Groton Utilities

Case Study involving sodium runoff to Groton Utilities lower reservoirs
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Department of Transportation
Department of Public Health

Balancing Regulations and Safety

Department of Transportation

Winter Highway Maintenance Operations: Connecticut

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A Report By

The Connecticut Academy of Science and Engineering

For

The Connecticut Department of Transportation

Department of Transportation

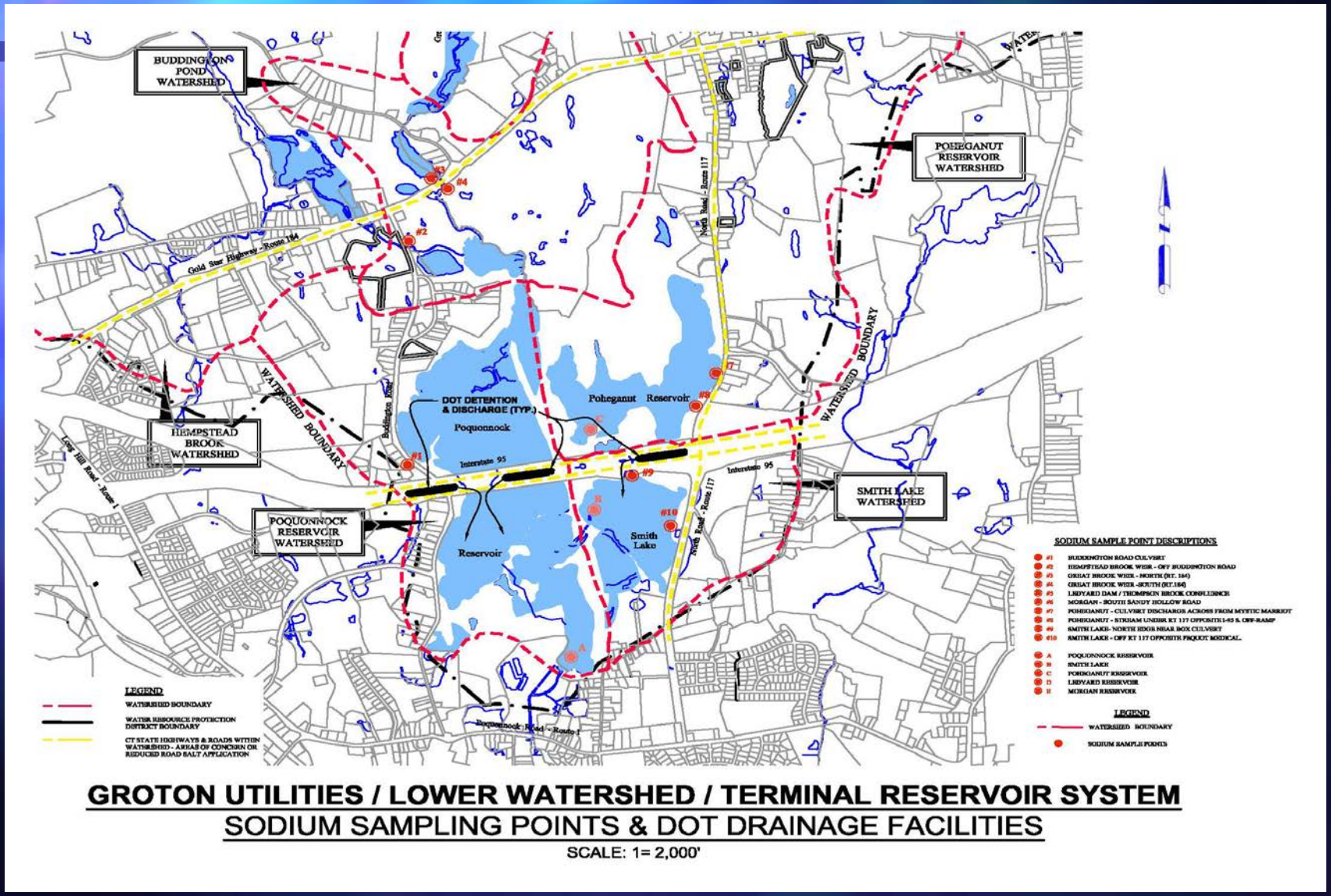
5.3.2 Surface Water

Typical sodium concentrations in surface waters are less than 20 mg/L and a survey of several reservoir systems across the state indicates that sodium levels in raw intake water are typically below this level. A few reservoirs have observed levels periodically exceeding 28 mg/L, including Mianus Reservoir in Stamford serviced by Aquarion Water Company and Lake Whitney in Hamden.[79] This was not an exhaustive survey of all surface water reservoirs, and the available data only represents quarterly sampling. With so few samples, no seasonal or inter-annual trends could be observed.

The regulations of Connecticut State Agencies, Sec. 19-13-B32(h), states that "Where sodium occurs in excess of 15 mg/l in a public drinking water supply, no sodium chlorine [chloride] shall be used for maintenance of roads, driveways, or parking areas draining to that water supply except under application rates approved by the commissioner of health, designed to prevent the sodium content of the public drinking water from exceeding 20 mg/l." In the early 1990's, CTDOT changed the deicing material applied to a special mixture of calcium chloride and sodium chloride in response to DPH concerns about elevated levels of sodium in certain drinking water watersheds; but with new best practices enacted over the past several decades, e.g. calibration of spreaders, pre-wetting and better control of application rates, the water supply concerns were addressed.

Groton Terminal Reservoir System

Groton Lower Reservoirs, Structures and Sample Locations



GROTON UTILITIES / LOWER WATERSHED / TERMINAL RESERVOIR SYSTEM

SODIUM SAMPLING POINTS & DOT DRAINAGE FACILITIES

SCALE: 1= 2,000'

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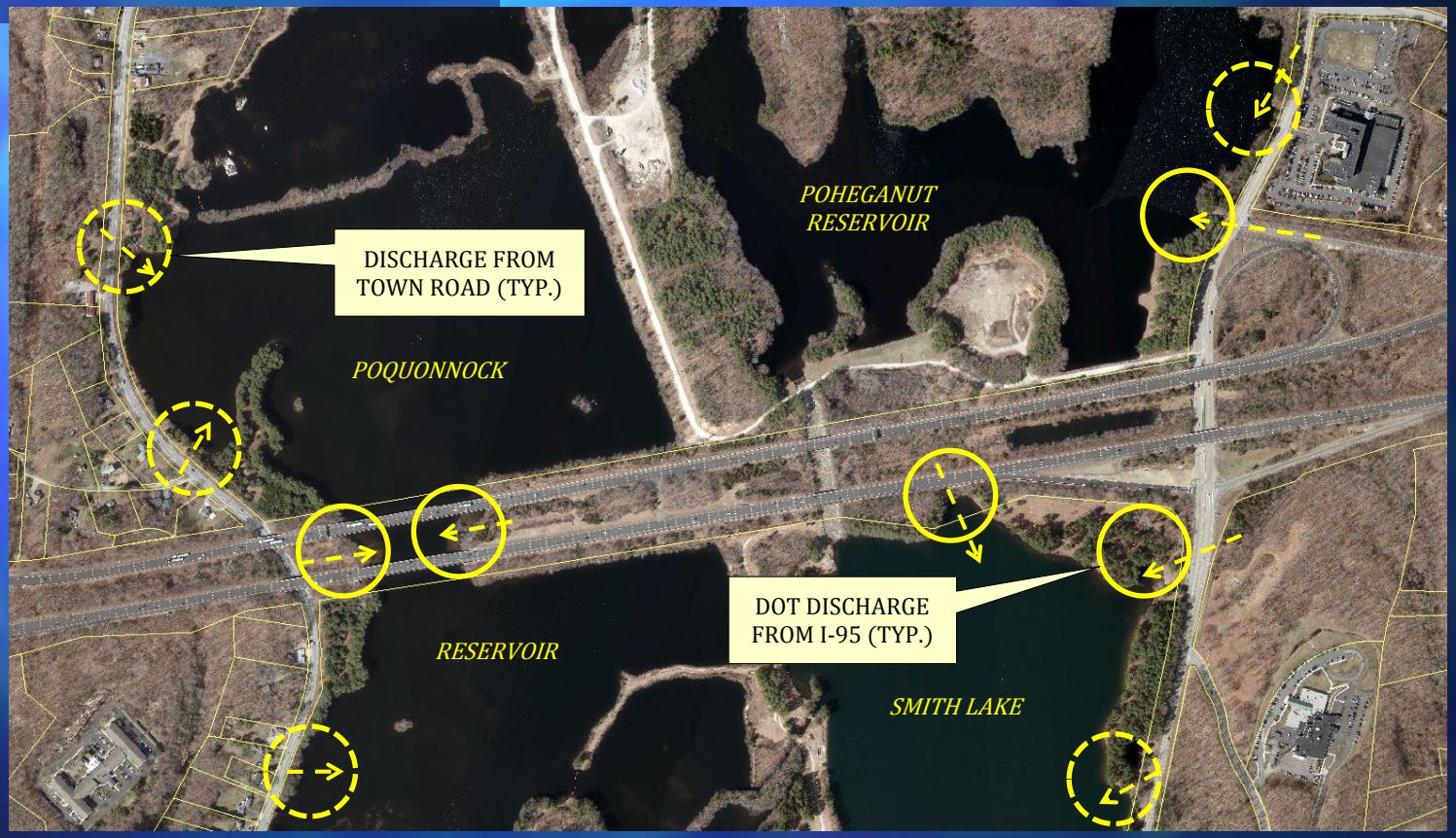

VICINITY MAP / TERMINAL RESERVOIR SYSTEM
MAJOR DISCHARGE POINTS

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DISCHARGE FROM DOT DETENTION BASIN
SMITH LAKE

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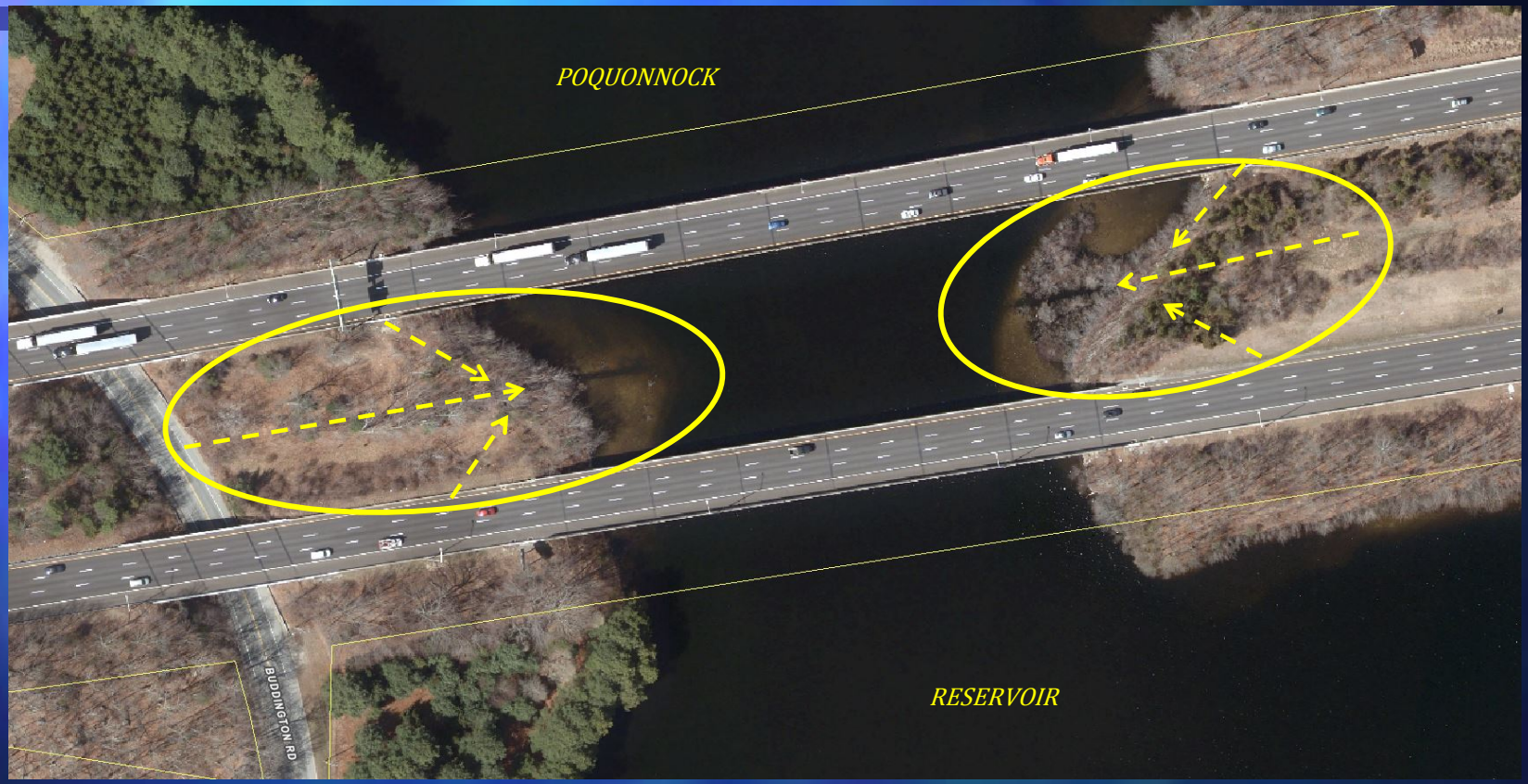
Drainage Systems



DIRECT DISCHARGE FROM DOT / I-95 & BUDDINGTON ROAD THROUGH SWALES TO POQUONNOCK RESERVOIR

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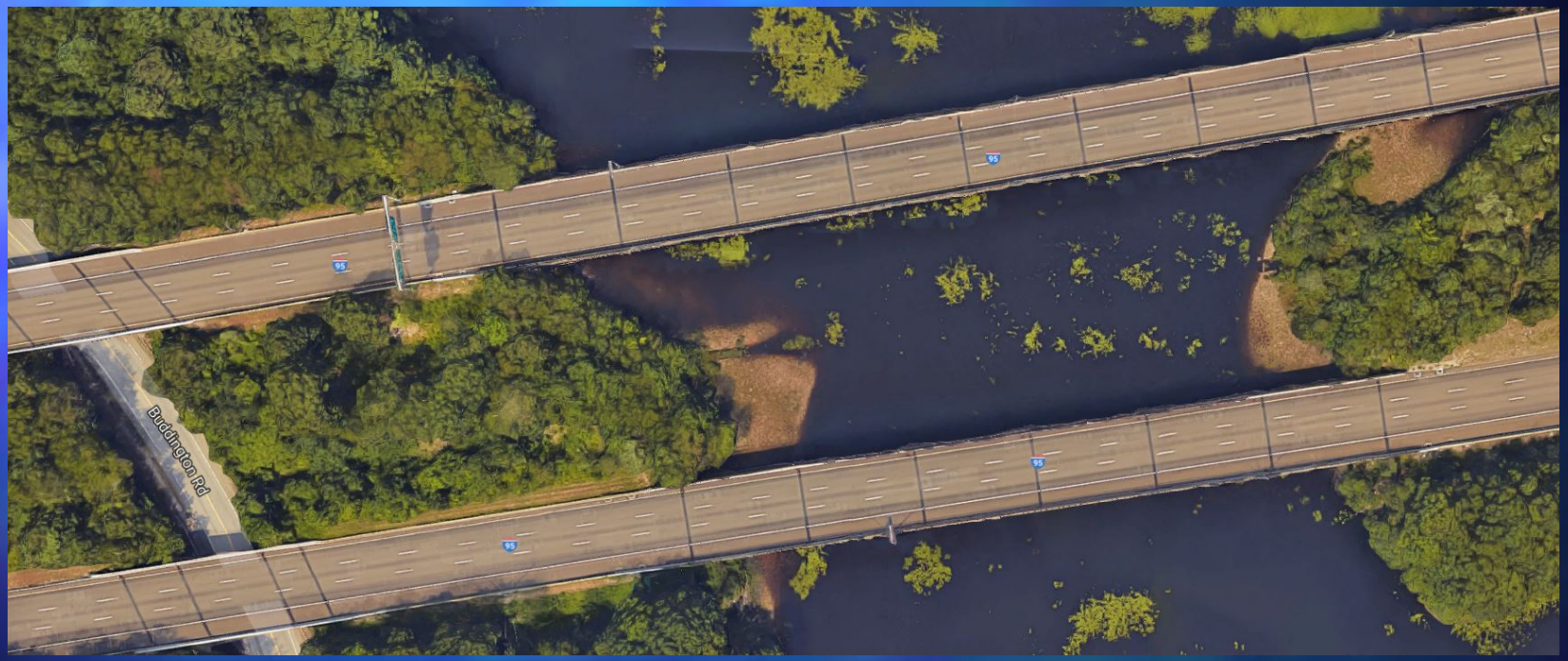

SEASONAL DIFFERENCES
DIRECT DISCHARGE FROM DOT / I-95 & BUDDINGTON ROAD
THROUGH SWALES TO POQUONNOCK RESERVOIR

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MAINTENANCE ISSUES
VIEW FROM BUDDINGTON ROAD / LOOKING EASTERLY
BETWEEN NORTH & SOUTH-BOUND I-95 LANES

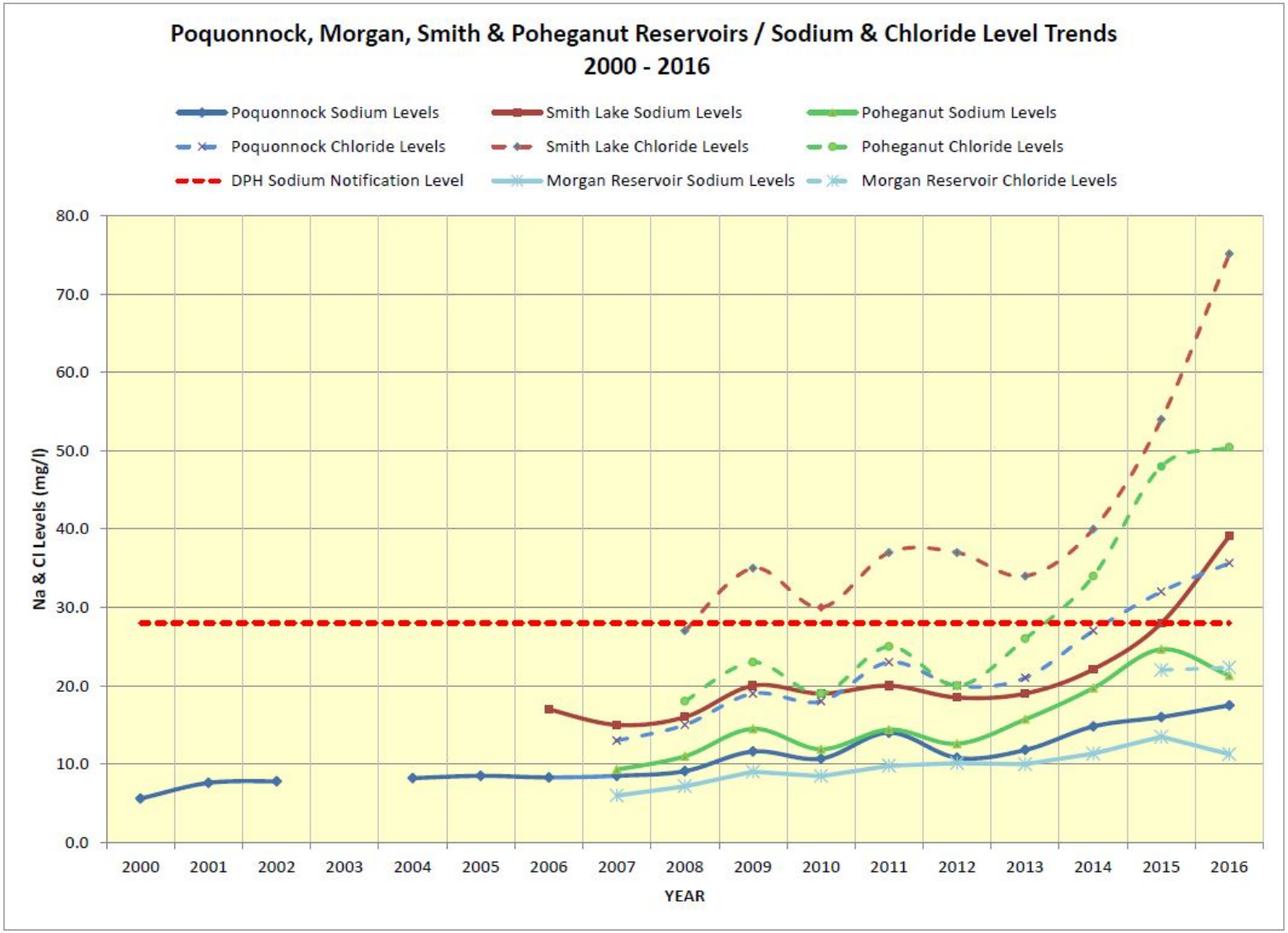
GU / DPH / DOT Action Plan

- Cooperative Effort Between GU, DOT and DPH
- GU Advises DOT of Elevated Sodium Levels
- GU Advises DPH of Elevated Sodium Levels
- Meetings with DOT, including Administrative, Environmental and Maintenance Staff
- GU and DOT Share Drawings of Watershed and Potential Impact Areas
- GU Shares Sampling Data and Early Trends
- GU Agrees to Continue and Intensify Sampling and Continue to Share Data
- DOT Clears Basins and Inflow Areas
- DOT Agrees to Share Watershed Outlines with Drivers
- DOT Agrees to Analyze, Fine Tune and Calibrate Dispersion Rates for Trucks

Water Quality Results

- Sampling Done by Groton Utilities Staff
- Lab Testing Done by Groton Utilities Lab
- Data Analysis and Processing by Groton Utilities
- Current Focus is on Watershed Protection
- Raw Water Sampling
- Sampling at Point of Entry to Distribution System

Water Quality – Reservoir System



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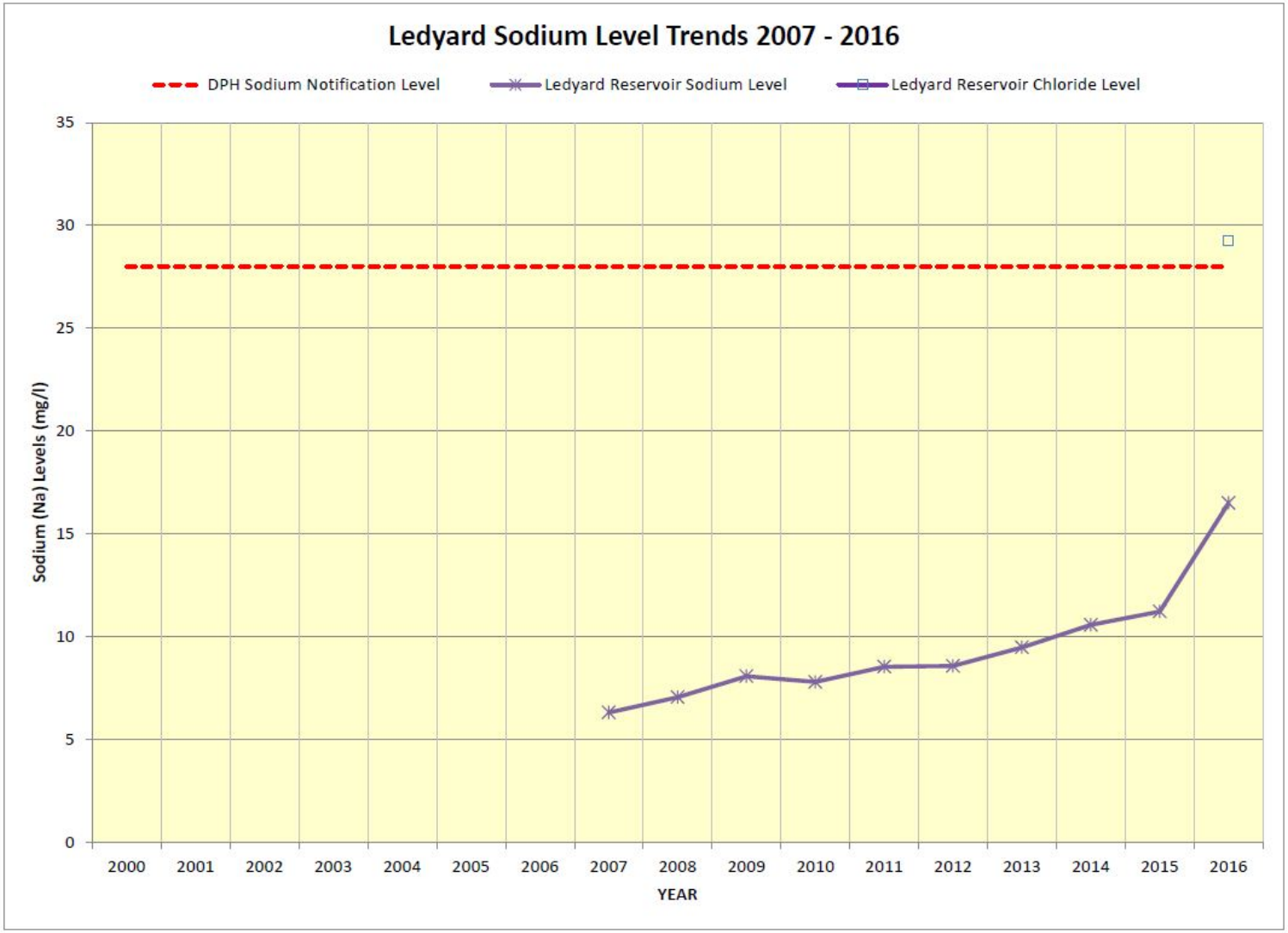

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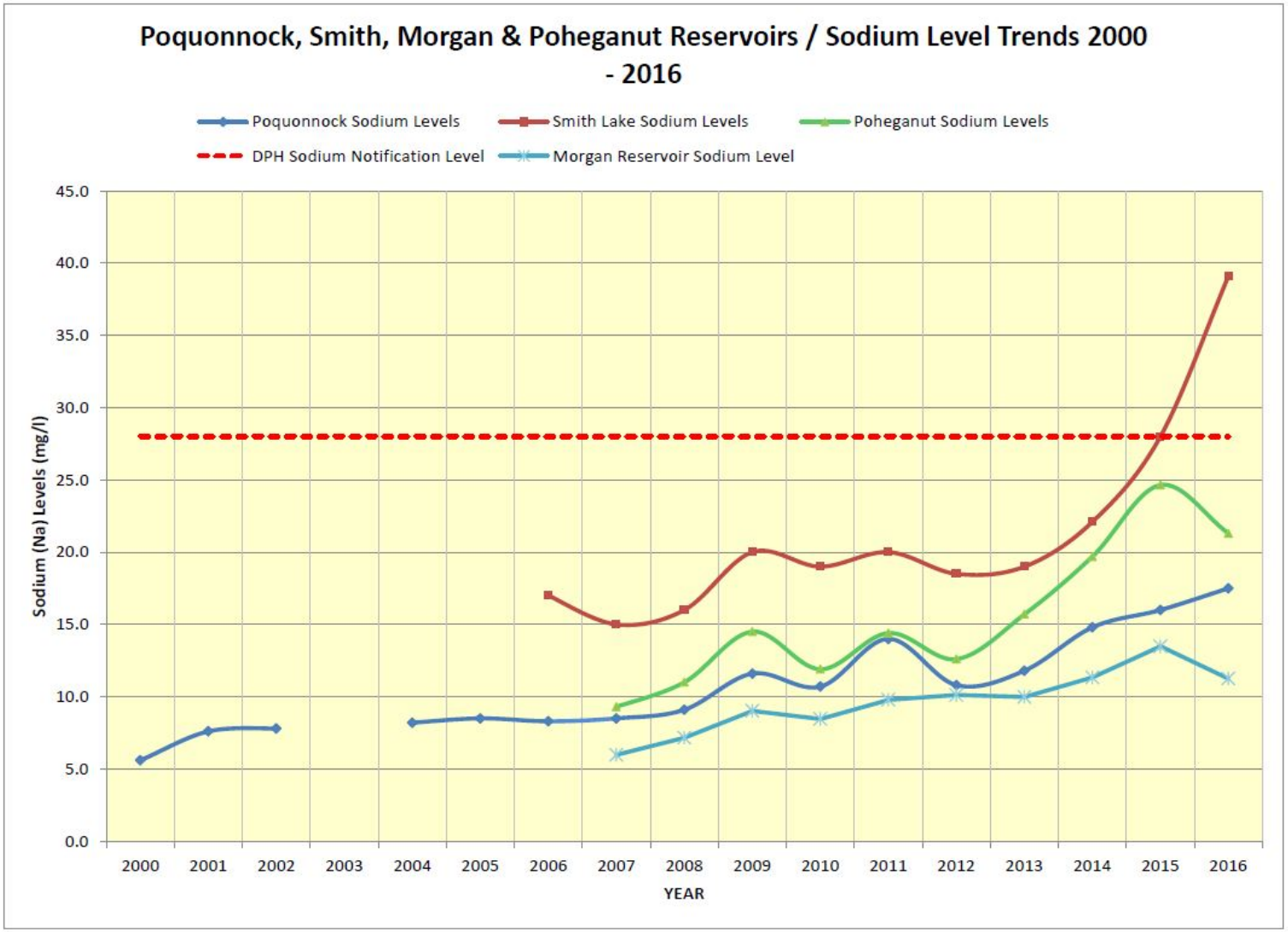

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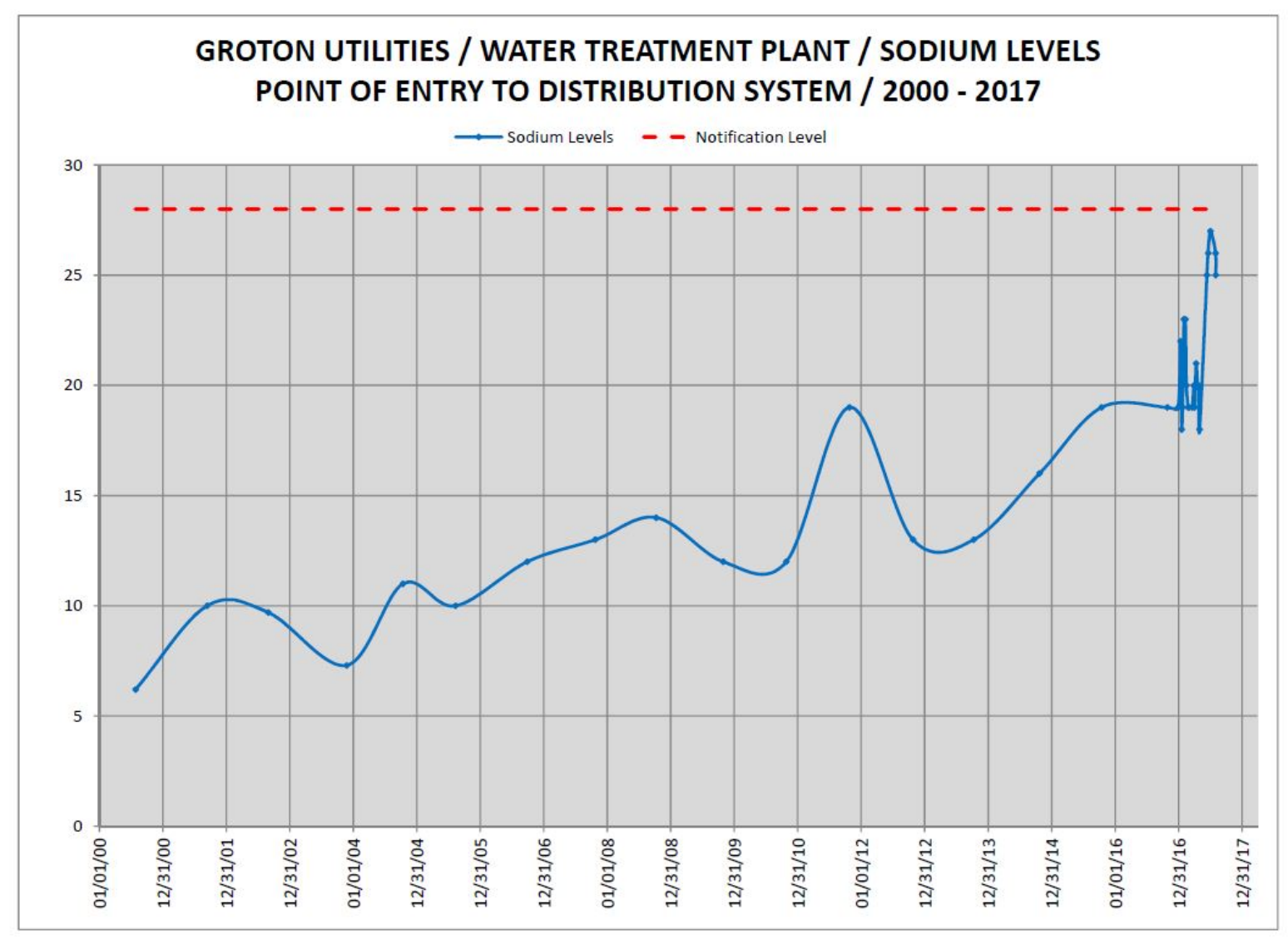

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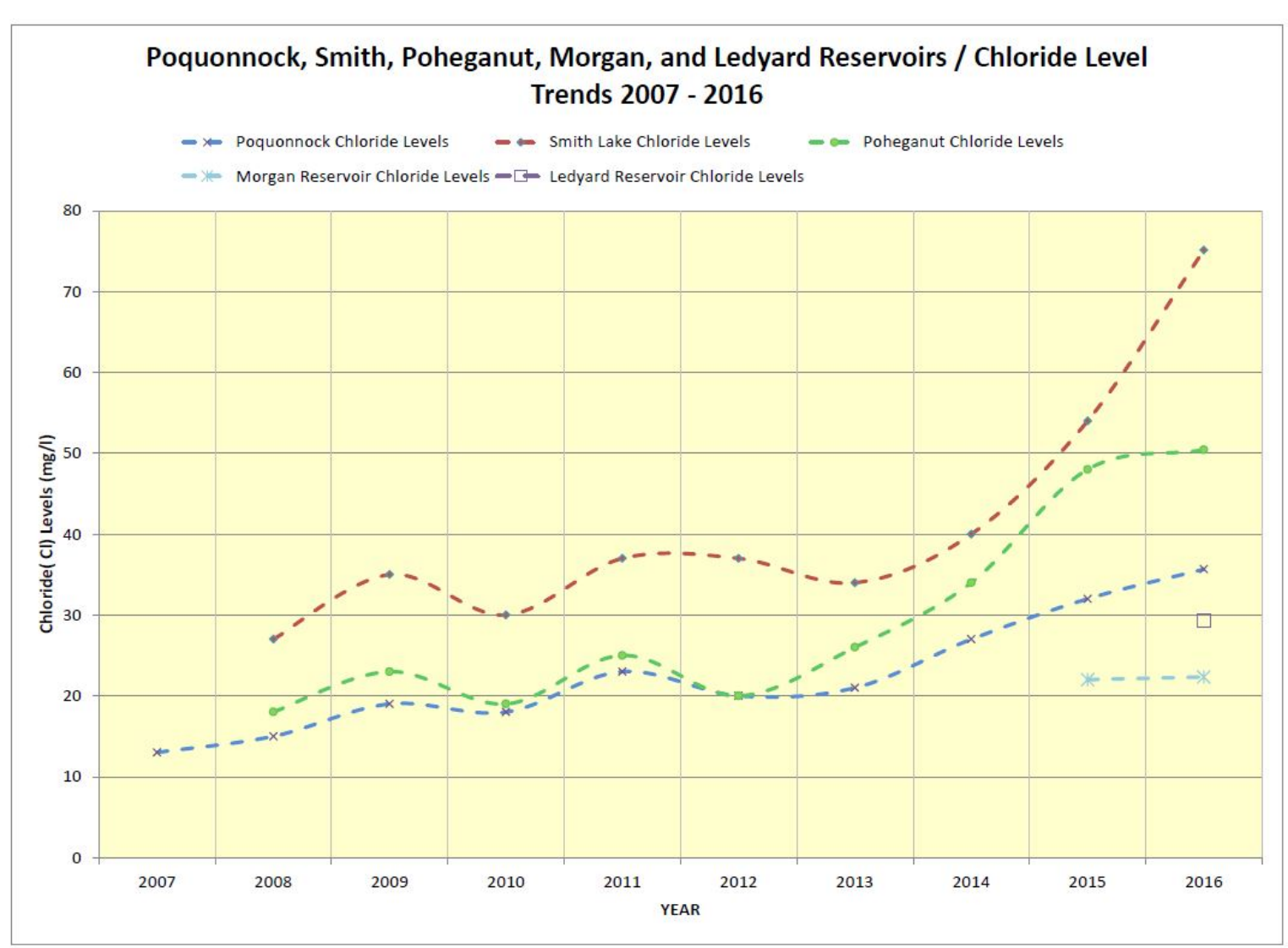

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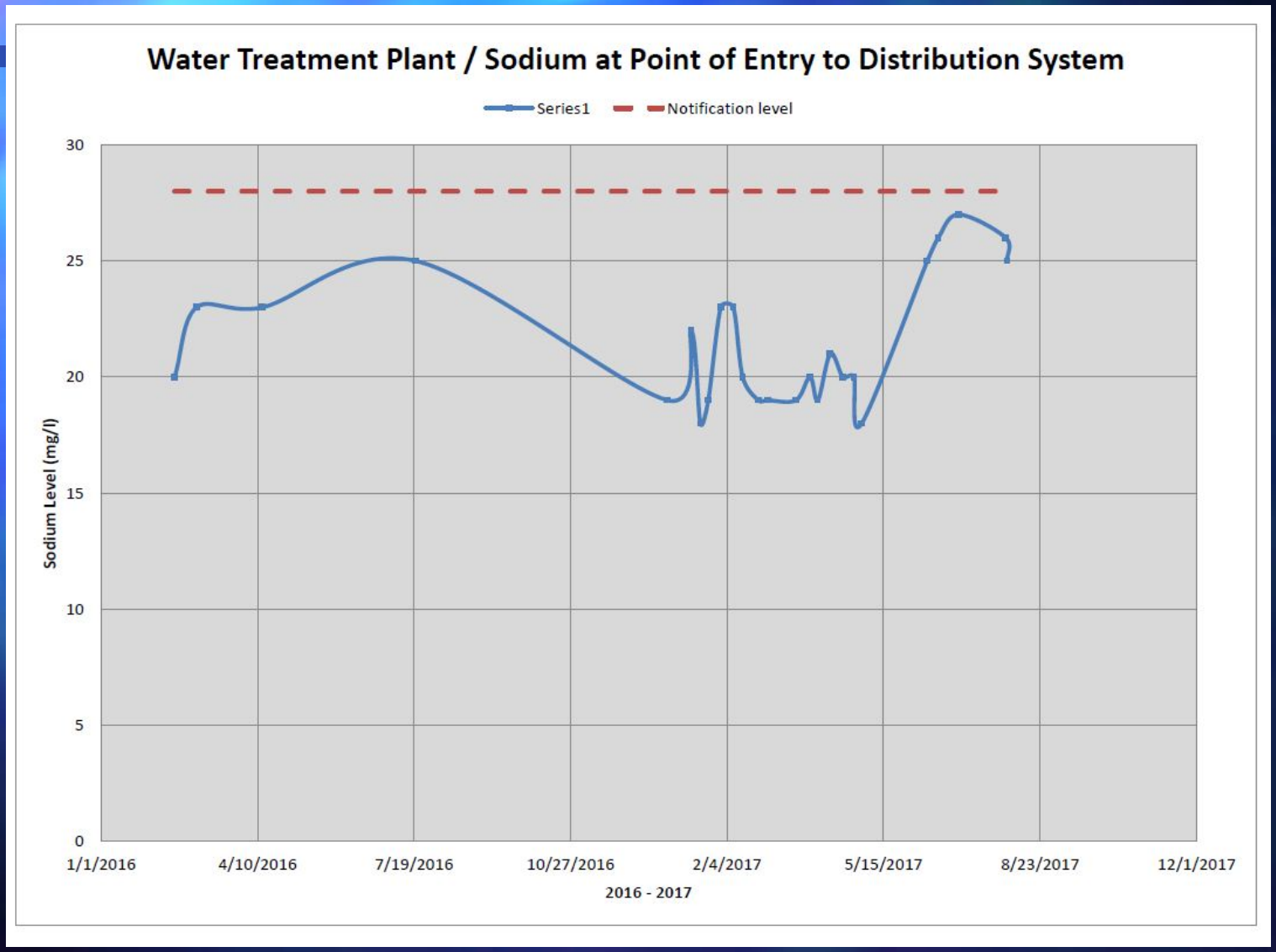

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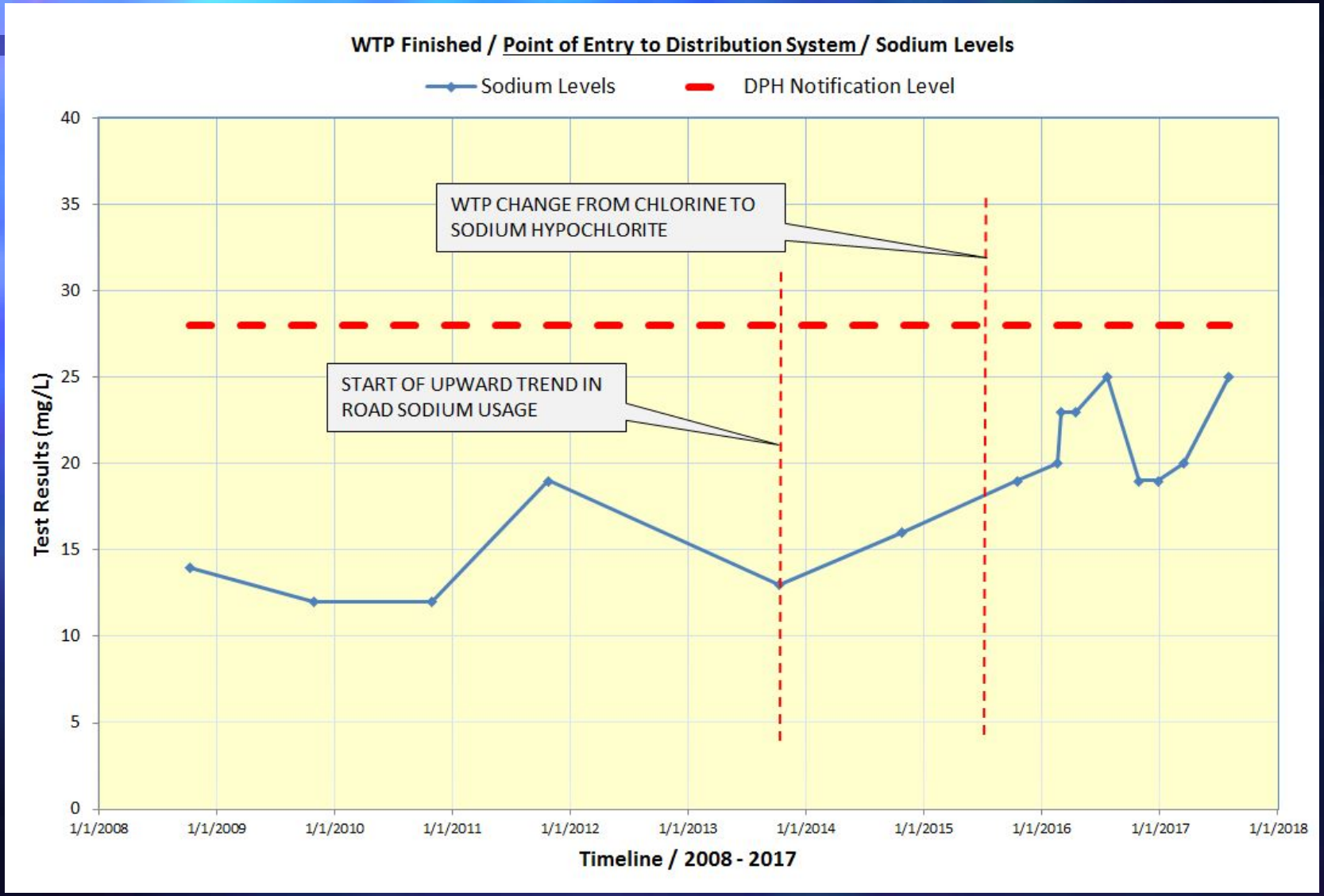

Lessons Learned and Going Forward

- Working with DOT and Municipal Public Works
- Increased Frequency for Raw Water Sampling
- Continued Maintenance / Groton Utilities Staff and DOT (Approachability to Sampling Sites)
- More Intense Maintenance at Detention Sites
- Future Concentration and Evaluation of Hydraulic Loading on Basins and Straight Discharges
- Additional Remediation
- Future Analysis & Study
  - New Treatment Methods (Change to DAF0
  - Recent Change from Chlorine to Sodium Hypochlorite

Questions.....