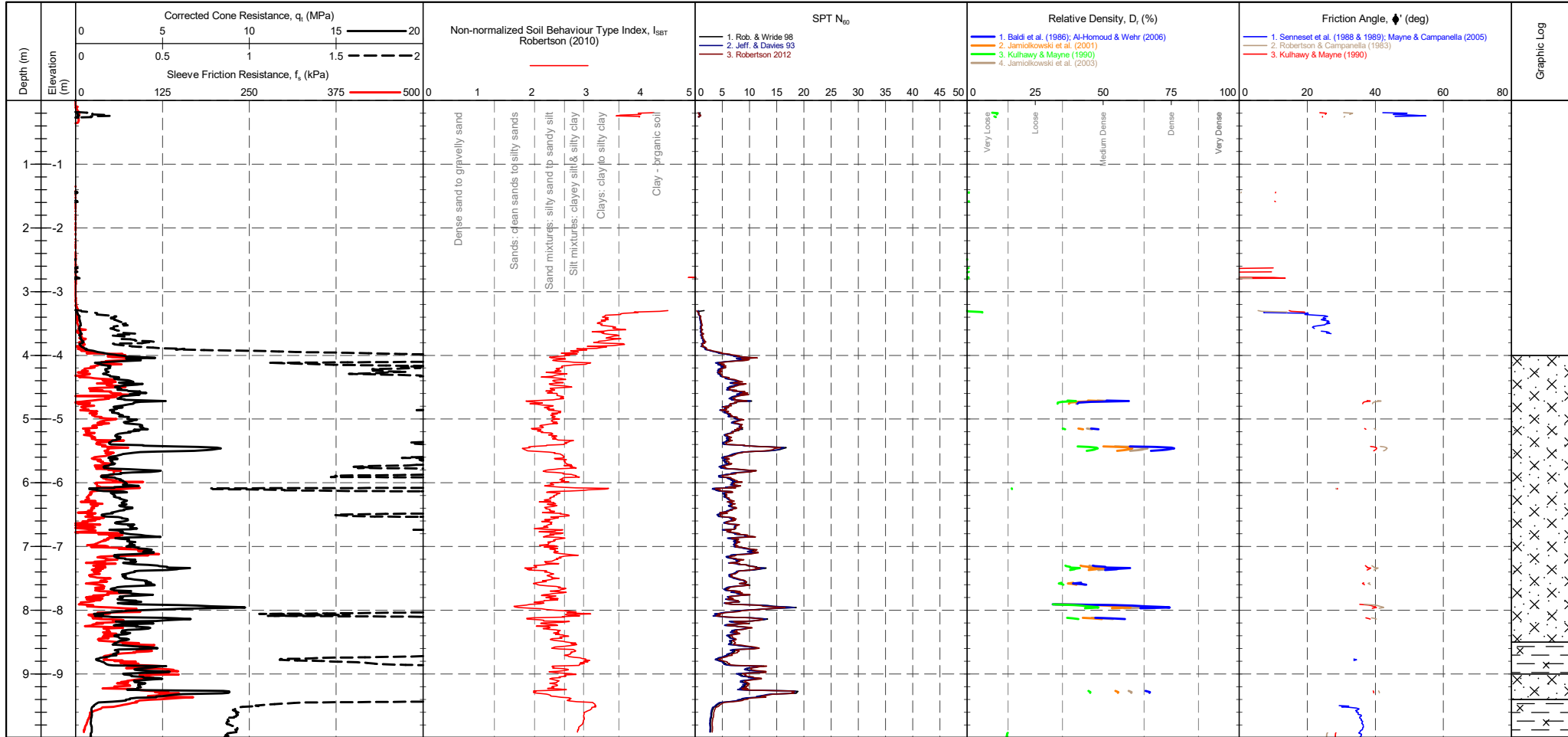
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>256 mV</td> <td>253 mV</td> <td>-0.034 MPa</td> </tr> <tr> <td>Sleeve</td> <td>263 mV</td> <td>261 mV</td> <td>-0.001 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>340 mV</td> <td>326 mV</td> <td>-0.004 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2516 mV</td> <td>2430 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	256 mV	253 mV	-0.034 MPa	Sleeve	263 mV	261 mV	-0.001 kPa	Pore Pressure 2	340 mV	326 mV	-0.004 kPa	X-Y Inclinator	2516 mV	2430 mV		METHOD : Robertson et al. 1986 qc Rf <table border="1"> <tr> <td>1 - Sensitive fine grained material</td> <td>5 - Clayey SILT to silty CLAY</td> <td>9 - SAND</td> </tr> <tr> <td>2 - Organic material</td> <td>6 - Sandy SILT to clayey SILT</td> <td>10 - Gravelly SAND to SAND</td> </tr> <tr> <td>3 - CLAY</td> <td>7 - Silty SAND to sandy SILT</td> <td>11 - Very stiff fine grained</td> </tr> <tr> <td>4 - Silty CLAY to CLAY</td> <td>8 - SAND to silty SAND</td> <td>12 - SAND to clayey SAND</td> </tr> </table>	1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND	2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND	3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained	4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND	Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																																	
Tip	256 mV	253 mV	-0.034 MPa																																	
Sleeve	263 mV	261 mV	-0.001 kPa																																	
Pore Pressure 2	340 mV	326 mV	-0.004 kPa																																	
X-Y Inclinator	2516 mV	2430 mV																																		
1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND																																		
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND																																		
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained																																		
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND																																		

PointID
CPTU05T3

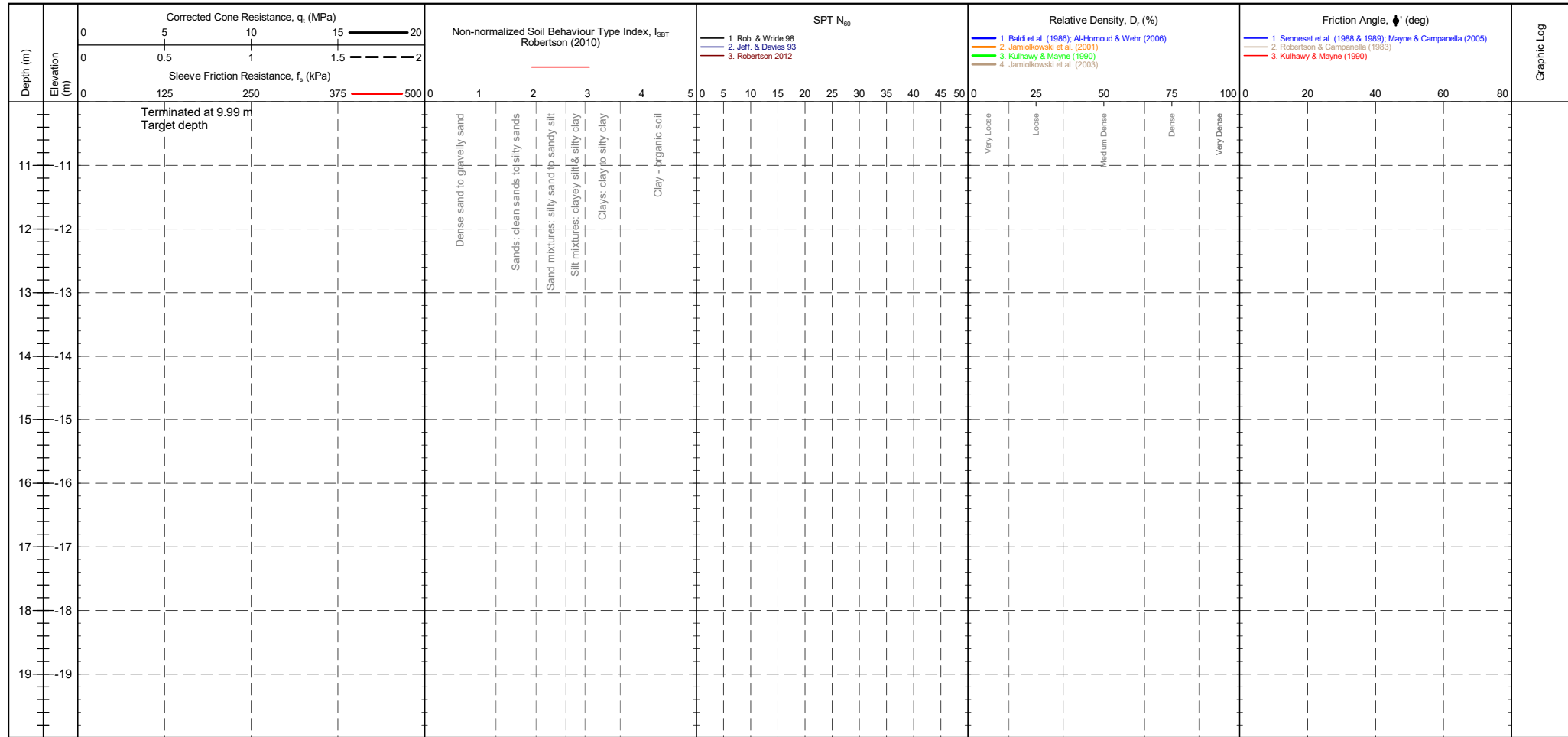
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 256 mV / 253 mV / -0.034 MPa Sleeve : 263 mV / 261 mV / -0.001 kPa Pore Pressure 2 : 340 mV / 326 mV / -0.004 kPa X-Y Inclinometer : 2516 mV / 2430 mV	CPTU ZERO VALUES Description SBT Index, I _c Description SPT N value, NSPT Description Relative Density D _r (%) Clays 2.95-3.60 Very Loose 0 - 4 Very Loose 0 - 15 Silt mixtures 2.60-2.95 Loose 4 - 10 Loose 15 - 35 Sand mixtures 2.05-2.60 Medium Dense 10 - 30 Medium Dense 35 - 65 Sands 1.31-2.05 Dense 30 - 50 Dense 65 - 85 Gravelly sand <1.31 Very Dense >50 Very Dense >85	Groundwater Level Dissipation Test
--	--	--	---	---------------------------------------

PointID
CPTU05T3

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--

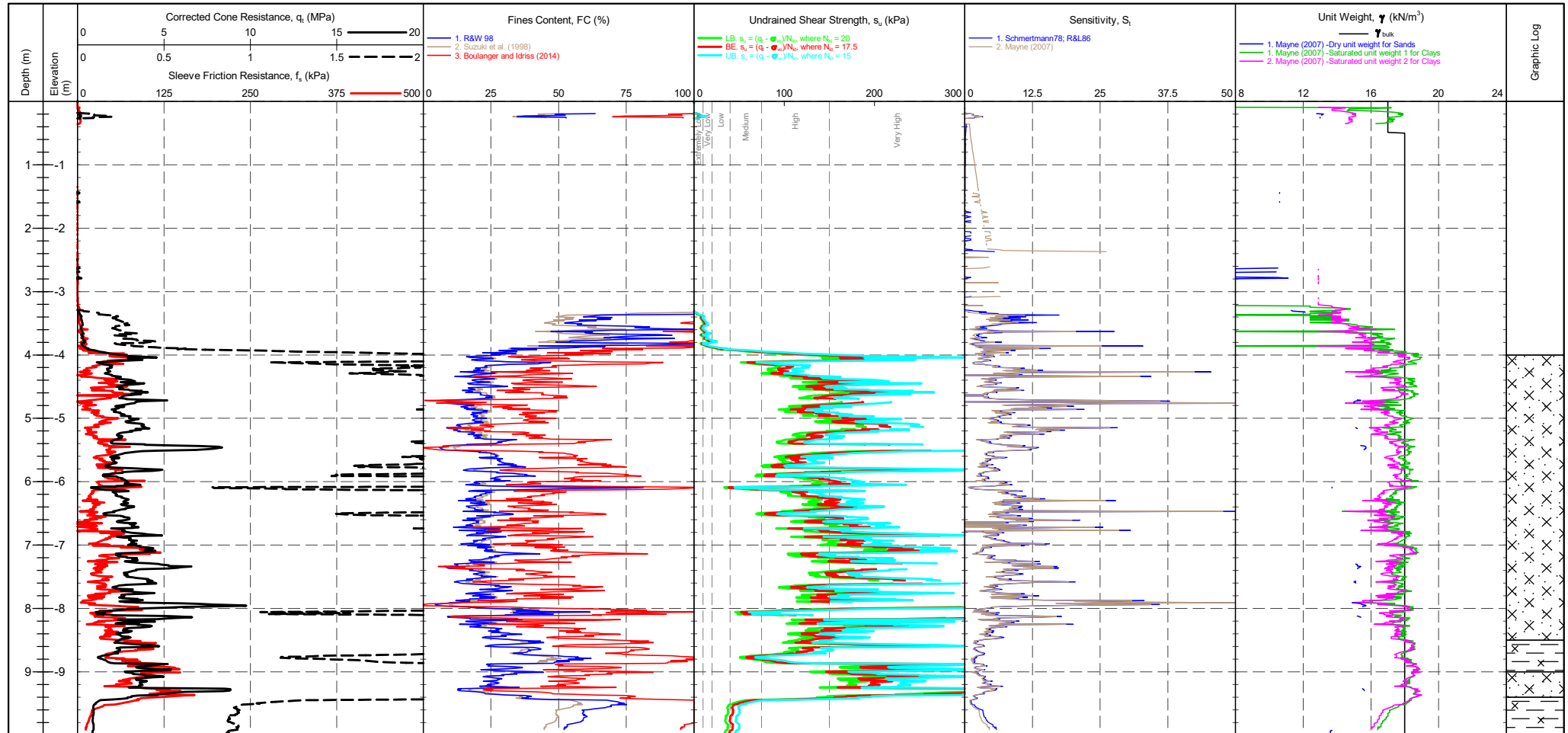


CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 256 mV Sleeve : 263 mV Pore Pressure 2 : 261 mV X-Y Inclinometer : 340 mV Pre : 253 mV Post : 261 mV Difference : -0.034 MPa -0.001 kPa -0.004 kPa 2430 mV	CPTU ZERO VALUES Pre Post Difference 256 mV 253 mV -0.034 MPa 263 mV 261 mV -0.001 kPa 340 mV 326 mV -0.004 kPa 2516 mV 2430 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)																																				
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																				
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35																																				
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																				
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																				
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																				

PointID

CPTU05T3

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 256 mV Sleeve: 263 mV Pore Pressure 2: 340 mV X-Y Inclinator: 2516 mV	CPTU ZERO VALUES Post: 253 mV Difference: -0.034 MPa 261 mV -0.001 kPa 326 mV -0.004 kPa 2430 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
--	--	--	--	--	---	---------------------------------------

PointID
CPTU05T3

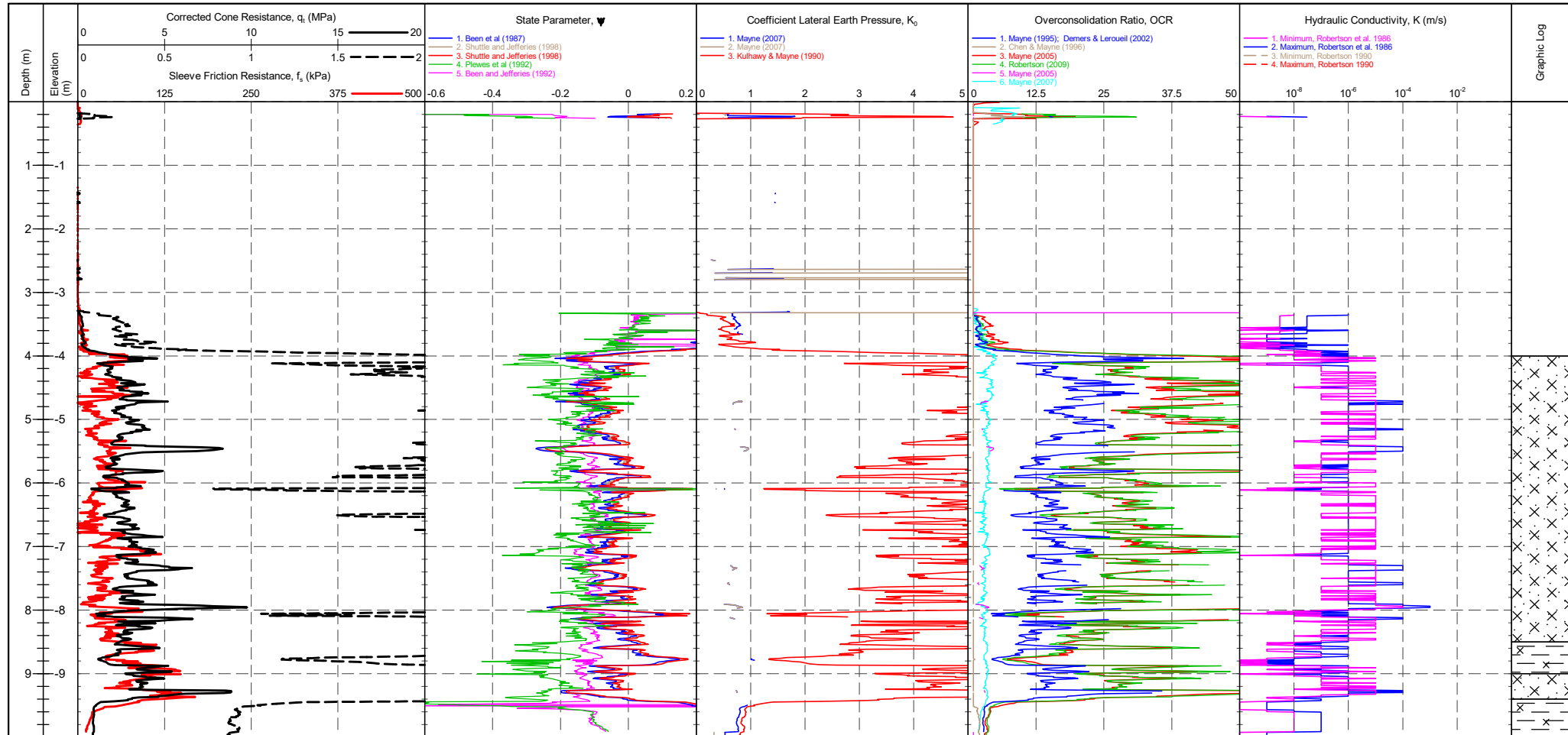
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Pre Post Difference Tip 256 mV 253 mV -0.034 MPa Sleeve 263 mV 261 mV -0.001 kPa Pore Pressure 2 340 mV 326 mV -0.004 kPa X-Y Inclinator 2516 mV 2430 mV	CPTU ZERO VALUES Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
--	--	---	--	--	---------------------------------------

PointID
CPTU05T3

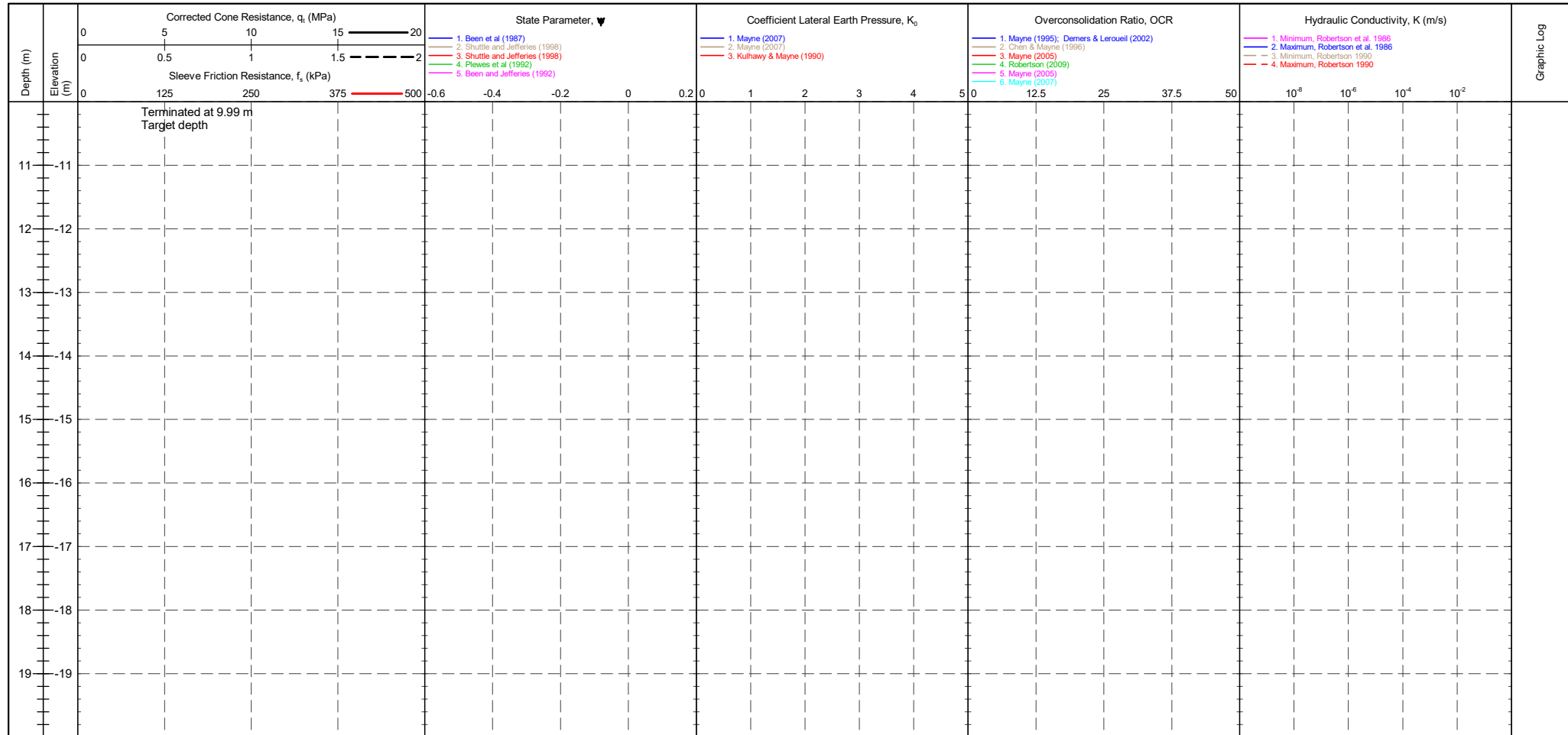
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	--	---



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 256 mV 253 mV -0.034 MPa Sleeve 263 mV 261 mV -0.001 kPa Pore Pressure 2 340 mV 326 mV -0.004 kPa X-Y Inclinator 2516 mV 2430 mV	Groundwater Level Dissipation Test
--	---	--	---------------------------------------

PointID
CPTU05T3

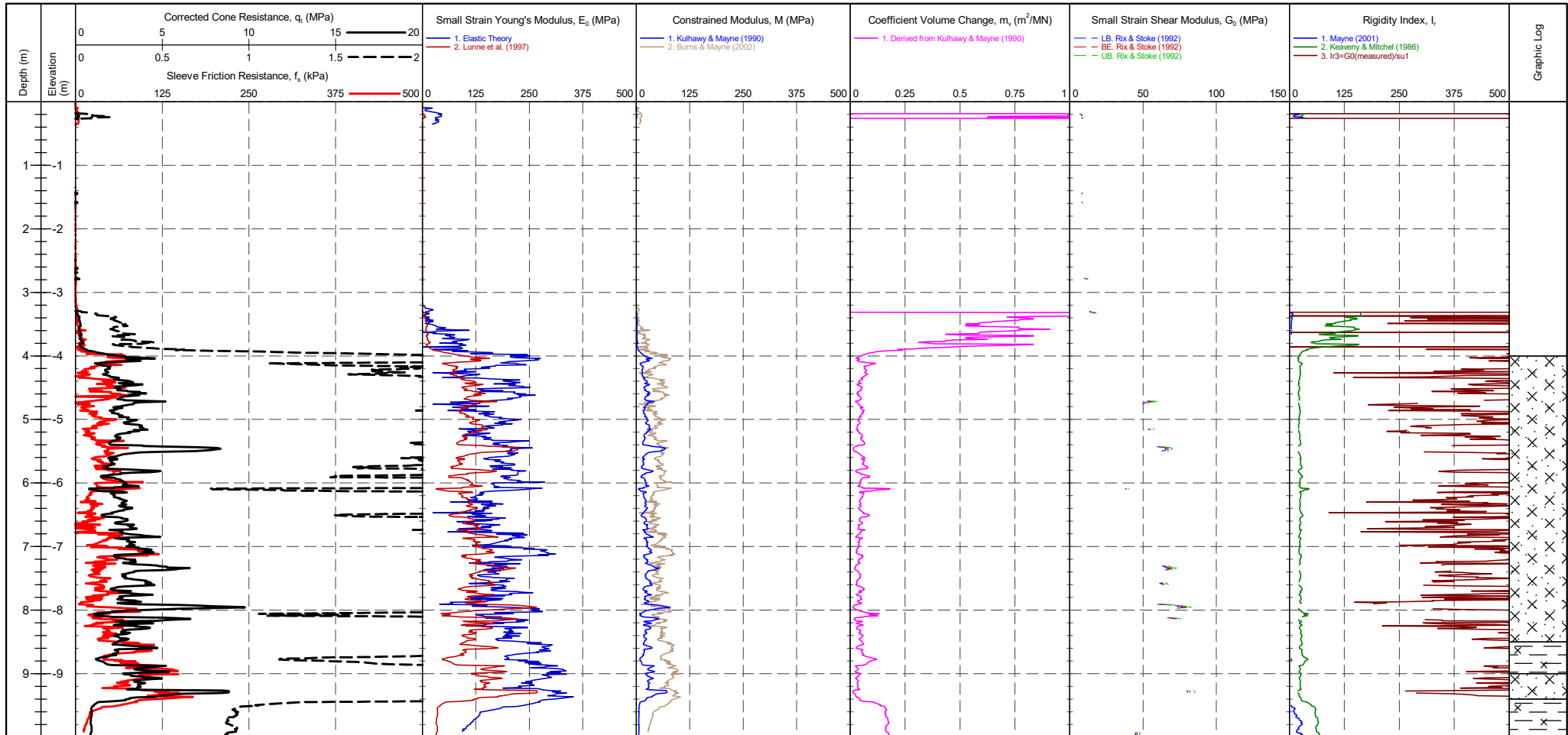
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>256 mV</td> <td>253 mV</td> <td>-0.034 MPa</td> </tr> <tr> <td>Sleeve</td> <td>263 mV</td> <td>261 mV</td> <td>-0.001 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>340 mV</td> <td>326 mV</td> <td>-0.004 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2516 mV</td> <td>2430 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	256 mV	253 mV	-0.034 MPa	Sleeve	263 mV	261 mV	-0.001 kPa	Pore Pressure 2	340 mV	326 mV	-0.004 kPa	X-Y Inclinator	2516 mV	2430 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	256 mV	253 mV	-0.034 MPa																				
Sleeve	263 mV	261 mV	-0.001 kPa																				
Pore Pressure 2	340 mV	326 mV	-0.004 kPa																				
X-Y Inclinator	2516 mV	2430 mV																					

PointID
CPTU05T3

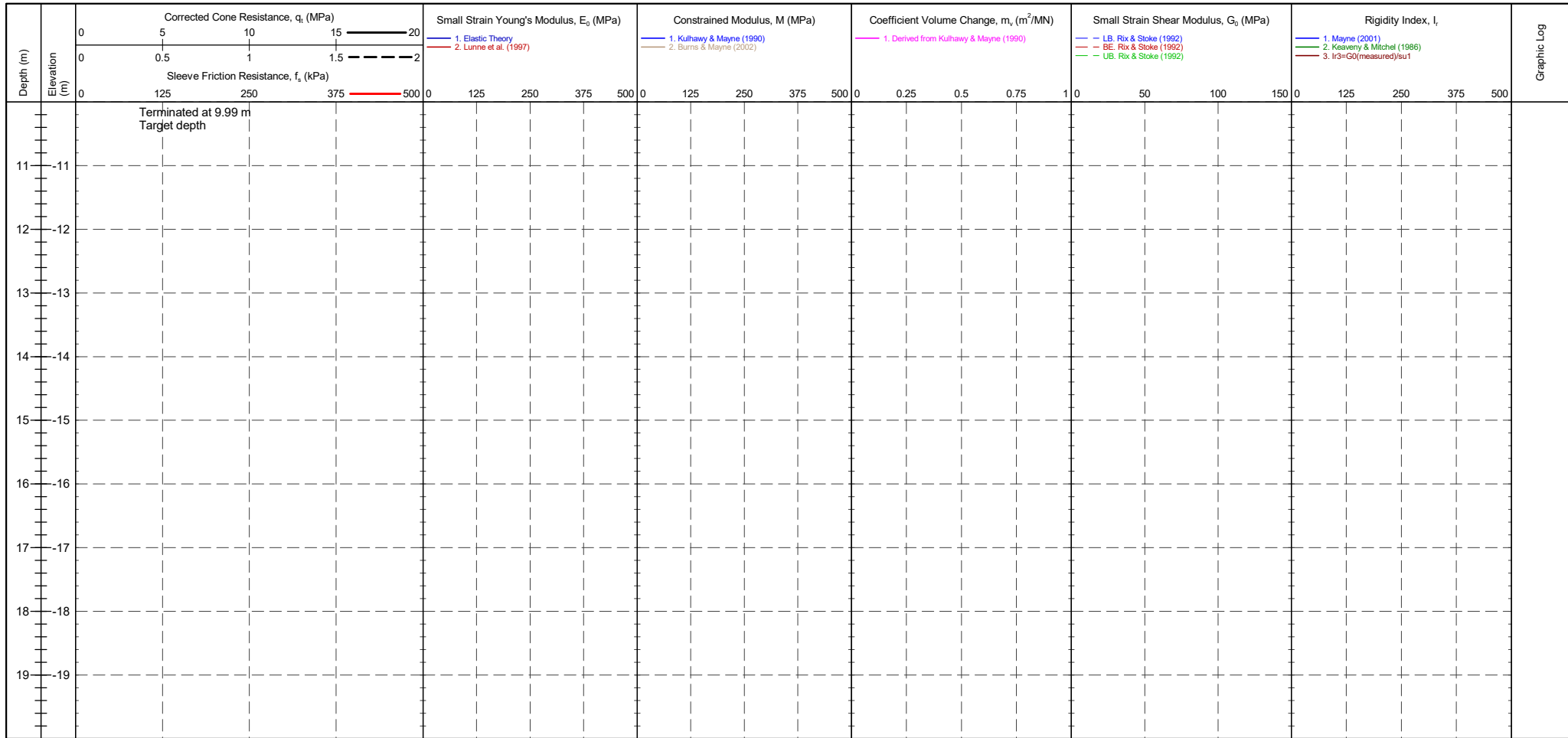
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><th>Transducer</th><th>Pre</th><th>Post</th><th>Difference</th></tr> <tr><td>Tip</td><td>256 mV</td><td>253 mV</td><td>-0.034 MPa</td></tr> <tr><td>Sleeve</td><td>263 mV</td><td>261 mV</td><td>-0.001 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>340 mV</td><td>326 mV</td><td>-0.004 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2516 mV</td><td>2430 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	256 mV	253 mV	-0.034 MPa	Sleeve	263 mV	261 mV	-0.001 kPa	Pore Pressure 2	340 mV	326 mV	-0.004 kPa	X-Y Inclinator	2516 mV	2430 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	256 mV	253 mV	-0.034 MPa																				
Sleeve	263 mV	261 mV	-0.001 kPa																				
Pore Pressure 2	340 mV	326 mV	-0.004 kPa																				
X-Y Inclinator	2516 mV	2430 mV																					

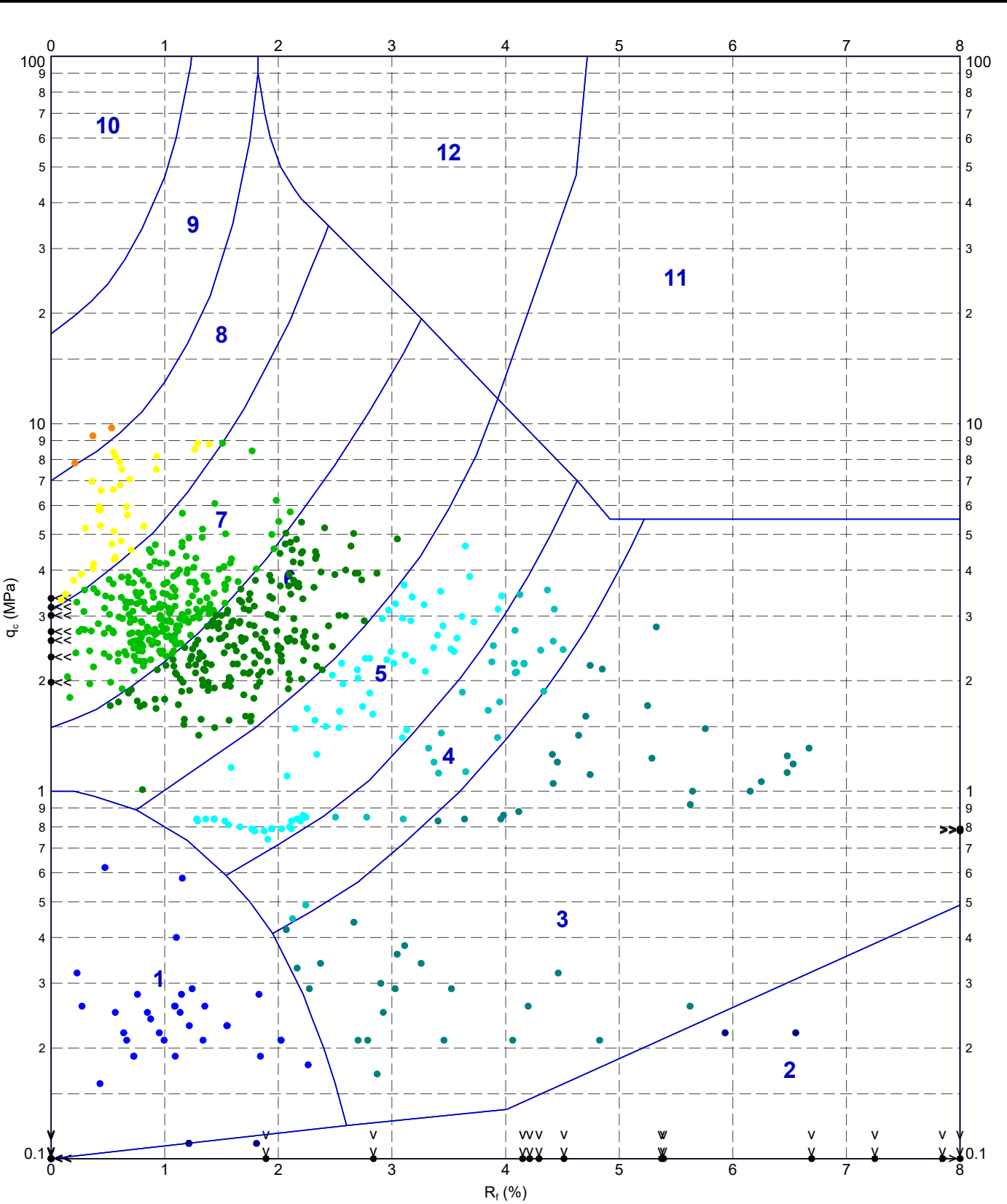
PointID
CPTU05T3

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Target depth	Remark: Test completed at target depth.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>256 mV</td> <td>253 mV</td> <td>-0.034 MPa</td> </tr> <tr> <td>Sleeve</td> <td>263 mV</td> <td>261 mV</td> <td>-0.001 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>340 mV</td> <td>326 mV</td> <td>-0.004 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2516 mV</td> <td>2430 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	256 mV	253 mV	-0.034 MPa	Sleeve	263 mV	261 mV	-0.001 kPa	Pore Pressure 2	340 mV	326 mV	-0.004 kPa	X-Y Inclinator	2516 mV	2430 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	256 mV	253 mV	-0.034 MPa																				
Sleeve	263 mV	261 mV	-0.001 kPa																				
Pore Pressure 2	340 mV	326 mV	-0.004 kPa																				
X-Y Inclinator	2516 mV	2430 mV																					

20628-ADVANCED REPORT INSTITUSI 2.02.1 LIB - LUISA.GLB Graph CPT ROBERTSON ET AL. 86 OC VS. RF A4P 1230390 BARRY WATERFRONT COLLEGE HSP CONSULTING.GPJ <<DrawingFile>> 16/10/2023 16:52 10.03.00.09 Daigral Lab and In Situ Tool - DGD [Lib: In Situ SI 2.02.0 2017-07-10 Pdf: In Situ SI 2.02.0 2017-07-10]



METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE HSP Consulting Laura Jones Barry Barry Waterfront College Robertson et al. 1986 qc vs. Rf - CPTU05T3	DRAWN _____ DATE 16/10/2023
	CHECKED _____ DATE 16/10/2023	
	SCALE Not To Scale	A4
	PROJECT No 1230390	FIGURE No _____

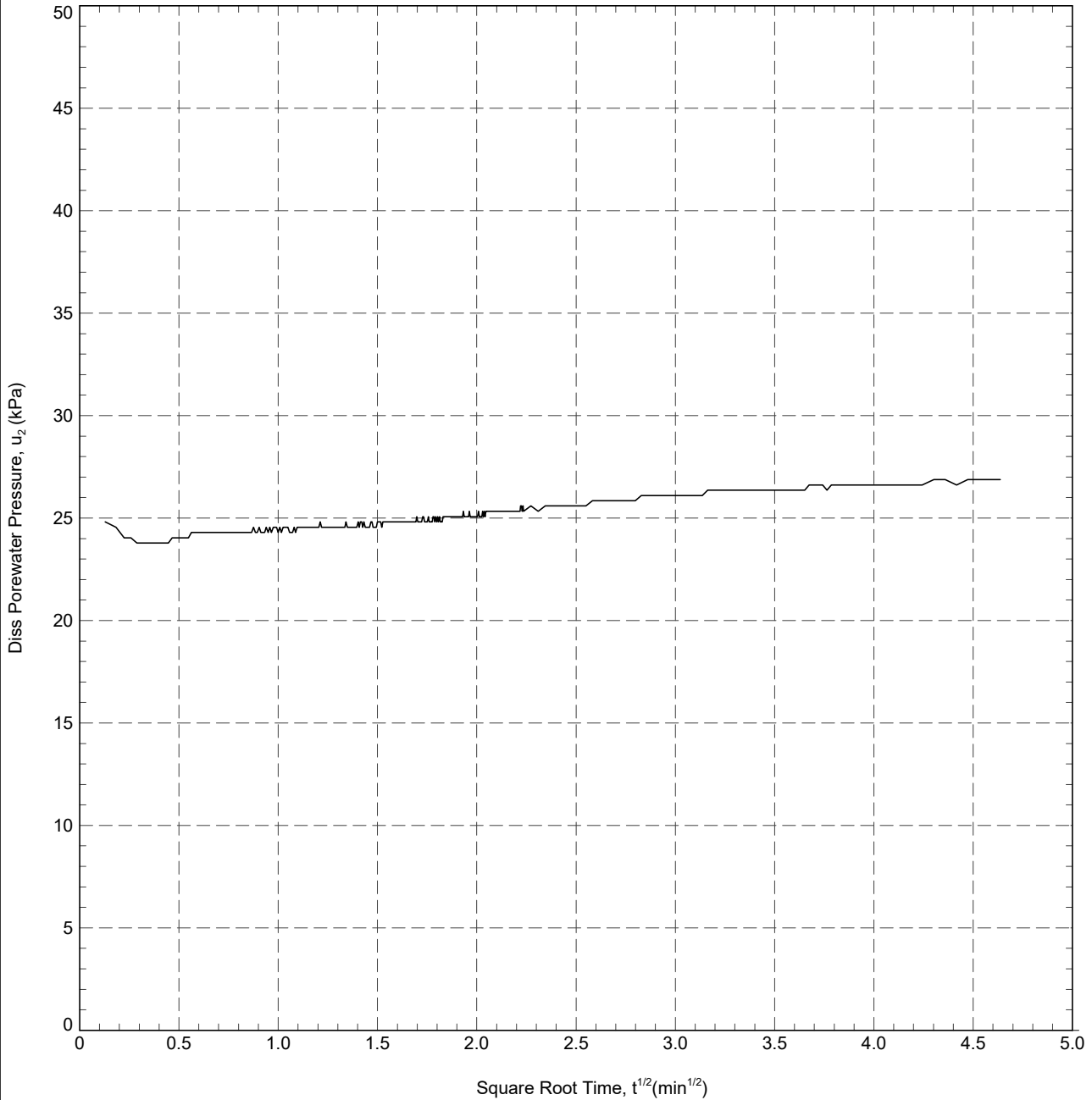
Test ID

CPTU05T3 - 7.00 m

CLIENT : HSP Consulting
ENGINEER : Laura Jones
PROJECT : Barry Waterfront College
LOCATION : Barry
PROJECT No. : 1230390

AREA : Barry Waterfront College
EASTING : 0.0 m
NORTHING : 0.0 m
COORD. SYS.:
ELEVATION : 0.00 m

SHEET : 1 OF 1
STATUS : Final
DATE : 11/10/23



Final Pore Pressure: 26.9 kPa

Normalised Excess Pore Pressure, U

RIG : CPT 011 - Unimog
CONE TYPE : Subtraction
CONE ID : S15-CFIP.2136
OPERATOR : JC

ANALYSED BY : ZJ
CHECKED BY : DW
APPROVED BY : DW

DATE: 12/10/2023
DATE: 12/10/2023
DATE: 12/10/2023

REMARK
T50 not reached.

Working with:

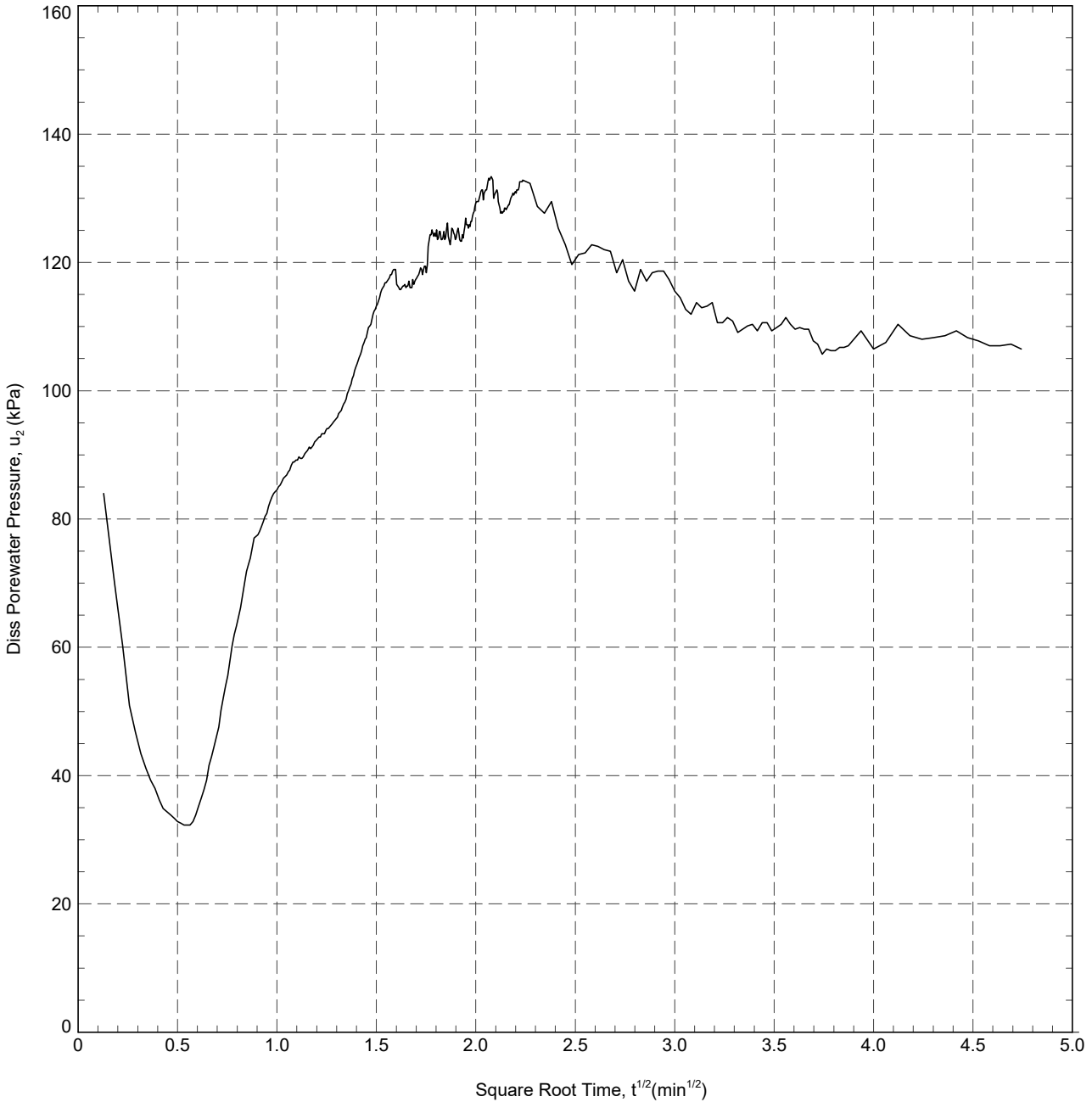
Test ID

CPTU05T3 - 9.45 m

CLIENT : HSP Consulting
ENGINEER : Laura Jones
PROJECT : Barry Waterfront College
LOCATION : Barry
PROJECT No. : 1230390

AREA : Barry Waterfront College
EASTING : 0.0 m
NORTHING : 0.0 m
COORD. SYS.:
ELEVATION : 0.00 m

SHEET : 1 OF 1
STATUS : Final
DATE : 11/10/23



Final Pore Pressure: 106.5 kPa

Normalised Excess Pore Pressure, U

RIG : CPT 011 - Unimog
CONE TYPE : Subtraction
CONE ID : S15-CFIP.2136
OPERATOR : JC

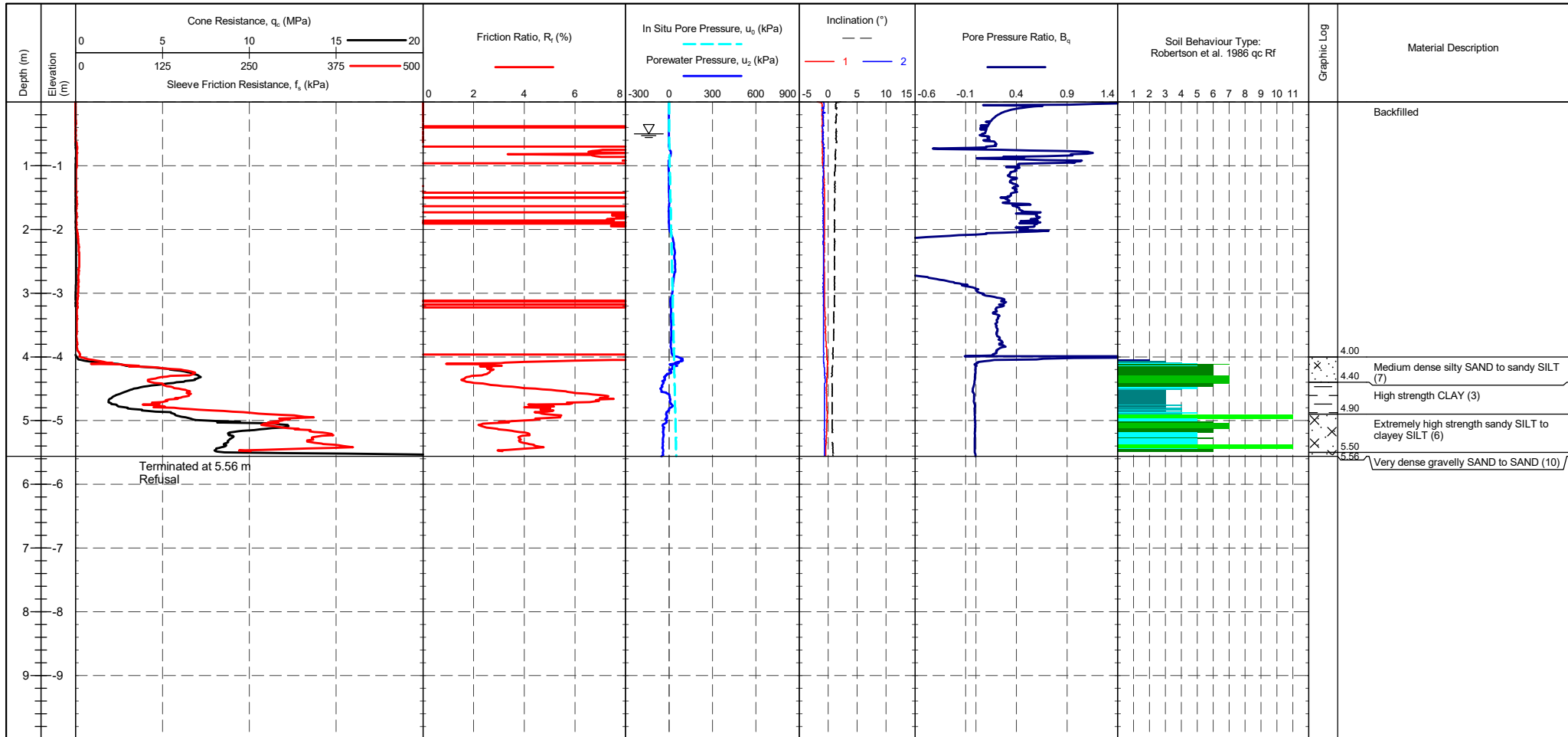
ANALYSED BY : ZJ
CHECKED BY : DW
APPROVED BY : DW

DATE: 12/10/2023
DATE: 12/10/2023
DATE: 12/10/2023

REMARK
T50 not reached.

PointID	CPTU06
---------	---------------

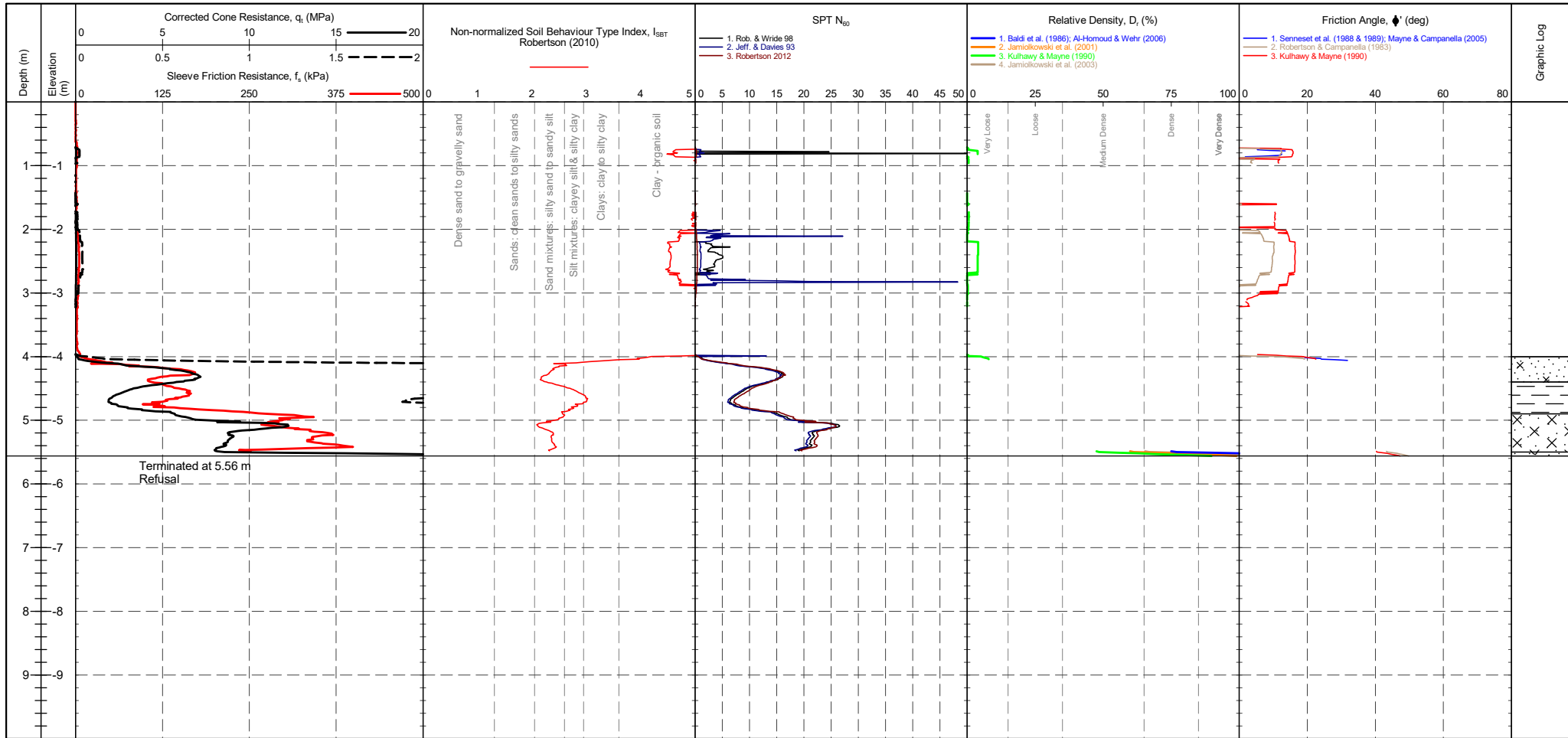
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	--	---



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 254 mV 252 mV -0.023 MPa Sleeve : 261 mV 258 mV -0.002 kPa Pore Pressure 2 : 323 mV 306 mV -0.004 kPa X-Y Inclinator : 2456 mV 2473 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clay SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
---	---	--	--	---------------------------------------

PointID
CPTU06

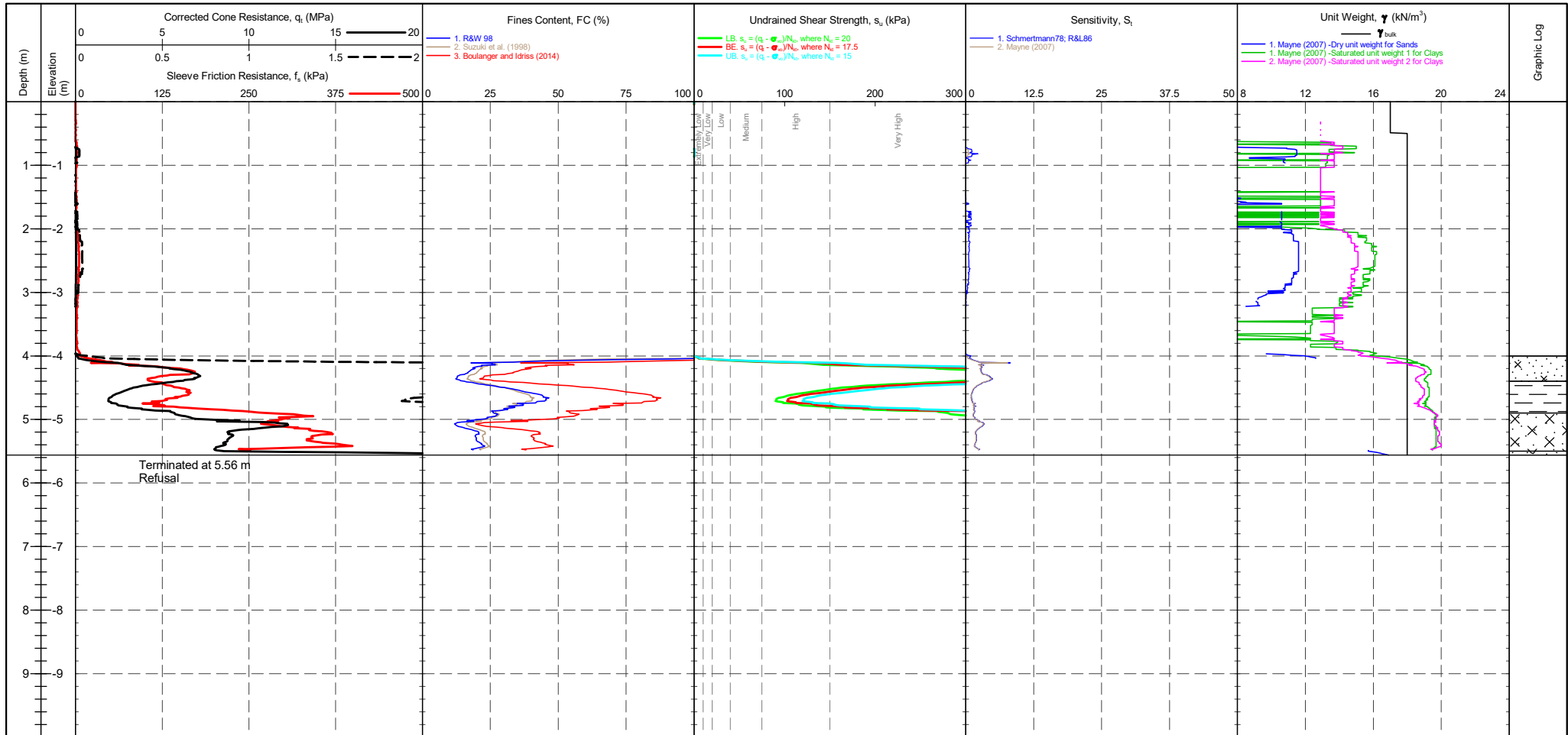
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 254 mV / 252 mV / -0.023 MPa Sleeve: 261 mV / 258 mV / -0.002 kPa Pore Pressure 2: 323 mV / 306 mV / -0.004 kPa X-Y Inclinator: 2456 mV / 2473 mV	CPTU ZERO VALUES Pre: 254 mV, Post: 252 mV, Difference: -0.023 MPa Pre: 261 mV, Post: 258 mV, Difference: -0.002 kPa Pre: 323 mV, Post: 306 mV, Difference: -0.004 kPa Pre: 2456 mV, Post: 2473 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																				
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																				
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35																																				
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																				
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																				
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																				

PointID
CPTU06

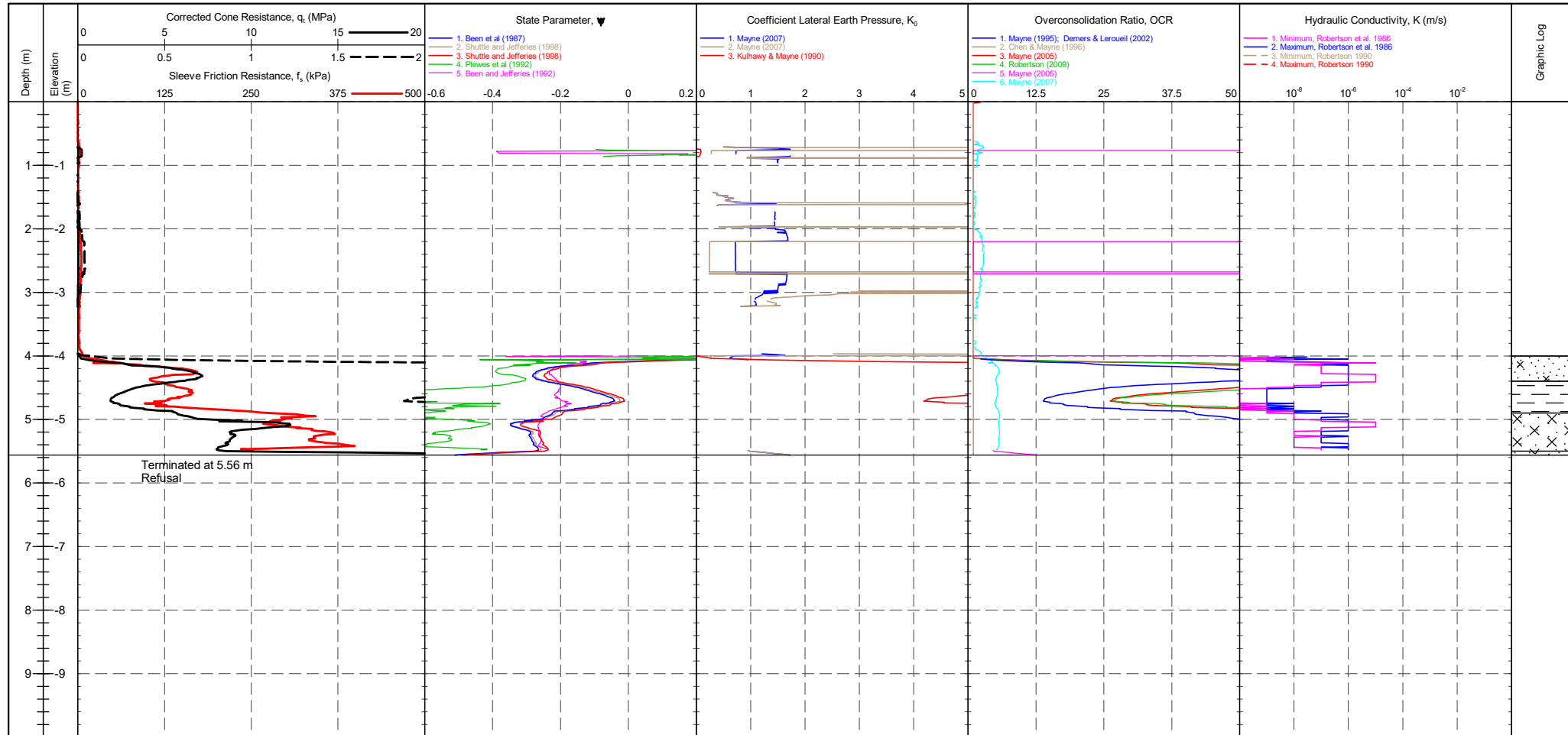
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 254 mV / 252 mV / -0.023 MPa Sleeve: 261 mV / 258 mV / -0.002 kPa Pore Pressure 2: 323 mV / 306 mV / -0.004 kPa X-Y Inclinator: 2456 mV / 2473 mV	CPTU ZERO VALUES Pre: 254 mV, Post: 252 mV, Difference: -0.023 MPa Sleeve: 261 mV, 258 mV, -0.002 kPa Pore Pressure 2: 323 mV, 306 mV, -0.004 kPa X-Y Inclinator: 2456 mV, 2473 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa): Extremely low strength: <10 Very low strength: 10-20 Low strength: 20-40 Term based on measurement s_u (kPa): Medium strength: 40-75 High strength: 75-150 Very high strength: 150-300 Extremely high strength: >300	Groundwater Level Dissipation Test
--	--	--	---	--	---------------------------------------

PointID
CPTU06

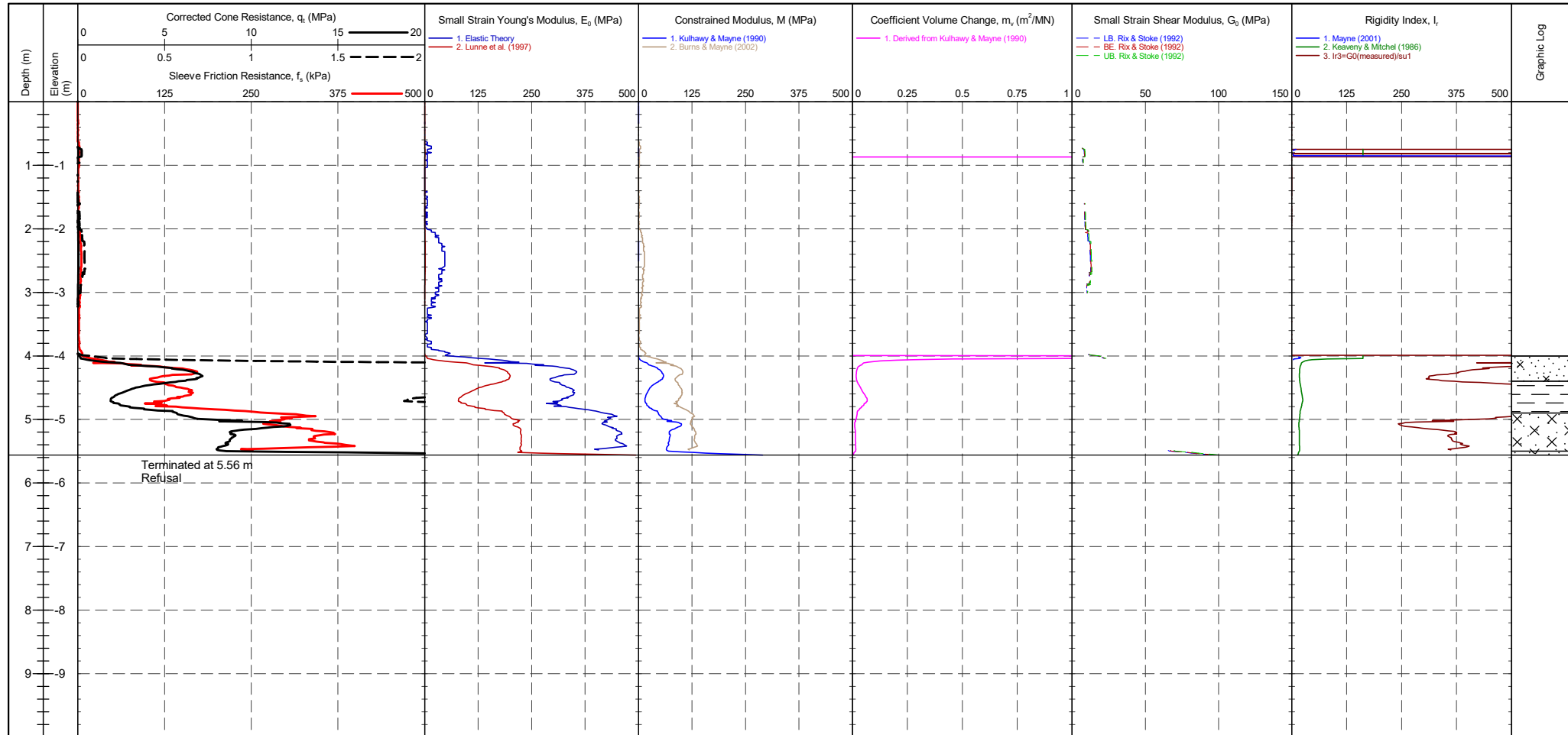
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>254 mV</td> <td>252 mV</td> <td>-0.023 MPa</td> </tr> <tr> <td>Sleeve</td> <td>261 mV</td> <td>258 mV</td> <td>-0.002 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>323 mV</td> <td>306 mV</td> <td>-0.004 kPa</td> </tr> <tr> <td>X-Y Inclinometer</td> <td>2456 mV</td> <td>2473 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	254 mV	252 mV	-0.023 MPa	Sleeve	261 mV	258 mV	-0.002 kPa	Pore Pressure 2	323 mV	306 mV	-0.004 kPa	X-Y Inclinometer	2456 mV	2473 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	254 mV	252 mV	-0.023 MPa																				
Sleeve	261 mV	258 mV	-0.002 kPa																				
Pore Pressure 2	323 mV	306 mV	-0.004 kPa																				
X-Y Inclinometer	2456 mV	2473 mV																					

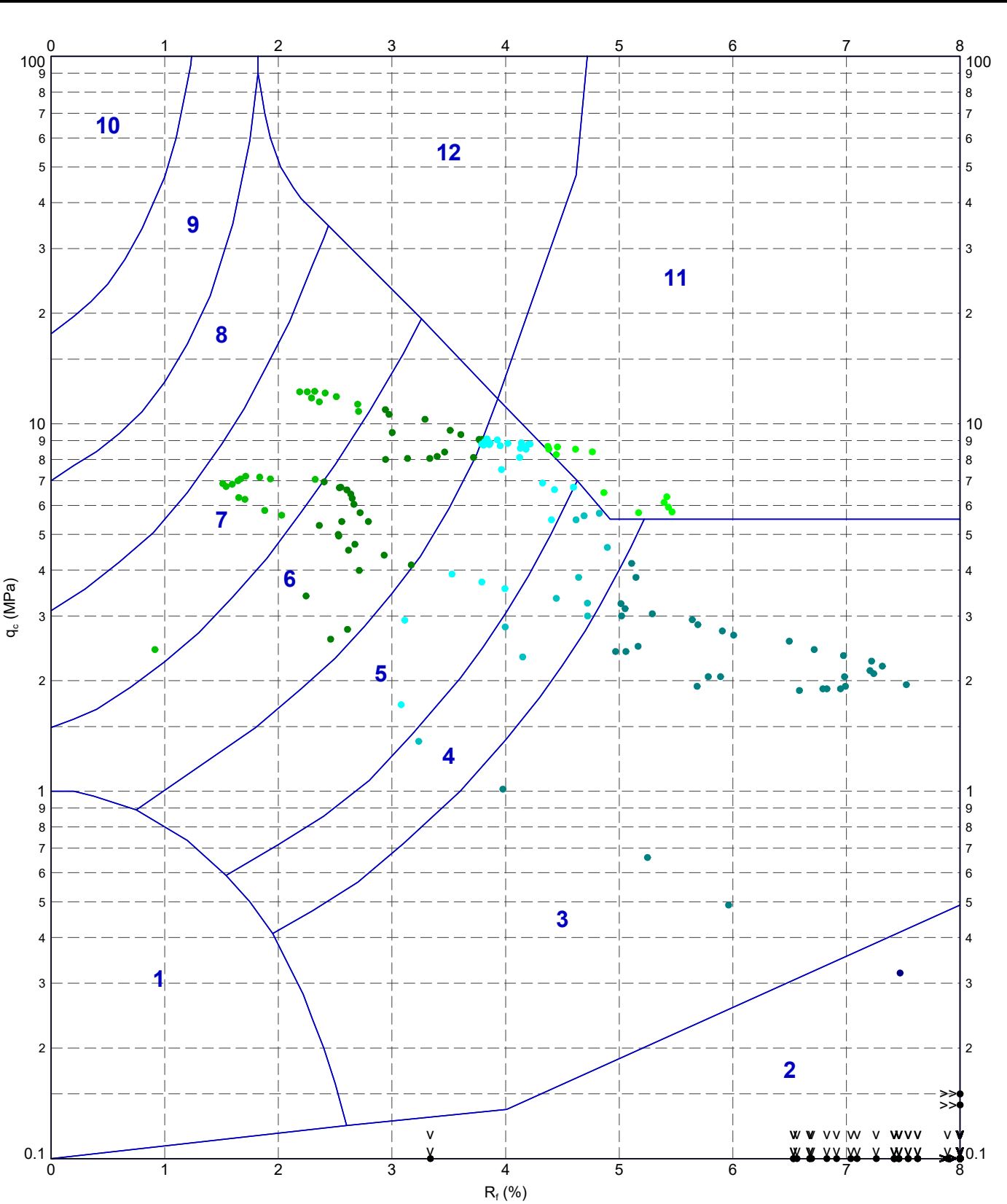
PointID
CPTU06

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>254 mV</td> <td>252 mV</td> <td>-0.023 MPa</td> </tr> <tr> <td>Sleeve</td> <td>261 mV</td> <td>258 mV</td> <td>-0.002 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>323 mV</td> <td>306 mV</td> <td>-0.004 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2456 mV</td> <td>2473 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	254 mV	252 mV	-0.023 MPa	Sleeve	261 mV	258 mV	-0.002 kPa	Pore Pressure 2	323 mV	306 mV	-0.004 kPa	X-Y Inclinator	2456 mV	2473 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	254 mV	252 mV	-0.023 MPa																				
Sleeve	261 mV	258 mV	-0.002 kPa																				
Pore Pressure 2	323 mV	306 mV	-0.004 kPa																				
X-Y Inclinator	2456 mV	2473 mV																					

20628-ADVANCED REPORT INSTITUSI 2.02.1 LIB - LUISA.GLB Graph CPT ROBERTSON ET AL. 86 OC VS. RF AAP 1230390 BARRY WATERFRONT COLLEGE HSP CONSULTING.GPJ <<DrawingFile>> 16/10/2023 15:55 10.03.00.09 D:\gdl\lab and in situ\Tod - DGD [Lib - In Situ SI 2.02.0 2017-07-10 Proj - In Situ SI 2.02.0 2017-07-10



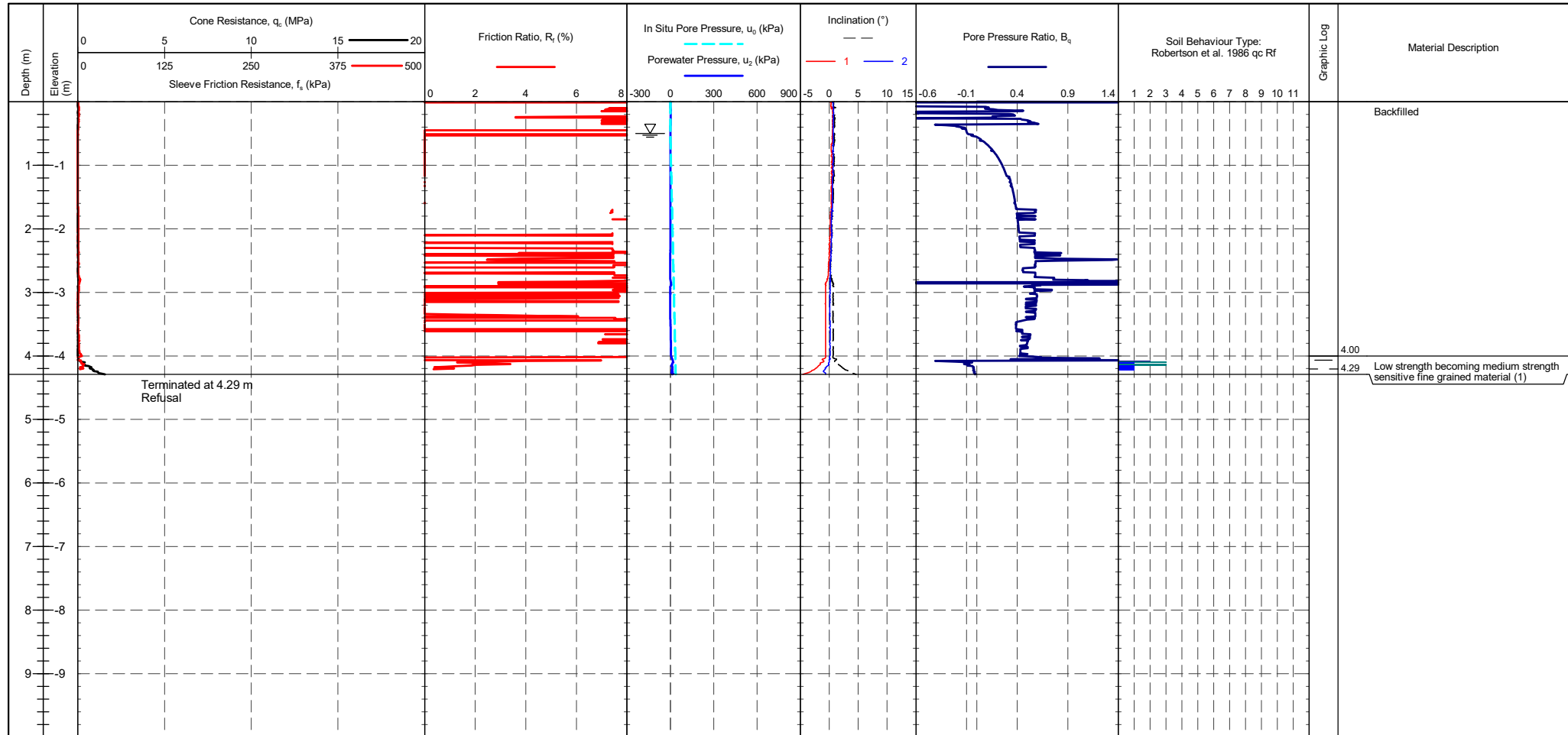
METHOD: Robertson et al. 1986 q_c vs R_f

- | | | | |
|---|--|---|--|
| ■ 1 - Sensitive fine grained material | ■ 4 - Silty CLAY to CLAY | ■ 7 - Silty SAND to sandy SILT | ■ 10 - Gravelly SAND to SAND |
| ■ 2 - Organic material | ■ 5 - Clayey SILT to silty CLAY | ■ 8 - SAND to silty SAND | ■ 11 - Very stiff fine grained |
| ■ 3 - CLAY | ■ 6 - Sandy SILT to clayey SILT | ■ 9 - SAND | ■ 12 - SAND to clayey SAND |

	TITLE HSP Consulting Laura Jones Barry Barry Waterfront College Robertson et al. 1986 q_c vs. R_f - CPTU06	DRAWN DATE 16/10/2023	
		CHECKED DATE 16/10/2023	
		SCALE Not To Scale	A4
		PROJECT No 1230390	FIGURE No

PointID	CPTU07
---------	---------------

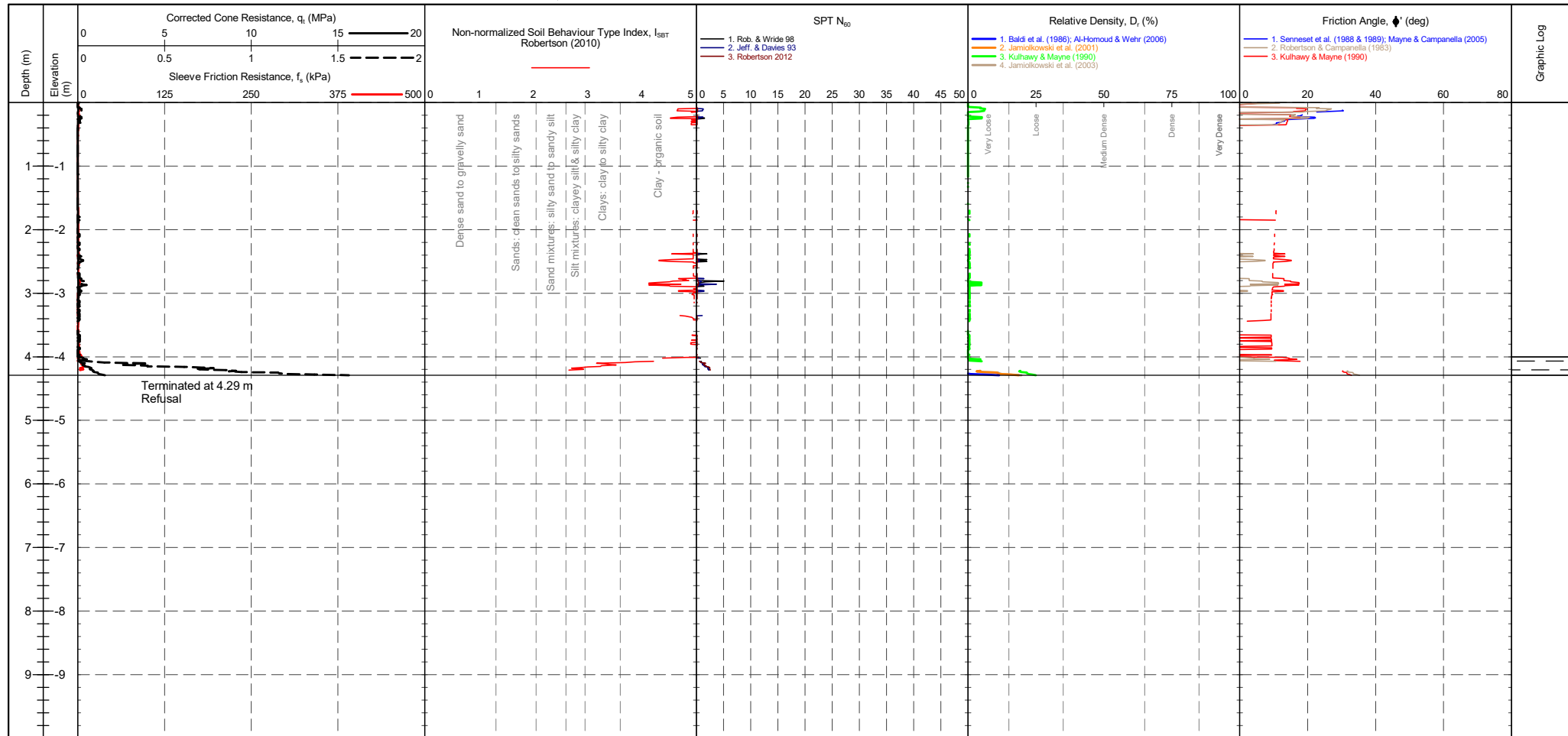
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CALIBRATION DATE : 20/06/2023 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 253 mV 253 mV 0 MPa Sleeve 260 mV 260 mV 0 kPa Pore Pressure 2 316 mV 329 mV 0.003 kPa X-Y Inclinator 2536 mV 2531 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
--	---	---	--	---------------------------------------

PointID
CPTU07

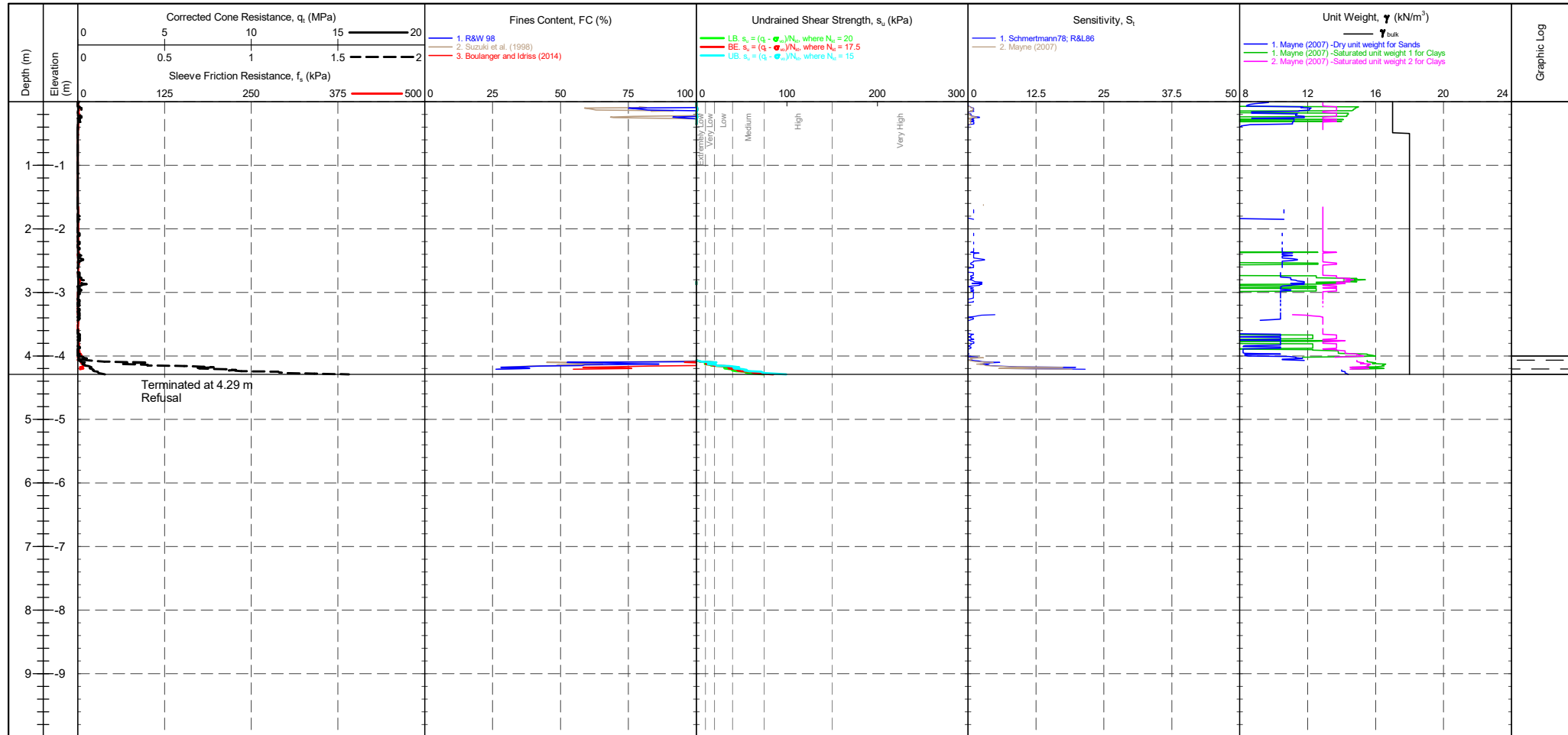
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Tip 253 mV 253 mV 0 MPa Sleeve 260 mV 260 mV 0 kPa Pore Pressure 2 316 mV 329 mV 0.003 kPa X-Y Inclinometer 2536 mV 2531 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																			
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																			
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35																																			
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																			
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																			
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																			

PointID	CPTU07
---------	---------------

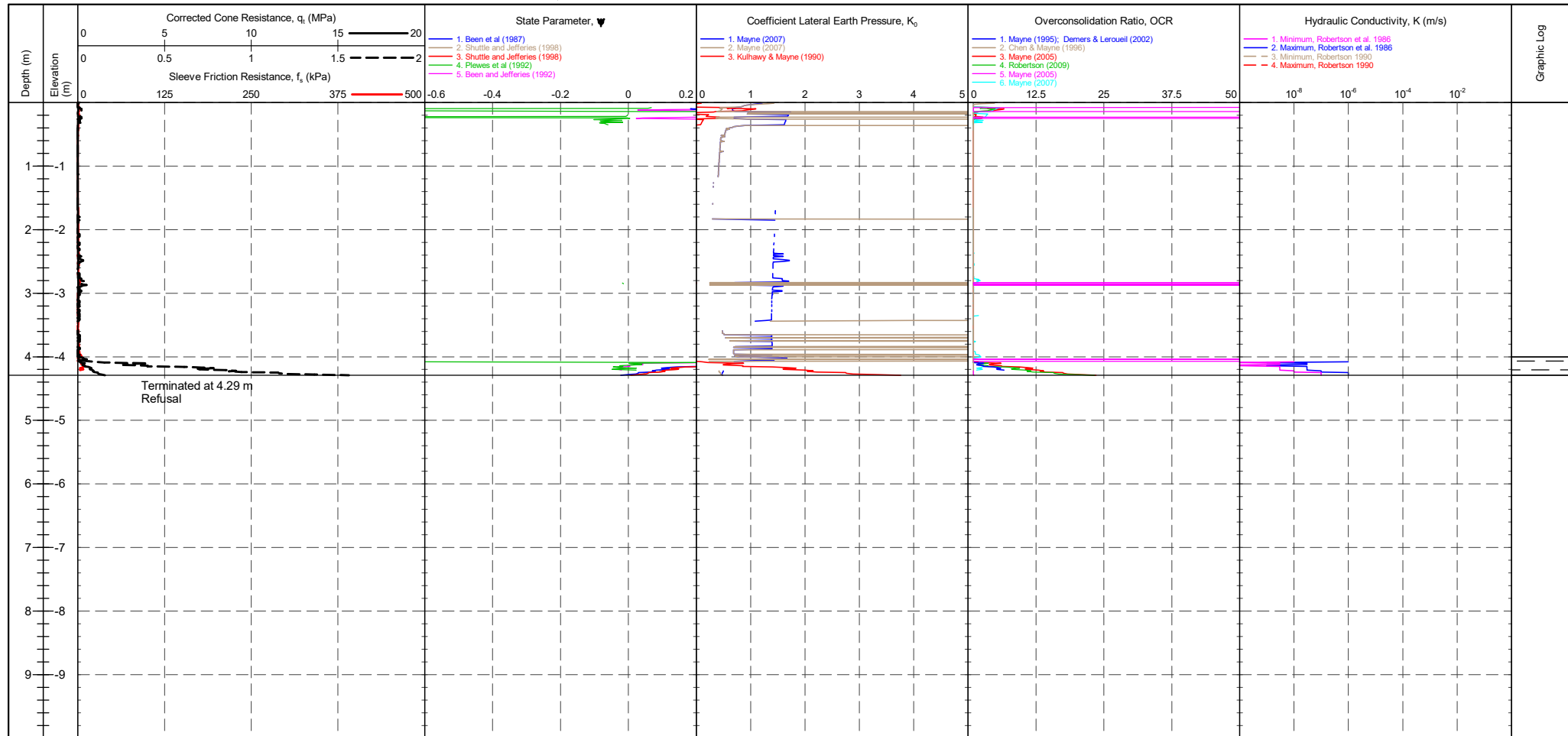
CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	--	--	---



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICTION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 253 mV 253 mV 0 MPa Sleeve 260 mV 260 mV 0 kPa Pore Pressure 2 316 mV 329 mV 0.003 kPa X-Y Inclinator 2536 mV 2531 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa) Term based on measurement s_u (kPa) Extremely low strength <10 Medium strength 40-75 Very low strength 10-20 High strength 75-150 Low strength 20-40 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
--	---	---	---	---------------------------------------

PointID
CPTU07

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 253 mV 253 mV 0 MPa Sleeve 260 mV 260 mV 0 kPa Pore Pressure 2 316 mV 329 mV 0.003 kPa X-Y Inclinator 2536 mV 2531 mV	Groundwater Level Dissipation Test
--	--	---	---------------------------------------

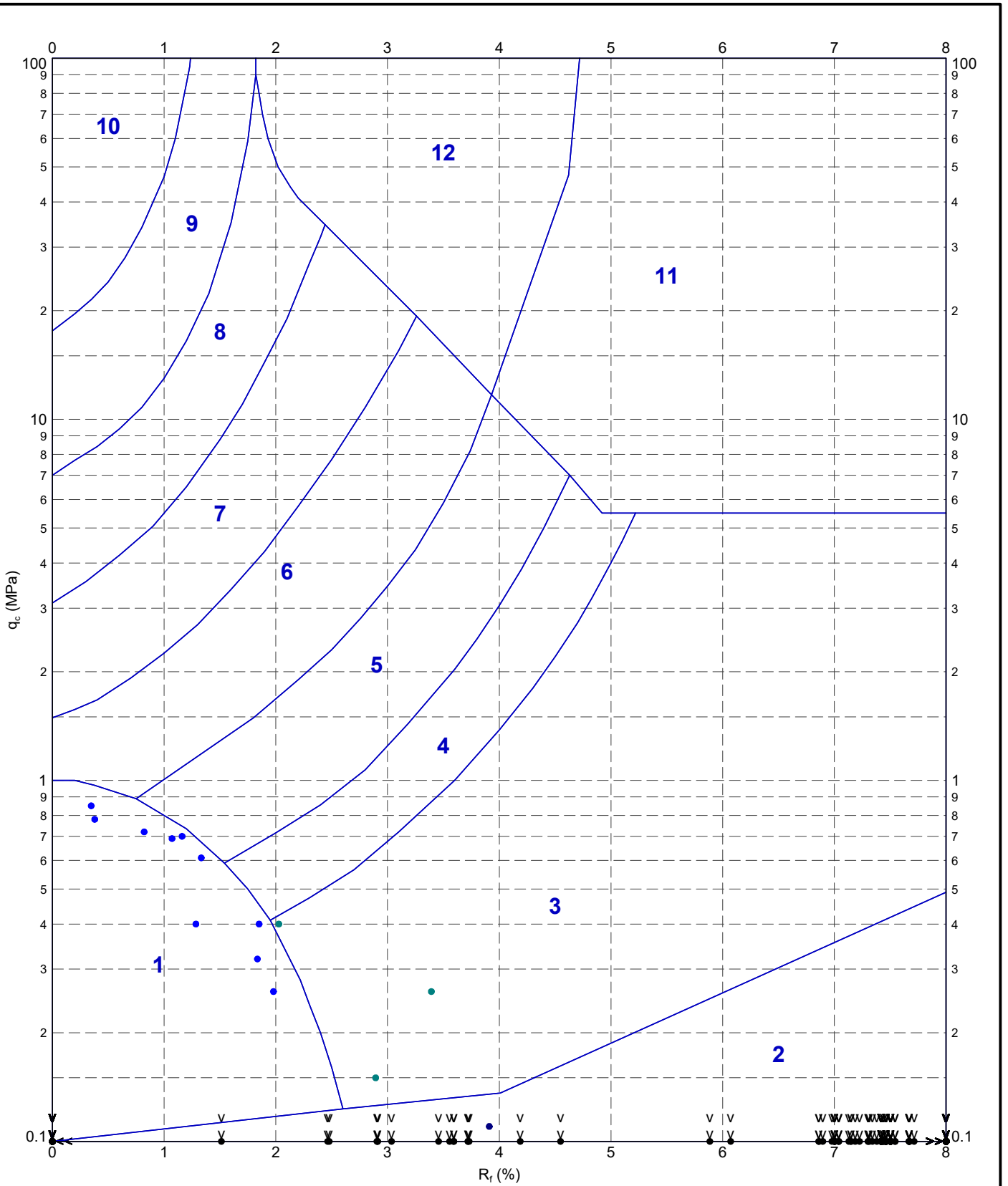
PointID
CPTU07

CLIENT : HSP Consulting PROJECT : Barry Waterfront College LOCATION : Barry PROJECT No. : 1230390	EASTING : 0.000 m NORTHING : 0.000 m ELEVATION : 0.000 m OD CHECKED BY : DW TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 11/10/2023 PLOT DATE : 16/10/2023 METHOD : ISO 22476-1:2022
--	---	---	--



CONE ID : S15-CFIP.2136 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 011 - Unimog OPERATOR : JC FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>253 mV</td> <td>253 mV</td> <td>0 MPa</td> </tr> <tr> <td>Sleeve</td> <td>260 mV</td> <td>260 mV</td> <td>0 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>316 mV</td> <td>329 mV</td> <td>0.003 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2536 mV</td> <td>2531 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	253 mV	253 mV	0 MPa	Sleeve	260 mV	260 mV	0 kPa	Pore Pressure 2	316 mV	329 mV	0.003 kPa	X-Y Inclinator	2536 mV	2531 mV		Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip	253 mV	253 mV	0 MPa																				
Sleeve	260 mV	260 mV	0 kPa																				
Pore Pressure 2	316 mV	329 mV	0.003 kPa																				
X-Y Inclinator	2536 mV	2531 mV																					

20628-ADVANCED REPORT INSTITUSI 2.02.1 LUB - LUISA.GLB Graph CPT ROBERTSON ET AL. 86 OC VS. RF AAP 1230390 BARRY WATERFRONT COLLEGE HSP CONSULTING.GPJ <<DrawingFile>> 16/10/2023 16:56 10.03.00.09 Dargel Lab and In Situ Tool - DGD [Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI 2.02.0 2017-07-10]



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |



TITLE
HSP Consulting
Laura Jones
Barry
Barry Waterfront College
Robertson et al. 1986 qc vs. Rf - CPTU07

DRAWN	DATE	16/10/2023
CHECKED	DATE	16/10/2023
SCALE	Not To Scale	
PROJECT No	FIGURE No	
1230390		
	A4	



IN SITU SITE INVESTIGATION

Unit 23 Hastings Innovation
Centre,
Highfield Drive
St. Leonards on Sea, East Sussex,
TN38 9UH, U.K.

Company No. : 6339499
VAT No. : 922 3561 41

Appendix XII



Final Report

Report No.: 23-41630-1

Initial Date of Issue: 03-Jan-2024

Re-Issue Details:

Client HSP Consulting Engineers Limited

Client Address: Lawrence House
Meadowbank Way
Eastwood
Nottinghamshire
NG16 3SB

Contact(s): Laura Jones

Project C3297 Barry Waterfront Campus

Quotation No.: **Date Received:** 15-Dec-2023

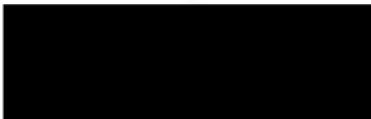
Order No.: SC14999 **Date Instructed:** 15-Dec-2023

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 21-Dec-2023

Date Approved: 03-Jan-2024

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				23-41630	23-41630	23-41630
Quotation No.:		Chemtest Sample ID.:				1746564	1746565	1746566
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				13-Dec-2023	13-Dec-2023	13-Dec-2023
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
pH at 20C		U	1010		4.0	8.1	8.1	8.7
Chloride		U	1220	mg/l	1.0	4700	92	87
Ammoniacal Nitrogen		U	1220	mg/l	0.050	0.59	0.93	0.34
Sulphate		U	1220	mg/l	1.0	1400	83	26
Cyanide (Total)		U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium (Total)		N	1455	mg/l	5.0	260	250	87
Total Hardness as CaCO3		U	1270	mg/l	15	1700	470	130
Arsenic (Dissolved)		U	1455	µg/l	0.20	2.0	1.9	1.1
Boron (Dissolved)		U	1455	µg/l	10.0	1600	390	130
Beryllium (Dissolved)		U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)		U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)		U	1455	µg/l	0.50	0.90	0.79	1.8
Mercury (Dissolved)		U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)		U	1455	µg/l	0.50	0.62	4.2	1.1
Lead (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)		U	1455	µg/l	0.50	1.6	< 0.50	9.6
Vanadium (Dissolved)		U	1455	µg/l	0.50	0.88	< 0.50	1.4
Zinc (Dissolved)		U	1455	µg/l	2.5	12	< 2.5	26
Dissolved Organic Carbon		U	1610	mg/l	2.0	2.2	5.1	3.4
Florisil Cleanup		N		-	N/A	Done	Done	Done
Aliphatic TPH >C5-C6	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	EH_2D_AL_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:		23-41630	23-41630	23-41630		
Quotation No.:		Chemtest Sample ID.:		1746564	1746565	1746566		
Order No.: SC14999		Client Sample Ref.:		BH02	BH03	BH04		
		Sample Location:		BH02	BH03	BH04		
		Sample Type:		WATER	WATER	WATER		
		Top Depth (m):		7.00	4.50	4.50		
		Bottom Depth (m):		7.50	5.00	5.00		
		Date Sampled:		13-Dec-2023	13-Dec-2023	13-Dec-2023		
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Aromatic TPH >C21-C35	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	EH_2D_AR_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	EH_2D_Total_#1	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Chloromethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Vinyl Chloride		N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromomethane		U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Chloroethane		U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Trichlorofluoromethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloroethene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Trans 1,2-Dichloroethene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloroethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
cis 1,2-Dichloroethene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromochloromethane		U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Trichloromethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1,1-Trichloroethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tetrachloromethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloropropene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Benzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichloroethane		U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Trichloroethene		N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichloropropane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Dibromomethane		U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Bromodichloromethane		U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
cis-1,3-Dichloropropene		N	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Toluene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Trans-1,3-Dichloropropene		N	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
1,1,2-Trichloroethane		U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Tetrachloroethene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3-Dichloropropane		U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Dibromochloromethane		U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
1,2-Dibromoethane		U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Chlorobenzene		N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1,1,2-Tetrachloroethane		U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Ethylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
m & p-Xylene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:		23-41630	23-41630	23-41630		
Quotation No.:		Chemtest Sample ID.:		1746564	1746565	1746566		
Order No.: SC14999		Client Sample Ref.:		BH02	BH03	BH04		
		Sample Location:		BH02	BH03	BH04		
		Sample Type:		WATER	WATER	WATER		
		Top Depth (m):		7.00	4.50	4.50		
		Bottom Depth (m):		7.50	5.00	5.00		
		Date Sampled:		13-Dec-2023	13-Dec-2023	13-Dec-2023		
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
o-Xylene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Styrene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tribromomethane		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Isopropylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromobenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,3-Trichloropropane		N	1760	µg/l	50	[C] < 50	[C] < 50	[C] < 50
N-Propylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
2-Chlorotoluene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3,5-Trimethylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
4-Chlorotoluene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tert-Butylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,4-Trimethylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Sec-Butylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3-Dichlorobenzene		N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
4-Isopropyltoluene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,4-Dichlorobenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
N-Butylbenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichlorobenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dibromo-3-Chloropropane		U	1760	µg/l	50	[C] < 50	[C] < 50	[C] < 50
1,2,4-Trichlorobenzene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Hexachlorobutadiene		U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,3-Trichlorobenzene		U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Methyl Tert-Butyl Ether		N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
N-Nitrosodimethylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Isophorone		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				23-41630	23-41630	23-41630
Quotation No.:		Chemtest Sample ID.:				1746564	1746565	1746566
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				13-Dec-2023	13-Dec-2023	13-Dec-2023
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
2-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Carbazole		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:		23-41630	23-41630	23-41630		
Quotation No.:		Chemtest Sample ID.:		1746564	1746565	1746566		
Order No.: SC14999		Client Sample Ref.:		BH02	BH03	BH04		
		Sample Location:		BH02	BH03	BH04		
		Sample Type:		WATER	WATER	WATER		
		Top Depth (m):		7.00	4.50	4.50		
		Bottom Depth (m):		7.50	5.00	5.00		
		Date Sampled:		13-Dec-2023	13-Dec-2023	13-Dec-2023		
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Benzo[a]anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
PCB 28		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 52		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 101		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 118		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 153		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 138		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 180		N	1815	µg/l	0.010	< 0.010		< 0.010
Total PCBs (7 congeners)		N	1815	µg/l	0.010	< 0.010		< 0.010
Total Phenols		U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1746564	BH02		BH02	13-Dec-2023	C	Coloured Winchester 1000ml
1746564	BH02		BH02	13-Dec-2023	C	Plastic Bottle 1000ml
1746565	BH03		BH03	13-Dec-2023	C	Coloured Winchester 1000ml
1746565	BH03		BH03	13-Dec-2023	C	Plastic Bottle 1000ml
1746566	BH04		BH04	13-Dec-2023	C	Coloured Winchester 1000ml
1746566	BH04		BH04	13-Dec-2023	C	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH at 20°C	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8- C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44 Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1815	Polychlorinated Biphenyls (PCB) ICES7 Congeners in Waters by GC-MS	ICES7 PCB congeners	Solvent extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.: 24-00791-1

Initial Date of Issue: 18-Jan-2024

Re-Issue Details:

Client HSP Consulting Engineers Limited

Client Address: Lawrence House
Meadowbank Way
Eastwood
Nottinghamshire
NG16 3SB

Contact(s): Laura Jones
Harry Evans

Project C3297 Barry Waterfront Campus

Quotation No.: **Date Received:** 12-Jan-2024

Order No.: SC14999 **Date Instructed:** 12-Jan-2024

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 18-Jan-2024

Date Approved: 18-Jan-2024

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-00791	24-00791	24-00791
Quotation No.:		Chemtest Sample ID.:				1753161	1753162	1753163
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				10-Jan-2024	10-Jan-2024	10-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
pH at 20C		U	1010		4.0	8.4	7.9	8.4
Chloride		U	1220	mg/l	1.0	3200	38	590
Ammoniacal Nitrogen		U	1220	mg/l	0.050	0.35	0.068	2.0
Sulphate		U	1220	mg/l	1.0	540	22	54
Cyanide (Total)		U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium (Total)		N	1455	mg/l	5.0	110	250	440
Total Hardness as CaCO3		U	1270	mg/l	15	1100	380	270
Arsenic (Dissolved)		U	1455	µg/l	0.20	14	0.28	1.2
Boron (Dissolved)		U	1455	µg/l	10.0	850	69	480
Beryllium (Dissolved)		U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)		U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)		U	1455	µg/l	0.50	0.84	1.0	< 0.50
Mercury (Dissolved)		U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	1.7
Lead (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)		U	1455	µg/l	0.50	2.4	< 0.50	0.98
Vanadium (Dissolved)		U	1455	µg/l	0.50	1.4	< 0.50	< 0.50
Zinc (Dissolved)		U	1455	µg/l	2.5	7.6	3.1	3.0
Dissolved Organic Carbon		U	1610	mg/l	2.0	2.2	2.1	2.9
Florisil Cleanup		N		-	N/A	Done	Done	Done
Aliphatic TPH >C5-C6	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	EH_2D_AL_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:		24-00791	24-00791	24-00791		
Quotation No.:		Chemtest Sample ID.:		1753161	1753162	1753163		
Order No.: SC14999		Client Sample Ref.:		BH02	BH03	BH04		
		Sample Location:		BH02	BH03	BH04		
		Sample Type:		WATER	WATER	WATER		
		Top Depth (m):		7.00	4.50	4.50		
		Bottom Depth (m):		7.50	5.00	5.00		
		Date Sampled:		10-Jan-2024	10-Jan-2024	10-Jan-2024		
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Aromatic TPH >C21-C35	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	EH_2D_AR_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	EH_2D_Total_#1	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane		U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane		U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane		U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane		U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
Toluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane		U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane		U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane		U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-00791	24-00791	24-00791
Quotation No.:		Chemtest Sample ID.:				1753161	1753162	1753163
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				10-Jan-2024	10-Jan-2024	10-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
o-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane		N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane		U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Isophorone		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-00791	24-00791	24-00791
Quotation No.:		Chemtest Sample ID.:				1753161	1753162	1753163
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				10-Jan-2024	10-Jan-2024	10-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
2-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Carbazole		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront Campus

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-00791	24-00791	24-00791
Quotation No.:		Chemtest Sample ID.:				1753161	1753162	1753163
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				10-Jan-2024	10-Jan-2024	10-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Benzo[a]anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
PCB 28		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 52		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 101		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 118		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 153		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 138		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 180		N	1815	µg/l	0.010	< 0.010		< 0.010
Total PCBs (7 congeners)		N	1815	µg/l	0.010	< 0.010		< 0.010
Total Phenols		U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH at 20°C	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8- C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44 Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1815	Polychlorinated Biphenyls (PCB) ICES7 Congeners in Waters by GC-MS	ICES7 PCB congeners	Solvent extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.: 24-02180-1

Initial Date of Issue: 05-Feb-2024

Re-Issue Details:

Client HSP Consulting Engineers Limited

Client Address: Lawrence House
Meadowbank Way
Eastwood
Nottinghamshire
NG16 3SB

Contact(s): Laura Jones

Project C3297 Barry Waterfront College

Quotation No.: Q23-31791

Date Received: 25-Jan-2024

Order No.: SC14999

Date Instructed: 25-Jan-2024

No. of Samples: 3

Turnaround (Wkdays): 5

Results Due: 31-Jan-2024

Date Approved: 05-Feb-2024

Approved By:



Details: Stuart Henderson, Technical
Manager
Nick Watson, Operations Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Water

Project: C3297 Barry Waterfront College

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Chromatogram (TPH)	EH_1D_Total	N			N/A	See Attached	See Attached	See Attached
pH at 20C		U	1010		4.0	8.0	7.7	7.6
Chloride		U	1220	mg/l	1.0	5900	89	910
Ammoniacal Nitrogen		U	1220	mg/l	0.050	0.44	0.52	2.6
Sulphate		U	1220	mg/l	1.0	820	93	68
Cyanide (Total)		U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium (Total)		N	1455	mg/l	5.0	150	160	570
Total Hardness as CaCO3		U	1270	mg/l	15	2000	540	350
Arsenic (Dissolved)		U	1455	µg/l	0.20	1.9	4.6	2.6
Boron (Dissolved)		U	1455	µg/l	10.0	1800	370	710
Beryllium (Dissolved)		U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)		U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)		U	1455	µg/l	0.50	0.95	< 0.50	1.2
Mercury (Dissolved)		U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)		U	1455	µg/l	0.50	< 0.50	3.5	2.3
Lead (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)		U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)		U	1455	µg/l	0.50	1.2	< 0.50	0.91
Vanadium (Dissolved)		U	1455	µg/l	0.50	0.88	< 0.50	< 0.50
Zinc (Dissolved)		U	1455	µg/l	2.5	7.8	2.6	< 2.5
Dissolved Organic Carbon		U	1610	mg/l	2.0	< 2.0	4.2	6.0
Florisil Cleanup		N		-	N/A	Done	Done	Done
Aliphatic TPH >C5-C6	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	EH_AL_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	EH_AL_2D_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: C3297 Barry Waterfront College

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Aromatic TPH >C12-C16	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	EH_AR_2D_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	EH_AR_2D_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	EH_Total_2D_#1	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane		U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane		U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane		U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane		U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
Toluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane		U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane		U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane		U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

Results - Water

Project: C3297 Barry Waterfront College

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
1,1,1,2-Tetrachloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane		N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane		U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront College

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
N-Nitrosodi-n-propylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Isophorone		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: C3297 Barry Waterfront College

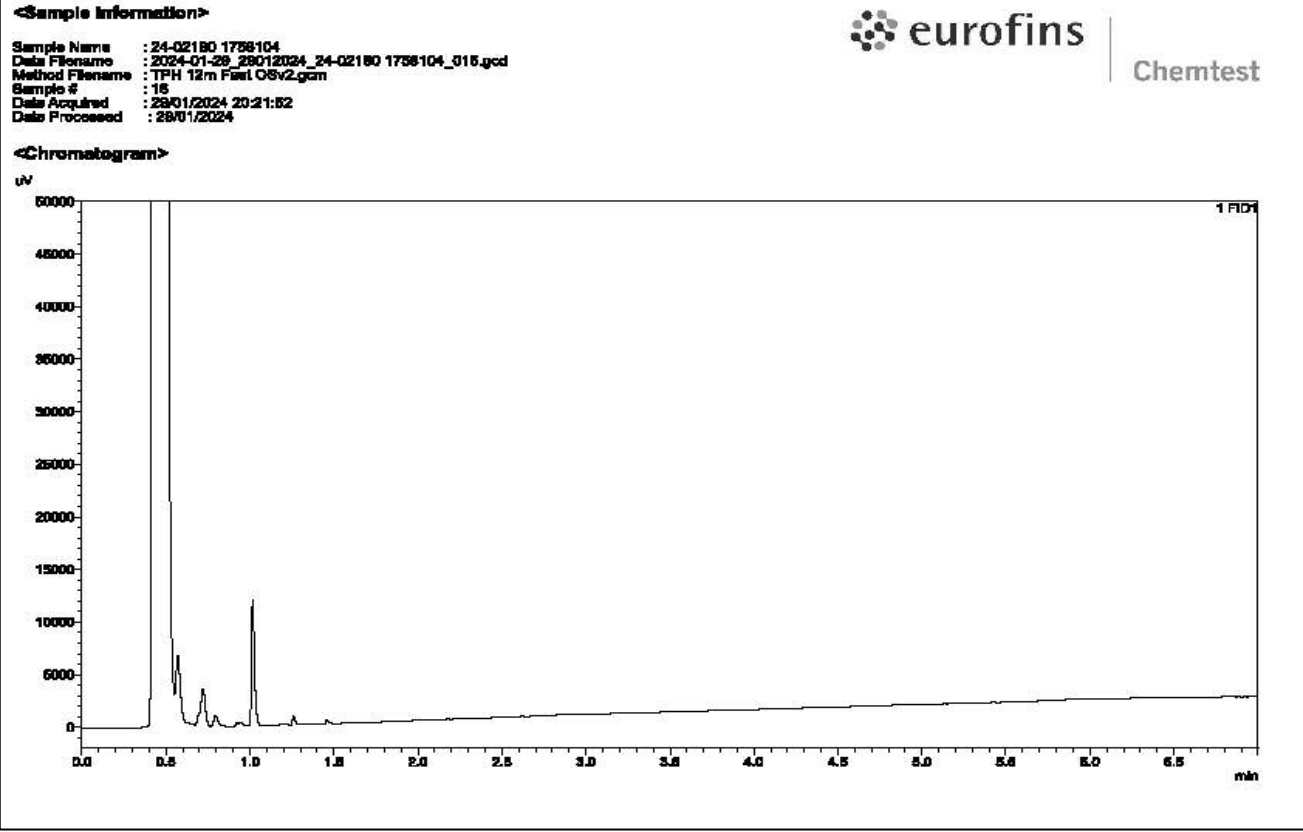
Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Carbazole		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
PCB 28		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 52		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 101		N	1815	µg/l	0.010	< 0.010		< 0.010

Results - Water

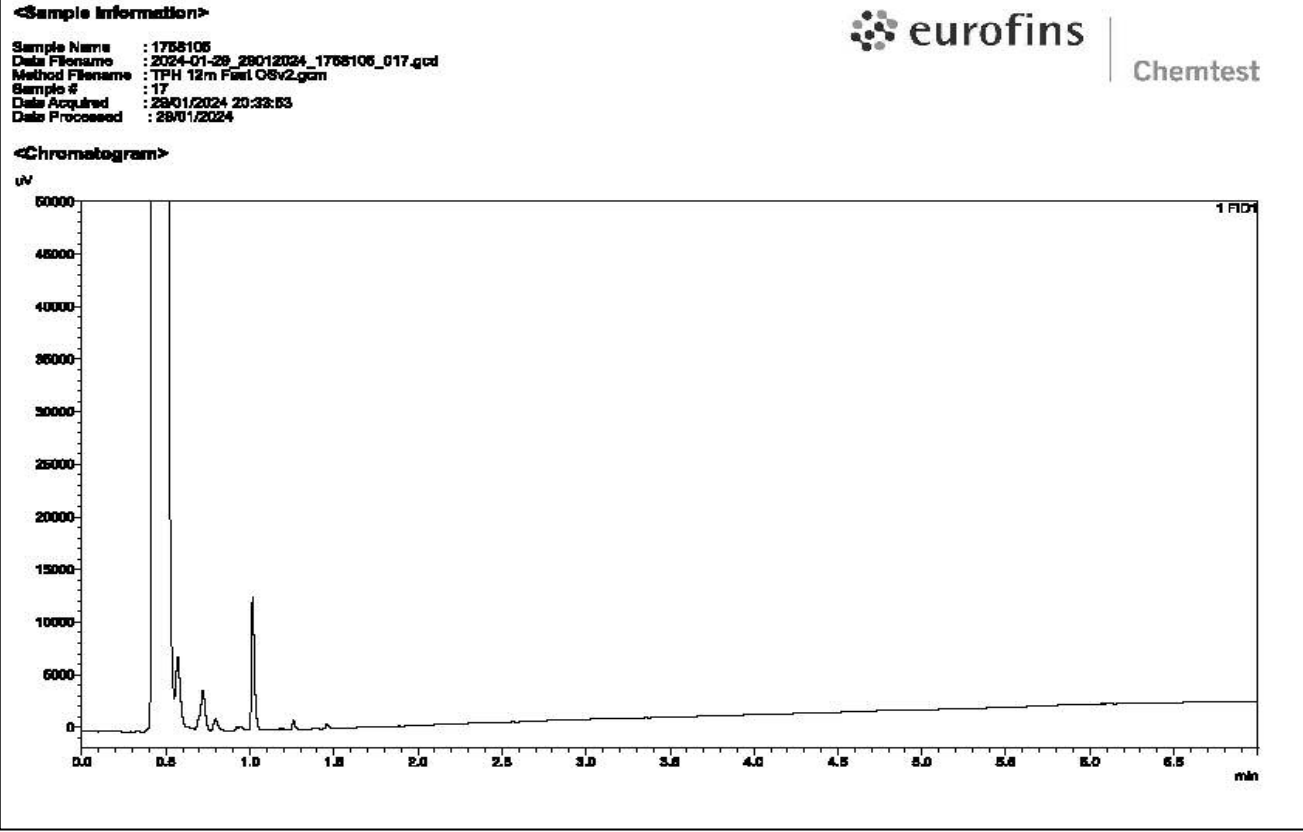
Project: C3297 Barry Waterfront College

Client: HSP Consulting Engineers Limited		Chemtest Job No.:				24-02180	24-02180	24-02180
Quotation No.: Q23-31791		Chemtest Sample ID.:				1758104	1758105	1758106
Order No.: SC14999		Client Sample Ref.:				BH02	BH03	BH04
		Sample Location:				BH02	BH03	BH04
		Sample Type:				WATER	WATER	WATER
		Sample Sub Type:				Ground Water	Ground Water	Ground Water
		Top Depth (m):				7.00	4.50	4.50
		Bottom Depth (m):				7.50	5.00	5.00
		Date Sampled:				23-Jan-2024	23-Jan-2024	23-Jan-2024
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
PCB 118		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 153		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 138		N	1815	µg/l	0.010	< 0.010		< 0.010
PCB 180		N	1815	µg/l	0.010	< 0.010		< 0.010
Total PCBs (7 congeners)		N	1815	µg/l	0.010	< 0.010		< 0.010
Total Phenols		U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

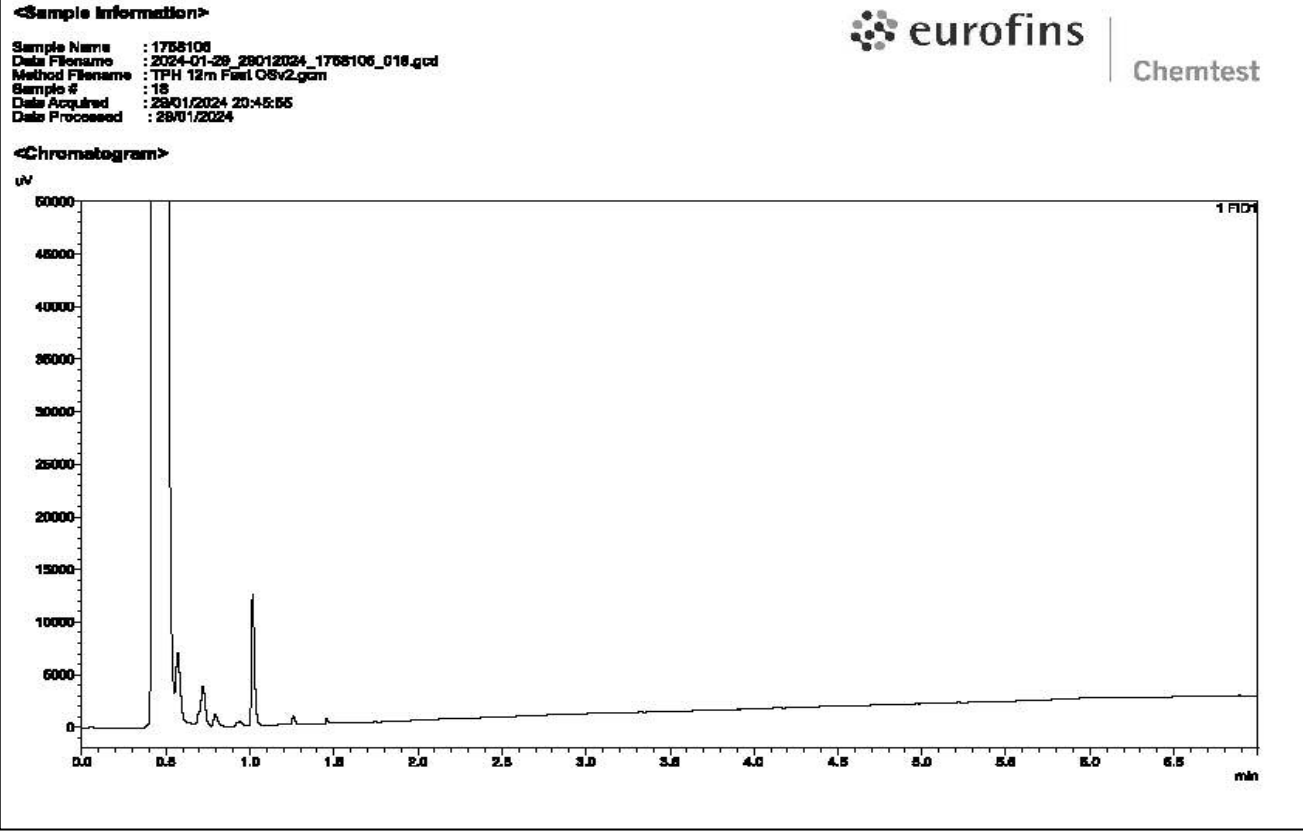
TPH Chromatogram on Water Sample: 1758104



TPH Chromatogram on Water Sample: 1758105



TPH Chromatogram on Water Sample: 1758106



Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	RE PW TE TS PL DW GW
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.	RE PW PL LE DW GW
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.	RE PW PL SW DW GW
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.	GW
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	RE PW PL SW DW GW
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation	PL SW GW
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44 Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Pentane extraction / GCxGC FID detection	
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.	PL GW
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection	
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection	PL GW
1815	Polychlorinated Biphenyls (PCB) ICES7 Congeners in Waters by GC-MS	ICES7 PCB congeners	Solvent extraction / GCMS detection	
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

Water Sample Category Key for Accreditation

DW - Drinking Water

GW - Ground Water

LE - Land Leachate

NA - Not Applicable

PL - Prepared Leachate

PW - Processed Water

Report Information

RE - Recreational Water

SA - Saline Water

SW - Surface Water

TE - Treated Effluent

TS - Treated Sewage

UL - Unspecified Liquid

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

SCHEDULE 1.19.5: TEST SUITES (derived from BRE Special Digest SD1)

CHEMICAL TESTS ON POTENTIALLY AGGRESSIVE GROUND AND GROUNDWATER

Sample type	Determinand	Recommended test methods	Method specified
SUITE A Greenfield site (pyrite absent)			
SOIL	pH in 2.5:1 soil/water extract	BR 279 Electrometric method	
		BS 1377-3 Section 9 Electrometric method	
	SO ₄ in 2:1 water/soil extract WS (g/l SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
WATER	pH	BR 279 Electrometric method	
		BS 1377-3 Section 9 Electrometric method	
	Soluble sulfate GWS (SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
SUITE B Greenfield site (pyrite present)			
SOIL	pH in 2.5:1 soil/water extract	BR 279 Electrometric method	
		BS 1377-3 Section 9 Electrometric method	
	SO ₄ in 2:1 water/soil extract WS (g/l SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
		TRL Report 447, Test 1 Sulfate extraction procedure as BS 1377-1, but ICP-AES used to determine sulfur in solution.	
	Acid soluble sulfate AS (% SO ₄)	BR 279 Gravimetric method	
		BS 1377-3, Section 5 Gravimetric methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
		TRL Report 447, Test 2 Preparation and extraction of sulfate as BS 1377-3, ICP-AES used to determine sulfur in solution.	
	Total sulfur TS (% S)	BR 279 Only Ignition in oxygen method recommended.	
		TRL Report 447, Test 4A Microwave digestion method.	
TRL Report 447, Test 4B Ignition in oxygen method (e.g. with sulphur-carbon determinator).			
WATER	pH	BR 279 Electrometric method	

Sample type	Determinand	Recommended test methods	Method specified
		BS 1377-3 Section 9 Electrometric method	
	Soluble sulfate GWS (SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
		Commercial test laboratory in-house procedure: Determination of sulfur by inductively coupled plasma atomic emission spectroscopy (ICP-AES)	
SUITE C Brownfield site (pyrite absent)			
SOIL	pH in 2.5:1 soil/water extract	BR 279 Electrometric method	
		BS 1377-3 Section 9 Electrometric method	
	SO ₄ in 2:1 water/soil extract WS (g/l SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
		TRL Report 447, Test 1 Sulfate extraction procedure as BS 1377-1, but ICP-AES used to determine sulfur in solution.	
	Magnesium in 2:1 soil/water extract (g/l Mg)	BR 279 Atomic absorption spectrometry (AAS) method recommended.	
		Commercial test laboratory in-house procedure. Sample preparation as BR 279; ICP-AES used to determine magnesium in solution.	
	Nitrate in 2:1 soil/water extract (g/l NO ₃)	BR 279	
Chloride in 2:1 soil/water extract (g/l Cl)	BR 279		
	BS 1377-3 Section 7		
WATER	pH	BR 279 Electrometric method	
		BS 1377-3 Section 9 Electrometric method	
	Soluble sulfate GWS (SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	
		Commercial test laboratory in-house procedure: Determination of sulfur by inductively coupled plasma atomic emission spectroscopy (ICP-AES)	
	Soluble magnesium (g/l Mg)	BR 279 Atomic absorption spectrometry (AAS) method.	
		Commercial test laboratory in-house procedure: Determination of magnesium in solution by ICP-AES.	
	Nitrate (g/l NO ₃)	BR 279	
Chloride (g/l Cl)	BR 279		
	BS 1377-3 Section 7		

Sample type	Determinand	Recommended test methods	Method specified
SUITE D Brownfield site (pyrite present)			
SOIL	pH in 2.5:1 soil/water extract	BR 279 Electrometric method	✓
		BS 1377-3 Section 9 Electrometric method	✓
	SO ₄ in 2:1 water/soil extract WS (g/l SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	✓
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	✓
		TRL Report 447, Test 1 Sulfate extraction procedure as BS 1377-1, but ICP-AES used to determine sulfur in solution.	✓
	Acid soluble sulfate AS (% SO ₄)	BR 279 Gravimetric method	✓
		BS 1377-3, Section 5 Gravimetric methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	✓
		TRL Report 447, Test 2 Preparation and extraction of sulfate as BS 1377-3, ICP-AES used to determine sulfur in solution.	✓
	Total sulfur TS (% S)	BR 279 Only Ignition in oxygen method recommended.	✓
		TRL Report 447, Test 4A Microwave digestion method.	✓
		TRL Report 447, Test 4B Ignition in oxygen method (e.g. with sulphur-carbon determinator).	✓
	Soluble magnesium (g/l Mg)	BR 279 Atomic absorption spectrometry (AAS) method.	✓
		Commercial test laboratory in-house procedure: Determination of magnesium in solution by ICP-AES.	✓
	Nitrate (g/l NO ₃)	BR 279	✓
Chloride (g/l Cl)	BR 279	✓	
	BS 1377-3 Section 7	✓	
WATER	pH	BR 279 Electrometric method	✓
		BS 1377-3 Section 9 Electrometric method	✓
	Soluble sulfate GWS (SO ₄)	BR 279 Procedures for gravimetric method, cation exchange or ion chromatography.	✓
		BS 1377-3, Section 5 Gravimetric or ion exchange methods. (Values determined as g/l SO ₃ should be multiplied by 1.2.)	✓
		Commercial test laboratory in-house procedure: Determination of sulfur by inductively coupled plasma atomic emission spectroscopy (ICP-AES)	✓
	Soluble magnesium (g/l Mg)	BR 279 Atomic absorption spectrometry (AAS) method.	✓
		Commercial test laboratory in-house procedure: Determination of magnesium in solution by ICP-AES.	✓
Nitrate (g/l NO ₃)	BR 279	✓	

Sample type	Determinand	Recommended test methods	Method specified
	Chloride (g/l Cl)	BR 279	✓
		BS 1377-3 Section 7	✓

S1.19.6 Geotechnical laboratory testing on site (Clause 14.7)

Not required.

S1.19.7 Special geotechnical laboratory testing (Clause 14.8)

Not required.

S1.20 Geoenvironmental laboratory testing (Clause 15) Particular restrictions/relaxations

S1.20.1 Investigation Supervisor or Contractor to schedule geoenvironmental testing (Clause 15.1)

Except where specified otherwise herein, the Investigation Supervisor will schedule the required geoenvironmental tests.

The Contractor shall prepare a blank geoenvironmental test schedule (Clause 15.1), listing on one axis the following information for each sample:

borehole number

sample number of each sample taken

sample type of the sample

sample depth of the sample

and on the other axis the following:

all suites of chemical tests that are identified with quantities in the Bill of Quantities, with separate sheets provided for solid, liquid and gas samples.

The Contractor shall provide each blank geoenvironmental schedule, along with the relevant draft logs, to the Investigation Supervisor within **24 hours** of the sampling for contamination testing.

Where sampling of water is specified, the Contractor shall agree the suite of tests with the Investigation Supervisor in advance of starting water sampling operations. The water sample(s) and the completed water test schedule shall be sent by the Contractor to the laboratory on the same day as the water sampling occurred. If water sample(s) have not been received by the laboratory by mid-day on the day following the water sample collection, the Contractor may be required to retake the samples at their own cost.

S1.20.2 Accreditation required (Clause 15.2)

Chemical laboratory testing shall be carried out to BS EN ISO/IEC 17025. Laboratory testing on soil samples shall conform to the Environment Agency MCERTS (Monitoring Certification Scheme), where applicable. MCERTS is required for, but not limited to, the analytes listed in Annex A of the Environment Agency publication *Performance Standard for Laboratories Undertaking Chemical Testing of Soil*, Version 4, March 2012.

For asbestos, the method of asbestos analysis used shall be accredited the UK Accreditation Service (UKAS); the use of non-accredited methods for asbestos analysis is not permitted. The quality control schemes used by the asbestos analysis laboratory shall comply with UKAS LAB 30 (*Application of ISO/IEC 17025 for asbestos sampling and testing*) and HSE HSG 248 (*Asbestos: the analyst's guide for sampling, analysis and clearance procedures*).

SI.20.3 Chemical testing for contamination (Clause 15.3)

Test Suites E to G are specified in the following tables. The Contractor shall confirm in its Tender return the test methods and shall detail what accreditation requirement shall be provided. Gas sampling is not required (Suite G).

SCHEDULE 1.20.3: TEST SUITES

CHEMICAL LABORATORY TESTING FOR CONTAMINANTS

Nominated test laboratory? *	
Required testing turnaround times? *	

* To be completed in the Tender return

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE E1 - Soil samples general			
Arsenic	1 mg/kg		
Cadmium	0.5 mg/kg		
Chromium - total	10 mg/kg		
Copper	10 mg/kg		
Lead	10 mg/kg		
Mercury	0.5 mg/kg		
Nickel	10 mg/kg		
Selenium	0.5 mg/kg		
Zinc	10 mg/kg		
Antimony	0.1 mg/kg		
Beryllium	1 mg/kg		
Vanadium	0.5mg/kg		
Cyanide - total	5 mg/kg		
pH	0.1 units		
Boron (water soluble)	0.5 mg/kg		
Phenols - total	1 mg/kg		
Total Organic Carbon	0.1% w/w	ASTM D2974-87	
SUITE E2 - Soil samples Asbestos			
Asbestos presence and identification	0.001% w/w	Note E2a	
Asbestos quantification HSG248	0.001%w/w	Note E2b	
SUITE E3 - Soil samples TPHCWG and BTEX			

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
TPHCWG	10 mg/kg	GC-FID Note E3a	
BTEX	0.05 mg/kg	GCMS	
SUITE E4 – Soil samples PAH			
USEPA 16 Polyaromatic Hydrocarbons	0.2 mg/kg	CGMS	
SUITE E5 – Soil samples VOC and SVOC			
Semi-Volatile Hydrocarbons	0.01 mg/kg	GC-MS US EPA Method 8270	
Volatile Hydrocarbons	0.01 mg/kg	GC-MS US EPA Method 8260	
SUITE E6 – Soil samples PCB			
Polychlorinated Biphenyls	0.005 mg/kg	WHO 12	
SUITE E7 – Soil samples hydrocarbon fuel identification			
Total Petroleum Hydrocarbons	50 mg/kg	C8 to C40 by GC FID	
SUITE E8 – Soil samples cyanide speciation – not required			
SUITE E9 – Soil samples hexavalent chromium			
Chromium - hexavalent	1 mg/kg		
SUITE E10 – Soil samples speciated phenols – not required			
SUITE E11 – Soil samples herbicides – not required			
SUITE E12 – Soil samples pesticides – not required			
SUITE E13 – Soil samples organotins– not required			
SUITE E14 – Soil samples dioxins, furans and dioxin-like PCBs– not required			
SUITE E15 – Soil samples for UKWIR water pipe selection I – not required			
SUITE E16 – Soil samples - other tests			
Free Sulphur	100 mg/kg		
Sulphides	10 mg/kg		
Chloride	5 mg/kg		
Loss on ignition	0.1% w/w		
<p>Note E2a</p> <p>Initial Stereo-binocular/PLM identification</p> <p>Each sample is thoroughly mixed, spread across a clean plastic tray and examined visually for the presence of asbestos. Any obvious asbestos material (asbestos cement, pieces of loose lagging, etc.) is removed by hand picking and set aside for weighing.</p>			

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
<p>The samples in which asbestos is detected are dried and weighed along with any materials removed to determine the proportion of asbestos in the original soil sample. The asbestos content of the asbestos containing materials (ACM) are determined by comparison with standard reference materials.</p> <p>A representative sub-sample of approximately for each soil is selected by coning and quartering. These samples are analysed visually under stereo binocular microscope and by polarised light microscopy (PLM) using the method described in HSG 248 (HSE, 2005).</p> <p>Note E2b</p> <p>Approximately 1 gramme of each sample shall be transferred to a clean 500ml conical flask and 300ml of filtered distilled water added. The sample/water mixture shall be agitated for 20 seconds and allowed to stand for 10 seconds. After sedimentation time, aliquots shall be removed from just below the liquid surface and deposited onto a 0.8µm pore size blank tested membrane filter. The filter shall be carefully dried, cleared and fixed onto glass microscope slides using the acetone/triacetin method described in HSG 248 (2005).</p> <p>Two microscope slides produced from each sample. The estimated mass percentage calculated as the mean of the two results for each sample.</p> <p>Phase contrast microscopy shall be based closely on HSG 248 (2005) including reagents, equipment and filter clearing and mounting. A specific Walton-Beckett graticule shall be used for fibre sizing.</p> <p>For the purposes of estimating the asbestos mass percentage, a countable fibre is defined as an amphibole asbestos or chrysotile fibre. Non-asbestos fibres should not be counted.</p> <p>Fibre dimensions (length and diameter), number of ends falling in the graticule, and fibre identity shall be recorded for each individual countable fibre. Measurements shall be recorded to the nearest 5µm for length and to the nearest 0.5µm for diameter, up to a maximum of 5µm. The identity of each fibre shall be recorded as amphibole or chrysotile, where possible. Fibre identification shall be based on morphology and optical properties determined by polarised light microscopy.</p> <p>The overall mass percentage of asbestos is given by: $A.W.(\sum V.p_A + \sum V.p_C) \times 100 / (a.N.q.S)$</p> <p>$p_A$ = average density of amphibole asbestos ($3.0 \times 10^{-6} \mu g \mu m^{-3}$)</p> <p>$p_C$ = density of chrysotile ($2.5 \times 10^{-6} \mu g \mu m^{-3}$)</p> <p>A = area of filter (mm²)</p> <p>V = volume of fibre (μm^3)</p> <p>W = volume of water in suspension (ml)</p> <p>a = area of graticule (mm²)</p> <p>N = number of graticules evaluated</p> <p>S = mass of soil in suspension (μg)</p> <p>q = aliquot on filter (ml)</p> <p>Note E3a</p> <p>Aliphatic: EC5-EC6; >EC6-EC8; >EC8-EC10; >EC10-EC12; >EC12-EC16 ;>EC16-EC35;>EC35-EC44</p> <p>Aromatic: >EC6-EC7; >EC7-EC8; >EC8-EC10; >EC10-EC12; >EC12-EC16; >EC16-EC21; >EC21-EC35; >EC35-EC44</p>			

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE F1 - Water samples general			
pH value	0.1 pH units		
Hardness	2 mg/l		
Arsenic	1 µg/l		
Cadmium	0.5 µg/l		
Chromium	5 µg/l		
Copper	0.5 µg/l		
Lead	1 µg/l		
Mercury	0.1 µg/l		
Nickel	1 µg/l		
Selenium	1 µg/l		
Zinc	1 µg/l		
Antimony	1 µg/l		
Beryllium	1 µg/l		
Vanadium	1 µg/l		
Ammoniacal nitrogen	0.02 mg/l		
Chloride	1 mg/l		
Cyanide - total	10 µg /l		
Phenols - total	10 µg/l		
Dissolved organic carbon (DOC)	10 µg/l		
Calcium	10 µg/l		
SUITE F2 - Water samples speciated TPH and BTEX			
TPH CWG	10 µg/l	Note F12a GC-FID	
BTEX	1 µg/l	GCMS	
SUITE F3 - Water samples PAH			
16 USEPA Polyaromatic Hydrocarbons	0.01 µg/l	GCMS	
SUITE F4 - Water samples VOC and SVOC			
Volatile Organic compounds	1 µg/l	GC-MS US EPA Method 8260	
Semi-Volatile Organic compounds	1 µg/l	GC-MS US EPA Method 8270	

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE F5 – Water samples PCB			
Polychlorinated biphenyls	0.001 µg/l		
SUITE F6 – Water samples hydrocarbon fuel identification			
Total Petroleum Hydrocarbons	50 µg/l	C8 to C40 by GC FID	
SUITE F7 – Water samples cyanide speciation – not required			
SUITE F8 – Water samples hexavalent chromium– not required			
SUITE F9 – Water samples speciated phenols– not required			
SUITE F10 – Water samples oxygen demand– not required			
SUITE F11 – Water samples herbicides– not required			
SUITE F12 – Water samples pesticides– not required			
SUITE F14 – Water samples other parameters– not required			
SUITE F15 – Water samples NAPL			
NAPL fractional and compositional hydrocarbon analysis	-	GCFID with MS	
NAPL density and viscosity	1 kg/m ³ and 0.5 mPa.s		
<p>Note F12a</p> <p>Aliphatic: >EC5-EC6; >EC6-EC8; >EC8-EC10; >EC10-EC12; >EC12-EC16 ;>EC16-EC35;>EC35-EC44</p> <p>Aromatic: >EC6-EC7; >EC7-EC8; >EC8-EC10; >EC10-EC12; >EC12-EC16; >EC16-EC21; >EC21-EC35; >EC35-EC44</p>			

SI.20.4 Waste characterisation (Clause 15.4)

Not required.

SI.20.5 Waste Acceptance Criteria (WAC) testing (Clause 15.5)

Test Suites H to I are specified in the following tables. The Contractor shall confirm the test methods and detail what accreditation requirement will be provided.

Leachate testing is to be undertaken as per the two stage BS EN 12457-3 method whereby the leachate 2:1 results are also reported.

SCHEDULE 1.20.5: TEST SUITES

CHEMICAL TESTING FOR WASTE ACCEPTANCE CRITERIA TESTING (from STWAPs 2003)

Nominated test laboratory? *	
Required testing turnaround times? *	

*** To be completed in the Tender return**

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE H - Waste acceptance total soils			
Total organic carbon	0.1%		
BTEX	0.1mg/kg		
PCBs (7 congeners)	0.1mg/kg		
Mineral oil (C10 - C40)	10 mg/kg		
Polyaromatic hydrocarbons	0.1 mg/kg		
Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE I - Leachability			
Arsenic	0.5 mg/kg		
Barium	20 mg/kg		
Cadmium	0.04 mg/kg		
Chromium	0.5 mg/kg		
Copper	2 mg/kg		
Mercury	0.01 mg/kg		
Molybdenum	0.5 mg/kg		
Nickel	0.4 mg/kg		
Lead	0.5 mg/kg		
Antimony	0.06 mg/kg		

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
Selenium	0.1 mg/kg		
Zinc	4 mg/kg		
Chloride	800 mg/kg		
Fluoride	10 mg/kg		
Sulphate	1,000 mg/kg		
Total dissolved solids (TDS)	4,000 mg/kg		
Phenol Index	1 mg/kg		
Dissolved organic carbon at own pH or pH 7.5-8.05	500 mg/kg		

S1.20.6 Geoenvironmental laboratory testing on site (Clause 15.6)

Not required.

S1.20.7 Special geoenvironmental laboratory testing (Clause 15.7)

The following special geoenvironmental laboratory testing is required:

Soil leachability testing for purposes other than waste classification using method BS EN 12457-3 and testing for suites below. Results shall be reported in mg/l.

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
SUITE J1 - Soil leachability general			
pH value	0.1 pH units		
Arsenic	1 µg/l		
Cadmium	0.5 µg/l		
Chromium	5 µg/l		
Copper	0.5 µg/l		
Lead	1 µg/l		
Mercury	0.1 µg/l		
Nickel	1 µg/l		
Selenium	1 µg/l		
Zinc	1 µg/l		
Antimony	1 µg/l		
Beryllium	1 µg/l		
Vanadium	1 µg/l		

Determinand	Detection level [required]/[offered]	Test method [required]/[offered]	Accreditation [required]/[offered]
Ammoniacal nitrogen	0.02 mg/l		
Cyanide - total	10 µg /l		
Phenols - total	10 µg/l		
SUITE J2 – Soil leachability PAH and BTEX			
BTEX	1 µg/l	GCMS	
16 Polyaromatic Hydrocarbons	0.01 µg/l	GCMS	
SUITE J3 – Soil leachability PCB – not required			
SUITE J4 – Soil leachability cyanide speciation – not required			
SUITE J5 – Soil leachability hexavalent chromium – not required			
SUITE J6 – Soil leachability speciated phenols– not required			
SUITE J7 – Soil leachability other parameters – not required			

S1.21 Reporting (Clause 16) Particular restrictions/relaxations

S1.21.1 Form of exploratory hole logs (Clauses 16.1 and 16.2.1)

No project-specific format requirements apply.

S1.21.2 Information on exploratory hole logs (Clause 16.2.2)

The requirements of Clause 16.2.2 apply.

Exploratory hole locations shall be reported in National Grid coordinates and relative to Ordnance Datum (Clause 16.2.2).

Soil classification is required on exploratory hole logs and shall be in accordance with BS EN ISO 14688-2.

For rock strata, fracture spacings shall be reported.

S1.21.3 Variations to final digital data supply requirements (Clause 16.5.1)

Digital data of all fieldwork, monitoring and laboratory data (including contamination testing) are required (Clause 16.5).

The final digital data shall be issued at the same time as the final report.

Digital data shall be provided in AGS4 format (as specified in Association of Geotechnical and Geoenvironmental Specialists *Electronic transfer of geotechnical and geoenvironmental data* Version 4 and in the guidance documents and standard abbreviations published by AGS on www.ags.org.uk) and in accordance with the requirements specified in Schedule 5 Annex J and Schedules S1.21.3 and S1.21.4.

Attention is drawn to the requirement for any geoenvironmental testing to be included within the .ags file.

All geoenvironmental testing data shall additionally be provided in Excel and .hwo files.



CIVIL | STRUCTURAL | GEOTECHNICAL & ENVIRONMENTAL | TRAFFIC AND TRANSPORT
Lawrence House | 6 Meadowbank Way | Nottingham | NG10 3SB

01773 535555 | design@hspconsulting.com | www.hspconsulting.com