Purpose of the Master Plan

The City of Clearwater Public Utilities Department remains committed to the City's overall quality of life, health, and economy.

The City of Clearwater (City) owns and operates three water reclamation facilities (WRFs) to provide essential wastewater collection and treatment services to a significant portion of Pinellas County (County).

To address the growing population in the County and ensure continued high-quality service for both current and future customers, the City enlisted the services of Black & Veatch to complete a 30-year Master Plan and implementation strategy for the City's three WRFs. While the WRFs have sufficient capacity to meet existing and future average daily flows and loadings, maximum and peak flows and loadings will require improvements before the 2050 planning horizon is completed.

This WRF Master Plan evaluates future strategies of the WRFs, the capacity of existing facilities, and alternatives that may be implemented to consolidate the facilities. The WRF Master Plan also proposes a Capital Improvement Plan (CIP) through 2050, identifying potential new projects to meet future demand.

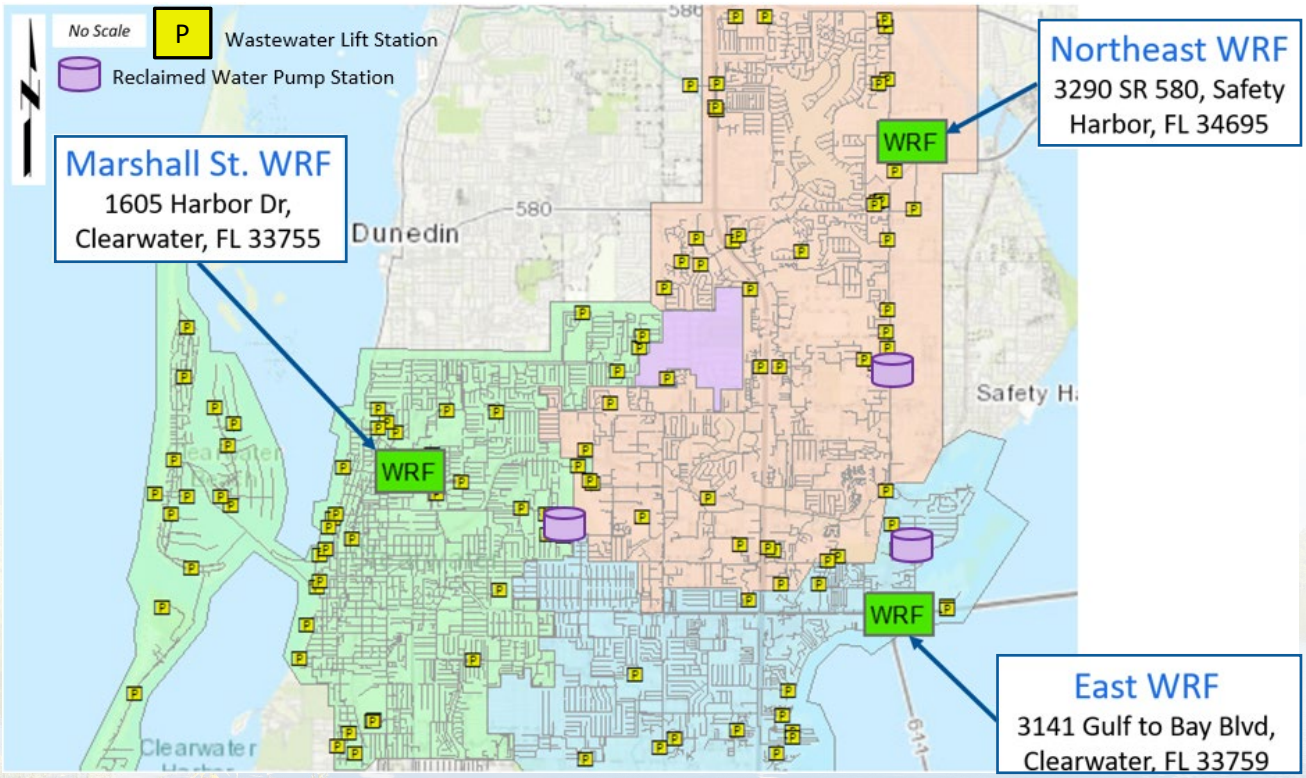
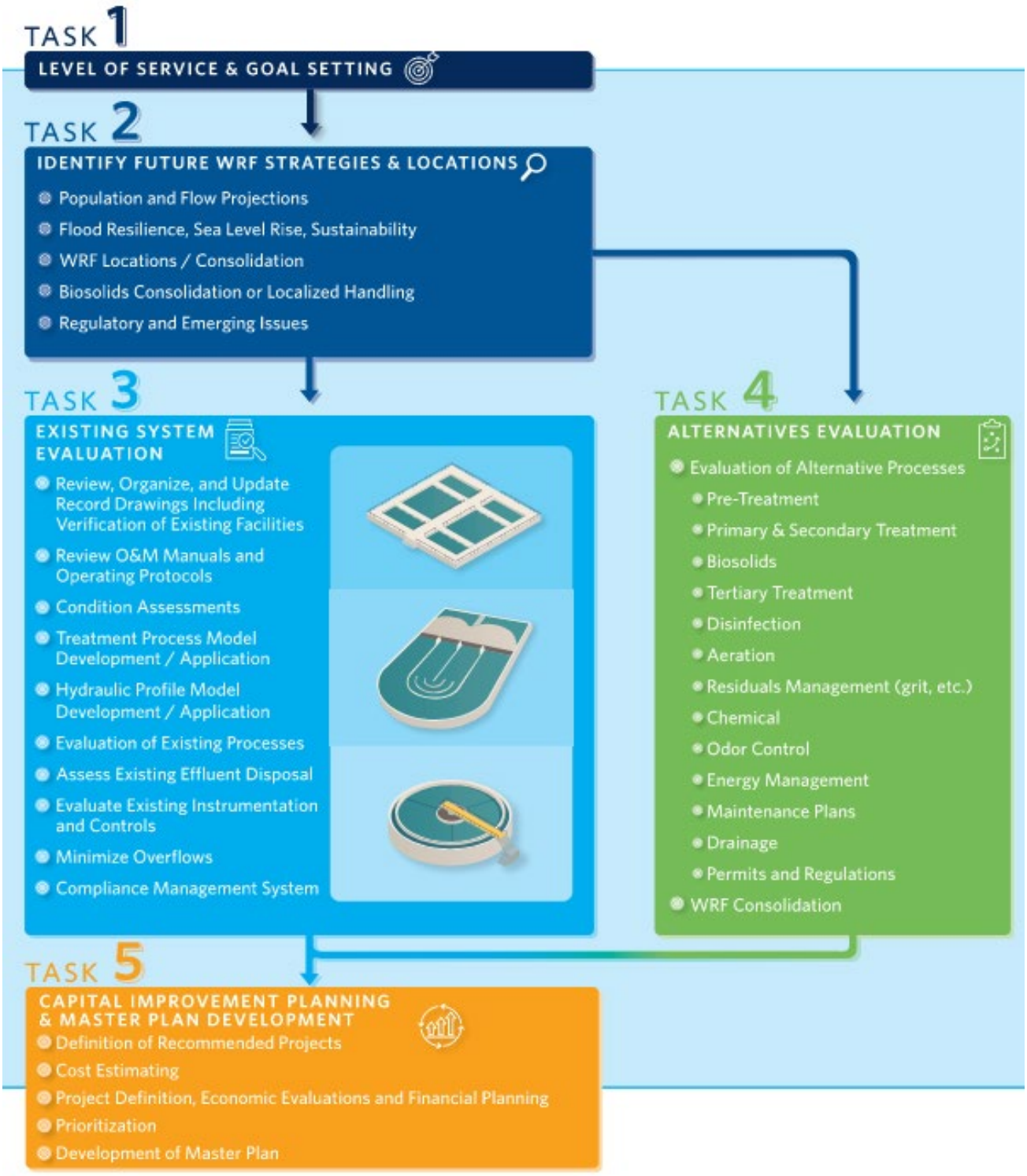


Figure ES-1 **City of Clearwater's Water Reclamation Facilities, Services Areas, Lift Station, and Reclaimed Water Pump Stations**

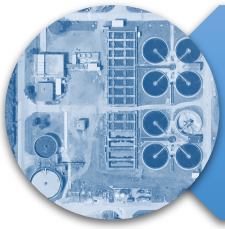
The Master Plan aids in determining current WRF renewal and replacement (R&R) needs and serves as a budgeting and planning roadmap for implementing future WRF modifications and improvements.

The Master Plan included the following Tasks:



Level of Service and Goal Setting

The first step of the Master Plan was to set the level of service goals to be used to determine what the future system configuration would look like. The following categories were used for Level of Service of the WRFs and Goals of the Master Plan.

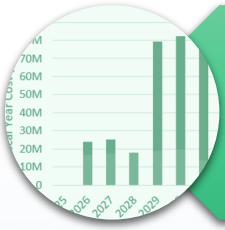


Service Reliability and Resiliency

Operate and maintain infrastructure efficiently to provide a reliable and resilient service to customers.

Sustainability

Manage infrastructure to achieve the Clearwater Greenprint 2.0 sustainability goals and objectives to mitigate climate change impacts and improve resilience.



Financial Responsibility

Ensure responsible financial management through optimization of expenditures.

Safety

Maintain and operate facilities to ensure employee, community, and public safety.

Quality

Produce treated effluent and recycled water that meet or exceed full compliance with regulatory requirements (current and upcoming).

Future WRF Strategies

The Future WRF Strategies task focused on understanding the big picture needs of the three existing WRFs and assessing the impacts to the system from the following categories. The early decision, key to the rest of the Master Plan, ultimately revolved around defining the optimal configuration of the system(s). To consolidate or not to consolidate the three WRF? How to Consolidate?

Initial Assessments:

- Growth / Flow Projections
- High Level Condition Assessment / R&R Needs
- Load Projections
- Effluent Management Strategy Development
- Regulatory Review
- Biosolids Management Strategy Development
- Climate Variability / Costal Hazards Vulnerability

Figure ES-2 Marshall Street WRF Predicted Storm Surge Levels

Consolidation Evaluation

After developing and evaluating six consolidation scenarios, the City's Public Utilities Department and Black & Veatch scored each scenario using seven scoring criteria: System Reliability and Resilience; Maintenance Reliability and Resilience; Ease of Operations; Climate and Environmental Vulnerability; Sustainability; Financial Responsibility; and Public Perception. Scenario No. 2 – Consolidate Marshall Street WRF (MSWRF) and East WRF (EWRF) to Northeast WRF (NEWRF) was scored the highest and proceeded as the recommended consolidation scenario.

On March 3, 2023, City Council approved the complete consolidation of MSWRF and EWRF to NEWRF.

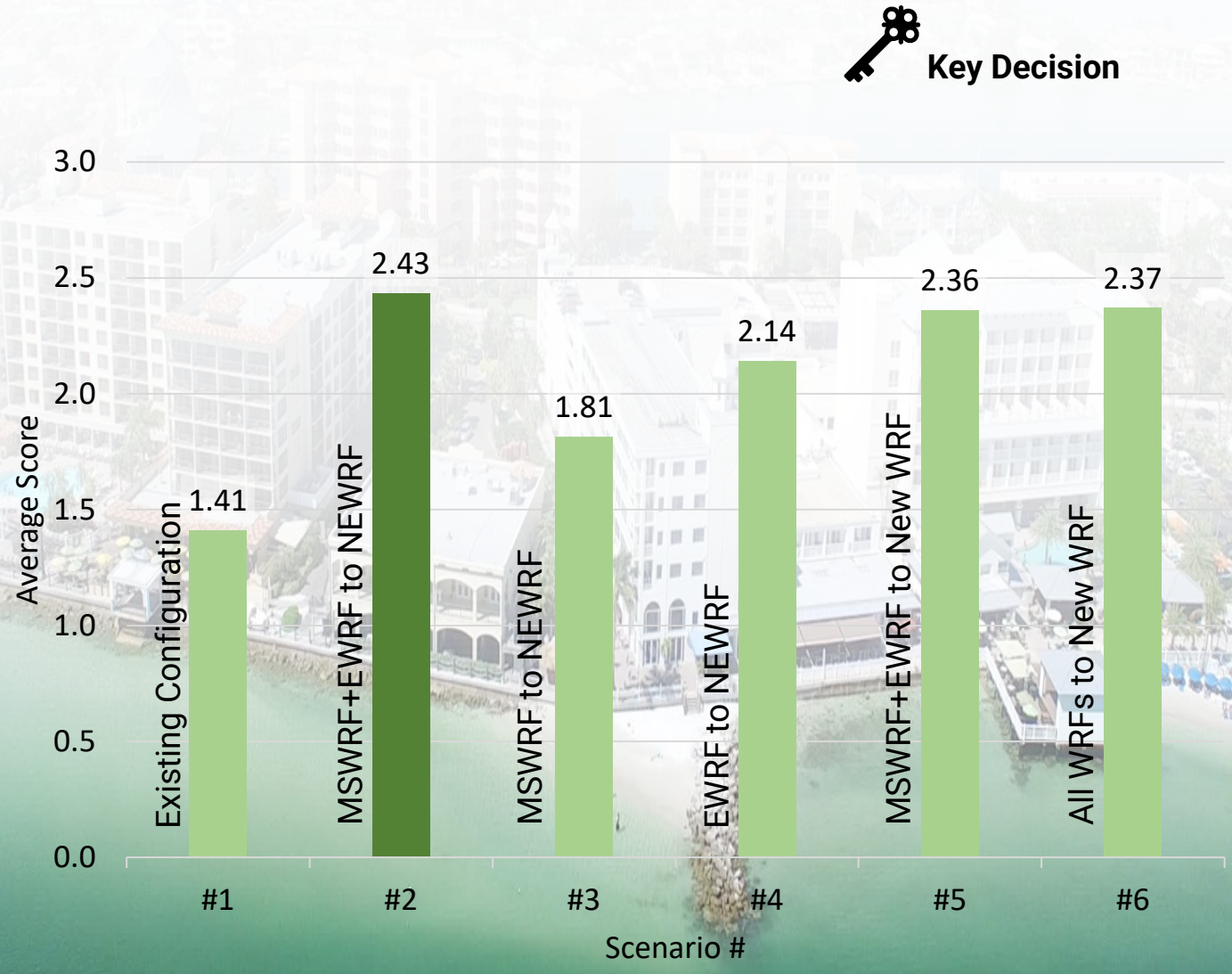


Figure ES-3 Final Consolidation Evaluation Results

Existing System Evaluation

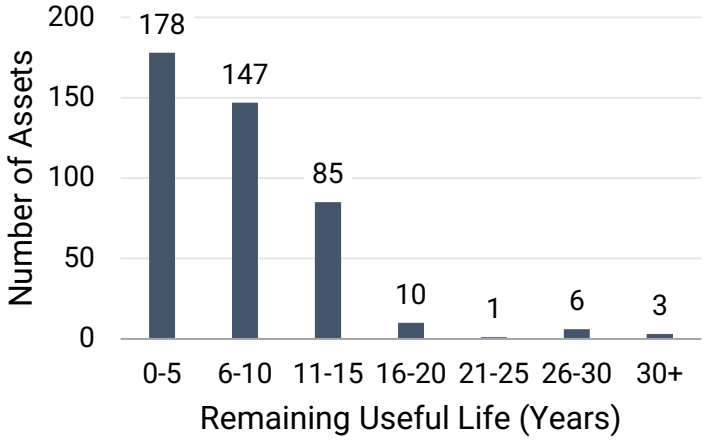
The Existing System Evaluation detailed the state of the existing facilities and processes at the NEWRF to identify issues that need to be addressed over the 30-year planning horizon, as well as to identify any limitations affecting each treatment unit's ability to provide reliable long-term performance. To accomplish the evaluation, nine evaluations were conducted to assess the NEWRF.

Existing System Evaluations:

- Detailed Condition Assessment
- Treatment Model Evaluation
- Building Assessment
- I&C Evaluation
- Record Drawing Review
- Electrical Evaluation
- O&M Manual Update
- Energy and Chemical Use Baseline
- Hydraulic and Pump System Evaluation

While NEWRF generally is in fair condition, many of the assets are approaching the end of their remaining useful life. These results indicate a substantial amount of R&R will need to take place at NEWRF within the next 15 years and helped inform the formulation of CIP projects.

Figure ES-4 Remaining Useful Life of NEWRF Assets

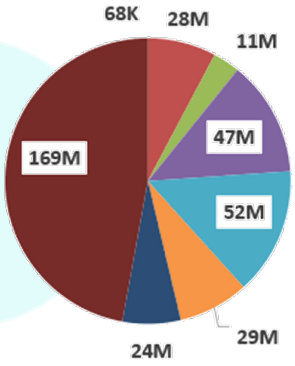


Alternatives Evaluation

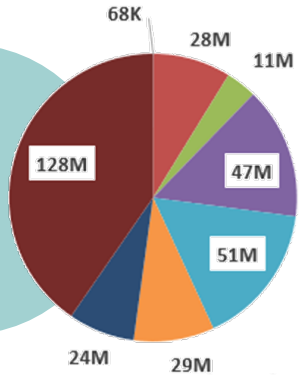
A future process configuration evaluation was performed to determine if the treatment process at NEWRF should remain the same (5-stage Bardenpho process) or be modified to another treatment process to higher optimization. The unit processes for the three short-listed alternatives were evaluated to assess overall feasibility, identify required upgrades for implementation, and ensure alignment with the City's level of service and goals.

Cost estimates were developed based on a holistic and comprehensive series of evaluations to identify the improvement needs for the three biological treatment expansion alternatives. The improvements are categorized into R&R and Expansion projects, and the budget costs for the through 2050 years are summarized below.

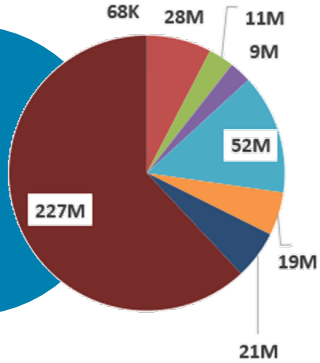
Alternative 1:
32 MGD Peak Flow
Base Case
(5-Stage Bardenpho)



Alternative 2:
32 MGD Peak Flow
Mobile Organic Biofilm
(MOB) System
(Nuvoda) Expansion



Alternative 3: 37.33
MGD Peak Flow
Base Case
(5-Stage Bardenpho)
Increased flows.



Alternative Scoring and Recommendations

The scoring criteria and weighting were first developed during Task 2 Future WRF Strategies to evaluate the City's WRF system, including MSWRF, EWRF, and NEWRF. The criteria and weighting were then revised to align with the City's decision to consolidate MSWRF and EWRF into NEWRF and expand NEWRF to accommodate the combined flow. Black & Veatch met with the City for the Alternative Scoring Results Workshop. During the workshop, participants scored the three alternatives based on the agreed upon criteria. Alternative 3 received the highest score of 2.48 overall, as well as in the categories of System Reliability and Resilience, Maintenance Reliability and Resilience, and Ease of Operations. Therefore, Alternative 3 is the recommended solution / treatment configuration for the future of the NEWRF.

Scoring Criteria	Weight	Alternative No. 1 - Base Case	Alternative No. 2 - MOB System (Nuvoda)	Alternative No. 3 - Base Case - 37.33 MGD Peak Flow
		Score	Score	Score
System Reliability and Resilience	20%	2.39	1.79	2.95
Maintenance Reliability and Resilience	20%	2.62	1.21	2.77
Ease of Operations	25%	2.48	1.71	2.79
Sustainability (Greenprint 2.0)	5%	1.95	2.50	1.67
Financial Responsibility	20%	2.00	3.00	2.00
Public Perception	5%	1.80	1.93	1.45
Schedule	5%	2.20	1.57	1.70
TOTAL	100%	2.32	1.93	2.48

Capital Improvement Planning

A Capital Improvement Plan (CIP) was developed based on the recommended alternatives for expansion, repairs, future pipelines, and other improvements identified in this WRF Master Plan. By prioritizing these projects and investing in the necessary upgrades and repairs, the City is ensuring that it can meet the needs of its growing customer base, maintain customer level of service and increase the resiliency of its infrastructure for years to come.

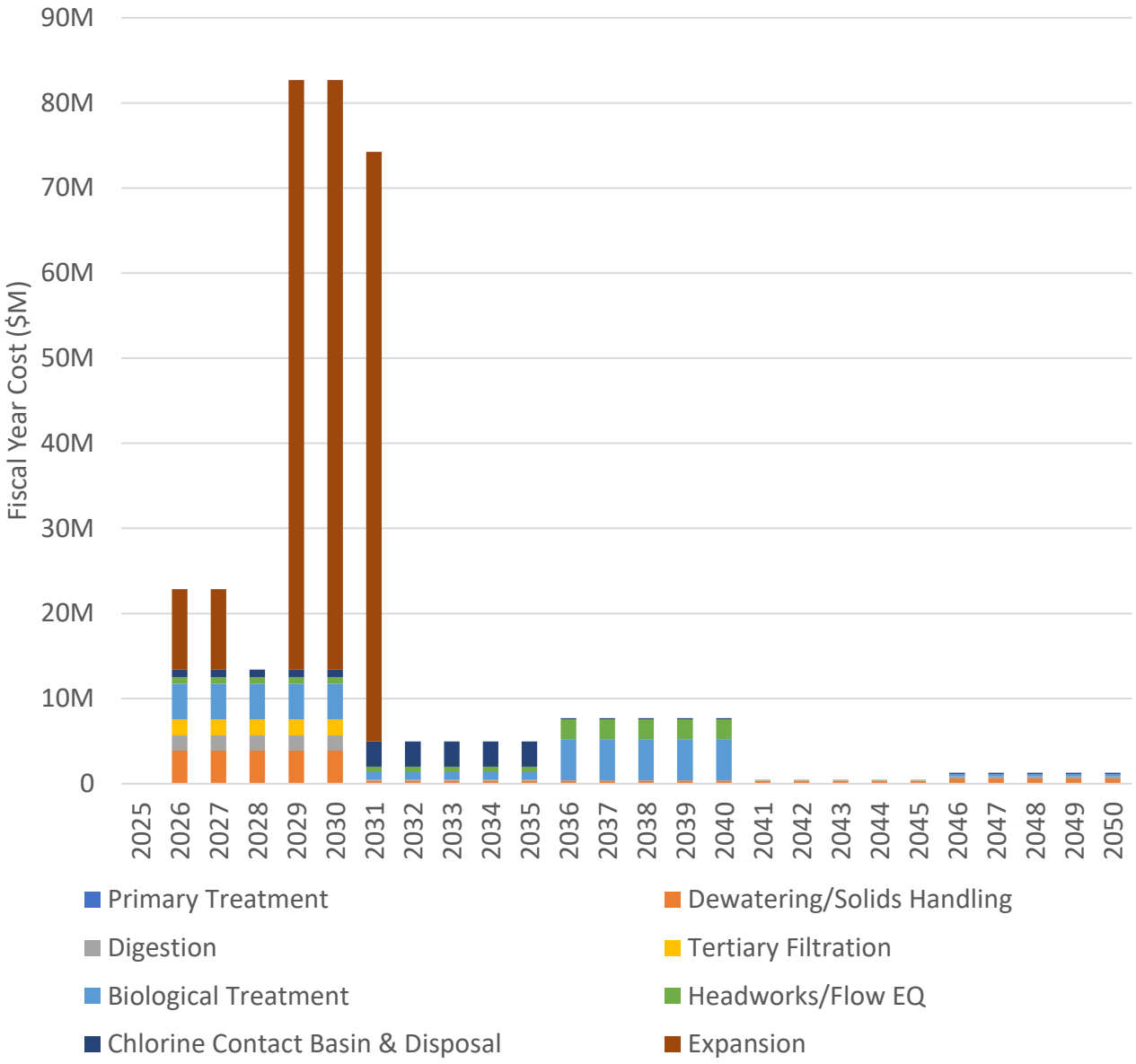


Figure ES-5 Capital Improvement Plan Cash Flow

NEWRF Expansion Project - $227 Million in 2025 Dollars

- Install new headworks building including four mechanically cleaned screens, grit removal, three AquaPrime Mega Disk Filters or other approved equivalent and a 5 MG flow equalization storage tank.
- Install a new 5-Stage Bardenpho Treatment Train including: two fermentation basins, two first anoxic tanks, one oxidation ditch, two second anoxic tanks, and one reaeration tank.
- Install two new secondary clarifiers.
- Install an intermediate pump station to transfer flow from the existing and new secondary clarifiers to the new filter building.
- Install three Aqua MegaDisk cloth media filters or other approved equivalent.
- Install three sodium hypochlorite storage tanks and relocate chemical building.
- Add four pumps to the chlorine contact chambers.
- Install one primary digester and install digester heating and mixing into existing secondary digester.
- Install two centrifuges.
- Install two 5 MGD reclaimed storage tanks.

R&R Projects: 2026 through 2030 - $70 Million in 2025 Dollars

Dewatering/Solids Handling, FOG Removal, In-Plant Pump Stations, Digestion, Effluent, Generators & Fuel Storage, Maintenance Building, Primary Treatment, Secondary Treatment (Biological), Secondary Treatment (Clarifiers), and Tertiary Filtration

R&R Projects: 2031 through 2035 - $22 Million in 2025 Dollars

Blower Building, Secondary Treatment (Biological), Secondary Treatment (Clarifiers), Disinfection, Dewatering/Solids Handling, FOG Removal, Effluent, Digestion, and Generators & Fuel Storage

R&R Projects: 2036 through 2040 - $39 Million in 2025 Dollars

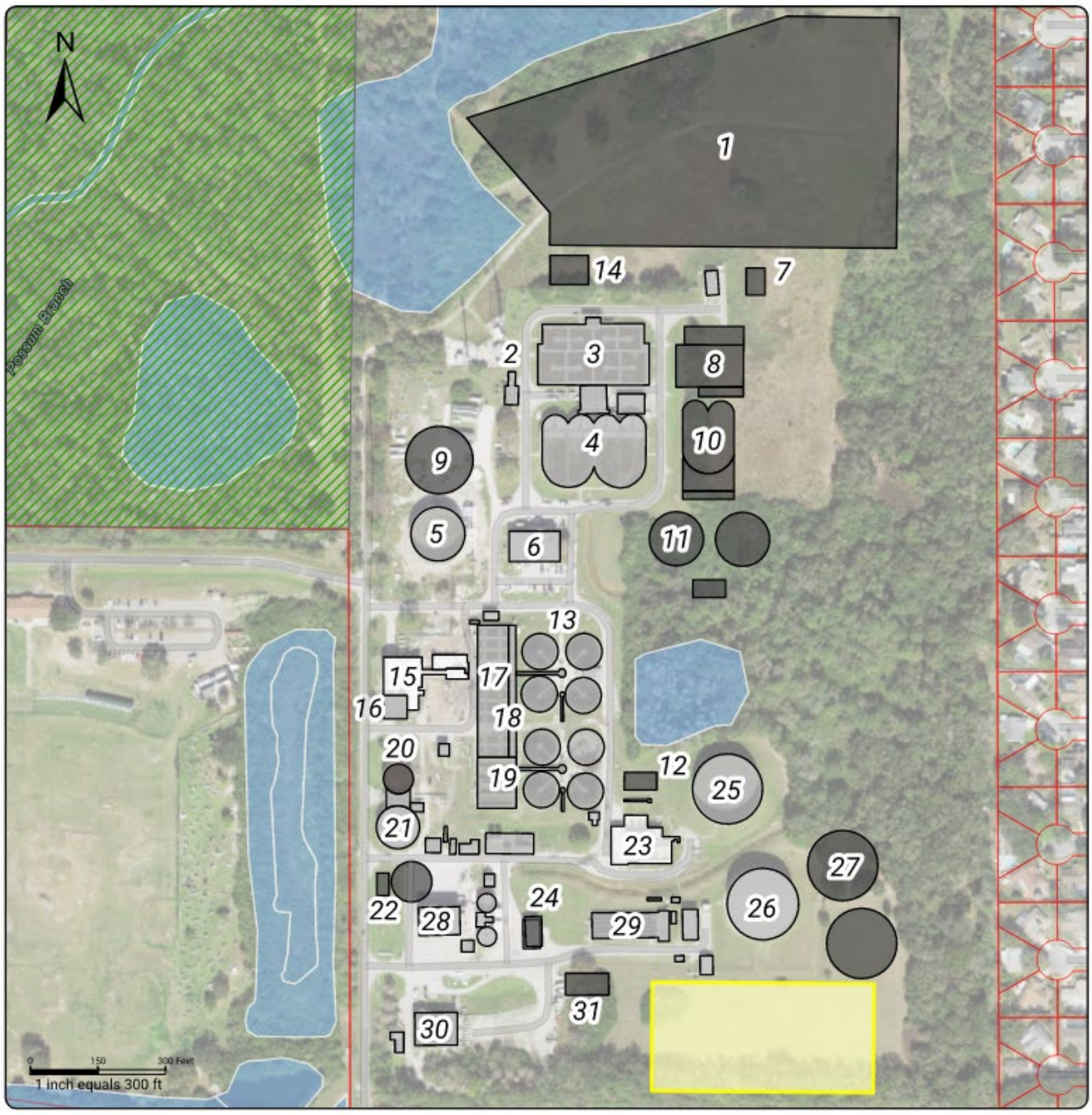
Blower Building, Secondary Treatment (Biological), Secondary Treatment (Clarifiers), Dewatering/Solids Handling, In-Plant Pump Stations, Generators & Fuel Storage, Maintenance Building, and Disinfection

R&R Projects: 2041 through 2045 - $2 Million in 2025 Dollars

Dewatering/Solids Handling, Digestion, and Generators & Fuel Storage

R&R Projects: 2046 through 2050 - $6 Million in 2025 Dollars

Blower Building, Secondary Treatment (Clarifiers), Dewatering/Solids Handling, Digestion, and Disinfection



Clearwater WRF MP - Draft 5-Stage Bardenpho Expansion Figure (37.33 MGD) - 12/11/2025

Clearwater WRF Master Plan

Northeast Water Reclamation Facility

3290 SR 580, Safety Harbor, FL 34695

CLEARWATER
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LEGEND

- Clearwater Parks Department
- Pinellas Parcels
- FL Wetlands
- NEWRF Existing Infrastructure
- NEWRF Planned Projects
- NEWRF New Infrastructure
- NEWRF Infrastructure to be Removed

1. New Solar Field
2. Generator Building
3. Fermentation & 1st Anoxic Tanks
4. Oxidation Ditches
5. Existing Equalization Tank
6. Control Building
7. New Electrical & Generator Building
8. New Fermentation & 1st Anoxic Tanks & New Dry Pit Submersible Pumps
9. New 5 MG Storage Tank
10. New Oxidation, 2nd Anoxic & Reaeration Tanks
11. New Secondary Clarifiers & RAS/WAS Pump Station
12. New Pump Station to Filter Building
13. Secondary Clarifiers
14. New Headworks Building & Primary Filtration
15. Remove Existing Headworks & Primary Filters
16. Sludge Thickening Building
17. 2nd Anoxic Basins
18. Re-Aeration Basins
19. Aerobic Digester
20. Refurbish Secondary Digester
21. Primary Digester
22. New 90' Dia. Anaerobic Digester
23. Remove Tertiary Filters
24. New Filter Building
25. Reject Tank
26. Reuse Water GST
27. New Reuse GSTs
28. Sludge Dewatering Building
29. Chlorine Contact Tank
30. Old Lime Treatment Building
31. Relocate Chemical Building

Alternative No. 3 – 5-Stage Bardenpho Expansion Figure (37.33 MGD Peak)

CLEARWATER
BRIGHT AND BEAUTIFUL · BAY TO BEACH

FINAL

WATER RECLAMATION FACILITY MASTER PLAN

January 2026