Stantec Consulting Ltd
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Fax: (902) 564-8756

November 4, 2011
File: 121410955.215

Sydney Tar Ponds Agency
1 Inglis Street
PO Box 1028, Stn. A
Sydney, NS B1P 6J7

Attention: **Ms. Diane Ingraham, PhD., PMP, Quality Contracts Manager**

Dear Ms. Ingraham:

Reference: **STPA Project Element TP7 – North & South Tar Ponds Surface Cap**
IQAC – July 2011 Monthly Summary Report

At the request of Sydney Tar Ponds Agency (STPA), Stantec Consulting Ltd. (hereafter Stantec) acting as the Independent Quality Assurance Consultant (IQAC) has completed the following quality assurance inspection/testing services and meetings in accordance with the project requirements at the above mentioned project element between July 1 and July 31, 2011:

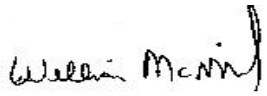
- Project Item PM-01: Nine daily field reports.
- Project Item PM-03: One monthly report (July 2011) completed in the month of November 2011.
- Project Item PM-04: Two site meetings and preparation for the meetings.
- Project Item PM-05: Other meetings and frequent opinions and emails were provided in the month of July 2011.
- Project Item PM-10: Two weekly quality QC/QA meetings and preparation for the meetings.
- Project Item PM-19: Review of and data entry into TP7 April 2011 QC/QA testing summary tables.
- Project Item QCP-02: Submittal reviews (July 2011 QC monthly/daily and testing/inspection reports).
- Project Item TS-43: Completed five site visits on July 8, 13, 14, 21 and 26, 2011 to collect 9 samples (Shelby tubes) from test pads and/or placed grading/bedding (G/B) and protective fill (P/F) soil layers for the purpose of performing laboratory hydraulic conductivity testing. The IQAC was successful in extracting and testing 6 of these samples. The test result of the tested specimens met the project specifications and are included in this monthly report and summarized in the QC-QA Summary table section.
- Project Item TS-112: Completed seven site visits on July 4, 7, 14, 19, 20, 21 and 26, 2011 to assess compaction of test pads and/or protective fill (P/F) soil layers. All measured compaction readings of the placed protective fill (P/F) layers, 21 out 37 readings, exceeded the specified 95% minimum compaction criteria. It should be noted that the IQAC was unable on July 19, 2011 to test a placed protective fill (P/F) soil layer as it was too wet. The test results are included in this monthly report and summarized in the QC-QA Summary table section.
- Project Items Env-T-01: One noise monitoring event completed on July 20, 2011. Noise levels were within the specified limits.

Reference: STPA Project Element TP7 – North & South Tar Ponds Surface Cap
IQAC – July 2011 Monthly Summary Report

We trust this information meets your present requirements. If you have any questions, please do not hesitate to contact us.

Sincerely,

STANTEC CONSULTING LTD



Rabi Morelly, M.Sc., P.Eng.
Geotech/Materials Quality Lead
rabi.morelly@stantec.com

Willie McNeil, B.Tech. (Env.), CET
Project Manager
willie.mcneil@stantec.com

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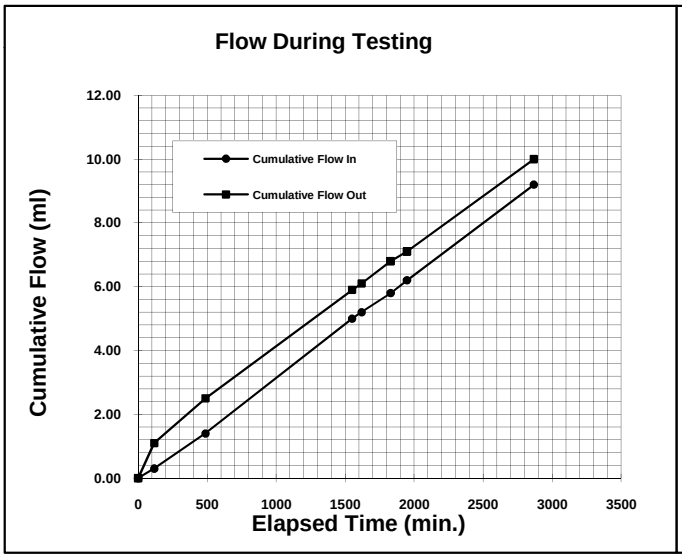
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

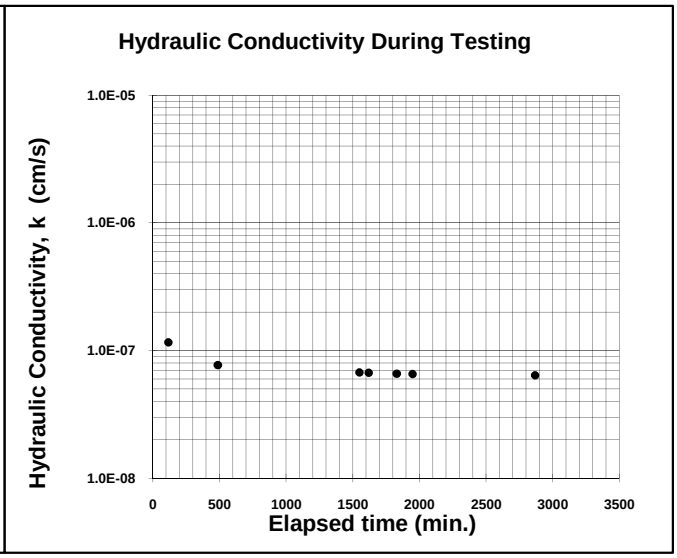
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 14-11
SAMPLE DESCRIPTION:	Test Pad- Protective Fill	**SAMPLE No.:**	TP7-SA2A-14July11-Test Pad

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	9.69	Length (cm)	9.69
Diameter (cm)	6.89	Diameter (cm)	6.89
Area (cm ²)	37.28	Area (cm ²)	37.28
Total Mass (g)	807.9	Total Mass (g)	812.7
Volume (cm³)	361.3	Volume (cm³)	361.3
Water Content (%)	12.5	Water Content (%)	14.2
Degree of Saturation (%)	94.4	Degree of Saturation (%)	103.7
Wet Density (g/cm³)	2.236	Wet Density (g/cm³)	2.249
Dry Density(g/cm³)	1.988	Dry Density(g/cm³)	1.970
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	370	Cell Pressure (kPa)	430
Top Cap Pressure(kPa)	350	Top Cap Pressure (kPa)	370
Bottom Cap Pressure(kPa)	350	Bottom Cap Pressure(kPa)	390
Consolidation Pressure(kPa)	20	Hydraulic Gradient	21.0





HYDRAULIC CONDUCTIVITY= 7.46E-08 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10 $^{-6}$ cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 22-Jul-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 22-Jul-11

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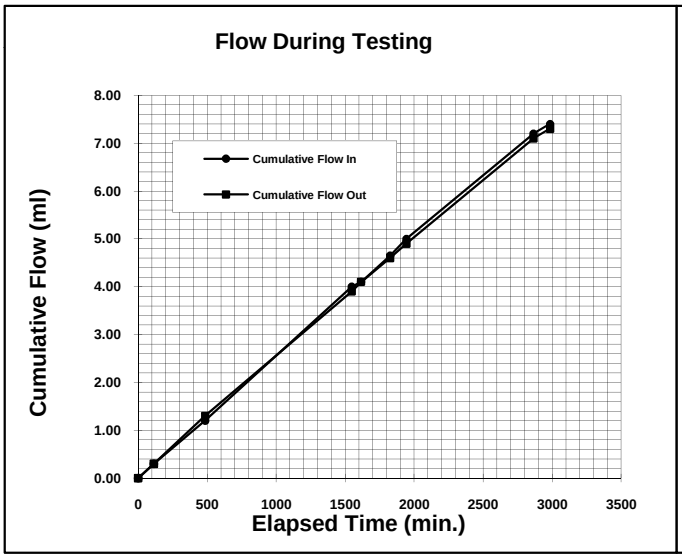
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

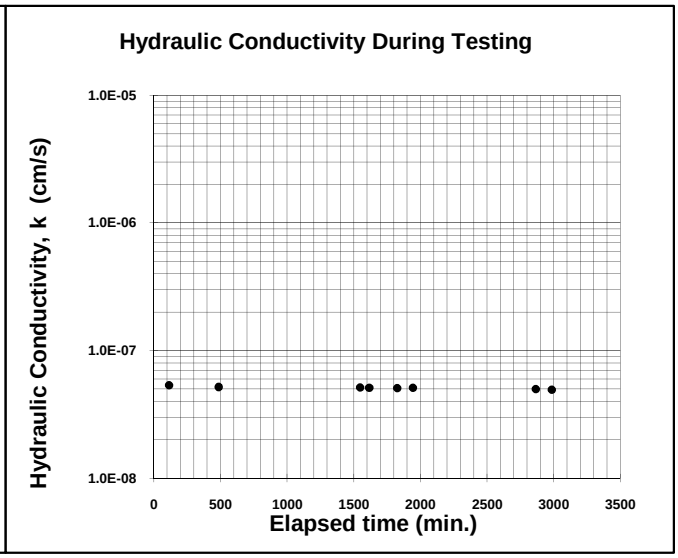
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 14-11
SAMPLE DESCRIPTION:	Test Pad- Protective Fill	**SAMPLE No.:**	TP7-SA1B-14July11-Test Pad

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	9.96	Length (cm)	9.96
Diameter (cm)	6.92	Diameter (cm)	6.92
Area (cm ²)	37.61	Area (cm ²)	37.61
Total Mass (g)	846.9	Total Mass (g)	855.9
Volume (cm³)	374.6	Volume (cm³)	374.6
Water Content (%)	12.1	Water Content (%)	13.0
Degree of Saturation (%)	96.8	Degree of Saturation (%)	104.8
Wet Density (g/cm³)	2.261	Wet Density (g/cm³)	2.285
Dry Density(g/cm³)	2.016	Dry Density(g/cm³)	2.022
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	370	Cell Pressure (kPa)	430
Top Cap Pressure(kPa)	350	Top Cap Pressure (kPa)	370
Bottom Cap Pressure(kPa)	350	Bottom Cap Pressure(kPa)	390
Consolidation Pressure(kPa)	20	Hydraulic Gradient	20.5





HYDRAULIC CONDUCTIVITY= 5.11E-08 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10 $^{-6}$ cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 22-Jul-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 22-Jul-11

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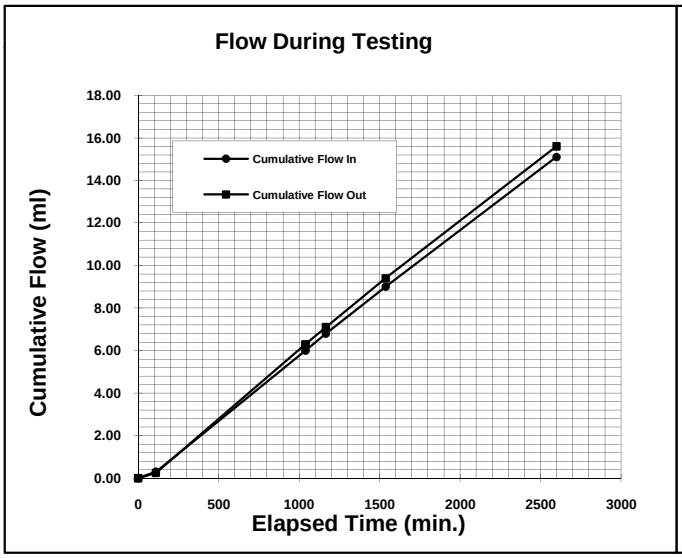
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

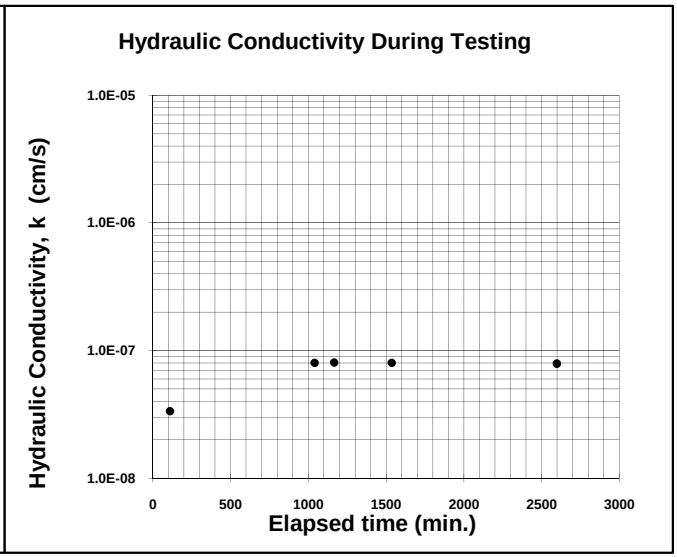
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 13, 2011
SAMPLE DESCRIPTION:	Grading/Bedding Layer	**SAMPLE No.:**	TP7-SA1C-13JULY11-Grading and Bed

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	8.14	Length (cm)	8.14
Diameter (cm)	6.93	Diameter (cm)	6.93
Area (cm ²)	37.72	Area (cm ²)	37.72
Total Mass (g)	678.2	Total Mass (g)	698.2
Volume (cm³)	307.0	Volume (cm³)	307.0
Water Content (%)	7.3	Water Content (%)	12.6
Degree of Saturation (%)	63.7	Degree of Saturation (%)	101.3
Wet Density (g/cm³)	2.209	Wet Density (g/cm³)	2.274
Dry Density(g/cm³)	2.058	Dry Density(g/cm³)	2.019
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	380	Cell Pressure (kPa)	440
Top Cap Pressure(kPa)	360	Top Cap Pressure (kPa)	360
Bottom Cap Pressure(kPa)	360	Bottom Cap Pressure(kPa)	380
Consolidation Pressure(kPa)	20	Hydraulic Gradient	25.1





HYDRAULIC CONDUCTIVITY= 7.07E-08 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10 $^{-6}$ cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 22-Jul-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 22-Jul-11

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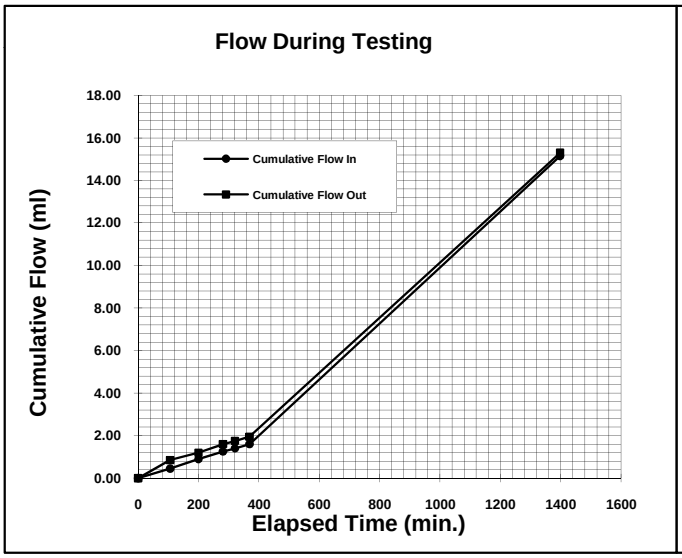
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

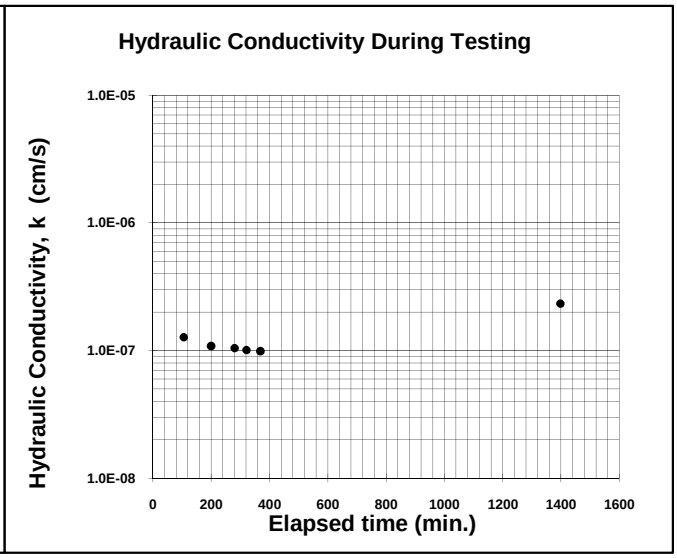
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 8, 2011
SAMPLE DESCRIPTION:	Protective Fill Layer	**SAMPLE No.:**	TP7-SA2C-08JULY11-Protective Fill

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	10.02	Length (cm)	10.02
Diameter (cm)	6.92	Diameter (cm)	6.92
Area (cm ²)	37.61	Area (cm ²)	37.61
Total Mass (g)	845.2	Total Mass (g)	858.4
Volume (cm³)	376.9	Volume (cm³)	376.9
Water Content (%)	11.3	Water Content (%)	12.8
Degree of Saturation (%)	90.0	Degree of Saturation (%)	102.9
Wet Density (g/cm³)	2.243	Wet Density (g/cm³)	2.278
Dry Density(g/cm³)	2.015	Dry Density(g/cm³)	2.019
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	320	Cell Pressure (kPa)	380
Top Cap Pressure(kPa)	300	Top Cap Pressure (kPa)	340
Bottom Cap Pressure(kPa)	300	Bottom Cap Pressure(kPa)	360
Consolidation Pressure(kPa)	20	Hydraulic Gradient	20.4





HYDRAULIC CONDUCTIVITY= 1.29E-07 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10^{-6} cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 14-Jul-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 14-Jul-11

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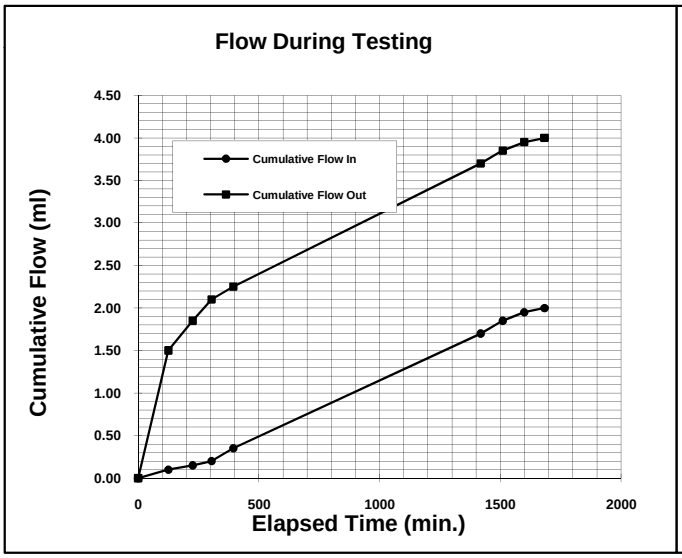
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

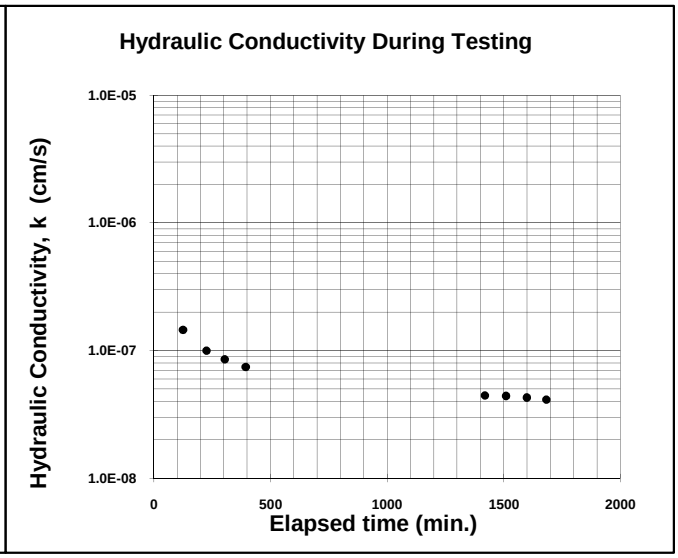
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 8, 2011
SAMPLE DESCRIPTION:	Protective Fill Layer	**SAMPLE No.:**	TP7-SA1H-8JULY11-Protective Fill

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	10.52	Length (cm)	10.52
Diameter (cm)	6.95	Diameter (cm)	6.95
Area (cm ²)	37.94	Area (cm ²)	37.94
Total Mass (g)	849.7	Total Mass (g)	865.9
Volume (cm³)	399.1	Volume (cm³)	399.1
Water Content (%)	7.2	Water Content (%)	13.3
Degree of Saturation (%)	57.0	Degree of Saturation (%)	91.9
Wet Density (g/cm³)	2.129	Wet Density (g/cm³)	2.170
Dry Density(g/cm³)	1.987	Dry Density(g/cm³)	1.915
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	320	Cell Pressure (kPa)	380
Top Cap Pressure(kPa)	300	Top Cap Pressure (kPa)	320
Bottom Cap Pressure(kPa)	300	Bottom Cap Pressure(kPa)	340
Consolidation Pressure(kPa)	20	Hydraulic Gradient	19.4





HYDRAULIC CONDUCTIVITY= 7.21E-08 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10 $^{-6}$ cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 21-Jul-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 21-Jul-11

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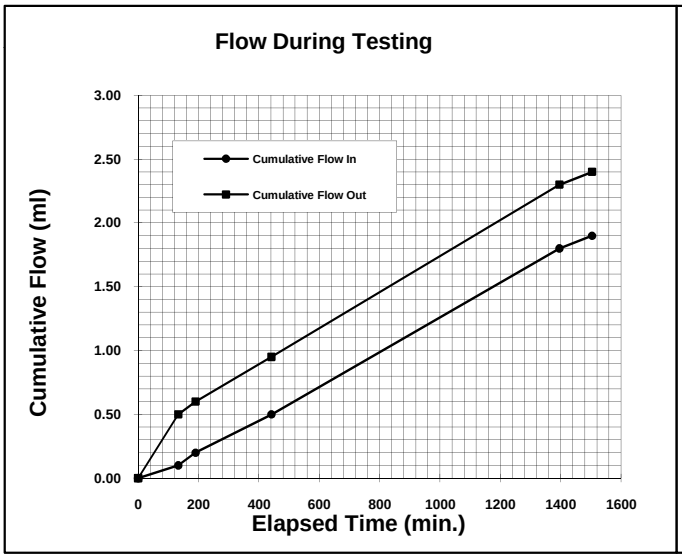
FLEXIBLE WALL HYDRAULIC CONDUCTIVITY TEST REPORT

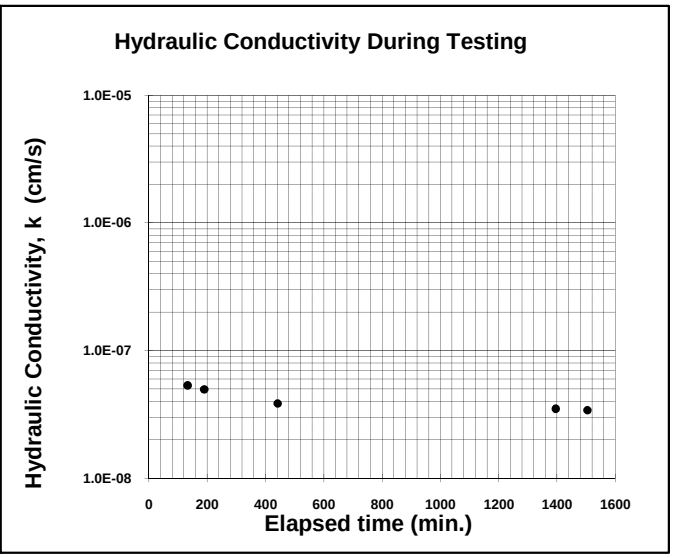
(ASTM D5084-03 Modified)

CLIENT:	Sydney Tar Ponds Agency	**STANTEC PROJECT No:**	121410955
PROJECT TITLE:	Element TP 7	**DATE:**	July 26-11
SAMPLE DESCRIPTION:	Test Pad- Protective Fill	**SAMPLE No.:**	TP7-SA2A-26July11-Test Pad

INITIAL SAMPLE DATA		**FINAL SAMPLE DATA**	
Length (cm)	10.73	Length (cm)	10.73
Diameter (cm)	6.93	Diameter (cm)	6.93
Area (cm ²)	37.72	Area (cm ²)	37.72
Total Mass (g)	933.4	Total Mass (g)	944.2
Volume (cm³)	404.7	Volume (cm³)	404.7
Water Content (%)	8.9	Water Content (%)	11.0
Degree of Saturation (%)	87.6	Degree of Saturation (%)	104.5
Wet Density (g/cm³)	2.306	Wet Density (g/cm³)	2.333
Dry Density(g/cm³)	2.118	Dry Density(g/cm³)	2.102
Assumed Specific Gravity	2.70		

CONSOLIDATION PHASE		**HYDRAULIC CONDUCTIVITY PHASE**	
Cell Pressure(kPa)	380	Cell Pressure (kPa)	420
Top Cap Pressure(kPa)	360	Top Cap Pressure (kPa)	380
Bottom Cap Pressure(kPa)	360	Bottom Cap Pressure(kPa)	400
Consolidation Pressure(kPa)	20	Hydraulic Gradient	19.0





HYDRAULIC CONDUCTIVITY= 4.21E-08 cm/s

Comments:

Test specimen met the specified maximum Hydraulic Conductivity.

Note: Section 02 51 19 of the Project Specifications requires a maximum Hydraulic Conductivity of 1x10 $^{-6}$ cm/s.

Tested By: Blair MacVicar, B.Tech **Date:** 8-Aug-11

Checked By: Rabi Morelly, M.Sc., P.Eng. **Date:** 8-Aug-11

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SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-P/F **SAMPLED FROM** Beechmont- Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 16728

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
4-Jul-2011	1	5112466, 4601349	Protective Fill	2011.0	9.1	96.1	X		200	The measured percent compactions met the requirements of the project specifications (Minimum 95%).
	2	5112499, 4601316		2130.0	8.2	101.8	X		200	
	3	5112417, 4601320		2132.0	6.4	101.9	X		200	

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 4-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 4-Jul-2011

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SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-P/F **SAMPLED FROM** Beechmont-Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 29763

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
7-Jul-2011	1	5112437, 4601340	Protective Fill	2022.0	6.9	96.7	X		200	The measured percent compactions met the requirements of the project specifications (Minimum 95%).
	2	5112481, 4601295		2081.0	7.5	99.5	X		200	
	3	5112525, 4601316		2100.0	6.9	100.4	X		200	

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 7-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 7-Jul-2011

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SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-Test Pad (Protective Fill) **SAMPLED FROM** Beechmont-Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 29723

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
14-Jul-2011	1	5112458, 4601412	1st Lift	1959.0	12.9	93.6	-	-	200	3 Passes
	2	5112458, 4601412	1st Lift	1889.0	13.5	90.3	-	-	200	3 Passes
	3	5112457, 4601411	1st Lift	1974.0	11.5	94.4	-	-	200	3 Passes
	4	5112447, 4601411	1st Lift	1912.0	13.3	91.4	-	-	200	3 Passes
	1	5112448, 4601414	1st Lift	1901.0	14.5	90.9	-	-	200	4 Passes
	2	5112448, 4601410	1st Lift	1909.0	13.5	91.3	-	-	200	4 Passes
	3	5112457, 4601409	1st Lift	1887.0	17.7	90.2	-	-	200	4 Passes
	4	5112457, 4601412	1st Lift	1893.0	13.4	90.5	-	-	200	4 Passes

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 14-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 14-Jul-2011

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SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-P/F **SAMPLED FROM** Beechmont-Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 29723

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
20-Jul-2011	1	5112633, 4601465	2nd lift (P/F)	2029.0	9.8	97.0	X		200	The measured percent compactions met the requirements of the project specifications (Minimum 95%).
	2	5112615, 4601469	2nd lift (P/F)	2010.0	8.3	96.1	X		200	
	3	5112616, 4601435	2nd lift (P/F)	2069.0	8.2	98.9	X		200	

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 20-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 20-Jul-2011

207-201 Churchill Drive
Membertou, NS B1S 1H0
Ph: (902) 564-1855
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SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-P/F **SAMPLED FROM** Beechmont-Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 29763

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
21-Jul-2011	1	5112568, 4601450	2nd lift (P/F)	2112.0	7.9	101.0	X		200	
	2	5112617, 4601429	2nd lift (P/F)	2045.0	7.6	97.8	X		200	
	3	5112663, 4601431	2nd lift (P/F)	2007.0	7.8	95.9	X		200	
	4	5112626, 4601407	2nd lift (P/F)	2146.0	6.6	102.6	X		200	
	5	5112540, 4601428	2nd lift (P/F)	2109.0	8.4	100.8	X		200	
	6	5112547, 4601399	2nd lift (P/F)	2083.0	7.0	99.6	X		200	The measured percent compactions met the requirements of the project specifications (Minimum 95%).
	7	5112547, 4601363	2nd lift (P/F)	2092.0	6.6	100.0	X		200	
	8	5112512, 4601415	2nd lift (P/F)	2101.0	7.0	100.4	X		200	
	9	5112548, 4601418	2nd lift (P/F)	2053.0	6.9	98.1	X		200	
	10	5112514, 4601373	2nd lift (P/F)	2063.0	6.8	98.6	X		200	
	11	5112606, 4601416	2nd lift (P/F)	2086.0	7.3	99.7	X		200	
	12	5112678, 4601430	2nd lift (P/F)	2042.0	6.0	97.6	X		200	

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 21-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 21-Jul-2011

207-201 Churchill Drive
Membertou, NS B1S 1H0
Ph: (902) 564-1855
Fx: (902) 564-8755

SOILS COMPACTION REPORT SHEET

CLIENT: Sydney Tar Ponds Agency **PROJECT:** Element TP7 - North and South Tar Ponds Surface Cap **PROJECT NO:** 121410955.215-500

MATERIAL AND PROCTOR DATA

COMPACTION SPECIFICATION 95% Minimum **MATERIAL TYPE** Cohesive Backfill-Test Pad (Protective Fill) **SAMPLED FROM** Beechmont-Frenchvale

PROCTOR TYPE STD **MAX. DRY DENSITY (kg/m^3)** 2092 **OPTIMUM MOISTURE** 7.2 % **GAUGE SERIAL #** 16731

FIELD TEST DATA

DATE	TEST NO.	TEST LOCATIONS (GPS Coordinates/ ATS-77 System) Northing/Easting	APPROX. ELEV.	DRY DENSITY (kg/m^3)	MOISTURE CONTENT (%)	COMPACTION (%)	PASS	FAIL	PROBE DEPTH (mm)	REMARKS
26-Jul-2011	1	4601358, 5112520	1st Lift	2019.0	8.4	96.5	-	-	200	3 Passes
	2	4601357, 5112517	1st Lift	2095.0	9.2	100.1	-	-	200	3 Passes
	3	4601362 , 5112513	1st Lift	2010.0	10.3	96.1	-	-	200	3 Passes
	4	4601360, 5112521	1st Lift	2049.0	9.0	97.9	-	-	200	3 Passes
	1	4601358, 5112520	1st Lift	2092.0	8.9	100.0	-	-	200	4 Passes
	2	4601357, 5112517	1st Lift	2066.0	8.9	98.8	-	-	200	4 Passes
	3	4601362 , 5112513	1st Lift	2099.0	8.9	100.3	-	-	200	4 Passes
	4	4601360, 5112521	1st Lift	2066.0	9.7	98.8	-	-	200	4 Passes

Note: A compaction test only provides data for the specific test location and to a depth of up to 300 mm below the surface at the time of the test.
Total approval of a fill project requires continuous inspection and a brief report written by a geotechnical engineer.

REVIEWED BY: Rabi Morelly, M.Sc., P.Eng. **DATE:** 26-Jul-11

FIELD TECHNICIAN: Derek Corbett RESULTS REPORTED ON SITE TO: Not Applicable DATE: 26-Jul-2011

Monthly Noise QA Testing Summary Table

Contractor:	HAZCO	**Client:**	STPA	**Form Number:**	TP7 Noise June 2011
Element:	TP7	**Oversight:**	AECOM/CBCL	**Project:**	Remediation of the Tar Ponds and Coke Ovens Sites
Month:	JULY 2011	**IQAC:**	Stantec		

SPECIFIED REQUIREMENTS					RESULTS							NOTES
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QA Frequency**	**Date Collected**	**Criteria**	**QA Sample ID**	**Sample Location GPS Coordinates NAD 83**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QA**
EPP	ENV-T-01	Noise	CBRM Noise By-Law & NSE Criteria	once per month	20-Jul-11	<65 dBA	TP7-07-20-2011-0813-1014	460 1629 511 2287	52.4 dBA	Pass	Y	Sampling location: Terminal Road Fenceline.
EPP	ENV-T-01	Noise	CBRM Noise By-Law & NSE Criteria	once per month	20-Jul-11	<65 dBA	TP7-07-20-2011-1017-1219	460 1705 511 2375	56.5 dBA	Pass	Y	Sample location: Inglis Street fenceline. Transitting contractor trucks and water trucks.
EPP	ENV-T-01	Noise	CBRM Noise By-Law & NSE Criteria	once per month	20-Jul-11	<65 dBA	TP7-07-20-2011-1228-1430	460 1650 511 2550	58.9dBA	Pass	Y	Sample location: Cooling pond laydown area. Transitting contractor trucks, water truck and clay import trucks (Peter's)

Activities onsite at the time of the sampling events included material trucking/dozing and compaction of clay to South Pond.

Stantec Consulting Ltd
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November 3, 2011
File: 121410955.215

Sydney Tar Ponds Agency
1 Inglis Street
PO Box 1028, Stn. A
Sydney, NS B1P 6J7

Attention: **Ms. Diane Ingraham, Ph.D., PMP, Quality Contract Manager**

Dear: Ms. Ingraham

Reference: **Geotechnical/Materials Quality Assurance of Quality Control Program**
Element TP7, Sydney Tar Ponds Project, Sydney, NS
Review of Contractor's July 2011 Quality Control (QC) Report

At the request of the Sydney Tar Ponds Agency (STPA), Stantec Consulting Ltd. (hereafter Stantec), acting as the project Independent Quality Assurance Consultant (IQAC), has completed a Quality Assurance Review of the Contractor's (HAZCO) and their quality control consultant (exp Global Inc)) Monthly Quality Control (QC) Report for the month of July 2011 for project Element TP7.

Comments are prepared using a three tier system as requested by the STPA:

Level 1 - Critical comments which need to be addressed promptly. The IQAC requests responses on any critical comments within one week.

Level 2 - Comments for which a response is required. All comments for which a response is required should be responded to in the form of a written response or by providing the necessary information as requested.

Level 3 - Comments that would improve the quality of the work but for which the agency need not respond to.

Based on our review of the QC information provided from the referenced period, the IQAC offers the following comments for your considerations:

Level 2	Manufacturer quality control test certificates of installed Geotextile are not included in this monthly report.
Level 2	The gradation test results of Rip Rap material supplied from Fred Peter's Pit and tested onsite on May 26, 2011 are still not provided and/or listed in this monthly report.

Reference: **Geotechnical/Materials Quality Assurance of Quality Control Program**
Element TP7 Sydney Tar Ponds Project, Sydney, NS
Review of Contractor's July 2011 Quality Control (QC) Report

Level 2	Despite the fact that all compactions performed on the placed cohesive backfill soil exceeded the specified 95% minimum compaction criteria, over 50% of associated moisture contents were below the specified expected moisture content limits.
Level 3	The hydraulic conductivity (HC) test reports of cohesive soil specimens still do not clearly state the type of tested material and project name. Also, the vertical scale of Hydraulic Conductivity (HC)-Time graph in the test reports should be adjusted to show clearly the change in HC with time during the test.
Level 3	All reports should be signed by the applicable QC testing and review personnel, with names clearly printed, and dated once they are completed and reviewed.

This report covers the quality control aspects for both the geotechnical and materials portions of the project.

We trust this information meets your present needs. If you have any questions, or if we can be of further assistance, please do not hesitate to contact us at your convenience.

Sincerely,

STANTEC CONSULTING LTD

Rabi Morelly, M.Sc., P.Eng.
Geotech/Materials Quality Lead
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November 4, 2011
File: 121410955.215

Sydney Tar Ponds Agency
1 Inglis Street
PO Box 1028, Stn. A
Sydney, NS B1P 6J7

Attention: **Ms. Diane Ingraham, Ph.D., PMP, Quality Contract Manager**

Dear: Ms. Ingraham

Reference: **Environmental Quality Assurance of Quality Control Program**
Element TP7, Sydney Tar Ponds Project, Sydney, NS
Review of Contractor's July 2011 Quality Control (QC) Report

At the request of the Sydney Tar Ponds Agency (STPA), Stantec Consulting Limited (Stantec), acting as the project Independent Quality Assurance Consultant (IQAC), has completed a Quality Assurance Review of the Contractor's (Hazco and their quality control consultant (exp. Global Inc.), Monthly Quality Control (QC) Report for the month of July 2011 for project element TP7.

Comments are prepared using a three tier system as requested by the STPA:

Level 1 - Critical comments which need to be addressed promptly. The IQAC requests responses on any critical comments within one week.

Level 2 - Comments for which a response is required. All comments for which a response is required should be responded to in the form of a written response or by providing the necessary information as requested.

Level 3 - Comments that would improve the quality of the work but for which the agency need not respond to.

Based on our review of the QC information provided from the referenced period, the IQAC offers the following comments for your considerations:

Level 3	<u>Appendix F Environmental</u> QC EILs for July 5 and 6 (7:30) indicate that Noise Monitoring is Acceptable. However, noise monitoring was not conducted on these dates.

Reference: **Environmental Quality Assurance of Quality Control Program**
Element TP7 Sydney Tar Ponds Project, Sydney, NS
Review of Contractor's July 2011 Quality Control (QC) Report

We trust this information meets your present needs. If you have any questions, or if we can be of further assistance, please do not hesitate to contact us at your convenience.

Sincerely,

STANTEC CONSULTING LTD

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Sydney Tar Ponds Agency — Stantec

Quality Control (QC) and Quality Assurance (QA) Environmental Testing Summary Table

Contractor:	HAZCO	**Client:**	STPA	**Form Number:** 97918-QAF-073
Element:	TP 7	**Oversight:**	AECOM/CBCL	**Project:** Remediation of the Tar Ponds and Coke Ovens Sites
		IQAC:	Stantec	

☐ **Weekly**
☑ **Monthly**

From: 26-Jun-11 30-Jul-11

Note: This summary table shall be submitted with the Contractor's Monthly QC Report only after all revisions are made to the data here contained based on any DE Environmental comments of the information submitted weekly.

SPECIFIED REQUIREMENTS						RESULTS												NOTES	
Spec Section	Spec Description	Test Type	Standard	QC Frequency	QA Frequency	Date Collected	QC Sample ID	Criteria	Date QC Result Received	QC Test Result	QC Pass/Fail	QC Frequency Met? Y/N	QA Sample ID	Date QA Result Received	QA Test Result	QA Pass/Fail	QA Frequency Met? Y/N	QC	QA
Week 1																			
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		29-Jun-11	Noise-TP7-Terminal Rd Fence line- 29 Jun 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	29-Jun-11	46.7 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		29-Jun-11	Noise-TP7-South Pond look off-29 Jun 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	29-Jun-11	56.8 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		29-Jun-11	Noise-TP7-Cooling pond-29 Jun 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	29-Jun-11	50.1 Leq (dBA)	Pass	Y							
ENV-T-02	Turbidity Monitoring	Turbidity sampling with portable turbidity meter	EPP Req.	No Testing		No Testing	No Testing	8 NTU above background	No Testing	No Testing	No Testing	No Testing						No turbidity monitoring was conducted because HAZCO has not performed any intrusive work in or near waterways during the reporting period.	
Week 2																			
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		4-Jul-11	Noise-TP7-Terminal Rd Fence line- 04 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	4-Jul-11	53.5 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		4-Jul-11	Noise-TP7-Inglis St Fence line- 04 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	4-Jul-11	47.9 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		4-Jul-11	Noise-TP7-South Pond Look off- 04 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	4-Jul-11	50.9 Leq (dBA)	Pass	Y							
ENV-T-02	Turbidity Monitoring	Turbidity sampling with portable turbidity meter	EPP Req.	No Testing		No Testing	No Testing	8 NTU above background	No Testing	No Testing	No Testing	No Testing						No turbidity monitoring was conducted because HAZCO has not performed any intrusive work in or near waterways during the reporting period.	
Week 3																			
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		11-Jul-11	Noise-TP7-Terminal Rd Fence line- 11 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	11-Jul-11	48.0 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		11-Jul-11	Noise-TP7-Inglis St Fence line- 11 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	11-Jul-11	51.7 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		11-Jul-11	Noise-TP7-South Pond Look off- 11 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	11-Jul-11	54.7 Leq (dBA)	Pass	Y							
ENV-T-02	Turbidity Monitoring	Turbidity sampling with portable turbidity meter	EPP Req.	No Testing		No Testing	No Testing	8 NTU above background	No Testing	No Testing	No Testing	No Testing						No turbidity monitoring was conducted because HAZCO has not performed any intrusive work in or near waterways during the reporting period.	
Week 4																			
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly	Once monthly	20-Jul-11	Noise-TP7-Terminal Rd Fence line- 20 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	20-Jul-11	48.9 Leq (dBA)	Pass	Y	TP7-07-20-2011-0813-1014	20-Jul-11	52.4 dBA	Pass	Y		Based on 2 hour Leq - Side by side with QC. Refer to Monthly Noise QA Testing Summary Table provided in this report for further details.
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly	Once monthly	20-Jul-11	Noise-TP7-Inglis St Fence line- 20 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	20-Jul-11	53.7 Leq (dBA)	Pass	Y	TP7-07-20-2011-1017-1219	20-Jul-11	56.5 dBA	Pass	Y		Based on 2 hour Leq - Side by side with QC. Refer to Monthly Noise QA Testing Summary Table provided in this report for further details.
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly	Once monthly	20-Jul-11	Noise-TP7-Cooling Pond Laydown- 20 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	20-Jul-11	56.4 Leq (dBA)	Pass	Y	TP7-07-20-2011-1228-1430	20-Jul-11	58.9 dBA	Pass	Y		Based on 2 hour Leq - Side by side with QC. Refer to Monthly Noise QA Testing Summary Table provided in this report for further details.
ENV-T-02	Turbidity Monitoring	Turbidity sampling with portable turbidity meter	EPP Req.	No Testing		No Testing	No Testing	8 NTU above background	No Testing	No Testing	No Testing	No Testing						No turbidity monitoring was conducted because HAZCO has not performed any intrusive work in or near waterways during the reporting period.	
Week 5																			
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		25-Jul-11	Noise-TP7-Terminal Rd Fence line- 25 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	25-Jul-11	46.3 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		25-Jul-11	Noise-TP7-South Pond look off- 25 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	25-Jul-11	52.6 Leq (dBA)	Pass	Y							
ENV-T-01	Noise Montiroing	Noise Montiroing with dosimeter or equivalent	CBRM Bylaw and NSE Criteria	Once weekly		25-Jul-11	Noise-TP7-Inglis St fence line - 25 July 2011	CBRM Bylaw and NSE Criteria 65 Leq (dBA)	25-Jul-11	52.1 Leq (dBA)	Pass	Y							
ENV-T-02	Turbidity Monitoring	Turbidity sampling with portable turbidity meter	EPP Req.	No Testing		No Testing	No Testing	8 NTU above background	No Testing	No Testing	No Testing	No Testing						No turbidity monitoring was conducted because HAZCO has not performed any intrusive work in or near waterways during the reporting period.	

Quality Control (QC) and Quality Assurance (QA) Testing Summary Table

☐ **Weekly**
☑ **Monthly** **From:** 26-Jun-11 **To:** 30-Jul-11

Contractor:	Hazco	**Client:**	STPA	**Form Number:**	97918-QAF-059
Element:	TP7	**Oversight:**	AECOM/CBCL	**Project:**	Remediation of the Tar Ponds and Coke Ovens Sites
		IQAC:	Stantec		

SPECIFIED REQUIREMENTS						RESULTS													NOTES	
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QC Frequency**	**QA Frequency**	**Date Collected**	**QC Sample ID**	**Criteria**	**Date QC Result Received**	**QC Test Result**	**Units**	**QC Pass/Fail**	**QC Frequency Met? Y/N**	**QA Sample ID**	**Date QA Result Received**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QC**	**QA**
Week 1 Jun 26 - Jul 02, 2011																				
32 91 21	Topsoil Placement and Grading	Physical Evaluation	ASTM D5268	Each source or when material properties change		15-Apr-11	TS-SA#1-15-Apr-11	20%-70% Sand min 7% Clay pH 6.0-7.5 <5% Larger 2mm	pending	pending	%	pending	Y							
32 91 21	Topsoil Placement and Grading	Organic Matter Content	ASTM D2974	Each Source		15-Apr-11	TS-SA#1-15-Apr-11	4.0-8.0%	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		4-May-11	GB-Com-04 May 11	95% (or 92% if moisture ≥ opt. +6%)	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		20-May-11	LP-Com-20 May 11	95% (or 92% if moisture ≥ opt. +6%)	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		30-May-11	PF-Com-30 May 11	95% (or 92% if moisture ≥ opt. +6%)	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		31-May-11	Perm-PF-1	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		9-Jun-11	Perm-GB-8	≤ 1 x 10^{-6} cm/sec	27-Jun-11	4.7E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		9-Jun-11	Perm-GB-9	≤ 1 x 10^{-6} cm/sec	27-Jun-11	2.0E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	9-Jun-11	GB-Com-09 Jun 11	95% (or 92% if moisture ≥ opt. +6%)	7-Jul-11	96.1-100.4 (8.8-12.1)	%	pass	Y	G/B-Cohesive Backfill, Tests 1-3 (9-June-11b)	9-Jun-11	% Compaction: 97.8, 95.6 and 97.0 % M.C.: 11.3, 10.8 and 11.8	Pass	Y		All compactions met the specified 95% minimum compaction criteria. Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		10-Jun-11	Perm-GB-10	≤ 1 x 10^{-6} cm/sec	28-Jun-11	1.3E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		10-Jun-11	Perm-GB-11	≤ 1 x 10^{-6} cm/sec	28-Jun-11	4.6E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		13-Jun-11	Perm-GB-12	≤ 1 x 10^{-6} cm/sec	28-Jun-11	2.7E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		14-Jun-11	Perm-GB-13	≤ 1 x 10^{-6} cm/sec	4-Jul-11	8.5E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		21-Jun-11	GB SA#2	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	29-Jun-11	100% passing 150 mm 100% passing 100 mm 83.3% passing 5 mm 39.6% passing 0.075 mm	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		21-Jun-11	GB SA#2	Not Specified	30-Jun-11	Liquid Limit: 22.4 Plastic Limit: 16.7 Plastic Index: 5.8	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		21-Jun-11	GB SA#2	Not Specified	30-Jun-11	2077 (8.9)	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		21-Jun-11	PF SA#2	Not Specified	pending	pending	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		21-Jun-11	PF SA#2	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	29-Jun-11	100% passing 150 mm 100% passing 100 mm 81.5% passing 5 mm 52.1% passing 0.075 mm	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		21-Jun-11	GB SA#3	Not Specified	30-Jun-11	Liquid Limit: 32.6 Plastic Limit: 16.1 Plastic Index: 16.5	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		21-Jun-11	GB SA#3	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	30-Jun-11	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		21-Jun-11	GB SA#3	Not Specified	30-Jun-11	2098 (9.8)	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Compaction and Moisture Content	ASTM D698		1 test per source or if material properties change									Cohesive Backfill Soil G/B Beechmont 22-June-11	29-Jun-11	SPMDD=2092 kg/m^3 Optimum Moisture = 7.2 %	Not Applicable	Y		Standard Proctor Maximum Dry Density completed in accordance to specified standard Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422 ASTM C136		1 test per source or if material properties change									Cohesive Backfill Soil G/B Beechmont 22-June-11	27-Jun-11	Passing 150 mm : 100.0% Passing 100 mm: 100.0% Passing 4.75 mm: 83.8% Passing 0.075mm: 27.0%	Fail	Y		The specified gradations limits are: 100 % Passing 150 mm 95-100 % Passing 100 mm 80-100 % Passing 4.75 mm ≥30 % Passing 0.075 mm Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Soil Liquid Limit, Plastic Limit and Plasticity Index	ASTM D4318		1 test per source or if material properties change									Cohesive Backfill Soil G/B Beechmont 22-June-11	27-Jun-11	LL= 24.7 PL= 21.0 PI= 3.7	Refer to comment section	Y		Acceptance criteria are not specified (informative tests). Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Laboratory Compaction and Moisture Content	ASTM D698		1 test per source or if material properties change									Cohesive Backfill Soil G/B Frenchvale 22-June-11	28-Jun-11	SPMDD=2032kg/m^3 Optimum Moisture = 10.4%	Not Applicable	Y		Standard Proctor Maximum Dry Density completed in accordance to specified standard. Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422 ASTM C136		1 test per source or if material properties change									Cohesive Backfill Soil G/B Frenchvale 22-June-11	27-Jun-11	Passing 150 mm : 100.0% Passing 100 mm: 100.0% Passing 4.75 mm: 81.30% Passing 0.075mm: 52.0%	Pass	Y		The specified gradations limits are: 100 % Passing 150 mm 95-100 % Passing 100 mm 80-100 % Passing 4.75 mm ≥30 % Passing 0.075 mm Test results were reported in June 2011 IQAC report.

Quality Control (QC) and Quality Assurance (QA) Testing Summary Table

Contractor:	Hazco	**Client:**	STPA
Element:	TP7	**Oversight:**	AECOM/CBCL
		IQAC:	Stantec

Form Number: 97918-QAF-059
Project: Remediation of the Tar Ponds and Coke Ovens Sites

☐ **Weekly**
☑ **Monthly** **From:** 26-Jun-11 **To:** 30-Jul-11

SPECIFIED REQUIREMENTS						RESULTS													NOTES	
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QC Frequency**	**QA Frequency**	**Date Collected**	**QC Sample ID**	**Criteria**	**Date QC Result Received**	**QC Test Result**	**Units**	**QC Pass/Fail**	**QC Frequency Met? Y/N**	**QA Sample ID**	**Date QA Result Received**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QC**	**QA**
31 22 16	Cohesive Soil Backfill	Soil Liquid Limit, Plastic Limit and Plasticity Index	ASTM D4318		1 test per source or if material properties change									Cohesive Backfill Soil G/B Frenchvale 22-June-11	27-Jun-11	LL= 25.4 PL= 21.2 PI= 4.2	Refer to comment section	Y		Acceptance criteria are not specified (informative tests). Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		22-Jun-11	Perm-PF-6	≤ 1 x 10^{-6} cm/sec	5-Jul-11	3.1E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		23-Jun-11	PF SA#3	Not Specified	5-Jul-11	Liquid Limit: 23.2 Plastic Limit: 17.0 Plastic Index: 6.2	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		23-Jun-11	PF SA#3	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	5-Jul-11	100% passing 150 mm 100% passing 100 mm 82.0% passing 5 mm 44.7% passing 0.075 mm	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		23-Jun-11	PF SA#3	Not Specified	8-Jul-11	2115 (9.5)	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		23-Jun-11	Perm-PF-7	≤ 1 x 10^{-6} cm/sec	5-Jul-11	8.1E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		23-Jun-11	Perm-PF-8	≤ 1 x 10^{-6} cm/sec	5-Jul-11	3.8E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		23-Jun-11	Perm-PF-9	≤ 1 x 10^{-6} cm/sec	5-Jul-11	2.6E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		23-Jun-11	Perm-PF-10	≤ 1 x 10^{-6} cm/sec	5-Jul-11	2.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		24-Jun-11	PF-Com-24 June 11	95% (or 92% if moisture ≥ opt. +6%)	27-Jun-11	96.5-100.9 (7.5-9.6)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		24-Jun-11	Perm-PF-11	≤ 1 x 10^{-6} cm/sec	6-Jul-11	2.5E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		24-Jun-11	Perm-PF-12	≤ 1 x 10^{-6} cm/sec	6-Jul-11	1.9E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		25-Jun-11	PF-Com-25 June 11	95% (or 92% if moisture ≥ opt. +6%)	27-Jun-11	95.9-100.6 (8.0-11.7)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jun-11	Perm-PF-13	≤ 1 x 10^{-6} cm/sec	6-Jul-11	4.5E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jun-11	Perm-PF-14	≤ 1 x 10^{-6} cm/sec	6-Jul-11	1.8E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		27-Jun-11	PF-Com-27 June 11	95% (or 92% if moisture ≥ opt. +6%)	28-Jun-11	96.6-100.9 (8.0-11.2)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		27-Jun-11	GB-Com-27 June 11	95% (or 92% if moisture ≥ opt. +6%)	28-Jun-11	97.6-100.5 (8.1-10.5)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		27-Jun-11	Perm-GB-14	≤ 1 x 10^{-6} cm/sec	6-Jul-11	9.5E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		27-Jun-11	Perm-GB-15	≤ 1 x 10^{-6} cm/sec	6-Jul-11	2.6E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		27-Jun-11	GB SA#4	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	8-Jul-11	100% passing 150 mm 100% passing 100 mm 80.3% passing 5 mm 50.2% passing 0.075 mm	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		27-Jun-11	GB SA#4	Not Specified	8-Jul-11	Liquid Limit: 26.6 Plastic Limit: 18.7 Plastic Index: 8.0	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		27-Jun-11	GB SA#4	Not Specified	8-Jul-11	2006 (10)	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	28-Jun-11	PF-Com-28 June 11	95% (or 92% if moisture ≥ opt. +6%)	29-Jun-11	95.6-100.5 (8.4-12.4)	%	pass	Y	P/F-Cohesive Backfill, Tests 1-3 (28-June-11)	28-Jun-11	% Compaction: 100.7, 97.3 and 97.3 % M.C.: 7.3, 9.6 and 9.1	Pass	Y		All compactions met the specified 95% minimum compaction criteria. Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.									P/F-Cohesive Backfill, Tests 4-6 (28-June-11)	28-Jun-11	% Compaction: 99.6, 95.3 and 97.5 % M.C.: 8.3, 5.9 and 6.1	Pass	Y		All compactions met the specified 95% minimum compaction criteria. Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3	1 test or 10% of QC tests whichever is greater.	28-Jun-11	Perm-PF-15	≤ 1 x 10^{-6} cm/sec	7-Jul-11	1.9E-08	cm/s	pass	Y	P/F-Cohesive Backfill, Perm (28-June-11)	14-Jul-11	1.29 x10^{-7} cm/s	Pass	Y		Met the specified maximum Permeability of 1 x 10^{-6} cm/s. Test results were reported in June 2011 IQAC report.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		28-Jun-11	Perm-PF-16	≤ 1 x 10^{-6} cm/sec	7-Jul-11	1.9E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		29-Jun-11	PF-Com-29 June 11	95% (or 92% if moisture ≥ opt. +6%)	30-Jun-11	96.8-100.9 (8.0-10.9)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		29-Jun-11	Perm-PF-17	≤ 1 x 10^{-6} cm/sec	7-Jul-11	1.0E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		30-Jun-11	GB-Com-30 June 11	95% (or 92% if moisture ≥ opt. +6%)	4-Jul-11	98.1-101.0 (7.9-9.6)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		30-Jun-11	Perm-GB-16	≤ 1 x 10^{-6} cm/sec	11-Jul-11	1.6E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		30-Jun-11	GB SA#5	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		30-Jun-11	GB SA#5	Not Specified	8-Jul-11	Liquid Limit: 25.9 Plastic Limit: 21.0 Plastic Index: 4.9	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		30-Jun-11	GB SA#5	Not Specified	pending	pending	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		30-Jun-11	PF-Com-30 June 11	95% (or 92% if moisture ≥ opt. +6%)	4-Jul-11	96.6-100.9 (8.2-12.5)	%	pass	Y							

Quality Control (QC) and Quality Assurance (QA) Testing Summary Table

☐ **Weekly**
☑ **Monthly** **From:** 26-Jun-11 **To:** 30-Jul-11

Contractor:	Hazco	**Client:**	STPA	**Form Number:**	97918-QAF-059
Element:	TP7	**Oversight:**	AECOM/CBCL	**Project:**	Remediation of the Tar Ponds and Coke Ovens Sites
		iQAC:	Stantec		

SPECIFIED REQUIREMENTS						RESULTS												NOTES	
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QC Frequency**	**QA Frequency**	**Date Collected**	**QC Sample ID**	**Criteria**	**Date QC Result Received**	**QC Test Result**	**Units**	**QC Pass/Fail**	**QC Frequency Met? Y/N**	**QA Sample ID**	**Date QA Result Received**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QC**	**QA**
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		30-Jun-11	Perm-PF-18	≤ 1 x 10^{-6} cm/sec	11-Jul-11	1.1E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		30-Jun-11	Perm-PF-19	≤ 1 x 10^{-6} cm/sec	11-Jul-11	9.1E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		30-Jun-11	PF SA#4	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	See Note	See Note	%	pending	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		30-Jun-11	PF SA#4	Not Specified	See Note	See Note	%	For Information Only	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		30-Jun-11	PF SA#4	Not Specified	pending	pending	kg/m^3 (%)	For Information Only	Y							
Week 2 Jul 03 - Jul 09, 2011																				
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		4-Jul-11	GB-Com-04 July 11	95% (or 92% if moisture ≥ opt. +6%)	5-Jul-11	96.6-100.9 (7.0-10.0)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		4-Jul-11	Perm-GB-17	≤ 1 x 10^{-6} cm/sec	13-Jul-11	8.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		4-Jul-11	Perm-GB-18	≤ 1 x 10^{-6} cm/sec	13-Jul-11	1.9E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	4-Jul-11	PF-Com-04 July 11	95% (or 92% if moisture ≥ opt. +6%)	5-Jul-11	97.2-100.4 (8.5-11.9)	%	pass	Y	PF-Cohesive Backfill, Tests 1-3 (4-Jul-11)	4-Jul-11	% Compaction: 96.1-101.9 % M.C.: 6.4-9.1	Pass	Y		All compactions met the specified 95% minimum compaction criteria.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		4-Jul-11	Perm-PF-20	≤ 1 x 10^{-6} cm/sec	13-Jul-11	1.1E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		4-Jul-11	Perm-PF-21	≤ 1 x 10^{-6} cm/sec	13-Jul-11	5.0E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		5-Jul-11	GB-Com-05 July 11	95% (or 92% if moisture ≥ opt. +6%)	6-Jul-11	98.2-100.9 (8.6-10.3)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		5-Jul-11	PF-Com-05 July 11	95% (or 92% if moisture ≥ opt. +6%)	6-Jul-11	96.6-100.1 (6.9-11.0)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		5-Jul-11	PF-SA#5	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	See Note	See Note	%	pending	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		5-Jul-11	PF-SA#5	Not Specified	See Note	See Note	%	For Information Only	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		5-Jul-11	PF-SA#5	Not Specified	pending	pending	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		6-Jul-11	GB-Com-06 July 11	95% (or 92% if moisture ≥ opt. +6%)	7-Jul-11	97.1-100.9 (7.8-8.8)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		6-Jul-11	PF-Com-06 July 11	95% (or 92% if moisture ≥ opt. +6%)	7-Jul-11	97.6-100.3 (9.0-11.5)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		6-Jul-11	Perm-PF-22	≤ 1 x 10^{-6} cm/sec	15-Jul-11	1.0E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		6-Jul-11	Perm-PF-23	≤ 1 x 10^{-6} cm/sec	15-Jul-11	1.9E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		6-Jul-11	Perm-PF-24	≤ 1 x 10^{-6} cm/sec	15-Jul-11	1.2E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		7-Jul-11	GB-Com-07 July 11	95% (or 92% if moisture ≥ opt. +6%)	8-Jul-11	96.8-100.9 (8.3-10.1)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	7-Jul-11	PF-Com-07 July 11	95% (or 92% if moisture ≥ opt. +6%)	8-Jul-11	97.3-100.5 (8.1-10.4)	%	pass	Y	PF-Cohesive Backfill, Tests 1-3 (7-Jul-11)	7-Jul-11	% Compaction: 96.7-100.4 % M.C.: 6.9-7.5	Pass	Y		All compactions met the specified 95% minimum compaction criteria.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		7-Jul-11	Perm-GB-19	≤ 1 x 10^{-6} cm/sec	18-Jul-11	1.0E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		7-Jul-11	Perm-GB-20	≤ 1 x 10^{-6} cm/sec	18-Jul-11	1.5E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		7-Jul-11	Perm-PF-25-A	≤ 1 x 10^{-6} cm/sec	18-Jul-11	9.0E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		7-Jul-11	Perm-PF-25-B	≤ 1 x 10^{-6} cm/sec	18-Jul-11	3.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		7-Jul-11	Perm-PF-25-C	≤ 1 x 10^{-6} cm/sec	18-Jul-11	1.9E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Particle Size Analysis	ASTM D422	Every 10 000 m^3		7-Jul-11	PF-SA#6	100% passing 150 mm ≥ 95% passing 100 mm ≥ 80% passing 4.75 mm ≥ 30% passing 0.075 mm	See Note	See Note	%	pending	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Atterburg Limits	ASTM D698	Every 10 000 m^3		7-Jul-11	PF-SA#6	Not Specified	See Note	See Note	%	For Information Only	Y						Testing not required under contract. Revised daily reports to reflect changes.	
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		7-Jul-11	PF-SA#6	Not Specified	pending	pending	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		8-Jul-11	PF-Com-08 July 11	95% (or 92% if moisture ≥ opt. +6%)	11-Jul-11	95.1-100.4 (8.4-10.4)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		8-Jul-11	Perm-PF-26	≤ 1 x 10^{-6} cm/sec	20-Jul-11	5.7E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		8-Jul-11	MC-PF-1	Not Specified	15-Jul-11	13.8%	%	For Information Only	Y							

Quality Control (QC) and Quality Assurance (QA) Testing Summary Table

☐ **Weekly**
☑ **Monthly** **From:** 26-Jun-11 **To:** 30-Jul-11

Contractor:	Hazco	**Client:**	STPA	**Form Number:**	97918-QAF-059
Element:	TP7	**Oversight:**	AECOM/CBCL	**Project:**	Remediation of the Tar Ponds and Coke Ovens Sites
		IQAC:	Stantec		

SPECIFIED REQUIREMENTS						RESULTS													NOTES	
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QC Frequency**	**QA Frequency**	**Date Collected**	**QC Sample ID**	**Criteria**	**Date QC Result Received**	**QC Test Result**	**Units**	**QC Pass/Fail**	**QC Frequency Met? Y/N**	**QA Sample ID**	**Date QA Result Received**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QC**	**QA**
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		8-Jul-11	MC-PF-2	Not Specified	15-Jul-11	10.0%	%	For Information Only	Y							
Week 3 Jul 10 - Jul 16, 2011																				
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		11-Jul-11	PF-Com-11 July 11	95% (or 92% if moisture ≥ opt. +6%)	12-Jul-11	97.1-100.9 (8.5-9.2)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		11-Jul-11	GB-Com-11 July 11	95% (or 92% if moisture ≥ opt. +6%)	12-Jul-11	96.8-100.4 (8.7-8.8)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		11-Jul-11	Perm-PF-27	≤ 1 x 10^{-6} cm/sec	21-Jul-11	7.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		11-Jul-11	Perm-PF-28	≤ 1 x 10^{-6} cm/sec	21-Jul-11	1.8E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		11-Jul-11	Perm-GB-21	≤ 1 x 10^{-6} cm/sec	20-Jul-11	1.4E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		11-Jul-11	Perm-GB-22	≤ 1 x 10^{-6} cm/sec	20-Jul-11	1.0E-07	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		11-Jul-11	Perm-GB-23	≤ 1 x 10^{-6} cm/sec	20-Jul-11	4.3E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		11-Jul-11	MC-PF-3	Not Specified	15-Jul-11	11.5	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		12-Jul-11	PF-Com-12 July 11	95% (or 92% if moisture ≥ opt. +6%)	13-Jul-11	96.8-100.0 (8.5-10.2)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		12-Jul-11	Perm-PF-29	≤ 1 x 10^{-6} cm/sec	21-Jul-11	5.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		13-Jul-11	PF-Com-13 July 11	95% (or 92% if moisture ≥ opt. +6%)	14-Jul-11	96.3-100.8 (8.5-10.4)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		13-Jul-11	Perm-PF-30	≤ 1 x 10^{-6} cm/sec	26-Jul-11	5.2E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		13-Jul-11	Perm-PF-31	≤ 1 x 10^{-6} cm/sec	26-Jul-11	3.7E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		13-Jul-11	MC-PF-4	Not Specified	15-Jul-11	11.0	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		14-Jul-11	PF-Com-14 July 11	95% (or 92% if moisture ≥ opt. +6%)	15-Jul-11	97.6-101.7 (8.0-10.2)		pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		14-Jul-11	Perm-PF-32	≤ 1 x 10^{-6} cm/sec	26-Jul-11	6.8E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	14-Jul-11	TS3-Com-3 Passes	95% (or 92% if moisture ≥ opt. +6%)	15-Jul-11	95.8-97.9 (11.3-13.0)	%	pass	Y	Test Pad-3 Passes-Cohesive Backfil (PF)I, Tests 1-4 (14-Jul-11)	14-Jul-11	% Compaction: 90.3-94.4 % M.C.: 11.5-13.5	See Notes	Y		Test pad construction is required to demonstrate that the protectve fill can be installed to achieve the required permeability.
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	14-Jul-11	TS3-Com-4 Passes	95% (or 92% if moisture ≥ opt. +6%)	15-Jul-11	94.7-96.7 (11.7-12.6)	%	pass	Y	Test Pad-4 Passes-Cohesive Backfill (PF), Tests 1-4 (14-Jul-11)	14-Jul-11	% Compaction: 90.2-91.3 % M.C.: 13.4-17.7	See Notes	Y		Test pad construction is required to demonstrate that the protectve fill can be installed to achieve the required permeability.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3	1 test or 10% of QC tests whichever is greater.	14-Jul-11	Perm-TS3-1	≤ 1 x 10^{-6} cm/sec	26-Jul-11	2.5E-08	cm/s	pass	Y	TP7-SA1B-14July11-Test Pad	14-Jul-11	5.11 x10^{-8} cm/s	Pass	Y		Met the specified maximum Permeability of 1 x 10^{-7} cm/s.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3	1 test or 10% of QC tests whichever is greater.	14-Jul-11	Perm-TS3-2	≤ 1 x 10^{-6} cm/sec	26-Jul-11	6.2E-08	cm/s	pass	Y	TP7-SA2A-14July11-Test Pad	14-Jul-11	7.46 x10^{-8} cm/s	Pass	Y		Met the specified maximum Permeability of 1 x 10^{-7} cm/s.
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		14-Jul-11	TS3-MC-1	Not Specified	18-Jul-11	12.3	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		14-Jul-11	TS3-MC-2	Not Specified	18-Jul-11	13.1	%	For Information Only	Y							
Week 4 Jul 17 - Jul 23, 2011																				
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		18-Jul-11	PF-Com-18 July 11	95% (or 92% if moisture ≥ opt. +6%)	19-Jul-11	97.6-100.5 (8.8-10.2)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		18-Jul-11	Perm-PF-33	≤ 1 x 10^{-6} cm/sec	29-Jul-11	8.1E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		19-Jul-11	PF-Com-19 July 11	95% (or 92% if moisture ≥ opt. +6%)	20-Jul-11	96.8-100.9 (9.0-12.1)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		19-Jul-11	Perm-PF-34	≤ 1 x 10^{-6} cm/sec	29-Jul-11	4.3E-08	cm/s	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		19-Jul-11	Perm-PF-35-A	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		19-Jul-11	Perm-PF-35-B	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		19-Jul-11	Perm-PF-35-C	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		19-Jul-11	PF-SA#7	Not Specified	25-Jul-11	2136 kg/m3 (8.4%)	kg/m^3 (%)	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	20-Jul-11	PF-Com-20 July 11	95% (or 92% if moisture ≥ opt. +6%)	21-Jul-11	96.1-100.7 (8.6-12.3)	%	pass	Y	PF-Cohesive Backfill, Tests 1-3 (20-Jul-11)	20-Jul-11	% Compaction: 96.1-98.9 % M.C.: 8.2-9.8	Pass	Y		All compactions met the specified 95% minimum compaction criteria.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		20-Jul-11	Perm-PF-36	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							

Quality Control (QC) and Quality Assurance (QA) Testing Summary Table

☐ **Weekly**
☑ **Monthly** **From:** 26-Jun-11 **To:** 30-Jul-11

Contractor:	Hazco	**Client:**	STPA	**Form Number:**	97918-QAF-059
Element:	TP7	**Oversight:**	AECOM/CBCL	**Project:**	Remediation of the Tar Ponds and Coke Ovens Sites
		IQAC:	Stantec		

SPECIFIED REQUIREMENTS						RESULTS													NOTES	
Spec Section	**Spec Description**	**Test Type**	**Standard**	**QC Frequency**	**QA Frequency**	**Date Collected**	**QC Sample ID**	**Criteria**	**Date QC Result Received**	**QC Test Result**	**Units**	**QC Pass/Fail**	**QC Frequency Met? Y/N**	**QA Sample ID**	**Date QA Result Received**	**QA Test Result**	**QA Pass/Fail**	**QA Frequency Met? Y/N**	**QC**	**QA**
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		20-Jul-11	Perm-PF-37	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		20-Jul-11	MC-PF-5	Not Specified	22-Jul-11	10.5	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	21-Jul-11	PF-Com-21 July 11	95% (or 92% if moisture ≥ opt. +6%)	22-Jul-11	97.0-100.9 (8.5-10.8)	%	pass	Y	PF-Cohesive Backfill, Tests 1-12 (21-Jul-11)	21-Jul-11	% Compaction: 95.9-101.0 % M.C.: 6.0-8.4	Pass	Y		All compactions met the specified 95% minimum compaction criteria.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		21-Jul-11	Perm-PF-38	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		21-Jul-11	Perm-PF-39	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		21-Jul-11	MC-PF-6	Not Specified	25-Jul-11	10.0	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		22-Jul-11	PF-Com-22 July 11	95% (or 92% if moisture ≥ opt. +6%)	25-Jul-11	96.5-100.9 (8.5-11.7)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		22-Jul-11	Perm-PF-40	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		22-Jul-11	Perm-PF-41	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
Week 5 Jul 24 - Jul 30, 2011																				
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		25-Jul-11	PF-Com-25 July 11	95% (or 92% if moisture ≥ opt. +6%)	26-Jul-11	97.2-101.0 (8.5-9.6)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jul-11	Perm-PF-42	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jul-11	Perm-PF-43-A	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jul-11	Perm-PF-43-B	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		25-Jul-11	Perm-PF-43-C	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		26-Jul-11	PF-Com-26 July 11	95% (or 92% if moisture ≥ opt. +6%)	27-Jul-11	97.3-100.9 (8.6-10.8)	%	pass	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		26-Jul-11	Perm-PF-44	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		26-Jul-11	Perm-PF-45	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.	26-Jul-11	TS3-Com-26 July 11	95% (or 92% if moisture ≥ opt. +6%)	27-Jul-11	95.0-98.9 (7.7-9.1)	%	pass	Y	Test Pad-3 Passes-Cohesive Backfill (PF), Tests 1-4 (26-Jul-11)	14-Jul-11	% Compaction: 96.1-100.1 % M.C.: 8.4-10.3	See Notes	Y		Test pad construction is required to demonstrate that the protectve fill can be installed to achieve the required permeability.
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift	1 test or 10% of QC tests whichever is greater.									Test Pad-4 Passes-Cohesive Backfill (PF), Tests 1-4 (26-Jul-11)	14-Jul-11	% Compaction: 98.8-100.3 % M.C.: 8.9-9.7	See Notes	Y		Test pad construction is required to demonstrate that the protectve fill can be installed to achieve the required permeability.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3	1 test or 10% of QC tests whichever is greater.	26-Jul-11	Perm-TS3-3	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y	TP7-SA2A-26July11-Test Pad	8-Aug-11	4.21 x10^{-8} cm/s	Pass	Y		Met the specified maximum Permeability of 1 x 10^{-7} cm/s.
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		26-Jul-11	Perm-TS3-4	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		26-Jul-11	Perm-TS3-5	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		26-Jul-11	Perm-TS3-6	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		26-Jul-11	MC-TS3-3	Not Specified	28-Jul-11	8.7	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Laboratory Moisture	ASTM D2216	Not Specified		26-Jul-11	MC-TS3-4	Not Specified	28-Jul-11	9.4	%	For Information Only	Y							
31 22 16	Cohesive Soil Backfill	Compaction (and Moisture)	ASTM D6938	Every 1000 m^2 for each lift		29-Jul-11	PF-Com-29 July 11	95% (or 92% if moisture ≥ opt. +6%)	pending	pending	%	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		29-Jul-11	Perm-PF-46	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		29-Jul-11	Perm-PF-47-A	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		29-Jul-11	Perm-PF-47-B	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Permeability	ASTM D5084	Every 2000 m^3		29-Jul-11	Perm-PF-47-C	≤ 1 x 10^{-6} cm/sec	pending	pending	cm/s	pending	Y							
31 22 16	Cohesive Soil Backfill	Standard Proctor	ASTM D698	Every 10 000 m^3		29-Jul-11	PF-SA#8	Not Specified	pending	pending	kg/m^3 (%)	For Information Only	Y							

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Tel: (902) 564-1855
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November 3, 2011
File: 121410955.215

Sydney Tar Ponds Agency
1 Inglis Street
PO Box 1028, Stn. A
Sydney, NS B1P 6J7

Attention: **Ms. Diane Ingraham, Ph.D., PMP, Quality Contracts Manager**

Dear Ms. Ingraham:

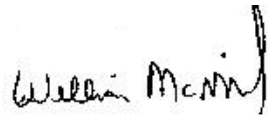
Reference: **Extras Section - STPA Project Element TP7**
Independent Quality Assurance (IQAC) July Monthly Summary Report

At the request of Sydney Tar Ponds Agency (STPA), Stantec Consulting Limited (Stantec) has no reportable extra items to include in this section of the (IQAC) July 2011 Monthly Summary Report

We trust this information meets your present requirements. If you have any questions, please do not hesitate to contact us.

Sincerely,

STANTEC CONSULTING LIMITED



Willie McNeil, B.Tech. (Env.), CET
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Stantec Consulting Ltd
207-201 Churchill Drive
Membertou NS B1S 0H1
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Sydney Tar Ponds Agency
1 Inglis Street
PO Box 1028, Stn. A
Sydney, NS B1P 6J7

Attention: **Ms. Diane Ingraham, PhD., PMP, Quality Contracts Manager**

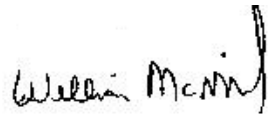
Dear Ms. Ingraham:

Reference: **Monthly Invoices**

As per the request of the Sydney Tar Ponds Agency, monthly invoices will be submitted in a separate submittal.

Sincerely,

STANTEC CONSULTING LTD



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