

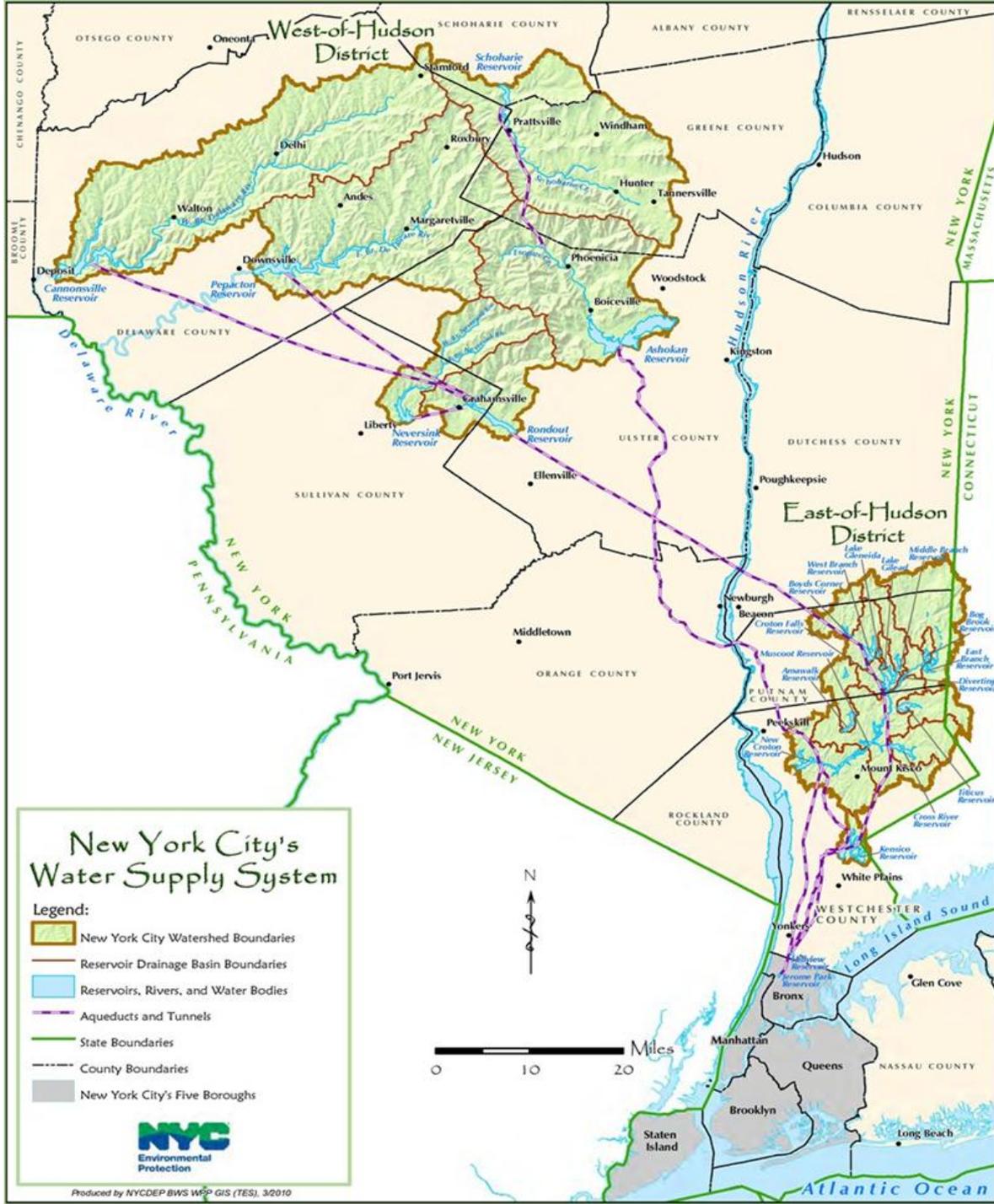


Cannonsville Dam Public Outreach Meetings

Deputy Commissioner Paul V. Rush, P.E.
Bureau of Water Supply

Deposit, NY
July 23, 2015

- Water Supply Overview
- Cannonsville Dam Overview
- Dam Analyses
- Cannonsville Hydroelectric Project
- Current Situation
- Emergency Action Plans
- Contact information
- Q&A



New York City's Water Supply System

Legend:

- New York City Watershed Boundaries
- Reservoir Drainage Basin Boundaries
- Reservoirs, Rivers, and Water Bodies
- Aqueducts and Tunnels
- State Boundaries
- County Boundaries
- New York City's Five Boroughs



Cannonsville Dam Overview

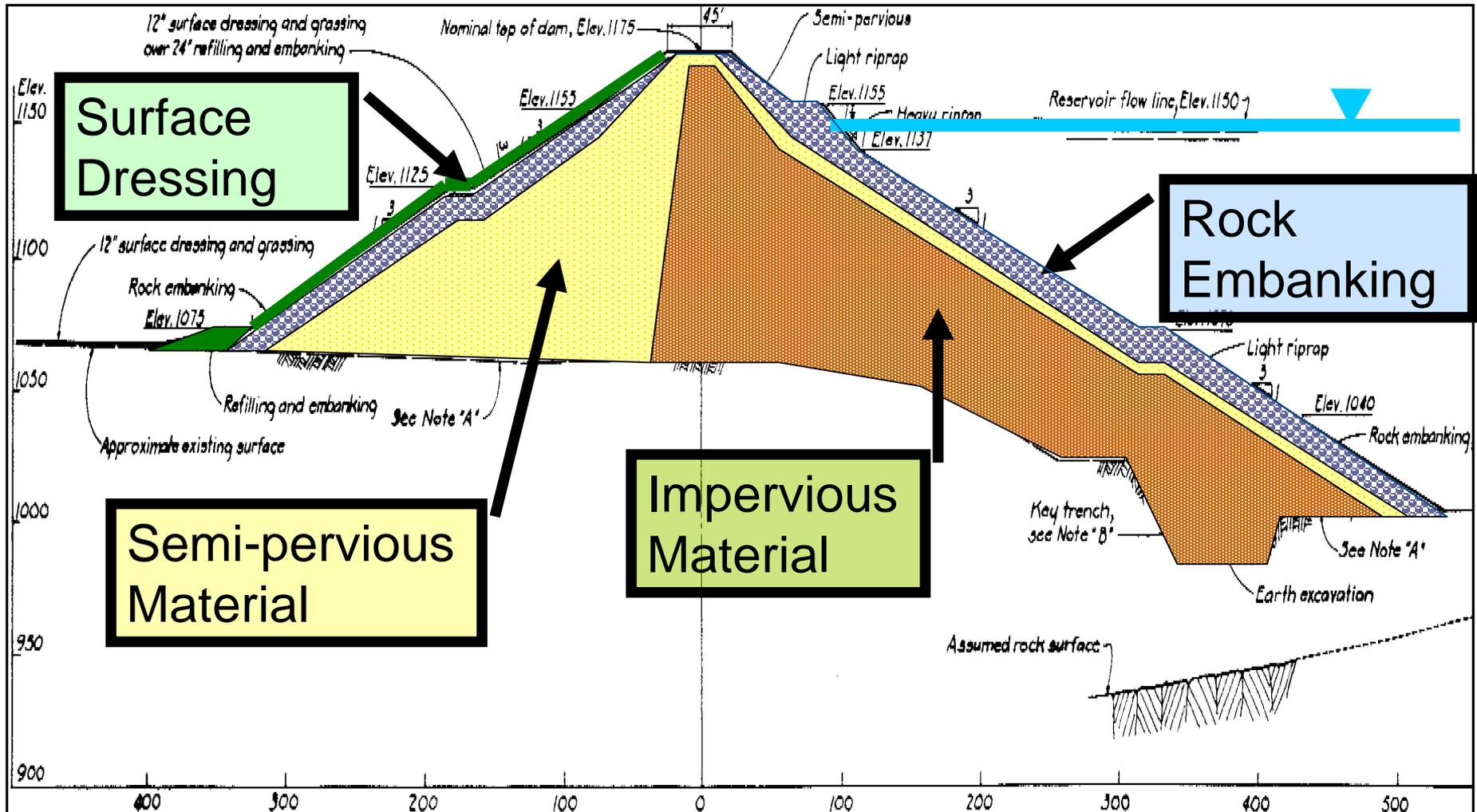
- Earthen embankment
- Height: 175'
- Length: 2800'
- Width: 1,100'
- Spillway:
 - Crest elevation: 1150'
 - Length: 800' (two sections)
- Cannonsville Reservoir capacity: 95.6 BG
- Watershed Area: 450 sq. mi.

Current Status

- Release: 970 MGD
- Diversion: 470 MGD
- Elevation: 1141.97'
- Storage: 84.74 BG
- Inflow: 168 MGD



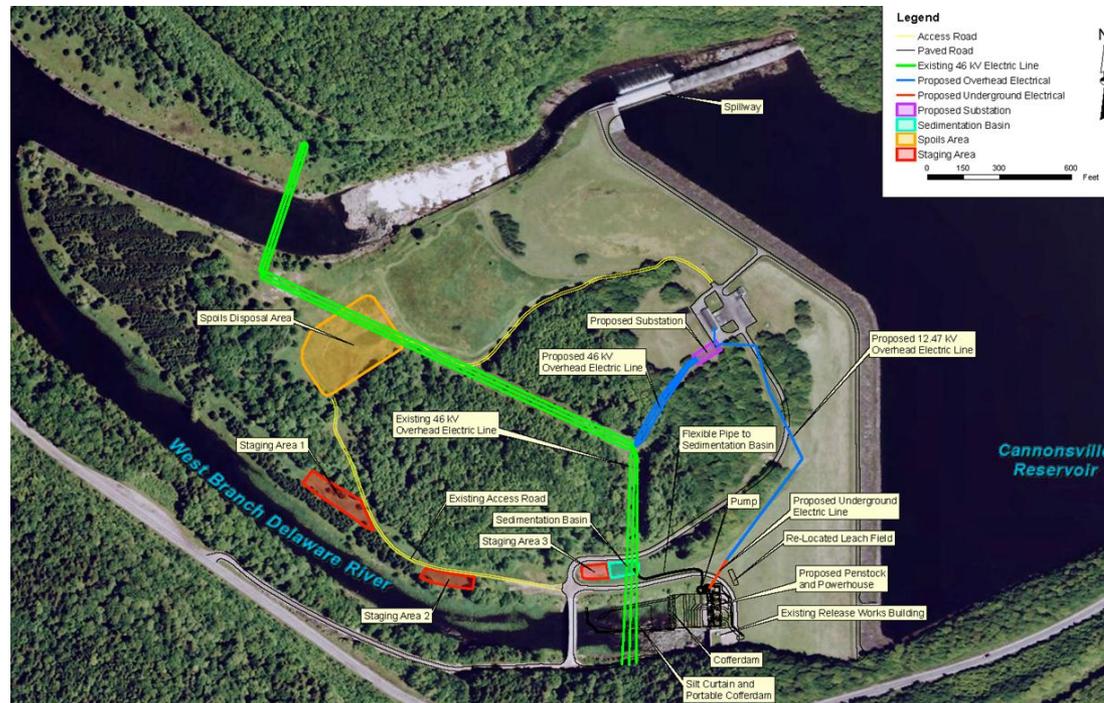
Cannonsville Dam



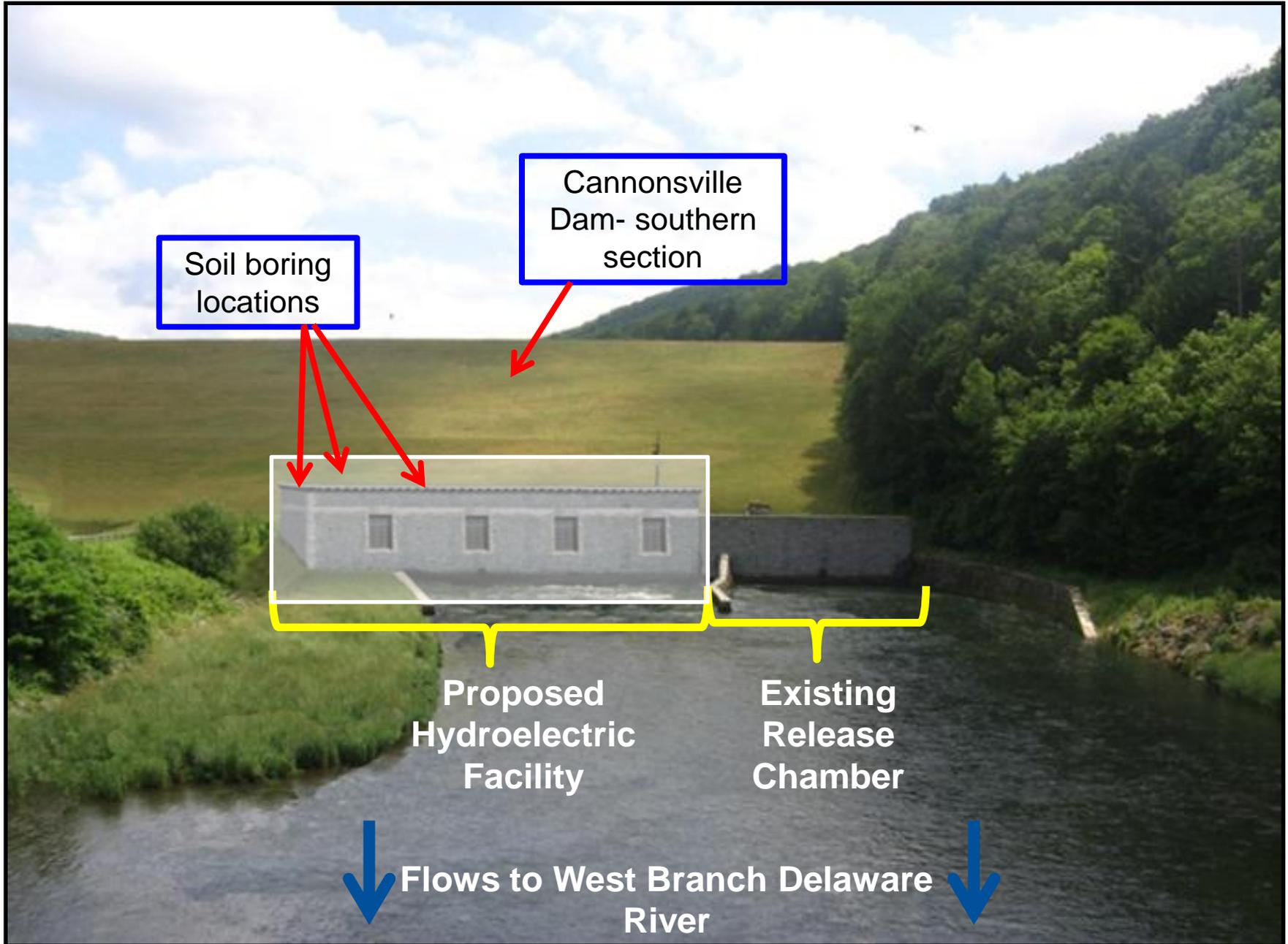
- 1998-2003 GZA dam analysis as part of DEP review of all dams in Catskill and Delaware Supply
 - Cannonsville Dam factors of safety meet or exceed NYSDEC Guidelines
- 2012 URS & CDM (*Joint Venture*) Engineering Assessment of Cannonsville Dam
 - 10-Year Requirement of NYSDEC
 - Cannonsville Dam factors of safety meet or exceed NYSDEC Guidelines
- Dam Safety Program
 - Rigorous Dam inspection program
 - Biennial DEC Dam Safety Inspections through 2014
 - FERC Dam Safety Inspections- September 2014, June 2015

Cannonsville Hydroelectric Project

- Proposed 14 Megawatt Hydroelectric Plant
- New Powerhouse proposed to be constructed adjacent to the West Delaware Release Chamber
- Federal Energy Regulatory Commission (FERC) issued license May 2014
- Cannonsville Dam now regulated by FERC



Hydroelectric Facility planning



Soil boring activities

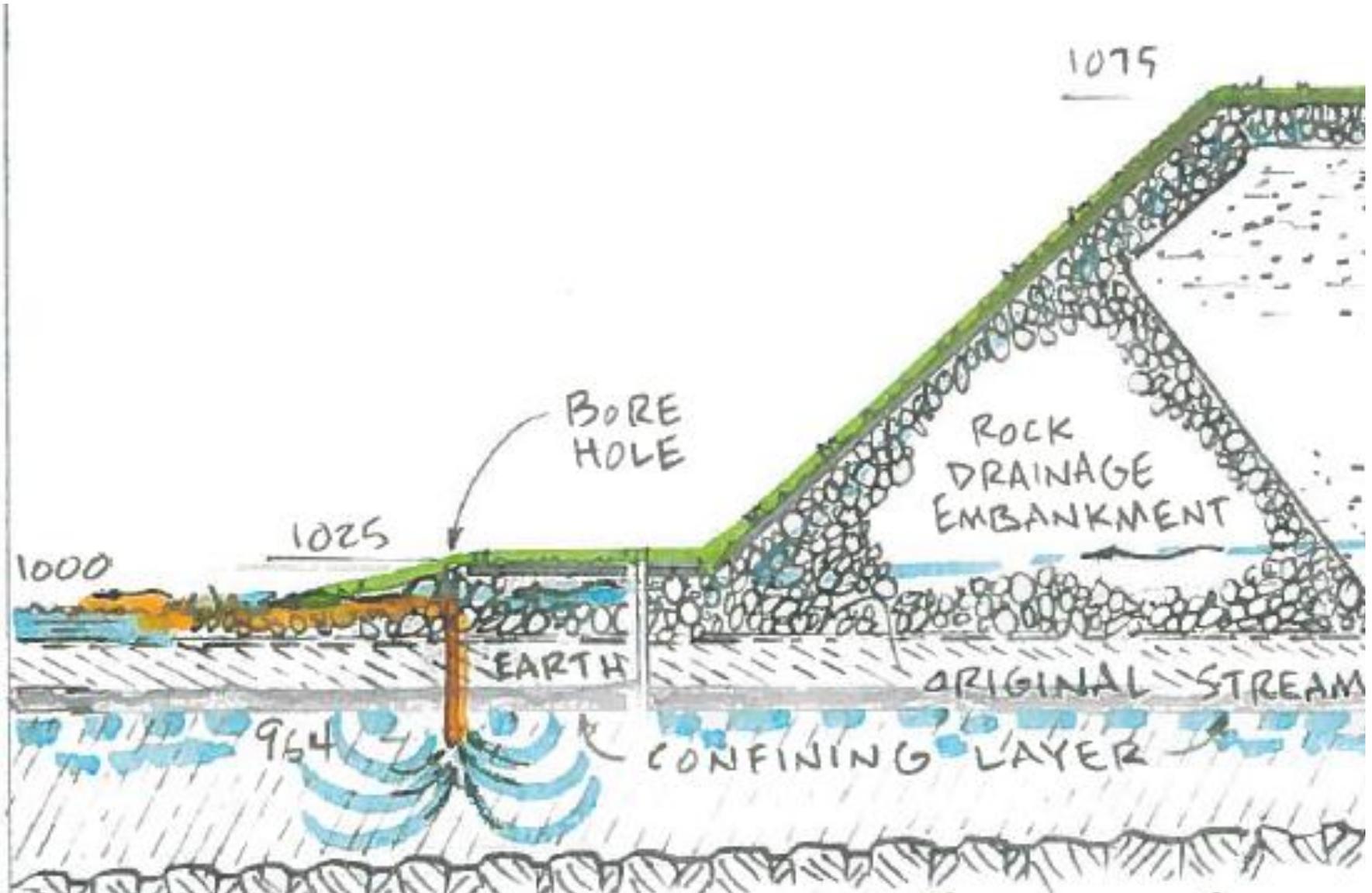


What happened



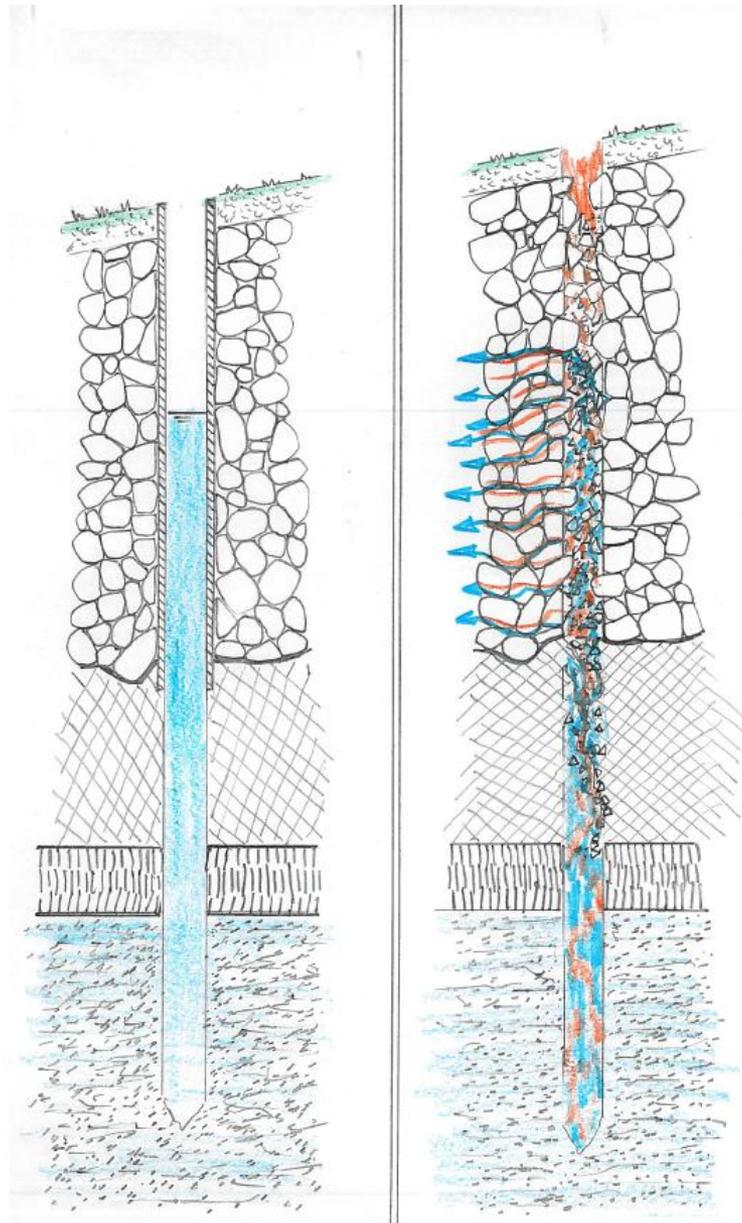
JULY 14, 2015

What happened



What happened

1. Hole bored through confining layer into artesian aquifer

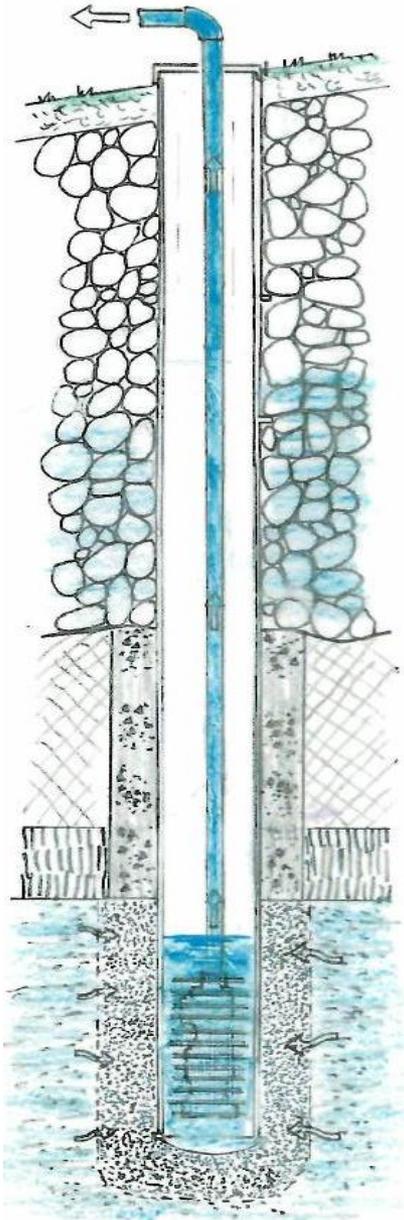


2. Casing pulled, hole filled with Bentonite grout mixture.
3. Hole partially collapses - artesian water carries bore hole material and Bentonite, through rock embankment to river

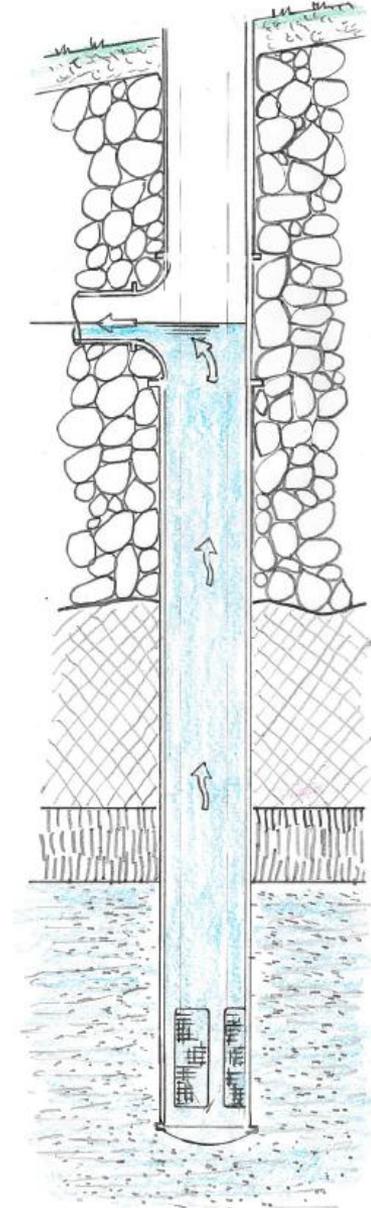
- Site monitoring
 - 24/7 physical monitoring presence
 - Enhanced piezometer data collection/analysis by consultant experts
 - Turbidity monitoring, water sample analysis and comparison to boring samples
 - Piezometer and turbidity alarms
 - Engineer daily inspections
 - Frequent DEP Police patrols
 - Downstream flow monitoring
 - Turbid discharge plume photographic monitoring
- Review of historical information
- Stockpiling materials and equipment for emergency on-call repairs
- Consultations with FERC, DEC Dam Safety and construction contractors for repair plans
- Lowering Reservoir – maximized drinking water diversions and river releases
- Public awareness, EAP reviews, Updates with State and County OEMs



Corrective Action-Step 1

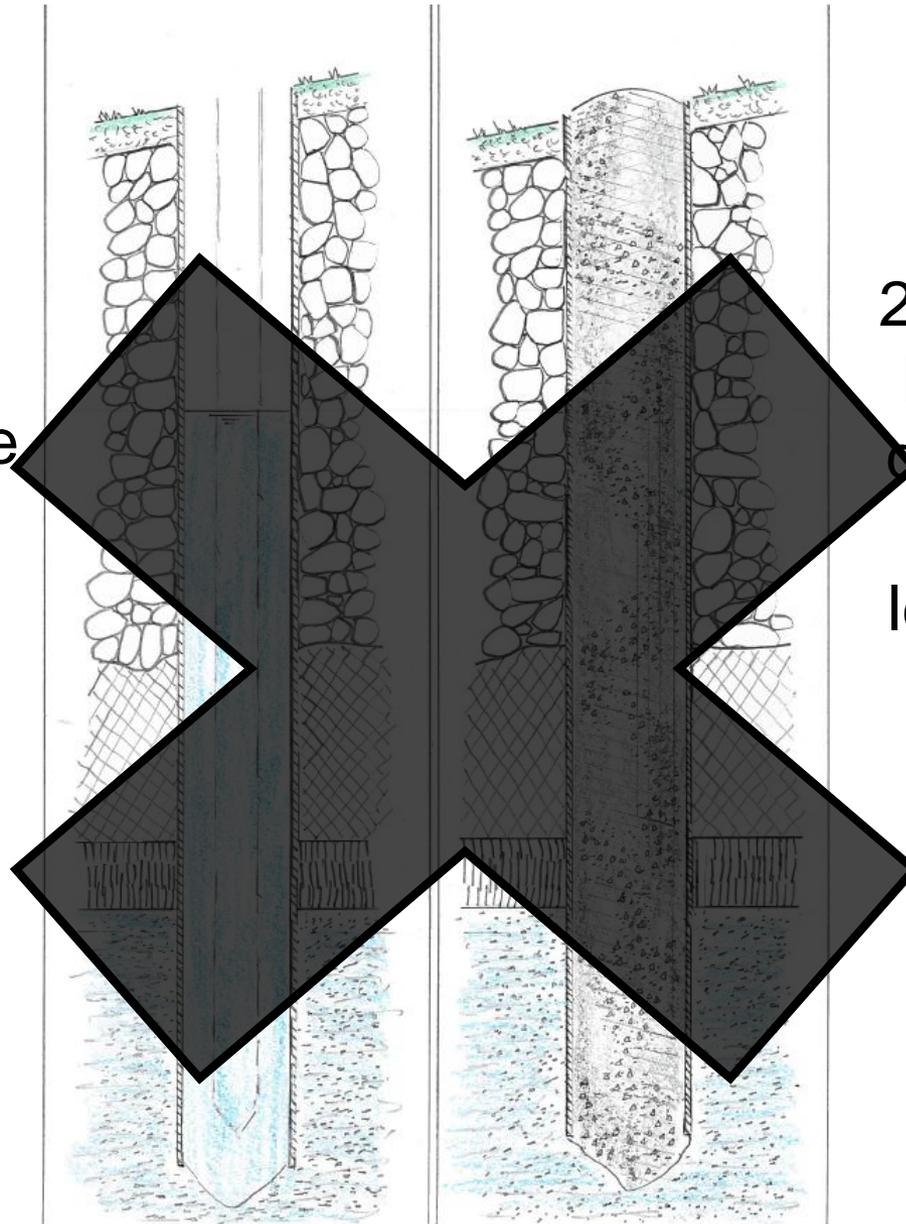


- Install upstream relief wells
 - Allows artesian water through screens into casing
 - Can serve as pumping wells and maintain long term pumping if necessary
 - Clean water is passively discharged through Tee to rock embankment
- DEP has procured Moretrench as repair contractor



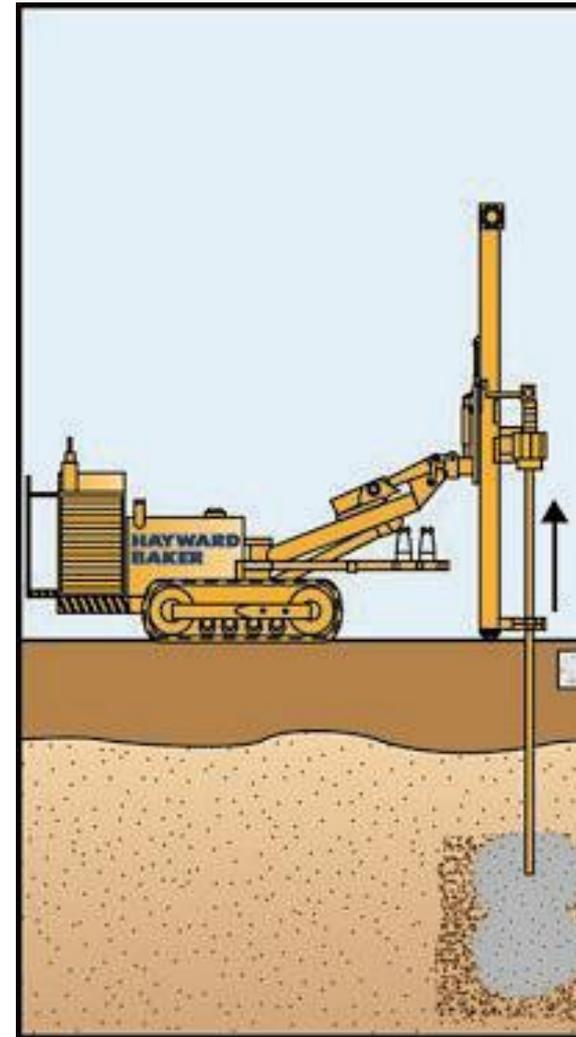
Corrective Action- Step 2 Alternative "A"

1. Over bore hole on same alignment - use casing full depth



2. Fill over bore hole with high density fast set concrete - leave casing in place (plug)

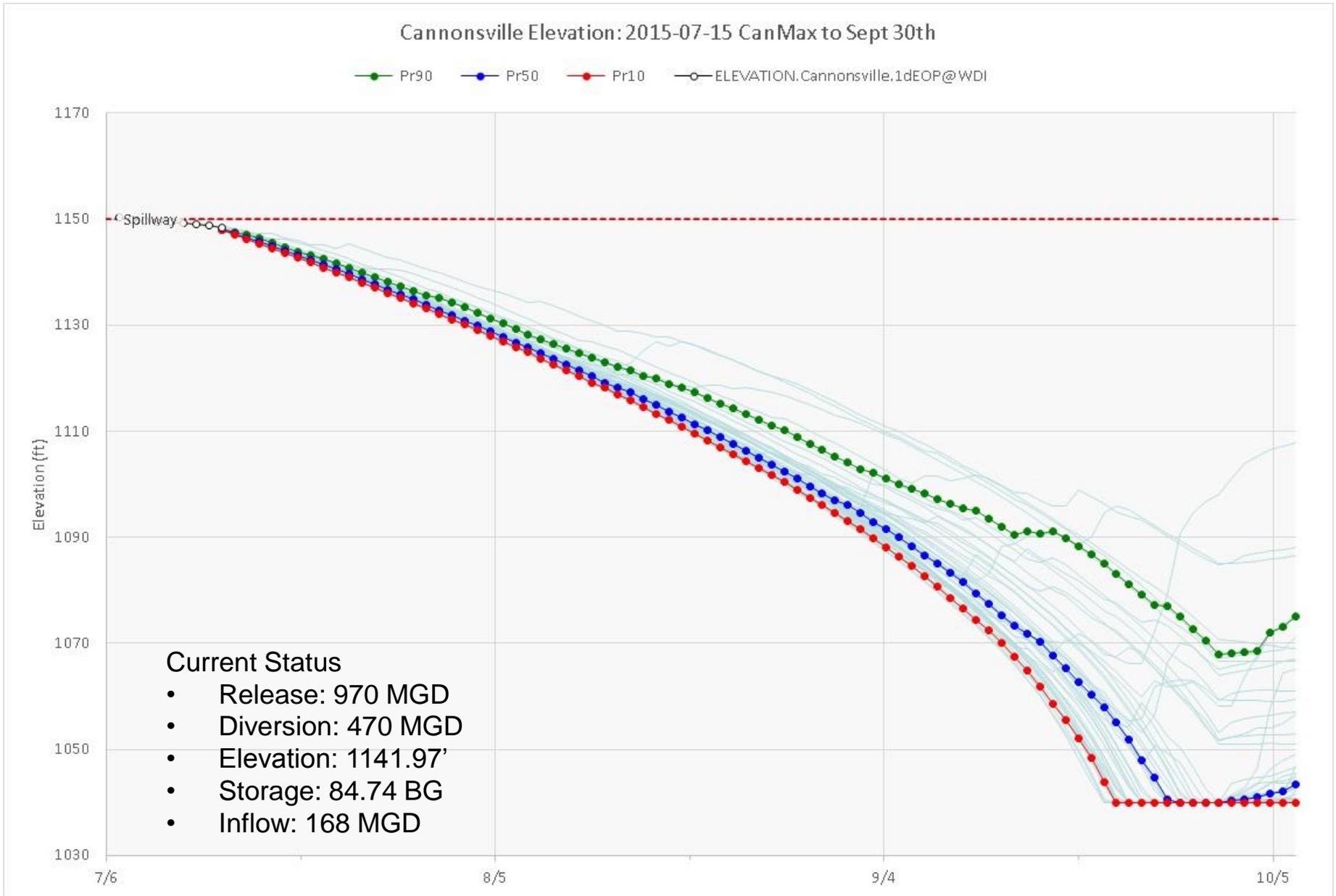
- Compaction grouting
 - Small diameter cased core holes to surround each existing bore hole
 - Inject grout while compacting it a little at a time
 - The injected grout pushes the soils to the side as it forms a grout column or bulb



- Timeline
 - Moretrench able to perform all contemplated work
 - Mobilization scheduled for Tuesday July 21, 2015
 - Work scheduled to begin Thursday, July 23, 2015
 - Preliminary timeline for completion – September 2015
- Impacts
 - Higher flows in West Branch (FFMP L1A – 1500 cfs)
 - Lower elevation in Reservoir
 - Increased turbidity of release as reservoir elevation decreases

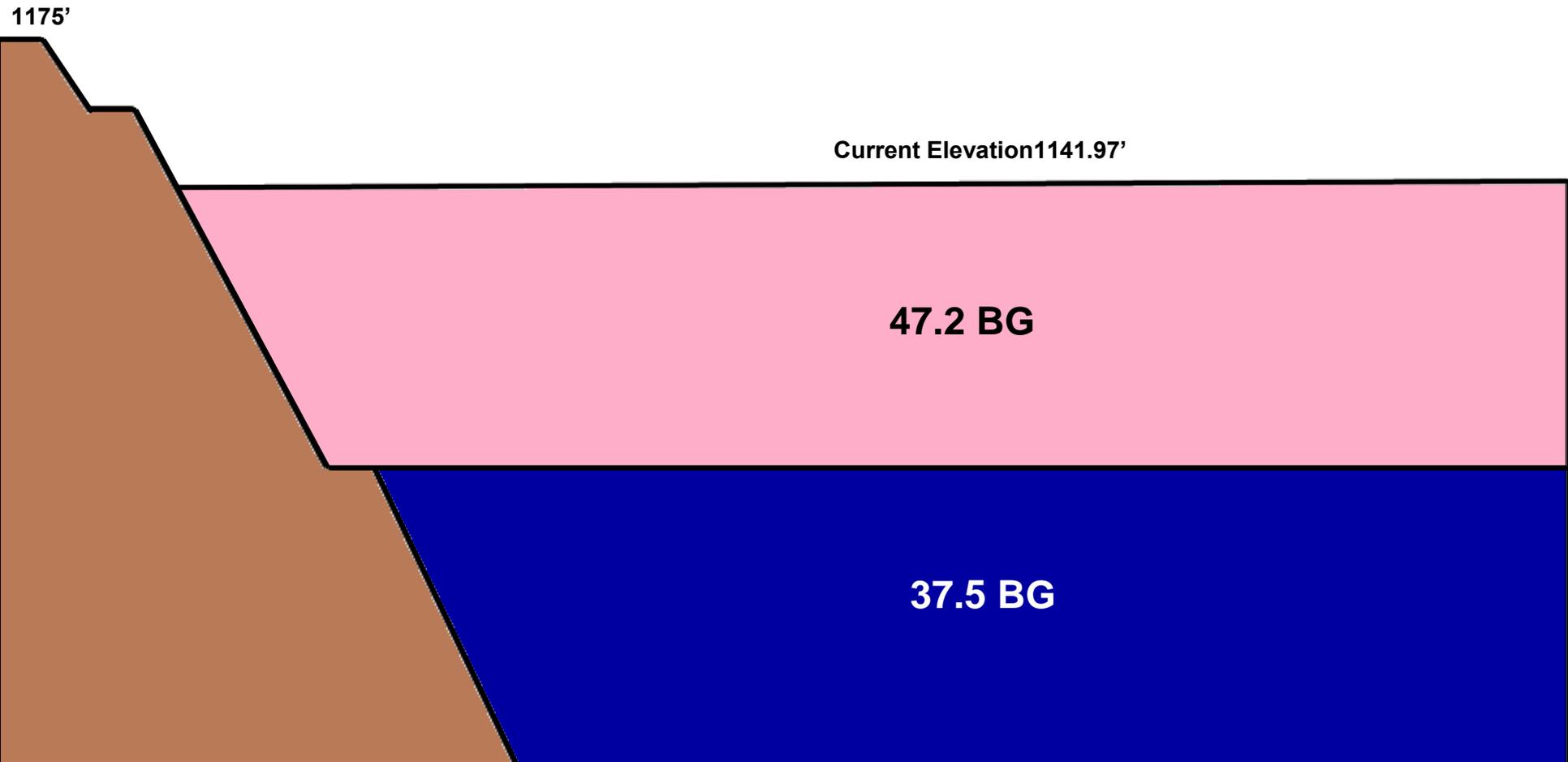


Projected Cannonsville Elevation



Temperature Profile

Cold water pool at present rate will be depleted by August 17, 2015



Emergency Categories

- Condition Red (Type A)
 - The dam has failed or is near failure. Failure is imminent in this case.
- Condition Orange (Type B)
 - A potentially hazardous situation exists at the dam, however failure is not imminent.

Who has Emergency Action Plans?

- Offices of Emergency Management
- Municipalities
- Law Enforcement
- Other State and Federal Agencies (FEMA, NWS, NPS)

CLASS C - HIGH HAZARD

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

FINAL Emergency Action Plan



Cannonsville Dam

Lat:42 03' 46" Lon:75 22' 30"

West Branch Delaware River, Delaware County, New York

Owner/Operator: The City of New York

Report Prepared by: New York City Department of
Environmental Protection

Rev: May 2015 Final 2.0

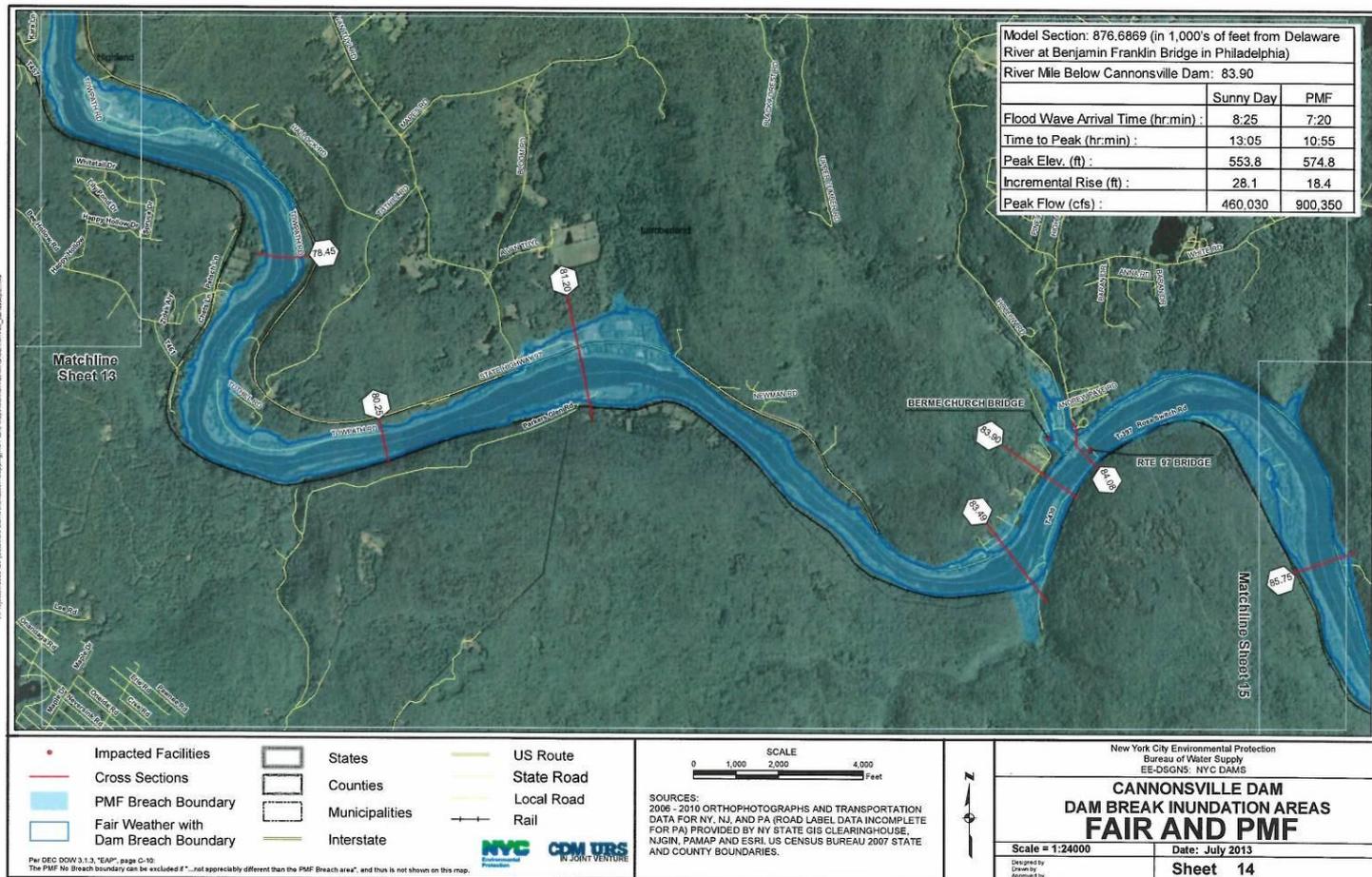
CONTAINS CEII - DO NOT RELEASE



FERC Project ID# 13287
NYSDEC Dam ID# 11-2889
NATDAM ID# NY 00542

Inundation Map

- A flood inundation map library is a set of maps that shows where flooding may occur over a range of water levels in a community's local stream or river
- Flood inundation maps depict forecasted hydrodynamic conditions and enable officials to make timely decisions before and during flood events



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 - http://www.nyc.gov/html/dep/html/watershed_protection/cannonsville.shtml