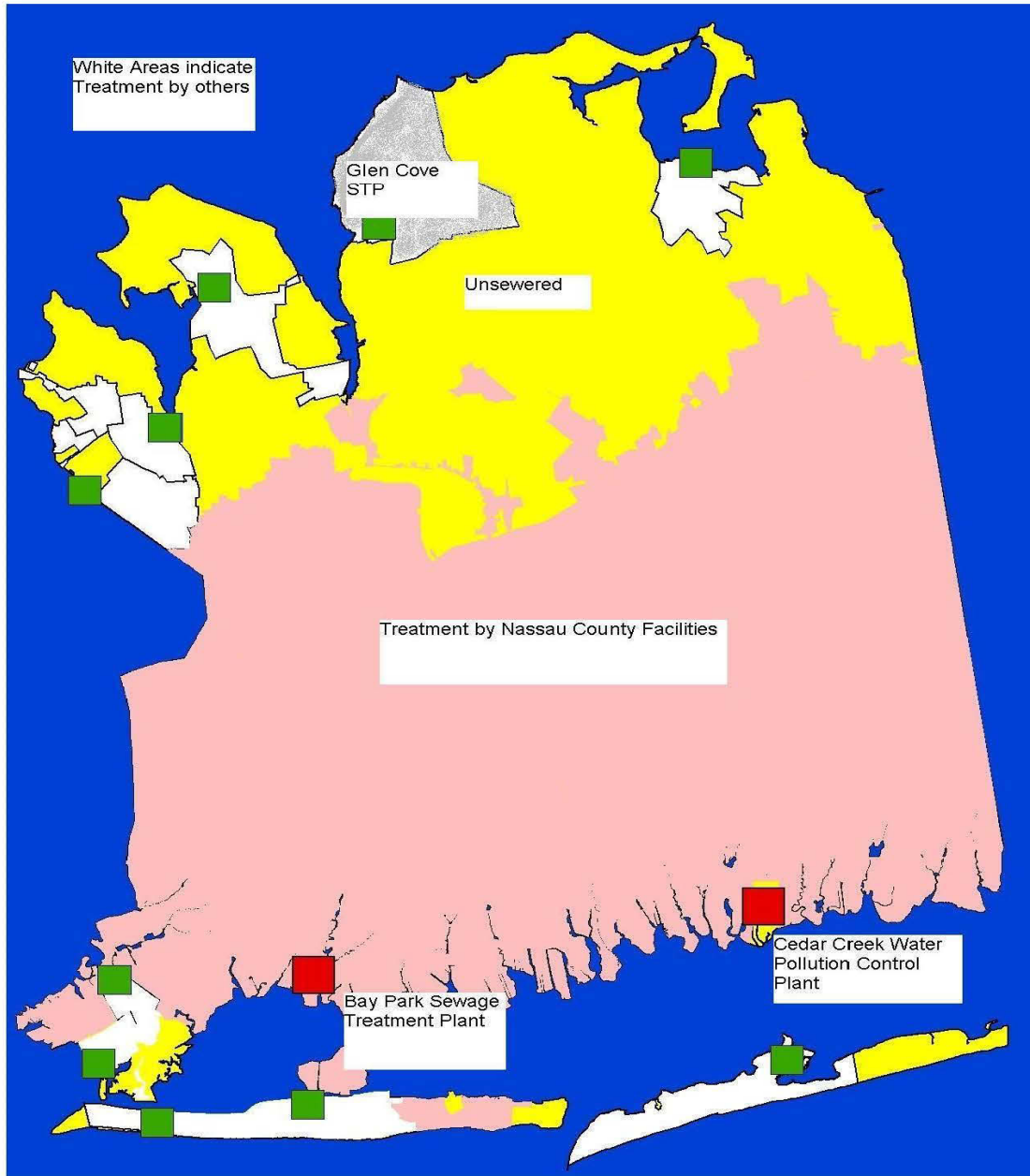


NASSAU COUNTY NITROGEN REDUCTION INITIATIVES

- INVESTIGATION OF FEASIBILITY OF DIVERTING TREATED EFFLUENT FROM BAY PARK PLANT TO THE EFFLUENT DISCHARGE PIPE AT CEDAR CREEK PLANT
- TREATMENT PLANT UPGRADES AT SOUTH SHORE WATER RECLAMATION FACILITY (BAY PARK)
 - SEASONAL BNR AND SIDESTREAM TREATMENT CONSTRUCTION PROJECTS WILL REDUCE NITROGEN IN EFFLUENT BY 50%
- SANITARY SEWER FEASIBILITY STUDY OF HEMPSTEAD HARBOR COMMUNITIES
 - FOCUSED STUDY OF CRESCENT BEACH SUBWATERSHED





SEWERED AND UNSEWERED AREAS OF NASSAU COUNTY

Existing Conditions for the Western Bays Sewage Treatment Plant Discharges in Reynolds Channel





<http://www.newsday.com/long-island/nassau/nassau-eyes-aqueduct-as-solution-to-bay-park-outfall-problem-1.11820108>

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Nassau eyes aqueduct as solution to Bay Park outfall problem

May 20, 2016 By Jennifer Barrios jennifer.barrios@newsday.com



Outfall tide pumps at the Bay Park Sewage Treatment Plant want to send effluent to the Cedar Creek (J. Eckert)

Effluent from Nassau Park sewage-treatment plant to an ocean-outfall pipe at Cedar Creek plant in Wantagh. Nassau County officials announced Friday.

The new proposal is estimated to cost far less than the estimated \$400 million to build an ocean-outfall pipe to send the effluent to the Atlantic Ocean instead of the nitrogen-choked Western Bays.

"This will save the Western Bays," said Adrienne Esposito, executive director of the Citizens Campaign for the Environment. "Unequivocally, without a doubt. It's the best news we've gotten in two decades."

Under the proposal, County Executive Edward Mangano said Nassau would use 10 miles of the county-owned aqueduct that runs under Sunrise Highway to transport treated effluent from Bay Park to the ocean-outfall pipe at the county's Wantagh sewage-treatment plant.

The county would build connections from both plants to the aqueduct, a steel pipe built around the turn of the 20th century that once carried water from Long Island to Brooklyn.

Cedar Creek's outfall pipe extends three miles into the Atlantic Ocean and can handle a maximum flow of 200 million gallons per day. The Bay Park flow would bring the total at

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Nassau: Plan to fix Bay Park outfall woes 'holds great promise' | Newsday

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Nassau LONG ISLAND

Nassau: Plan to fix Bay Park outfall woes 'holds great promise'

Updated May 20, 2016 8:36 PM

By Jennifer Barrios jennifer.barrios@newsday.com

Reprints



The Bay Park sewage treatment plant on Jan. 7, 2016. Photo Credit: Flying Dog Photos

Nassau County officials on Friday



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Mangano Advances New Path For Ocean Outfall Pipe

Written by Long Island News & PR | 23. May 2016

Nassau County, NY - May 20, 2016 - Nassau County Executive Edward P. Mangano and local environmental activists gathered today to announce a less costly plan toward achieving the benefits of an ocean outfall pipe for treated effluent at the Bay Park Wastewater Treatment Plant.

The Nassau County Department of Public Works will soon issue a Request for Proposals (RFP) to determine the feasibility of operating an existing non-utilized underground pipeline to connect the Bay Park Plant to the ocean outfall pipe at the Cedar Creek Wastewater Treatment Plant.

"A feasibility study will determine if existing infrastructure can support a connection to the Cedar Creek ocean outfall pipe," said County Executive Mangano. "To strengthen our shoreline, protect our marine life and improve our environment for decades to come, it's critically important to connect Bay Park to an ocean outfall pipe."

Engineer's project this new path would be less costly because using the existing Cedar Creek ocean outfall pipe avoids the cost of constructing a new two mile pipe – saving millions of dollars. While Governor Cuomo committed \$150 million for construction costs and County Executive Mangano and local environmental activists lobbied Washington lawmakers for Federal funding, no additional capital materialized for the proposed new ocean outfall pipe at Bay Park.

After careful consultation with County engineers and the State Department of Environmental Conservation (DEC), Nassau County may have the ability to achieve the same environmental success in a cost-efficient manner by connecting the Bay Park Plant to Cedar Creek's ocean outfall pipe.

Presiding Officer Norma Gonsalves stated, "I look forward to getting additional information on an interesting concept which has the potential to solve both the environmental and financial problems associated with the effluent for the Bay Park Sewage Treatment Plant."

"The Bay Park Wastewater Treatment Plant is in the backyard of my hometown, and area neighbors have endured the adverse impacts associated with discharging treated waste into local bays for far too long," stated Hempstead Town Supervisor Anthony J. Santino. "I am very supportive of studying any measures that could bring about the environmentally preferable alternative of ocean discharge of treated wastewater. Ocean discharge is better for our families, local marine life, fishing enthusiasts and the planet as a whole."

"This innovative solution saves time, saves money and will save our western bays. It's the best environmental news for Long Island in two decades. When this project is completed, these south shore bays will once again be abundant with fish, shellfish, shore birds and marine life. This will accelerate the restoration and recovery of these magnificent and essential bays and wetlands. Long Island's future just got better," said Adrienne Esposito, Executive Director of Citizens Campaign for the Environment.

"Any proposal which will improve the long-term safety and sustainability of Reynolds Channel is one worth exploring. The plan is promising and we must consider all environmental and community concerns," added County Legislator Steve Rhoads.

<http://www.longisland.com/news/05-21-16/mangano-bay-park-wastewater-treatment-plant...> 4/19/2017

<http://www.newsday.com/long-island/nassau/nassau-eyes-aqueduct-as-solution-to-bay-park-outfall-problem-1.11820108>

<http://www.newsday.com/long-island/nassau/nassau-plan-to-fix-bay-park-outfall-woes-holds-great-promise-1.11820108> 4/19/2017

SUNRISE HIGHWAY AQUEDUCT SYSTEM

THIS SYSTEM CONSISTED OF A SERIES OF SURFACE WATER IMPOUNDMENTS, INFILTRATION GALLERIES, PIPES, CONDUITS AND GROUND WATER WELL FIELDS COLLECTIVELY PUMPING AS MUCH AS 60 MGD FROM NASSAU COUNTY INTO THE CITY OF BROOKLYN BETWEEN 1862 AND 1958 THROUGH A 72 INCH STEEL FORCE MAIN BENEATH SUNRISE HIGHWAY

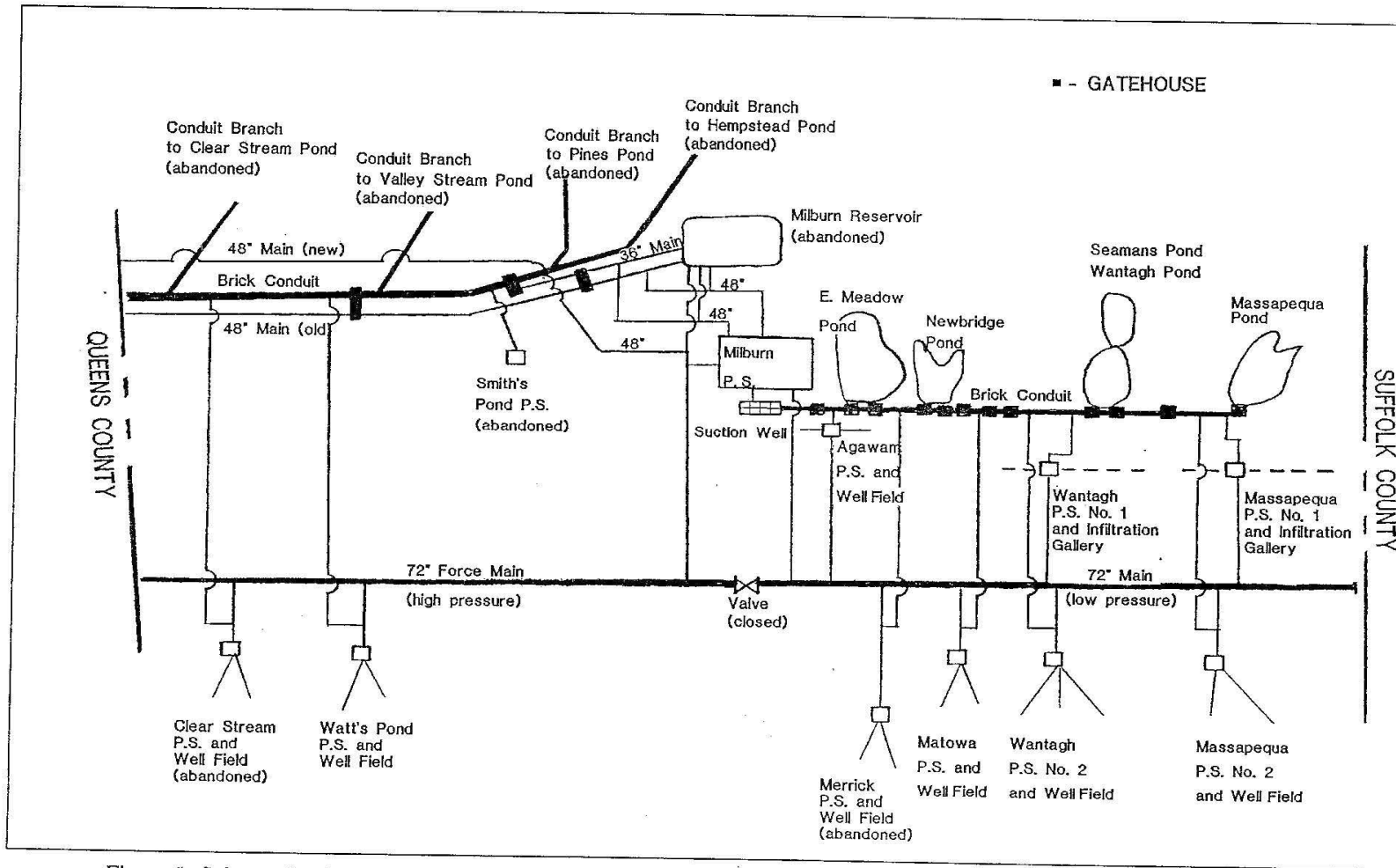


Figure 1. Schematic of the Sunrise Highway Aqueduct System

1977 INSPECTION REPORT



23. An Inspector Walking in the Pipe in Seaford
Manhole No. 19



25. Removing Small Manhole Cover - Massapequa

Pipe, look
out



21. An inspector entering the Manhole - Merrick
Manhole No. 14

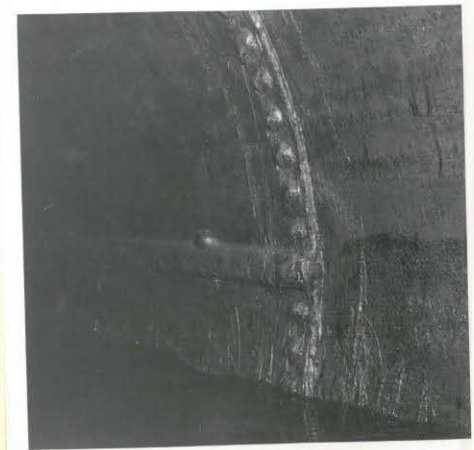
24. Interior of Pipe - looking East - Seaford
Manhole No. 20



26. 12-inch Blow off East of Hicksville Road - Massapequa
Manhole No. 21



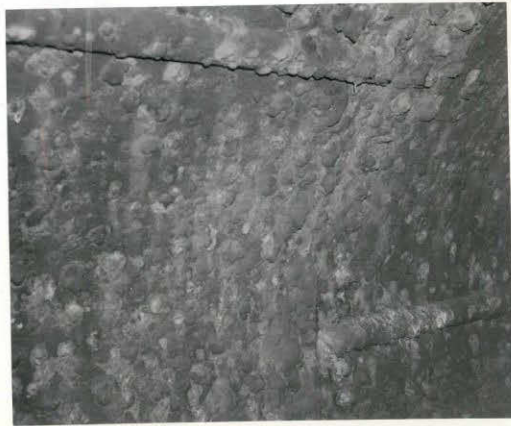
22. Detail of Joints - Wantagh
Manhole No. 17



1977 INSPECTION REPORT



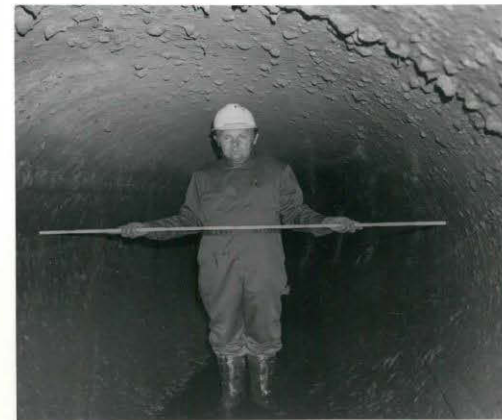
11. Steel Plate Welded Over Hole where Core Sample No. 3 was drilled - Lynbrook
Manhole No. 8



12. Detail of Joints - Covered with Tuberculation
Rockville Centre
Manhole No. 9



13. Inspecting the Pipe Interior in Rockville Centre
Manhole No. 10



14. Measuring Pipe Diameter with 6 foot rule - Rockville Centre
Manhole No. 10

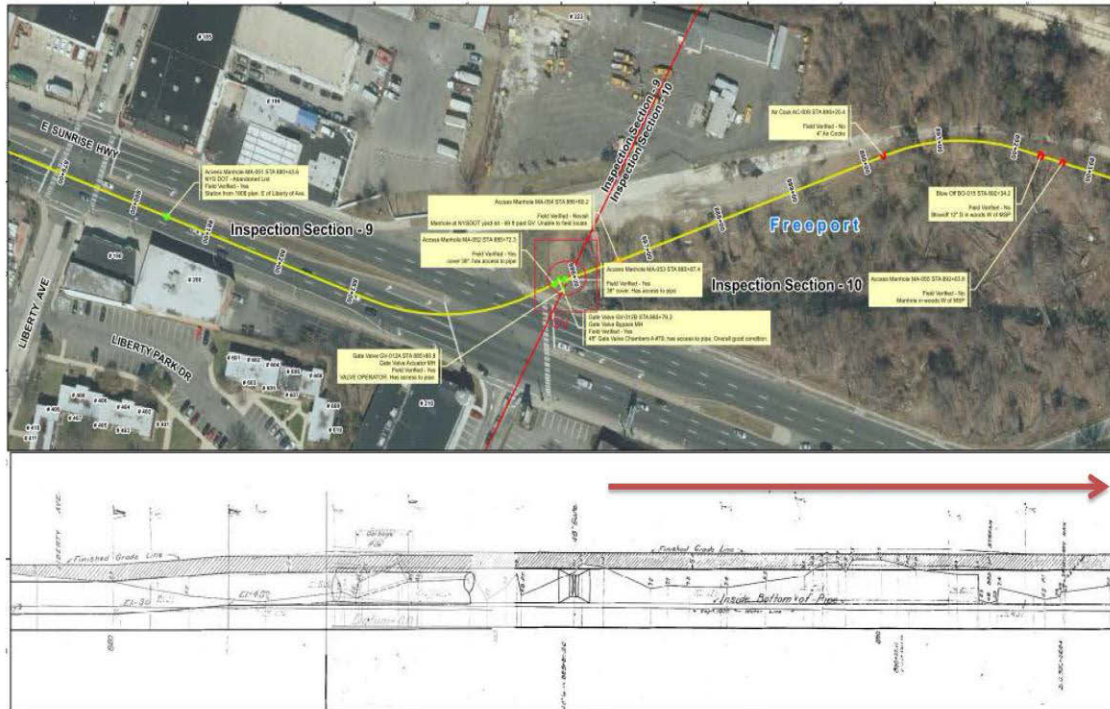
“THE PIPE IS IN ACCEPTABLE CONDITION AND CAN BE USED FOR MANY PRACTICAL PURPOSES SUCH AS WATER SUPPLY, FIRE WATER STORAGE, STREAM FLOW AUGMENTATION, SEWER MAINS OR AS A SLEEVE FOR UTILITY CONDUITS AND OTHER GENERAL PURPOSES THE COUNTY MAY HAVE”.



EFFORTS TO IMPROVE WESTERN BAYS



2017 Set Up for Inspection - East Run Segment 10

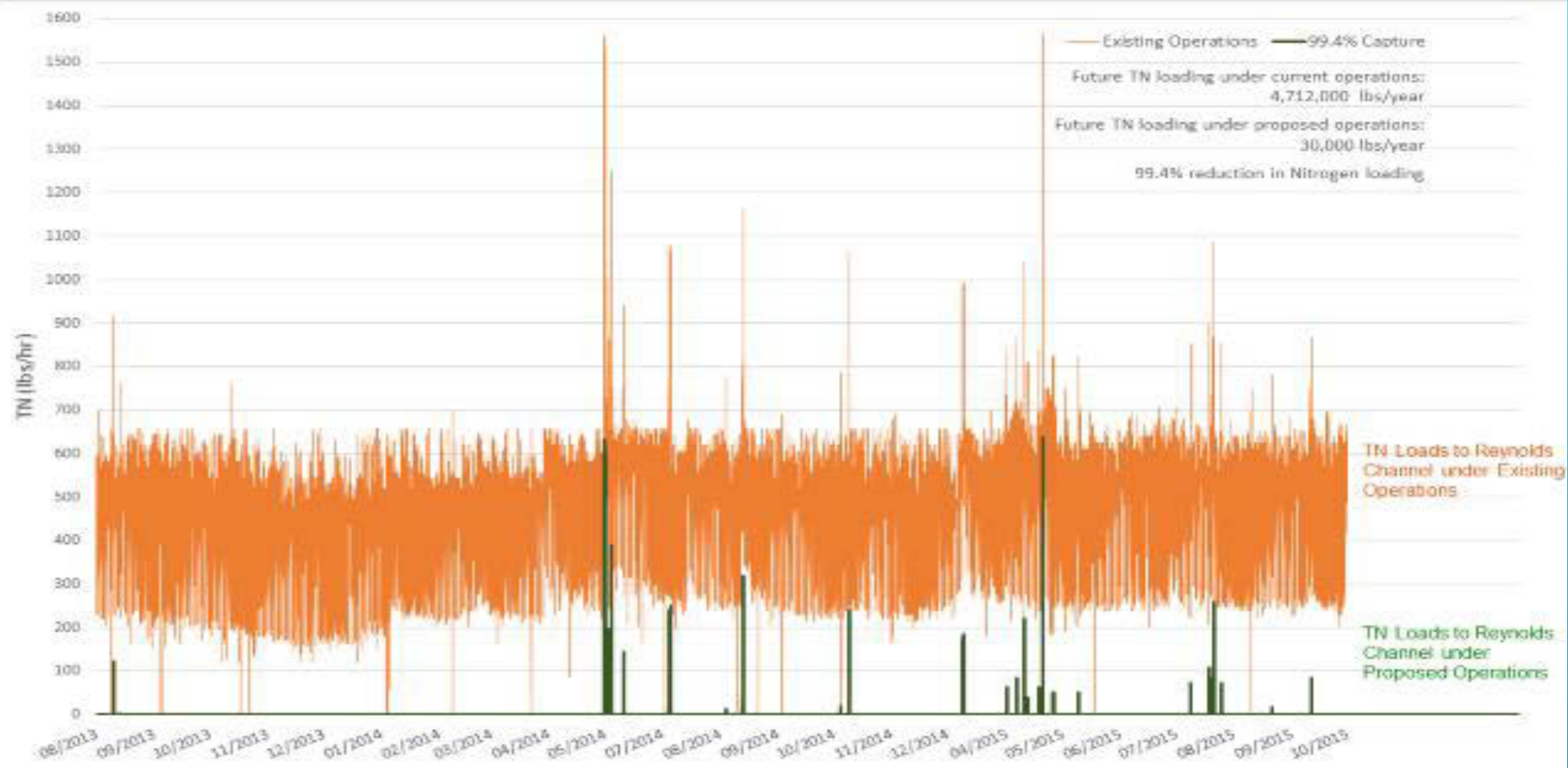


Summary of condition

- No change from 1977 in this snapshot
- Likely full of pinholes but excellent ring stiffness (e.g. no change in cross section, excellent pipe-soil interaction still)
- Lining shot as it should be
 - Degree of tuberculation present, readily cleaned by current technology
- Excellent candidate for re-use via re-lining
 - Three (3) options we will look at varying from spray-on, close-fit reinforced tube, and discrete pipes
- Pipe condition in this section, excellent based on visual criteria alone



Reduction of TN Loading in Reynolds Channel (Wet Weather/ High Flow Events)



STP Operational Improvements

Seasonal BNR and Side Stream Treatment



Sidestream treatment reduces effluent nitrogen by 15 percent

\$20.6 MILLION



Seasonal BNR reduces nitrogen from 35 mg/l to 20 mg/l during the summer (~4 months)

\$18.9 MILLION

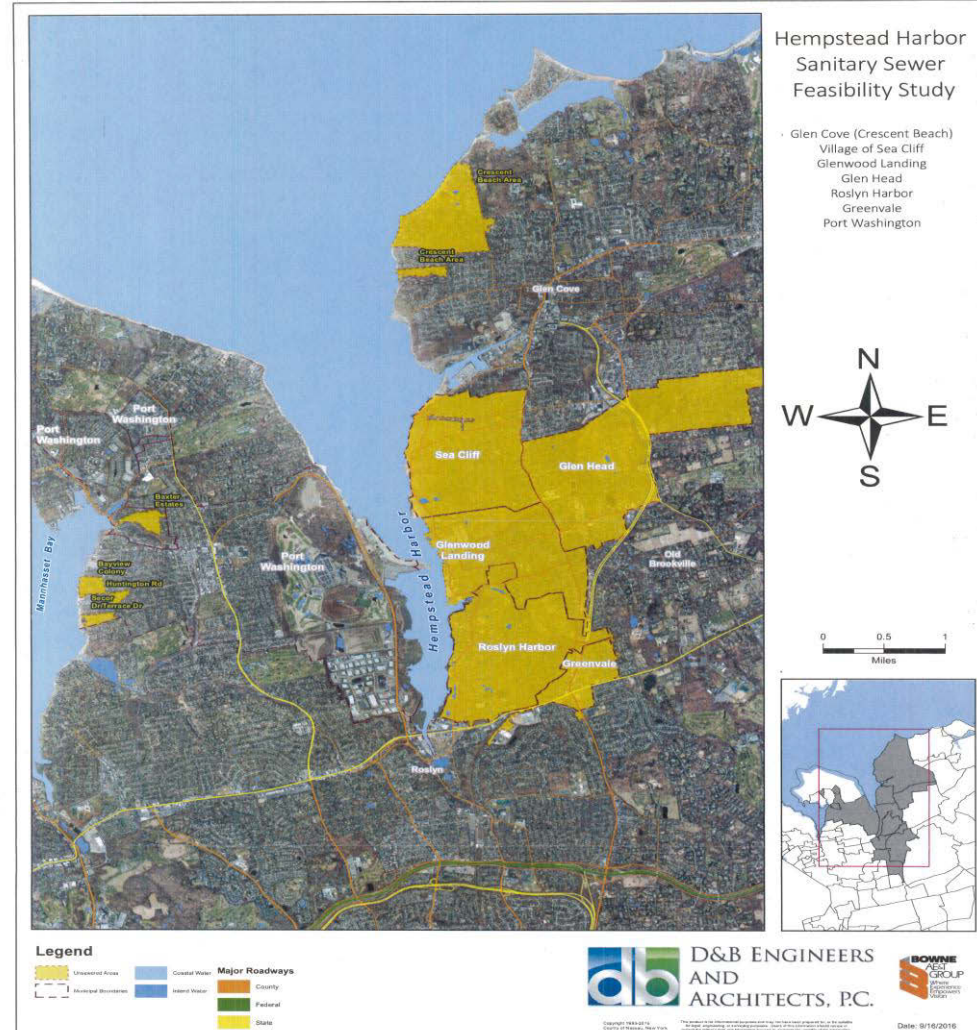
SANITARY SEWER FEASIBILITY STUDY OF HEMPSTEAD HARBOR COMMUNITIES



- ▶ Goals of study are two-fold:
- ▶ Protect the sole-source aquifer that supply's the County's drinking water supply and;
- ▶ Protect surface waters to allow for use of existing bathing beaches for recreational use.

SANITARY SEWER FEASIBILITY STUDY OF HEMPSTEAD HARBOR COMMUNITIES

D&B Engineers and Architects, P.C.

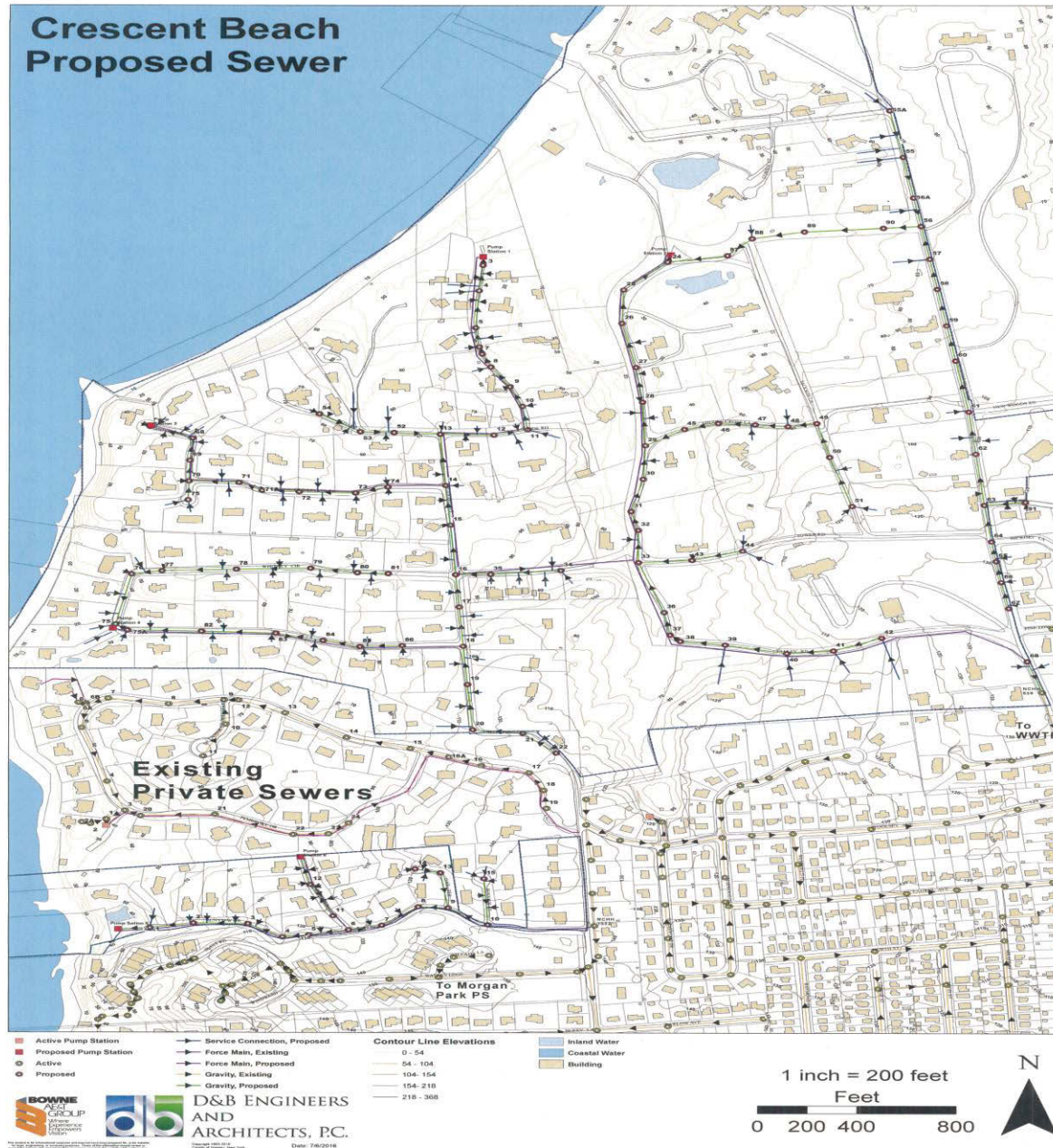


NCDPW Sanitary Sewer Feasibility Study Hempstead Harbor Communities Summary of Proposed Sewer

Village of Sea Cliff, Glenwood Landing, Glen Head, Roslyn Harbor and Greenvale:

- ~3,345 Acres
- 5,279 Properties Served
 - Single Family, Two Family, Multifamily, Apartments/Condominiums, Commercial, Industrial, Recreational/entertainment, Government Owned, Schools, community services and Vacant Land.
- Estimated Peak Flow is 8,074,000 GPD
 - 6,876,000 GPD tributary to the Glen Cove WWTP
 - 30,000 GPD tributary to the Shore Road Pump Station
 - 36,000 GPD tributary to Knott Drive Pump Station
 - 1,198,000 GPD Tributary to Roslyn Village Pump Station, Cedar Creek WPCP
- 364,300 LF (69 miles) of Gravity Sewer Ranging in size from 8" to 42" in Dia., 1,827 Manholes
- Twelve (12) Pump Stations and a Total of 17,900 LF of Force Main
- Preliminary Construction Cost Estimate \$613,000,000
 - Includes Improvements to Shore Road Pump Station
 - Includes Improvements to Knott Drive Pump Station
 - Includes Improvements to Roslyn Village Pump Station (replacement of the Station Force Main not included)
 - Includes Improvements to the Glen Cove Collection System (New Trunk Sewer)
 - Includes Improvements to the Cedar Creek WPCP Collection System Tributary to Roslyn Village Pump Station (Increasing the existing sewer from 8" to 12")
 - Improvements/expansion of Glen Cove WWTP not included

Crescent Beach Proposed Sewer



D&B Engineers and Architects, P.C.

NCDPW Sanitary Sewer Feasibility Study Hempstead Harbor Communities Summary of Proposed Sewer

Crescent Beach Community:

- ~295 Acres
- 152 Properties Served
 - Single Family, Multiple Family, Estates, Schools and Vacant Lots
- Estimated peak flow is 566,000 GPD – tributary to Glen Cove WWTP
 - 77,000 GPD tributary to Morgan Park and Garvies Point Pump Stations
- 21,080 LF (4 miles) of 8" Diameter Gravity Sewer, 109 Manholes
- Six (6) Pump Stations, 12,600 LF of Force Main
- Preliminary Construction Cost Estimate \$37,500,000
 - Includes Improvements to Morgan Park and Garvies Point Pump Stations
 - Includes Improvements to existing Glen Cove WWTP Collection System Gravity Sewer (increasing existing 8" diameter sewer to 12" diameter)

FOCUSED STUDY OF CRESCENT BEACH SUBWATERSHED

- Bacterial contamination has forced closure of Crescent Beach since 2009
- Previous investigations have shown bacterial contamination along stream which discharges at Crescent Beach
- Focused sampling of dry & wet weather flows combined with ground water monitoring well samples to determine likely sources of contamination
- Future phase of work would include evaluating alternatives to conventional sewers.
- RESULTS OF FIELD WORK EXPECTED BY END OF JUNE 2017

