



City of Rochester, New Hampshire
PUBLIC WORKS DEPARTMENT
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MEMO PUBLIC WORKS & BUILDING COMMITTEE AGENDA

TO: PUBLIC WORKS AND BUILDINGS COMMITTEE
FROM: PETER C. NOURSE, PE
DIRECTOR OF CITY SERVICES
DATE: April 11, 2024
SUBJECT: Public Works & Buildings Committee Meeting
Date *Thursday April 18, 2024 6PM*

There will be a Public Works and Buildings Committee Meeting held on Thursday April 18, 2024, at 6PM. This meeting will be at City Hall in City Council Chambers

AGENDA

1. Roll Call
2. Approval of the March 21, 2024, Public Works, and Buildings Committee (PWC) Minutes
3. Public Input
4. Intersection Improvements to the Milton Road/Salmon Falls Road/ Amarosa Drive
Intersection: Overview of Background, need, design and project discussion.
5. Discussion on Roadway Acceptance of Residential Subdivisions, featuring Directors of Planning and Public Works Departments.
6. Other

Public Works and Buildings Committee
City Hall Council Chambers
Meeting Minutes
March 21, 2024, 6PM

MEMBERS PRESENT

Chairman - Councilor Hamann
Councilor Alexander de Geofroy
Councilor Kevin Sullivan
Councilor David Walker

MEMBERS ABSENT

Councilor Daniel Fitzpatrick

OTHERS PRESENT

Peter C. Nourse PE, Director of City Service
Lisa J. Clark, Deputy Director
Gretchen Young, Deputy of Technical
Services Dan Camara, Coordinator GIS &
Asset Mgmt.
Ian Rohrbacher, Water System Superintendent
Kathleen DeWright, Underwood Engineers
Tom Page, Underwood Engineers

MINUTES

Councilor de Geofroy called the Public Works and Building Committee to order at 6 PM

1. Roll Call

Ms. Clark took the roll call attendance. Councilor Sullivan, Councilor Walker and Councilor de Geofroy were all present. Councilor Hamann and Councilor Fitzpatrick were not present for roll call. Councilor Haman joined the meeting at 7:10.

2. Approval of the February 22, 2024, PWC Minutes

Councilor Walker made a motion to accept the minutes of February 22, 2024, meeting as presented. Councilor Sullivan seconded the motion. The motion passed unanimously.

3. Public Input

There was no public present for public input.

4. Rochester Drinking Water Story Map

Mr. Nourse informed the committee that they would be hearing a lot about Rochester drinking water this evening. He stated that there will be presentations on current efforts to ensure Rochester will continue to provide adequate quantities of some of the best quality drinking water in the State of New Hampshire. Mr. Nourse displayed a story map of the water system on the monitors. He stated that this story map was produced by the Geographic Information System (GIS) Staff at the Department of Public Works (DPW) and that is currently in draft form. He noted that once completed it will be posted on the City website for public viewing.

5. Round Pond Reservoir Augmentation: Project Overview and Update

Mr. Nourse noted that the project to raise the water level at Round Pond was started approximately 10 years ago, but records indicate that interest in raising the operational level goes back to the 1920s. Mr. Nourse stated that raising the operational level of this reservoir significantly increases its volume and the firm yield of our watershed. He stated it will also allow us to maintain the ecological health of the Berry's River. Mr. Nourse introduced Rick Davee of Wright Pierce Engineers who was present to give a presentation and overview of the Round Pond Reservoir Augmentation Project. Mr. Davee stated he worked with the City of Rochester on water projects for over twenty-five years. He presented the attached Power Point which includes information on Round Pond and the next agenda topic for the Salmon Fall Booster Station Project. Mr. Davee explained that in the recent five years City Staff and Wright Pierce have working to get the Round Pond and Berry River watershed permit process started and working on getting permission to flood the private properties. He noted that Rochester owns ninety percent of the surrounding property in the Berry's River Watershed, but there are seven privately owned properties that the City needs to seek permission from because it increases the water on those properties. Mr. Davee stated that all but one of the seven property owners have signed off and that the last property has verbally committed and will be meeting with the City soon. Mr. Davee noted that raising the pond by eight feet will yield another two million gallons per day and that this project will secure the water necessary to support the City's planned growth and needs through 2060. Mr. Nourse noted that the project has an estimated cost of eight million dollars, and he will start seeking funding in the Fiscal year 2025 and 2026 capital budgets to support this effort. Mr. Nourse informed the Committee that the City Staff had submitted for drinking water state revolving fund loans, but this project did not score high enough in their ranking criteria to obtain those funds. Mr. Nourse stated that he wants to keep the momentum up and still has a few years to go on this project.

6. Salmon Falls Booster Pump Station Upgrades: Project Overview

Mr. Nourse gave a little background on the booster pump station that was built in 1984 along with the Salmon Falls Road Water Tank. Mr. Nourse stated that this pump station needs to be rebuilt as it is over 40 years old, and it does not have the capacity needed now nor in the future to support growth. Mr. Nourse stated that the Salmon Falls Road corridor is seeing rapid growth, the Granite State Business Park has requested more flow, a new school is to be built on Salmon Falls Road, and new residential subdivisions are crowding into this corridor. Mr. Nourse reminded the Committee that last October it was discussed to shift the surplus of the City's American Rescue Plan Act (ARPA) funds from a completed water project to this water project. Mr. Nourse noted the City Council authorized that shift to offset the cost of this booster pump station. Mr. Nourse further stated that the ARPA funds that were transferred to this project are \$1.5 million dollars, and the overall project estimate is \$3.25 million. He explained that the committee that he would request the difference of \$1.775 million dollars in this upcoming FY2025 budget. Mr. Davee continued his PowerPoint presentation and discussed the Salmon Falls Booster Pump Station. His PowerPoint showed the history of the project, the purpose of the project, and the existing conditions of the pump station. He noted the project will consist of demolition of existing pump station, associated piping, valves, and hydrants. He explained that there would be a new prefabricated above ground booster pump station, 3 pumps, space

for future pump if needed, supporting electrical equipment, emergency generator, site improvements and it would incorporate the existing infrastructure as possible. He noted that the project will need temporary power and there will be no modifications to the old Salmon Falls Standpipe that is solely used for communications.

7. Surface Water Treatment Facility Hydraulic Analysis and Water Treatment Residuals Management: Project Overviews

Mr. Nourse stated that the Surface Water Treatment Facility was built in 1985. He noted that there has been some upgrades over the years to allow the City to comply with changing environmental regulations. Mr. Nourse stated the water treatment facility was designed to produce up to five- million gallons per day of treated drinking water. Mr. Nourse further noted that recently it has been determined that its output is significantly less than the designed five million gallons per day and certainly not what the City will require in the future. Tom Page and Keith Pratt of Underwood Engineers were present with a PowerPoint presentation (attached) to go over how the current facility operates and hydraulic limitations. They also discussed the existing and future water demands, the existing and target supply sources and existing and target treatment capacity of the treatment plant. Mr. Page stated that the surface water treatment plant treats using conventional sedimentation, filtration, and disinfection processes. He noted that the hydraulics study showed that the original design was five million gallons in 1986 when the treatment plant went on line, however compliance and other operational improvements have impacted hydraulics of the plant and have limited the actual output capability. He noted the reservoir intake screen project, the clear well baffling project, the filter upgrade project, the low lift pump station project, and the elimination of pre-chlorination prior to filters as projects that may have impacted the hydraulics and operations. Mr. Page stated that Underwood is working to determine the hydraulic restrictions and identify improvements needed to meet the target capacity. He stated that there are interim improvements that would get the plant to 3.4 million gallons without exceeding the current restricted points at Water Treatment Plant and there are long term improvements planned to meet the target of 5 million gallons per day. Mr. Nourse explained that the Council will see funding request for capital improvement funds to keep these initiatives moving towards completion.

8. Cocheco Drinking Water Well Upgrades for Manganese, Iron and PFAS: Project Overview and Update

Mr. Nourse gave an overview of this project noting that this has been discussed in the previous budgets and also at the Public Works and Buildings Committee in February of 2023. Mr. Nourse said that manganese is a natural occurring element and common in groundwater. Mr. Nourse noted he reported that in 2022 NHDES attempted to regulate manganese as a primary contaminant in treated drinking water at 0.3 milligram, with a public notice at required 0.1 milligram. Mr. Nourse stated that those regulations were not realized and currently it is classed as a secondary contaminant, or non-life threatening and has a secondary limit of 0.05 milligram per liter. He noted that the NHDES 2022 efforts failed, but Mr. Nourse stated that the regulators are likely attempt this again. Mr. Nourse explained that a reduction of manganese and iron would improve the water quality, especially in East Rochester. Mr. Nourse also stated that last April he reported that the EPA had proposed a National Primary Drinking Water Regulation to establish a legally enforceable maximum contaminant level for six PFAS compounds in drinking water. Mr.

Nourse stated that these new limits are a fraction of the current regulatory limits. He stated the six compounds are PFOS, PFOA and 4 Genx compounds. Mr. Nourse stated the well contains Manganese and PFAS at limits that are near those of possible regulation. Mr. Nourse stated the current costs to add treatment trains to the well to treat for manganese is about \$14 million and for PFAS it would be more. Mr. Nourse stated that through Drinking Water Trust Fund loans and grants and an American Rescue Plan Act (ARPA) grant the City has obtained about \$5.6 million towards this estimate. Mr. Nourse said since these new Manganese and PFAS regulations are not currently in effect, the City is using only the ARPA grant funds to advance the design of the upgrades. Mr. Nourse said he feels strongly that PFAS treatment will be a future requirement and perhaps Manganese. Mr. Nourse stated currently they are advancing design and when regulations are issued, he hopes to have other funding sources line up to fund the upgrades. Councilor de Geofroy asked a question on the previous hydraulic discussion. He asked when you remove the restrictions in the process, will you find other unanticipated restrictions in the system? Mr. Page of Underwood Engineers said it is possible, and they are doing some further investigations to identify all restrictions. Underwood Engineers presented a power point presentation (attached) to go over the purpose, history, existing conditions & deficiencies, conceptual improvement concepts. Mr. Pratt stated that they believe the path for previously discussed work is to complete Round Pond Reservoir Augmentation, advance surface water treatment plant interim improvements, the hydraulic improvements, the residuals project, and the advance treatment at Cocheco well, Iron/Manganese and PFAS. The long-term improvement recommendations are to plan for long-term improvements at surface water treatment plant and consider 3rd groundwater source if needed and cost effective. Councilor Sullivan asked about increasing rates on the wastewater treatment side and water supply side if this was incorporated in the discussion from a previous meeting. Mr. Nourse said the previous discussion was on wastewater rates only and it did not incorporate potential water rates. Councilor Hamann asked if they are PFAs testing now. Mr. Nourse stated they have been testing for years but are not required to treat right now. Councilor Walker asked where in the process are the contaminants found at the plant. Mr. Nourse said they have not pinpointed where in the treatment stream and noted that it could be from system components such as rubber tubing or plastic pump parts.

9. Eastern Avenue Sewer Pipe Rehabilitation Overview and Bid Results and Next Steps (Refer to January 19, 2024, Public Works Committee Minutes for background)

Mr. Nourse stated he hoped the committee was able to review the minutes or video from the 1/19/2023 Public Works and Buildings Committee. Mr. Nourse stated the Eastern Avenue sewer pipe was videoed and noted to have major structural problems. Mr. Nourse stated that this pipe had issues in 2018 when there was a major collapse near the Highland Street area. Mr. Nourse explained that this project is a major rehab of over a mile of deteriorated sewer main pipe on Eastern Avenue. Mr. Nourse noted it is a major trunk line of sewerage. Mr. Nourse stated the base bid scope includes rehabbing over a mile of deteriorated sewer main under Eastern Avenue. Mr. Nourse stated that as the project was being prepared for bid, drainage projects were added as alternates to address failing drainage pipes at three separate locations. He stated that this similar work is necessary to avoid failure and the cost of excavating collapsed drainage pipes. Mr. Nourse stated the

award is flexible and allows the City to choose to award just the base bid or any combination of base bid and alternates. Mr. Nourse noted that they have \$1,315,000 from the Sewer CIP appropriations for Eastern Ave. He then explained that there is \$97,995 available from the annual corrective drainage CIP account. Mr. Nourse stated there were 3 bidders and the apparent low bidder is National Watermain Cleaning Co. of Canton, MA. Mr. Nourse further stated they have a good reputation and are actually doing the Closed-Circuit Television (CCTV) work Rochester for the Sewer System Master Plan (SSMP). Mr. Nourse presented the committee with the bid tab and noted just sewer base bid total with planned contingency is \$1,309,566 and the available \$1,315,000 will be sufficient. He stated the two drainage bid alternates with contingency total \$240,372. Mr. Nourse explained that there is an available balance of \$97,995 in the General Fund CIP Corrective Drainage Account, leaving a deficit of \$142,377.00 for the necessary drainage work. These 3 drain culverts in bad shape and need to be addressed, he notes, one is below a roadway, one is outside of the pavement, and one is under a house. Mr. Nourse said the cost to excavate and replace would be more than twice the cost of relining. ***Councilor Hamann motioned to recommend that the full City Council approve a supplemental appropriation of \$150,000 to the DPW General fund CIP for Drainage Relining projects stipulated in Bid 24-27. Councilor Walker seconded the motion.***

Discussion: Councilor De Geofroy asked if the lining was not completed at this time would the ability to reline the pipe be ruled out. Mr. Nourse stated that the pipes would continue to deteriorate and the ability to reline would be lost. Councilor Sullivan asked how long the relined pipe might last. Mr. Nourse stated that the technology is new, and though it is still unknown, the anticipated time is one hundred years. Councilor Sullivan asked if the pavement would be disturbed. Mr. Nours stated the pavement would not be disturbed and that the cost savings are related to not needing to excavate and replace the pavement.

The motion passed unanimously by voice vote.

10. Other

Public Information Meeting-Portland Street Sidewalks

Mr. Nourse said on April 3, 2024, at 7:00 PM at The Public Works Department, 209 Chestnut Hill Road there will be a local concern meeting regarding the Portland Street Sidewalk Project. Mr. Nourse stated that this is a joint project with NH DOT that will add about 6,400 feet of brand-new sidewalk along Portland Street down Chamberlain Street to Salmon Falls Road. Mr. Nourse noted that all the abutters have been invited and he also said that the committee is welcome to attend, the ward Councilors, the Mayor, Deputy Mayor and City Manager have also been invited. Mr. Nourse said it is a local concern meeting where they will hear comments, equant people with the idea of the project, listen to comments and answer questions to the best of our ability.

Roundabout Color Schemes

Mr. Nourse stated that Rochester will be seeing more roundabouts, and he wants to get the committees input on the color of ride up of the orbit the middle of the roundabout it is an aesthetic question not a functional question. Mr. Nourse stated that some of them are concrete. Mr. Nourse stated that to make them colored you put an additive in the concrete. Councilor Sullivan asked if there was a cost difference for the colored. Mr. Nourse stated that Strafford Square was about \$12,000 more. The committee said the

gray does not look bad. Councilor Hamann said that the Strafford Square Roundabout will need to be repaved again and needs to be well marked once the paving is done.

Pavement Disturbance Moratorium Waiver Request

Mr. Nourse stated that a single-family home is going in at 148 Old Dover Road and they are requested to tie into City water. Mr. Nourse said that Old Dover Road was paved in 2023 so it was less than five years. Mr. Nourse stated per the ordinance a Moratorium waiver would need to be considered. Mr. Nourse stated that they put their permit in before the road was paved, they weren't told the road is going to be paved. They are trying to put the house on the market in April and due to the fact that they had put the permits in, the housing shortage and that they don't have to go far onto the pavement. Mr. Nourse would recommend the Moratorium Waiver. Mr. Nourse further noted that due to Chapter 223 surety is now required on excavation on Moratorium roads, so they will have to have surety. ***Councilor Walker made a motion to recommend to full Council to grant the pavement disturbance moratorium waiver request for 148 Old Dover Road. Councilor Hamann seconded the motion. The motion- passed unanimously by voice vote.***

Councilor Walker made a motion to adjourn the meeting. The motion was seconded by Councilor Hamann. The meeting was adjourned at 7:32 PM

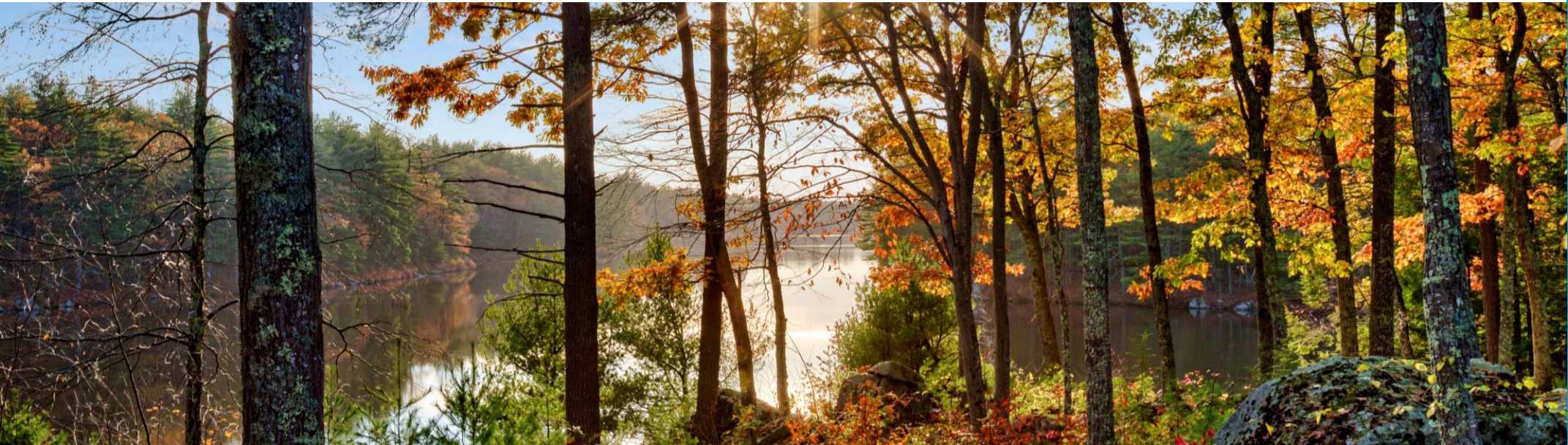
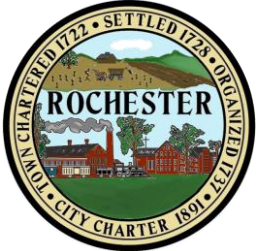
Minutes respectfully submitted by Laura McDormand, DPW Administration & Utility Billing Supervisor

Surface Water Supply Expansion Project

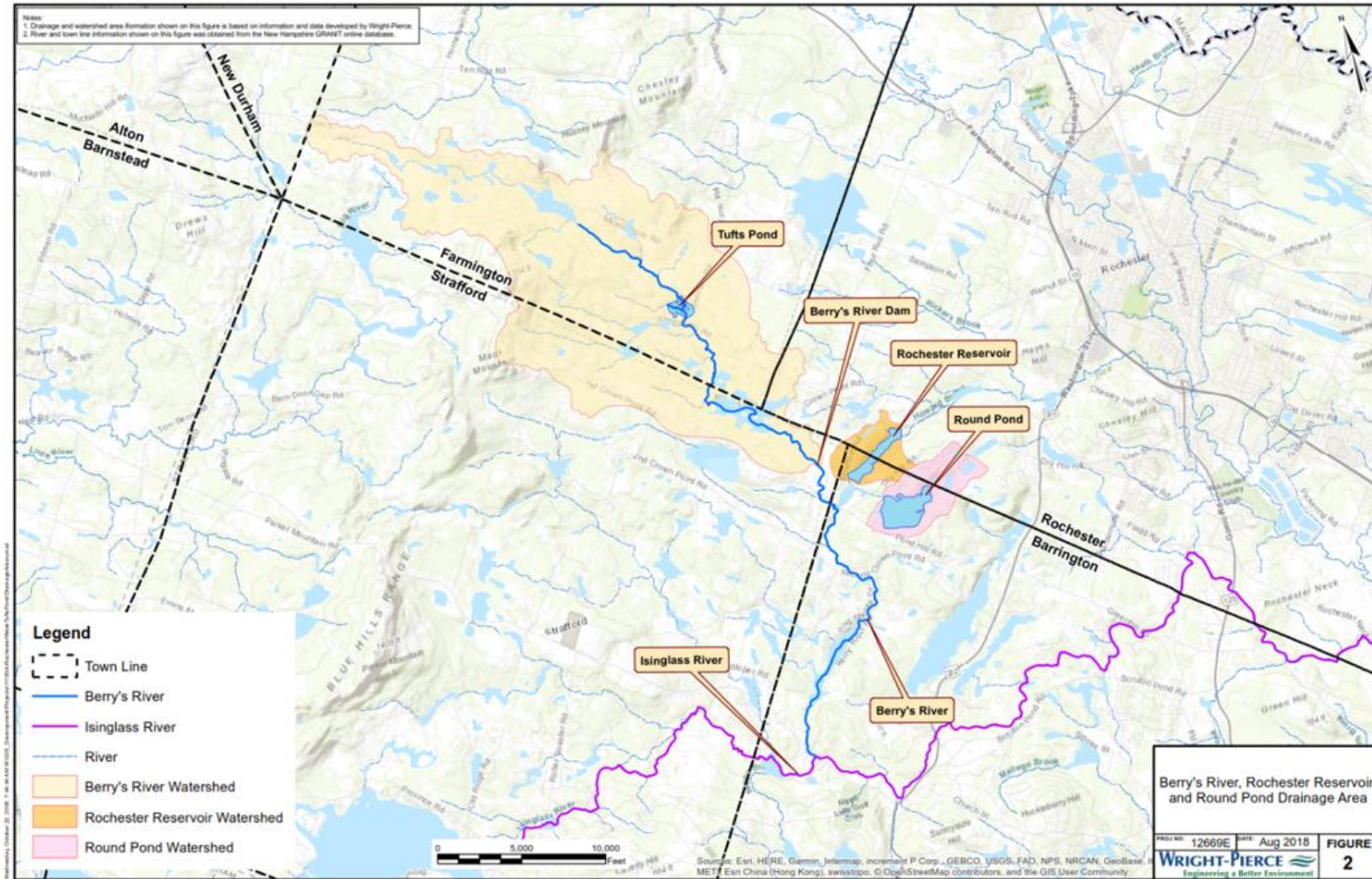
Rochester, New Hampshire

February 2024

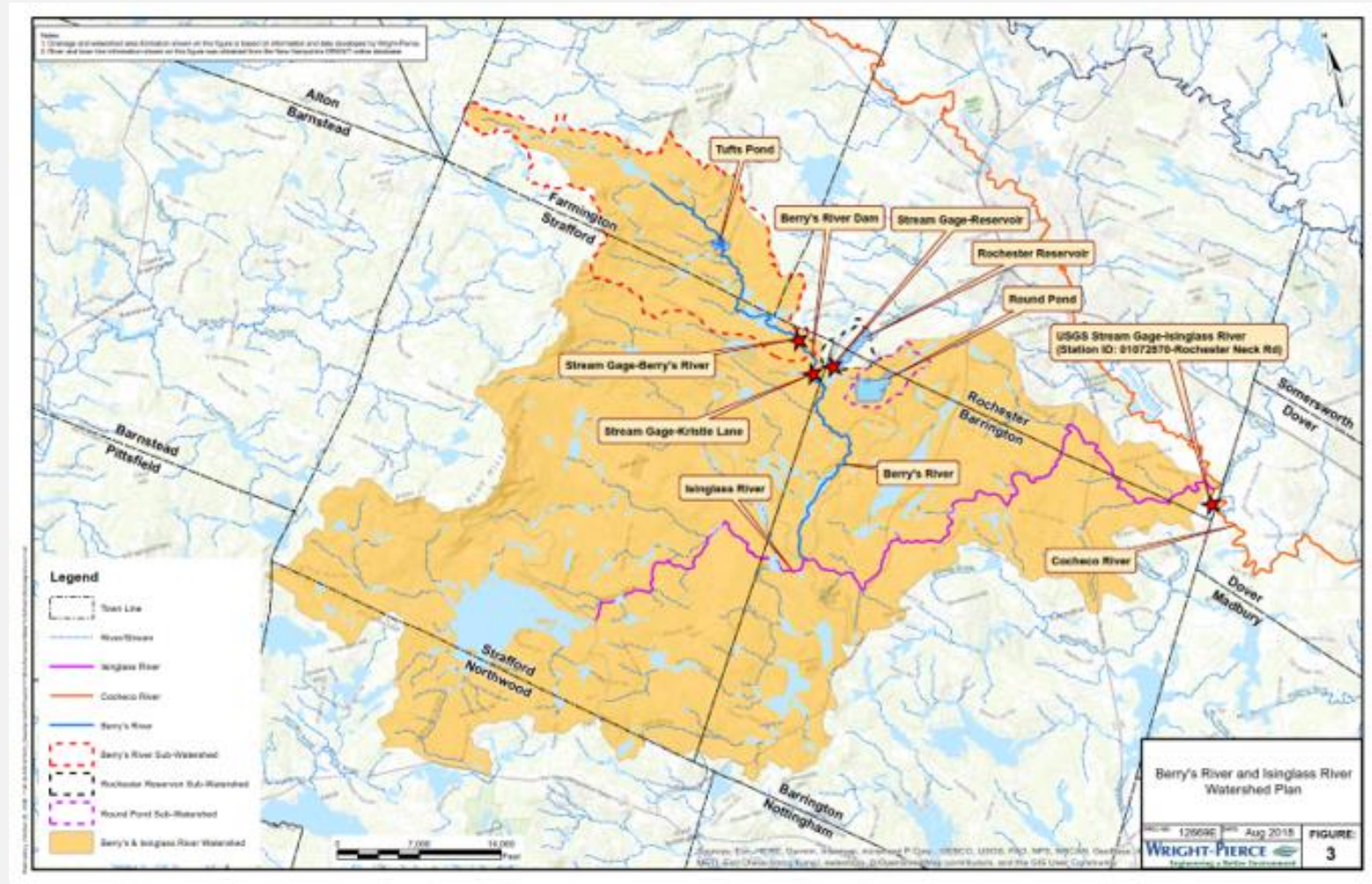
Richard Davee, PE –
Wright-Pierce
Tracy Tarr - GZA



Berry's River Watershed



Isinglass River Watershed



Second Major Impoundment

Round Pond

- Round Pond is located entirely in Barrington, approximately 3,000 feet south of the Rochester Reservoir
- Largest of the reservoirs - 350 million gallons
- It can either receive water from Berry's River through the 24-inch diversion pipeline or discharge water to the Rochester Reservoir
- Filled primarily during the spring melt and rainy seasons

Keys Issues

1

Water Audit – understanding current usage, natural inefficiencies, and where room for improvement

2

Supply Capacity – existing and how it can be improved

3

Demand/Consumption – now and in the future

Supply Capacities (Firm Yield)

Rochester's Reservoirs – Existing Elevations

Reservoir	Full Pond Elevation	Firm Yield (mgd)
Tufts Pond Reservoir	482 ft.	1 mgd (no change)
Berry River Dam Impoundment	401 ft.	-0-
Rochester Reservoir	375 ft.	0.25 mgd
Round Pond Reservoir	390 ft.	1.0 mgd
	Total	2.25 mgd

- Firm yields of Rochester's existing reservoirs (existing elevations) subject to minimum stream flow requirements

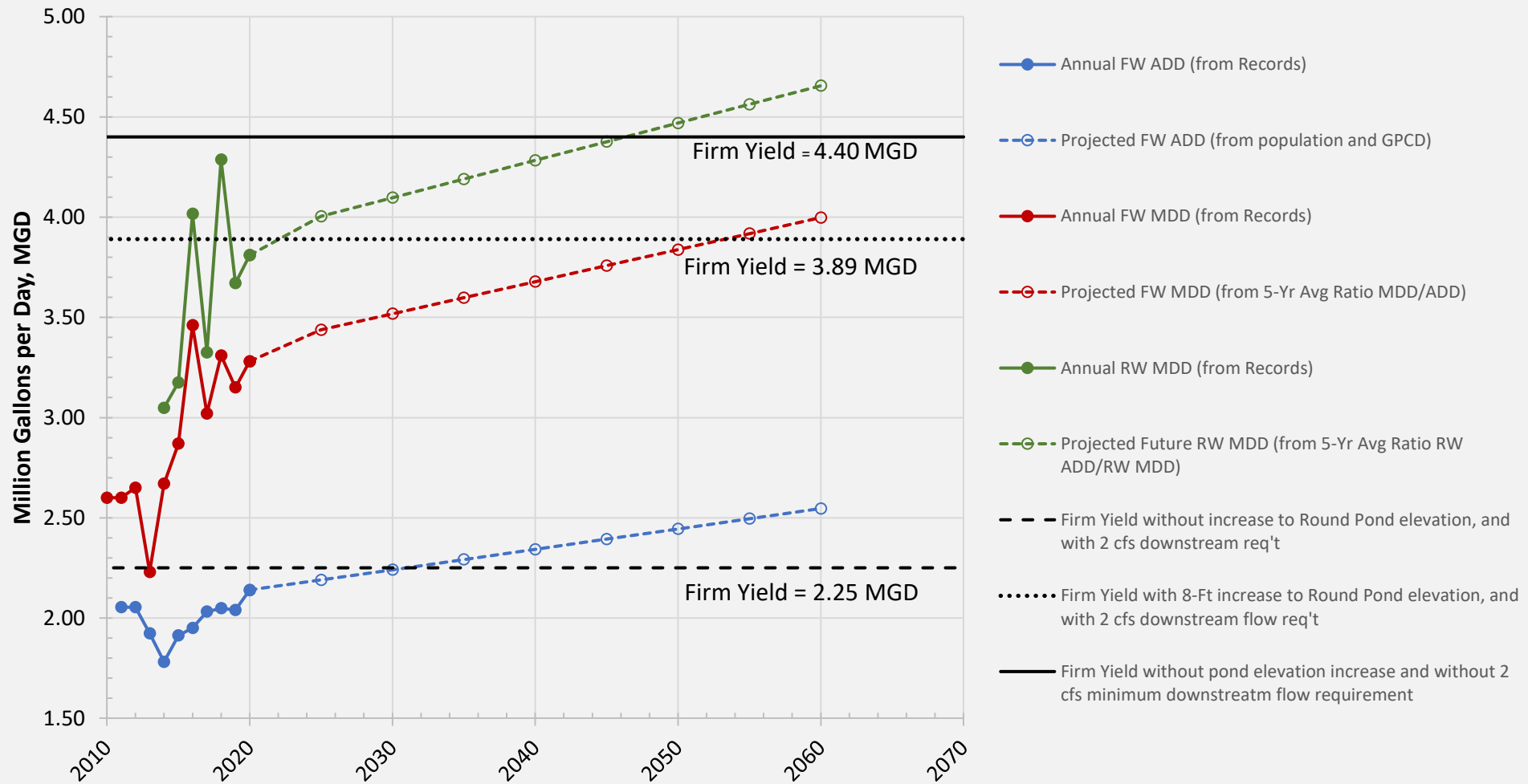
Supply Capacity (Firm Yields) of Rochester's Reservoirs

Round Pond Reservoir Elevation Increased

Reservoir	Full Pond Elevation	Firm Yield (mgd)
Tufts Pond Reservoir	482 ft.	1 mgd (no change)
Berry River Dam Impoundment	401 ft.	-0-
Rochester Reservoir	375 ft.	0.25 mgd
Round Pond Reservoir	398 ft.	2.64 mgd
	Total	3.89 mgd

- Firm yields of Rochester's reservoirs (Round Pond Reservoir elevation increased to 398 ft) subject to minimum stream flow requirements
- Increasing the water elevation Round Pond Reservoir to El 398 bring the Firm Yield of the surface Water Supply close to Firm Yield (3.89MGD) w/out minimum stream flow requirements

Existing & Projected 40-Year Demands with Alternative Firm Yields



Future Water Supply Management

- **Raising Round Pond's elevation could almost double storage with minimal impact**
- **Harvest a greater abundance of river flow**
- **Periods of >50 cfs (22500 gpm, 32MGD) in river that we could store for the summer months**
- **Help to improve and manage downstream flows**
- **Close diversion valve and draw down Round Pound, maintaining river flow**
- **Prepares us for impact of in-stream flow regulations**

Scope of Work



Impact Assessment

- Set the baseline with existing data
- Comparative analysis of existing pond elevation to 8-foot increase
- Used the mapped areas, habitat types, and species data we had to develop a baseline scenario
- Assessed the potential for impact to the mapped areas, habitat types, and species data in terms of level of impact
- Analyzed the “after” scenario to identify “new” extents of habitat types, in terms of increases and decreases

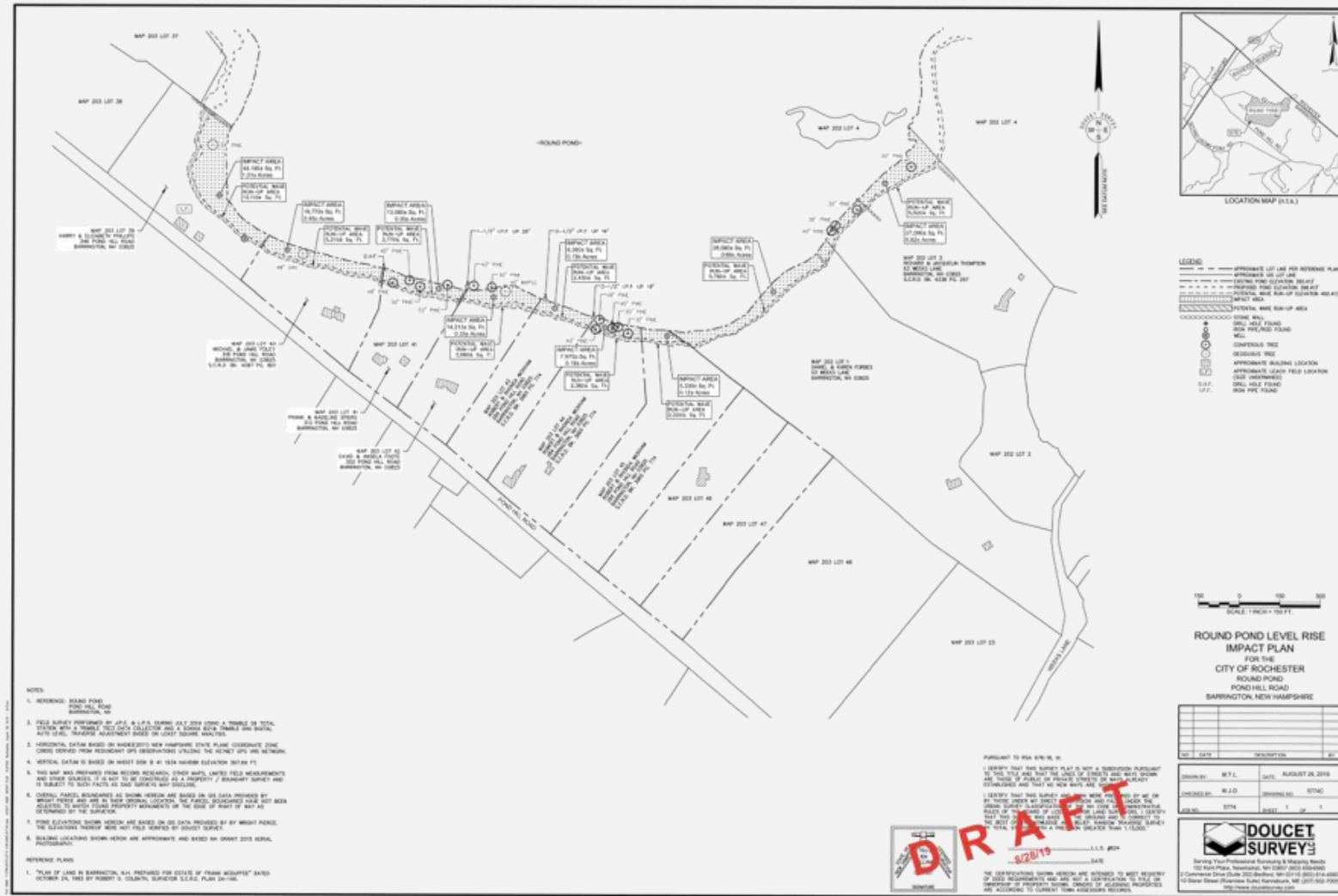
Rare Species



In Area of Inundation

- Blanding's = State Endangered
- Records known from Round Pond and "Pond C"
- Scrub-Shrub, Aquatic Bed, Marshes, and Vernal Pools provide important habitats
- Fish and Game requested Trapping
- Need to time water level changes to avoid impacts to overwintering sites

Sample Layout



Results

Rare Species



- Turtle trapping was completed during 2015 & 2016 according to regional protocols

View of Turtle Trap in “Pond C”

Results

BL001 “Dragon”



Captured in Pond 3

Transmitter Attachment



Results

BL002 “Storm”



Captured in Pond 3 – Near BL001

Radiotelemetry



Radiotelemetry



Overall Results

- Project is expected to maintain large portions of most habitats (except vernal pools)
- Maintaining high habitat diversity serves to maintain high wildlife diversity
- **11 additional vernal pools were observed nearby outside of inundation area**
- project creates 22.25 acres of wetland and open water habitat
- Fish and Game will expect minimization of potential habitat changes to Blanding's turtle habitats



Questions?



Contact Information



RICHARD DAVEE

rick.davee@wright-pierce.com

(603).570.7100

THANK YOU

Salmon Falls Water BPS Replacement

Rick Davee, PE

March 2024



Project Map



Existing Site



Project Background/Need

- **Existing Salmon Falls Booster Pump Station (SFBPS) has limited functionality and reached end of useful life.**
 - Current station cannot provide the required flow nor pressure
 - Originally installed in 1984, offline since 2012
 - During peak use, level of service has been dropping
- **Richardson Street Booster Pump Station (RSBPS)**
 - 2018 Asset Management Plan (AMP) recommends replacement of pumps, motors, main Programmable Logic Controller (PLC), and instrumentation
 - SFBPS will support future upgrades, provide redundancy, and improve pressure to RSBPS and Rochester Hill Pressure Zone.
- **Albany Engineered Composites has requested additional flow up to 900 gallons per minute (gpm) by 2028 to support their business.**
- **A proposed school is to be constructed at approximately 727 Salmon Falls Road that will require additional flows.**
- **Residential subdivisions in service area.**

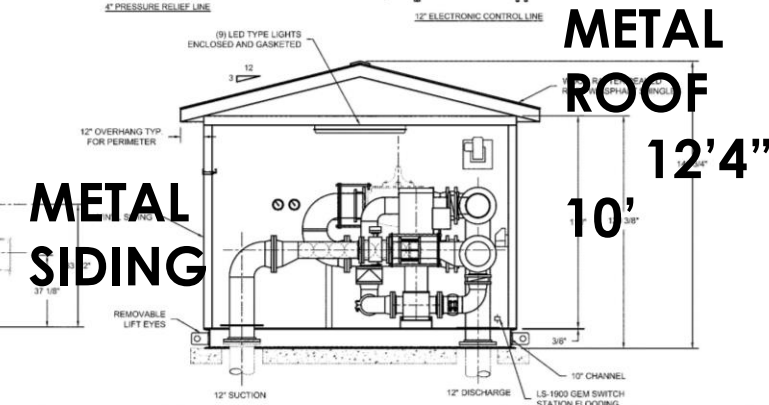
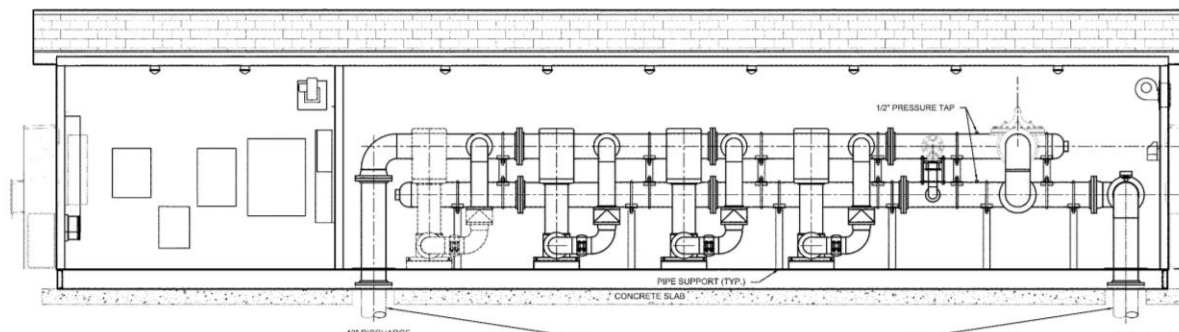
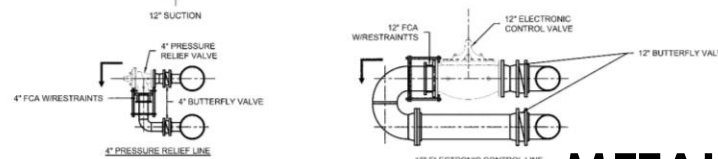
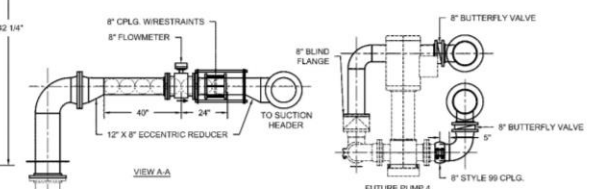
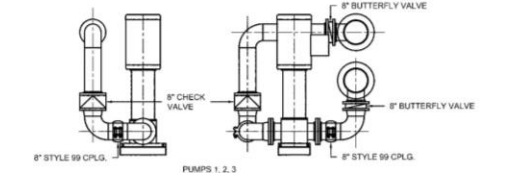
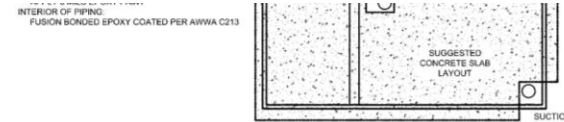
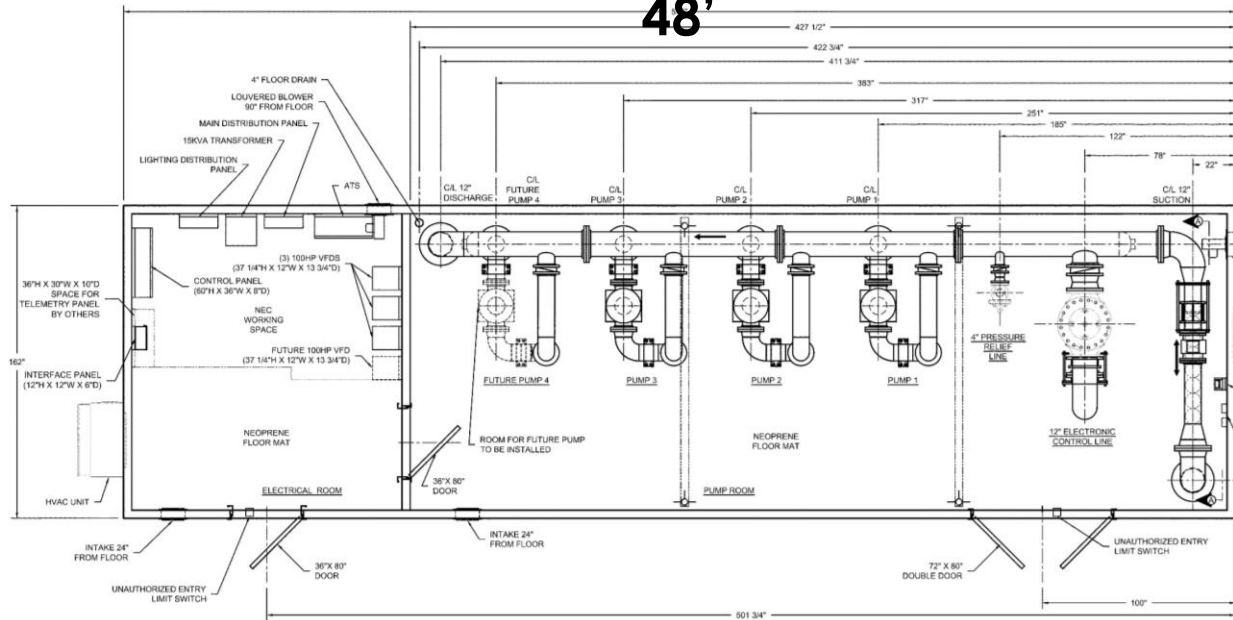
Project Description

- **Demolition of existing pump stations and associated piping, valves, hydrants, and UGE.**
- **New Prefabricated Above Ground Booster Pump Station**
 - **Three pumps**
 - **Space for future pump if needed**
 - **Supporting electrical equipment**
 - **Emergency generator**
 - **Site improvements**
 - **Incorporate existing infrastructure as possible**
- **Temporary Power Required.**
- **No modifications to retired Salmon Falls Standpipe, used for communications.**

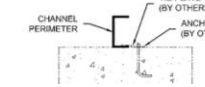
Proposed Floor Plan

13'5"

48'



NOTE
PIPE EXTERNAL TO STATION MUST BE INDEPENDENTLY SUPPORTED.



REV. NO.	REVISION	BY	CHKD	DATE	DESIGNED BY:	DATE
A	MIRRORED STATION, ADDED PRESSURE RELIEF LINE, AND ADDED ELECTRONIC CONTROL LINE.	JW	RC	11/10 23	JW	10/26

USEMCO
USEMCO INCORPORATED
P.O. BOX 550 (808) 372-5911 TOMAH WI. 54860
DESCRIPTION

Cost Estimate – October 2023

Salmon Falls Water Booster Pump Station

Category	Amount
Engineering/Design/Planning Costs	\$480,000
Construction	\$2,500,000
Construction Contingency	\$295,000
Land Acquisitions/Easements	\$0
Total Project Costs	\$3,275,000

Contact Information



RICK DAVEE

rick.davee@wright-pierce.com

(603).570.7100

THANK YOU

Public Works Committee Meeting Rochester, NH

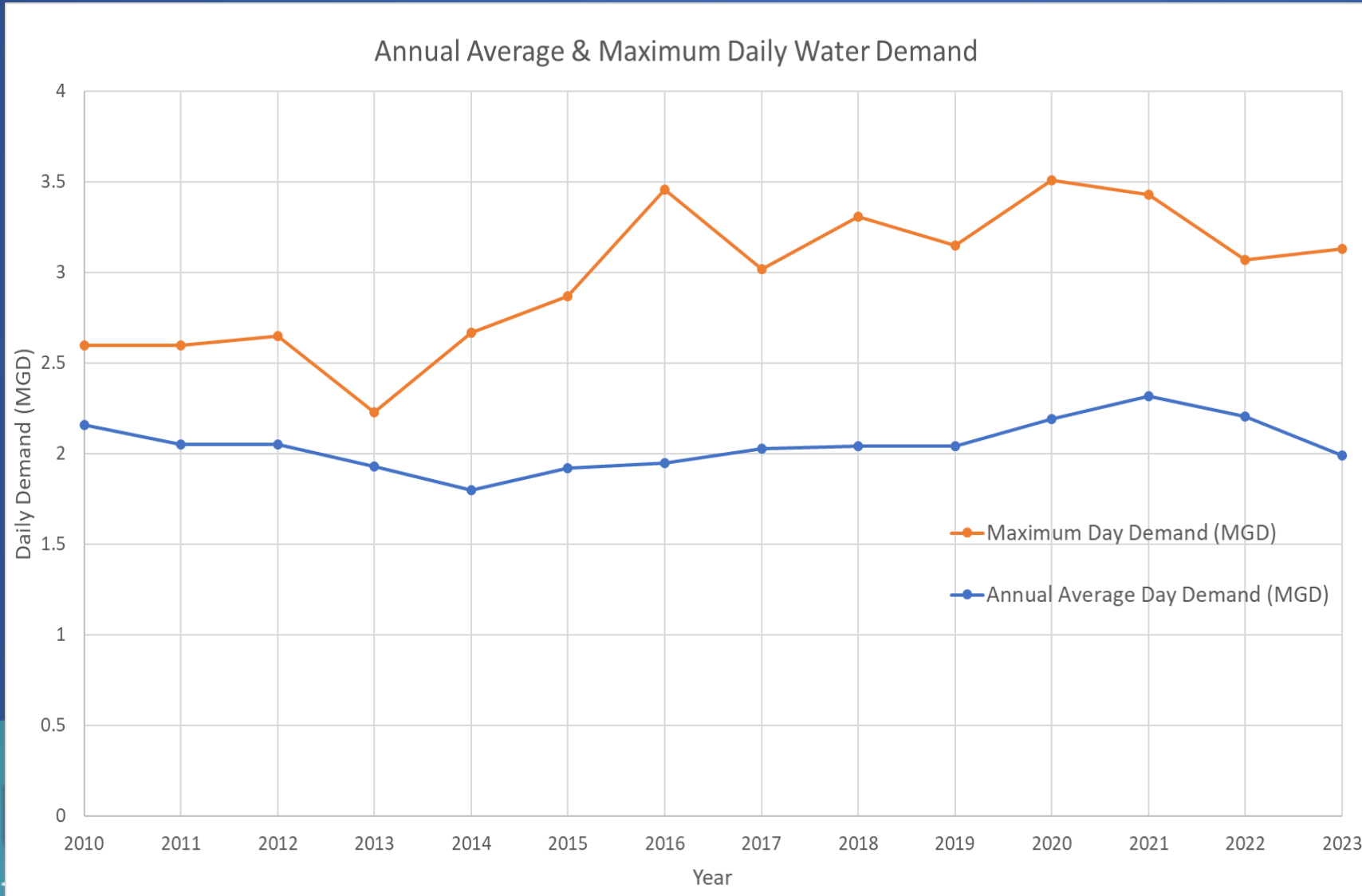
Water Supply Projects
Underwood Engineers
March 21, 2024

Agenda

1. Introductions
2. Water Supply Demands and Resources
3. Water Supply Targets
4. Water Treatment Plant Residuals
5. Water Treatment Plant Hydraulics
6. Cocheco Well Treatment
7. Roadmap for Improvements

Water Supply Demands and Resources

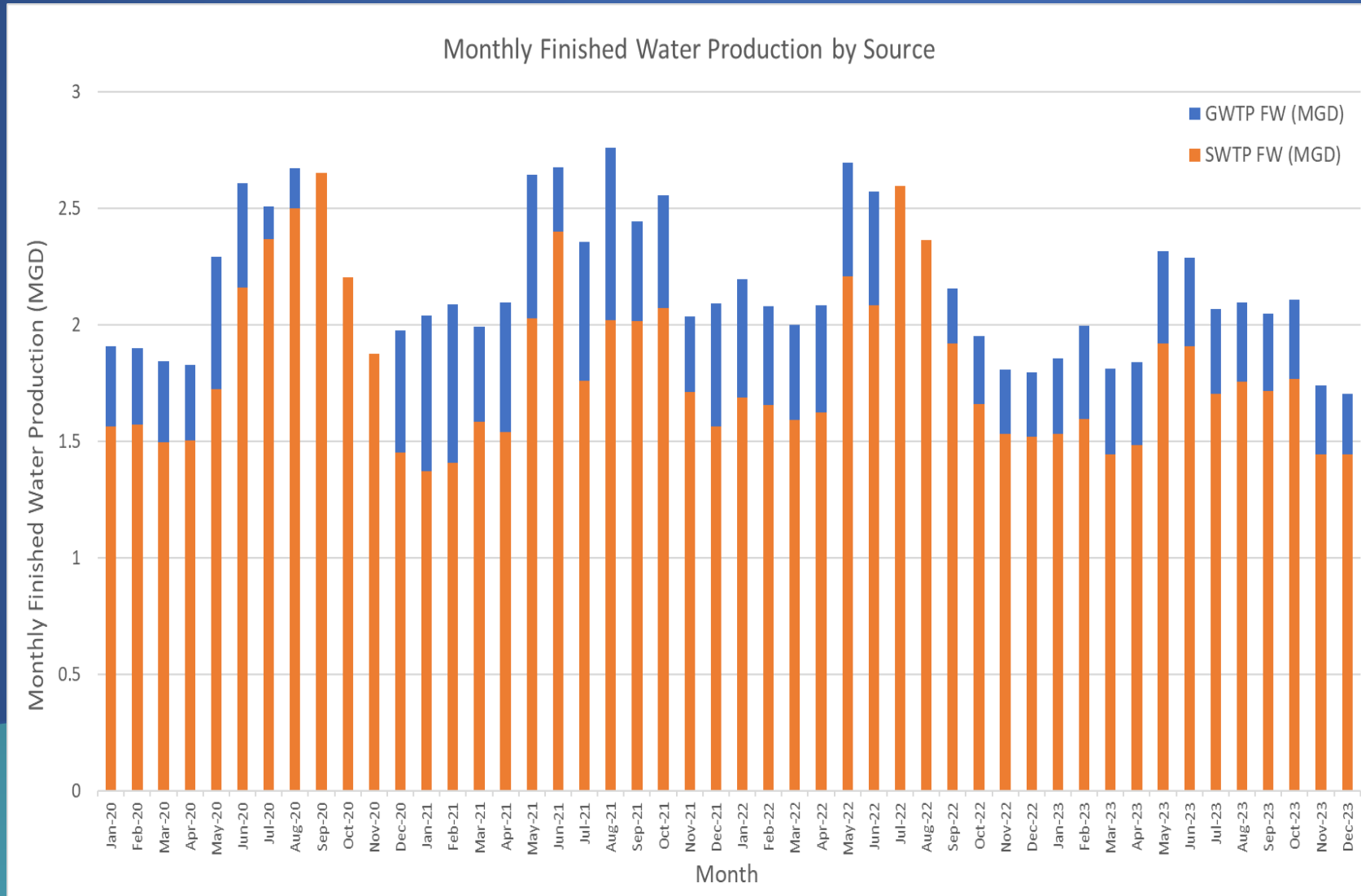
Annual Water Demands



Average demands up 28% between 2014 and 2021 and up by 10% in 2020-2022

Rainy summer in 2023 = reduced irrigation

Monthly Water Demands and Sources



Seasonal fluctuation in demands

Cochecho is a currently a lower cost source and helps with water quality because of DBP's and helps with MDD

Cochecho Well = 12% to 23% or 0.4 MGD average

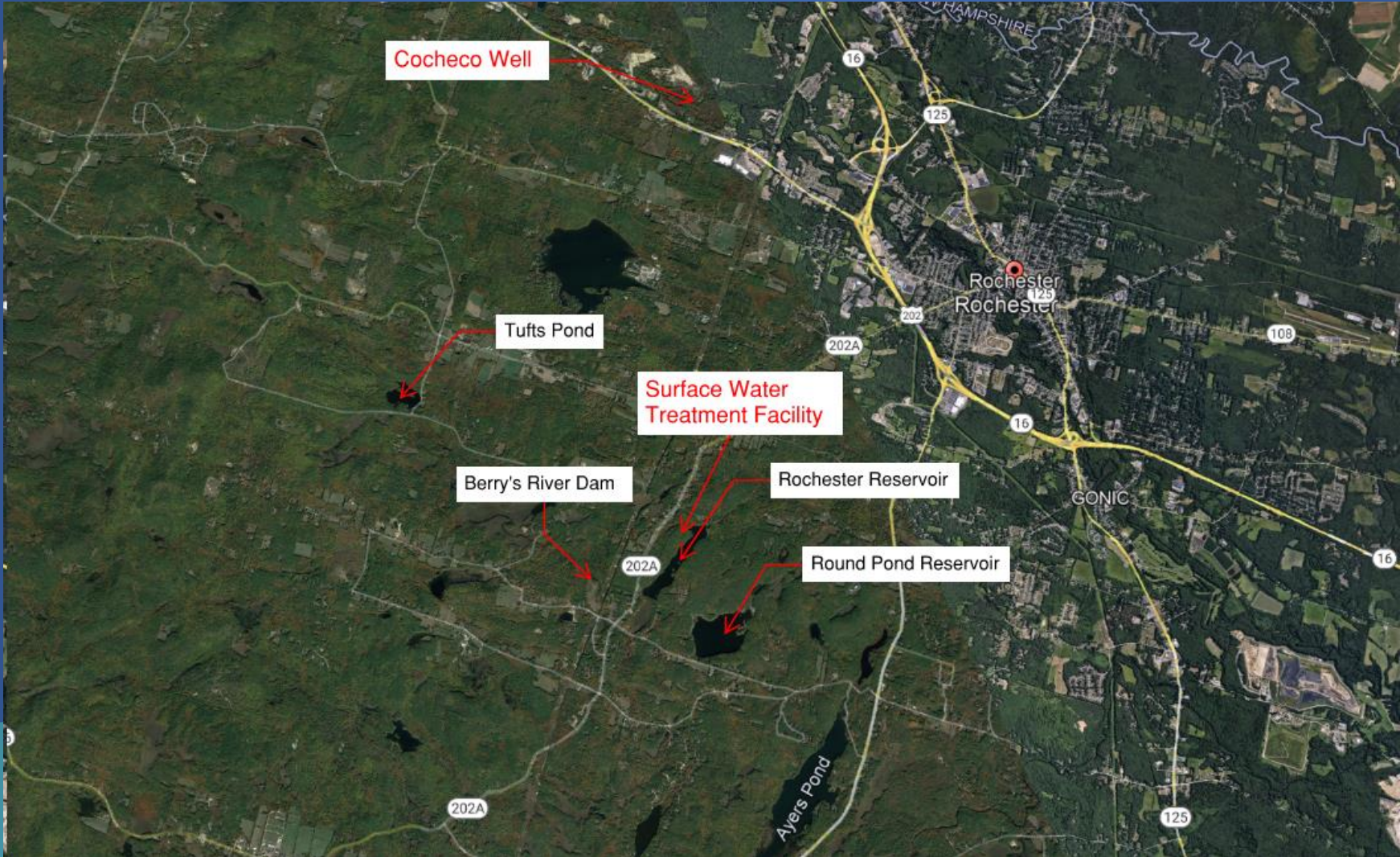
Existing and Future Water Demands

Description	Current	2040	2060
Annual Average Day (MGD)	2.18	2.36	2.61
Maximum Day Demand (MGD)	3.51	3.67	4.10

- Based on Wright-Pierce 2021 Supply and Demand Study

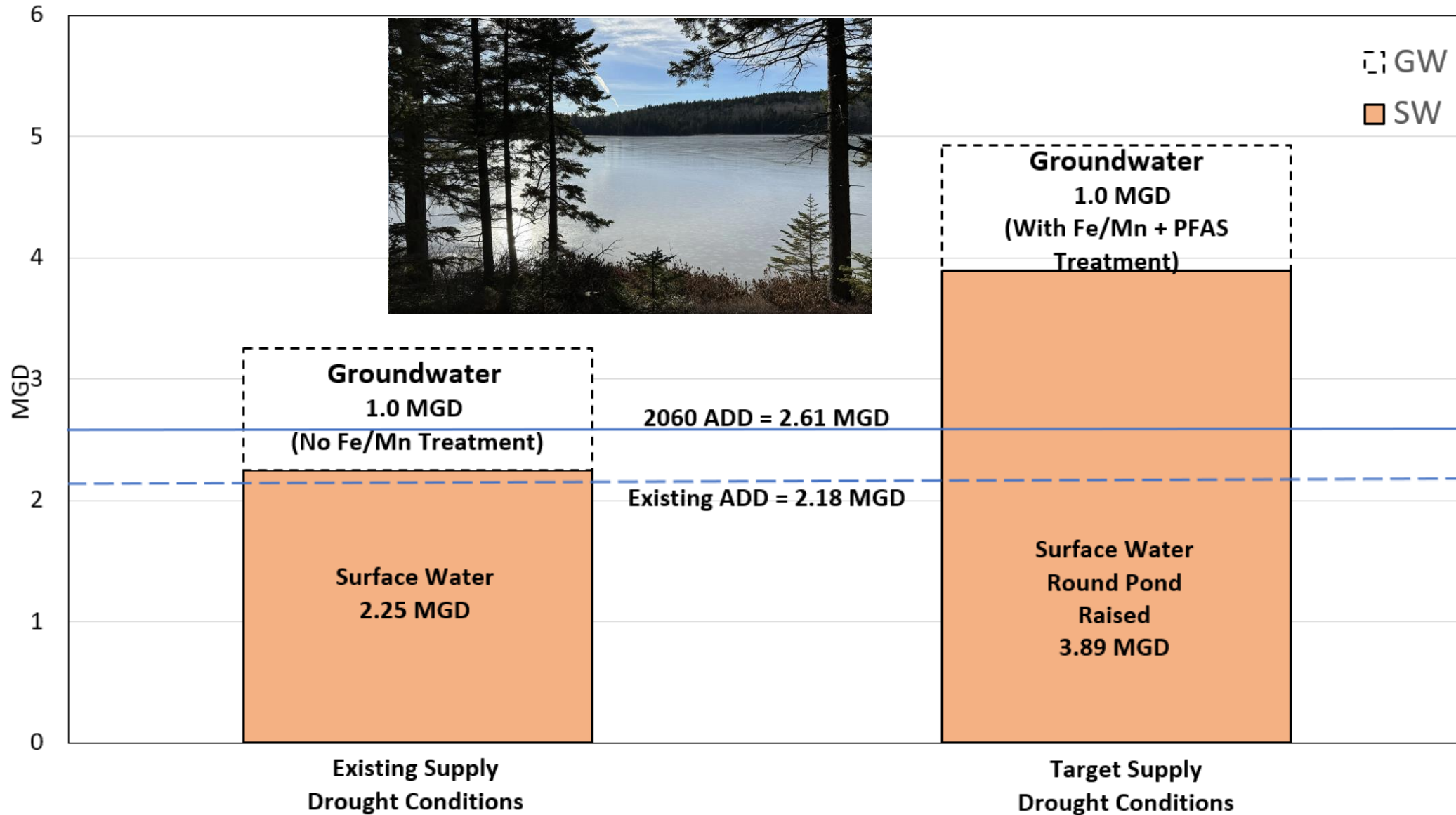
We need to get back to 5.0 MGD

Available Supplies



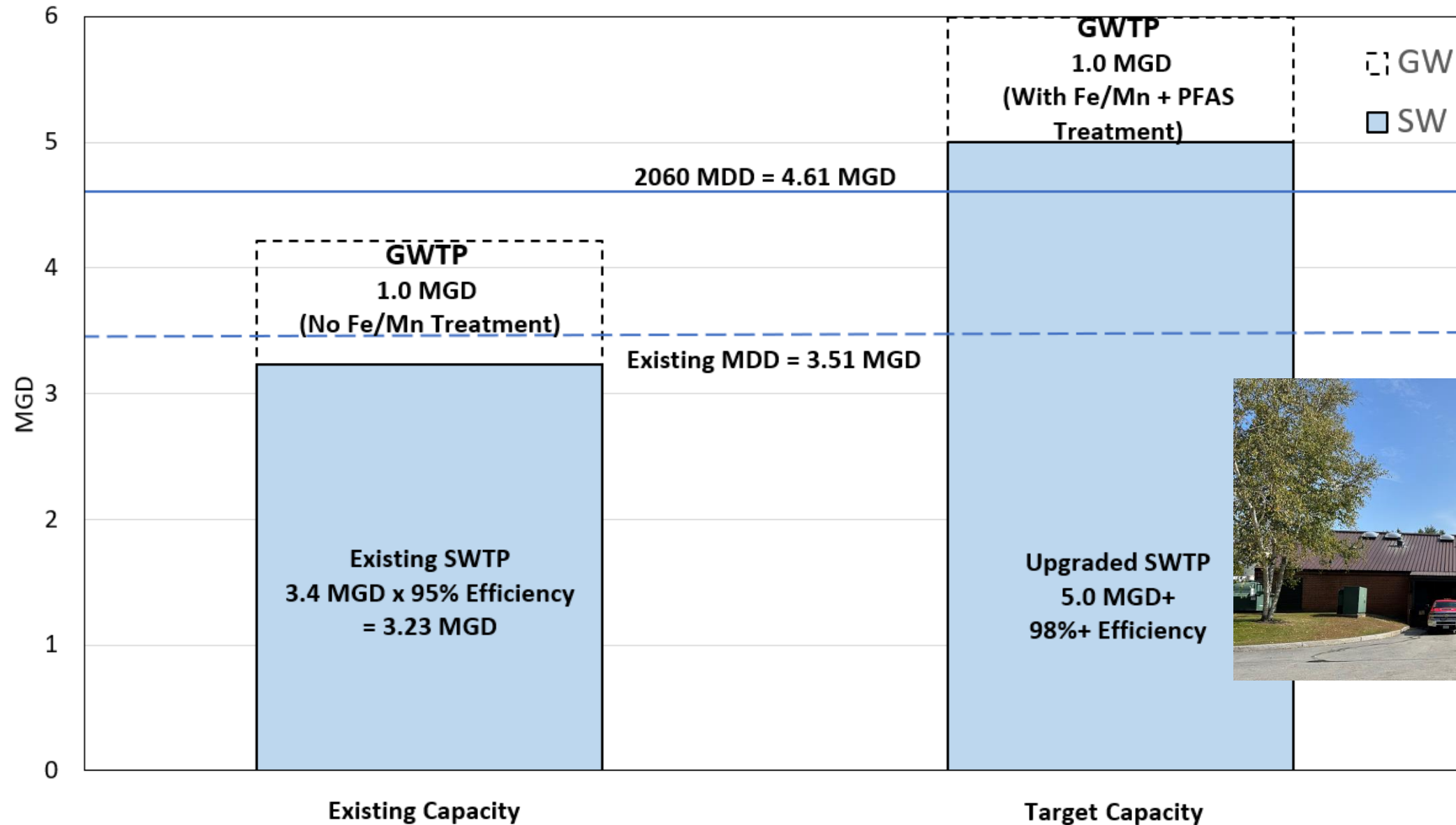
Existing and Target Supply Sources

Berry's River Reservoir System - Firm Yield vs. Average Day Demand

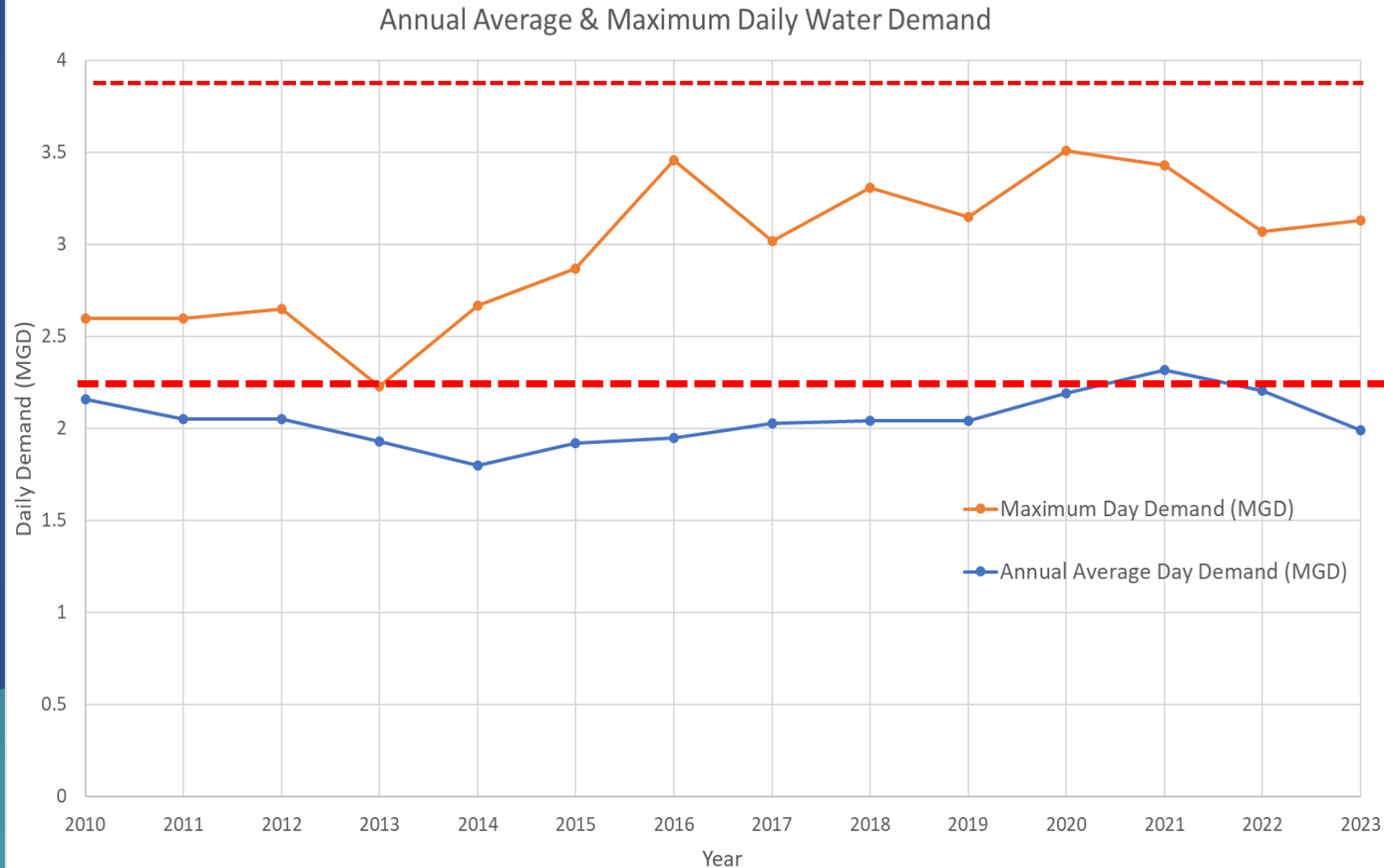


Existing and Target Treatment Capacity

Treatment Plant Firm Capacity vs. Maximum Day Demand



Annual Water Demands



Raised Pond
Firm Yield = 3.89 MGD

Existing
Firm Yield = 2.25 MGD

Both Sources are
Needed

Conclusions - Supply

- Need to Raise Round Pond Reservoir – increase firm yield
- Need Treatment Improvements
 - Water Treatment Plant Residuals – improve efficiency
 - Water Treatment Plant Hydraulics – improve capacity
 - Cocheco well – Iron/PFAS treatment
- Cocheco Well remains necessary & beneficial
 - Max day demands
 - Redundancy
 - Helps water quality by reducing disinfection byproducts

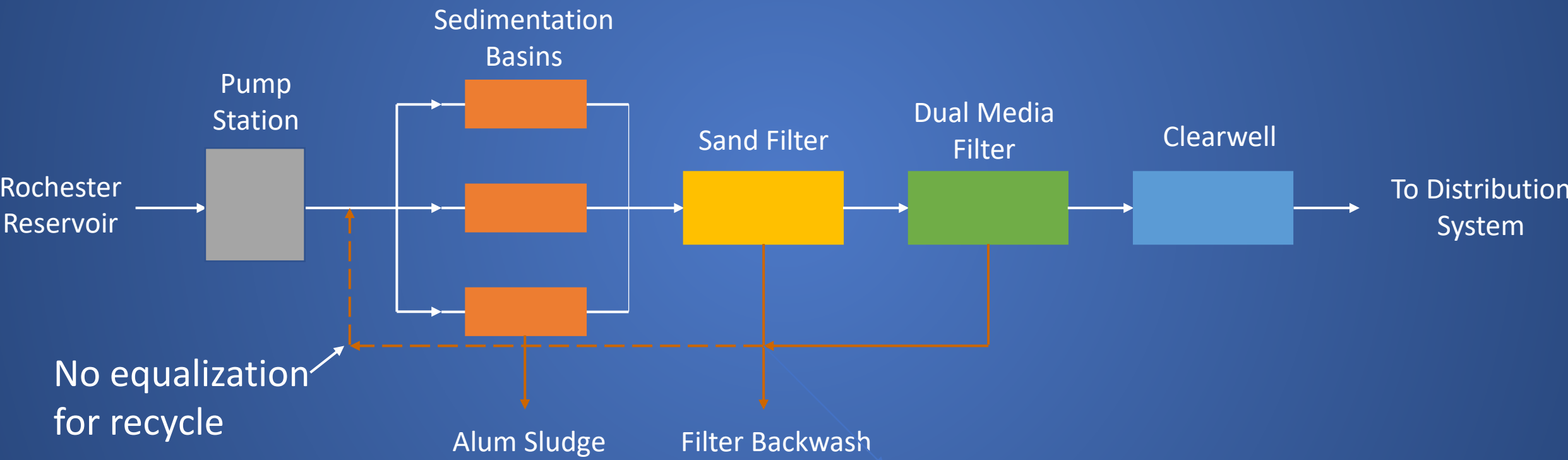
Water Treatment Plant Residuals

Surface Water Treatment Plant

- Original plant `1986
- On Strafford Road, near Rochester Reservoir
- Treats using conventional sedimentation, filtration, disinfection processes



Residuals Production



~300,000+ gpd
Combined

15% wasted water

Residuals Pipeline

- 6 mile pipeline of various sizes and materials to WWTF
- History of breaks and hydraulic issues
- Estimated repair cost of \$5.8M in 2016

Goal:
Avoid cost of wasted water



Alum Lagoons

- Three alum sludge lagoons located at the Wastewater Treatment Facility receive residuals for treatment



Pilot Study Goals

- Catch up on disposal of stored alum sludge
- Improve operations to handle and dewatering sludge

Strategies

- Recycle filter backwash to reduce flows
- Spread thinner layers to freeze and dry in winter
- Mixing and solar drying during the summer
- Pump station repairs



Lagoon B Buildup of 4.75 Feet of Sludge and Water
(September 2022)

Pilot Results – Water Plant Residuals

Spring 2023



- Freeze/thawed Sludge from Lagoon B spread in Lagoon C

January 2024



- Caught up on sludge backlog
- Remaining sludge to be trucked to landfill

Interim Improvements

- Lagoon C repairs in 2023
 - Haul out alum sludge, dirty sand, and vegetation
 - Add new clean sand and regrade bottom
- Currently online
- Pump Station and force main improvements



Residuals - Summary & Conclusions

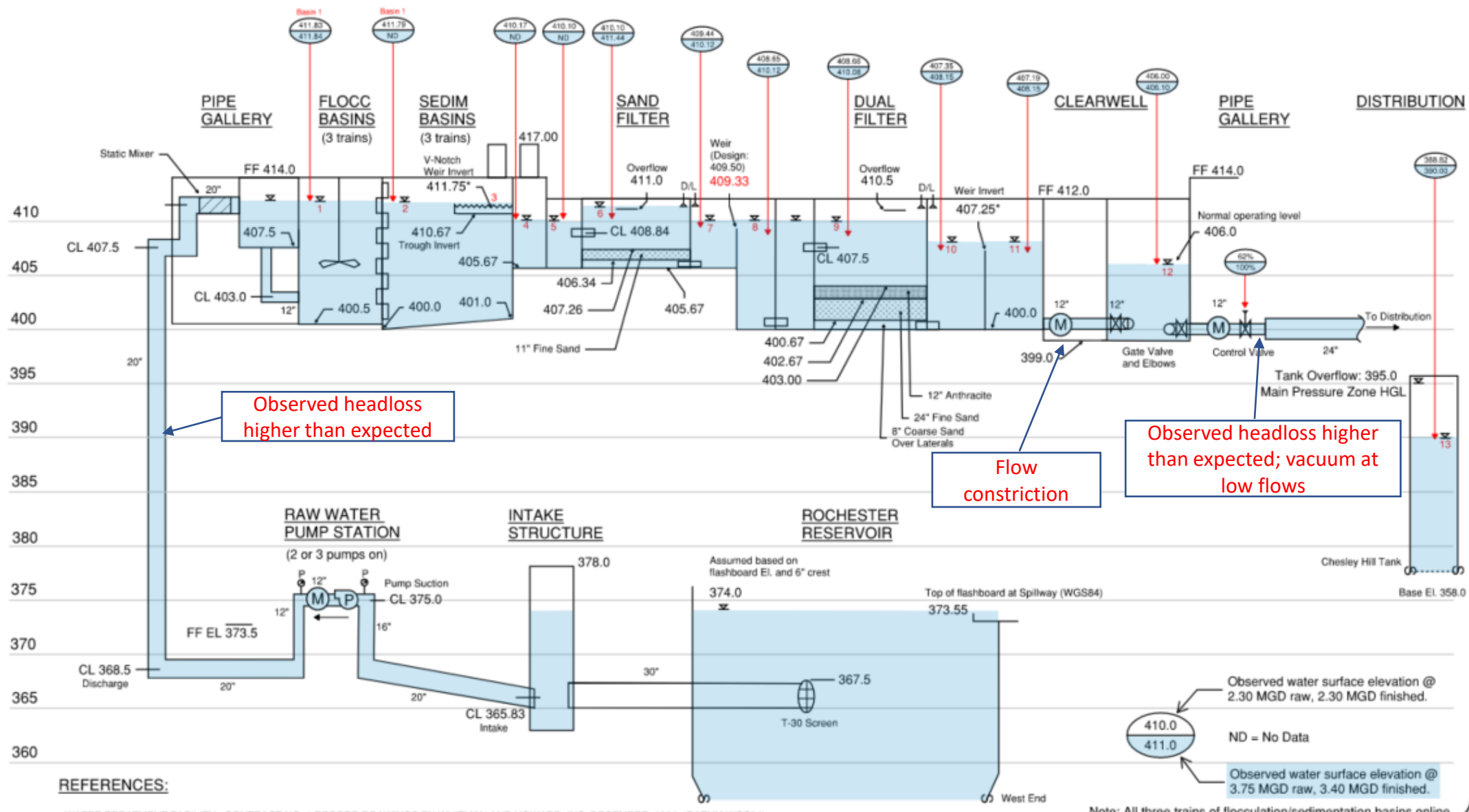
- Operational improvements have improved performance
- Recycling filter backwash to minimize residual flows is critical
- Plan for residual handling facilities at the Water Treatment Plant as the long term solution

Water Treatment Plant Hydraulics

Hydraulics and Supply Study

- Original design was 5 MGD in 1986
- Compliance improvements have impacted hydraulics, like
 - Reservoir intake screen, 2000
 - Clearwell baffling, 2008
 - Filter upgrade, 2015
 - Low lift pump station upgrade, 2018
 - No more pre-chlorination prior to filters
- Goals
 - Evaluate hydraulic restrictions
 - Identify improvements needed to meet target capacity

*Design parameters confirmed in the field.



Observed headloss higher than expected

Flow constriction

Observed headloss higher than expected; vacuum at low flows

REFERENCES:

- WATER TREATMENT FACILITY - CONTRACT NO. 1 RECORD DRAWINGS BY WHITMAN AND HOWARD, INC. DECEMBER, 1984. (DATUM WGS84)
- WATER FILTRATION PLANT UPGRADES - DRAWINGS BY WRIGHT-PIERCE. MAY, 2014.
- WATER TREATMENT FACILITY - CONTRACT NO. 1 O&M MANUAL BY WHITMAN AND HOWARD, INC. 1987.
- TRAVELING BRIDGE FILTER O&M MANUAL BY EVOQUA. FEBRUARY, 2015.
- WATER SUPPLY SOURCES TECHNICAL MEMORANDUM BY UNDERWOOD ENGINEERS. JANUARY, 2016.
- ROCHESTER RESERVOIR WEST END DAM SPILLWAY MODIFICATIONS - DRAFT DRAWINGS BY WRIGHT-PIERCE, 2000.

Note: All three trains of flocculation/sedimentation basins online.

DATE
10/2023

PROJECT
2936

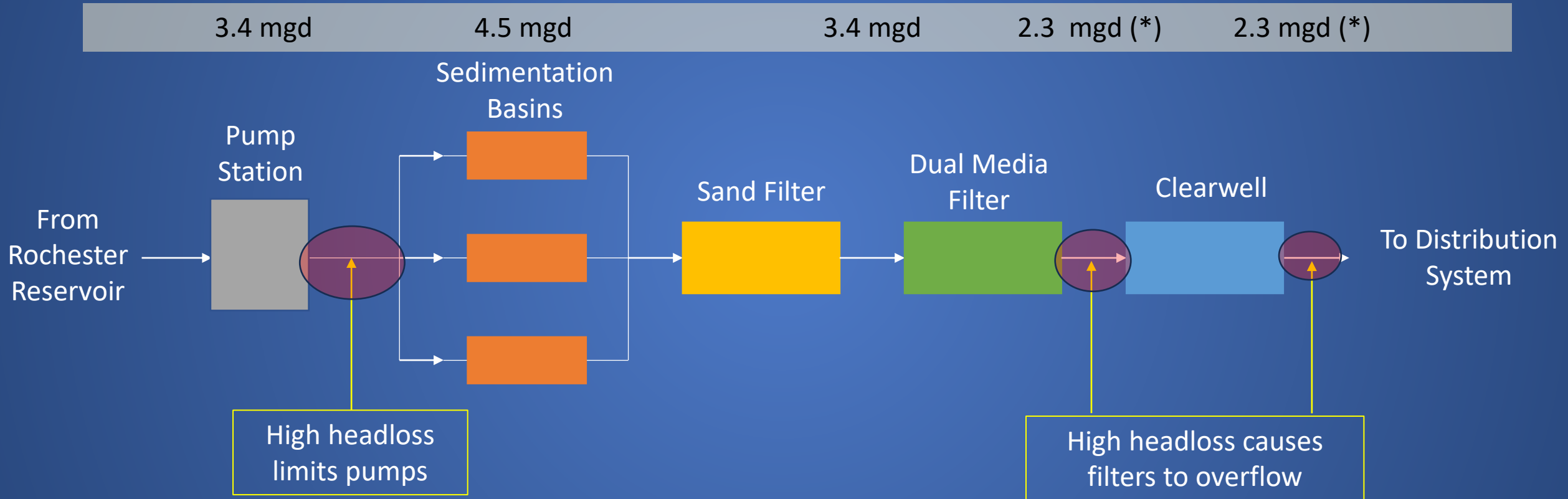
UNDERWOOD
engineers

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Tel. 603-436-6192 Fax. 603-431-4733

SURFACE WATER TREATMENT PLANT
(HYDRAULIC PROFILE)

ROCHESTER, NH

Most Limiting Hydraulic Constrictions



Water Treatment Plant Capacity

Table 1. Existing Hydraulic Capacity of SWTP Unit Processes

Unit Process	Capacity	Remarks
Raw Water Pumping	3.4 MGD	Based on 2 pumps running at 100% with one pump in standby.
	3.75 MGD	Based on all 3 pumps at 100% speed (no redundancy).
Coagulation/Flocculation/Sedimentation	4.5 to 5.0 MGD	No floc carryover or excessive headloss observed at 3.75 MGD. Meets typical design standards up to 4.5 to 5.0 MGD but needs to be confirmed.
	3.4 MGD	If one of three trains is out of service.
Sand Filter	3.4 MGD	Based on filter headloss not causing inlet level to overflow and on a maximum loading rate of 3 gpm/sf per typical standards.
Dual Media Filter	3.4 MGD	Based on filter headloss not causing influent level to back up into sand filter and on a maximum loading rate of 3 gpm/sf loading per typical standards.
Clearwell inlet piping/meter	2.3 MGD	Based on preventing upstream water level from rising above the dual media effluent filter weir and subsequently raising levels in the dual media filter and sand filter.
	3.4 MGD	Based on allowing upstream water level to rise and backup into the filters.
Clearwell disinfection	4.1 MGD	Based on worst case CT conditions for Giardia inactivation.
Clearwell outlet piping/control valve/meter	2.3 to 3.4 MGD	Based on maximum flow out of plant with Chesley Hill tank about 5 feet below overflow and control valve 100% open, capacity is less at higher tank level, limiting ability to fill Salmon Falls tank.

Interim Improvements – Preliminary Design

- Get to 3.4 MG+ without overflowing filters
- Low lift pump station piping improvements
- Clearwell piping improvements
- Tank fill controls
- Residuals handling facilities at Water Treatment Plant
- Long term improvements planning - target 5.0+ MGD
 - Piping
 - Clarifier enhancements
 - New filters
 - Residuals handling

Cochecho Well

Cocheco Well Treatment Plant



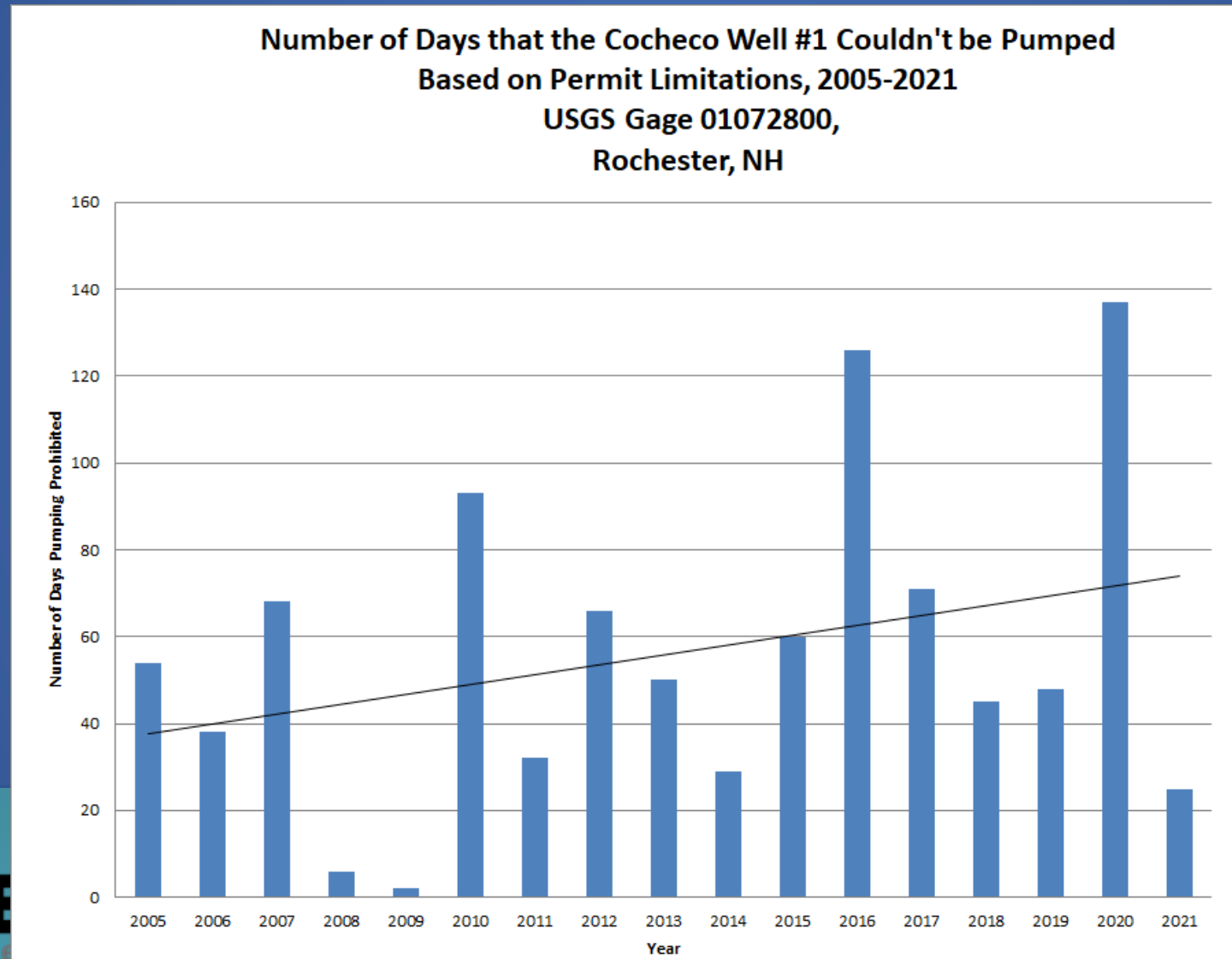
Existing Facility (2011)

- Well #1
 - Permitted capacity of 700 gpm
 - Operates at 50% due to the water quality.
 - Seasonal shutdowns based Cocheco River.
- Treatment Facility:
 - Aeration for pH adjustment, H₂S, and carbon dioxide removal.
 - Chemical feed of blended phosphate for sequestering and corrosion control, chlorine for disinfection, sodium bicarbonate for pH and alkalinity adjustment, and fluoride.

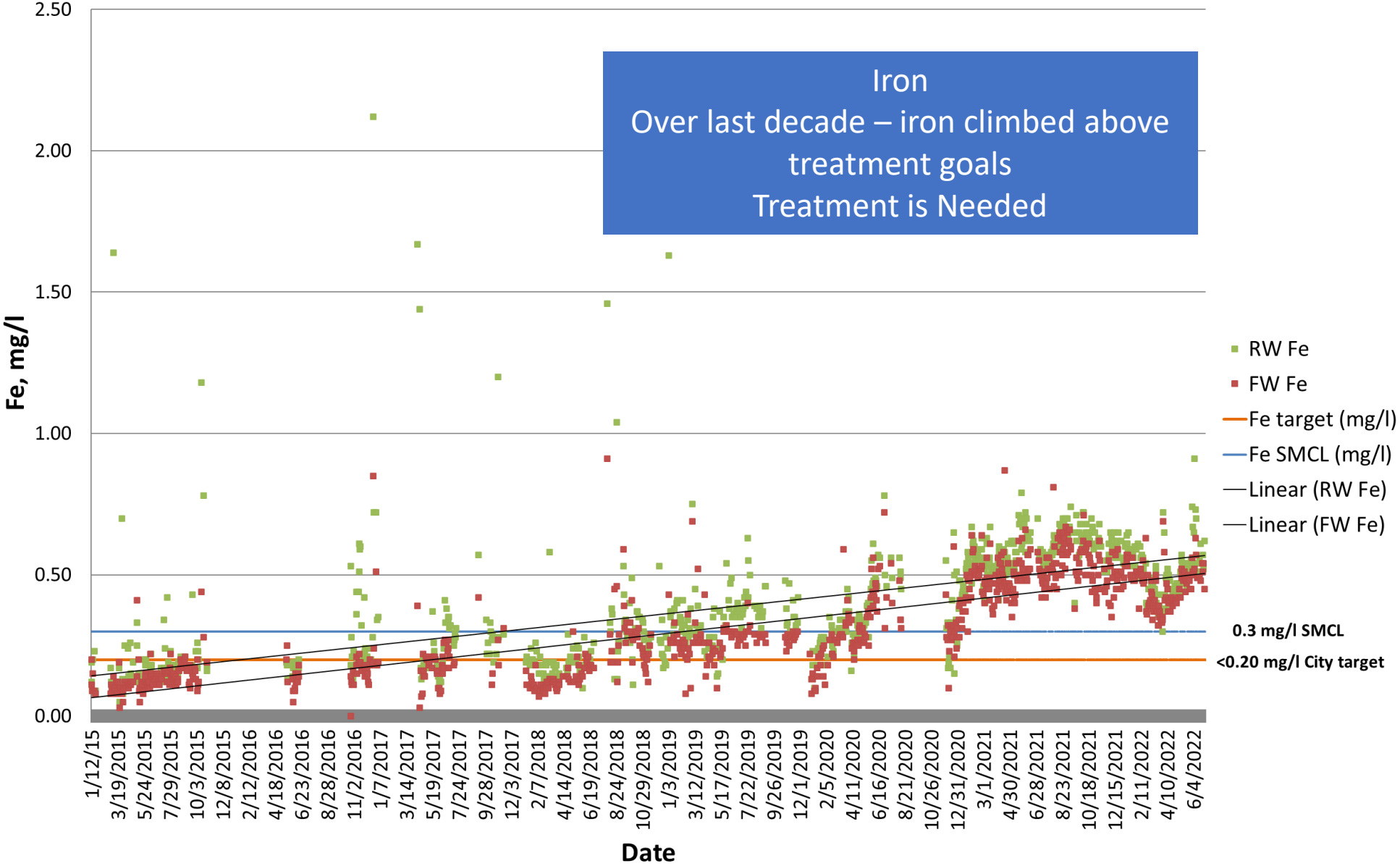
Provides 12 to 23% of
City's Water
Only Redundancy



Cocheco Well #1 Pumping Restrictions

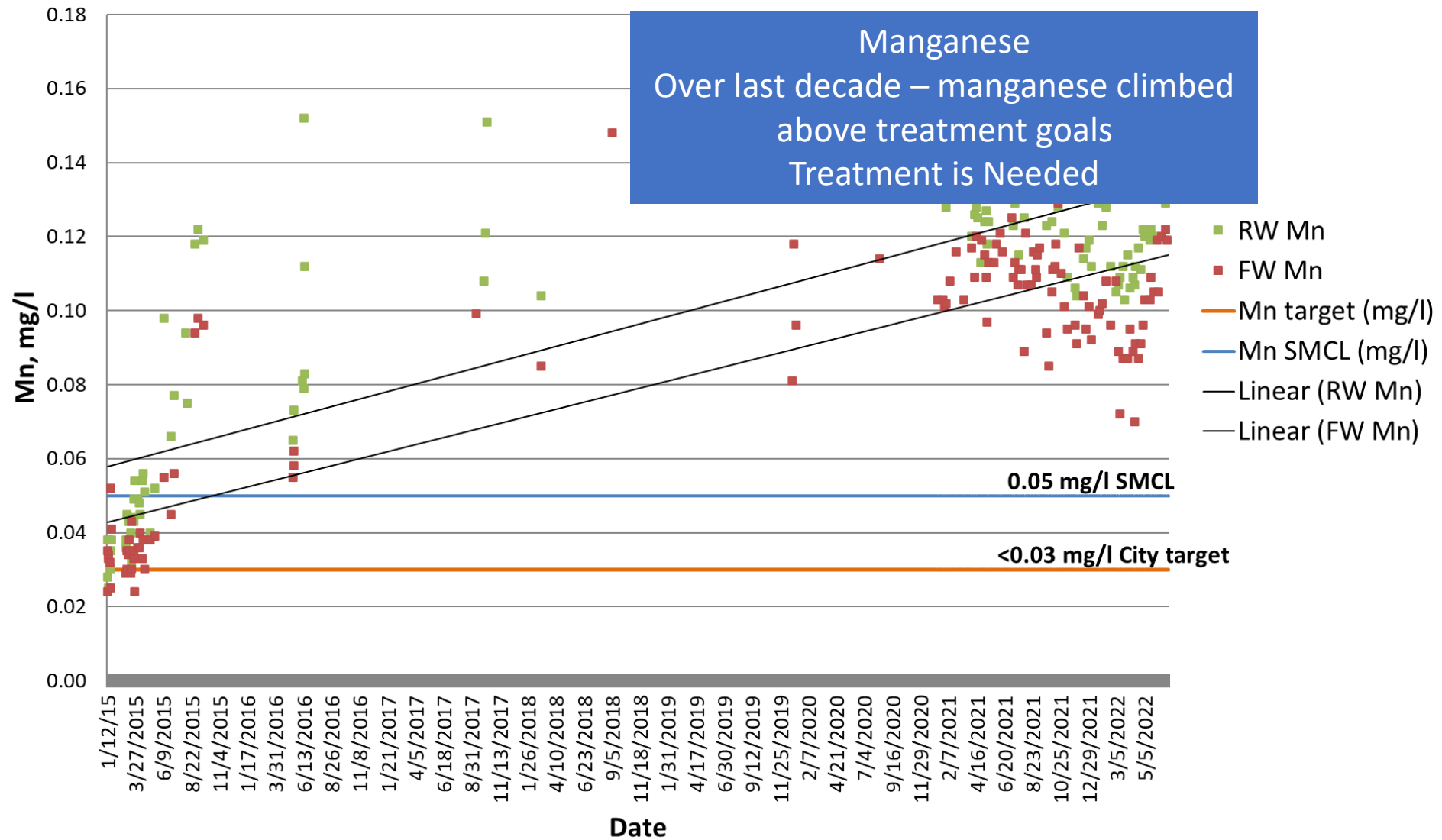


Cocheco Well #1 (RCH-1C), City of Rochester, NH Raw and Finished Water Iron 2015-2022



Cocheco Well #1 (RCH-1C), City of Rochester, NH

Raw and Finished Water Manganese 2015-2022



PFAS

PFAS
Currently just below proposed standard
Treatment is Planned

Contaminant	Existing MCL	EPA Proposed MCL	Concentration (Finished Water)
PFOA (ng/L)	12	4	3.07 – 3.80
PFOS (ng/L)	15	4	2.19 – 3.27
PFHxS (ng/L)	18	1.0 (unitless) Hazard Index	ND
PFNA (ng/L)	11		ND
HFPO-DA (ng/L)	-		N/A
PFBS (ng/L)	-		N/A

- Notes:**
- “ND” = below detection limit
 - Samples of well water are from NHDES OneStop.
 - On March 14th, 2023, EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS compounds as shown in the table above. Until this proposed rule is finalized, there is no action required. The rule is expected in 2024 and compliance will begin three years after the rule is promulgated.

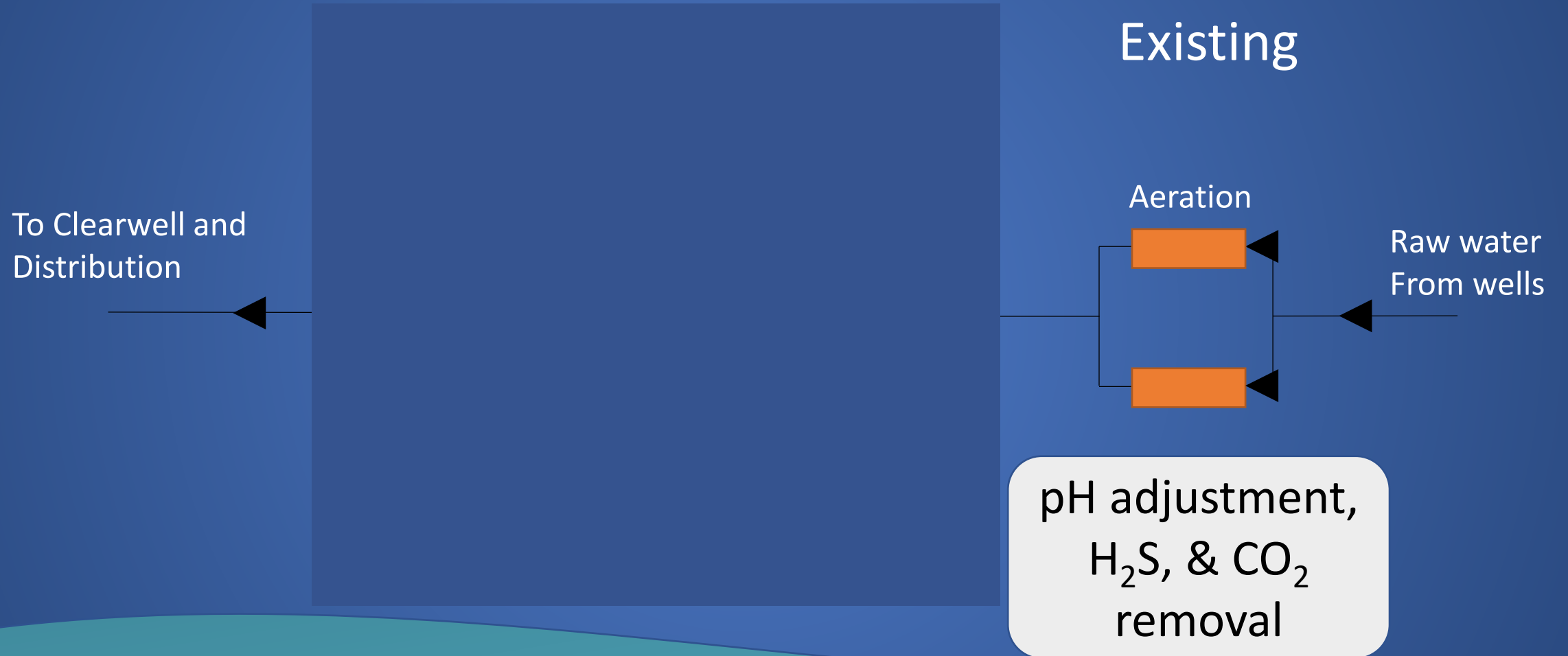
Existing Treatment Process



Design Phase – In Process

- Maintain/improve existing 13-year facility
- Greensand Plus System for Fe/Mn removal.
 - Remove Fe/Mn to below SMCLs and City target.
- GAC for PFAS removal.
 - Remove PFAS concentrations to below the EPA proposed MCLs

Proposed Treatment Process



Proposed Schedule

- Design through 2025.
- Construction - TBD
- Pursue Funding:
 - City has applied for the following funding opportunities: DWSRF, CDS, and Additional DWGTF – *all unsuccessful so far.*
 - City will engage DES once design is advanced showing the need for Cocheco Well.

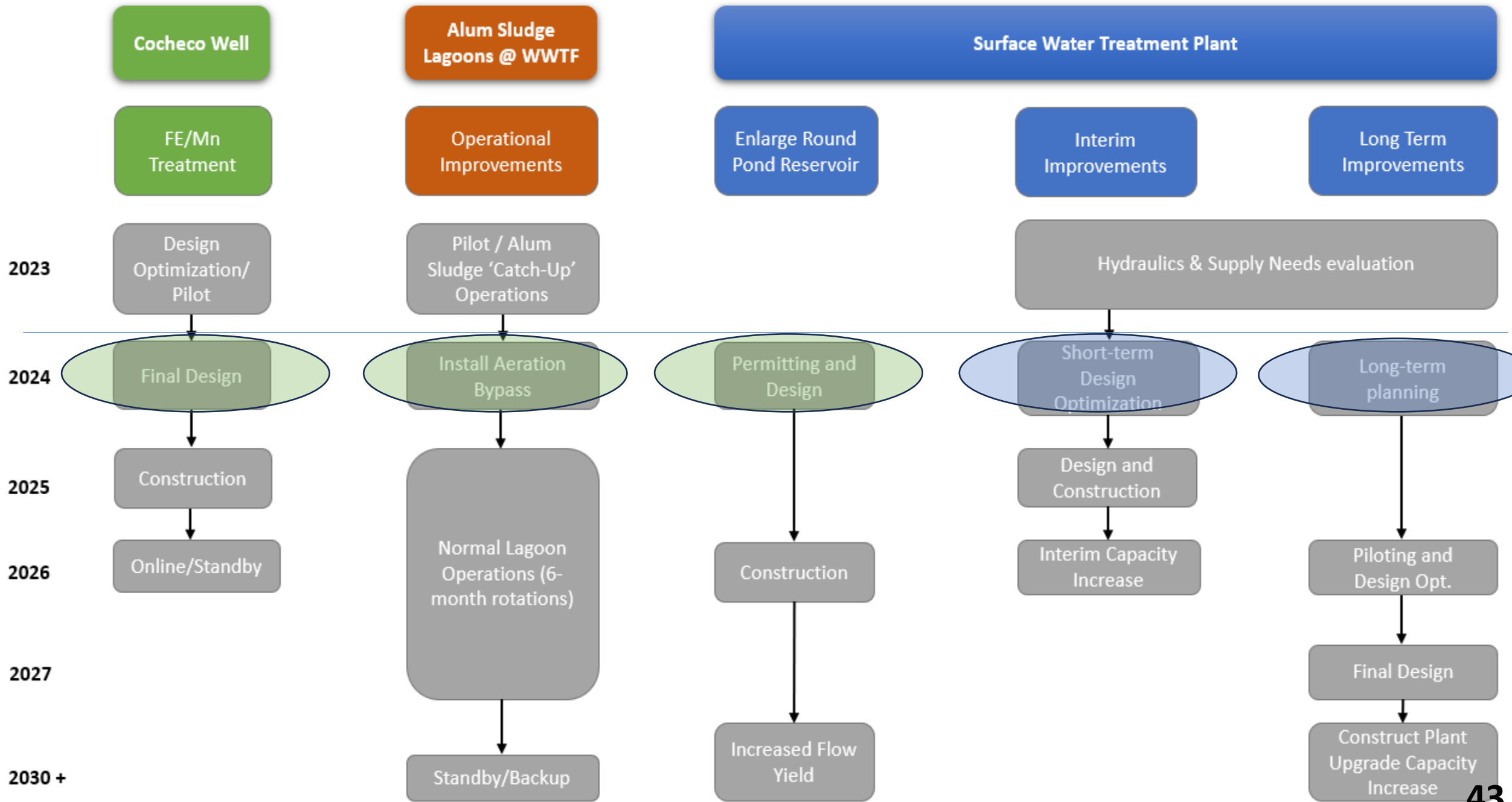
Road Map for Improvements All Sources

Recommendations – Near Term

- Complete Round Pond Reservoir
- Advance Surface Water Treatment Plant Interim Improvements
 - Hydraulics
 - Residuals
- Advance treatment at Cocheco Well
 - Fe/Mn and PFAS

Recommendations – Long Term

- Plan for Long-Term Improvements at Surface Water Treatment Plant
- Consider 3rd Groundwater Source if Needed and Cost Effective



Planning Costs

Costs

- Planning costs complete to identify cost effective projects
- Next phase of engineering will finalize capital needs

Planning Capital Costs

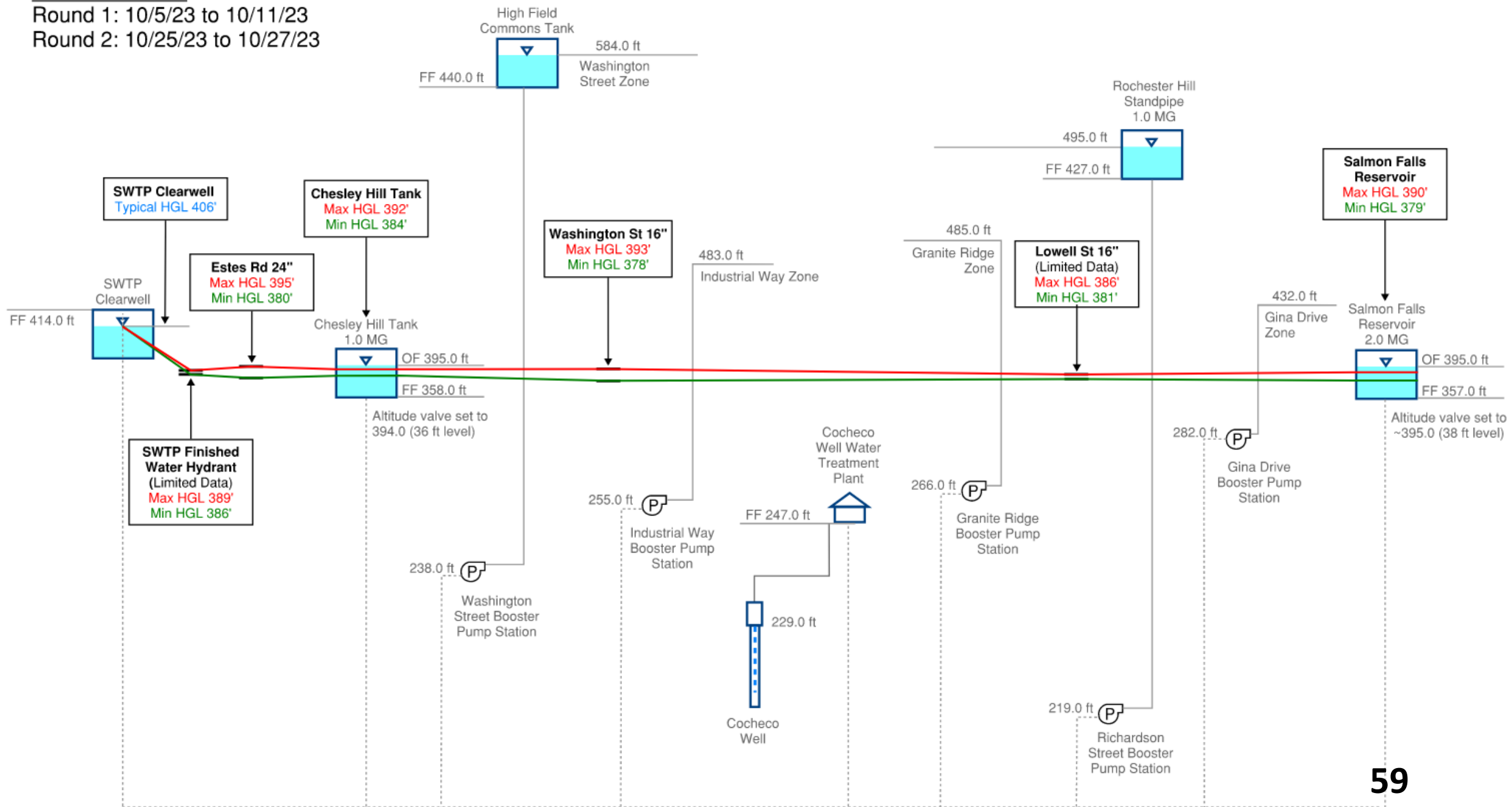
- Surface Water Treatment Plant
 - Round Pond Reservoir = \$8M (In process)
 - Interim hydraulics = \$1M (Design in Process)
 - Long Term = \$30M (2030+)
- Cocheco Well
 - Fe/Mn = \$13.8 (Design in Process)
 - PFAS = TBD
- New Sources (TBD – 2040 or beyond)
 - \$5 to \$17M

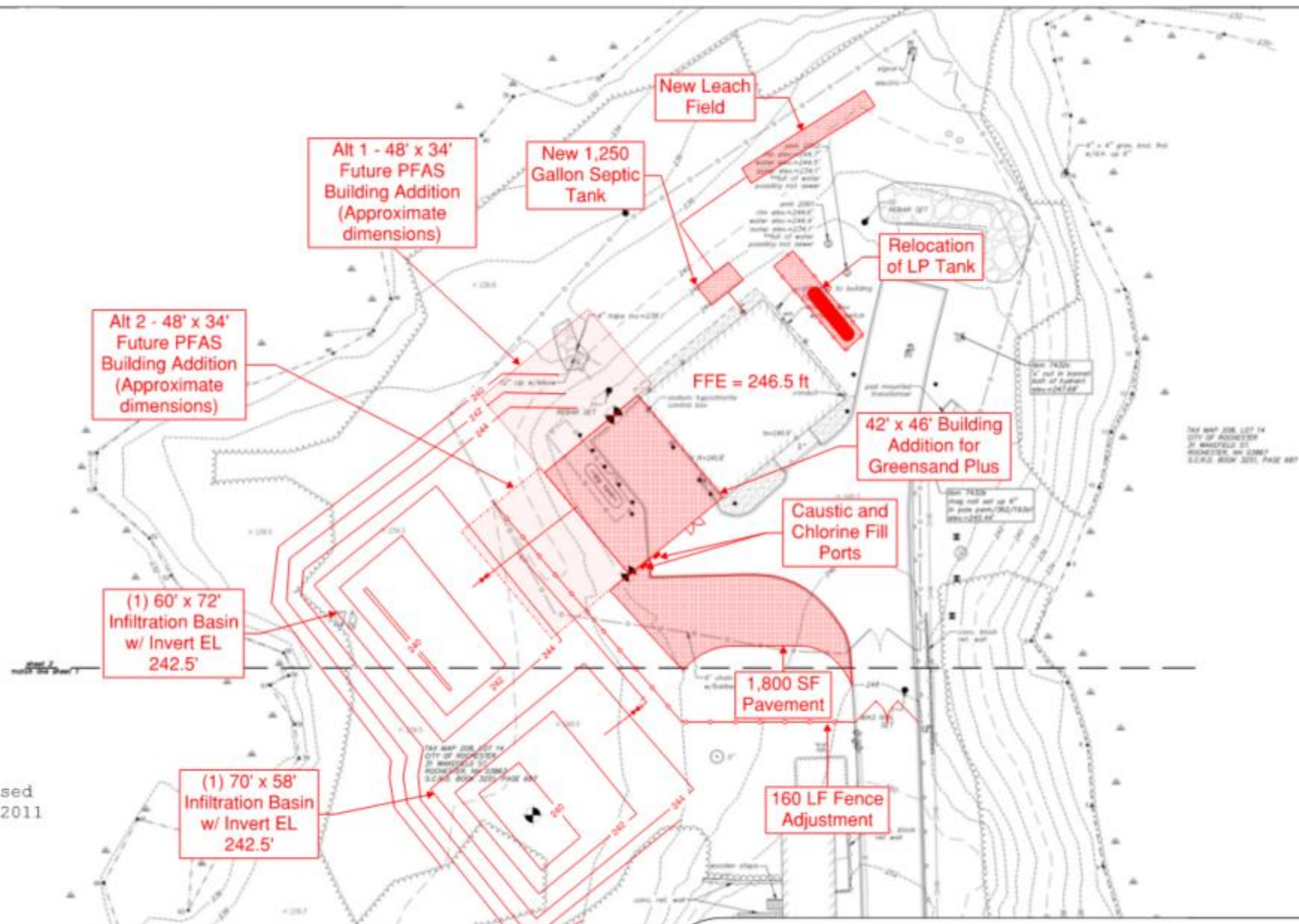
Questions

Data Collection

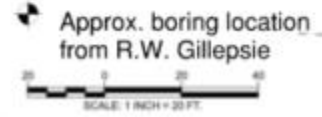
Round 1: 10/5/23 to 10/11/23

Round 2: 10/25/23 to 10/27/23





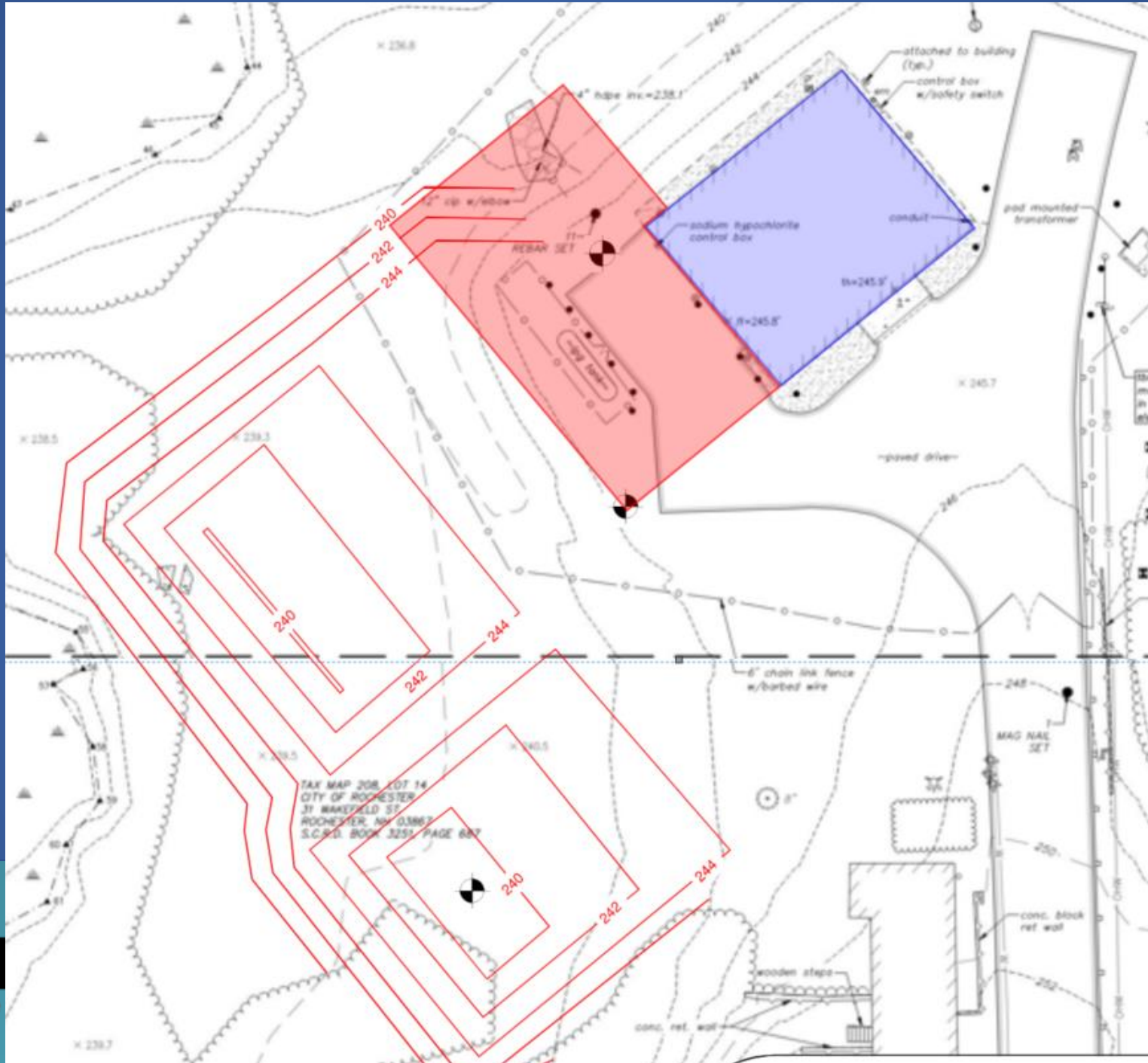
Note: Site plan based map from November 2011 Cocheco Well No. 1 Water Treatment Facility Record Drawings by Wright-Pierce

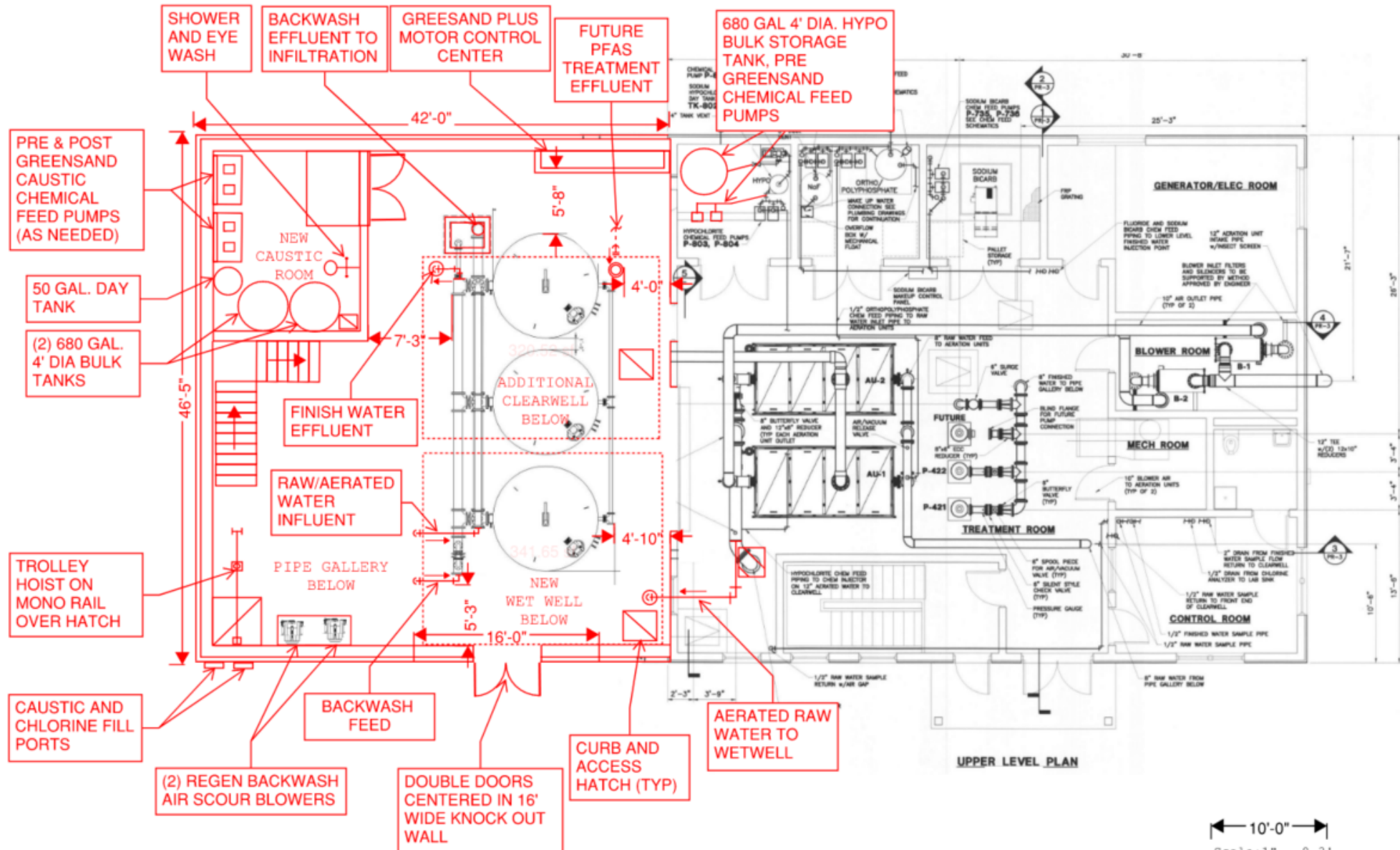


DATE 6/2023	 UNDERWOOD engineers
PROJECT 2815	
25 Vaughan Mall, Portsmouth, N.H. 03801 Tel. 603-436-6192 Fax. 603-431-4733	

PROPOSED SITE PLAN
 COCHECO WELL DESIGN OPT.
 ROCHESTER, NH

FIG.
 10
60





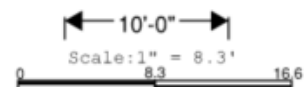
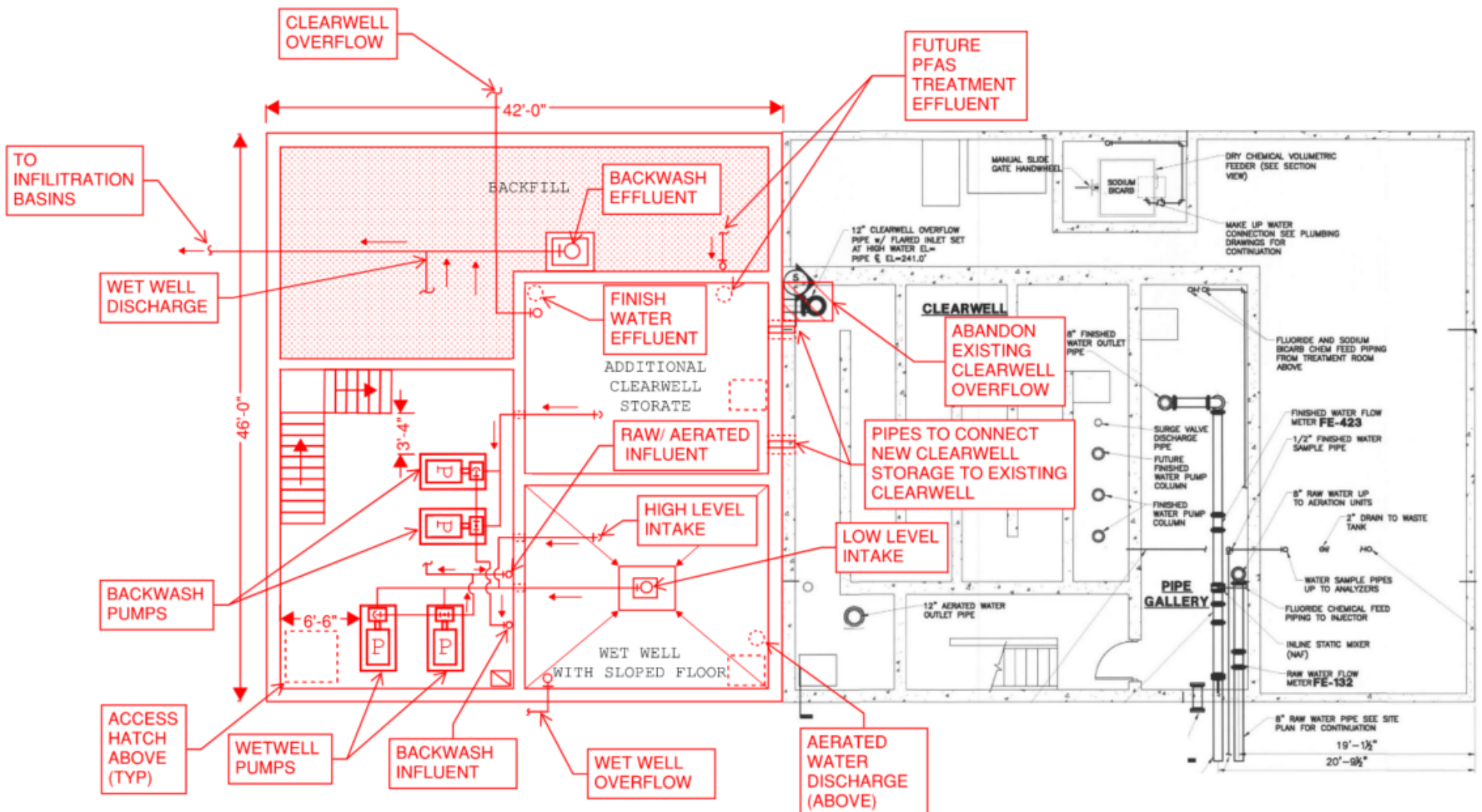
DATE	6/2023
PROJECT	2815

UNDERWOOD
engineers

99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

PROPOSED FLOOR PLAN -
UPPER LEVEL
COCHECO WELL DESIGN OPTIMIZATION
CITY OF ROCHESTER, NH

FIG. 862



DATE	6/2023
PROJECT	2815

UNDERWOOD
engineers

99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

PROPOSED FLOOR PLAN
LOWER LEVEL
COCHECO WELL DESIGN OPT.
CITY OF ROCHESTER, NH

of-way without approval from the Department.

Safe passage shall be maintained for all vehicles once a certificate of occupancy is issued on a private highway. The highway shall be accessible for residences, emergency vehicles, and service vehicles as determined by the Department of Public Works and the Fire Department. Safe passage shall include winter maintenance, general highway surface repair, and maintenance of all infrastructure such as lighting, fire hydrants, and sidewalks.

The City Council may change the name or address assignment of any private highway when necessary to conform to the requirements of the enhanced 911 telecommunications system (RSA F231:133, 231:133-a).

Residential owners of property which derive enjoyment from a highway not maintained by the City shall contribute equally to the reasonable cost of maintaining the private road and damaged occasioned to the highway by an abutter shall be corrected at that abutter's expense (RSA 231:81-a).

§ 223-32. Private Construction on a Class VI or Private Highway:

Private construction on Class VI highways shall be restricted to the approved uses per Chapter 275 Zoning and City process procedures.

The procedure for construction on a Class VI or private highway shall be:

The developer or its agent shall submit a Site Plan or Subdivision application to the Planning Department to request the authorization of Building Permits on a Class VI or private highway. The application shall address all requirements of Site Plan or Subdivision Regulations.

The application shall also include:

Draft language to be recorded which clearly states the municipality neither assumes responsibility for maintenance of said class VI highway nor liability for any damages resulting from the use thereof in accordance with RSA 674:41.

After review and comment by the Planning Board, City Council shall vote to authorize Building Permits.

Prior to the issuance of a Building Permit, the applicant shall file with the Registry of Deeds a notice of the limits of municipal responsibility and liability in accordance with RSA 674:41.

§ 223-33. Acceptance of Privately Constructed Highways as Public Highways.

No proposed new public highway with or without new public sewer or water, public improvements, developer contributions, or any combination of the above, shall be laid out, accepted or constructed which is not subject to review and approval by the Planning Board,

EXCERPT
CHAPTER 223
HIGHWAYS &
SIDEWALKS,
AMENDMENT 12/23



recommend for acceptance by the Department of Public Works and approved by the City Council (RSA 674:36).

A private highway shall not be considered for acceptance until a minimum of 75% of dwelling units or structures have obtained certificate of occupancy and any infrastructure required to support full function of at least such number of units is completed and functioning adequately as determined solely by the Department. Notwithstanding this section, the City shall release surety partially as appropriate to reflect achievement of progress goals towards completion of the infrastructure in accordance with approved plans and City construction standards.

All private highway construction which may be intended for acceptance as City highways shall be subject to surveillance by the City. Developers shall accommodate all such inspections and execute any corrective action required by the City to comply with City Standards.

The City will not normally accept highways or segments of highways for acceptance that would be subsequently used to support construction activities related to further build out of private highways and infrastructure that may be considered for acceptance.

Developers are responsible for all maintenance and services to highways intended to be petitioned for acceptance until such acceptance is final. Such services include but are not limited to trash pickup and snow and ice removal.

The degradation of a highway intended to be petitioned for acceptance shall not be considered for acceptance until it has been rebuilt or restored to the Department's standards.

The procedure for public highway acceptance shall be:

- A. The developer or its agent shall submit a written petition to the City Clerk on behalf of the City Council for acceptance of a private highway as a City highway. The developer or its agent shall provide three copies of the letter each for the Planning Department, Public Works Department and Legal Department.
- B. The letter shall include:
 - a. Construction reports of materials testing data, certified by an independent, qualified source in paper and electronic format.
 - b. All inspection reports and photos.
 - c. Technical literature and data for all elements of the infrastructure including pavement design, pavement bases, utility pipes, water test results of pressure, disinfection, sewer manhole vacuum, sewer mandrel, video of water and sewer pipe interiors, pump stations and appurtenances in paper and electronic format.
 - d. Drainage maintenance agreement signed by the owner.

- e. Descriptive deed, which details any fee title property and infrastructure that will be owned by the City and that which will be owned and maintained by a Homeowner's Association, if applicable, in paper and electronic format
 - f. Copy of drainage/utility and/or other easements in descriptive language in paper and electronic format
 - g. Recordable as-built plans in paper and electronic format
 - h. Full set of record drawings to include final survey plan showing all project improvements in paper and electronic format
 - i. A security in the form of an irrevocable letter of credit or passbook to guaranty that all site work was properly done to be posted by the applicant with the Department, which shall place the security with the City Treasurer. Such maintenance guaranty shall be in an amount of 2% of the value of the infrastructure intended to be conveyed to the City established in the City's schedule of values for such improvements and such values as are updated to reflect current values at the time of the petition. Elements shall include full cost of replacement for all street trees and other landscaping required, roadway, drainage and pedestrian facilities, and in force for three years after the date of City acceptance. If such repairs are required of the City following acceptance due to improper installation by the developer, such guaranty shall be used to implement corrective actions.
- C. The Department of Public Works will make a recommendation to the City Council for public highway acceptance when the following have been met:
- a. Resolution of any construction quality issues to the satisfaction of the Department to include restoration of damaged pavement even if such damage is due to age, consistent with sound trade practice.
 - b. All on or off-site improvements or contributions required by the Planning Board and Department of Public Works are complete and functioning as determined by the Department.
 - c. Final wear surface of asphalt pavement installed on all highways and sidewalks and all associated striping and signage.
 - d. All final grades, elevations and final vegetation within the right of way are complete, established and functioning as determined by the Department of Public Works
 - e. Drainage ditches have been stabilized; where grass is the stabilizer, a minimum of 90% growth has occurred as determined by the Department.
 - f. All stormwater, drinking water and wastewater facilities are complete and functioning as determined by the Department of Public Works
 - g. All on-site amenities such as highway trees, walking paths, gazebos, highway furniture, other structures, and landscaping required by the Planning Board are complete and functional as determined by the Department of Public Works
 - h. Adequate surety remains to complete the balance of the work as approved by the Planning Board

- i. A minimum of 75% of dwelling units or structures have obtained certificate of occupancy and all infrastructure required to support full function of at least such number of units is completed and functioning as determined by the Department of Public Works
- D. The City Council shall hold a public hearing on the proposed acceptance with public notice furnished by the City by certified mail (RSA 231:10). Upon acceptance by the City Council as a City highway, the following shall be submitted to the City Clerk with copies to the Planning Department, Legal Department and Department of Public Works within 30 days:
 - a. Signed warranty deed(s), easements, Home Owner Association covenants, stormwater management plans, if applicable and stamped recordable plan(s) for recording by the City Clerk
- E. The acceptance of a private highway as a public highway shall not be construed to confer upon the municipality any notice of, or liability for, insufficiencies or defects which arose or were created prior to such acceptance (RSA 231:92).

§ 223-34. Naming of Public Highways.

- A. Proposed highway names shall be approved by the City Council. Proposed names shall be submitted to the Planning and Development Department by application of private owner, developer or dedicator. The proposed name shall be reviewed by the E911 Committee. Following review the name and such name shall be presented to the City Council for approval. Naming assignments shall be issued by letter to the applicant with copies to City departments and the State E911 Unit within the Division of Emergency Services and Communications (RSA 231:133).
- B. The City shall not be bound by any name previously assigned to the highway, highway or right-of-way by the private owner, developer or dedicator. No name for a highway, highway, or right-of-way shall be selected which is already in use, or which is confusingly similar to any other existing name, or which otherwise might delay the locating of any highway in an emergency. Names of highways shall not duplicate or bear phonetic resemblance to the name of existing highways within the City (RSA 231:133)
- C. The City Council may change an existing name on any public or private highway at any time when in its judgment there is occasion for so doing such as in adherence to the requirements of the enhanced 911 telecommunications system (RSA 231:133)..
- D. Whenever a change in name is proposed to any highway or right of way, the E911 Committee shall make a recommendation to the City Council. Once approved, the E911 Committee shall make a record of a new name or name change and shall forward a copy of such record to the Department of Transportation, in accordance with the requirements of RSA 231:133, as presently enacted or in accordance with the corresponding provisions of any recodification or amendment thereof. In the process of assigning names to highways, highways and right-of-way, the E911 Committee shall follow the New Hampshire Addressing Standards Guide, to the extent possible: