ENVIRONMENTAL ASSESSMENT
FOR
Waste Water Treatment Modifications for Improved Effluent Compliance

Brookhaven National Laboratory

Community Advisory Council Presentation

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Tim Green

Environmental Protection Division

BROOKHAVEN NATIONAL LABORATORY

a passion for discovery

Office of Science
U.S. DEPARTMENT OF ENERGY

Background - Refresher

- In June 2009 NYSDEC modified BNL's SPDES permit
  - Past monitoring showed no appreciable evidence of contamination with radiological or volatile organic compounds.
  - Metals were targeted for reduction due to impacts on aquatic organisms. (Copper, Iron, Lead, Nickel, Mercury and Zinc)
  - Target Water Quality Based Effluent Limits (WQBELs) are extremely low due to BNL being the sole source of water to onsite portion of Peconic River during dry periods.
  - Required BNL to perform a Quantification and Removal Study and Mercury Minimization Program.
  - Permit modifications were presented to the CAC and BER in early 2009. Comments to the permit were submitted to NYSDEC by the CAC in May 2009.

Quantification and Removal Study/Mercury Minimization Program

Project Scope & Objectives

- Big Picture: Reduce metals discharges to Peconic River
  - To achieve Water Quality Based Effluent Limits
  - To reduce potential impacts on aquatic organisms

- Approach: Quantification & Removal Study and Mercury Minimization Program
  - An integrated study of options to reduce the discharge of metals to the Peconic River
    - Identify and measure sources of metals
    - Evaluate treatment options
    - Evaluate alternative disposal options
    - Recommend options to achieve goals

D & B Recommendations

- BNL should consider rerouting discharges to groundwater
  - Install new post-aeration filtration system to remove additional particulates that may have metals adhering to them.
  - Develop recharge basins for disposal of treated waste water.
- Polythiocarbonate treatment of waste water to remove priority metals
  - Install new metering system to dose secondary clarifiers with polythiocarbonate to precipitate metals.
  - Install new post-aeration filtration system to remove additional particulates that may have metals adhering to them
  - Discharge treated waste water directly to the Peconic River bypassing the sand filter beds.
- Second option would require pilot studies to determine effectiveness and toxicity of sulfur compounds (by products)

CAC Input & Recommendations

- Concurred with recommendations for rerouting STP discharges to ground water
- Recommended that:
  - Effluent not be allowed to bypass a final treatment process (i.e. filtration) ✓
  - Discharges to groundwater should be within Peconic River basin ✓
  - Minimize tree removal
  - Modify gauging stations to improve fish movement

  } **Considered in design phase**

  - Evaluation of discharge to groundwater ✓
    - Plumes, wetlands, wildlife

The NEPA Process

- Project conceived
  - Detail must be sufficient enough to describe what is going to be done.
- Environmental Evaluation and Notification Form
  - Checklist of all potential impacts associated with project
  - Determination
    - Categorical Exclusion (CX) – project proceeds or
    - Environmental Assessment
- Environmental Assessment
  - Finding of No Significant Impact – project proceeds or
  - Determination for Environmental Impact Statement

Environmental Assessment (EA)

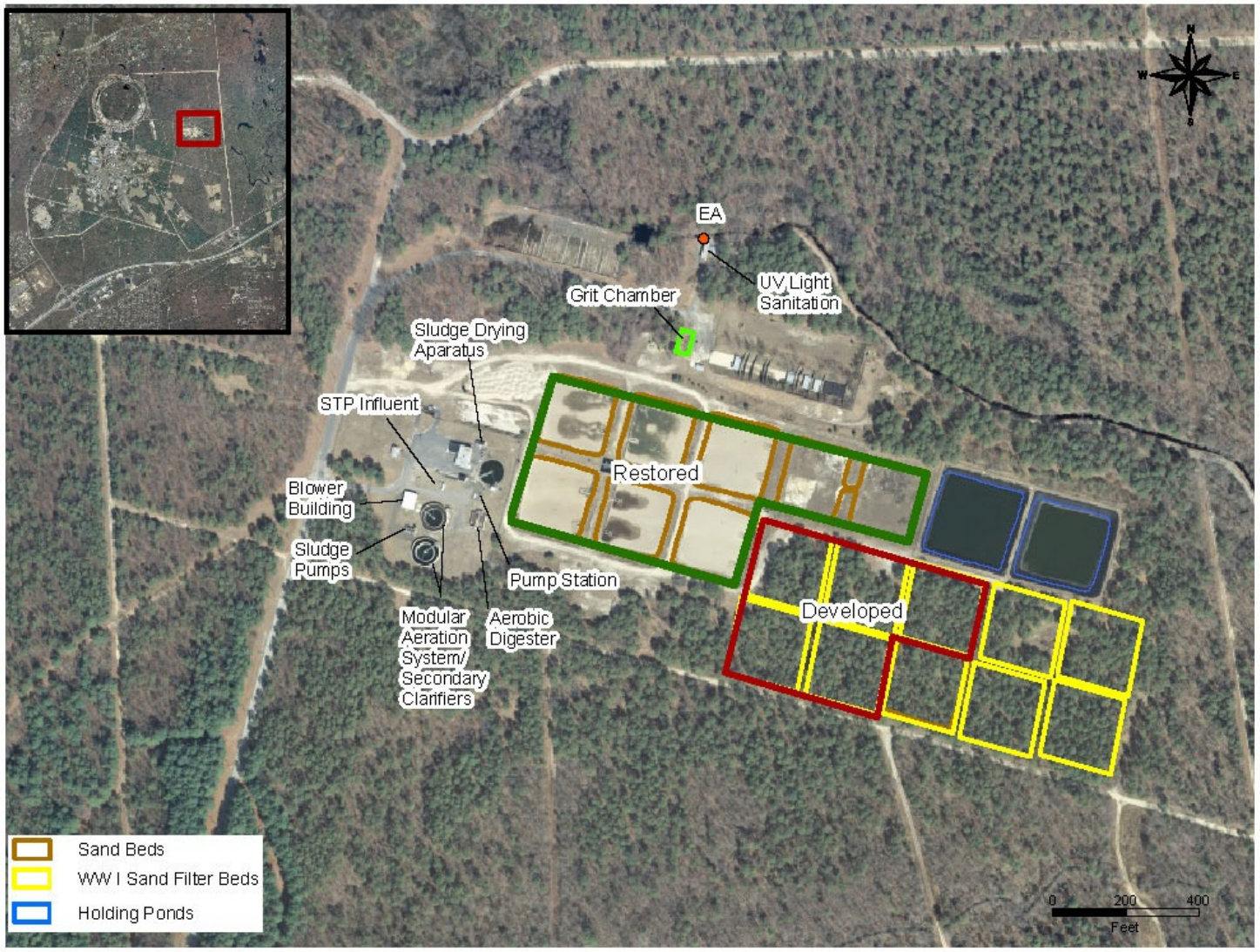
- **Purpose and Need (for the project)**
  - Ensure Compliance with SPDES Permit modifications
  - Ensure effective treatment of waste water
- **EA will Evaluate Treatment Alternatives**
  - Reduce concentrations of copper, iron, lead, mercury, nickel, and zinc
  - Meet WQBELs and discharge to Peconic River, or
  - Reroute discharge to groundwater
- **Meet new SPDES Permit requirements by July 2014**
- **Failure to meet requirements**
  - Fines
  - Erosion of environmental leadership

Alternatives Evaluated

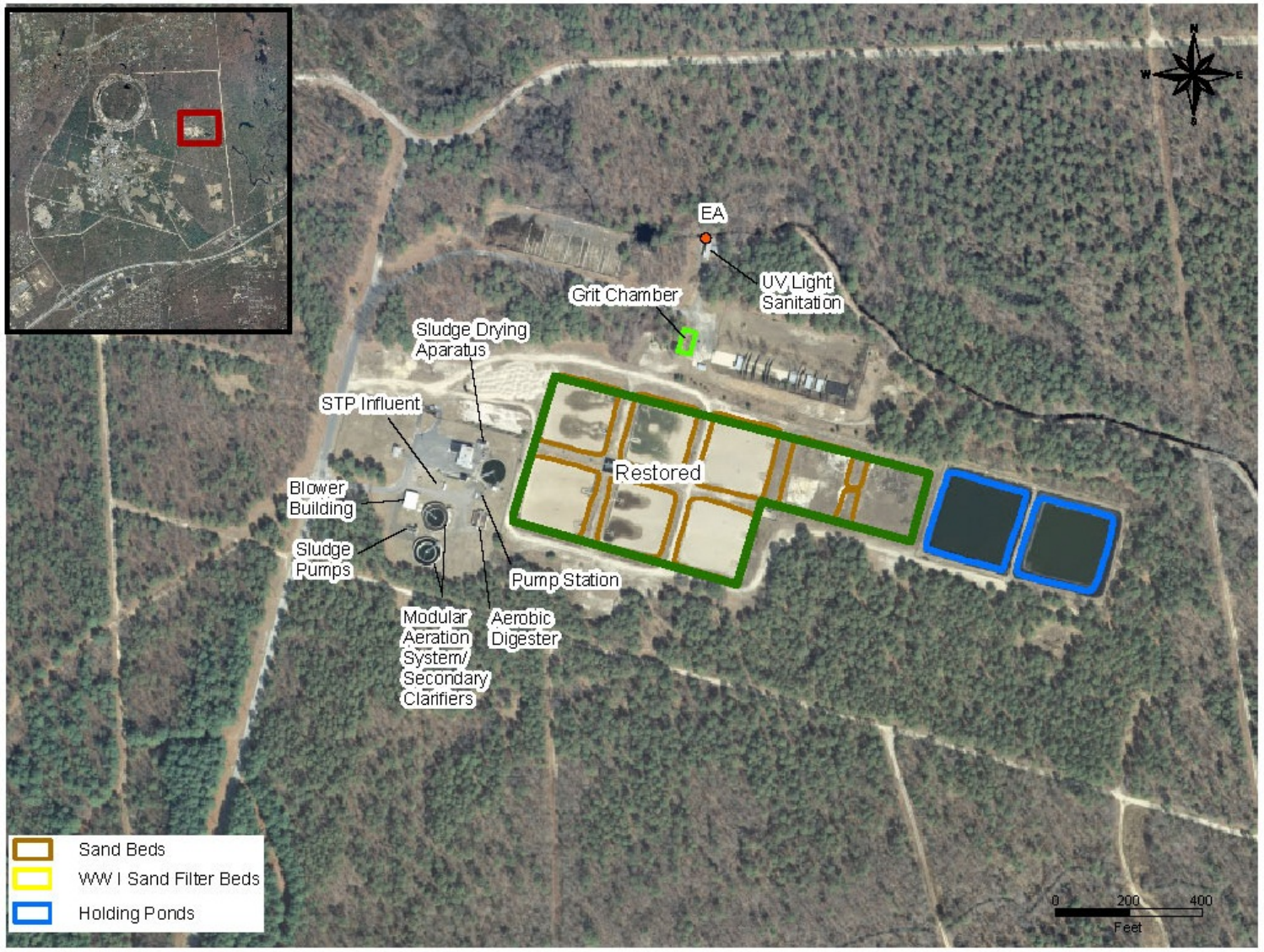
- Discharge to Groundwater (Preferred Alternative)
  - New post-aeration filtration
  - New recharge basins – development of 4-5 acres of WW I sand filter beds or other similar-suitable area
  - Connected Actions
    - Isolate and restore sand filter beds (~10 acres)
    - Remove UV light sanitation system – evaluate its re-use for final sanitation of effluent before groundwater recharge
    - Remove or abandon in place UV light chamber, settling chamber
    - Remove piping from sand filter beds to Peconic River
    - Remove or modify gauging stations
    - Remove Bldg 580 (dependent on removing gauging stations)
- No Action
- Enhanced Treatment with continued release to the Peconic River
  - New metering system for polythiocarbonate
    - Requires pilot testing to determine effectiveness and toxicity
  - New post-aeration filtration
  - Discharge to Peconic River (bypassing sand filter beds)
  - Isolate and restore sand filter beds (~10 acres)

STP Area

Discharge to Groundwater (Preferred)



Enhanced Treatment
(w/discharge to Peconic River)



Assessment

Topics Addressed in EA

- Ecology
  - Vegetation
  - Invasive Species
  - Threatened and Endangered Species
  - Migratory Birds
  - Mammals
  - Reptiles & Amphibians
  - Fish
- Water
  - Surface water
  - Groundwater
- Land Use, Demography, Social Justice
- Socioeconomic
- Transportation
- Cultural Resources
- Air Quality
- Climate
- Visual Quality
- Noise
- Industrial Safety & Occupational Health
- Natural Hazards
- Destructive Acts
- Utilities
- Waste Management/Pollution Prevention
- Commitment of Resources
- Decommissioning & Restoration

Water Resources

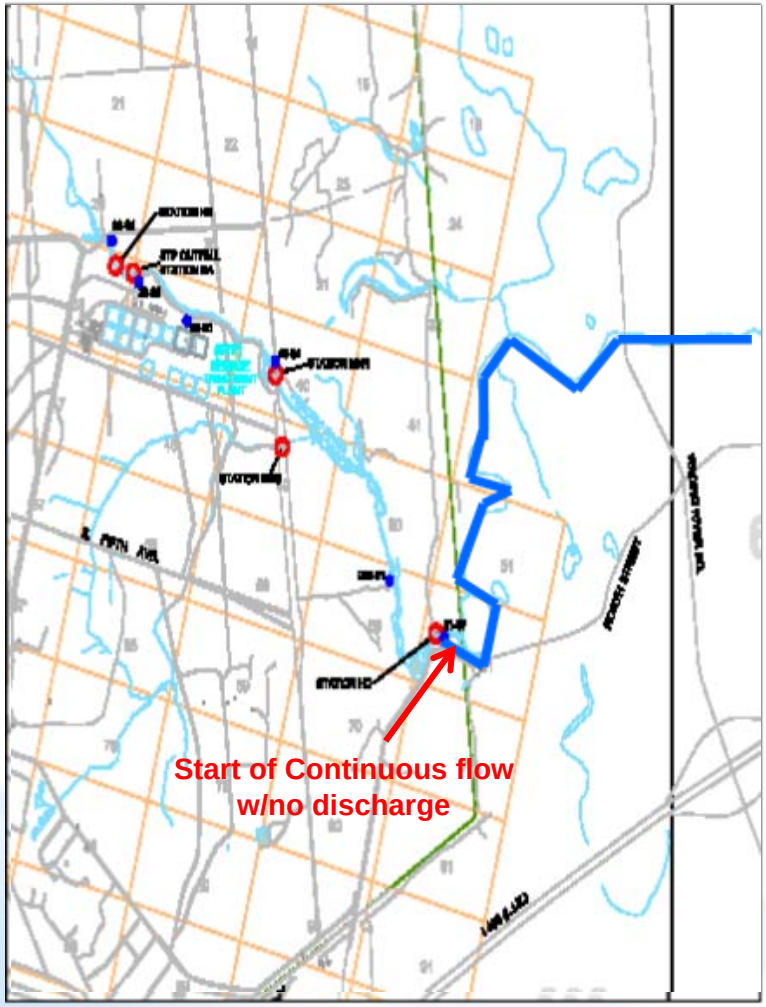
- Monitoring - Both Alternatives
  - Influent waters (ability to divert to holdup ponds)
  - Effluent waters (must meet SPDES permit requirements)
  - Groundwater under surveillance program

Water Resources - Surface Water

- Discharge to Groundwater (preferred)
  - Discharges to Peconic River would stop
  - ~2600’ of river would dry during “Dry Periods”
  - Deep water areas would remain wet
- Enhanced Treatment
  - Discharges to Peconic River would continue (20% increase in flow)
  - ~2600’ of river would remain wet year round

Water Resources – Surface Water

Dry Periods



Wet Periods

Water Resources – Surface Water

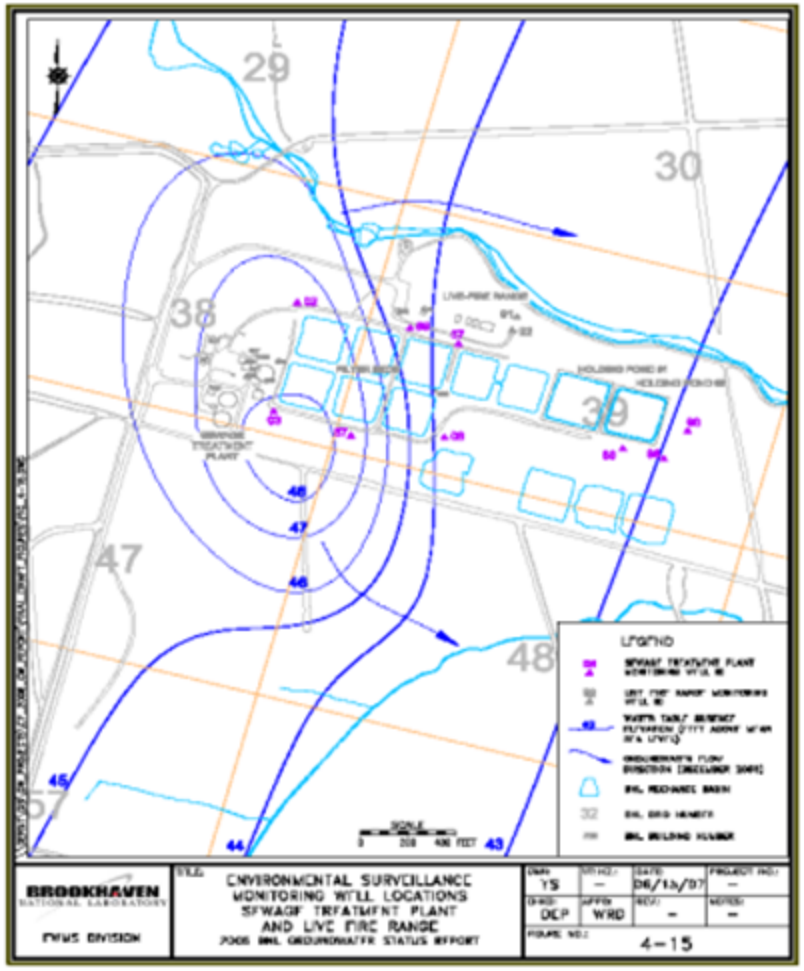
October 2007
(wet year)

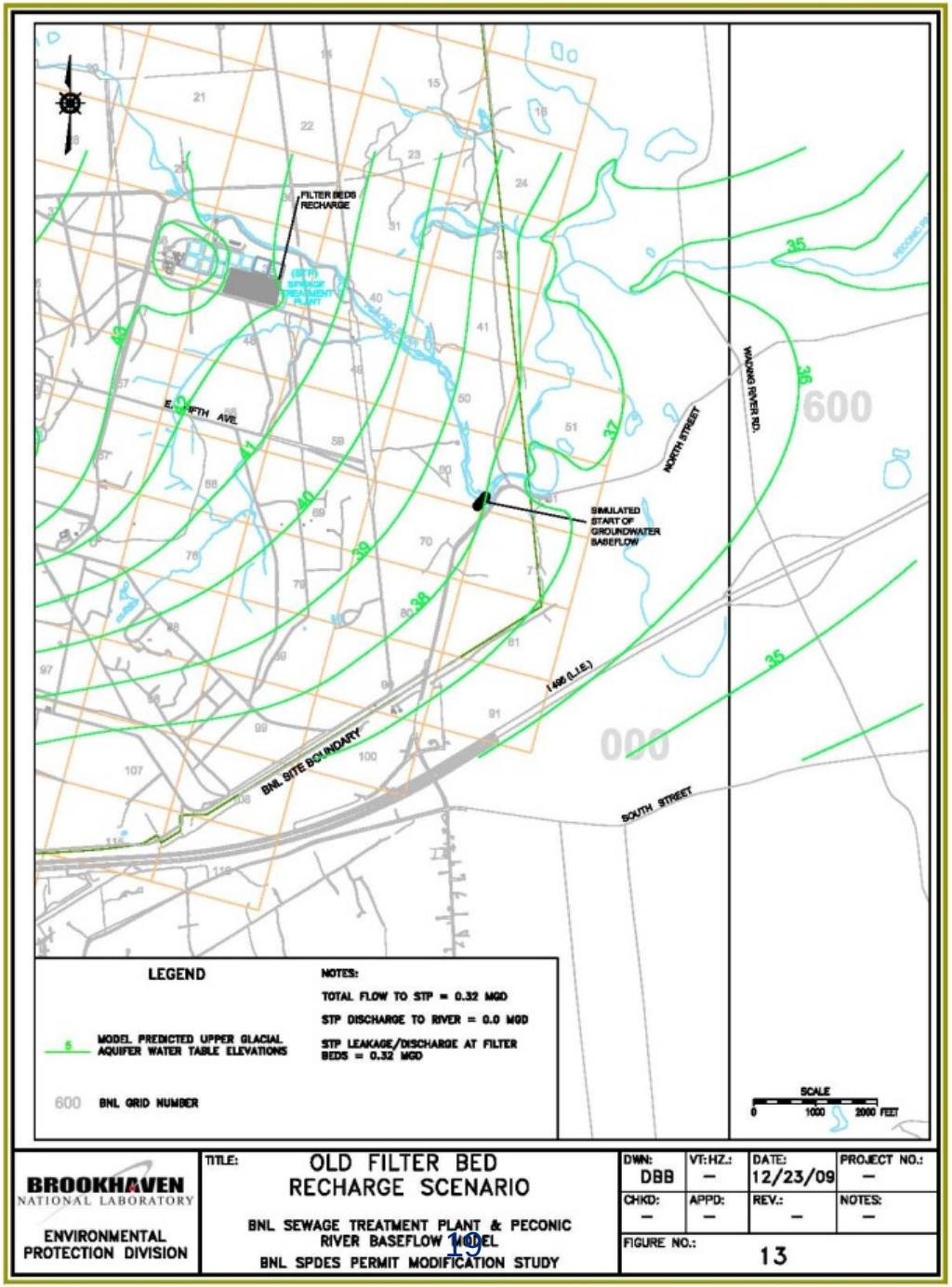
September 2008
(dry year)

Water Resources - Groundwater

- Discharge to Groundwater (preferred)
  - New Monitoring wells will be installed around recharge basins
  - Recharge will not impact plumes
  - Recharge will not impact supply wells
  - Use of UV disinfection before discharge to groundwater would be evaluated during engineering and design phase
- Enhanced Treatment
  - Perched groundwater mound would gradually dissipate
  - Peconic River would receive ~20% more discharge (amount lost to groundwater in sand filter beds)

Water Resources - Groundwater





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STP Area - Ecology

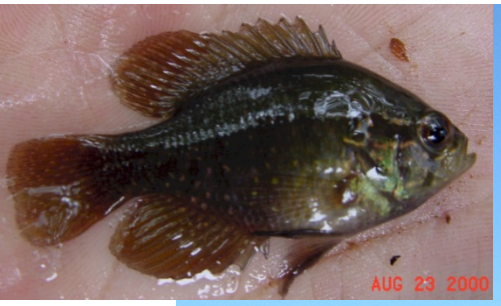
Ecological Resources - Comparison

Resource	No Action	Enhanced Treatment	Discharge to Groundwater
Vegetation	No Change	No Change	River would gradually change to conditions similar to upstream. (~2600')
Invasive Species	No Change	No Change	Some removal during clearing. Monitoring of disturbed areas
T & E Species	No Change	No Change	Improved habitat for banded sunfish, possibly swamp darter. No impacts on tiger salamanders or other T&E species
Migratory Birds	No Change	10 acres of native grasses will provide additional habitat for grassland species, esp. bluebirds. Good habitat for water dependent species (ducks, shorebirds)	Minimal impacts to tree nesting birds. 10 acres of native grasses will provide additional habitat for grassland species, esp. bluebirds. Good habitat for water dependent species (ducks, shorebirds)
Mammals	No Change	10 acres of native grasses will provide habitat for small mammals	10 acres of native grasses will provide habitat for small mammals
Reptiles & Amphibians	No Change	Minimal improved habitat due to native grasses.	Minimal impact from clearing 4-5 acres. Minimal improved habitat due to native grasses.
Fish	No Change	Reduction in mercury levels in onsite/offsite fish due to bypassing of Sand Filter Beds	Improved fish passage.. Reduction in mercury levels in onsite/offsite fish.

Ecology – former sand filters (preferred)

Ecology - Peconic River vegetation (preferred)

Ecology - Deep water habitats for fish (preferred)



2008 (Dry year)

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Restoration of sand filters (preferred and Enhanced Treatment)

Removal of gauging stations (preferred)

Improve fish passage (preferred)

Visual (preferred)

Peconic River road looking west, Bldg. 580 may be removed.

Visual
(preferred)

Left – photo from WW I sand filter beds looking toward Peconic River

Above – photos from along Peconic River road looking south toward WW I sand filter beds.

Questions?