

NEW BRITAIN WATER CO. SUMMIT: PAST, PRESENT, & FUTURE



JANUARY 28, 2019

2019 NEW BRITAIN WATER SUMMIT

OVERVIEW

AGENDA

Session 1 – New Britain Water Company

(9:00 a.m. to 10:00 a.m.)

- * Overview – Mayor Erin Stewart
- * History of the Water Department – Alderman Don Naples
- * Status of Operations – Mark Moriarty, Director of Public Works
- * Water Utility System – Ray Esponda, Deputy Director of Public Works
 - * Water Supply System
 - * Water Quality & Treatment
 - * Water Distribution System
 - * Current Projects and Initiative
 - * Water Rate Comparison



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OVERVIEW

AGENDA

Session 2 –Sanitary and Storm Sewer Systems

(10:15 a.m. to 11:00 a.m.)

- * Overview – Mayor Erin Stewart
- * Sanitary Sewer Collection System – – Mark Moriarty, Director of Public Works
 - * Sanitary System Components
 - * Sanitary Sewer Systems Related Programs
 - * Infiltration and Inflow (I&I)
 - * Fats, Oils, and Grease (FOG) Program
 - * US EPA Capacity, Management, Operations, and Maintenance (CMOM) Order
- * Storm Water Sewer Collection System –Brief Overview
- * The Mattabassett District – Michelle Ryan, District Engineer



2019 NEW BRITAIN WATER SUMMIT

HISTORY OF THE WATER DEPARTMENT

Origins date back to 1856 when Frederick T. Stanley
(the City's first Mayor & founder of the Stanley Works)
had a study performed about the feasibility of securing a water
supply to the City



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HISTORY OF THE WATER DEPARTMENT

- * One year later, in 1857, the NB Water Board was given authority to construct a water supply system
- * Ground breaking for Shuttle Meadow and original 5 miles of water main (4" to 8") started on **July 6, 1857** and the first day water flowed from Shuttle Meadow into the system was **October 6th, 1857**
- * The original bond issued for this construction was for \$50,000

The Water Department



Laying the city's first water line



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HISTORY OF THE WATER DEPARTMENT

- * 1857 - NB WATER DEPARTMENT FOUNDED (TOWN POPULATION 4,500)
- * 1868 - FIRST NEW BRITAIN WATER SHORTAGE, DUE TO RAPID POPULATION & INDUSTRY GROWTH
- * 1891 - NEW DAM ADDED 10 FEET HEIGHT AT SHUTTLE MEADOW RESERVOIR, BRINGING CAPACITY TO 1 BILLION GALLONS
- * 1910 - NEW BRITAIN POPULATION GREW TO 43,916
- * 1910 - SHUTTLE MEADOW RESERVOIR DAM RAISED ANOTHER 4 FEET, BRINGING CAPACITY TO 1.3 BILLION GALLONS, WHERE IT REMAINS TODAY
- * 1930 - NEW BRITAIN POPULATION GREW TO 68,124
- * 1938 - CONSTRUCTION BEGAN ON NEW BRITAIN'S FIRST WATER FILTRATION PLANT USING RAPID SAND FILTRATION (MORSE DESIGN); SECOND PLANT IN THE U.S. TO USE THIS DESIGN
- * 1950 - NEW BRITAIN BECAME THE FIRST CITY IN NEW ENGLAND TO ADD FLUORIDE TO ITS FILTERED WATER



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HISTORY OF THE WATER DEPARTMENT

- * 1960 - NEW BRITAIN POPULATION GREW TO 82,201
(City's estimated population peaked in the mid-1960's at approx. 95,000; 73,000 today)
- * 1961 - ADDITIONAL FILTRATION PLANT, THE B PLANT, PUT INTO OPERATION, BRINGING TOTAL WATER FILTRATION CAPACITY TO 25 MGD
- * 1964 - 52% OF WATER CONSUMPTION WAS USED BY INDUSTRIAL CUSTOMERS
- * 1965 - RECORD-HIGH USAGE FOR A SINGLE DAY: 21 MILLION GAL. ON JULY 14th
- * 1967 - WASEL RESERVOIR COMPLETED, ADDING 900 MILLION GAL. WATER STORAGE TO THE NEW BRITAIN SYSTEM.
- * 1971 - 35% OF WATER CONSUMPTION WAS USED BY INDUSTRIAL CUSTOMERS
(TODAY INDUSTRIAL USE IS UNDER 15%)
- * 1990 - NB WATER SYSTEM INCL. 1,973 FIRE HYDRANTS AND 16,920 WATER METERS IN SERVICE, WITH 207 MILES OF DISTRIBUTION & TRANSMISSION MAINS.
- * 2004 - NEW \$60M WATER FILTRATION PLANT COMPLETED & PLACED IN SERVICE



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HISTORY OF THE WATER DEPARTMENT

INTERESTING FACTS

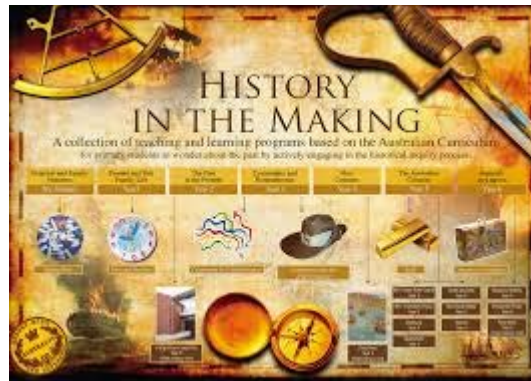


- * THE WASSEL RESERVOIR IS NAMED FOR NEW BRITAIN NATIVE DAVID WASSEL, A SUBMARINER IN THE U.S. NAVY WHO WAS LOST IN THE ACCIDENTAL SINKING OF THE USS THRESHER OFF THE COAST OF MASSACHUSETTS ON APRIL 10, 1963
- * THE ORIGINAL NAME OF THE RESERVOIR WAS PANTHER SWAMP



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STATUS OF OPERATIONS



History of New Britain Water continued....



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STATUS OF OPERATIONS

From 1856 to 2011 (155 years!)

New Britain Water was moving along just fine...

But then in 2012 was thrown
a pretty big kink...



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STATUS OF OPERATIONS



In 2012 the New Britain Water was merged
with the City's Public Works Department

&

New Britain Water now including managing the
City's Sanitary Sewer Systems

&

Storm Water Drainage System



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STATUS OF OPERATIONS

This merger added staff, but also added the following assets to Water:

- * 333 miles of pipe
- * 8,490 structures (manholes and catch basins)
- * Both sanitary and storm sewers require substantial maintenance
- * Have significant environmental permitting requirements
- * Require large scale capital investment



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STATUS OF OPERATIONS

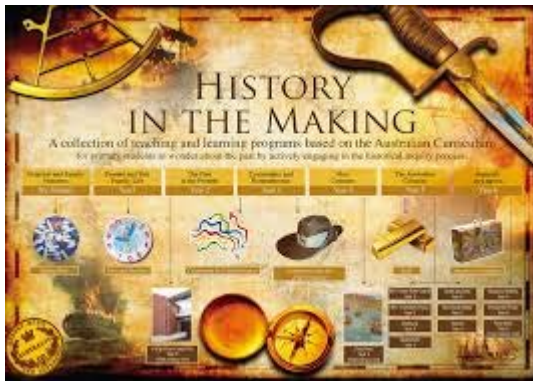
Merging the City's underground utility operations
has had a number of benefits for
both the City and NB Water
&
has been successful to date!



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STATUS OF OPERATIONS

History of New Britain Water continued....

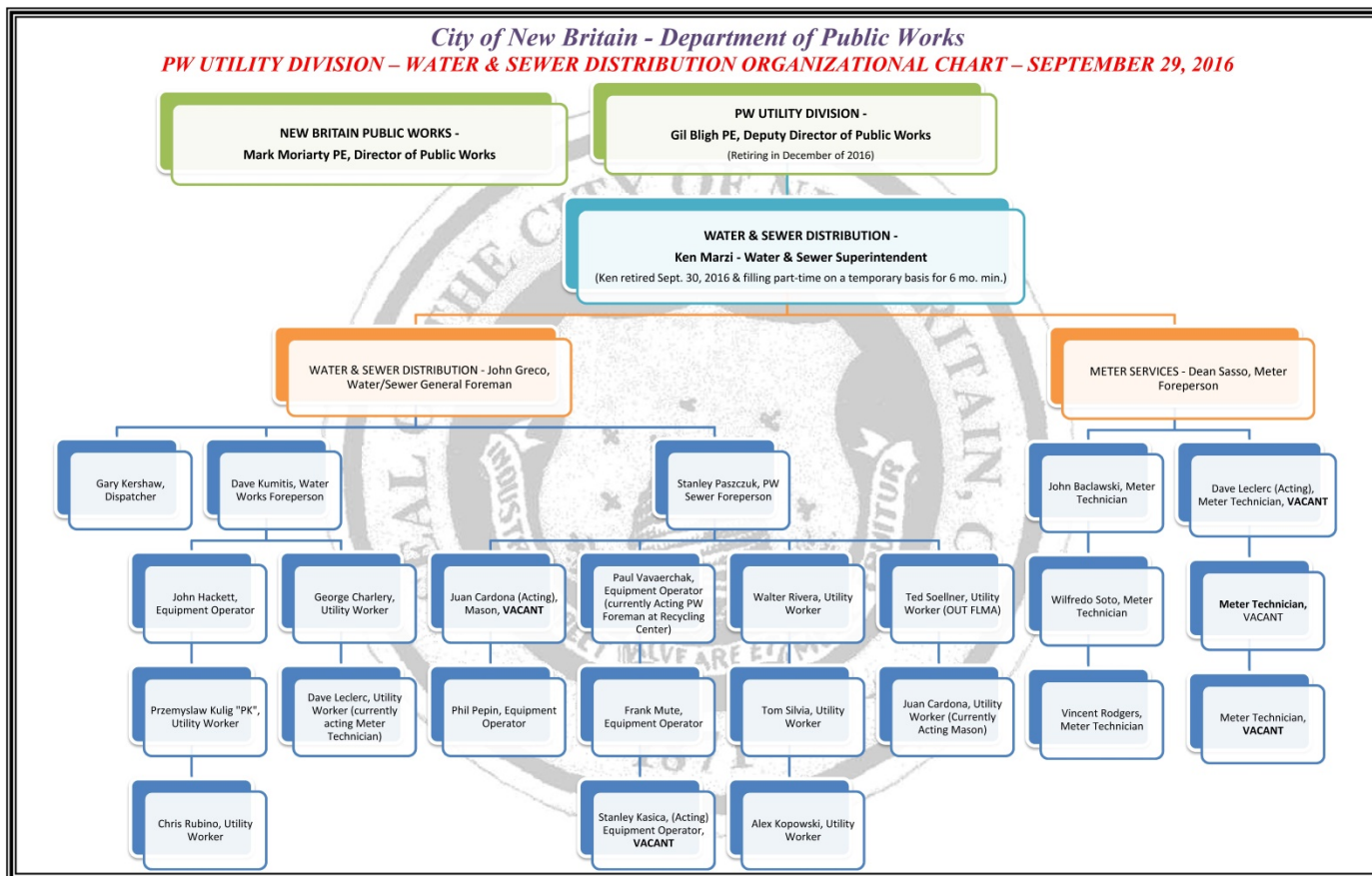


2016!



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STATUS OF OPERATIONS

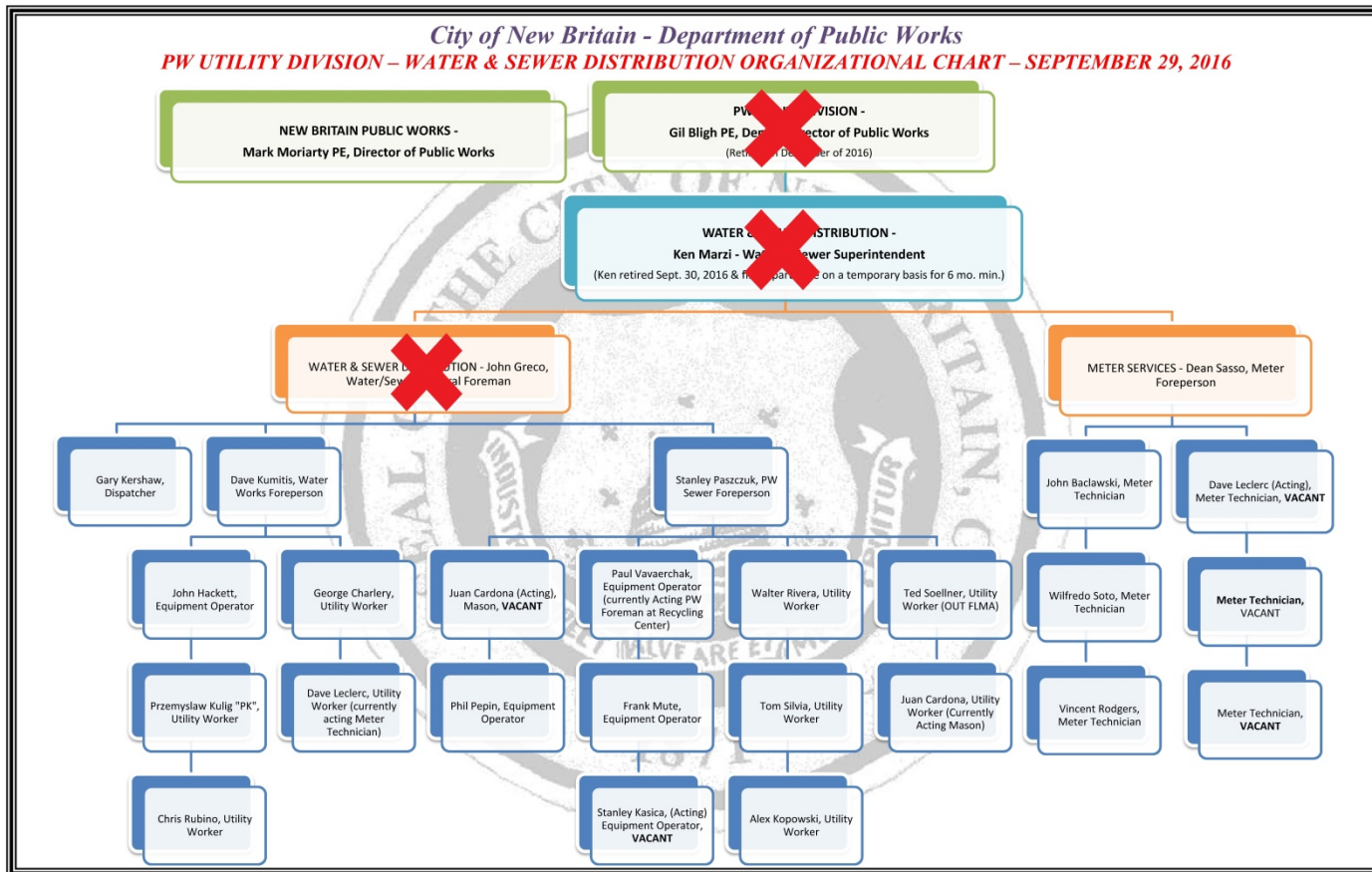


PUBLIC WORKS UTILITY DIVISION – DISTRIBUTION SYSTEM ORG. CHART 2016



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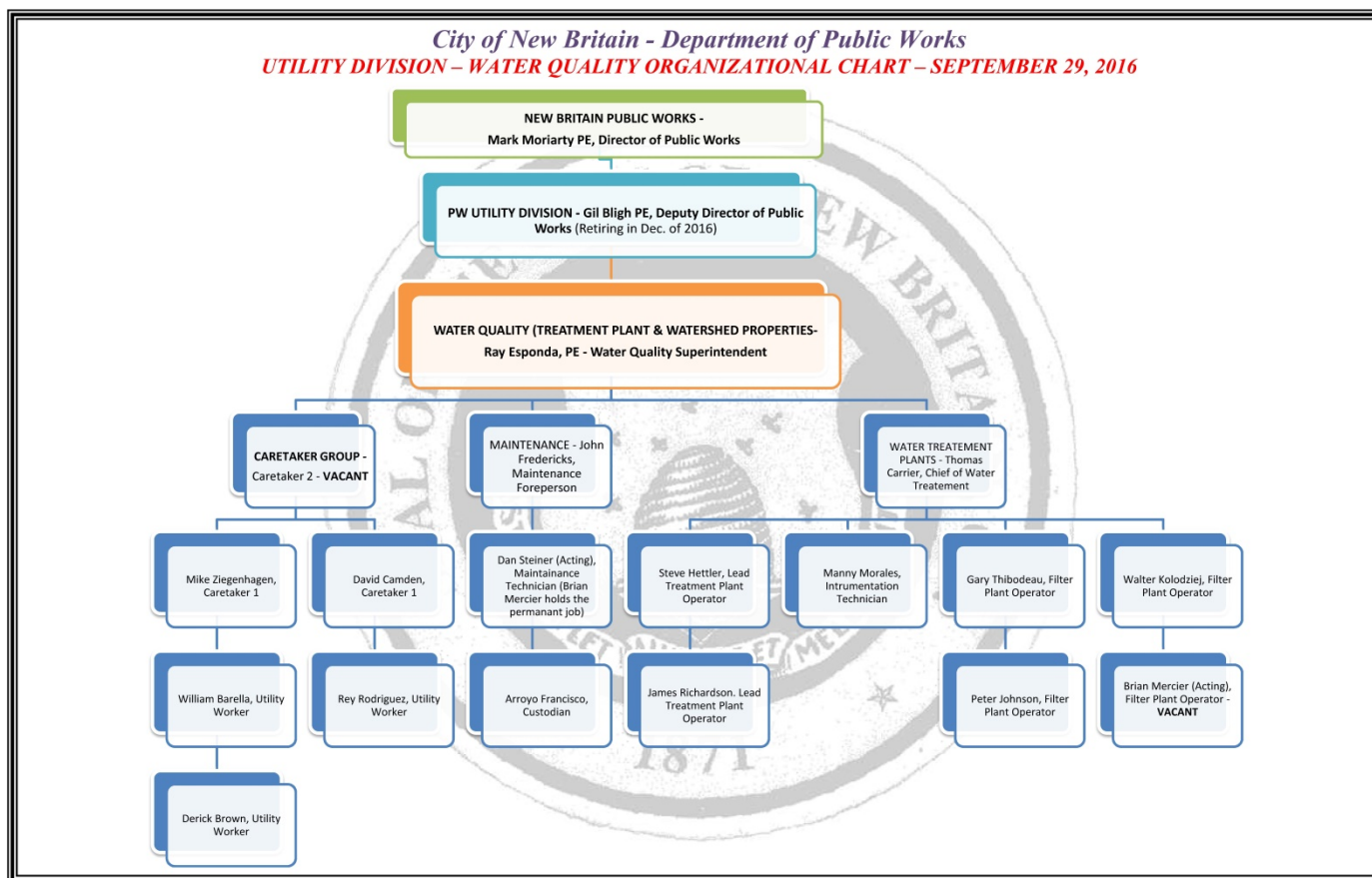
STATUS OF OPERATIONS



**PUBLIC WORKS UTILITY DIVISION – DISTRIBUTION SYSTEM ORG.
 CHART BEGINNING 2017**

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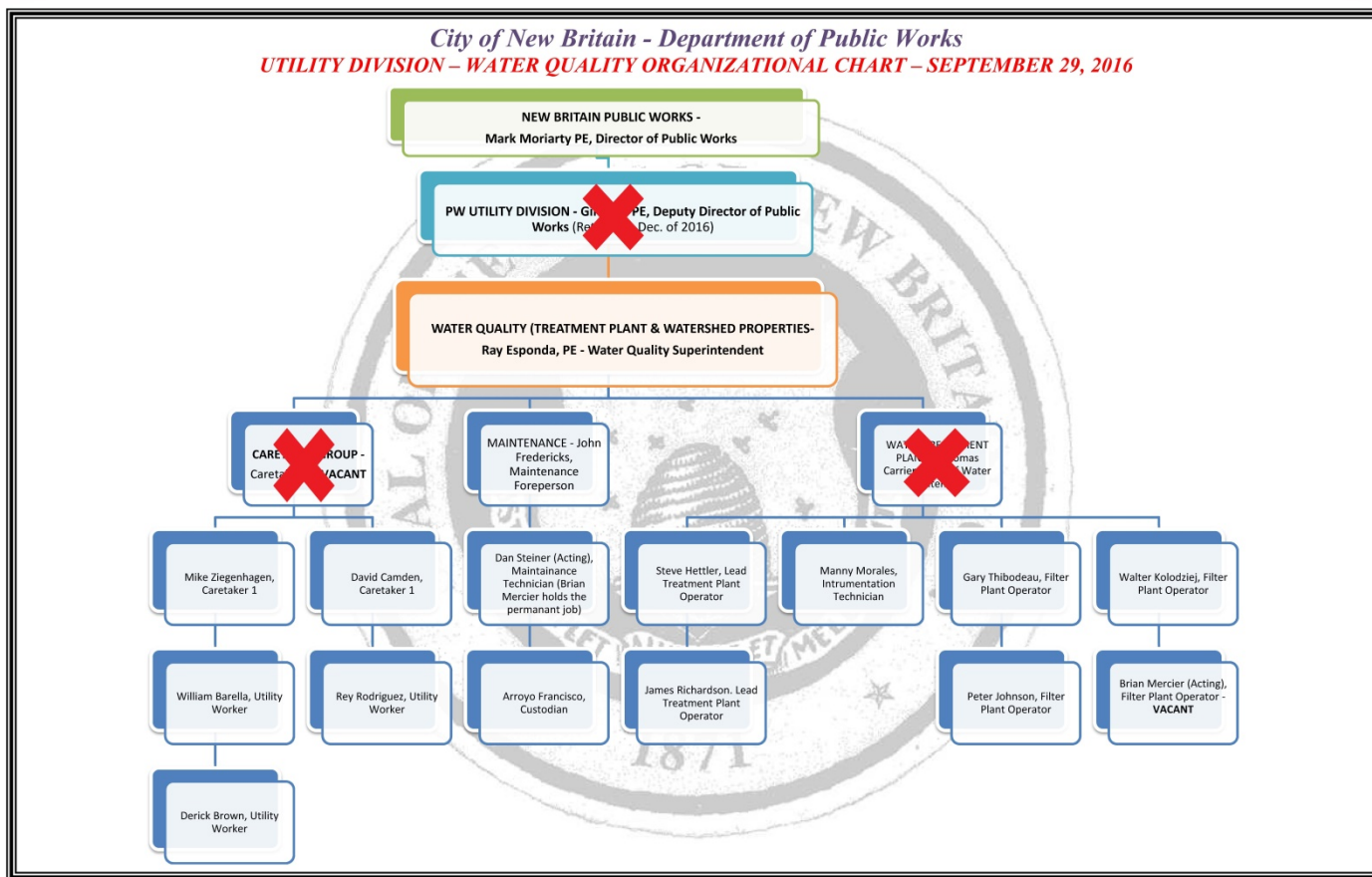
STATUS OF OPERATIONS



**PUBLIC WORKS UTILITY DIVISION – WATER QUALITY ORG.
CHART 2016**

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STATUS OF OPERATIONS



**PUBLIC WORKS UTILITY DIVISION – WATER QUALITY
 ORG. CHART - 2017**

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STATUS OF OPERATIONS

Within one year saw vacancies develop due to retirements in 5 out of 7 top positions including:

- * Water Director
- * Chief Treatment Plant Operator
- * Water/Sewer Superintendent
- * Chief Caretaker
- * Water/Sewer General Foreperson



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STATUS OF OPERATIONS



**At this same time on the water side of our operations
we were face with...**



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STATUS OF OPERATIONS



The most severe draught since 1960's.....

Shuttle Meadow Reservoir at 20%



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STATUS OF OPERATIONS



**And on the sanitary sewer side of our operations
we were face with...**



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STATUS OF OPERATIONS



2015 CMOM Consent Order from the US EPA for the Management and Maintenance of the Sewer System



U.S. Environmental Protection Agency

Region 1 – New England
5 Post Office Square – Suite 100
Boston, MA 02109-3912

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

DEC 23 2015

Mark Moriarty, Director
Department of Public Works
City of New Britain
27 West Main Street
New Britain, CT 06051

Re: In the Matter of the City of New Britain, Connecticut, Administrative Order on Consent,
Docket No. CWA-01-15-007

Dear Mr. Moriarty,

Enclosed is the fully executed copy of the Administrative Order on Consent ("Order") entered into between the U.S. Environmental Protection Agency and the City of New Britain, Connecticut.

Please let me know if you have any questions. My telephone number is (617) 918-1663 and my email address is melcher.john@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "John Melcher", is placed above the typed name.

John Melcher
Enforcement Officer
Office of Environmental Stewardship

cc (electronic only): Dennis Greci, Connecticut Department of Energy and Environmental
Protection ("CT DEEP")
Gil Bligh, City of New Britain
Joseph Skelly, City of New Britain



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STATUS OF OPERATIONS

Fast Forward to 2019 – New Water Leadership

- * Water Director – Raymond Esponda, PE (Deputy Director of Public Works)
- * Chief Treatment Plant Operator – Jay Richards
- * Water/Sewer Superintendent – Chris Polkowski
- * Chief Caretaker – David Camden
- * Water/Sewer General Foreperson – David Kunitis



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STATUS OF OPERATIONS

& They're Battle Tested



After Leading Us Through The 2016 Draught, the EPA CMOM
Consent Order & A Number Of Other Challenges



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STATUS OF OPERATIONS

Another challenge faced by NB Water has been an unbalanced work workforce in terms of age

Physicality of the field work can be taxing on a person's body

Unbalanced staff ages makes succession planning difficult



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STATUS OF OPERATIONS

This is an area we've made significant progress with over the past several years as vacancies have been filled



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WATER DISTRIBUTION SYSTEM



NB Water Staffing

- 48 Positions w/ 4 Vacancies

- * Water Distribution – 6 people
- * Water Treatment Plant- 7 people
- * Meter Service – 5 people
- * Sanitary and Storm Sewer – 8 people
- * Caretaker Group -6 people
- * Maintenance - 4 people

*Over 400 years of combined experience



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STATUS OF OPERATIONS

- ❖ Rest of this presentation you'll get a complete overview of our operations
- ❖ You'll also see that New Britain Water is making great progress on all fronts
- ❖ Not satisfied with maintaining the status quo
- ❖ Motivated staff showing leadership and committed to making things even better



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WATER UTILITY SYSTEM

Water Utility System (Ray Esponda, Deputy Director of Public Works)

- * Water Supply System
- * Water Quality & Treatment
- * Water Distribution System
- * Current Projects and Initiative
- * Water Rate Comparison



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WATER SUPPLY SYSTEM

City's Water Supply System (2 Branches: North & West)

- * Safe yield 17.6 MGD
- * Seven Reservoirs (owned)
- * 8 Class C High Hazard Dams
- * Rights of withdrawal to MDC's Nepaug Reservoir
- * Two Groundwater water supplies
- * 6,600 Acres of Watershed Properties in 6 towns
- * Miles of pipes feeding Shuttle Meadow and Wassel Reservoirs



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WATER SUPPLY SYSTEM

North Water Supply System

Shuttle Meadow Reservoir

- * 1.4 **billion** gal. capacity
- * 2.8 sq. mi. watershed area
- * 204.8 acres surface area
- * Class C High Hazard Dam

White Bridge Pond and pump station (impoundment)

- * 6 million gal. capacity
- * 11 Sq.Mi. watershed area
- * 1.3 acres surface area
- * Captures water from Polkville and Coppermine Brooks

White Bridge Wellfield SY=4.5MGD

Whigville Reservoir

- * 65 million gal. capacity
- * 3.96 sq. mi watershed area.
- * Class C High Hazard Dam

Nepaug Reservoir

(owned By MDC)

- * surface area 28.8 acres
- * City allowed 10 MGD peak withdraw
- * Average withdraw allowed 5 MGD



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WATER SUPPLY SYSTEM

West Water Supply System

Wassel Reservoir

- * 900 million gal. capacity
- * 0.38 sq. mi. watershed area
- * 102.4 acres surface area
- * Class C High Hazard Dam

Hart's ponds (upper and lower)

- * 57.7 million gal “upper” capacity
- * 1.56 sq. mi watershed area
- * 145.7 acres surface area
- * 166.8 million gal. “lower” capacity
- * 0.43 sq. mi. watershed area
- * 63.8 acres surface area
- * Class C High Hazard Dams

Wolcott Reservoir

- * 171 million gal. capacity
- * 2.5 sq. mi. watershed area
- * 51.2 acres surface area
- * Class C High Hazard Dam

Patton Brook Well

*(SY=1MGD)



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WATER QUALITY AND TREATMENT

City's Water Treatment Plant Process

- *Staff- 6 operators and 1 Instrument Tech
- *Ozone disinfection
- *PACl added at rapid mixers
- *Water flows through three plate settlers and five GAC/BAC filters
- *Final chemical addition of lime, carbon dioxide, fluoride, and sodium hypochlorite



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WATER QUALITY AND TREATMENT

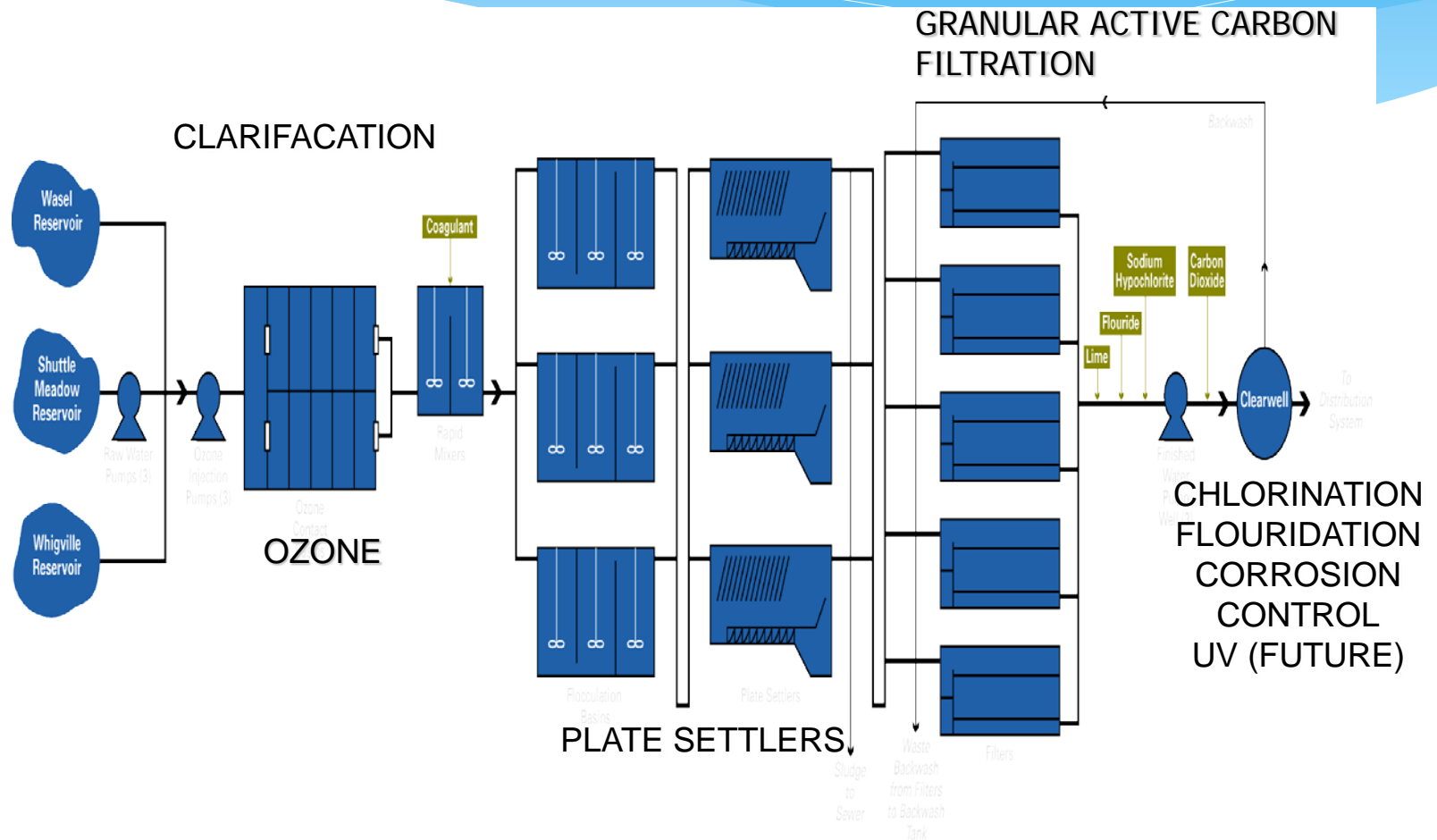
City's Water Treatment Plant Process

- *Raw water can be supplied directly from three sources directly
- *Ozone Disinfection
- *PACl added at rapid mixers
- *Water flows through three plate settlers and five GAC/BAC filters
- *Final chemical addition of lime, fluoride, and sodium hypochlorite



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WATER QUALITY AND TREATMENT



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WATER QUALITY AND TREATMENT

STEP 1 in the Treatment Process

Ozone Disinfection

1) Powerful Oxidant

- Kills bacteria , giardia, viruses and cryptosporidium to a lesser extent
- Removes metals
- Aids in turbidity removal
- Removes taste, odors, and color



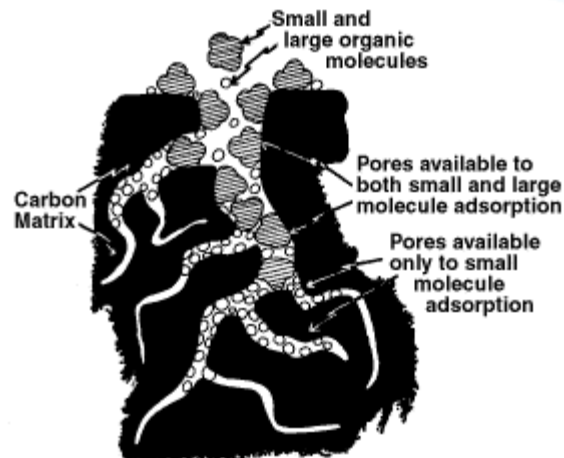
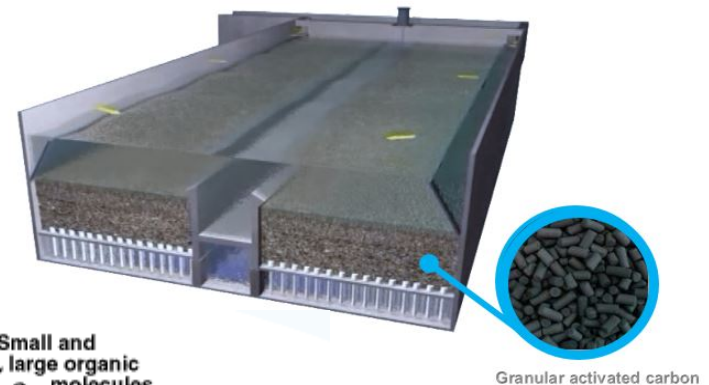
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WATER QUALITY AND TREATMENT

STEP 3 in the Treatment Process

GAC/BAC Filter Media

1. Removes DBP pre-cursors
2. Removes VOC's and SOC's
3. Removes taste and odor compounds



1 lb of activated carbon has 200 miles of pores and fissures, and offer the adsorbing surface area of 4 million ft².



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WATER QUALITY AND TREATMENT

Part of **STEP 4** in the Treatment Process

Sodium Hypochlorite Liquid

1. Provides residual disinfectant
2. Safer and easier to use than chlorine gas

Poly-aluminum Chloride (PACl)

1. Uses less alkalinity which reduces amount of lime
2. Works over greater pH range
3. Works well in cold temperatures
4. No need for adding organic polymers



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WATER QUALITY AND TREATMENT

Part of **STEP 4** in the Treatment Process

Lime

- ❖ pH adjustment
- ❖ Corrosion control
- ❖ Fluoride
- ❖ Required in CT for dental health for systems over 20,000 customers
- ❖ Potassium Permanganate
- ❖ Used Seasonally for Iron & manganese removal

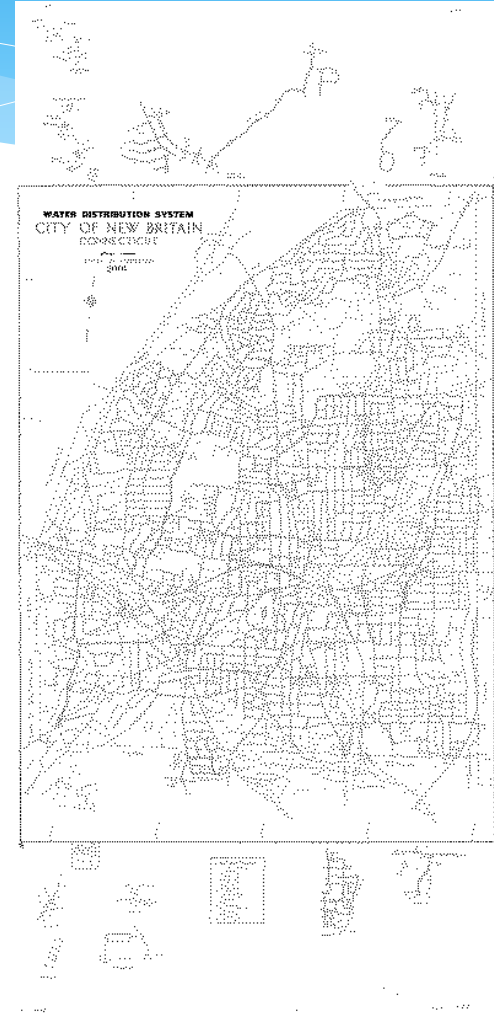


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WATER DISTRIBUTION SYSTEM

City's Water Distribution System

- 274 miles of Water Main
- 2,078 Fire Hydrants
- Pipe diameters – 30" transmission mains to 4" distribution mains
- Age of pipes vary with original pipes dating back to 1860's and new installations in the 2010's
- 3 Water Storage Tanks & 4 Pump Stations
- Servicing 85,000 people
- Approximately 18,000 service connections



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WATER DISTRIBUTION SYSTEM

City's Service Areas

- * Low Service Area Gravity Fed from 2 storage tanks
- * High Service fed by Elam Street Elevated Storage Tank and 3 Pump stations
- * Steele St High Service fed by 1 Pump Station

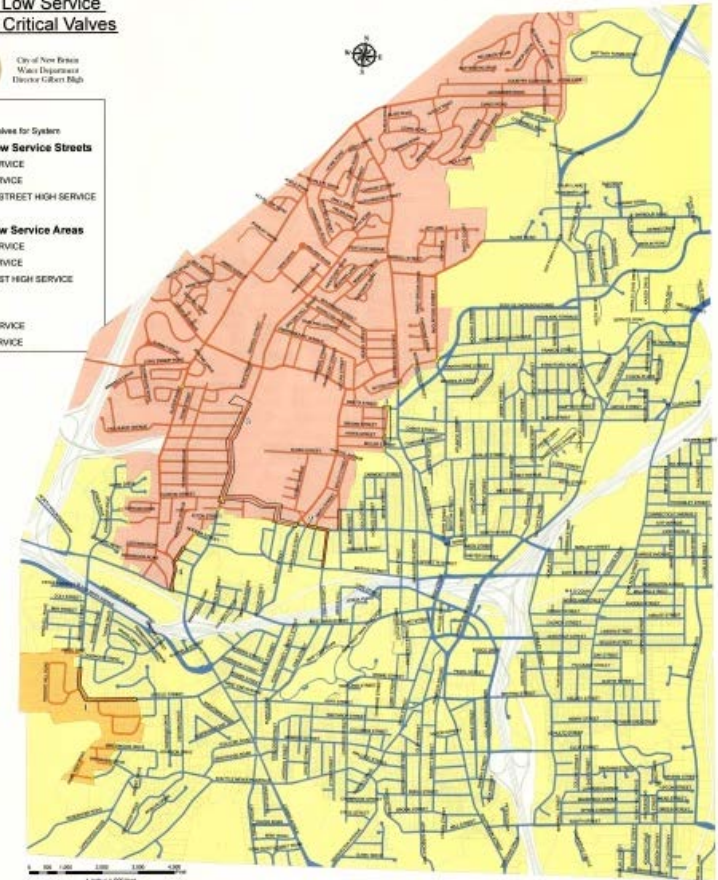
High/Low Pressure Valves define Service Areas

- * Open
- * Closed
- * Throttled
- * Back feeding during shutdowns

Water Mains

- * Distribution
- * Transmission

High and Low Service
Areas with Critical Valves



New Britain Water Summit Water Storage tanks

Plant Storage Tank / Clear well

- * Capacity 4.25 Million Gallons
- * Provides Contact Time for Proper Disinfection
- * Design is tank within tank to allow for maintenance



New Britain Water Summit Water Storage tanks

Elam Street Low Service Tank – Online In 2015

- * Capacity 2 Million Gallon
- * Provides Fire Protection
- * Monitors pH and Chlorine levels in system



New Britain Water Summit Water Storage tanks

Elam Street Elevated Tank

- * Capacity 1 million gallons
- * Provides pressure and water for areas of city at high elevations
- * Used as an antenna to improve radio communications throughout the city



New Britain Water Summit Pump Stations

Corbin Avenue Pump Station

- * Pumping capacity 4 million Gallons per day
- * Recent upgrade in 2015
- * Include new generator
- * Variable frequency drive
- * Automated Scada operation
- * All pumps replaced



New Britain Water Summit Pump Stations

Broad Street Pump Station

- * 2 constant speed in line pumps in under ground
- * Provides water to high service tank and high service distribution system
- * Redundant system provides for back up operation for Corbin Avenue



New Britain Water Summit Pump Stations

Elam Street Pump Station

- * 2 constant speed in pumps
- * Capacity 500 gallons per minute
- * Used to provides water to high service tank from low service tanks and high service distribution system Redundant system provides for back up operation



New Britain Water Summit Pump Stations

Steel Street Pump Station

- * Provides water and pressure to separate small high service area
- * 2 pumps constant operation providing pressure to service area.



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WATER DISTRIBUTION SYSTEM

Regular Work Activities

- * Water (Pipe) Crew
 - * Water Main Installation
 - * Fire Hydrant Replacement
 - * Water Service Cuts/Repairs
 - * Pressure Tests
 - * Disinfection of Water Mains
 - * Contractor Assistance
 - * Neighboring Water Company Assistance
 - * Emergency Response
 - * Annual Maintenance Programs



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WATER DISTRIBUTION SYSTEM

Water Distribution System

Annual Maintenance Programs

- * Hydrant Maintenance
 - * Flushing
 - * Greasing
 - * Painting
 - * Pumping
- * Valve Maintenance
 - * Exercising
 - * Cleaning
 - * Locating



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WATER DISTRIBUTION SYSTEM

Chestnut Street Water Main Break (Dec. 19th, 2018)

- * Filter plant lost approx. 1.0 Mil. of treated water within 45 min. period
- * New Britain Police Department left without water
- * Dialysis Center left without water & basement flooded
- * 8" distribution main break
 - * Off of 16" transmission main
- * 2-day repair with all in-house staff including road reconstruction
- * Cost of repair ~ \$25,000
- * Age of pipe 1975



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WATER DISTRIBUTION SYSTEM

Chestnut Street Water Main Break

(Dec. 19th, 2018)

- * 2-day repair with
- * all in-house staff including road reconstruction
- * Cost of repair ~ \$25,000



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AGING WATER UTILITY SYSTEM - PROJECTS

- * December 6th, 2017 – Southington CT
 - * 30" raw water transmission main break
 - * Equipment rentals
 - * Material loans (MDC)
 - * All in-house staff used
 - * 3 day repair
 - * Cost of repair ~ \$20,000
 - * 20 foot segment replaced
 - * Age of pipe 1892



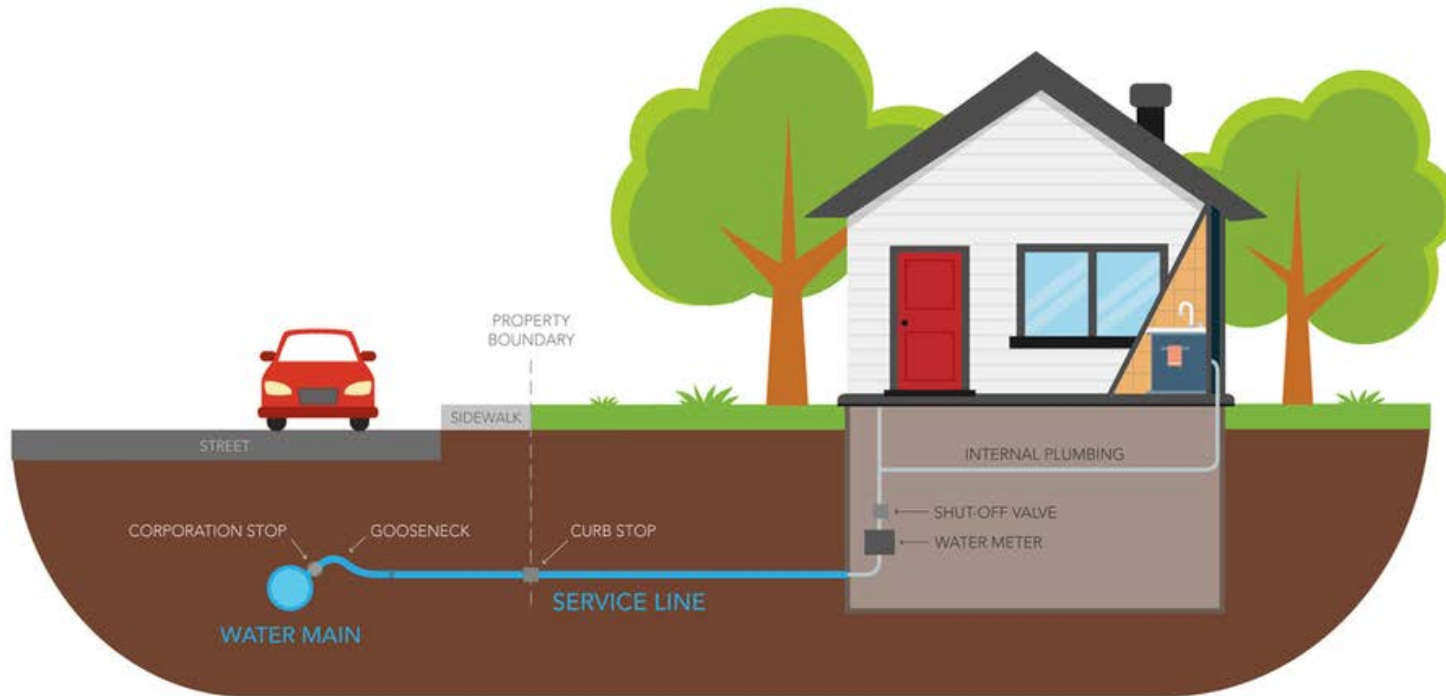
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WATER DISTRIBUTION SYSTEM



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WATER DISTRIBUTION SYSTEM



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WATER DISTRIBUTION SYSTEM

Meter Crew Regular Work Activities

- * Meter Replacement (Commercial & Residential)
- * Meter Reading Equipment Repairs
- * High Bill Investigations
- * Call Before You Dig (CBYD) Markouts
- * Water Line Repairs
- * Meter Testing
- * Water Main Taps
- * Meter Reads for Billing
- * Customer Service Interactive
- * Service Leak Investigations



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CURRENT PROJECT AND INITIATIVES

Water Distribution System Leak Detection Audit & Repairs

- * Implemented in 2018
- * Approx. 1.5 Mil. difference of water leaving treatment plant & water being billed
- * Identified 1.4 MGD of leaks in the distribution system
- * Examined entire distribution system for leaks
- * Types of leaks found:
 - * Service Leaks
 - * Water Main Breaks
 - * Valve Leaks
 - * Hydrant Leaks
- * Over 110 leaks found across the entire system
- * Repaired so far approximately 500,000 gallons per day
- * Currently in the process of addressing leaks in private service laterals



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FUTURE OF WATER POTABLE WATER SUPPLY

FUTURE PROJECTS

- * Back up potable drinking water wells
- * Plant automation
- * Pump station up grades
- * West Canal up grade
- * White Bridge Surface Supply up grade
- * Distribution System Pipe Replacement



- * Continued Investment in the City's Water Infrastructure Needed
- * Leak Audits will be commonplace
- * Cross training staff across all construction disciplines
- * Water is essential for human existence



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CURRENT PROJECT AND INITIATIVES

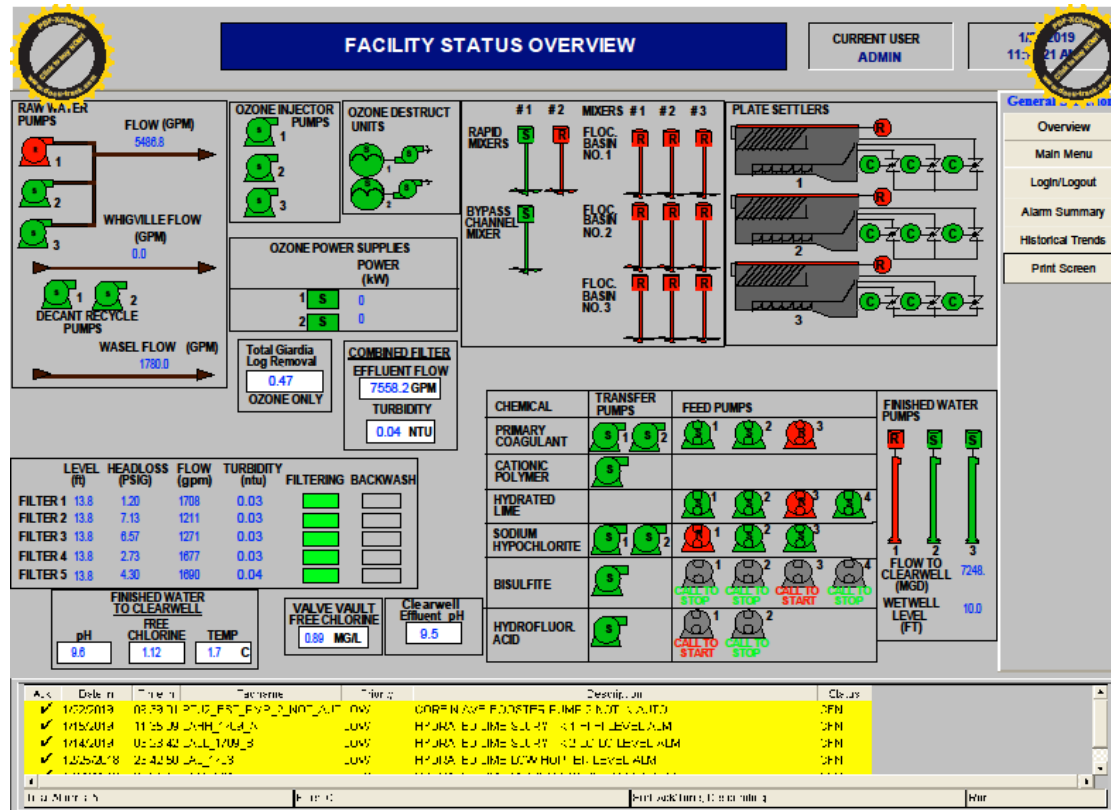


Dam Rehabilitation and Repairs



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OPERATION UPGRADES

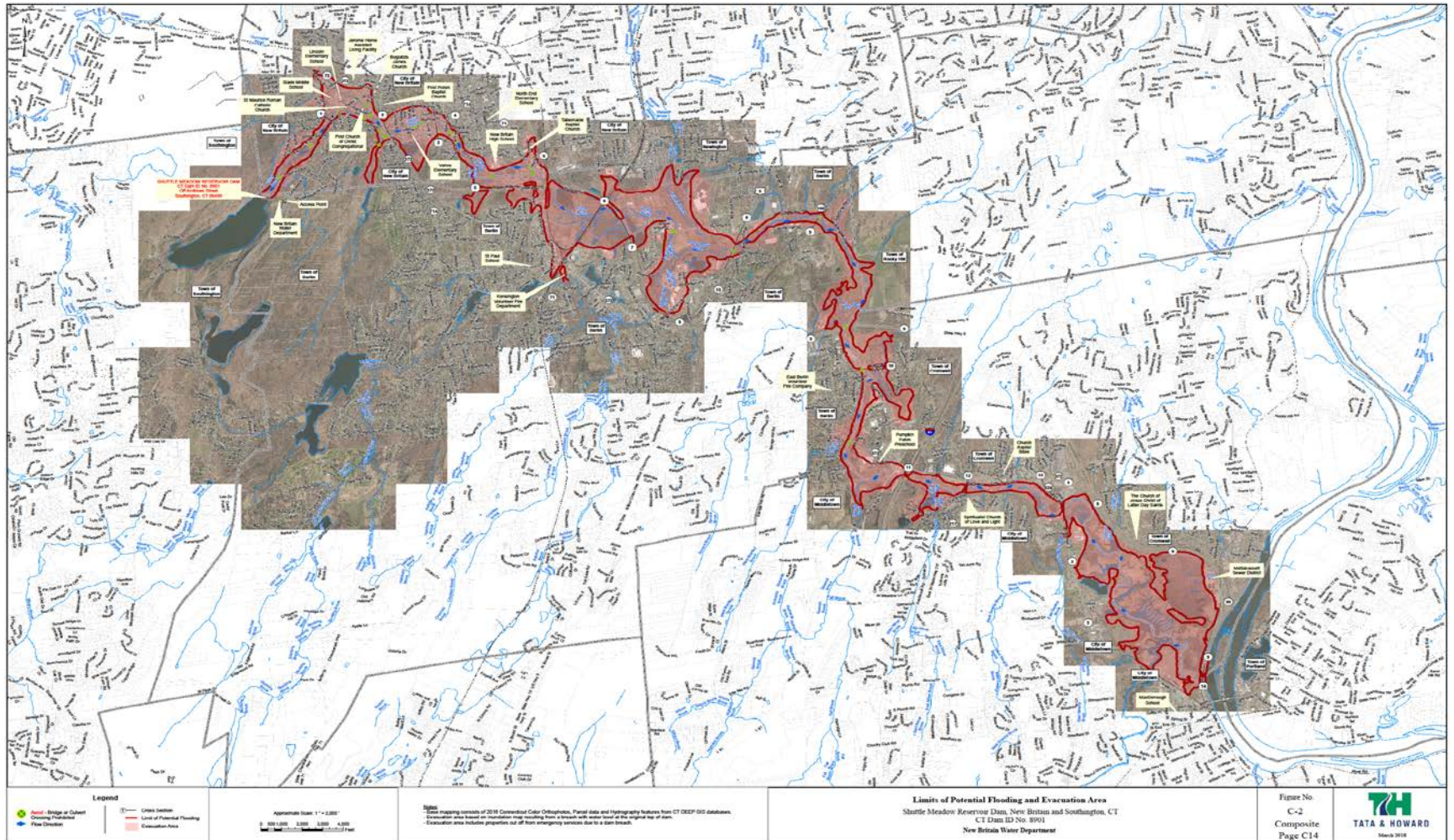


Supervisory Control and Data Acquisition (SCADA)

- * Future plans include full automation of plant for remote monitoring and operation, upgrade of plant security

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DAM INUNDATION STUDIES



2019 NEW BRITAIN WATER SUMMIT

BRISTOL WELLFIELD FUTURE WATER POTABLE WATER SUPPLY



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WATER MAIN EXTENSION

- * Eliminate dead end in the Water Main Distribution System
- * Looping system enhances water quality
 - * Project planned near Batterson Park & may use in-house staff



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WATER RATE COMPARISON

Typical 2018 Bi-annual (6-month) Residential Water Bill
(5/8" Meter & 2,000 cubic ft. of water usage)

Provider	consump chg per 100 cuft	2000 cuft chg	total
Valley Water	\$ 2.68	\$ 53.60	\$ 129.20
MDC member towns	\$ 3.50	\$ 70.00	\$ 159.88
MDC -Farmington	\$ 3.14	\$ 62.80	\$ 153.58
MDC - Glastonbury	\$ 3.14	\$ 62.80	\$ 161.14
MDC - South Windsor	\$ 3.14	\$ 62.80	\$ 154.36
MDC - non-member towns	\$ 3.14	\$ 62.80	\$ 152.68
Cromwell	\$ 6.58	\$ 131.60	\$ 210.80
Middletown	\$ 3.12	\$ 62.44	\$ 82.97
Southington	\$3.19/\$2.98	\$ 61.70	\$ 107.34
Bristol	\$ 2.50	\$ 50.00	\$ 102.00
Manchester	\$ 3.28	\$ 65.60	\$ 80.48
CT WATER Unionville Div includes Farmington	\$ 3.62	\$ 72.36	\$ 143.38
Meriden	\$ 4.50	\$ 90.00	\$ 113.14
New Britain	\$2.921	\$58.42	\$ 82.42

2019 NEW BRITAIN WATER SUMMIT

OVERVIEW

AGENDA

Session 2 – Sanitary and Storm Sewer Systems

(10:15 a.m. to 11:00 a.m.)

- * **Overview** — Mayor Erin Stewart
- * **Sanitary Sewer Collection System** – Mark Moriarty, Director of Public Works
 - * Sanitary Sewer Collection
 - * Sanitary Sewer Systems Related Programs
 - * General Maintenance
 - * Fats, Oils, and Grease (FOG) Program
 - * Infiltration and Inflow (I&I)
 - * US EPA Capacity, Management, Operations, and Maintenance (CMOM) Order
- * **Storm Water Sewer Collection System** — Brief Overview
- * **The Mattabassett District** — Michelle Ryan, District Engineer

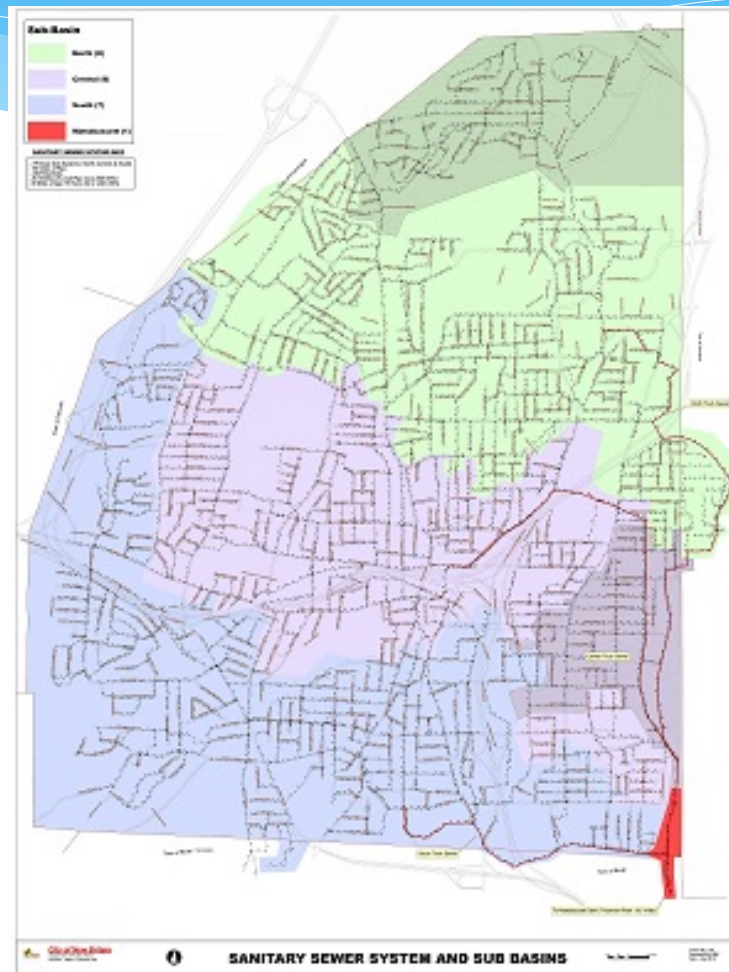


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SANITARY SEWER SYSTEM

Sanitary Sewer Collection System

- * Separated System (as opposed to combined which collects both storm and sanitary sewer)
 - * 179 Miles of Pipe
 - * 3,616 Sanitary Sewer Manholes
 - * 3 Sub-Systems & Trunk Lines (North, South, and Central)
 - * Gravity System (1 pump station – Nancy Road)
 - * 68 Miles (38%) of sewer piping 75 year or older
 - * Pipes types: Older: Vitrified Clay, Orangeburg (bitumenized fiber), Newer: PVC
 - * Sanitary Sewer Laterals private owned and maintained
 - * System includes a section of Newington (MDC), Kensington (KFD), and a few customers in Berlin and Farmington
- 9.5 Mile Trunk-line delivers Sewage from New Britain to Mattabassett District's treatment Plant in Cromwell



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SANITARY SEWER SYSTEM

Tree Root Damage

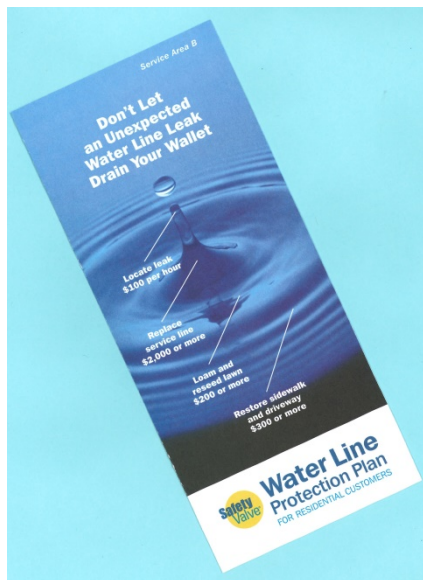


Typical Examples Sanitary Sewer System Tree Root Damage

2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

PURCHASE
SAFETY VALVE
WATER & SEWER
LATERAL
INSURANCE
REMINDER!!!!



(Brochures available here today or go to the City's Website)



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Fats, Oils, and Grease Program (FOG)

- * Fats, Oils and Grease (FOG) is a leading cause of sewer backups into basements. FOG occurs when cooking fats are poured down the drain and coat the inside of the pipes, eventually forming a blockage.



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Fats, Oils, and Grease Program (FOG)

- * Joint effort between Public Works & Health Departments
- * Combined inspection to ensure proper FOG prevention devices installed (grease traps)
- * Approx. 250 Food Establishments (mostly restaurants)
- * CT DEEP / EPA Req'd Program



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Sanitary Sewer - Regular Maintenance & Activities

- * Jet Rodding – Trouble Spots
- * Fats, Oils, and Grease Program (F.O.G.)
- * Tree Root Control
- * Structure Repairs and Adjustments
- * Illicit Discharge Detection and Elimination (MS4 Program)
- * Inflow and Infiltration (I&I)



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SANITARY SEWER SYSTEM

Sewer Maintenance - Jet Rodding & Related

- * Monthly, Quarterly, and Tri-Annual Jetting Location
- * Primary issues FOG, flat mains, sags in the mains, non-flushable products
- * Tree root issues – added attachment to jet rodder that cuts tree roots, roots treated with chemical to inhibit re-growth



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Illicit Discharge Detection and Elimination

- * On-going program
- * Program detects and eliminates illegal sanitary sewer lateral connections into the City's Storm Water System & other similar illicit connections
- * Environmental concern for polluting water bodies
- * Involves dry weather and wet weather testing of storm and sanitary lines, field investigation, smoke and dye testing, and pipe removal and relocation
- * CT DEEP MS4 Program Requirement



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I)

- * The Big Issue with older sanitary sewer collection systems
- * Involves “**already clean water**” getting into the sanitary sewer system, and getting routed to a sewage treatment plant to get treated “cleaned”
- * Problematic environmentally because Sewage Treatment Plants only have limited capacity to treat sewage flows & when that capacity is exceeded untreated, or only partially sewage, get discharged into water bodies
- * Problematic fiscally for NB because we’re billed based on sewage flows sent to the Mattabassett District’s Sewer Treatment Plant in Cromwell
- * About ½ of the sewage NB sends to the Mattabassett District treatment Plant is from I&I = **about 6 MGD on average**
- * The City is under a consent order from the US EPA to reduce our I&I flows



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I)



Sewer Cover Coming off due Excessive I&I



Sewer Main Infiltration



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SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I)

Infiltration

- * Bigger issue, **Estimated at 5 MGD** for NB an average day
- * Groundwater seeps into cracks and joints in the sewer lines.
- * Water enters via holes caused by tree root penetration.
- * Water enters via manhole covers that have holes or gaps due to a poor fit.
- * Water is forced from the storm to sanitary lines when both are in the same trench, without proper separation.
- * Infiltration increases during rain storms & periods of high ground water



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SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I)

Inflow

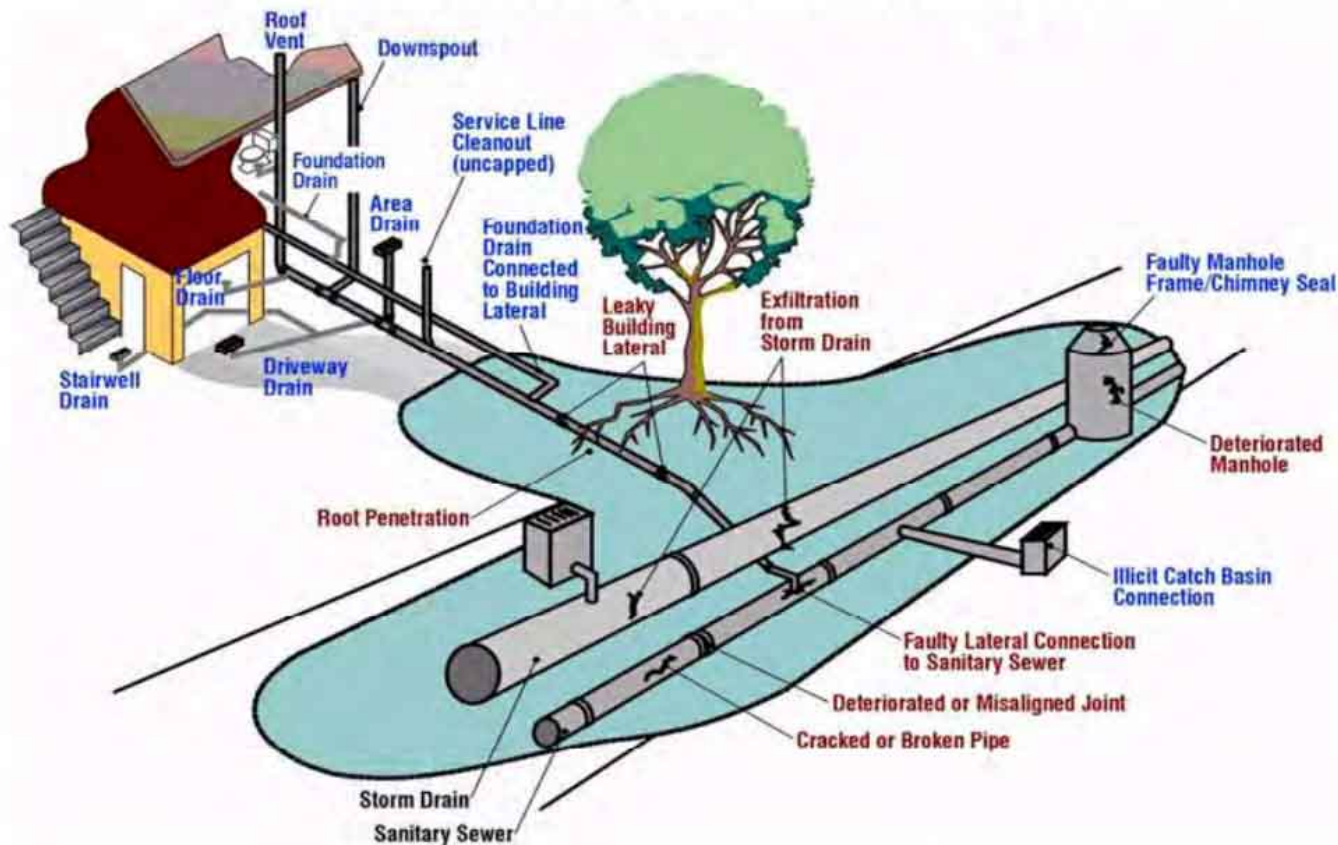
- * Lesser Issue but still significant, Estimated at 1.0 MGD for NB an average day
- * Inflow is when a storm drain is improperly or illegally connected directly into a sewer line.
- * Inflow sources include: sump pumps, downspouts, and drains for roofs, foundations, window wells, basement stairs, and driveways.



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow and Infiltration



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I)

PEAK FLOW - Environmental Concern

- * 2018 NB Peak Flow – 45.8 MGD

Mattabassett District Treatment Plant

- * Primary Treatment Flow (*removes solids, greases, and oils*) – 110 MGD
- * Secondary Treatment (*biological treatment*) – 55 MGD

AVERAGE DAILY FLOW- Financial Concern

- * 2018 Average Daily Flow – 12.24 MGD & 62.7% Total Matt. District Flow
- * 2019 New Britain Mattabassett District Cost - \$6,123,989 (55% of City's Sewer Budget)



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I) – Flow Metering

- * Performed to determine most problematic areas in the system
- * Needed to help determine where you get the most bang for your buck



Sanitary Sewer Manhole Flow Meter



Sewer Main Flow Meter



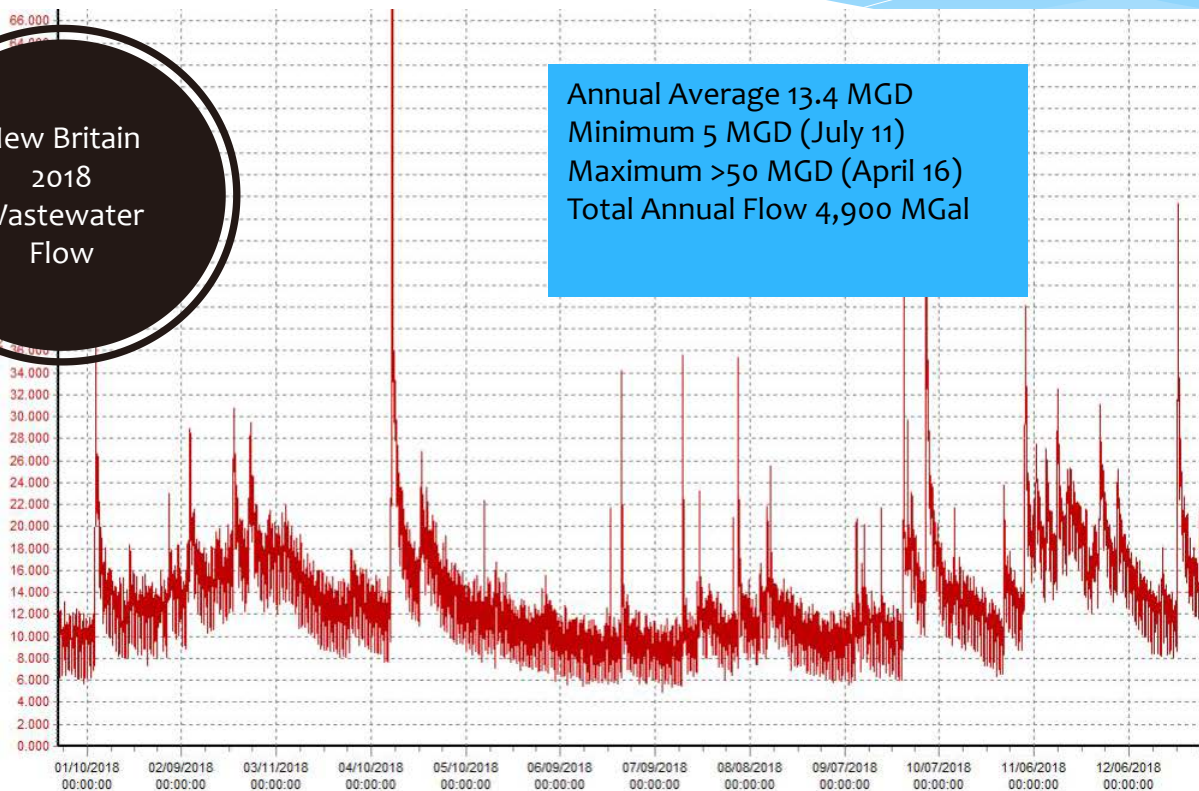
2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I) – Sewer Flows

New Britain
2018
Wastewater
Flow

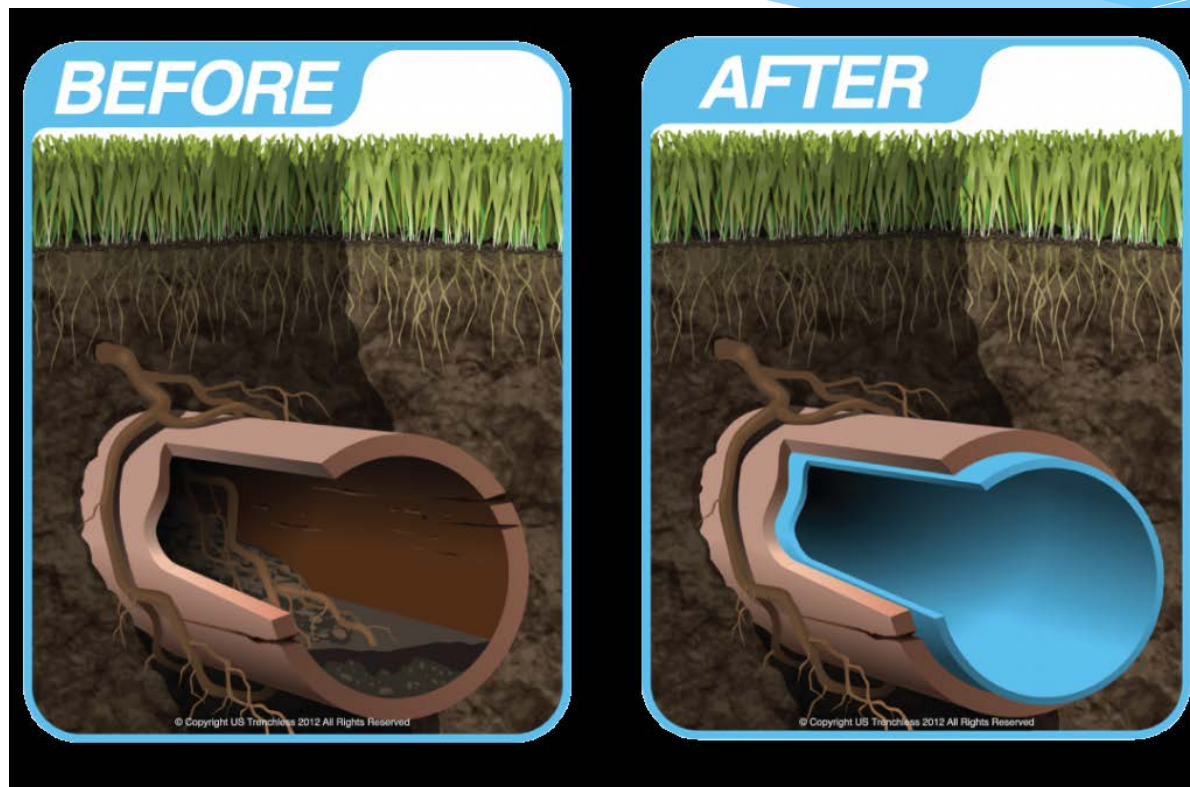
Annual Average 13.4 MGD
Minimum 5 MGD (July 11)
Maximum >50 MGD (April 16)
Total Annual Flow 4,900 MGal



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I) Elimination



Sewer Lining Includes:

- * Sewer Mains
- * Sewer Manholes
- * Sewer Laterals

Sewer Lining – Primary Method of Eliminating I&I



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I) - Elimination



** Added benefit to lining is that also serves as a structural repair



Sewer Lining – Cured-in Place Sewer Lining

2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

Inflow & Infiltration (I&I) - Elimination



Comprehensive Sewer Rehabilitation Process:

1. Sewer Main Lining
2. Sewer Lateral Lining
3. Sump Pump Reduction
4. Manhole Lining



2019 NEW BRITAIN WATER SUMMIT

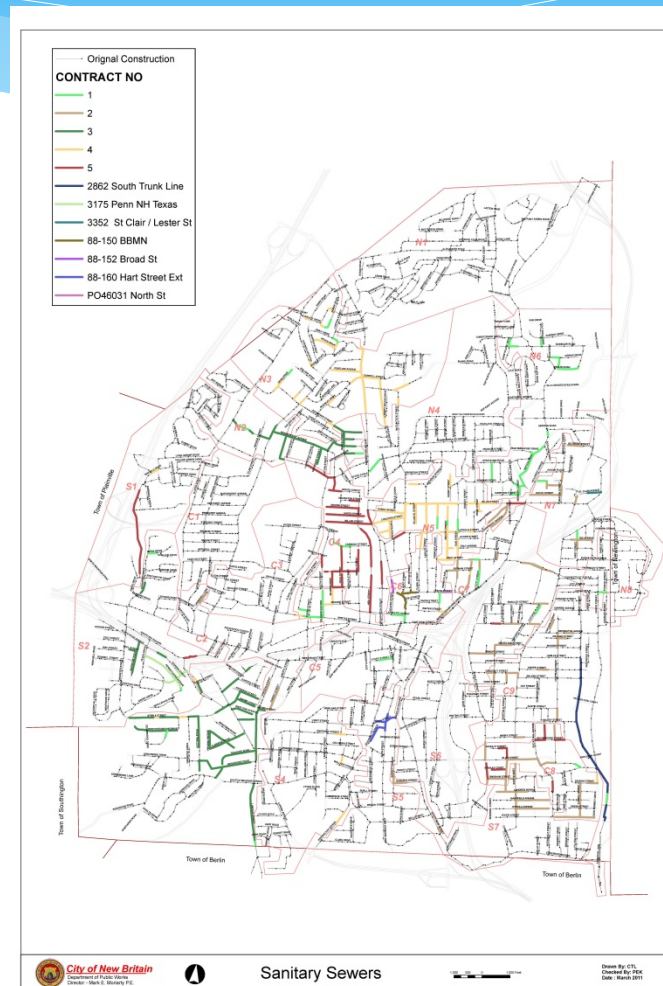
SANITARY SEWER SYSTEM

Sanitary Sewer Rehabilitation History

- * 7 specific projects between 2000 & 2012
- * 5 street projects with sewer system upgrades
- * 28.15 miles lined (16%)
- * Over a \$15 Mil. investment

2018 Sewer Rehabilitation Project

- * 1st Comprehensive Rehab. Project (includes service laterals)
- * Focus on Areas C9 and N1
- * Public Bid 3940, \$2.5 Mil. Construction
- * Green Mountain Pipeline Services Contractor



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

US EPA CMOM Order

- * CMOM stands for “Capacity, Management, Operations and Maintenance”
- * New Britain wasn’t targeted –
 - * US EPA investigated the Sanitary Sewer Systems for the primary Mattabassett District Communities (New Britain, Berlin, Cromwell and Middletown)
 - * Investigations were related to the federal funding the Mattabassett District received for the recent upgrades to the treatment plant (approx. \$100 Mil)
 - * CMOM Compliance Orders issued for all four communities
 - * Biggest impact is the specific I&I reductions targets established
 - * Will require a \$20 Mil. investment in the City’s Sanitary Sewer System over the next 10 years
 - * City required to file annual report to the US EPA



2019 NEW BRITAIN WATER SUMMIT

WATER RATE COMPARISON

FY-19 Sewer Rates Comparison

Community	Sewer Rate per Hundred Cubic Feet (\$/hcf)
Manchester	\$5.11 / HCF
Meriden	\$4.69 / HCF
MDC Communities (Hartford, East Hartford, Newington, Wethersfield, Rocky Hill, Bloomfield, Windsor, West Hartford)	\$4.64 / HCF (mostly paid "Ad Valorem as part of their property taxes)
Berlin	\$5.72 / HCF
New Britain	\$4.30 / HCF



2019 NEW BRITAIN WATER SUMMIT

SANITARY SEWER SYSTEM

The Sanitary Sewer System – Moving Forward

- * Our aging sanitary system will continue to require a lot maintenance & investment to sustain
- * Taking steps to achieve compliance US EPA CMOM Order
- * Aggressive Comprehensive Sewer Rehabilitation Process planned that involves:
 1. Sewer Main Lining
 2. Sewer Lateral Lining
 3. Sump Pump Reduction
 4. Manhole Lining
- * Trying to achieve EPA Compliance without overly burdening the City's residents and businesses with sewer rate increases

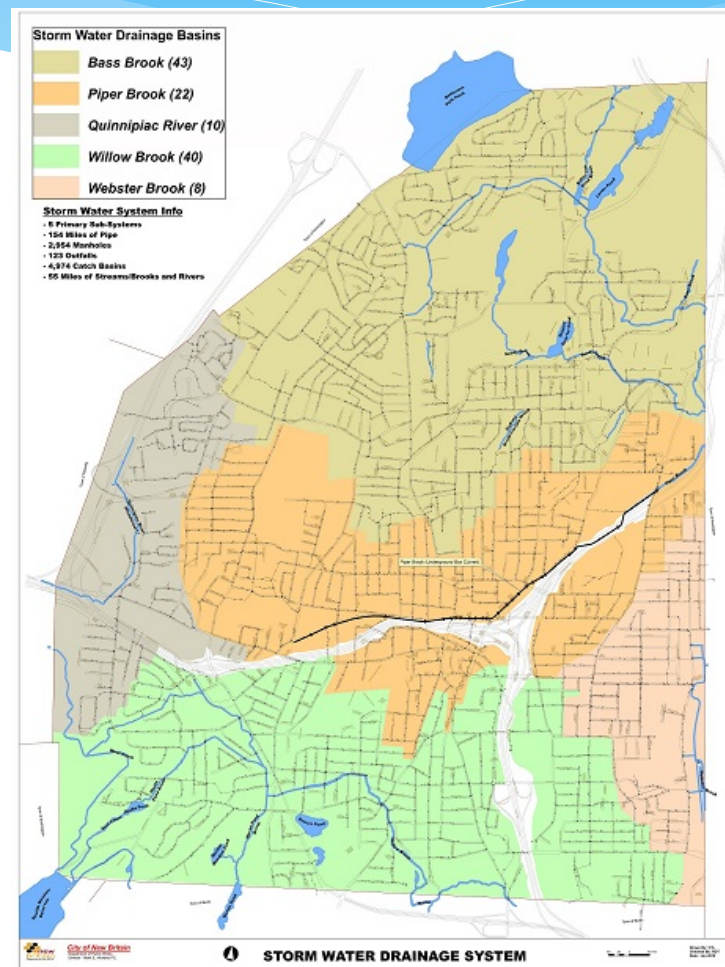


2019 NEW BRITAIN WATER SUMMIT

STORM WATER COLLECTION SYSTEM

Storm Water Drainage Collection System

- * 5 Sub-basins:
 - Bass Brook
 - Piper Brook
 - Quinnipiac River
 - Willow Brook
 - Webster Brook
- * 123 Systems & Outfalls
- * 154 Miles of Pipe
- * 2,954 Storm Sewer Manholes
- * 4,974 Catch Basins
- * 55 Miles of Streams & Brooks



2019 NEW BRITAIN WATER SUMMIT

STORM WATER COLLECTION SYSTEM

Storm Sewer Regular Maintenance & Activities

- * Catch Basin Cleaning Program
 - * Approx. 100 Priority Catch Basins in Areas prone to Flooding (clear grate)
 - * Catch Basin interior cleaning, Performed by Snow Route, Completed approx. 350 in 2018
- * Structure Repairs, Adjustments, and Replacement
- * Annual Paving Program Related Structure Work
- * Tree Root Related Cutting & Cutting
- * Right-of-Way Maintenance
- * CT DEEP MS4 Permit Compliance
 - Illicit Discharge Detection and Elimination
 - Dry weather and Wet weather storm runoff sampling
 - Stream & Brook maintenance (flooding related)



2019 NEW BRITAIN WATER SUMMIT

STORM WATER COLLECTION SYSTEM



City Mason Installing New Catch Basin Top



PW Utility Worker Clearing Blocked Storm Drain During Flooding

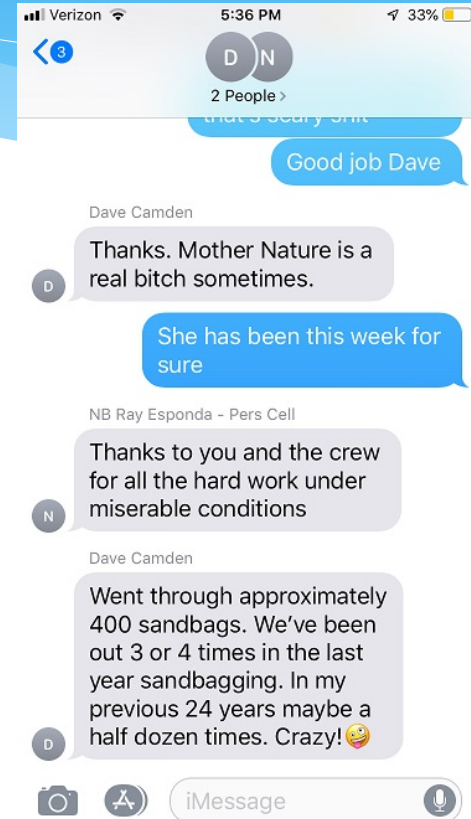


2019 NEW BRITAIN WATER SUMMIT

STORM WATER COLLECTION SYSTEM



Sand Bagging on the West Canal that feeds Shuttle Meadow Reservoir (January 24, 2019)



Flooding Frequency Increasing
Sign of the Times

An aerial photograph of the Mattabassett District wastewater treatment plant. The plant features several large circular aeration tanks and rectangular clarifiers. It is situated near a highway and a river. The surrounding landscape includes bare trees, fields, and some residential areas.

THE MATTABASSETT DISTRICT

Arthur Simonian, P.E., Executive Director
Michelle Ryan, P.E., District Engineer

WASTEWATER TREATMENT

**1968 PRIMARY TREATMENT &
MULTI HEARTH INCINERATOR**

**1989 SECONDARY TREATMENT &
FLUIDIZED BED INCINERATOR
(\$30 MIL)**

**2012 NITROGEN UPGRADE AND
INCLUSION OF CITY OF
MIDDLETOWN (\$110 MIL)**



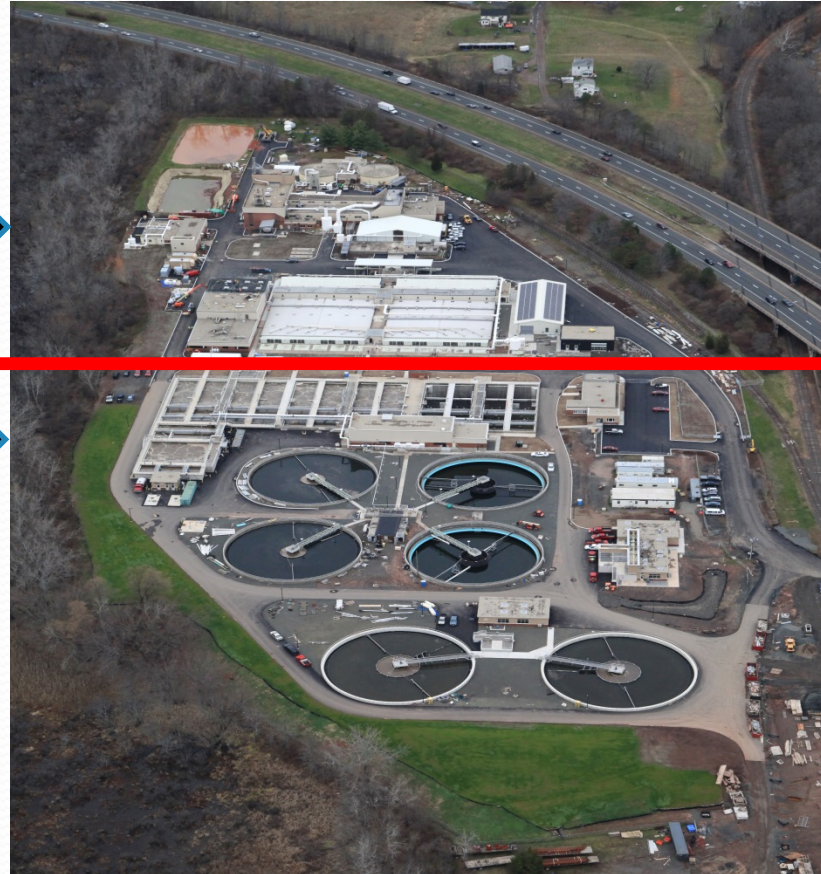
DISTRICT MEMBER & CONTRACTURAL TOWNS

- NEW BRITAIN,
- BERLIN,
- MIDDLETOWN,
- CROMWELL,
- portion of MDC & FARMINGTON
(CONTRACTURAL)



TREATMENT DESIGN

- PRIMARY TREATMENT 35 MGD AVE, **110 MGD** PEAK FLOW
- SECONDARY TREATMENT 55 MGD PEAK FLOW
- WET WEATHER TREATMENT **110 MGD** PEAK FLOW



THE MATTABASSETT DISTRICT

NEW BRITAIN FLOWS

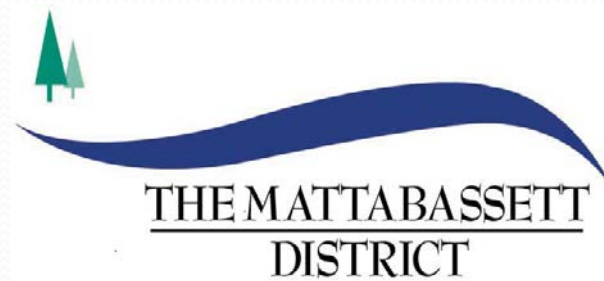
- ACCOUNTS FOR APPROX 62% OF COMMUNITY FLOWS
- RESERVE CAPACITY 46 MGD (TOTAL PEAK FLOW)
WITH 22.5 MGD (SECONDARY TREATMENT)

Resulting in.....

- WET WEATHER SECONDARY EXCEEDANCE
(INFILTRATION AND INFLOW)

DISTRICT BUDGET- NEW BRITAIN'S CONTRIBUTION

- **MAKES UP 40% OF DISTRICT'S BUDGET**
- **MAKES UP 51 % OF ALL ASSESSMENTS
COLLECTED FROM THE MEMBER TOWNS
(\$ 6.1 mil assessment due July 1, 2019)**



Why is Wastewater Treatment Important?

Importance of Clean Water

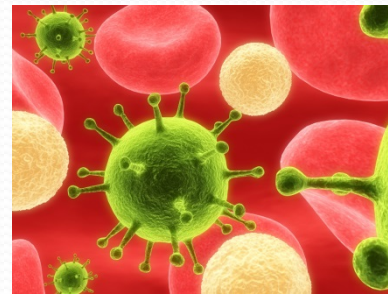
- 70% of Earth's surface is covered by water
- Less than 1% of world's total water supply is usable
- Clean Water is important for human use :
 - Public Health
 - Environment



What is being done to get clean water

Significant advancement in 20th century in Wastewater Treatment resulting in reduction in pollution to our environment:

- Significant decline in water related death and illness
- The United States saw the virtual elimination of waterborne diseases such as typhoid, cholera, and hepatitis A.





- Wastewater Treatment provides our communities with clean waters for rivers and beaches for recreational activity and for fish and animals

HOWEVER.....

- In Connecticut and many other states across the country, these systems are in need of repair or in need of expansion/improvement due to community growth and increasing regulations.

TREATMENT

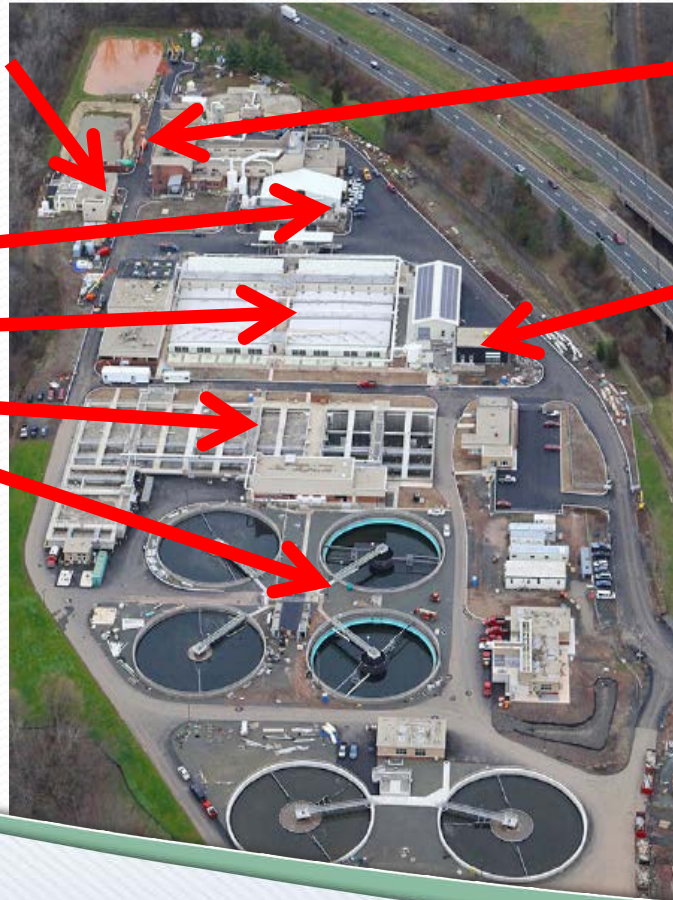
- INFLUENT SCREENING

- GRIT REMOVAL

- PRIMARY SETTLING

- ACTIVATED SLUDGE

- FINAL CLARIFICATION



- SOLIDS HANDLING &
- INCINERATION
- DISINFECTION

THE MATTABASSETT DISTRICT

2012 NITROGEN UPGRADE



THE MATTABASSETT
DISTRICT

THE MATTABASSETT DISTRICT

ADDITIONAL FACILITIES

- **ODOR CONTROL SYSTEMS**
- **UNDERGROUND DIESEL FUEL STORAGE TANKS**
- **EMERGENCY GENERATORS**
- **SEPTAGE AND SLUDGE HANDLING FACILITY**

FLUDIZED BED INCINERATOR

- MEETS LATEST EPA SSI EMISSIONS REGULATIONS
- AUTOMATED DEWATERING & SLUDGE FEED EQUIPMENT
- INCINERATE SLUDGE, SEPTAGE & GREASE
- INCINERATED ASH IS LANDFILLED



ENERGY EFFICIENCY



60 kW
Solar
Panels



Aeration
Blowers

Waste Heat
Recovery from
Fluidized Bed
Incinerator



THE MATTABASSETT DISTRICT

ENVIRONMENTAL COMPLIANCE



PLANT OPERATES IN COMPLIANCE WITH EPA & CT DEEP PERMITS :

- **WATER DISCHARGE PERMIT**
- **INCINERATOR OPERATING PERMIT**
- **AIR PERMIT**
- **STORMWATER PERMIT**
- **LANDFILL OPERATING PERMIT**
- **UNDERGROUND STORAGE TANK REGULATIONS**

THE MATTABASSETT DISTRICT

PLANT MAINTENANCE & OPERATIONS

- **ADMINISTRATION STAFF - 6**

PLANT MANAGEMENT, PLANNING, BILLING, ENVIRONMENTAL COMPLIANCE

- **OPERATIONS STAFF - 16**

PROCESS EQUIPMENT MONITORING AND OPERATIONS

- **MAINTENANCE STAFF - 9**

EQUIPMENT REPAIR

- **LABORATORY STAFF - 2**

SAMPLING AND REPORTING

WORKER SAFETY

- PLANT STAFF OPERATES IN COMPLIANCE WITH OSHA REQUIREMENTS AND
- EH&S PROGRAMS



THE MATTABASSETT DISTRICT

CONSTRUCTION



THE MATTABASSETT DISTRICT



THE MATTABASSETT DISTRICT

MATTABASSETT DISTRICT

*PROVIDING
CLEAN WATER
AND FOR OVER
50 YEARS*



THE MATTABASSETT DISTRICT