



Stantec

BUILDING OUR COMMUNITIES



Sydney Tar Ponds
Remediation, NS

A Strong Quality Program Imperative to Environmental Remediation Success

Solidification/Stabilization of the Sydney Tar Ponds Project

Diane Ingraham, Willie McNeil

Stantec Consulting Ltd.



A Strong Quality Program Imperative to Environmental Remediation Success

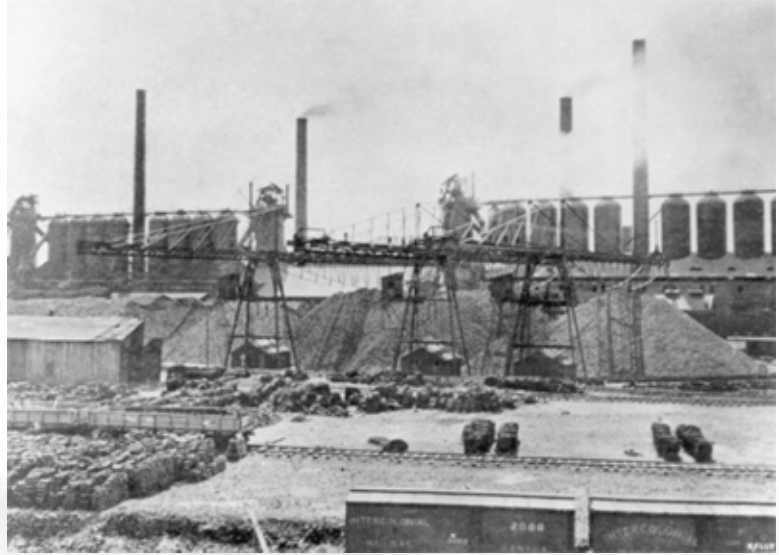
2013
Remediation
technologiesymposium

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This is a story of kids and quality (or... A successful cleanup and lessons learned)





DOSCO

Welcomes You
Centennial of Canadian Confederation Le Centenaire de la Confédération Canadienne



From wasteland to
community asset



Kids and Quality

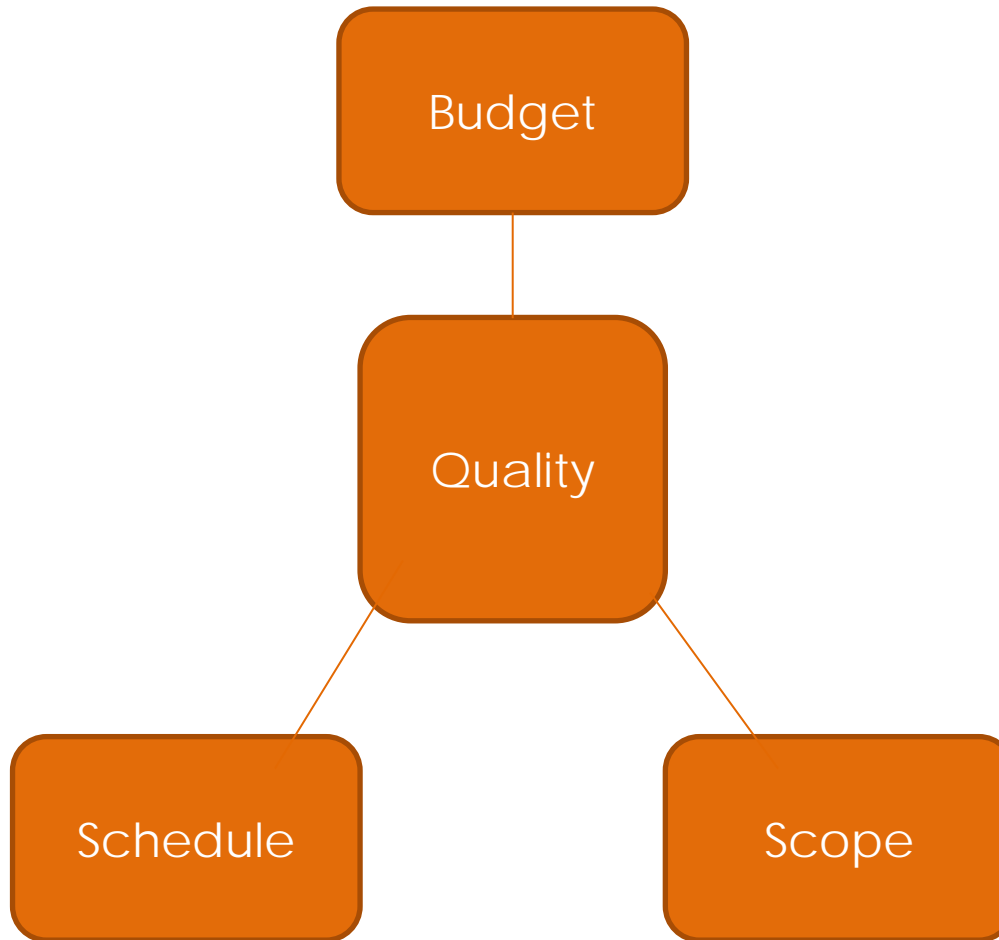
- The owners split the \$400M project into 15 elements, each with stringent regulatory, fiscal, & schedule requirements
- Wonderful learning opportunity
- Key lessons:
 - Invest in upfront planning
 - Build strong team
 - Tackle challenges collaboratively without blaming
 - Develop SOPs as living guidelines to success
 - Keep communications open to build trust

A community asset in the making

- We had to keep tidal harbor water out of the work area – that meant pumping 30,000,000,000 US Gal between Sep 2010 and Apr 2013
- We SS'ed in cells – 3,486 of them
- That's 679,015.89 m³
 - Or 27,161 Olympic swimming pools worth!



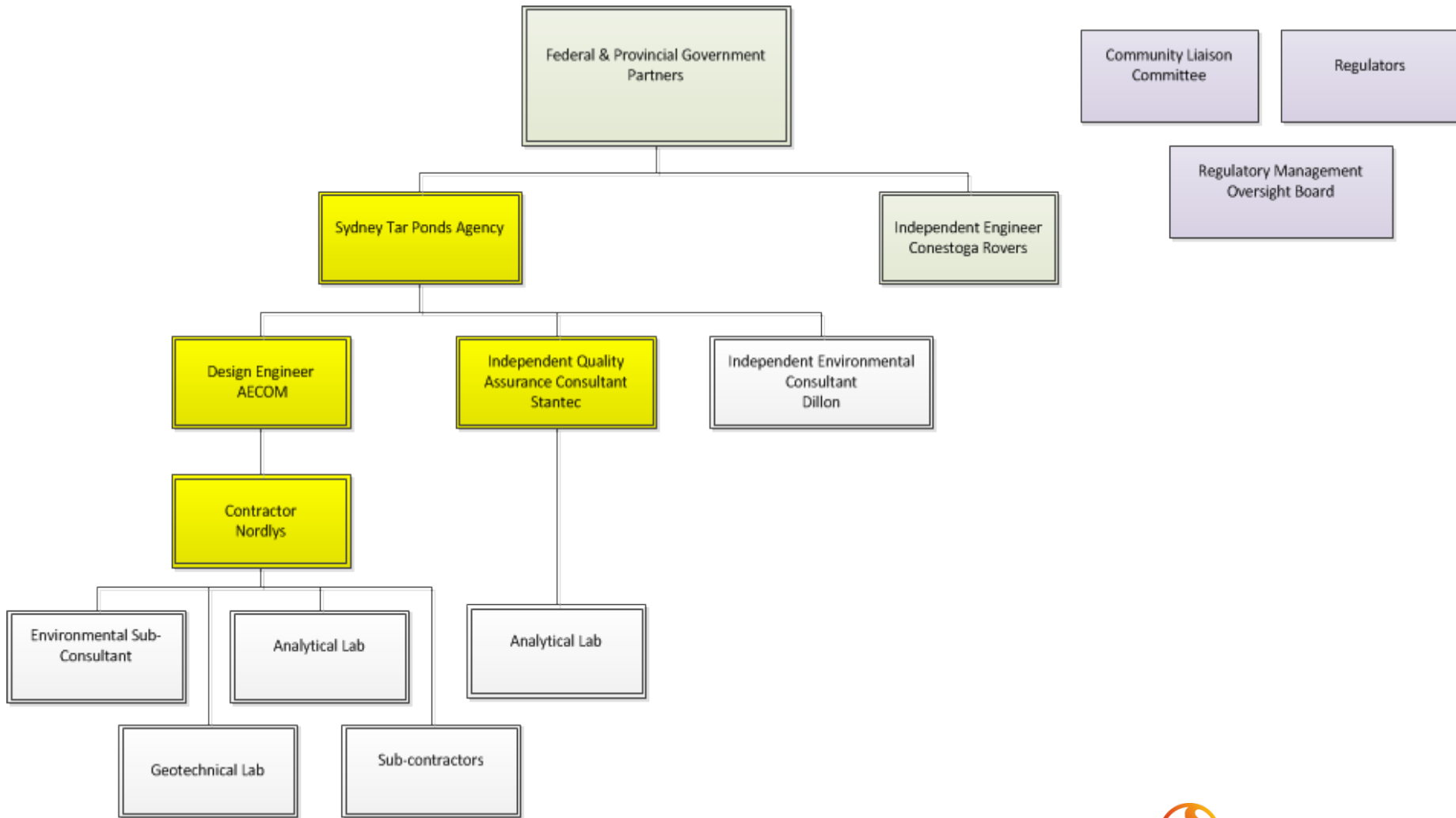
Triangle of Success



Project Quality Team



Project Quality Team



Communications – Integral to Achieving Consistency

- Although SOPs existed, slight differences in process and procedures made significant difference in results
- Differences were recognized in how QA and QC were preparing samples for testing
- Weekly communication and collaboration in order to come up with the best possible processes and methodologies for sampling and testing

Collaboration



Communications – Reports and Meetings

- Daily
 - Progress, status, issues, problem solving
- Weekly
 - Issues & contractor bi-weekly progress reports
- Monthly summaries
- Once every 6 weeks Quality Concerns Meetings



- OVERSIGHT:
 - Observe operations
 - Ensure compliance with contract documents & SOPs
 - Digital Terrain Model
 - Contours of sediments
 - Confirms predicted bottom of cell using contractor provided centre of cell
 - Visual confirmation with contractor
 - Field-Confirmed Bottom of Sediment Elevation



- CO-ORDINATION:
 - Completion of work on time
 - Ensuring Quality
 - Notifications to IQAC of testing and inspections required
 - Interactions of other contractors working on nearby elements
 - Clean Road Mapping

Health and Safety

Adherence to work zones



Sample Collection

At the cell



Sample Collection

At the cell



Sample Collection

At the cell – Inside exclusion zone in full tyvek.





Documentation per cell

Documentation:	Data Contained:	
Mixing Oversight Checklist	Key Cell Data & conformance to Contract & SOPs	
Cell Profile	Center Coordinate Cell Co-ordinates Bottom Elevation Pre Top Elevation Post Top Elevation	Wet Density Sediment Thickness Cell Surface Area Wet Volume Additional Soil Volume
ISS Report	Mix Time Reagent Quantities	Hours of Equipment Used for Mixing
Cement Receipt	Cement quantity	
Test Reports	UCS (x 4), PERM & SPLP (x 46 if applicable) test results	



Documentation per cell

- “Cradle to grave document trail”

71,000 pages!





SPLP (Leachate) Parameters Validated

46

SPLP Parameters		
Modified TPH (Tier 1)	Molybdenum	Benzo(b)fluoranthene
Aluminum	Nickel	Benzo(g,h,i)perylene
Antimony	Selenium	Benzo(k)fluoranthene
Arsenic	Silver	Chrysene
Barium	Strontium	Dibenzo(a,h)anthracene
Beryllium	Thallium	Fluoranthene
Boron	Tin	Fluorene
Cadmium	Uranium	Indeno(1,2,3-cd)pyrene
Chromium	Vanadium	Naphthalene
Cobalt	Zinc	Perylene
Copper	1-Methylnaphthalene	Phenanthrene
Iron	2-Methylnaphthalene	Pyrene
Lead	Acenaphthene	Total PAH
Lithium	Acenaphthylene	Total PCB
Manganese	Benzo(a)anthracene	
Mercury	Benzo(a)pyrene	

Nordlys

- Contractor's On Site QC:
 - On site Geotechnical Lab for UCS and Permeability testing
 - 4 climate control storage containers specially designed and constructed for sample storage
 - ≥ 95% humidity
 - 21 – 26 C



- Contractor's On Site QC:
 - Productivity – typically 12 cells per day:
 - 12 UCS molds per cell = 144 per day, 720 per week.
 - 16,032 for Phase I. 9,336 for Phase II, 16,464 for Phase III
 - 4 Perm molds per cell = 48 per day, 240 per week.
 - 5,344 for Phase I. 3,112 for Phase II, 5,488 for Phase III

41, 832 UCS
13,944 Perms

- Stantec's History On-Site:
 - Mid 1980: site assessment began
 - Early 1990: part of JWEL-IT consortium
 - completed an environmental assessment & remediation design (encapsulation using slag price tag was \$23 million)
 - Late 1990: part of JDAC consortium
 - completed additional site assessment programs on both the Tar Ponds & Coke Ovens site

- Independent Quality Assurance Consultant
 - Procurement Process:
 - RFP, Proposals, Review & selection, Award
 - Element TP2 – Material Processing Facility
 - 1st Element IQAC contract awarded in 2008
 - Element CO5 – Vertical Cut Off Walls
 - 2nd Element IQAC contract awarded in late 2008
 - Combined Elements (9)
 - 3rd & Final IQAC contract awarded in 2009

- Need for independent verification of contractor's quality
- Report directly to the owner (STPA)
- Primary Roles & Responsibilities
 - Overall QMS & IQAP
 - Review contractor's QC test results, reports & submittals
 - Provide the owner with engineering opinions as issues arise



- Stantec – Global Corporation over 12, 000 employees
 - Local Office Capabilities
 - Specialized Equipment Needs
- Challenges Met
 - Huge project with associated oversight
 - Resource planning
 - Client satisfaction

- IQAC On-Site QA:
 - On site Materials Testing Lab for UCS testing
 - Consists of 2 climate control storage containers specially designed, constructed & equipped for sample storage
 - Permeability testing is completed at local office (off-site) Materials Testing Laboratory

- Productivity – typically 2 QA cells per day:
 - 12 UCS specimens per cell (top and bottom) = 24 per day, 120 per week
 - 4 Perm specimens per cell = 8 per day, 40 per week
 - 4 leachate specimens per every 40 cells = 2 per week

2,368 UCS

627 Perms

191 SPLP



QA Preparing Specimens

UCS



Close up of material
QA



Medium Material QA



Dry sample material

QA

S-0502-TOP-Crew2-28June10



Bone found in material (cow)

QA



On site geotechnical lab

Storage totes used by QA

S0003-UCSX-BOT-A-9-O-9NOV09



UCS cross section from cell 3

Material from bottom of cell - QA



UCS break for cell 2

QA

S0002-PERM-COM-A-9-O-4NOV09



PERM specimen for cell 2

QA



Tamping SPLP specimen into mold

QA



QC Geotechnical Lab

Manual screening of material following SOP



QC Geotechnical Lab

Sample Preparation following SOP



QC Geotechnical Lab

Sample Preparation following SOP



QC Geotechnical Lab

Specimen



QC UCS



QC PERM boards



QC PERM boards

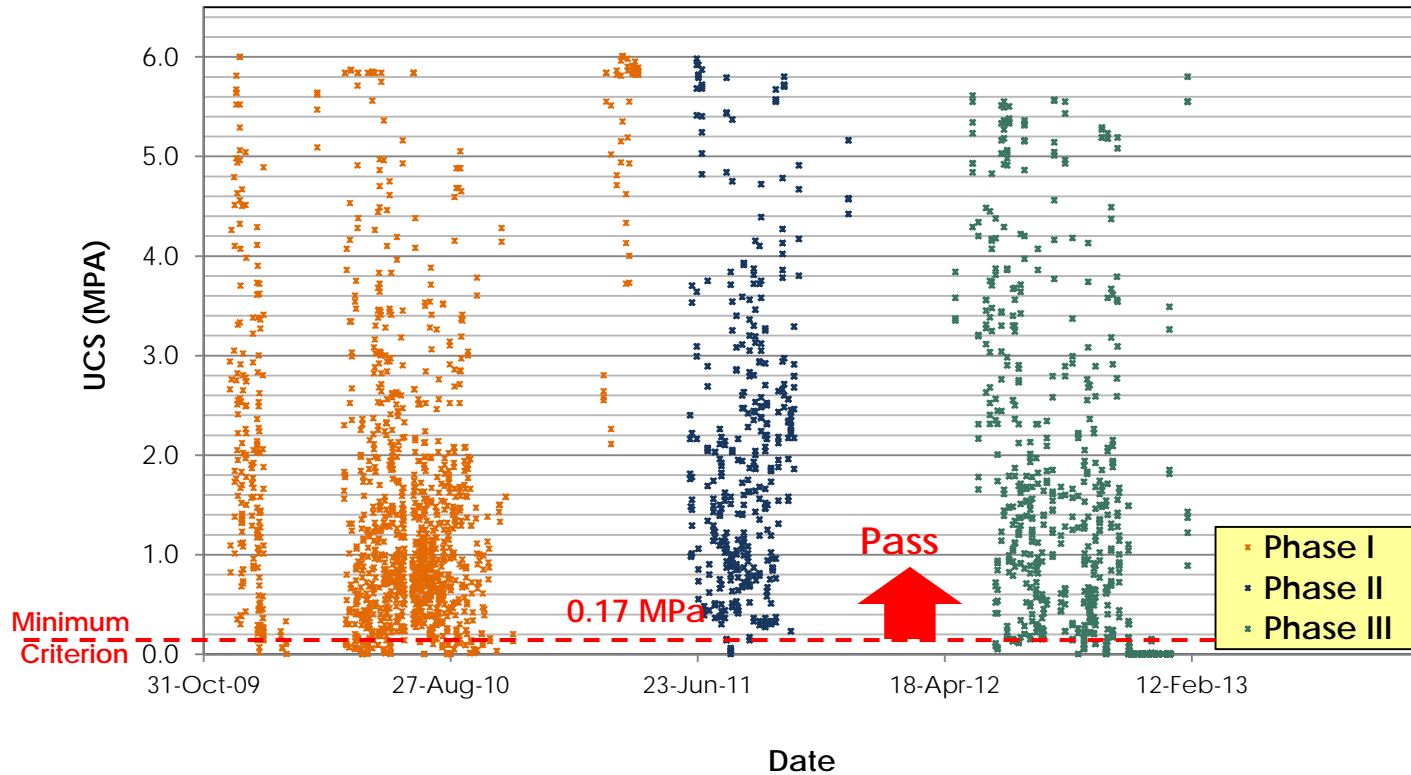




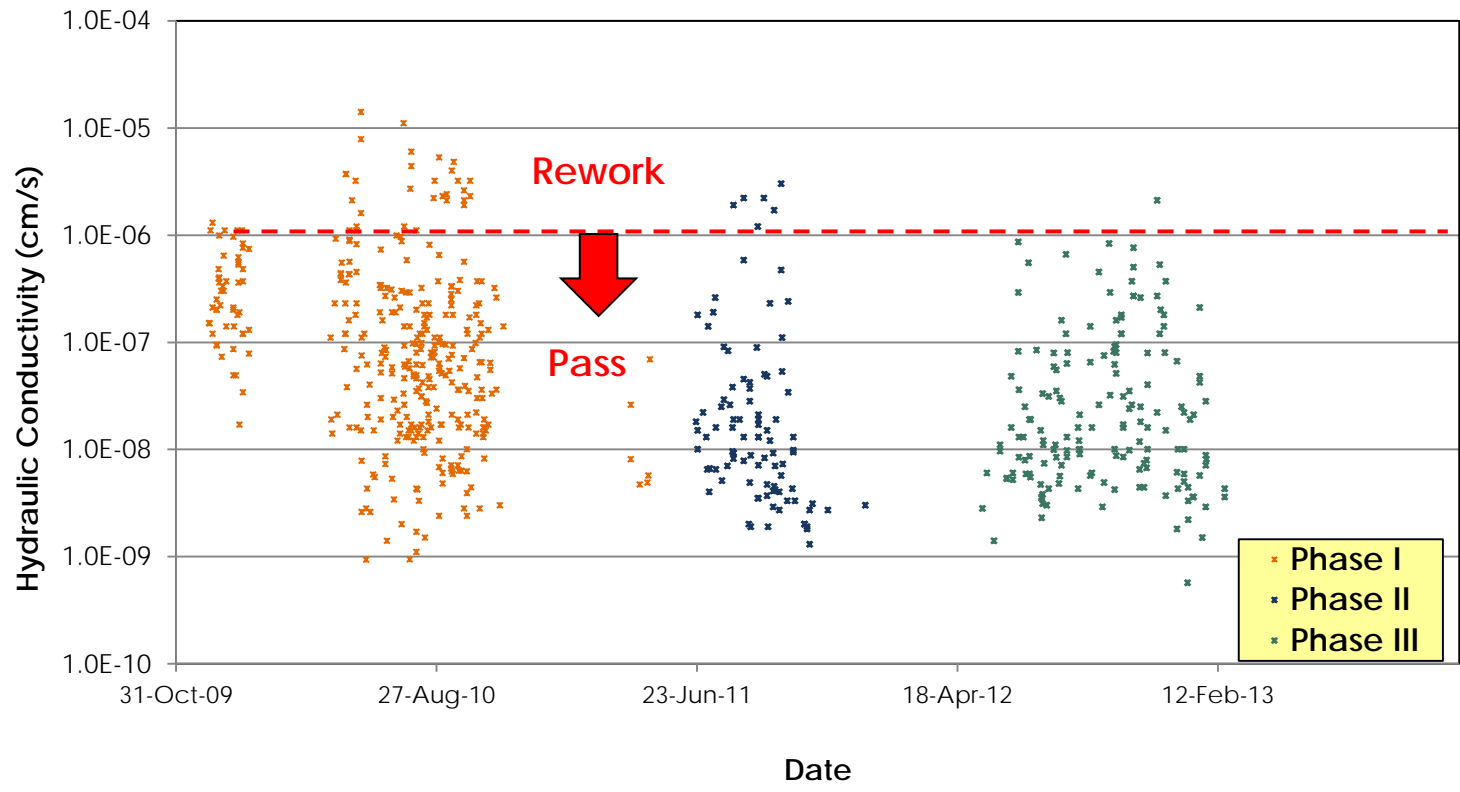
Nordlys

- 89% passing rate during Field Trial
- 97% passing on the first try in Phase I (after review & refinement of processes)
- 98% Passing on the first try in Phase II
- 86% passing on the first try in Phase III
- No cells failed after the second try in any phase

IQAC UCS Results

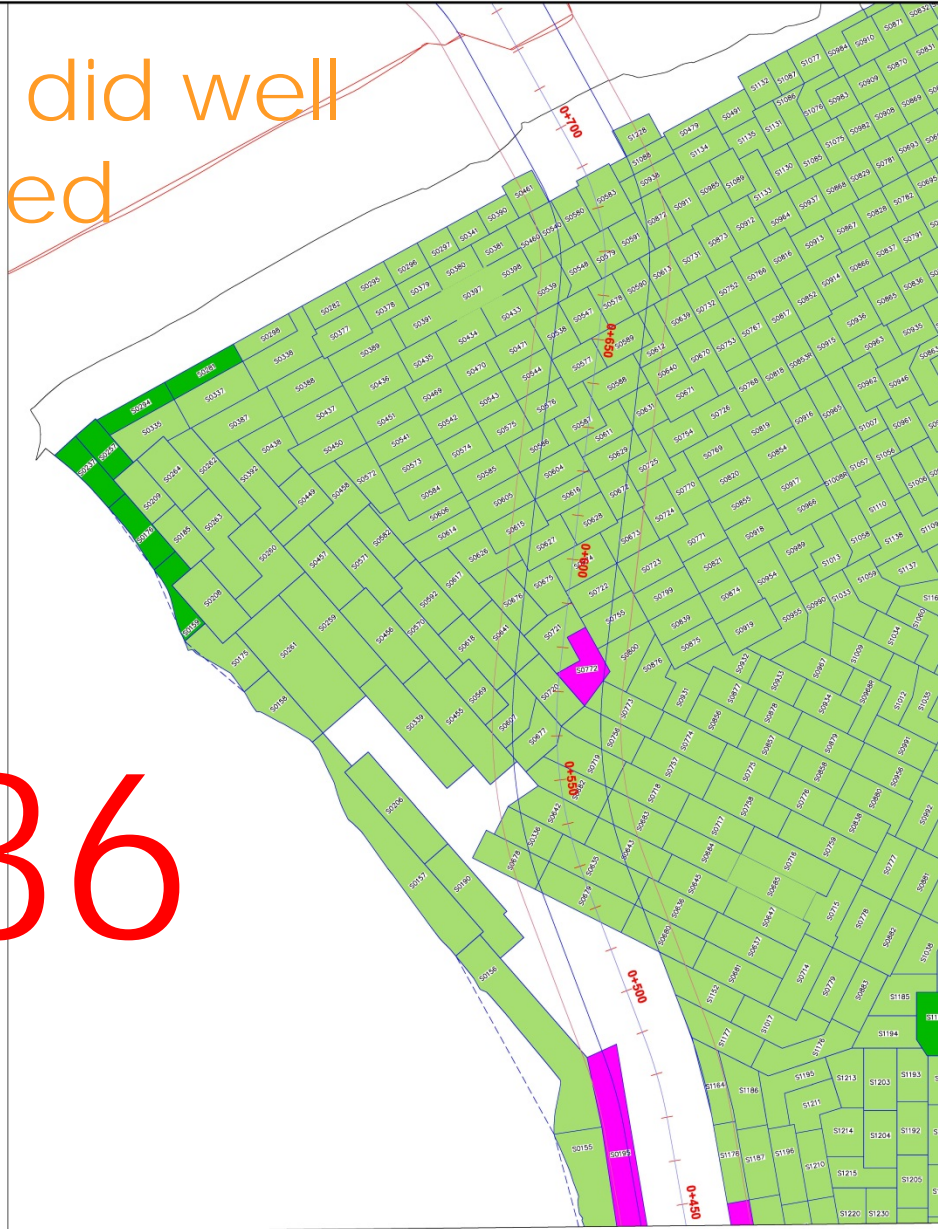


IQAC Perm Results



Proof we did well Cells S/S'ed

1336



NORTH



NOTES:

Channel shows the center line, bottom and top of channel at 1.30m. For excavation purposes, the top of channel width plus rip/rap & crusher dush width also should be considered

LEGEND:

- 1.0m Contour (Limit of S/S Treatment)
- PASS
- QUALIFIED PASS
- RETEST QC
- RETEST QA
- REWORK
- PENDING
- RELOCATED

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Revision or Issue			
No.	Description	Date	By

Remediation of the Tar Ponds and Coke Ovens Sites

Cell Testing Status Report
for JUNE 20-24, 2011

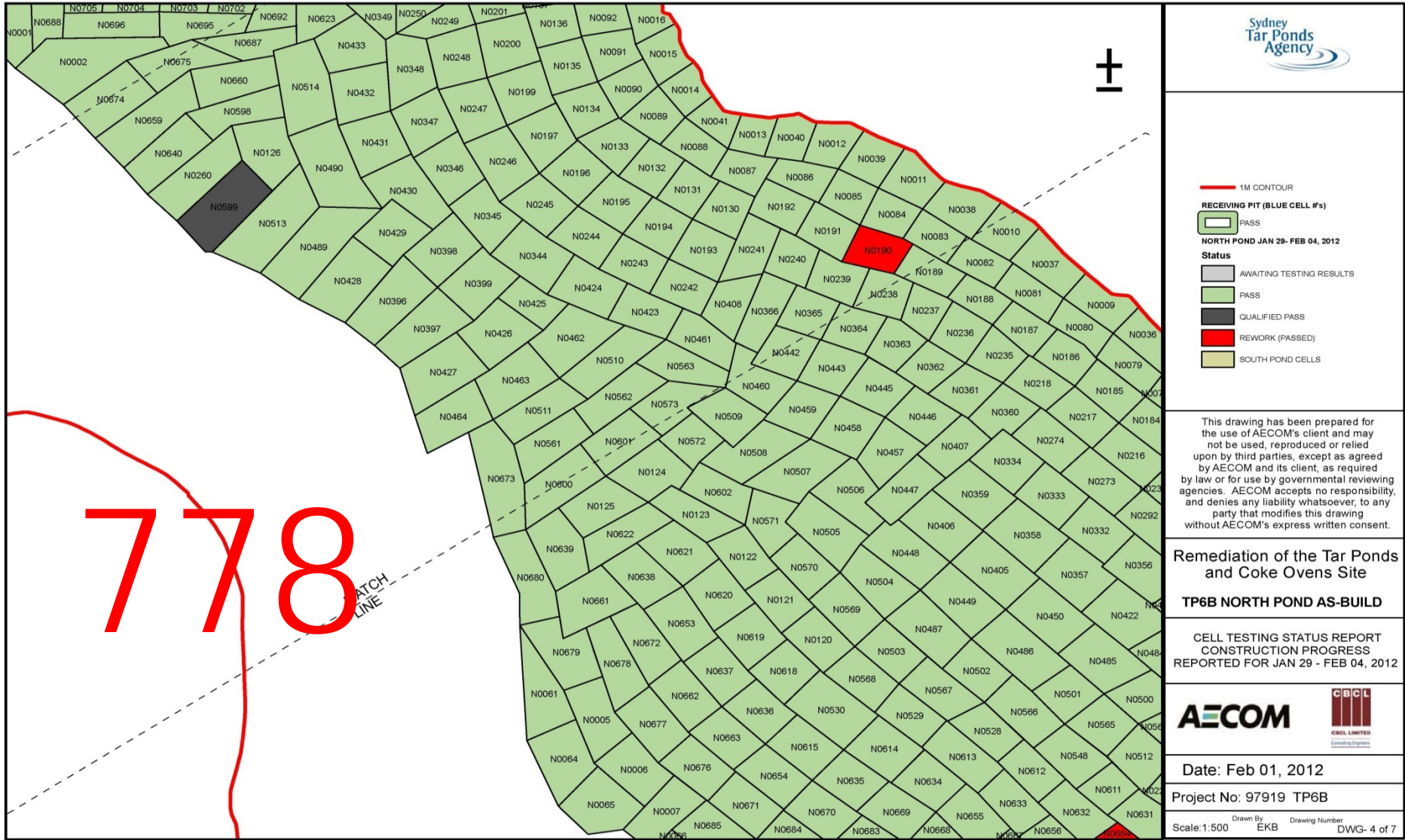


Scale N.T.S.	Drawn E.J.	Project No 97919 TP68
Date JUNE30,2011	Drawing No DWG-3 OF 5	

Date: Jun 30, 2011
Time: 8:29am
Drawing File: C:\Documents and Settings\kwardington\My Documents\TP68\TP68_Tst.dwg
Project: Remediation of the Tar Ponds and Coke Ovens Sites



Proof we did well – cells S/S'ed



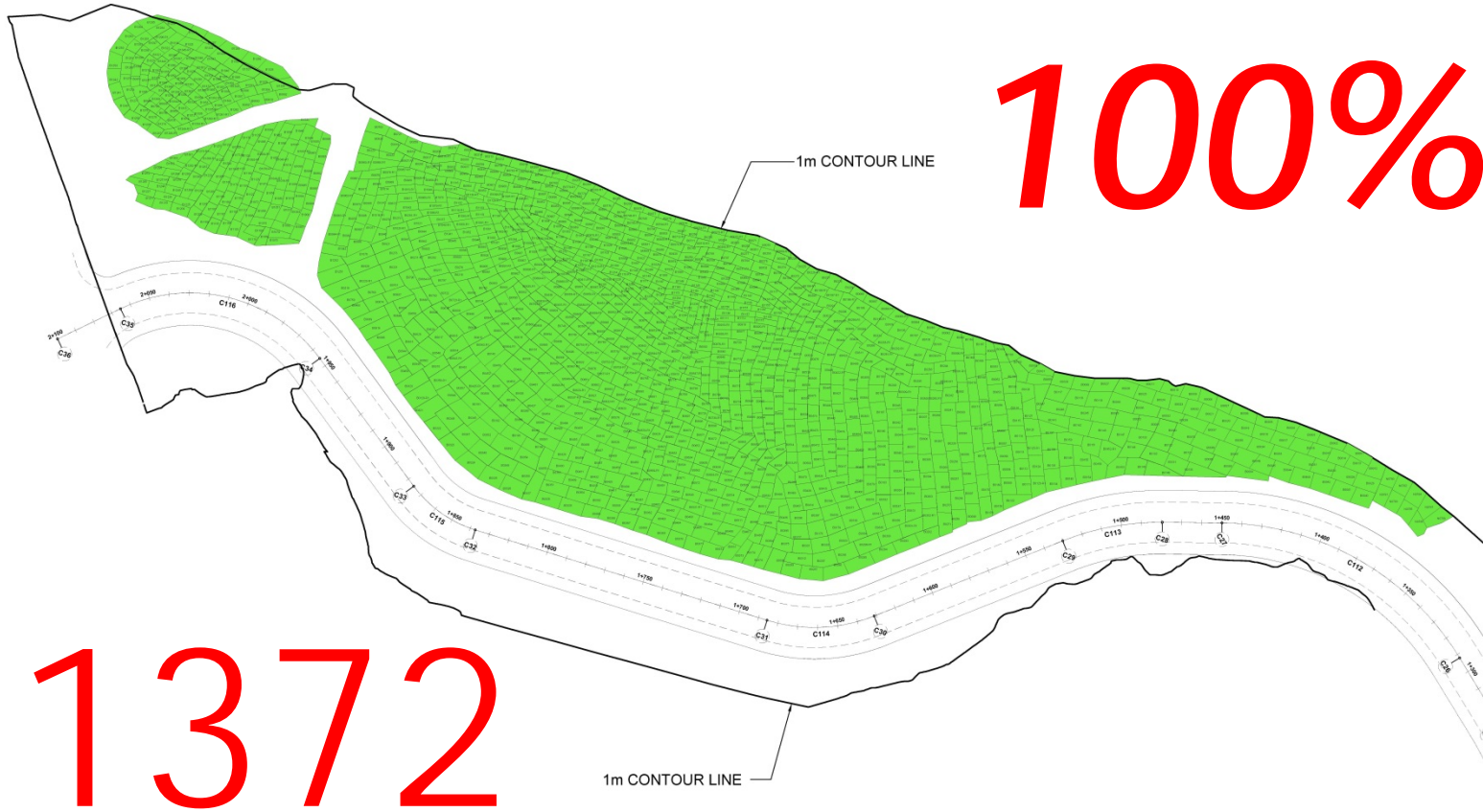


Proof we did well – cells S/S'ed



LEGEND:

- 1m Contour (Limits of Treatment)
- Passed
- Retest
- Rework



100%

1372

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Remediation of the Tar Ponds and Coke Oven Sites TP6B, Phase 3, (Battery Point)

CONSTRUCTION PROGRESS OVERALL CELL STATUS MAP
March 3 to March 9, 2013



Drawing Scale 1:1000		
Date Mar 9, 2013	Drawn R.B.	Contract No. 97919
Drawing No.		

Drawing 2 of 2

Date: Mar 09, 2013
 Drawing No: 97919-02
 Revision: 1





3486



- Post Remediation Site Redevelopment
 - \$1.1 million project awarded to Stantec November, 2011
 - Design completed July 2012
 - Construction began August, 2012
 - Anticipated Construction End date – Late December 2013

- Design process
 - Stakeholder Consultation
 - Interpretive Master Plan (consultation and research)
 - Public Consultation Sessions
- Consensus
 - Ideas collected during stakeholder consultations and research formed the conceptual design basis.
 - The conceptual design basis was presented at public consultation sessions (feedback used to fine tune the design)
- Challenges
 - On the heels of ongoing remediation
 - Short timeline
 - Can't please all stakeholders











- Design Team
 - Landscape Architects
 - Hamden, Connecticut
 - Halifax, Nova Scotia
 - Sports Group / Community Development
 - Boston, Massachusetts
 - Civil, Geotechnical, Structural, Mechanical, Electrical, Environmental, Planning
 - Stantec Sydney and Dartmouth Offices
 - Communications Consultant
 - Local Artists (All from Cape Breton)
- Other recent high profile project:
 - Yankee Stadium Uplands Park





 **Stantec**
Open Hearth Park





G. Langille
1 Aug 13

Acknowledgements

- Jerome MacNeil, P.Eng., PMP, Sydney Tar Ponds Agency
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- Rabi Morelly, M.Sc., P.Eng., Stantec Consulting Ltd.
- Melodie Magliaro, Stantec Consulting Ltd.



Questions?



2013

A stylized letter 'R' logo composed of three overlapping shapes: a brown square on the left, a light blue trapezoid in the middle, and a brown curved shape on the right that forms the top and right side of the 'R'.

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