

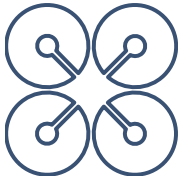
# Hazen



## Water District No. 2 Water Treatment Plant Upgrade

June 10, 2020

# Agenda



Current  
Treatment  
System



Projected  
Future  
Demand



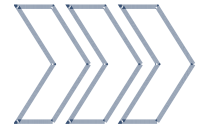
Safe Yield



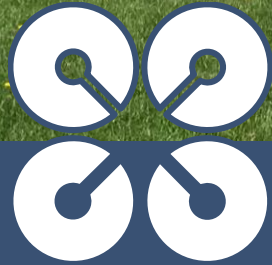
Treatment  
Evaluation



Conceptual  
Facility Cost



Next Steps



# Current Treatment System

# Existing Aerial View

LAKE GLENEIDA

INTAKE PUMP STATION AND METER PIT



EXISTING WATER TREATMENT PLANT SITE (1744 US ROUTE 6)

PARENT PARCEL (55.6-1-28)



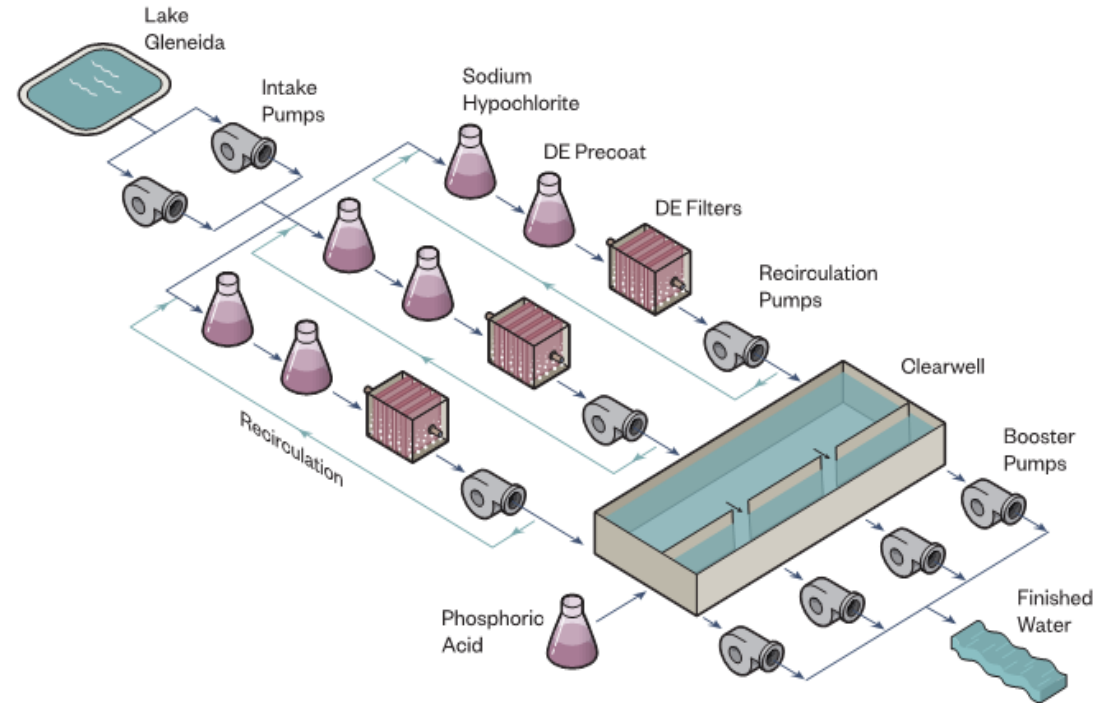
# Existing Plant

- Built Circa 1976
- Constrained Site
- Permitted Daily Capacity 1.0 MGD
- Treatment Process 3 Diatomaceous Earth (DE) Filters
- Reported Issues
  - Aging Equipment**
  - Carry over of DE to Distribution System**
  - High Amount of Wasted Backwash Water (up to 12%)**
  - Impact on CSD2 Plant**
  - High Operations Cost**

# Existing Plant



# Existing Process Schematics

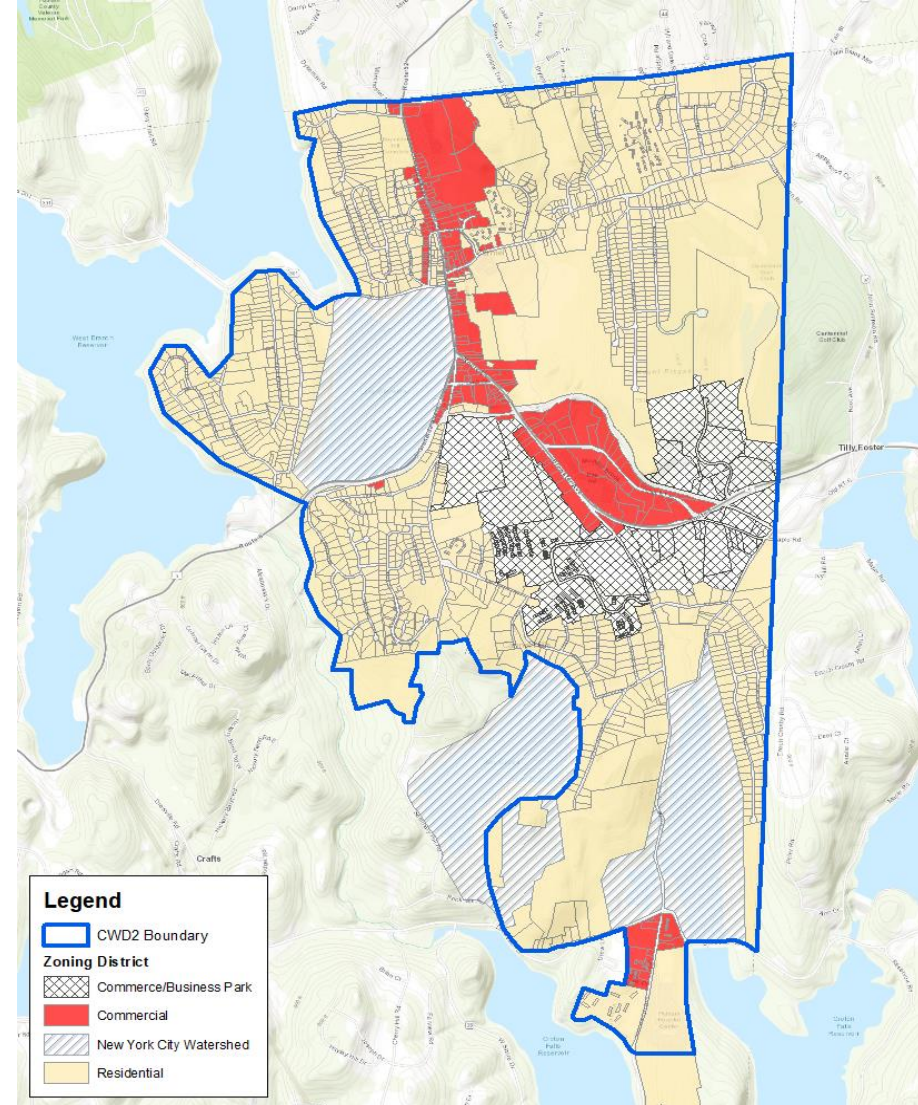




# Future Demand

# Current Zoning

	Acreage	Percent of Total Acreage
Residential	1,765	40.9%
Commercial	521	12.1%
Commerce/Business Park	762	17.6%
New York City Watershed	1,268	29.3%
Recreation/Trailways	6	0.1%



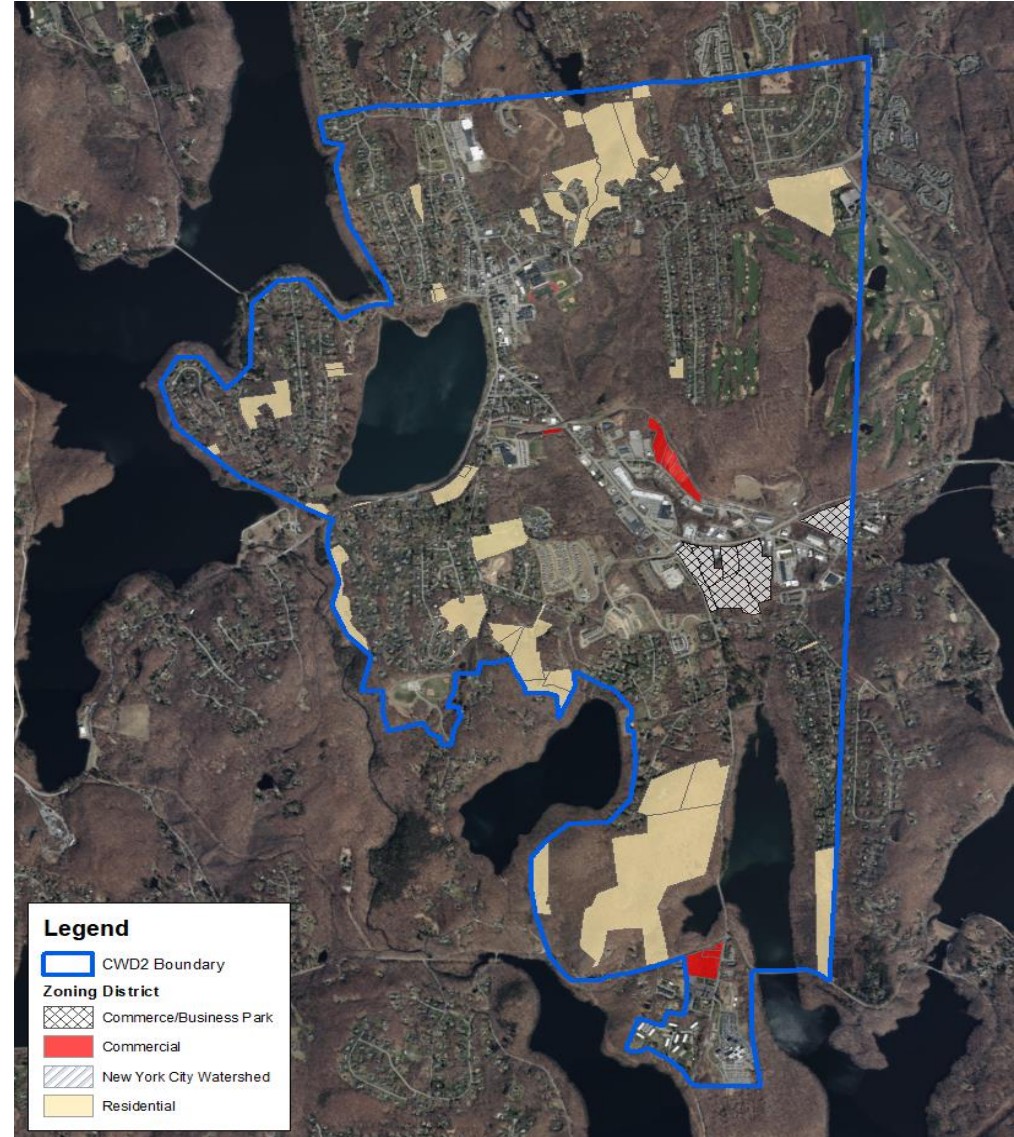


# Planned Developments and Vacant Parcels over 1 Acre

	Development Name	Zoning Type	Estimated Indoor Water Demand (gpd)
1	Hillcrest Commons	Residential	33,400
2	Fairway Townhouses	Residential	33,400
3	Gateway Summit	Commerce/Business Park	80,230
4	Alexandron Group Distillery	Commercial	161,055
5	The Hamlet at Carmel	Residential	13,200
6	RPK Precision Homes	Residential	5,675
7	The Retreat at Carmel	Residential	3,850
8	Hillside Court	Residential	510
9	Tompkins Recycling	Commercial	375

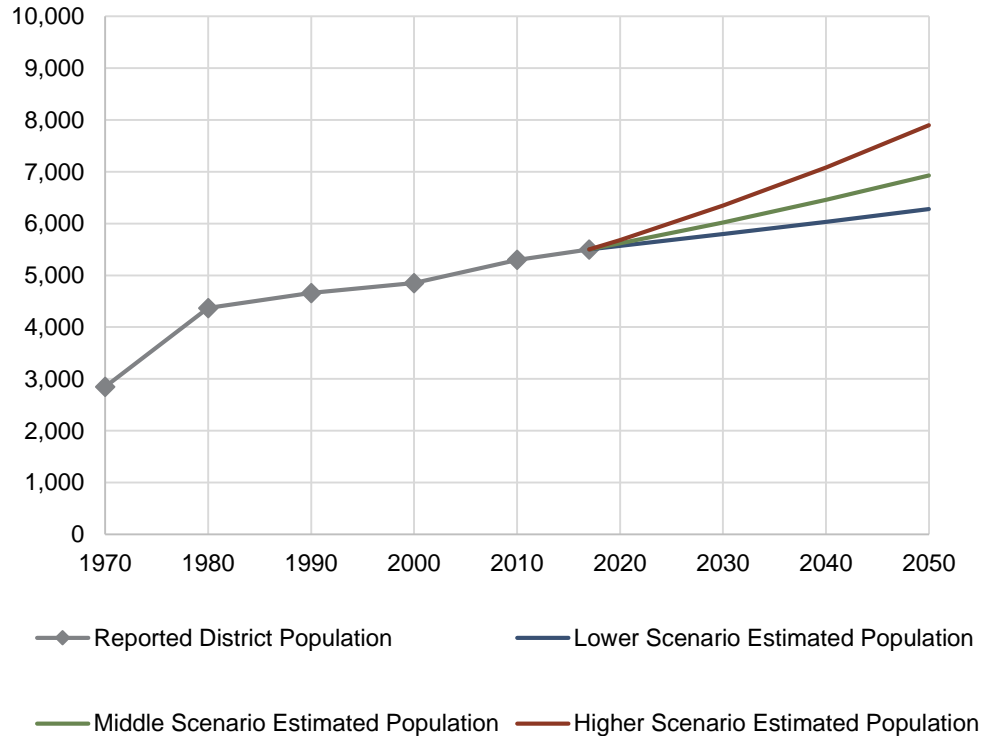
**Total: 331,695**

Vacant	Estimated Total Acreage of Vacant Land	Estimated Useable Acreage of Vacant Land
Residential	335	208
Commercial	20	16
Commerce/Business Park	52	47



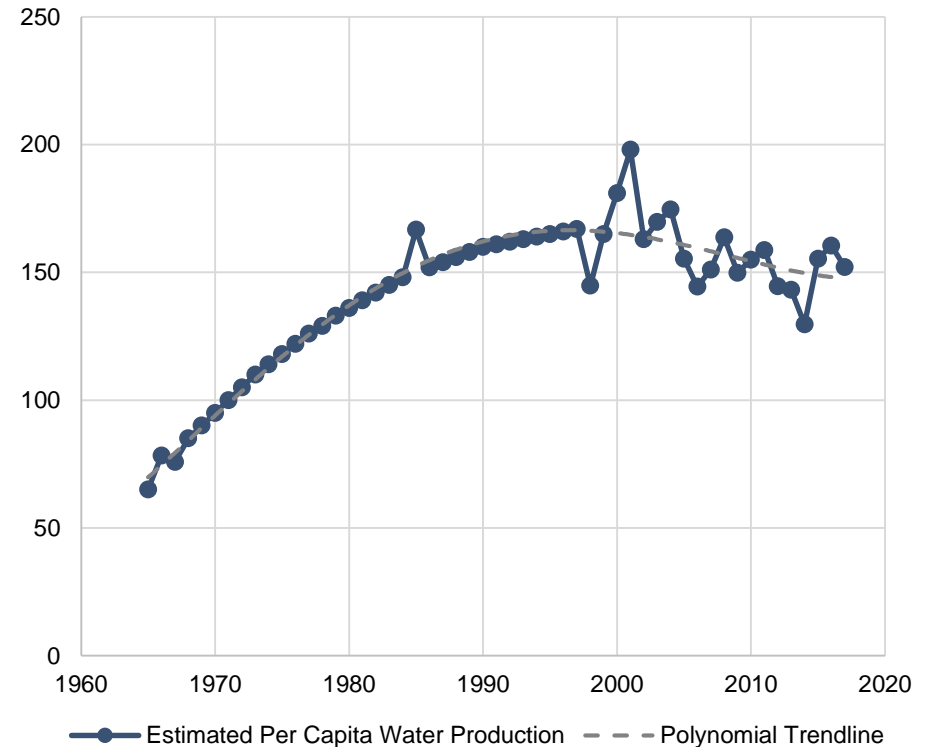
# District Population

(Total Population)



# Demand per Capita

(Gallons per Day per Person)



## Average Daily Demand (MGD)

Year	Lower Scenario Estimated Water Demand	Middle Scenario Estimated Water Demand	Higher Scenario Estimated Water Demand
2030	0.75	0.90	1.08
2040	0.78	0.97	1.20
2050	0.82	1.04	1.34

Raw Water Supply

## Maximum Daily Demand (MGD)

Year	Lower Scenario Estimated Water Demand	Middle Scenario Estimated Water Demand	Higher Scenario Estimated Water Demand
2030	1.21	1.44	1.73
2040	1.25	1.55	1.93
2050	1.31	1.66	2.15

Treatment Plant Capacity

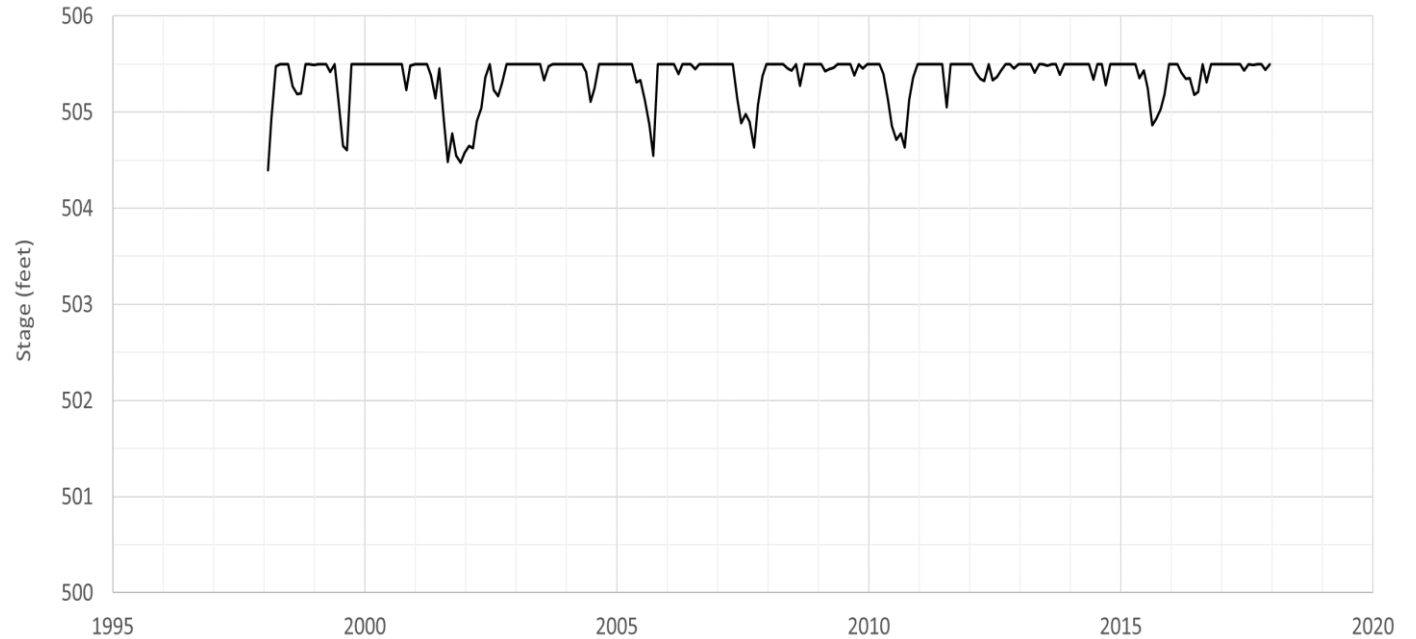
- Recommended Planning for Year 2050 and High End Scenario.



# Safe Yield

# Lake Gleneida

- Relatively Small Tributary Area
- Groundwater Recharge
- Simulation ran 1957 to 2017



Simulated WSEL 0.54 MGD GW and 0.4 MGD Surface Runoff

# Safe Yield Analyzed Options (MGD)

Water Sources	Option 1 Lake Gleneida Supply Only	Option 2 Combined Lake Gleneida and West Branch Reservoir Supplies
Lake Gleneida	0.6 – 1.0	0.6 – 1.0
West Branch Reservoir	0.0	2.0
Lake Mahopac	0.0	0.0
<b>Total Safe Yield</b>	<b>0.6 – 1.0</b>	<b>2.6 – 3.0</b>
2050 ADD	1.34	



# Treatment Evaluation

# Current Finished Water Quality Rules

- Surface Water Treatment
- Lead and Copper
- Radionuclide
- Disinfectant and Byproducts
- NYS Sanitary Code Part 5



# Potential Future Regulations/Concerns

- Revised Lead and Copper
- Perchlorate
- Harmful Algal Blooms
- Disinfection Byproducts
- Per-and Poly-Fluoroalkyl Substances (PFAS)

# Alternative Process Schemes

Qualitative Comparison Categories	Diatomaceous Earth Filtration	Direct Rapid Rate Gravity Filtration	Conventional Sedimentation with Rapid Rate Gravity Filtration	Inclined Plate Settling with Rapid Rate Gravity Filtration	Dissolved Air Flotation with Rapid Rate Gravity Filtration	Direct Membrane Filtration	Membrane Filtration with Pre-Treatment
Facility Size and Capital Cost	+	+	-	-	o	o	o
Operations and Maintenance	-	+	o	o	+	o	o
Treatment Flexibility	-	-	o	o	+	o	+
Energy and Chemical Usage	-	o	o	o	o	-	-
Residuals Handling	-	+	o	o	+	o	o

**Overall**

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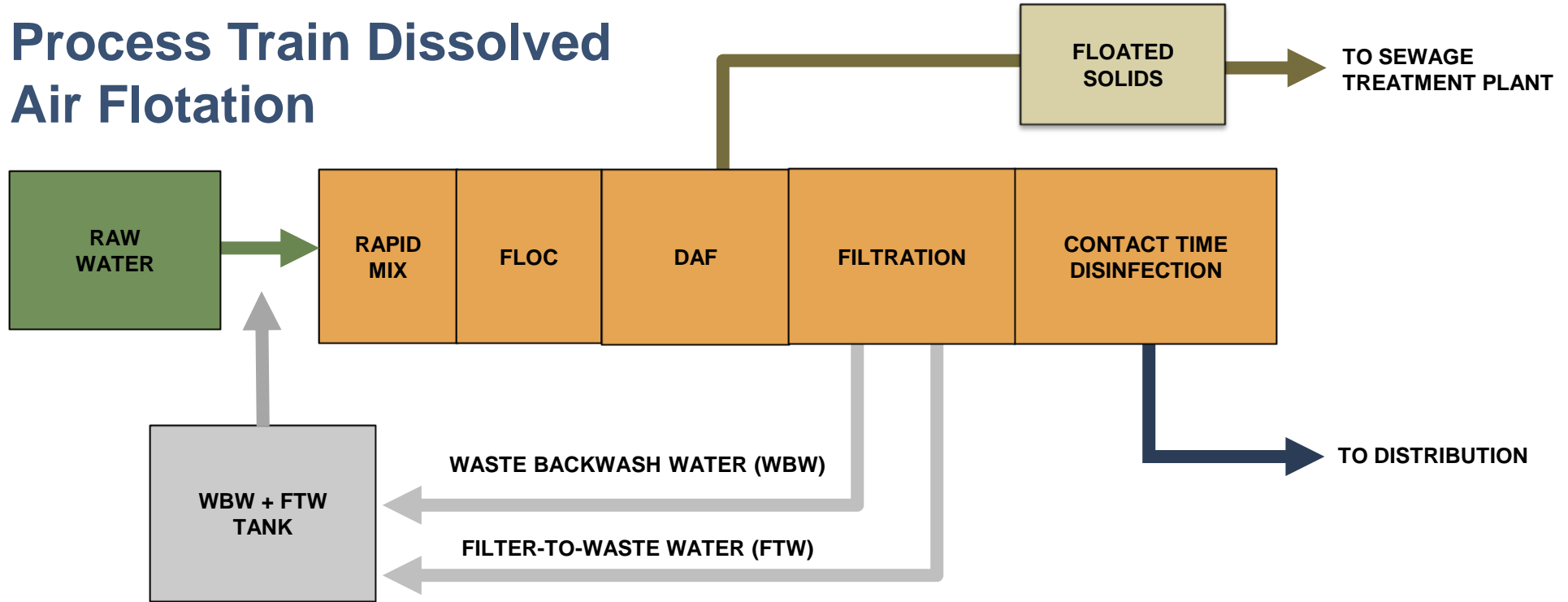
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o

- Negative | o Neutral | + Positive

# Selected Treatment Process Train Dissolved Air Flotation



- Reduces Discharge to Sewer
- Flexible for Change in Raw Water



# Conceptual Facility Cost

# Conceptual Cost Opinion

Item No.	Description	Total Cost Range	
		Low	High
1	General Conditions, Bonds and Insurances	\$1,726,000	\$2,101,000
2	Site Work	\$1,481,000	\$1,802,000
3	Substructure	\$1,696,000	\$2,064,000
4	Superstructure	\$2,095,000	\$2,551,000
5	Treatment Equipment	\$2,377,000	\$2,893,000
6	MEP Fitout	\$2,598,000	\$3,162,000
7	Intake Pump Modifications	\$1,257,000	\$1,530,000
<b>ESTIMATED CONSTRUCTION BASE COST</b>		<b>\$13,230,000</b>	<b>\$16,103,000</b>
8	Land Acquisition and Easements	\$600,000	\$1,000,000
9	Engineering Design and Construction Oversight	\$2,400,000	
10	Legal	\$250,000	
<b>ESTIMATED NON-CONSTRUCTION COST</b>		<b>\$3,250,000</b>	<b>\$3,650,000</b>
<b>ESTIMATED PROJECT TOTAL COST</b>		<b>\$16,480,000</b>	<b>\$19,753,000</b>

# Debt Analysis Table (\$)

Fund	15 Years		20 Years		30 Years	
	Low	High	Low	High	Low	High
Cost of Capital Project	16,480,000	19,753,000	16,480,000	19,753,000	16,480,000	19,753,000
Interest	1,742,070	2,088,510	2,758,605	3,304,847	5,075,013	6,085,024
Total Debt Service Cost	18,222,070	21,841,510	19,238,605	23,057,847	21,555,013	25,838,024
<b>Estimated Annual Debt Service Cost (15, 20, 30 year Bond)</b>	<b>1,214,805</b>	<b>1,456,101</b>	<b>961,930</b>	<b>1,152,892</b>	<b>718,500</b>	<b>861,267</b>
Total District Assessed Value	973,481,823	973,481,823	973,481,823	973,481,823	973,481,823	973,481,823
# of parcels	2,346	2,346	2,346	2,346	2,346	2,346
Average Assessed Value	414,954	414,954	414,954	414,954	414,954	414,954
Rate per thousand	0.00125	0.00150	0.00099	0.00118	0.00074	0.00088
<b>Estimated Annual Debt Service Per Taxpayer</b>	<b>517.82</b>	<b>620.67</b>	<b>410.03</b>	<b>491.43</b>	<b>306.27</b>	<b>367.12</b>



# Next Steps

# Next Steps

- Initiate Land Acquisition Process
- Execute Engineering Contract for Design of DAF Plant
  - Submit Report to Putnam County DOH
  - Geotechnical Evaluation
  - Evaluate Reduced Residual Flow on CSD 2 Treatment Plant
- Engage NYCDEP in Discussions