Halifax Harbour Solutions Project

Halifax Wastewater Treatment Facility - Update

Regional Council, April 14, 2009

Presentation Objectives

- Background
- Project Status
- Halifax Wastewater Treatment Facility Incident
- Recovery Plan
- Clear Up Project Misconceptions

Background

- 1996, HRM hosts Harbour Solutions Symposium
- 1997, HRM Council appoints Harbour Solutions Advisory Committee –16 members: residents, academics, business, technical experts, government officials: http://www.halifax.ca/harboursol/documents/final_sac_report.pdf
- 1998, HSAC recommended the Harbour Solutions Plan
- 2002, HRM selected the Halifax Regional Environmental Partnership to implement Harbour Solutions (Design/Build/Operate)

Background (cont'd)

- June 2003, HRM terminated relationship with HREP due to fundamental differences over quality control of the sewage treatment plants discharge
- October 2003, agreement with Dexter Construction to design & build sewage collection system (SCS) (approx. $112M), HRM owns & operates
- November 2003, SCS groundbreaking
- June 2004, agreement with D&D Water Solutions Inc. for the design, construction and commissioning of 3 wastewater treatment facilities (approx. $137M), HRM owns & operates

Background (cont'd)

- November 2004, agreement with SGE Acres Ltd to design and build biosolids processing (BPF) facility at AeroTech Park (approx. $12.5M)
- November 2004, 5-year (renewable) agreement with N-Viro to operate & maintain BPF
- May 2006, 10-year agreement with Seaboard Liquid Carriers for biosolids transportation from new treatment facilities
- July 2007, BPF commences operation
- August 2007, HRM wastewater staff and assets transferred to HRWC

Background (cont'd)

- November 2007, Halifax WWTF commences commissioning with sewage flows
- August 2008, Dartmouth WWTF commences commissioning with sewage flows
- December 2008, Halifax WWTF reaches Substantial Completion (approx. $1.7M deficiencies)
- January 14, 2009, Halifax WWTF flooding incident

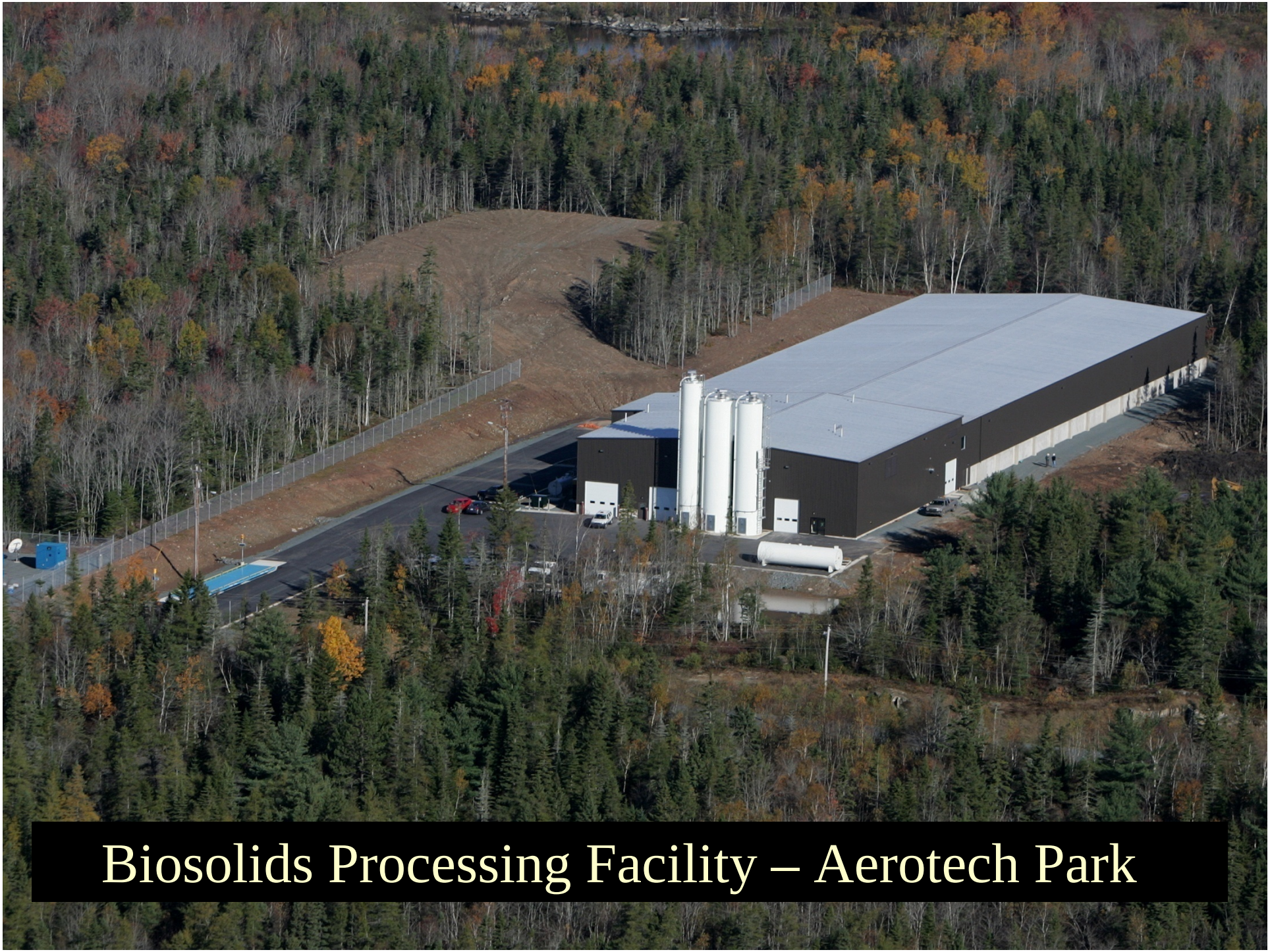
Harbour Solutions Project

- Sewage Collection System, including outfalls, diffusers & access roads
- Sewage Advanced Primary Treatment Plants (3) design & construction
- Operation of Sewage Treatment Plants & Collection System (HRM)
- Biosolids (sludge) Processing Facility
- Biosolids Transportation
- Source Control and Inflow/Infiltration reduction programs

Project Status

Biosolids Processing Facility

- Plant is in operation by N-Viro
- Biosolids product meets all regulations, most product meets highest standard of Exceptional Quality
- Labelled by Canadian Food and Inspection Agency
- Product sales are strong
- Plant deficiency rectification ongoing



Biosolids Processing Facility – Aerotech Park

Project Status (cont'd)

Wastewater Collection System

- Intercepts combined storm and sanitary flows and conveys to Treatment Facilities
- Halifax: Substantial Completion (HRM owns/HW operates) except CSO Chambers and Pier A Pumping Station (Dexter owns & operates)
- Dartmouth: Completed, awaiting Substantial Completion of Treatment Facility (Dexter owns & operates)
- Herring Cove: 97% complete (Dexter owns)

Collection System Facts

- 16.8 kilometres of mainline pipe
- 23 major outfalls intercepted
- 1075 metre underground tunnel
- 7 new pumping stations
- minimum of 10,000 tonnes of contaminated soil moved
- 50:1 outfall diffusion

Halifax Pumping Stations

Balmoral

Atlantic School of Theology

Pier A

Dartmouth Pumping Stations

Melva Street

Park Ave

Jamieson Street

Herring Cove Pumping Station-June 2008

Project Status (cont'd)

Wastewater Treatment Facilities (WWTF)

- Treat 4 X Average Dry Weather Flow using Advanced Primary Treatment technology
- Halifax: Substantial Completion (HRM owns/HW operates). Facility currently shut down, all flows screened to Harbour via CSO chambers.
- Dartmouth: Treating all sewage, commissioning ongoing. Deficiency rectification ongoing. (D&D owns & operates, HW provides labour force)
- Herring Cove: 93% complete, commissioning with sewage flows anticipated Summer 2009.

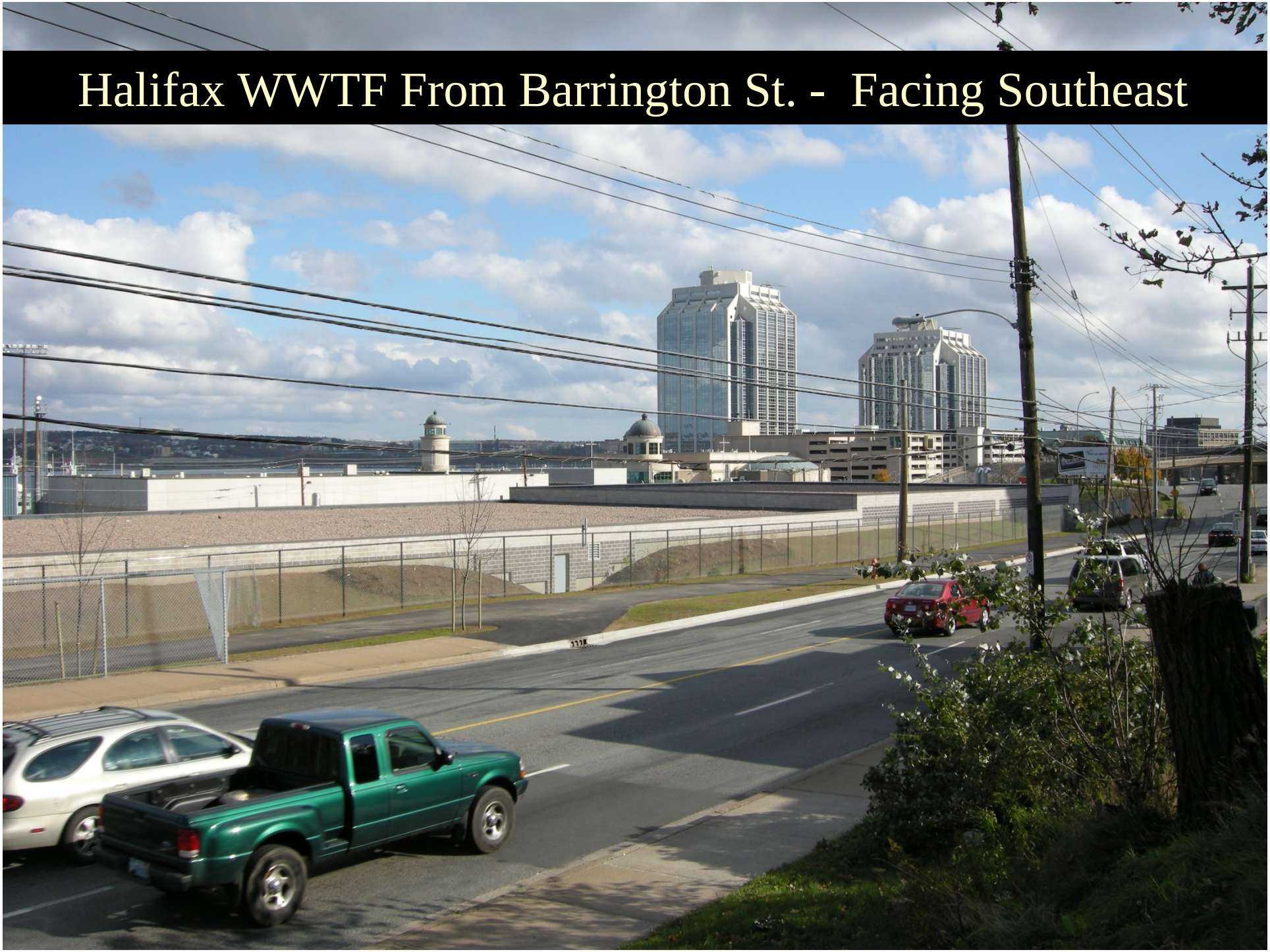
Herring Cove WWTF-Commissioning Scheduled Summer 2009

Dartmouth WWTF – Commissioning Phase Commenced July 2008

Halifax WWTF Site –August 2007


Halifax WWTF – Upper Water & Cornwallis Streets

Halifax WWTF From Barrington St. - Facing Southeast

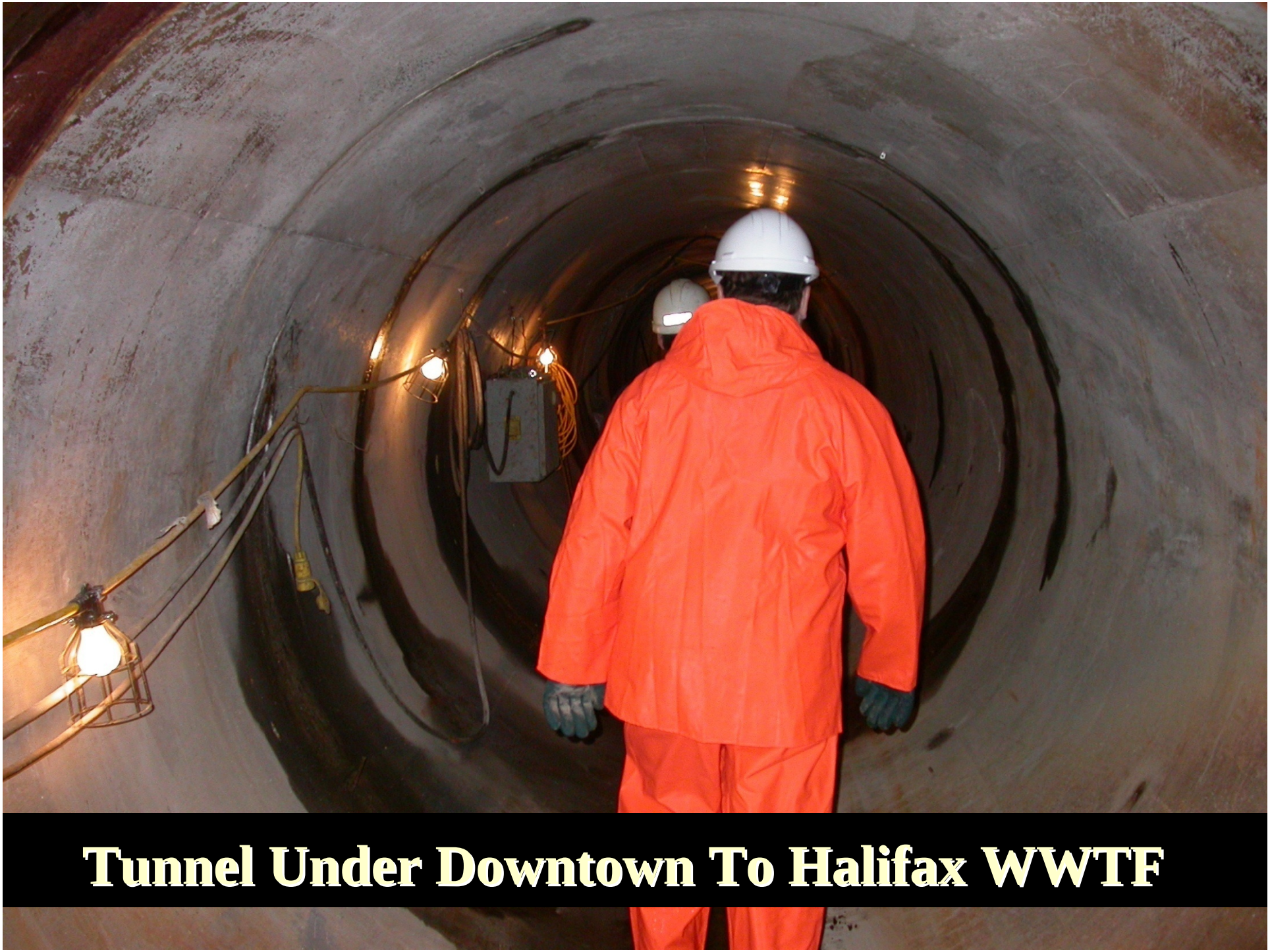


Biosolids Truck Halifax WWTF-Nov. 2007

Halifax WWTF Wet Well –September 2005

Crews Installing Safety Mesh in Wet Well

Rock Anchors and Safety Mesh in Wet Well Basement

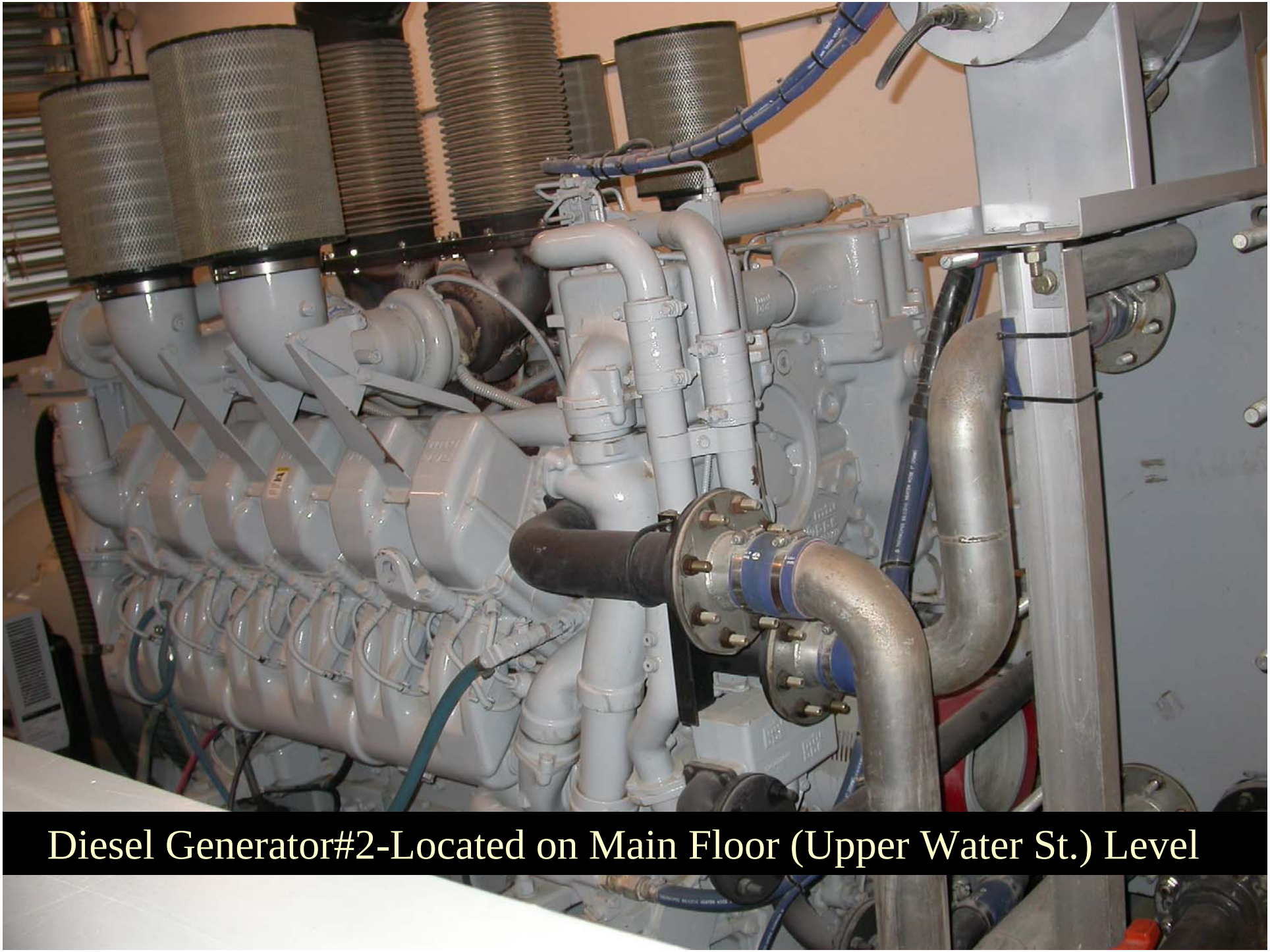


Tunnel Under Downtown To Halifax WWTF

Tunnel Entrance to Wet Well – Approx. 85 feet Below Grade

Halifax WWTF wet well –August 2007

Diesel Generator#1-Located on Main Floor (Upper Water St.) Level

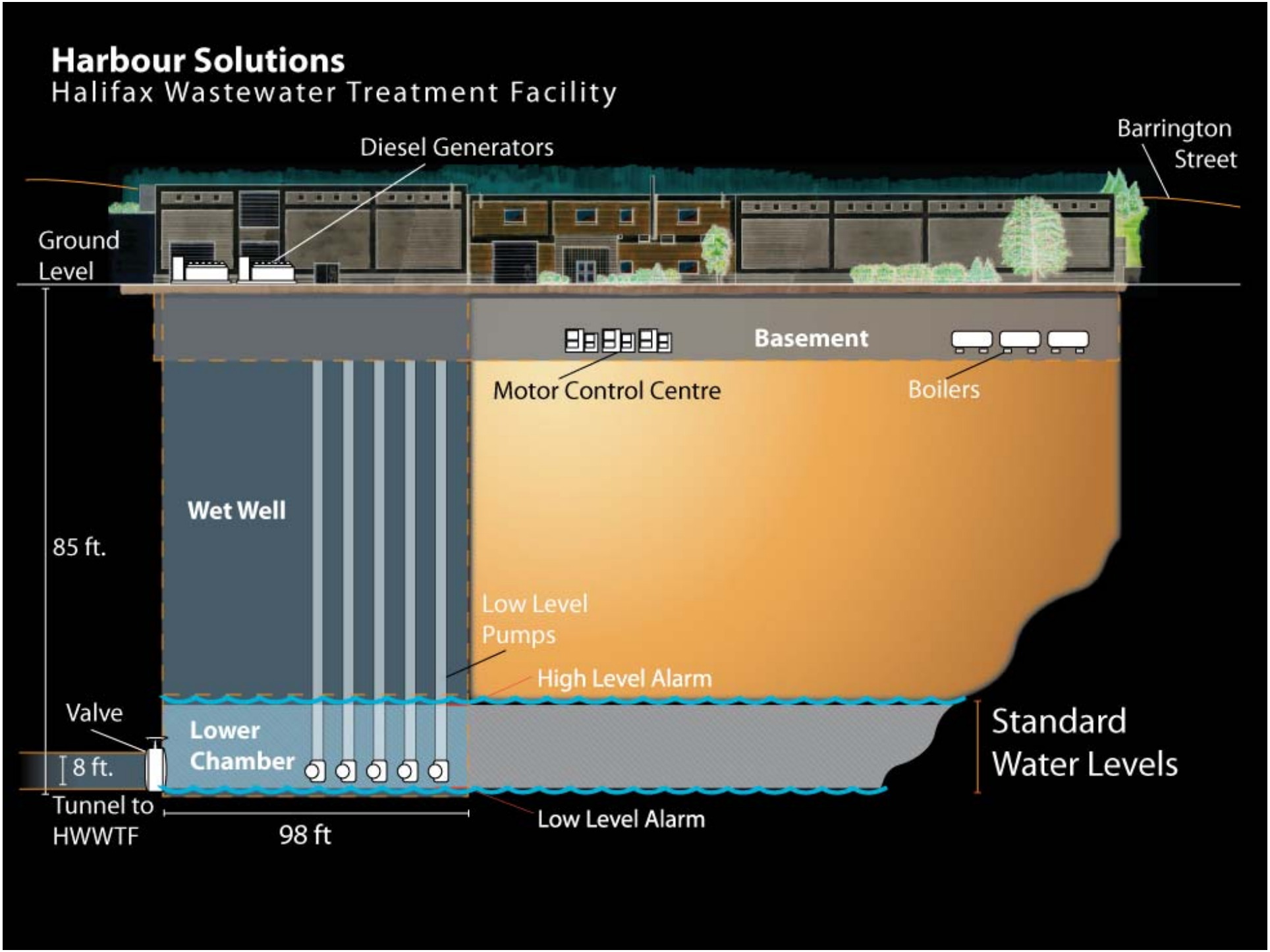


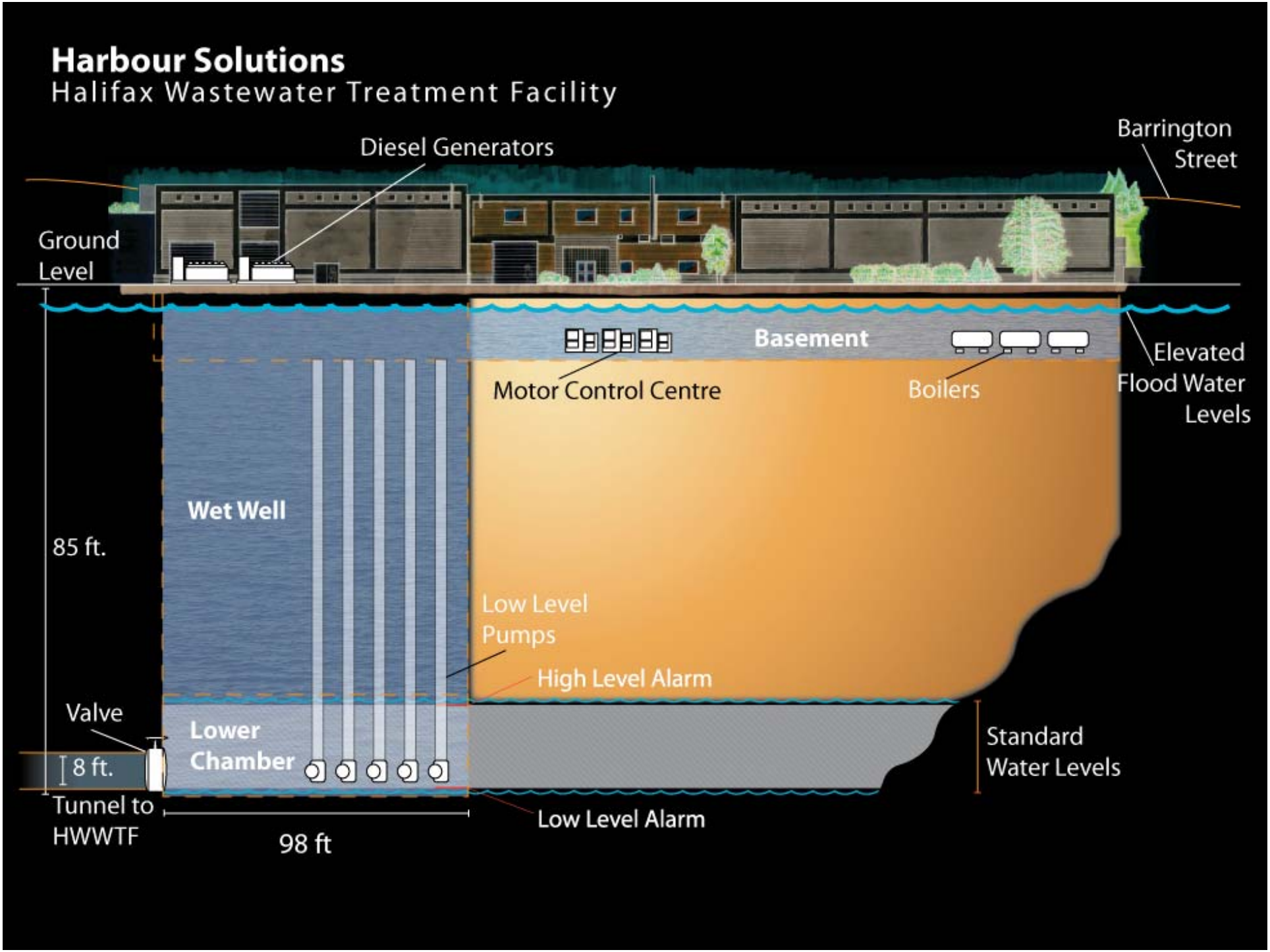
Diesel Generator#2-Located on Main Floor (Upper Water St.) Level

Halifax WWTF Incident

January 14, 2009

- Approx. 2:20 a.m., alarms at plant, primary power failure from grid
- Approx. 2:40 a.m. plant operator arrives, both emergency generators running, main sluice valve is closed, plant appeared to be functioning per normal emergency power procedures
- Operator commenced restarting plant equipment and opening main sluice valve to commence treating sewage flows
- Approx. 4 a.m., control system indicated one generator failed, attempts to restart unsuccessful
- Control system also indicated raw water pumps not running and valve in ‘open’ position, attempts to restart unsuccessful
- Wet well began flooding and continued into basement
- Flooding ceased a few few feet below ground floor, hydraulic equilibrium of collection system


Harbour Solutions
Halifax Wastewater Treatment Facility
Diesel Generators
Barrington Street
Ground Level
Basement
Motor Control Centre
Boilers
Wet Well
85 ft.
Low Level Pumps
High Level Alarm
Valve
Lower Chamber
8 ft.
Standard Water Levels
Tunnel to HWWTF
98 ft
Low Level Alarm


Harbour Solutions
Halifax Wastewater Treatment Facility
Diesel Generators
Barrington Street
Ground Level
Basement
Motor Control Centre
Boilers
Elevated Flood Water Levels
Wet Well
85 ft.
Low Level Pumps
High Level Alarm
Valve
Lower Chamber
8 ft.
Standard Water Levels
Tunnel to HWWTF
98 ft
Low Level Alarm

Flooded basement stairwell – Jan.14, 2009

Flooded wet well area – Jan.14, 2009

Flooded wet well area – Jan.14th

Pumping at WWTF site – Jan.14th

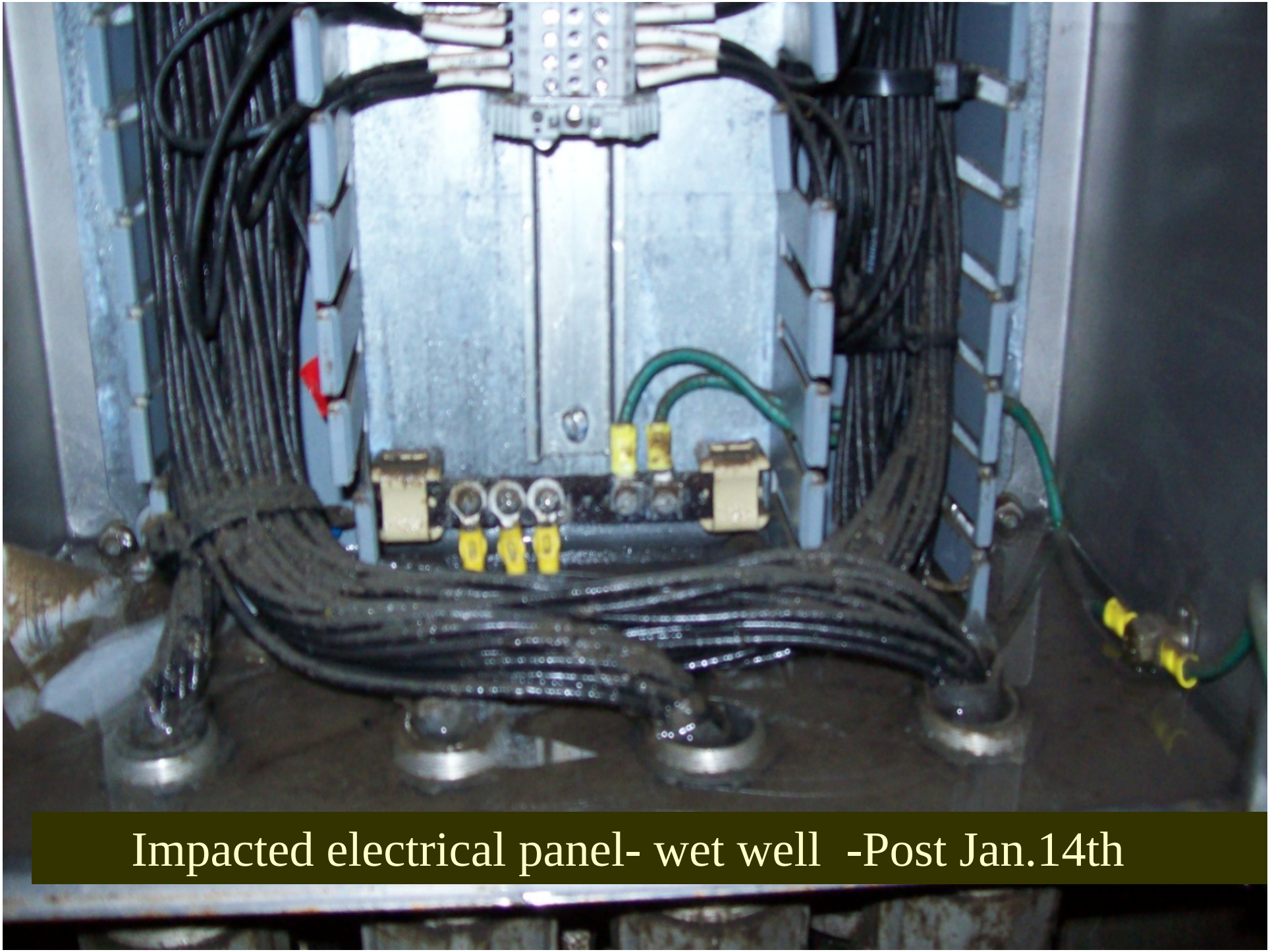
Pumping at WWTF site – Jan.14th

Impacted ventilation equipment - wet well -Post Jan.14th

Impacted ventilation equipment - wet well - Post Jan.14th


Floor - wet well -Post Jan.14th

Impacted pump equipment - wet well -Post Jan.14th

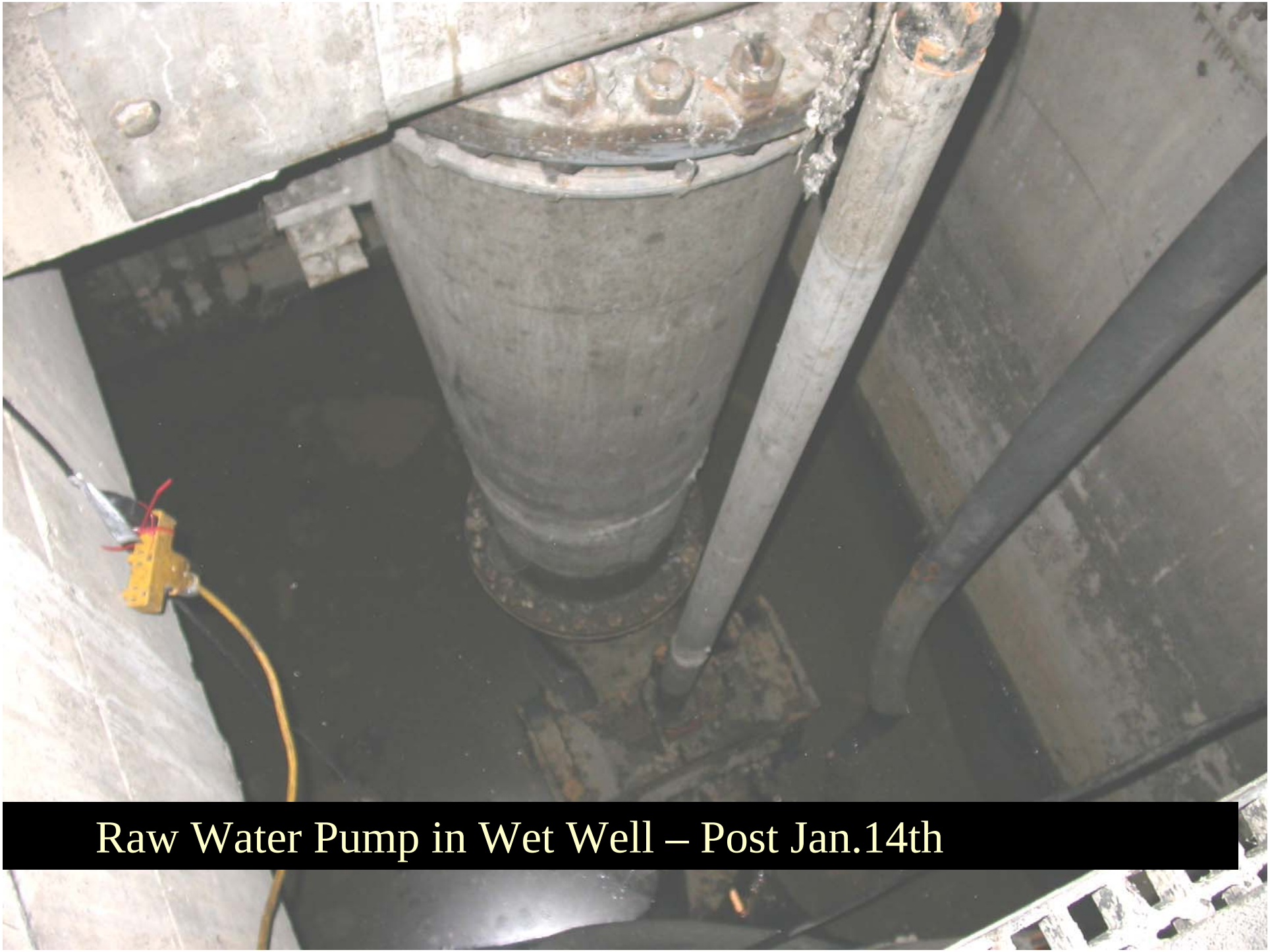


Impacted electrical panel- wet well -Post Jan.14th

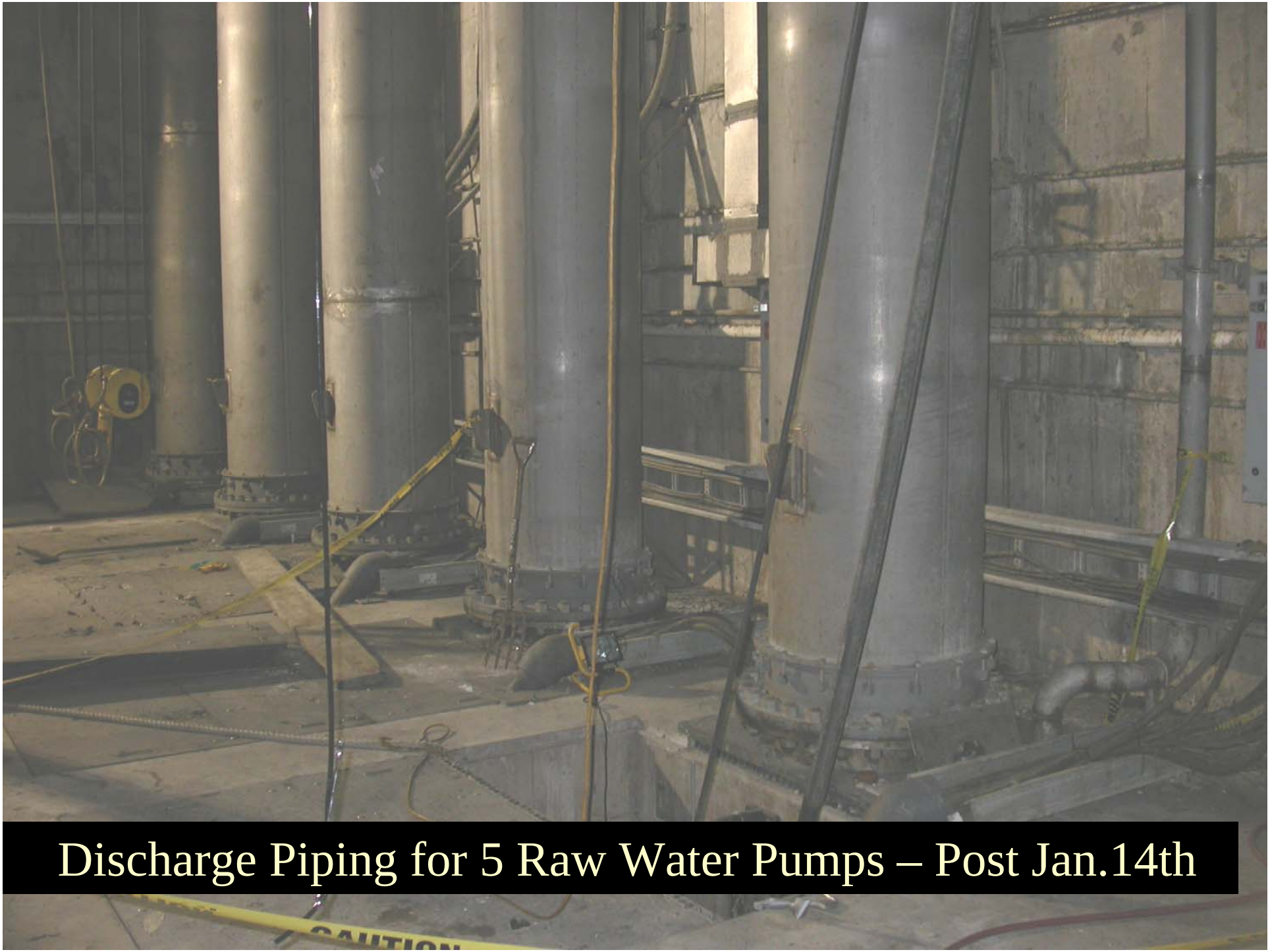
Impacted wet well area -Post Jan.14th

Impacted wet well area -Post Jan.14th

Flood impacted wiring – wet well area – Jan.24th



Raw Water Pump in Wet Well – Post Jan.14th



Discharge Piping for 5 Raw Water Pumps – Post Jan.14th

Wall in basement showing flood waterline – Post Jan.14th

Process pumps in Basement– Post Jan.14th

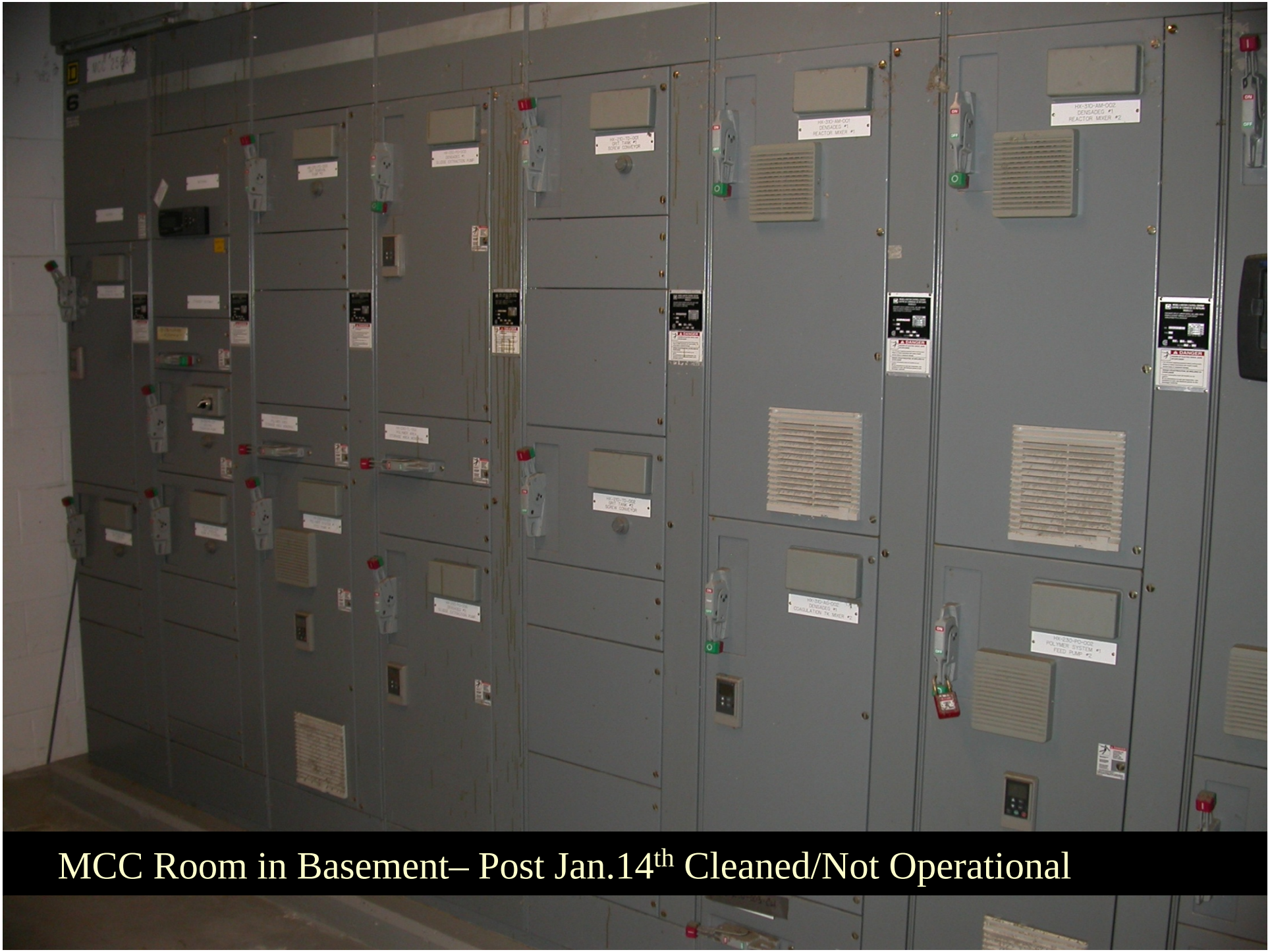
Process pumps in Basement– Post Jan.14th

Flood waterline – basement area – Jan.24th

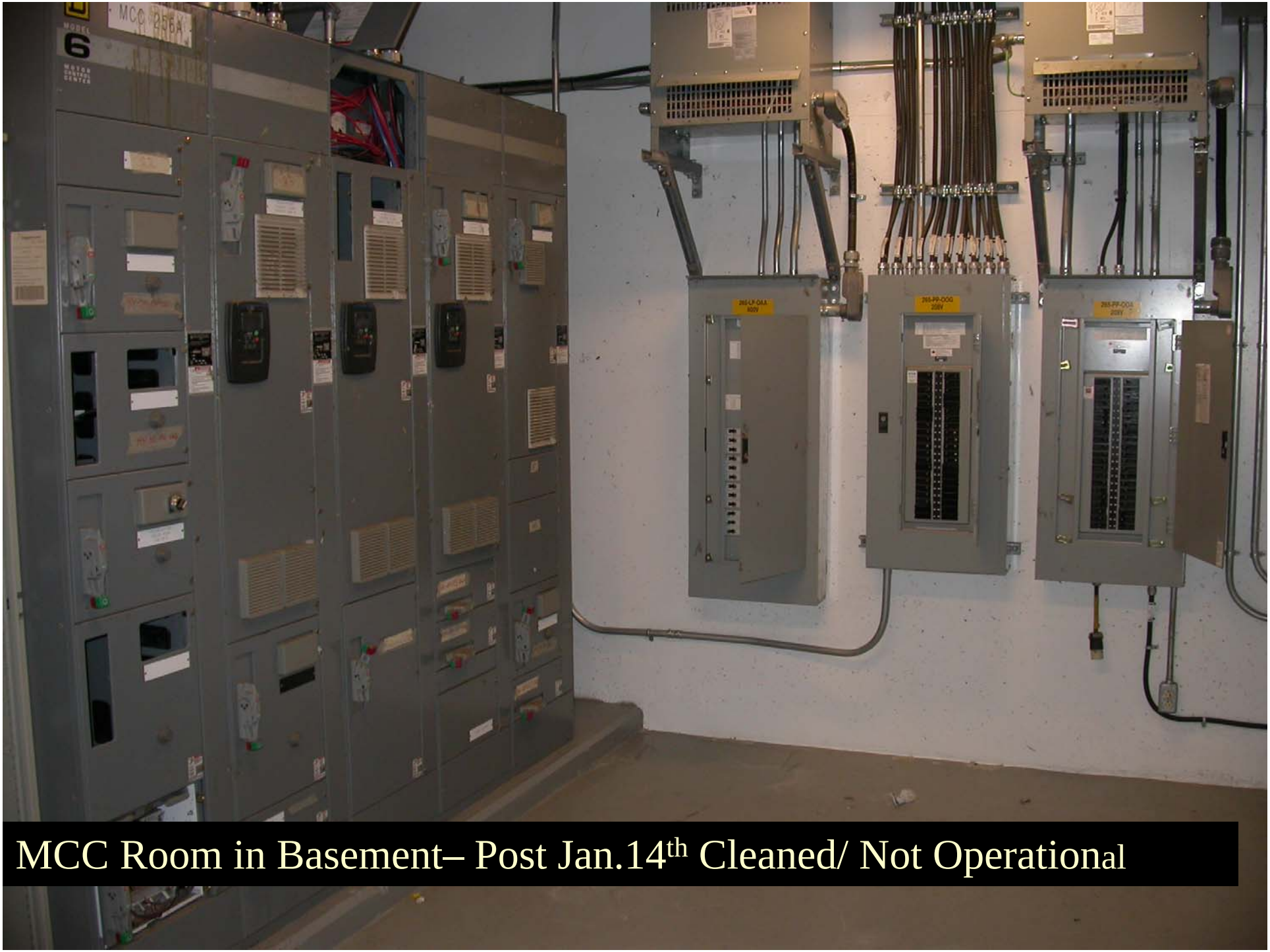
Floor of wet well prior to initial clean up – Jan.24th

Initial clean up of impacted ventilation equipment – Jan.24th

Boilers in Basement– Post Jan.14, 2009 Cleaned and Operational

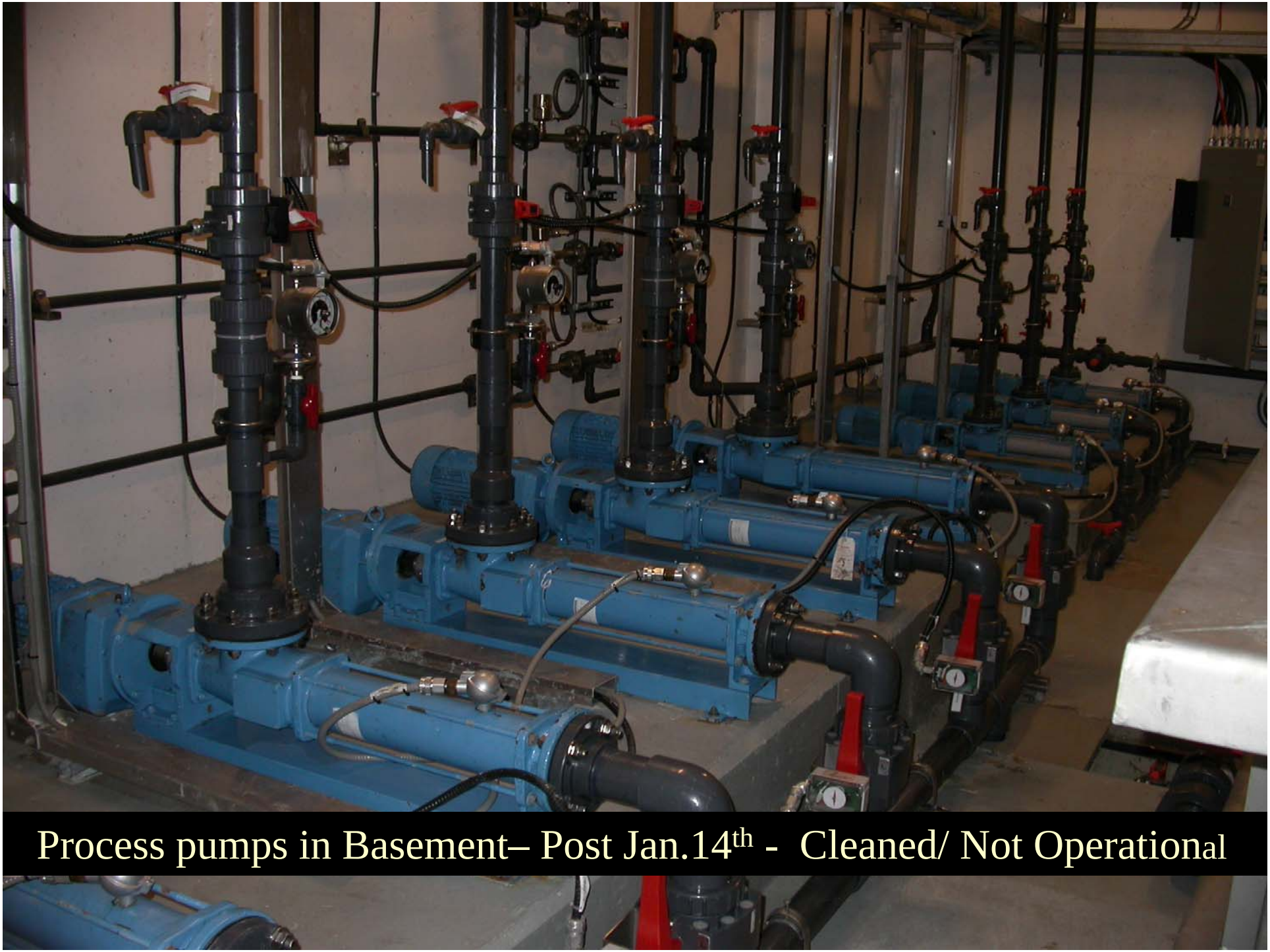


MCC Room in Basement– Post Jan.14th Cleaned/Not Operational



MCC Room in Basement– Post Jan.14th Cleaned/ Not Operational

Process pumps in Basement– Post Jan.14th - Cleaned/ Not Operational



Process pumps in Basement– Post Jan.14th - Cleaned/ Not Operational

Halifax WWTF Rapid Response

- Pump out of plant commenced on Jan 14 (valve still open to collection system)
- Temporary heating rigged immediately and in safe manner to protect plant and personnel from freezing temperatures
- Valve closed manually on Jan 18 to protect plant from wet weather
- Facility cleanup and insurance investigations commenced
- No safety incidents

Halifax WWTF Recovery; A Balancing Act

- Three Pillars
  - Get the plant operational as soon as possible
  - Correct deficiencies and enhance the design and operation to reduce the risk of flood reoccurrence
  - Shield the ratepayers from financial exposure

Halifax WWTF Recovery-Action on the Ground

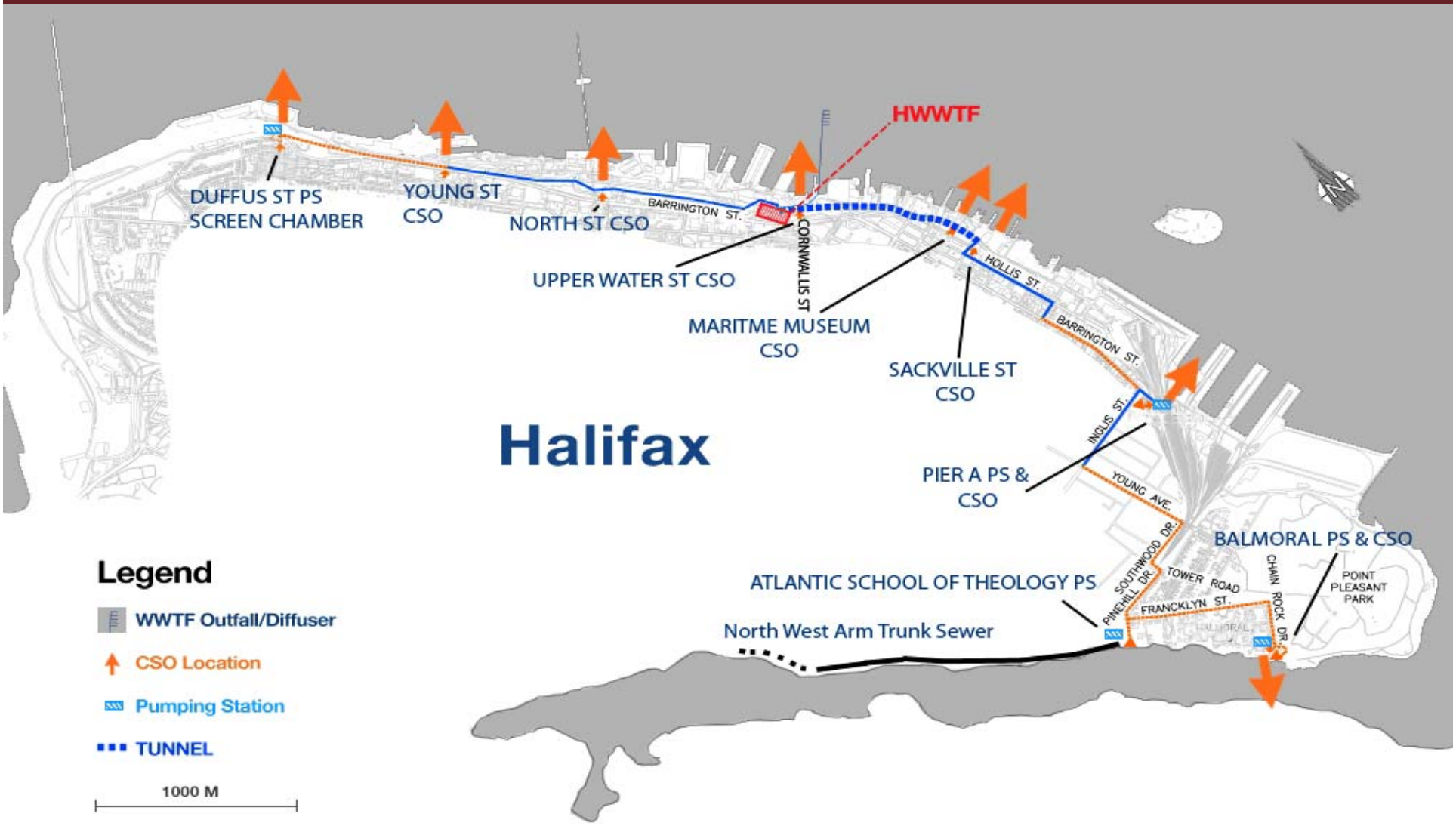
- Continue to Protect the Asset
- Complete inspection of the large raw water submersible pumps; if motors damaged, place an order as the delivery time is long [in the order of 6 to 7 months]
- Complete inspection of Sluice Gate Actuator
- Clean the Wet Well such that workers can replace equipment in a safe work environment
- Take an image of the SCADA software on the control system hardware

Halifax WWTF Recovery-Action on the Ground

Protect the Sewer Collection System Assets &Adjacent Property

- ❖Vigilance around the Pier A Pumping Station/CSO
- ❖Pump out grit/debris in waterfront CSOs on an as required basis [Effluent continues to be screened before discharge to Harbour]
- ❖Keep watch for wet weather events and co-ordinate pumping of tunnel in downtown Halifax to minimize street flooding

Halifax WWTF Recovery-Clean CSOs



Pumping at Pier A Pumping Station - CSO Chamber

Halifax WWTF Recovery-Next Steps

- Utilize insurance coverage to shield rate payers; insurance from one or both sources;
  - Builders Risk Insurance [Allianz]
  - HRM Property Insurance [Lombard]
- Builders Risk provides the best coverage and based on our analysis will be the prime coverage [HRM, Dexter and D&D are named insured]. The Property Insurance will be secondary.

Builders Risk Insurance-Coverage Summary

- Water Damage - $50 million
- Debris Removal - $5 million
- Expediting Expenses - $10 million
- Professional Fees - $1 million

Halifax WWTF Recovery-Next Steps

- Submerged electrical cables, instrumentation & electrical equipment to be repaired or replaced [NSPI electrical standard] including the MCC in the Basement [6 month delivery]
- Develop schedule for recovery & order the critical equipment. Who installs can be decided later
- Halifax Water has hired specialist consultants to perform more in depth forensics and make recommendations for improvements [work to be complete by May 09]

Halifax WWTF Recovery-Ultimate Goal

- Rehabilitate and recommission the plant to be fully operational by Spring, 2010
- Bring the Harbour water quality back to where it was prior to the flooding incident, meet the project specifications and meet the expectations of the public

Misconception – HRM Biosolids Program is a New and Unsafe Practice

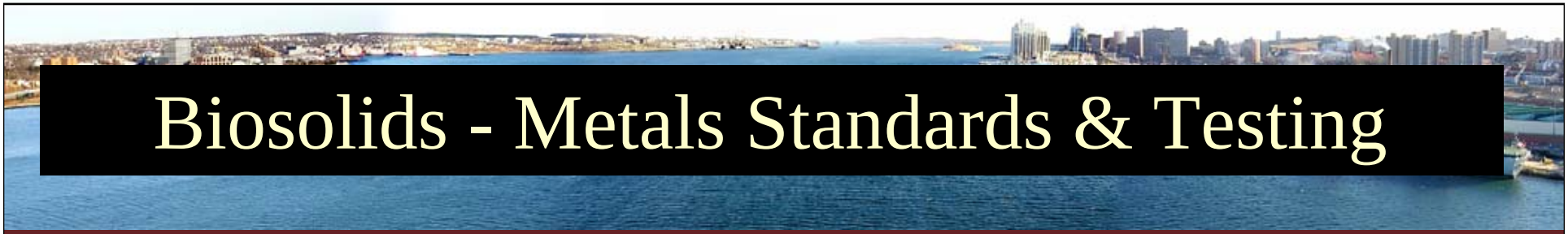
- Not New: Human wastes have been spread on agricultural lands for decades at much lower standards
- HRM Biosolids Program meets key principles:
  - HRM manages the waste it creates
  - Beneficial-use product, not land filled
- N-Viro process in use in Niagara and Sarnia
- Product meets all regulations, labeled by CFIA, and regularly meets Exceptional Quality standard

Biosolids- Microbial Standards & Testing

Halifax Soil Amendment (HSA)

	Nova Scotia Guidelines			HSA Average
	Class EQ	Class A	Class B	
Minimum Acceptable Levels of Pathogens				
Fecal Coliform	< 1000 MPN/g	< 1000 MPN/1g	< 2,000,000 MPN/g	Zero to < 10 MPN/g
Salmonella	< 3 MPN/4g	< 3 MPN/4g		negative (non detect)

MPN – Most Probable Number, CCME Standard



Biosolids - Metals Standards & Testing

Maximum Acceptable Levels of Metals and Pathogens (Nova Scotia)

Contaminant (mg/kg unless otherwise stated)	Class EQ N-Viro	Class A	Class B Most Ag Programs	Halifax Average**
Arsenic	13	75	75	3.5
Cadmium	3	20	20	0.0
Chromium	210	1060	1060	15.2
Cobalt	34	150	150	1.7
Copper	400	760	760	110.9
Mercury	0.8	5	5	0.2
Molybdenum	5	20	20	3.1
Nickel	62	180	180	9.7
Lead	150	500	500	57.1
Selenium	2	14	14	2.1
Zinc	700	1850	1850	211.8

**13 tests

Misconception – Harbour Solutions should have fixed localized flooding issues

- Harbour Solutions is a sewage treatment project designed to achieve specific water quality objectives
- Project intercepts and treats four times average dry weather sewage flow (approx. 95% of pollutants)
- Plants are sized for projected population growth to 2021, with 10% capacity upgrade to 2041
- There will be severe wet weather overflows to Harbour, consistent with most cities in North America

Misconception – Harbour Solutions should have fixed localized flooding issues (cont'd)

- Areas prone to flooding in extreme wet weather events before Harbour Solutions will still flood after
- Storm and sanitary sewer separation was not in scope for Harbour Solutions:
  - Extremely expensive
  - Too long to execute successfully on an opportunity basis
  - Questionable environmental approach
- HRM has commenced sewershed studies to understand and address stormwater challenges posed by current storm flows and climate change

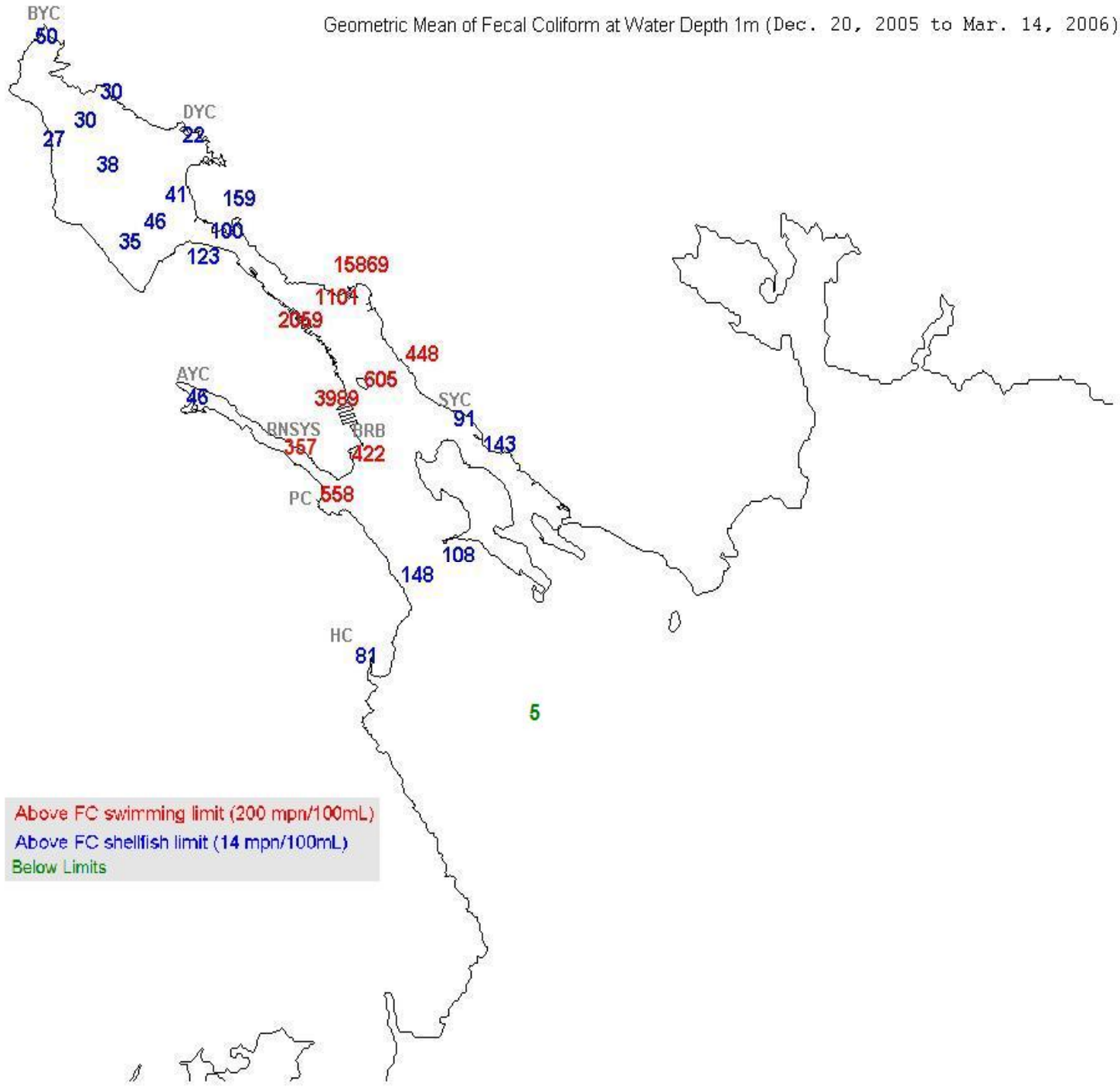
Misconception – Harbour Solutions uses outdated technology that does not work

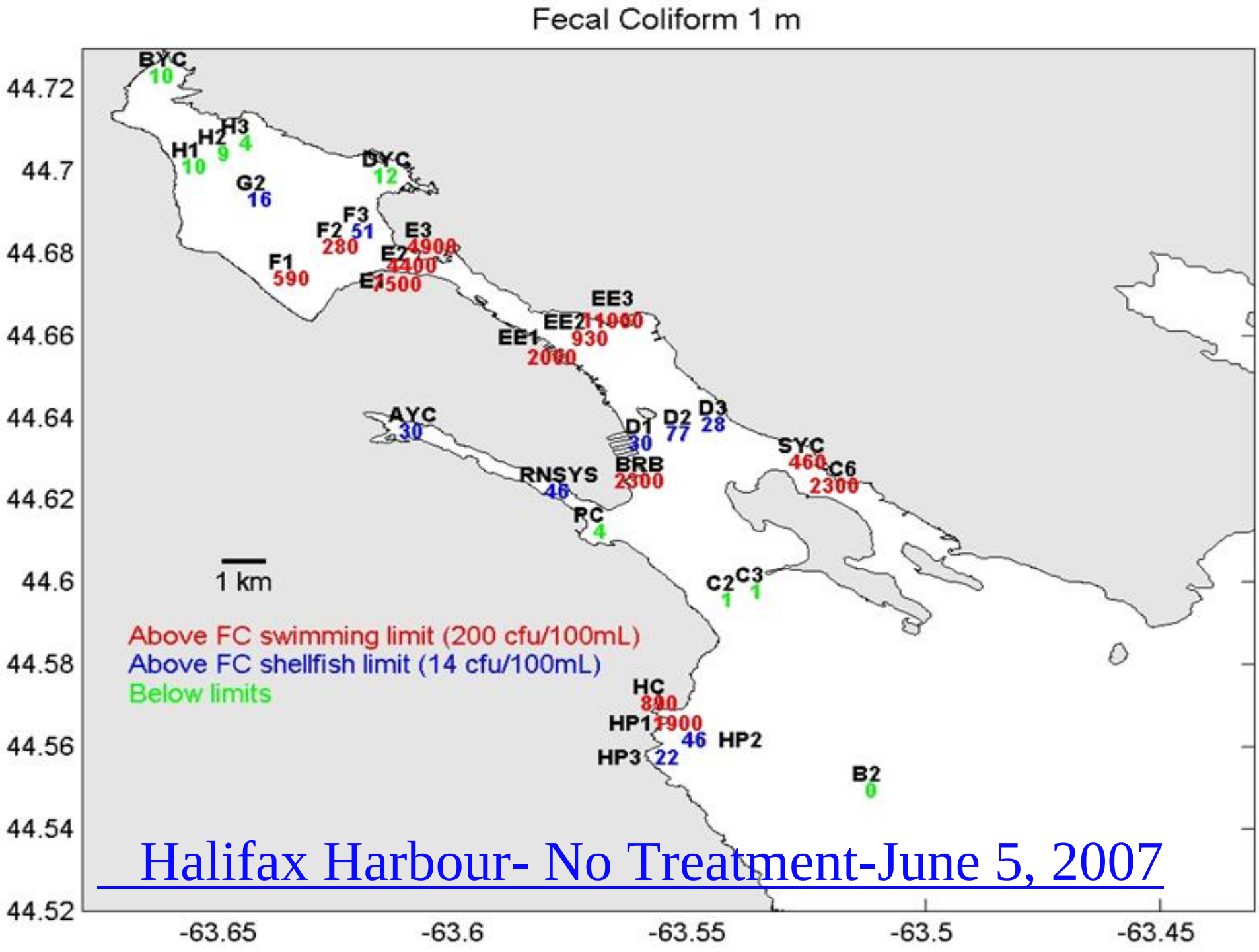
- Misconception has arisen largely from new CCME wastewater effluent strategy signed Feb 17, 2009
- National Performance Standard of Secondary Treatment must be met within 30 years, timing based on risk assessment completed in within next 8 years
- HHSP plant upgrades will be tied to risk assessment which will include an environmental analysis of Combined Sewer Overflows [CSOs]
- Plant upgrades will be carried out between 10 and 30 years depending on environmental “bang for the buck” [Plant upgrades vs CSO management plan]

Misconception – Harbour Solutions uses outdated technology that does not work (cont'd)

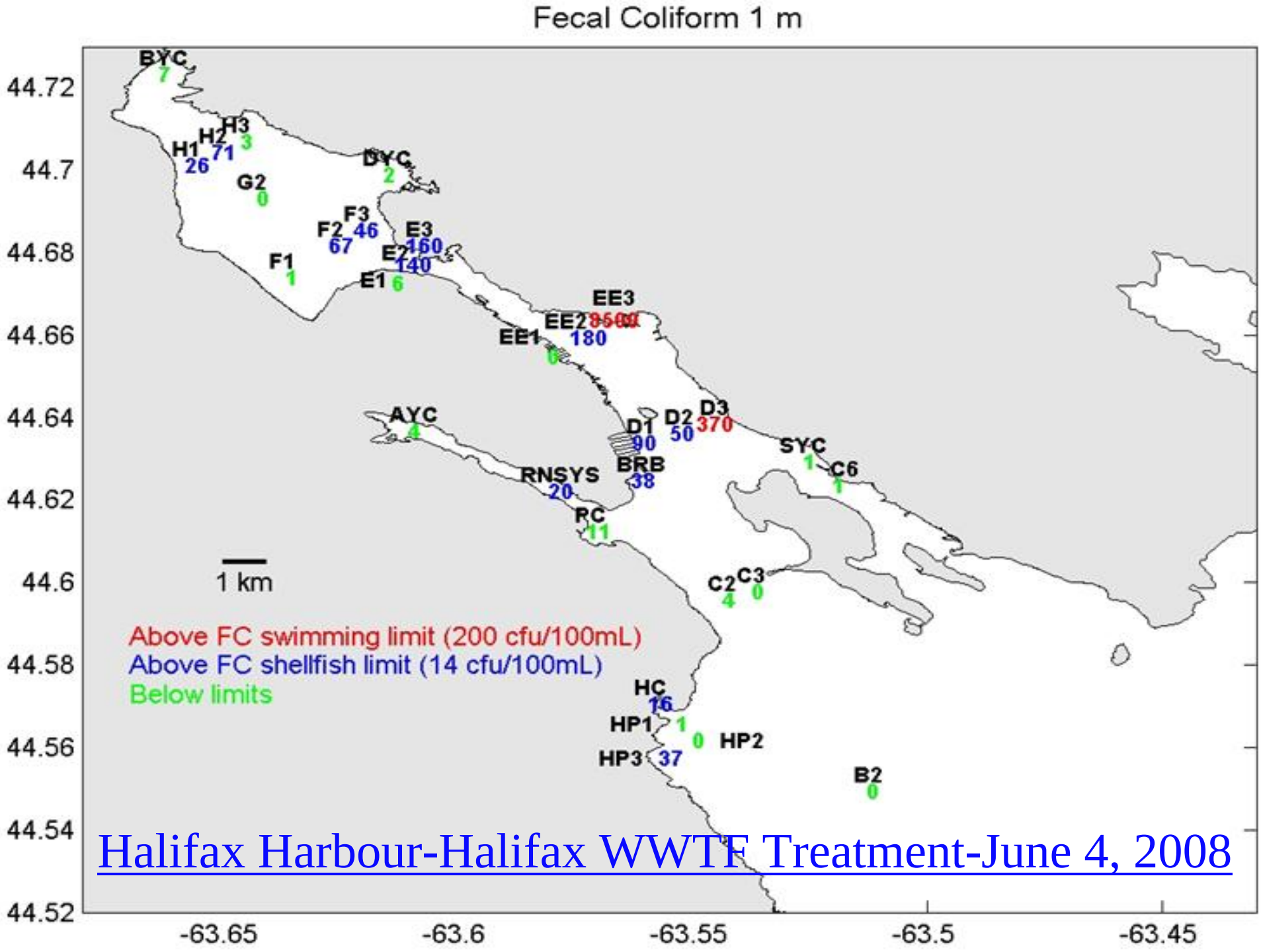
- HHSP Plants can be upgraded to secondary within existing land footprints, well positioned for future
- Secondary treatment would NOT have avoided incident at the Halifax WWTF
- Halifax Harbour Solutions Project is largely complete and has already achieved/exceeded water quality objectives

Harbour Solutions Project - Water Sampling In Halifax Harbour

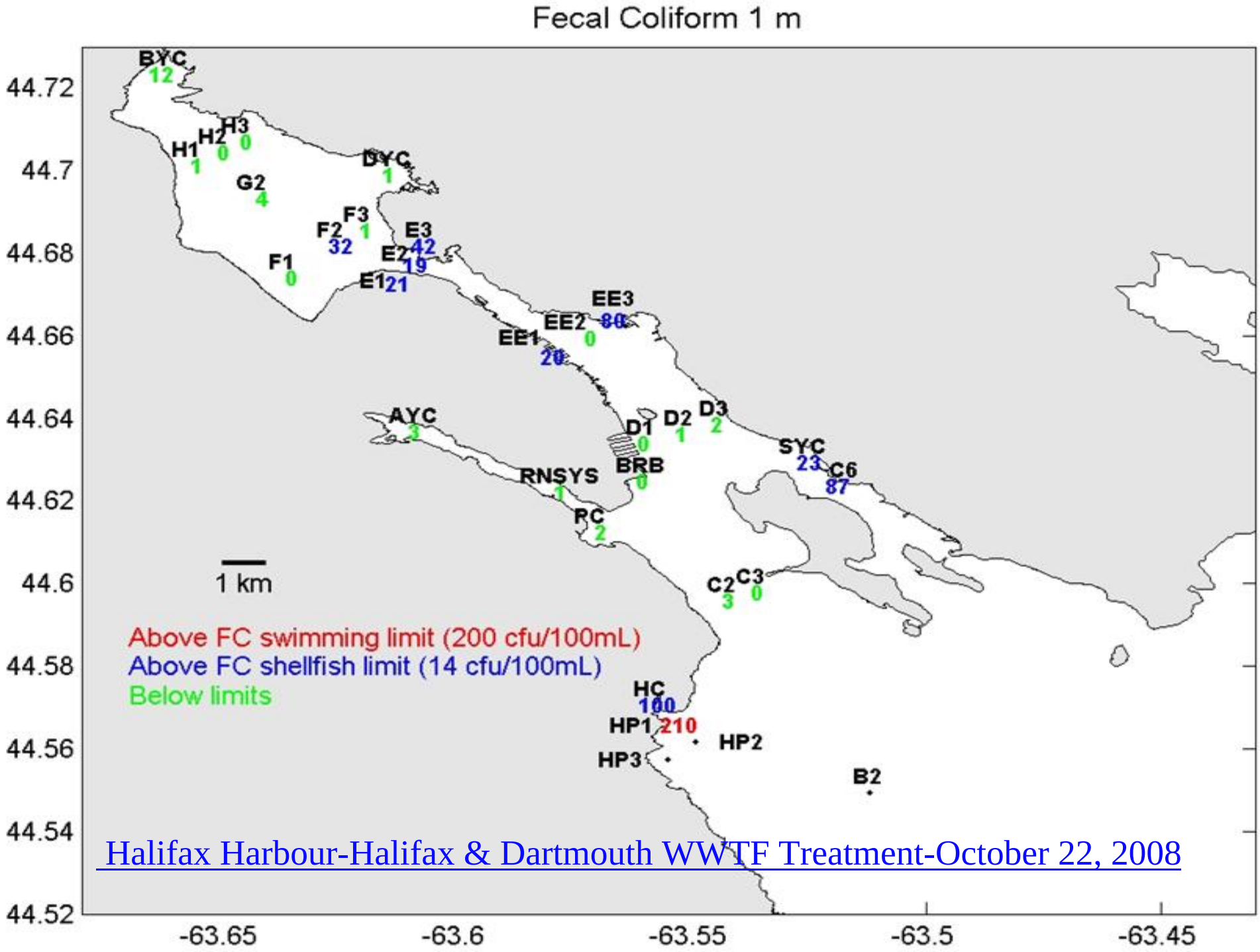

Geometric Mean of Fecal Coliform at Water Depth 1m (Dec. 20, 2005 to Mar. 14, 2006)
BYC
50
30
30
27
38
DYC
22
41
159
46
100
35
123
15869
1104
2059
448
AYC
46
605
3999
SYC
91
143
RNSYS
357
GRB
422
PC
558
108
148
HC
81
5
Above FC swimming limit (200 mpn/100mL)
Above FC shellfish limit (14 mpn/100mL)
Below Limits



Halifax Harbour- No Treatment-June 5, 2007

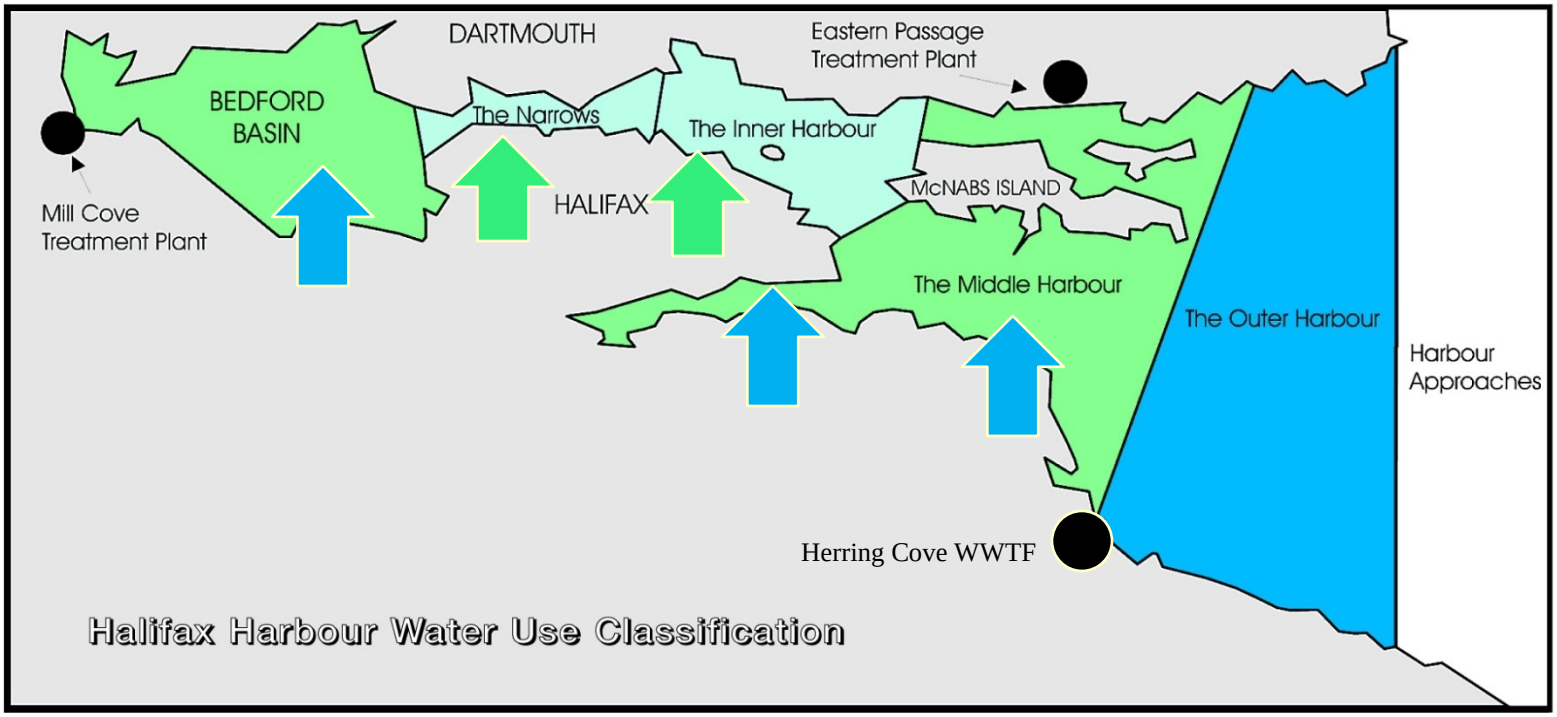


Halifax Harbour-Halifax WWTF Treatment-June 4, 2008



Halifax Harbour-Halifax & Dartmouth WWTF Treatment-October 22, 2008

HSAC Harbour Water Use Guidelines



CLASS SA

- bathing and contact recreation
- shellfish harvesting for direct human consumption
- fish and wildlife habitat

CLASS SB

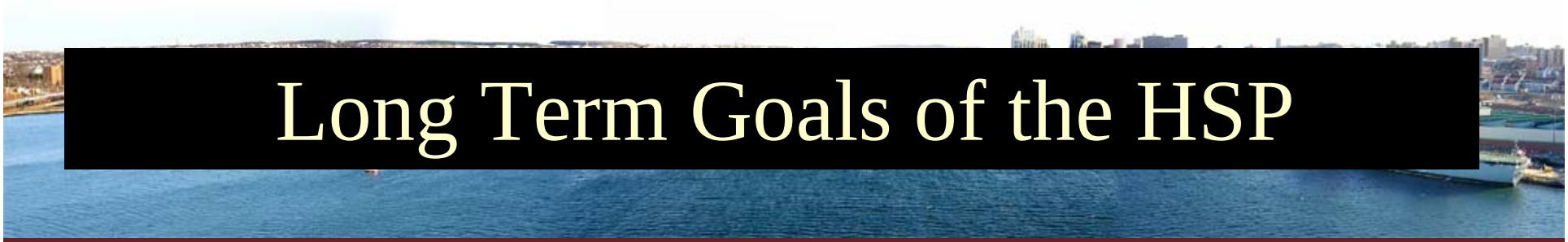
- shellfish harvesting for human consumption after depuration
- bathing and other primary contact recreational activities
- fish and wildlife habitat

CLASS SC

- boating and other secondary contact recreational activities
- industrial cooling
- good aesthetic value
- fish and wildlife habitat

Harbour Solutions Project Achievements

- ✓ One of Canada's Top 10 Infrastructure Projects, national/international recognition
- ✓ Within budget and close to overall schedule
- ✓ Economic driver for the Region
- ✓ Catalyst for numerous municipal upgrades
- ✓ Catalyst for Community Development
  - ✓ Herring Cove Water and Sewer, trails, park improvements
  - ✓ Dartmouth waterfront trails
  - ✓ Halifax community investment fund/micro-loan program
- ✓ Enabler for Natural Gas
- ✓ Beaches re-opened
- ✓ Excellent safety record



Long Term Goals of the HSP

- ✓ Greatly improved water quality in the Harbour
- ✓ Increased property values
- ✓ Increased tourism revenues
- ✓ Renewed shellfish harvesting
- ✓ Improved marine ecosystem health
- ✓ Avoided health costs due to water-related illnesses
- ✓ Increased recreational opportunities
- ✓ Overall enhanced quality of life for HRM

How Can You Stay Informed?

- HRM Website - www.halifax.ca - HSP Front page Icon
- Harbour Solutions Project Communications 490-4604 or email campbej@halifaxwater.ca
- Harbour Solutions Project Office 490-4756
- E-mail contactHRM@halifax.ca
- Naturally Green Newsletter
- HRM Call Centre (490-4000)
- News Releases, media briefings