Updates on Remedial Program at the GE Hudson Falls Plant Site

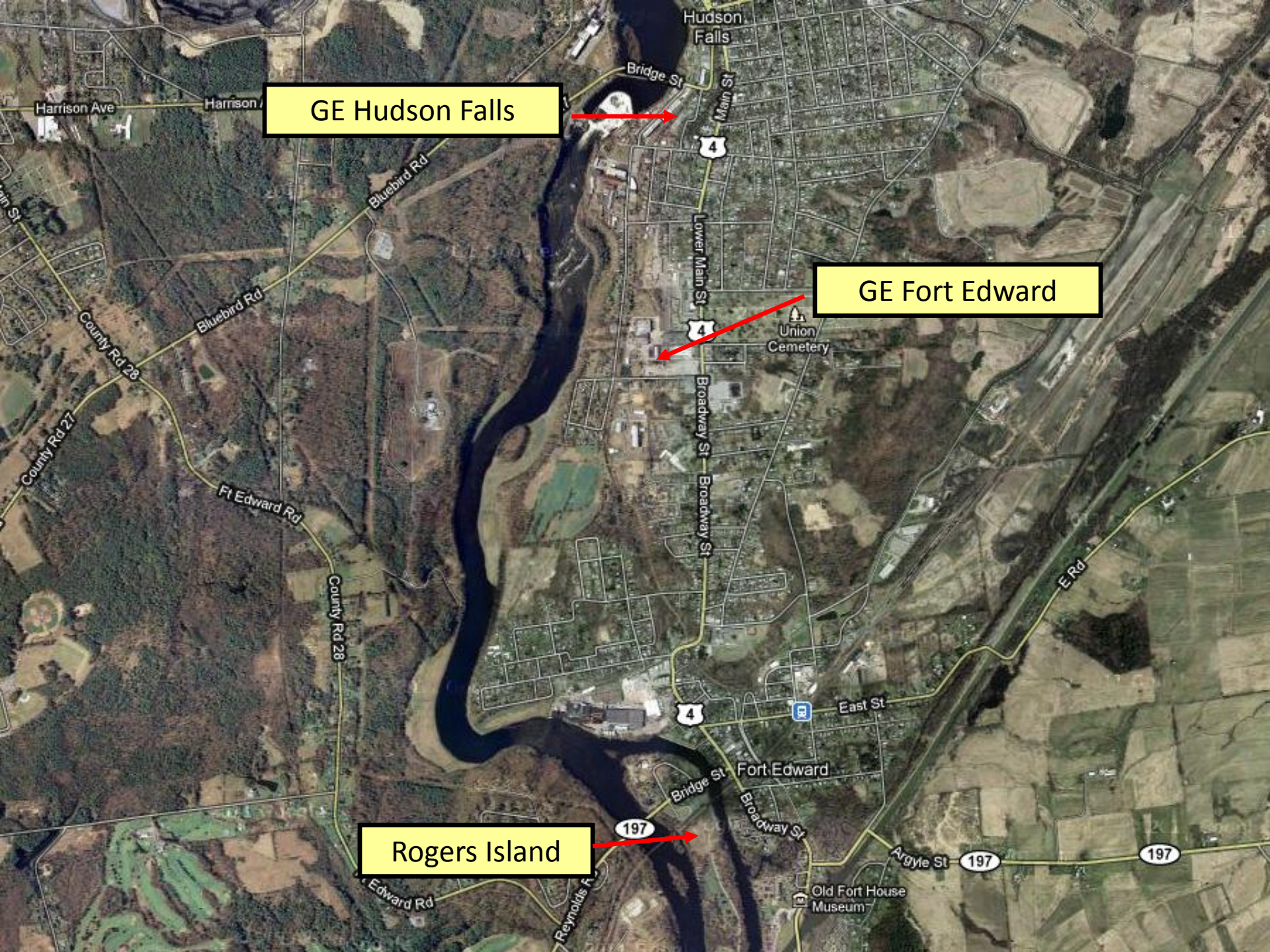
USEPA Community Advisory Group Meeting
June 30, 2011

Division of Environmental Remediation
New York State Department of Environmental Conservation

Quick Site History

- Facility located on Baker's Falls in the Village of Hudson Falls, Town of Kingsbury
- Facility originally used as a paper mill in the early 1900s
- GE capacitor production between 1952 and the mid 1990s.
- PCB used neat as the capacitor dielectric fluid between 1952 and 1977


GE Hudson Falls
GE Fort Edward

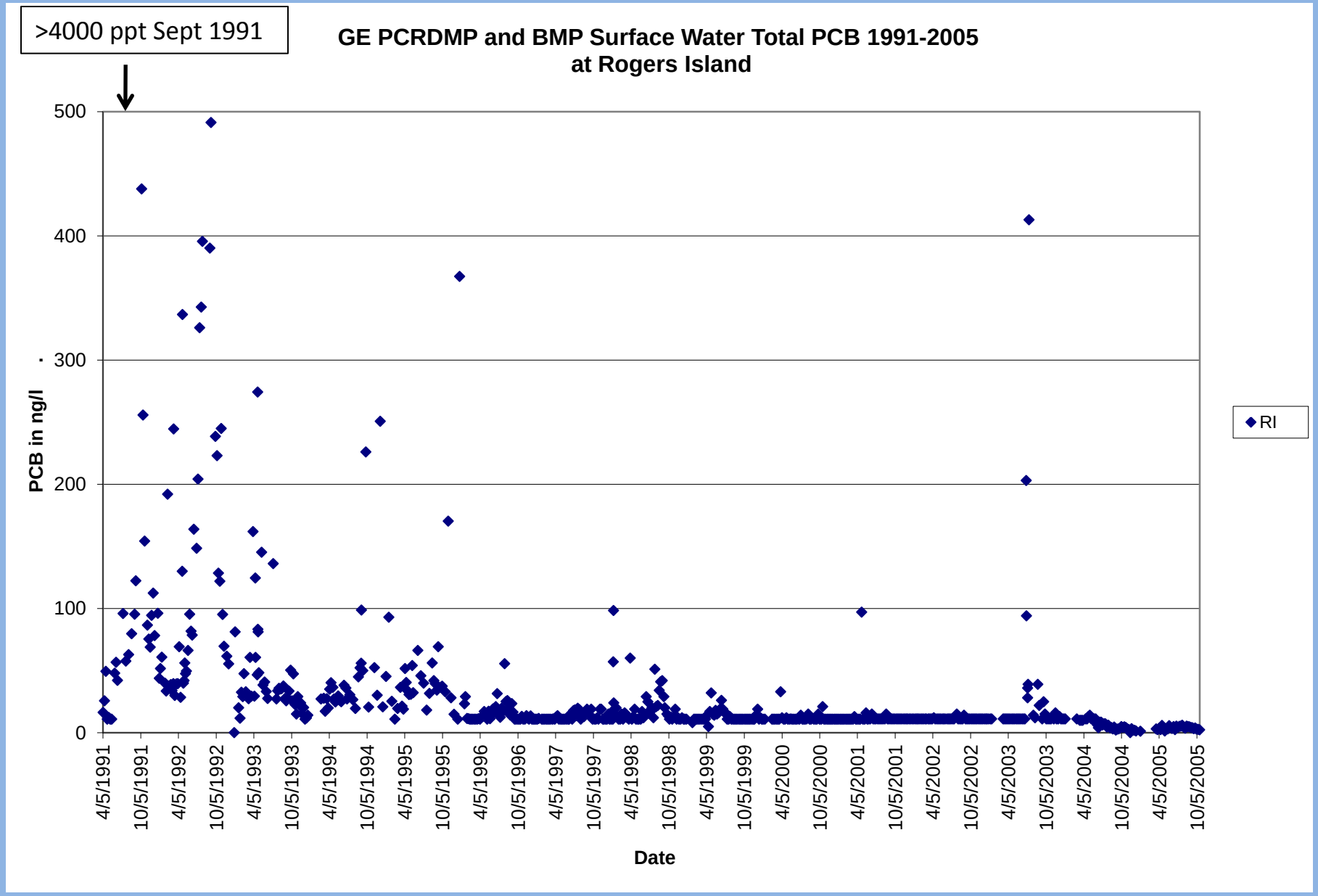

GE Hudson Falls
GE Fort Edward
Rogers Island
Hudson Falls
Bridge St
Main St
Harrison Ave
Bluebird Rd
Lower Main St
Union Cemetery
Broadway St
County Rd 28
County Rd 27
Ft Edward Rd
East St
Fort Edward
Argyle St
Old Fort House Museum
E Rd
197
4

Site Remedial History

- Site placed on the Registry of Inactive Hazardous Waste Sites in early 1980s; not proposed for inclusion on the EPA National Priorities List
- Preliminary investigations conducted in mid 1980s
- Site wide Remedial Investigation began in late 1980s
- As RI data allowed an understanding of site conditions, a series of Interim Remedial Measures were done in the early to mid 1990s

Major IRMs Performed

- Sediment removal from 002 outfall area, and Allen Mill area (upper and lower raceways, tailrace tunnel)
- Seepage collection system along eastern bank of the Hudson River
- Development and expansion of a site wide groundwater and PCB oil collection system in the overburden and bedrock
- Construction and operation of a new state of the art wastewater treatment plant


>4000 ppt Sept 1991
GE PCRDMP and BMP Surface Water Total PCB 1991-2005
at Rogers Island
PCB in ng/l
500
400
300
200
100
0
4/5/1991
10/5/1991
4/5/1992
10/5/1992
4/5/1993
10/5/1993
4/5/1994
10/5/1994
4/5/1995
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4/5/2002
10/5/2002
4/5/2003
10/5/2003
4/5/2004
10/5/2004
4/5/2005
10/5/2005
Date
RI

Relationship to EPA-lead Hudson River Project

- This facility, along with the nearby Fort Edward plant site, are the original sources for the GE PCB releases to the Hudson River
- Direct untreated discharges from the plant sites ended in 1977
- Since the cessation of direct untreated discharges, the plant sites were surpassed by the river sediments as the primary continuing source of PCB to the water column and biota of the Hudson River

Relationship to EPA-lead Hudson River Project

- EPA, in the Record of Decision for the Hudson River PCBs site, noted that “the expected source area work near the GE Hudson Falls plant is important to the full realization of the benefits of the remedial action called for in this ROD”
- EPA’s analyses during remedy selection assumed significant reductions in loading to the river from upstream sources, equivalent to a PCB load derived from an average concentration of 2 ng/l

2004 Record of Decision

- The ROD issued by NYSDEC in 2004 contained two primary elements – bedrock remedy and overburden remedy
- Overburden remedy – treatment of contaminated soils as feasible, with groundwater and PCB oil collection
- Bedrock remedy – enhancement of existing bedrock recovery system by construction of a Tunnel Drain Collection System (TDCS)

2004 ROD Remedial Action Objectives

Mitigate the impacts of contaminated groundwater on human health and the environment:

- Eliminate, to the extent practicable, the potential for contaminated groundwater, which does not meet NYSDOH Part 5 Drinking Water Quality Standards, to be used as a drinking water supply.
- Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.

2004 ROD Remedial Action Objectives

Mitigate the impacts of the contaminated soils at the site:

- Eliminate, to the extent practicable, the potential for direct human or animal contact with the contaminated soils on site
- Eliminate, to the extent practicable, the releases of contaminants from the soils at the site to the groundwater which contribute to, or result in, violations of groundwater quality standards.

2004 ROD Remedial Action Objectives

Mitigate the impacts of the contaminants at the site on the Hudson River:

- Eliminate, to the extent practicable, the migration of PCBs into the Hudson River via erosion of PCB contaminated soils, transport of suspended sediment with surface water, and transport of PCBs contained in NAPL, groundwater or surface water
- Eliminate, to the extent practicable, migration of NAPL to the Hudson River and other off-site areas through removal and hydraulic management
- Eliminate, to the extent practicable, the migration of PCBs from the site to biota in or near the Hudson River

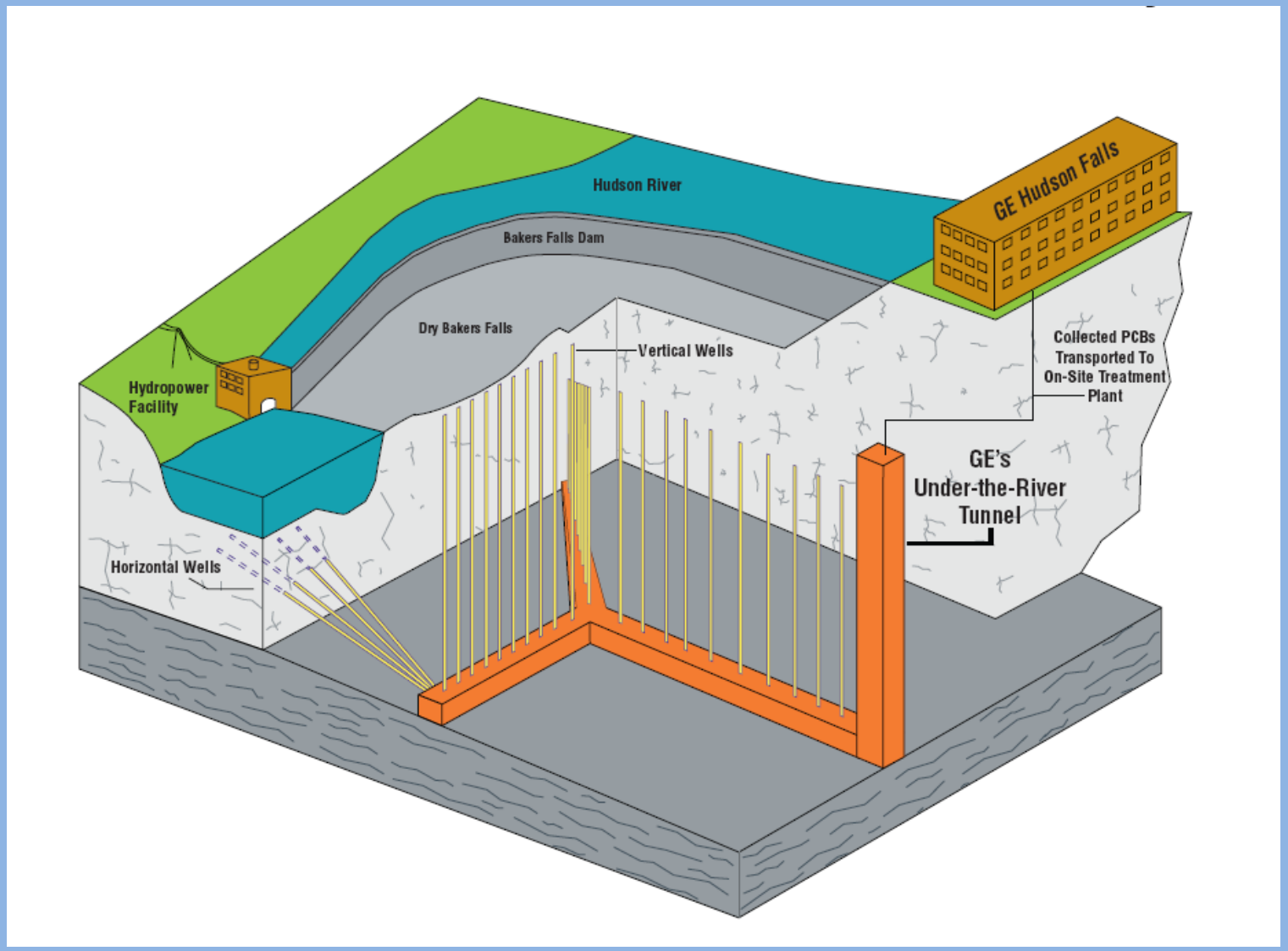
Basis for TDCS

- Mobile PCB oil was in the bedrock beyond the capture zone of the existing remedial systems
- The steep hydraulic gradients in the vicinity of the dam and waterfall made it difficult to intercept the flow of PCB oil to the river
- The installation of the TDCS beneath the primary bedrock horizon through which the PCB oil migrated to the river allowed establishment of sufficient hydraulic gradients into the TDCS

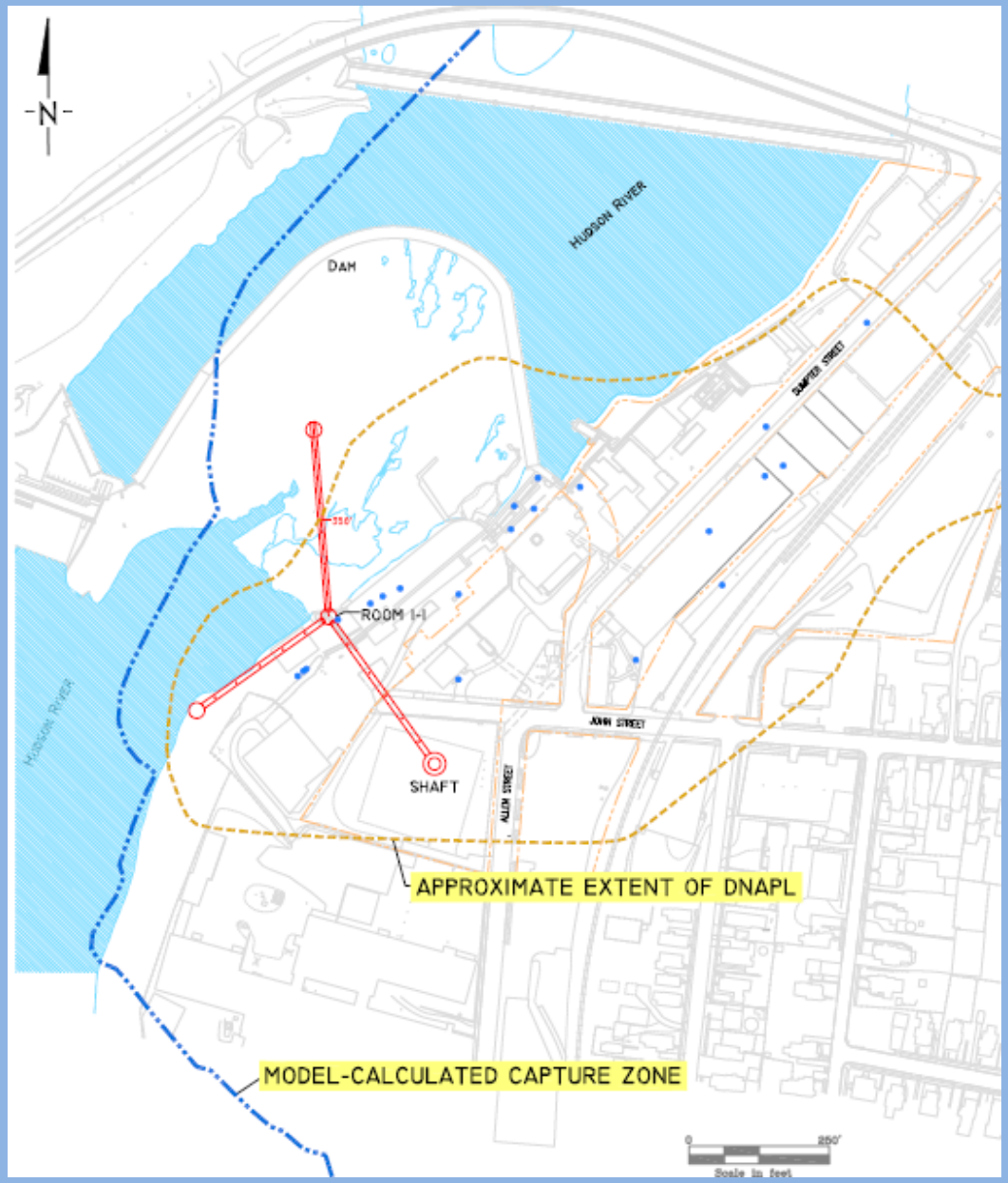
TDCS Construction

- GE designed the system between 2005 and 2007, and began construction in 2007
- Vertical Shaft - August 2007 to March 2008
- Tunnel legs - April 2008 to October 2008
- Drain well and piezometer installation - March to May 2009
- System operation began in May 2009 when the drain wells were opened to the tunnels

Final Tunnel Layout



Final Tunnel Layout



TDCS Operation

- The TDCS is entered infrequently by GE personnel
- Groundwater and PCB oil drain into the central sump and are pumped to the expanded onsite wastewater treatment plant
- Bedrock water levels are monitoring remotely by telemetry from TDCS piezometers
- Numerous monitoring wells and piezometers are also monitored

Preliminary Findings (1)

- Degree of capture in the zone containing PCB oil which could enter the river is good; steep hydraulic gradients have been established into the TDCS
- A large hydraulic capture zone has been established in the bedrock well beyond the zone containing PCB oil
- Approaching or meeting EPA's ROD goal for upstream source control

Figures

- Following figures are from the Tunnel Drain Collection System Performance Evaluation Report, May 2011 (Tetra Tech for GE)

Figure 3-12. Boat Launch Total PCB Concentrations

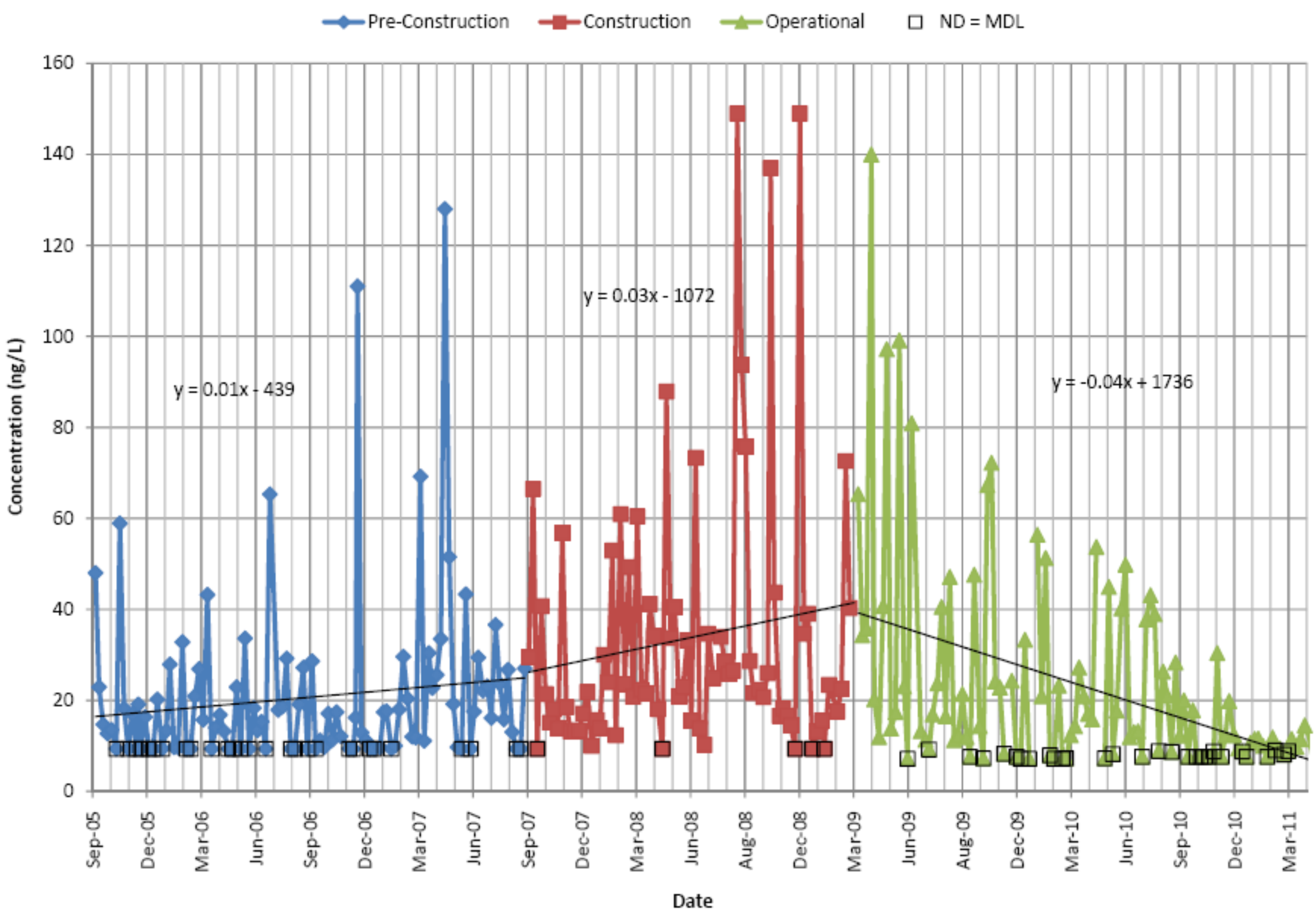


Figure 3-13. Boat Launch Total Tri+ PCB Concentrations

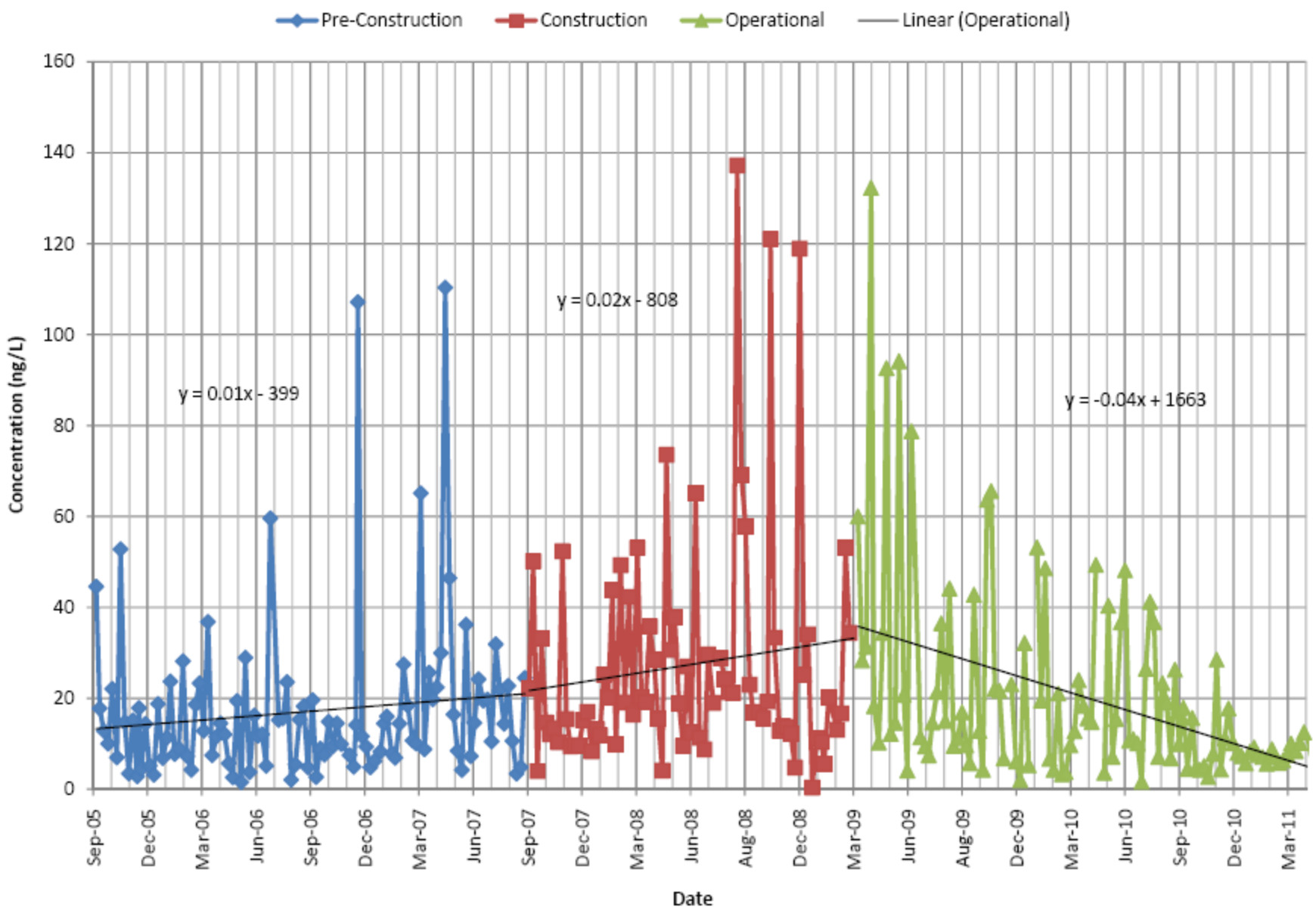


Figure 3-14. Rogers Island Total PCB Concentrations

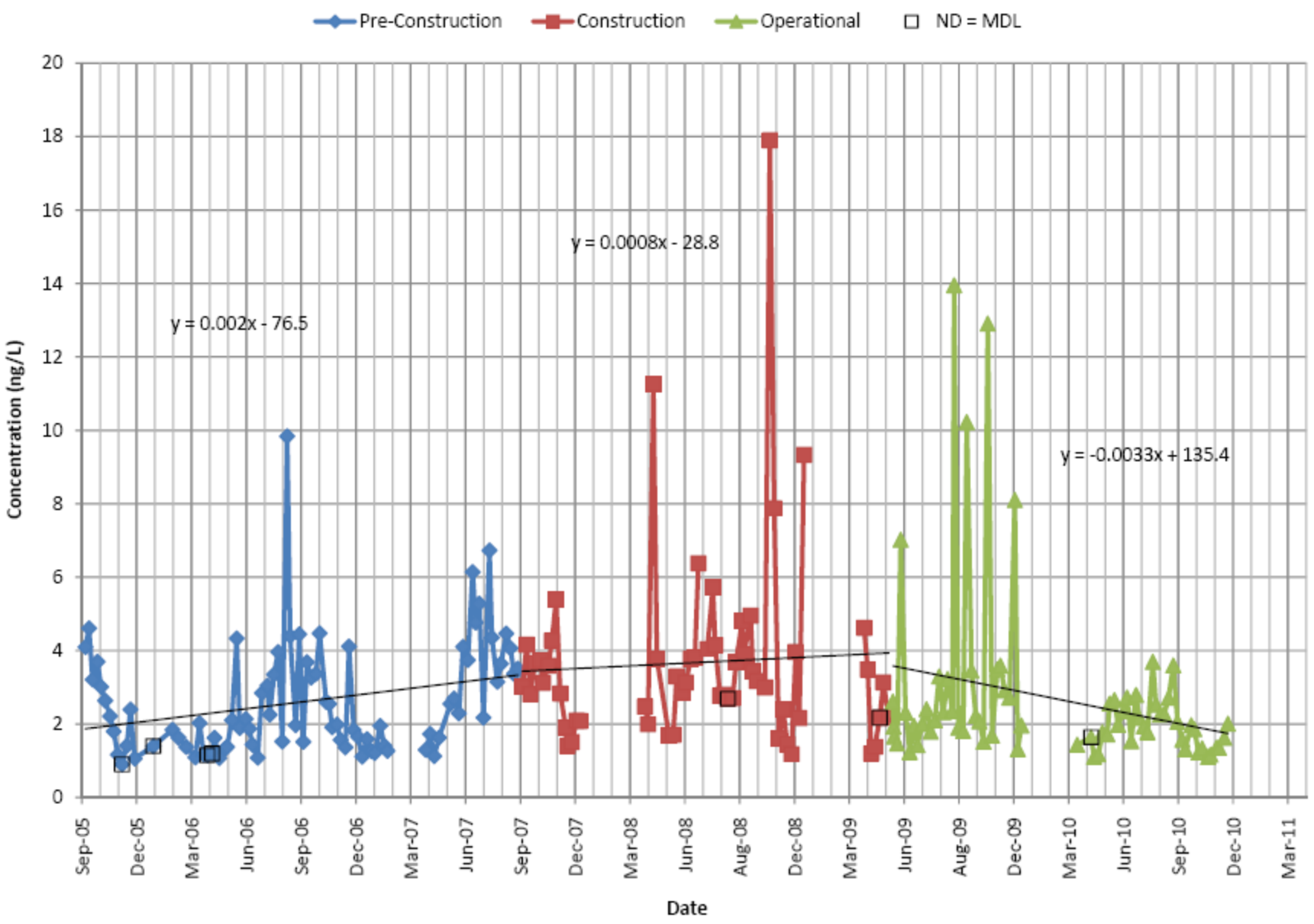


Figure 3-15. Rogers Island Total Tri+ PCB Concentrations

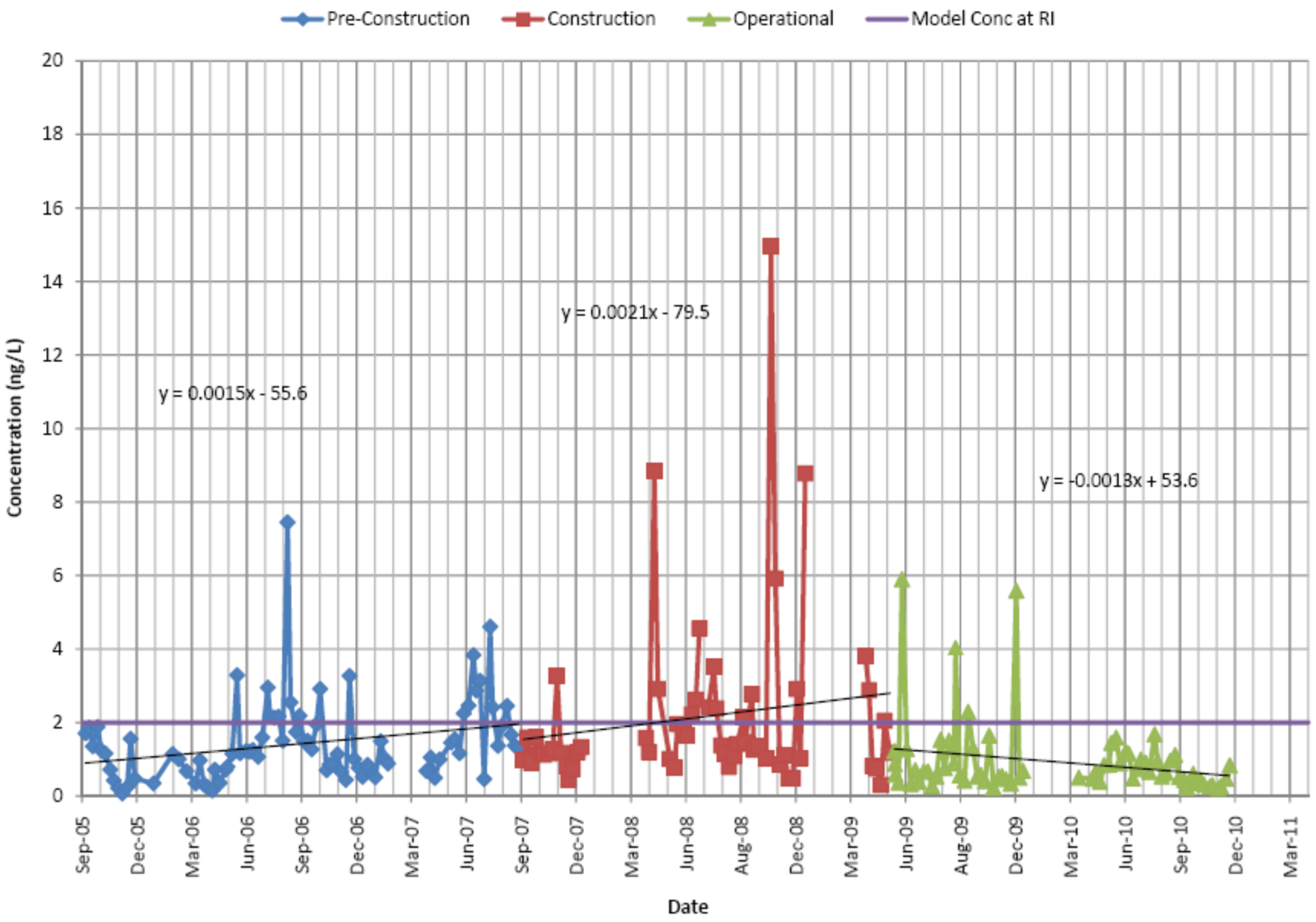


Figure 3-16. Rogers Island Total PCB Mass Discharge

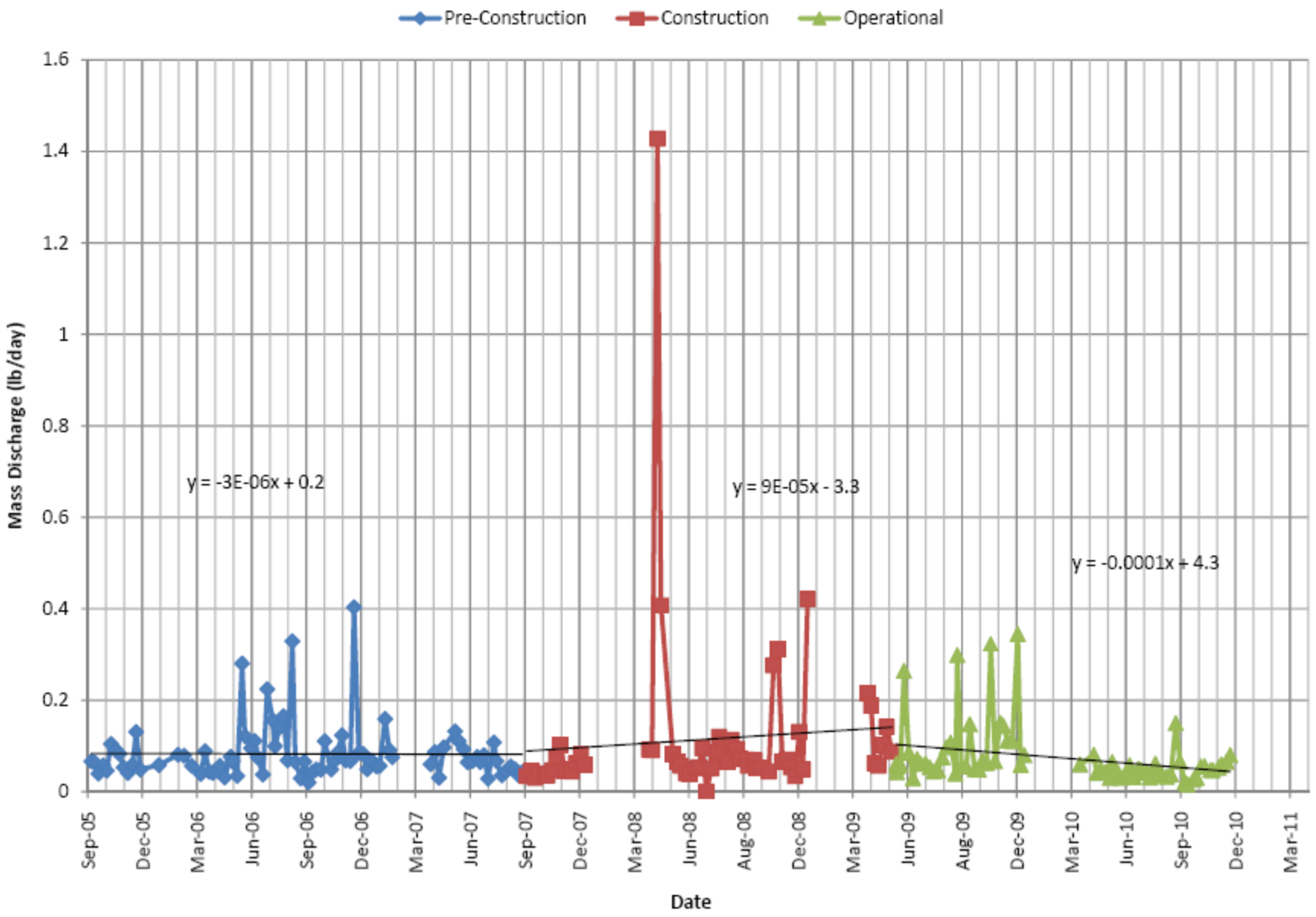
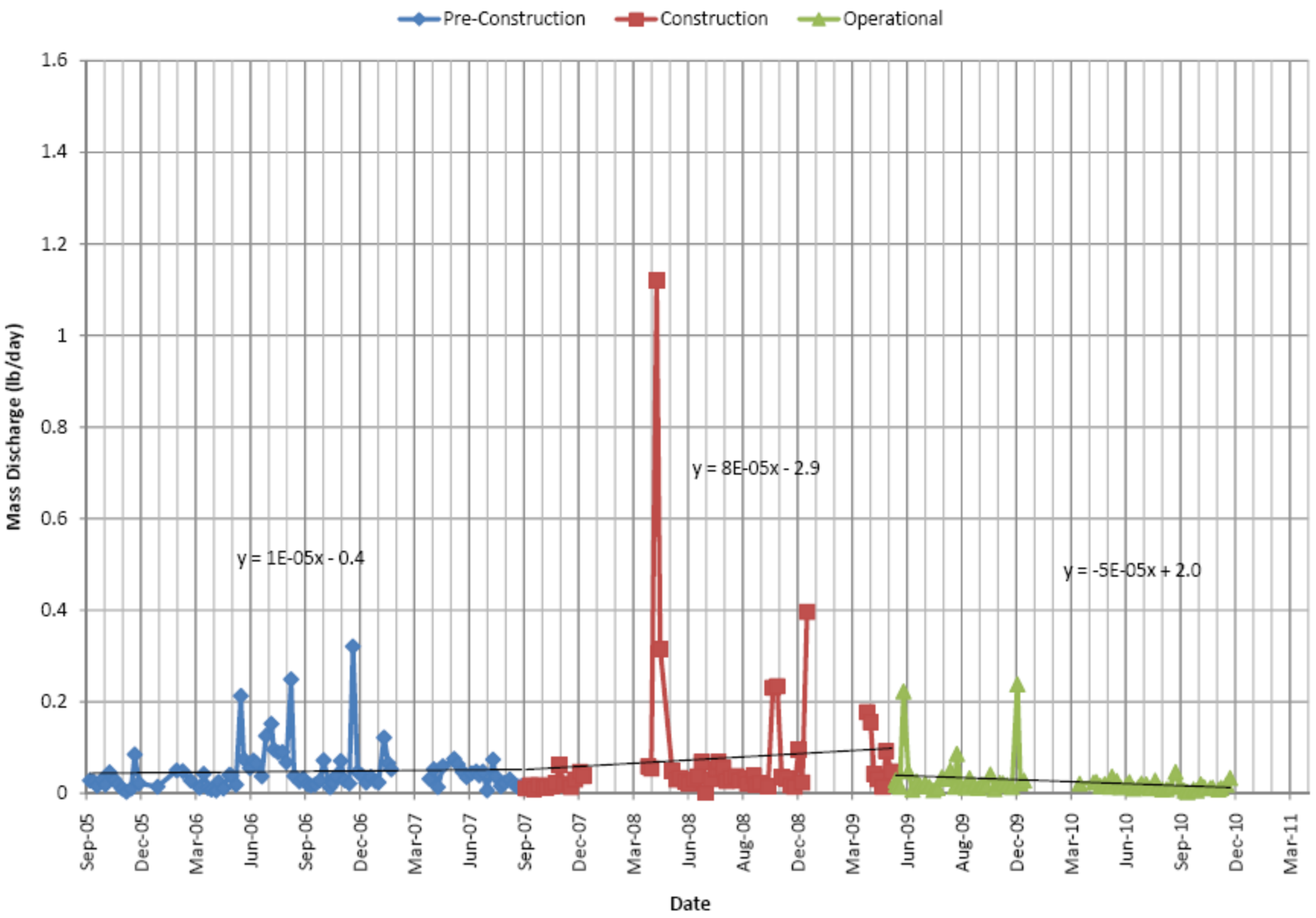
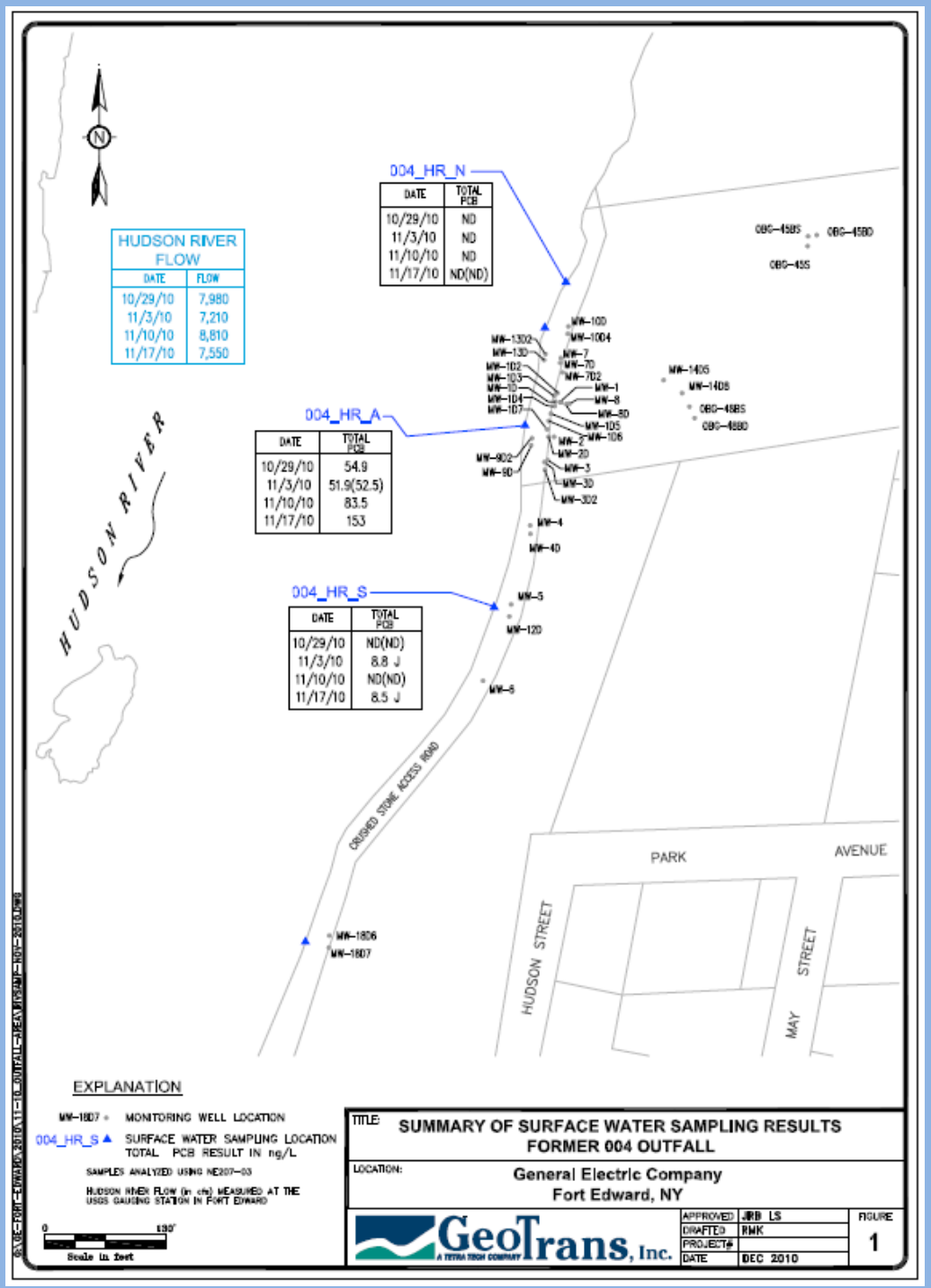


Figure 3-17. Rogers Island Total Tri+ PCB Mass Discharge

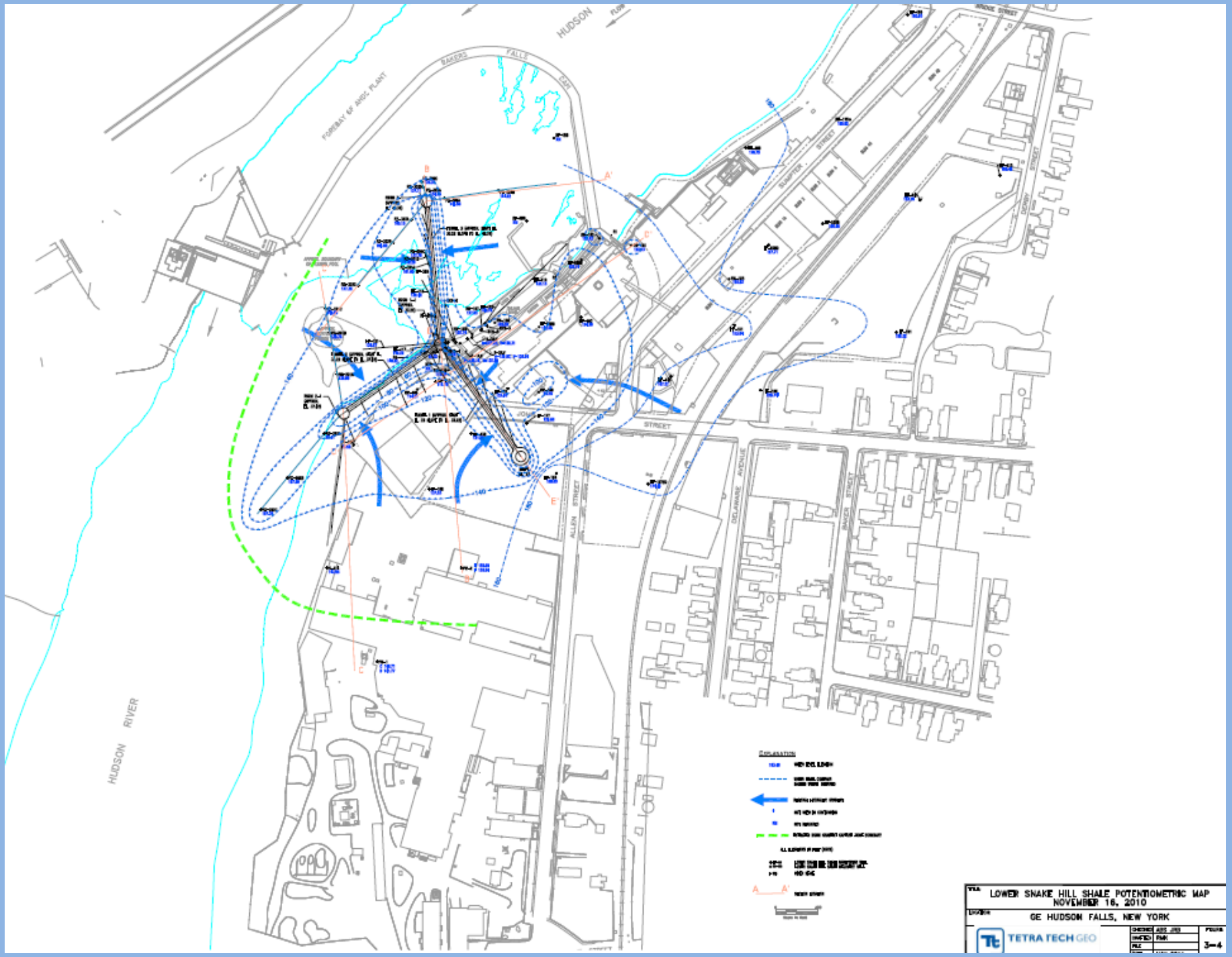


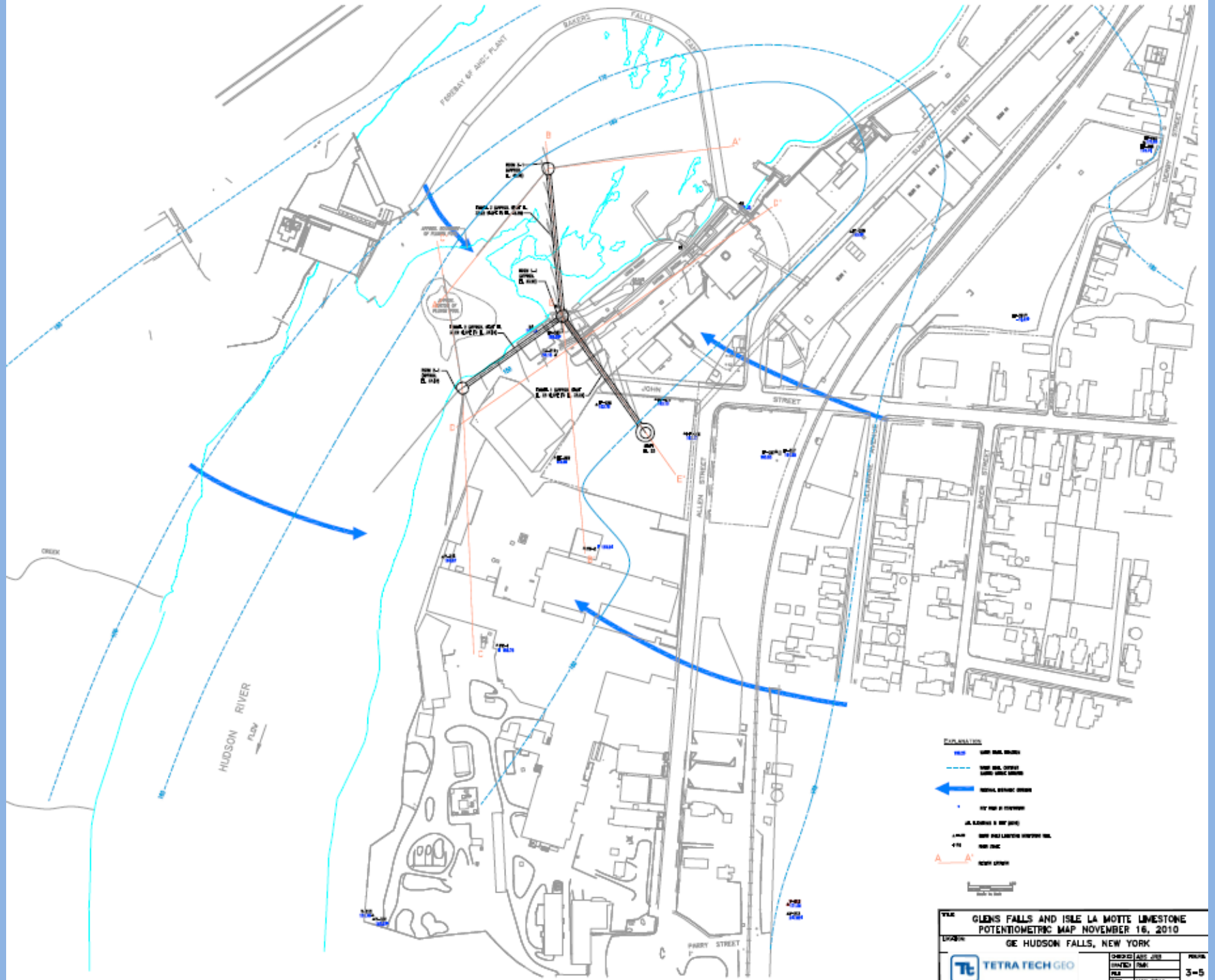
(Figure from November 2010 Monthly Report for GE FE plant site)



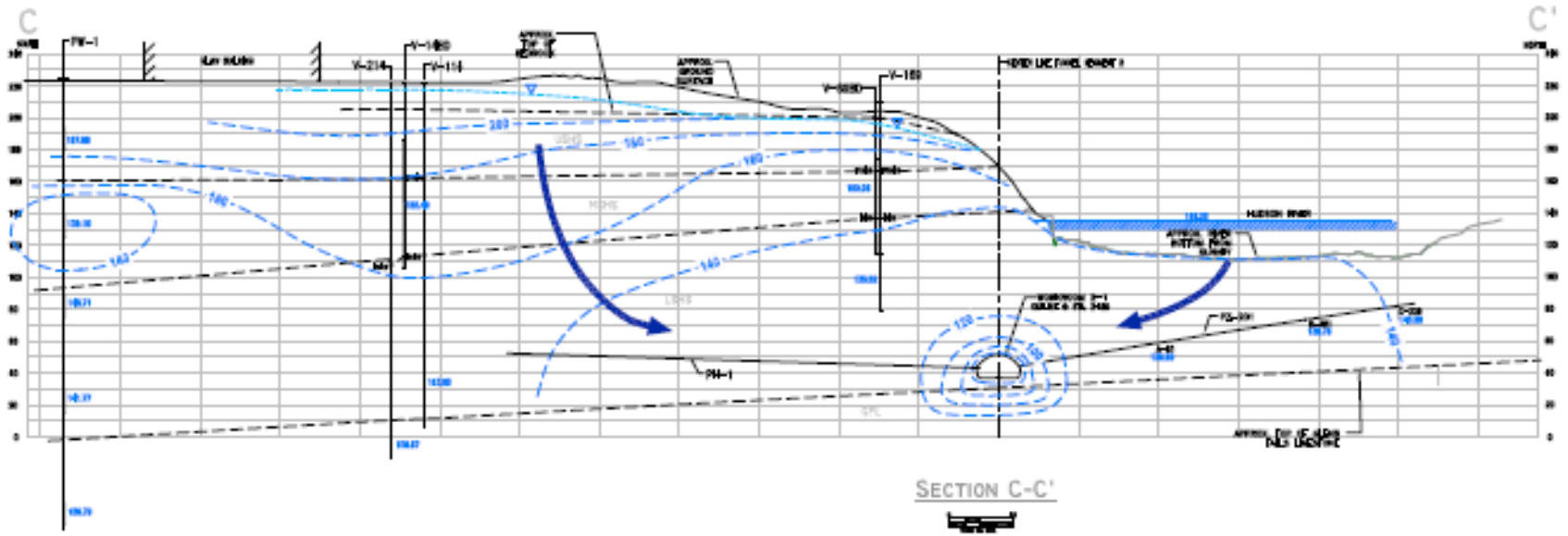
Preliminary Findings (2)

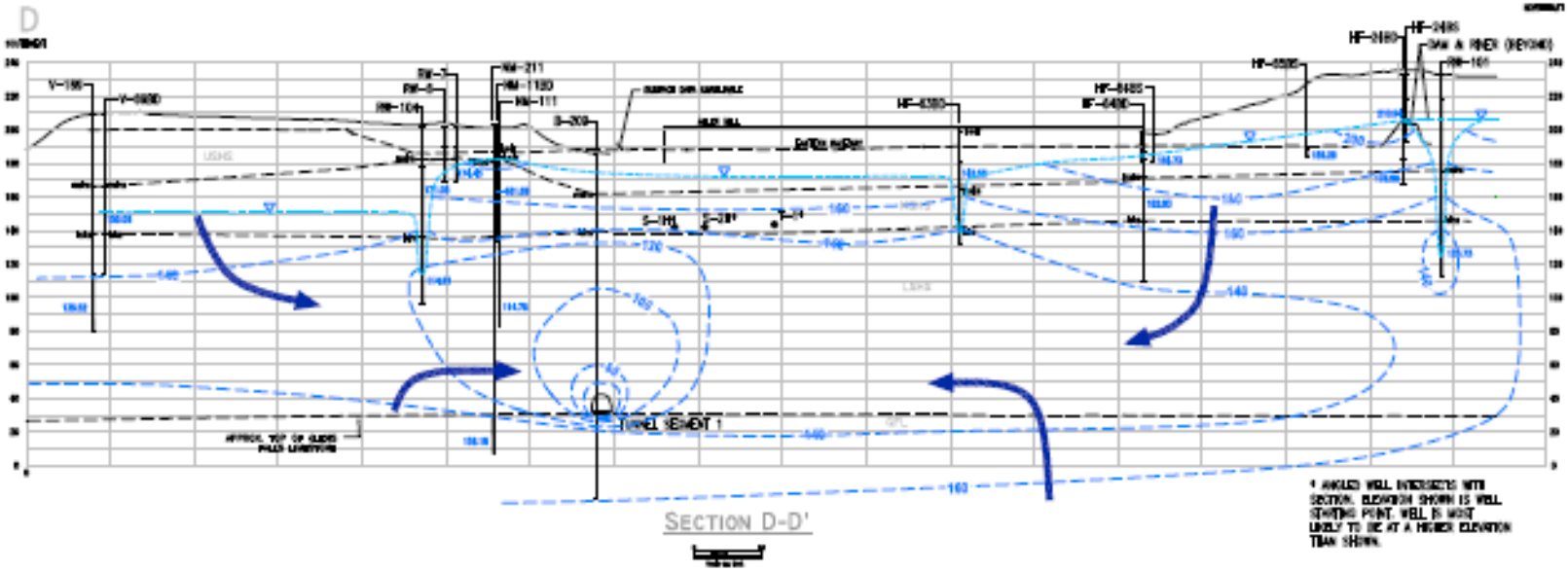
- The southern margin of the groundwater plume is potentially beyond the southern extent of hydraulic capture
- It may be appropriate to determine if the groundwater at the southern end of the plume may impact the river
- Concentrations along the southern plume boundary are typically below the drinking water standard (0.5 ppb), but marginally above the groundwater standard (0.09 ppb)


HUDSON
FALLS
FOREBAY OF ANDC PLANT
HUDSON RIVER
STREET
ALLEN STREET
DELAWARE AVENUE
BAKER STREET
EXPLANATION
LOWER SNAKE HILL SHALE POTENTIOMETRIC MAP
NOVEMBER 16, 2010
GE HUDSON FALLS, NEW YORK
TETRA TECH GEO
3-4

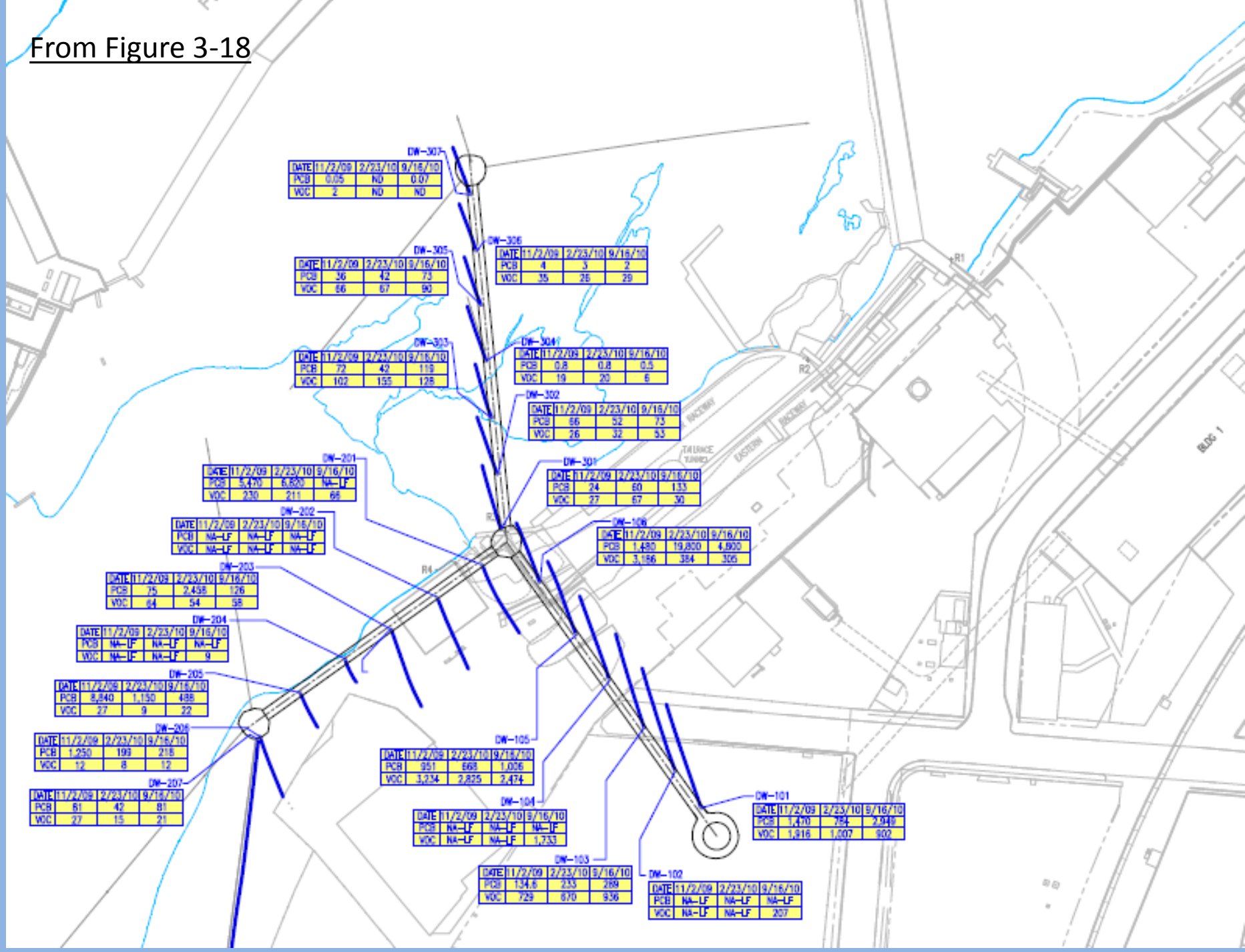

BAKERS FALLS
FERRARY OF AMCT PLANT
HUDSON RIVER
FLOW
JOHN STREET
ALLEN STREET
PARRY STREET
SUMPTER STREET
RIVER STREET
EXPLANATION
GLENS FALLS AND ISLE LA MOTTE LIMESTONE
POTENTIOMETRIC MAP NOVEMBER 16, 2010
GE HUDSON FALLS, NEW YORK
TETRA TECH GEO
3-5

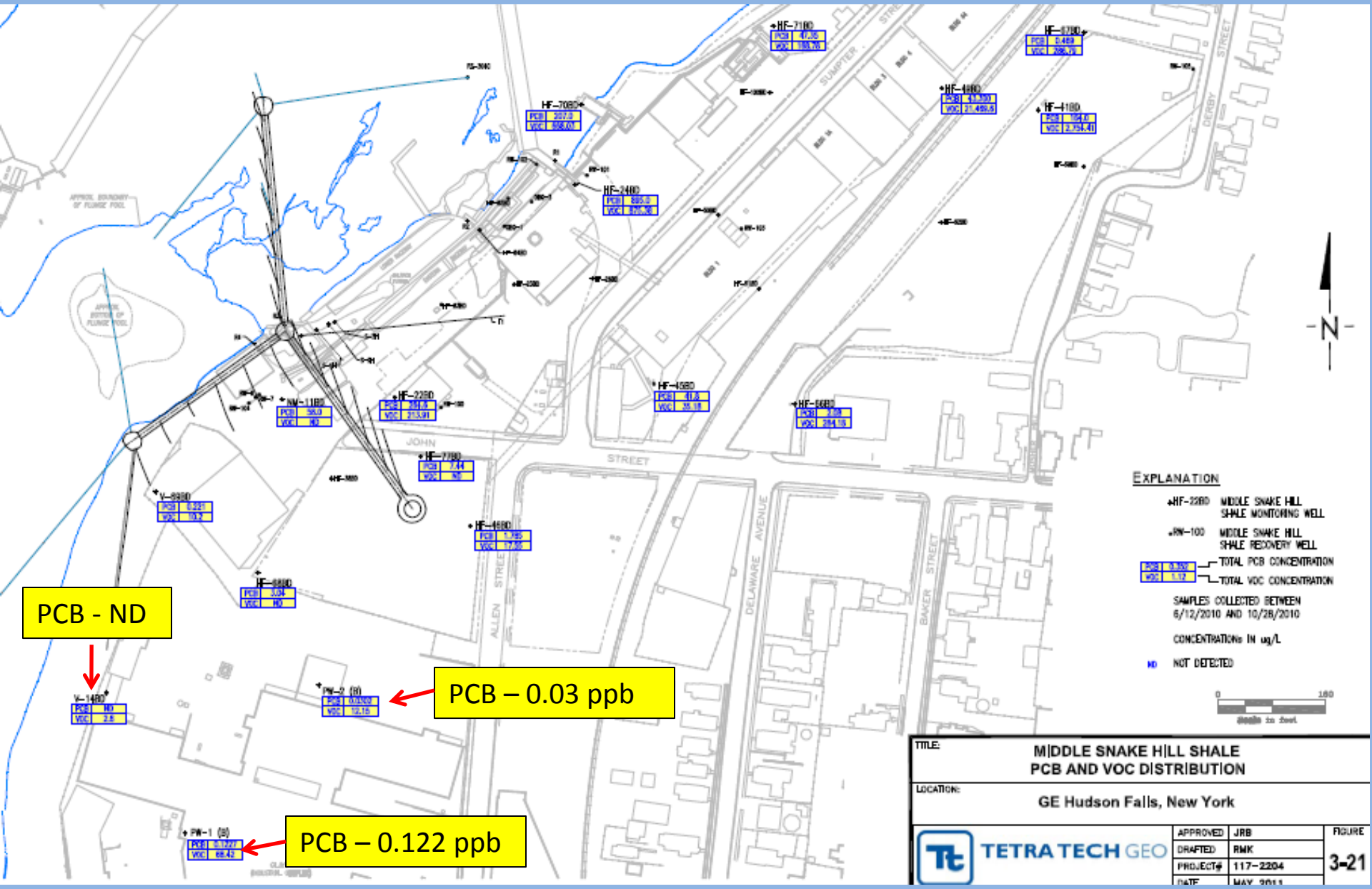
From Figure 3-7 of TDCS evaluation report

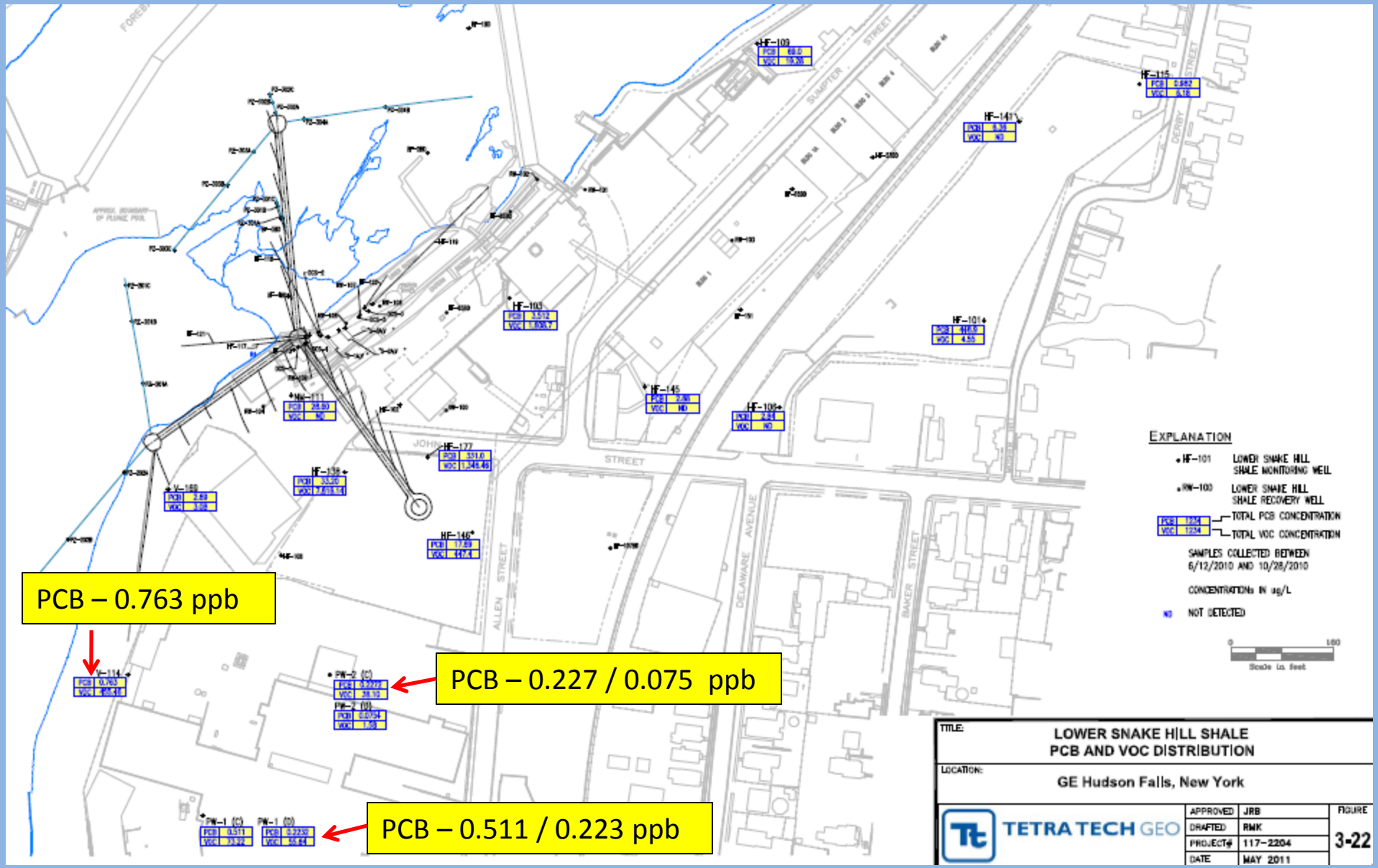


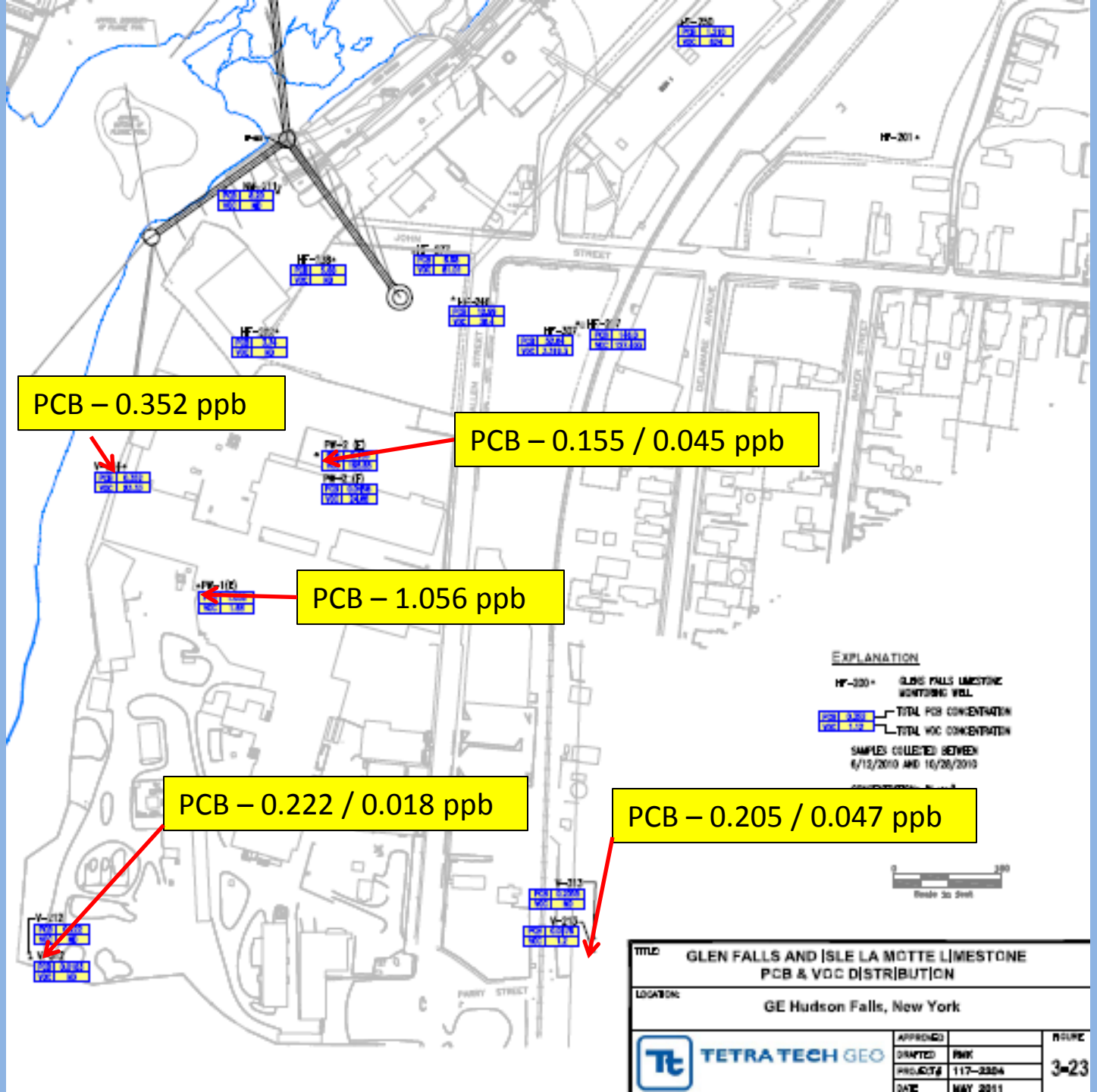


From Figure 3-18




PCB - ND
PCB – 0.03 ppb
PCB – 0.122 ppb
EXPLANATION
+HF-22BD MIDDLE SHALE SHALE MONITORING WELL
+RW-100 MIDDLE SHALE SHALE RECOVERY WELL
TOTAL PCB CONCENTRATION
TOTAL VOC CONCENTRATION
SAMPLES COLLECTED BETWEEN 6/12/2010 AND 10/28/2010
CONCENTRATIONS IN ug/L
ND NOT DETECTED
TITLE:
MIDDLE SHALE HILL SHALE PCB AND VOC DISTRIBUTION
LOCATION:
GE Hudson Falls, New York
TETRA TECH GEO
APPROVED JRB
DRAFTED RMK
PROJECT# 117-2204
FIGURE 3-21


PCB – 0.763 ppb
PCB – 0.227 / 0.075 ppb
PCB – 0.511 / 0.223 ppb
EXPLANATION
HF-101 LOWER SNAKE HILL SHALE MONITORING WELL
RW-100 LOWER SNAKE HILL SHALE RECOVERY WELL
TOTAL PCB CONCENTRATION
TOTAL VOC CONCENTRATION
SAMPLES COLLECTED BETWEEN 6/12/2010 AND 10/28/2010
CONCENTRATIONS IN ug/L
ND NOT DETECTED
TITLE: LOWER SNAKE HILL SHALE PCB AND VOC DISTRIBUTION
LOCATION: GE Hudson Falls, New York
TETRA TECH GEO
APPROVED JRB
DRAFTED RMK
PROJECT# 117-2204
DATE MAY 2011
FIGURE 3-22


PCB – 0.352 ppb
PCB – 0.155 / 0.045 ppb
PCB – 1.056 ppb
PCB – 0.222 / 0.018 ppb
PCB – 0.205 / 0.047 ppb
EXPLANATION
TOTAL PCB CONCENTRATION
TOTAL VOC CONCENTRATION
GLEN FALLS AND ISLE LA MOTTE LIMESTONE
PCB & VOC DISTRIBUTION
GE Hudson Falls, New York
TETRA TECH GEO
3-23

For More Information

Kevin L. Farrar

NYSDEC

625 Broadway, 12th Floor

Albany, NY 12233-7013

518-402-9778

kxfarrar@gw.dec.state.ny.us