

An aerial photograph of the Ashbridges Bay Treatment Plant in Toronto. The image is split into two panels. The left panel shows a large, dark, rectangular structure, likely a wastewater treatment tank, with a grid of pipes or walkways on top. The right panel shows a more complex industrial facility with several large, circular, reddish-brown tanks, a tall, white, cylindrical chimney, and various buildings and pipes. The plant is situated near a body of water, with a rocky shoreline and some greenery visible in the foreground.

**AECOM**

# Present Disinfection Practices and Solution for the Future

Ashbridges Bay  
Treatment Plant





# Presentation Outline

- Project Background
- Overview of ABTP Existing Infrastructure and Flow Management
- Primary Effluent Disinfection
  - Chlorination / Dechlorination
- Secondary Effluent Disinfection
  - UV Disinfection
- Conclusions





An aerial photograph of a large industrial complex, likely a refinery or chemical plant. The facility features numerous large storage tanks, distillation columns, and various processing units. A prominent tall smokestack is visible. The image is overlaid with a teal banner that contains the text "Project Background".

## Project Background

# Project Background

- New Federal Wastewater Systems Effluent Regulation requires 0.02 mg/L chlorine residual by end of 2015
- Current operation - No dechlorination at ABTP
- 2009 – Class EA Study recommended Chlor/Dechlor for disinfection at ABTP
- Council directed staff to provide UV disinfection (secondary effluent)
- New disinfection solution must work with existing plant layout and tie-in to future system



# Current ABTP Disinfection System

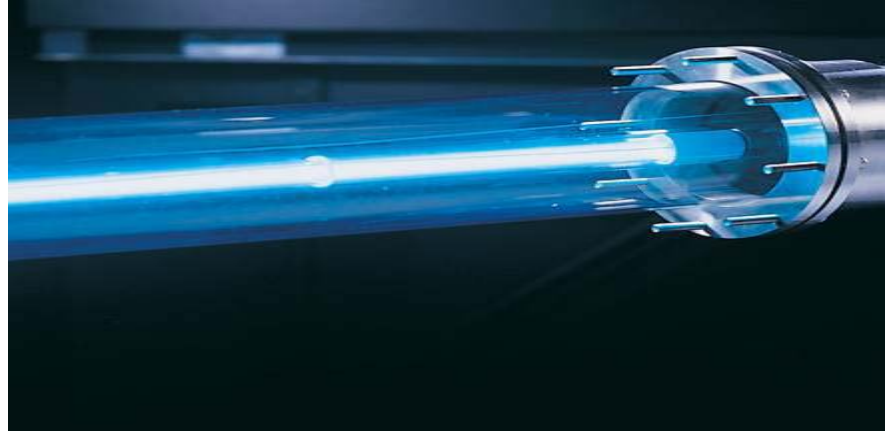
- Liquid chlorine used for disinfection. Delivered by rail.
- No dechlorination
- No chlorine contact tank. Dose in secondary outlet conduits. Contact time in conduits and outfall
- Limited disinfection of primary bypass effluent





# ABTP Proposed Future Disinfection Solution

- Secondary treated flows -  
Ultraviolet (UV) disinfection
- Primary effluent bypass -  
Chlorination/Dechlorination
  - Liquid sodium hypochlorite and  
sodium bisulphite





An aerial photograph of a large industrial complex, likely a refinery or chemical plant. The facility features numerous large storage tanks, distillation columns, and various processing units. A prominent tall distillation column is visible in the center. The complex is surrounded by roads and some greenery. A teal-colored rectangular overlay is positioned across the middle of the image, containing white text. The text reads "Overview of Existing Infrastructure and Flow Management".

# Overview of Existing Infrastructure and Flow Management



# Key conduits and channels







# Current Operational Strategy **818 MLD**

Full treatment provided





## Current Operational Strategy 818 MLD



- Full treatment provided





# Current Operational Strategy **2,000 MLD**

Full treatment for maximum 2-hours  
After 2 hrs: full treatment of 818 MLD;  
remainder of primary effluent bypassed





## Current Operational Strategy 2000 MLD



- Full treatment for maximum 2-hours
- After 2 hrs: full treatment of 818 MLD; remainder of primary effluent bypassed





# Current Operational Strategy

## 3,300 MLD

Full treatment up to 2,000 MLD for max 2-hours  
After 2 hrs: full treatment of 818 MLD;  
remainder of primary effluent bypassed



## Current Operational Strategy 3300 MLD



- Full treatment up to 2,000 MLD for max 2-hours
- After 2 hrs: full treatment of 818 MLD; remainder of primary effluent bypassed



# Primary and Secondary Disinfection Locations





# Solution

## Two Disinfection Locations

**Primary Effluent  
Disinfection**

**Secondary Effluent  
Disinfection Facility**



An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The image shows various structures including large rectangular basins, circular tanks, and a tall smokestack. A teal-colored banner is overlaid across the middle of the image, containing the text "Primary Effluent Disinfection".

# Primary Effluent Disinfection



# Primary Effluent Disinfection – Where???



Retrofit Primary Tanks???

Demolish Digesters ???



# Primary Effluent Disinfection



**Retrofit Primary Tanks 1 & 2  
into Chlorine Contact Tanks**

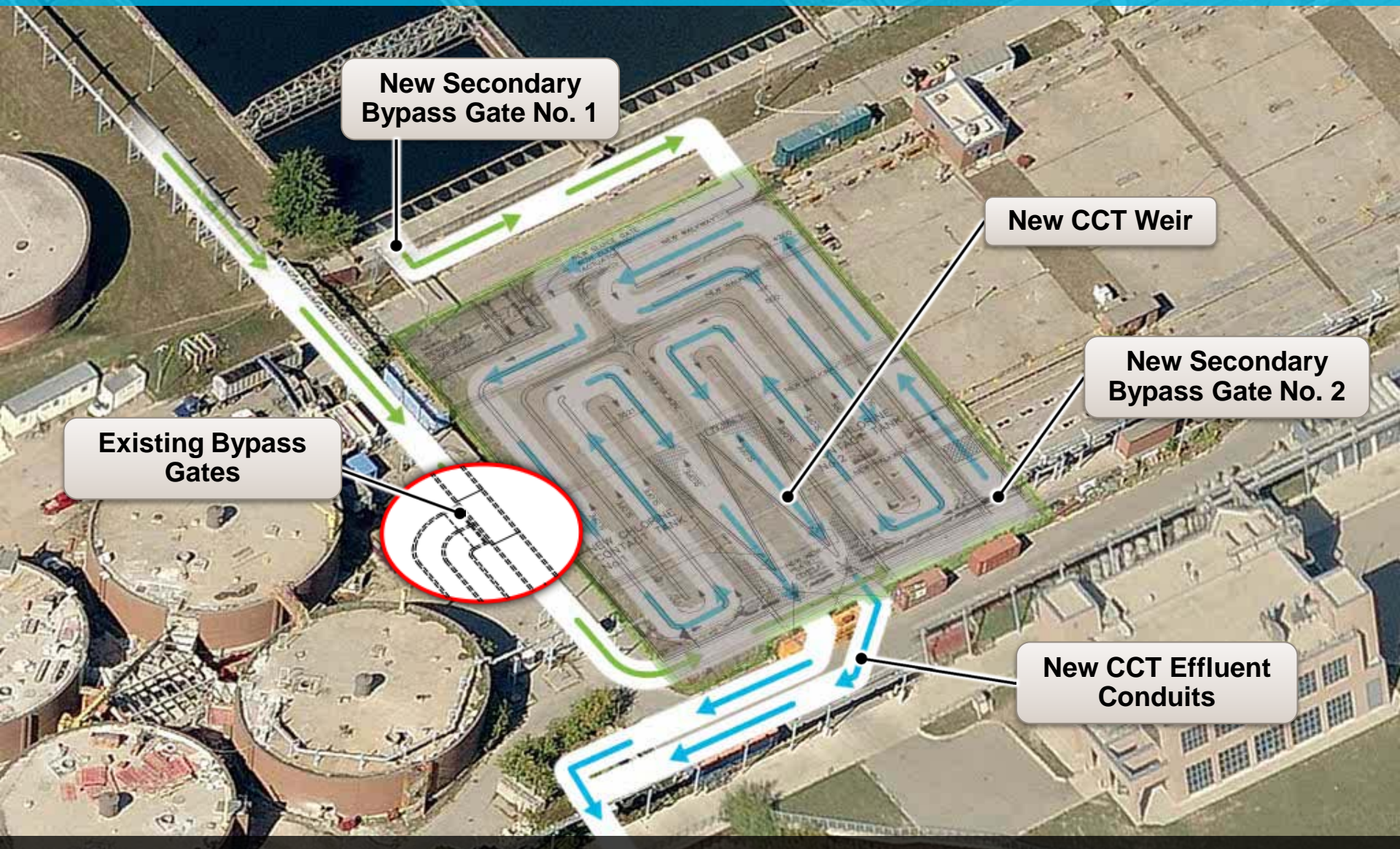


# Average Flow Conditions





# Secondary Bypass Flow Condition





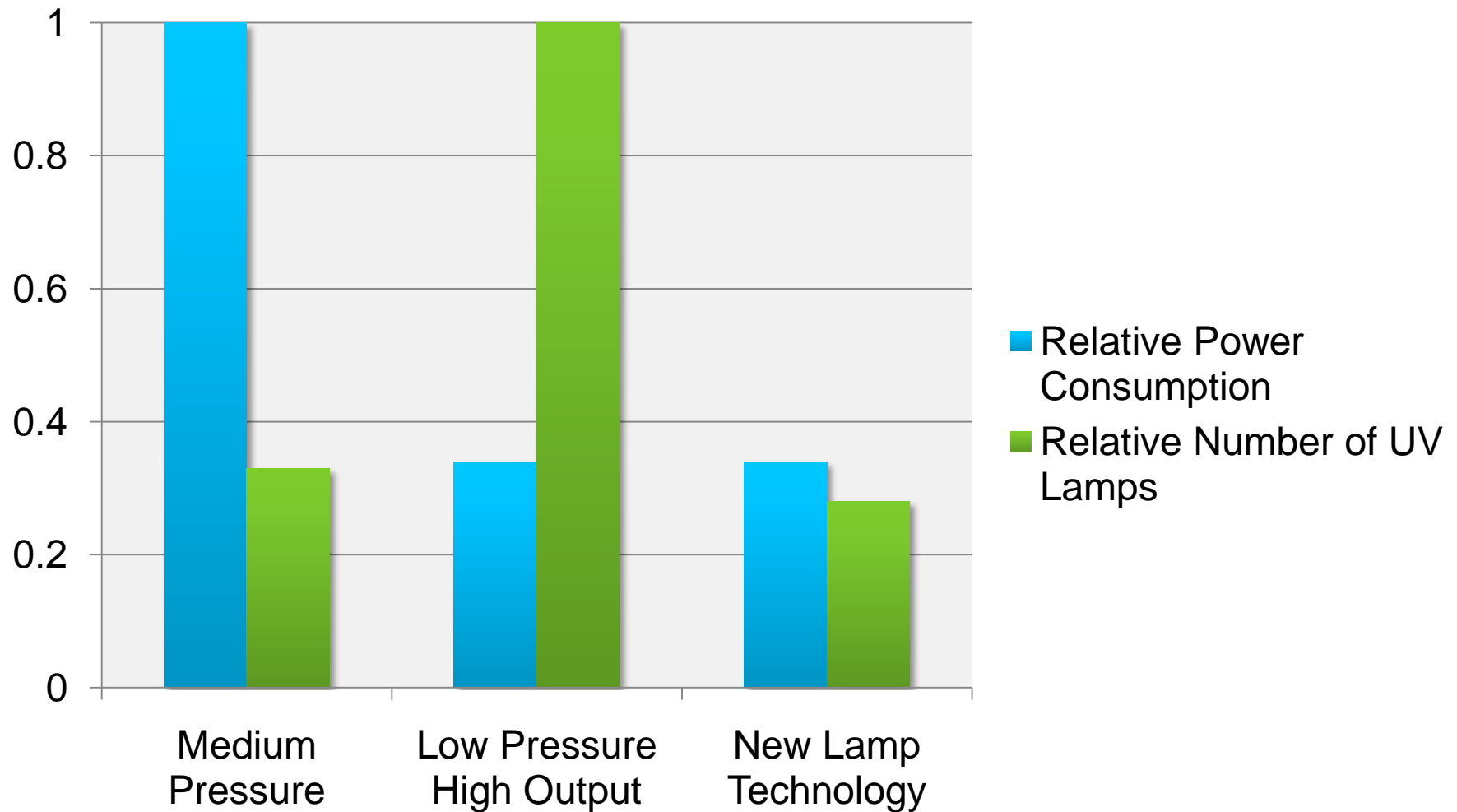
An aerial photograph of a large industrial facility, likely a wastewater treatment plant. The image shows various structures including large rectangular aeration tanks, circular clarifiers, and several tall smokestacks. A teal-colored banner is overlaid across the middle of the image, containing white text. Below the banner, the image continues to show more of the plant's infrastructure, including additional tanks and a body of water on the right side.

# **Secondary Effluent Disinfection**

## **UV Disinfection**



# Advancements in UV Lamp Technology





# Various Lamp Technologies at ABTP

Lamp Technology	Number of Lamps Required	Power Draw
Low Pressure – High Output	4,720	1,180 kW
Medium Pressure – High Output	1,680	4,300 kW
New Low Pressure – Very High Output	1,408	1,280 kW





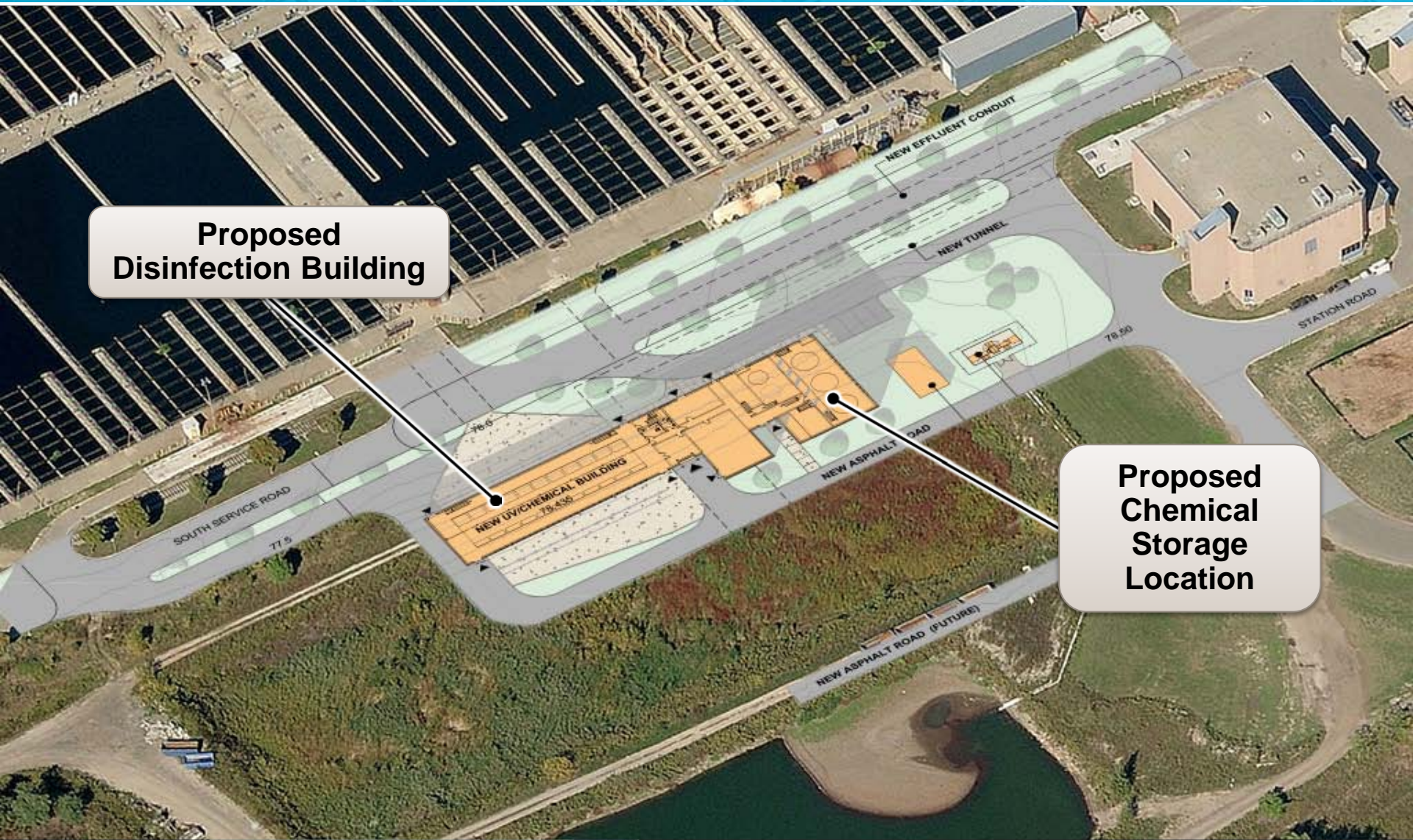
# UV System Site Plan





# UV System Site Plan

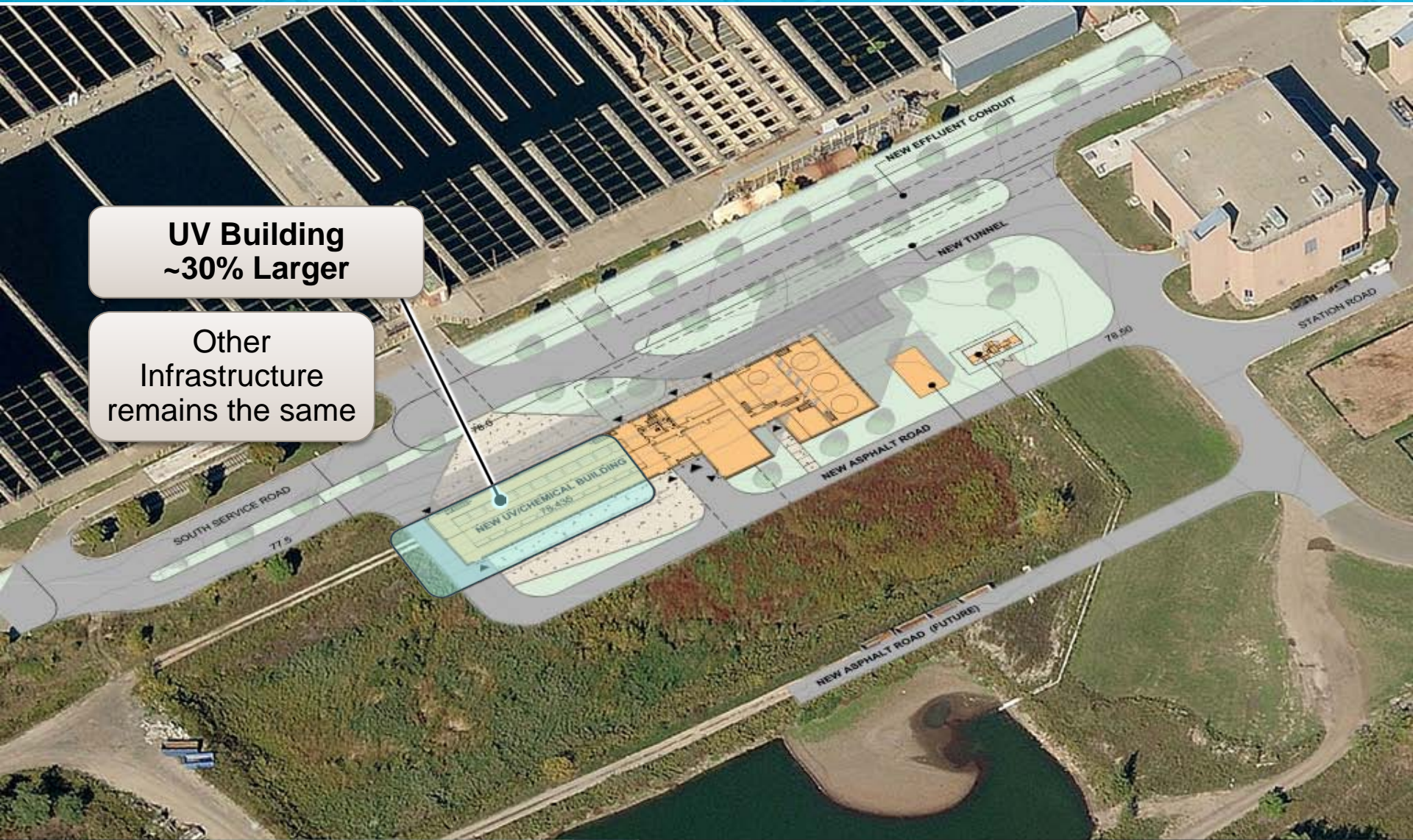
## New UV Lamp Technology





# UV System Site Plan

## Low-Pressure High-Output Lamps

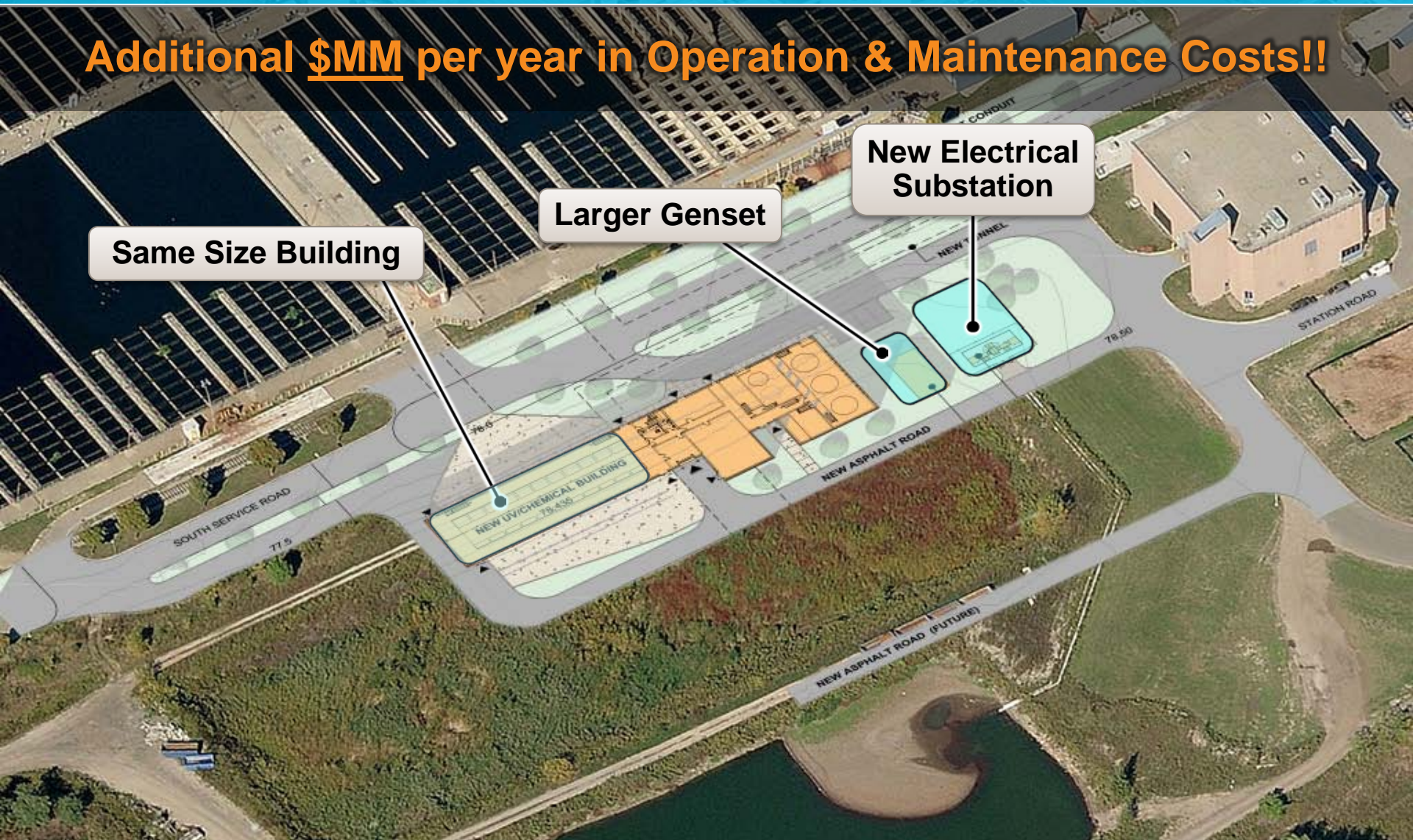




# UV System Site Plan

## Medium Pressure Lamps

**Additional \$MM per year in Operation & Maintenance Costs!!**





# UV Building – Conceptual Design





# UV Building – Conceptual Design





# Tie-In to Future Outfall





An aerial photograph of a large industrial complex, likely a refinery or chemical plant. The facility features numerous large storage tanks, distillation columns, and various processing units. A prominent tall smokestack is visible. The image is overlaid with a teal banner that contains the word "Conclusions".

# Conclusions



# Conclusions

- UV for secondary effluent disinfection. Chlorination / Dechlorination for secondary bypass effluent disinfection
- Creative but simple solution for primary bypass disinfection – very little automation
- Fully disinfected effluent discharged through seawall gates by 2019
  - Only ~5 years of this operation until all effluent discharged through new outfall
- Permanent disinfection solutions that work with existing infrastructure and new future outfall



An aerial photograph of a large industrial complex, likely a refinery or chemical plant. The facility features numerous large storage tanks, distillation columns, and various processing units. A prominent tall smokestack is visible in the center. The image is overlaid with a semi-transparent teal band across the middle, which contains the text "Questions?".

Questions?