

# North Service Area Water System Assessment and Rate Study

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TOWN OF GRANBY



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Prepared by



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## TOWN OF GRANBY

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SGM Project # 8133W

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## 1.0 Executive Summary

The Town of Granby (Town) tasked SGM with developing a Town-wide assessment of water infrastructure, capital needs, tap fees, and water rates. This includes the North Service Area (NSA), South Service Area (SSA) and Morraine Park, but excludes the West Service Area (WSA) for which a separate rate study was completed in 2021. After discussions with the Town, it was decided that an assessment and rate study for the NSA would be prepared first as the capital needs are well known for the NSA and incorporating water rate increases for the area as soon as possible is advantageous.

This report provides a review of previous master planning efforts for the NSA, costs for the needed capital improvements, and water rate increase scenarios to ensure the NSA has adequate funds to continue effective operations and complete the necessary capital improvement projects. The following list summarizes the objectives and results accomplished by this water system assessment for the NSA:

- **Review of 2011 Water Master Plan**
  - Reviewed system deficiencies and recommendations from 2011 Water Master Plan (WMP) for the NSA
  - Updated status of recommendations
- **Capital Improvement Projects**
  - Capital improvement projects, summarized in **Table 1-1** below, were identified to address system deficiencies on two time horizons: 2022-2026 and 2026+
  - Replacing the existing NSA Water Treatment Plant (WTP) and constructing an additional potable water storage tank are critical for system capacity and resiliency.
- **Water Service Rate Study**
  - The identified capital improvement projects were built into a cash flow model along with the existing NSA operating expenses and revenues to project future Water Fund balances.
  - Multiple water service rate increase scenarios were run using the model to determine how the timing of proposed capital improvement projects and increases to the water service rates impact Water Fund balances.

Table 1-1. Recommended Capital Improvement Projects

#	PROJECT DESCRIPTION	PROJECT PURPOSE	ESTIMATED CAPITAL COST - 2022
<b>2022-2026</b>			
1	REPLACE WTP	REPLACE THE EXISTING NSA WTP TO INCREASE RELIABILITY AND TREATMENT CAPACITY	\$15.60M EXISTING SITE \$21.0M NEW SITE
2	500,000-GALLON POTABLE WATER STORAGE TANK	ELIMINATE POTABLE WATER STORAGE DEFICIENCY FOR THE NSA	\$2.50M
<b>2026+</b>			
3	RESERVOIR FEASIBILITY STUDY <sup>1</sup>	IDENTIFY TECHNICAL, LEGAL, LOGISTICAL AND ECONOMIC FEASIBILITY OF DEVELOPING A NEW ROUGHLY 100-AF RAW WATER RESERVOIR IN THE GRANBY AREA.	\$0.10M
4	100-AF RESERVOIR WITH APPURTENANCES <sup>1</sup>	PROVIDE PHYSICAL WATER SUPPLY REDUNDANCY FOR THE TOWN'S POTABLE SYSTEM.	\$2.90M
5	12" PIPELINE: RESERVOIR TO WTP (ASSUMED TO BE 2 MILES LONG)	CONNECT NEW RESERVOIR TO EXISTING WTP	\$3.30M
6	RAW WATER PUMP STATION AT WTP SITE	PROVIDE ABILITY TO FILL NEW RESERVOIR WITH WATER DIVERTED FROM THE FRASER DURING ACCEPTABLE RAW WATER QUALITY PERIODS.	\$0.90M
7	1,100 LF OF NEW 8" LINE TO CONNECT THE EXISTING 8" LINE N. OF THE MIDDLE SCHOOL TO THE EXISTING 6" & 4" LINES DIAMOND AVENUE AND MESA STREET	IMPROVE FIRE FLOWS TO MIDDLE AND HIGH SCHOOLS	\$0.30M
8	485 LF OF NEW 8" LINE TO CONNECT THE EXISTING 6" LINE IN TOPAZ AVE. TO THE EXISTING 8" LINES IN N. 6 <sup>TH</sup> STREET AND GARNET AVENUE	RAISE FIRE FLOWS TO E. TOPAZ AVENUE AND 8 <sup>TH</sup> STREET AREAS TO GFPD TARGET LEVELS.	\$0.20M
9	1,200 LF OF NEW 8" LINE IN COUNTY RD. 60 & 200 LF OF NEW 6" LINE IN SOLAR SENIOR CENTER	RAISE FIRE FLOWS TO SOLAR SENIOR CENTER TO NEAR GFPD TARGET LEVELS.	\$0.50M

## 2.0 2011 Water Master Plan Review

SGM previously prepared a Water Master Plan (WMP) for the NSA in 2011. Additional master planning at this stage is unnecessary; the assessments and recommendations presented in the 2011 WMP are still relevant. The following sections summarize the assessments and recommendations presented in the 2011 WMP, the status of the issues facing the NSA, and other relevant information.

### 2.1 Planning/Growth Conditions

#### 2011 Summary

Future population growth and associated water demands for the NSA were evaluated in the 2011 WMP. The average equivalent residential unit (EQR) growth rate between 2000 and 2010 was 1.37%; the 2011 WMP assumed a conservative annual EQR growth rate of 1.5% in its future water demand projections. Based on WTP production data and quarterly billing data the NSA was estimated to have 710 EQRs with an average day potable water demand of 0.18 MGD in 2010.

#### Status

The average day potable water demand for 2021 was 0.16 MGD, showing a decrease in potable water production since 2010. Using the metric presented in the 2011 WMP of 263 gallons per day (gpd) of potable water demand per EQR, the NSA had 617 EQRs in 2021. Based on conversations with Town staff, a future growth rate of 2% is used in this Water System Assessment and Rate Study for water production and distribution infrastructure. The Town has indicated a potential for 40 EQRs of development over the next five years (2023-2028). Tap fees associated with that development are built into the cash flow model used in the rate study portion of this report. **Table 2-1** shows the results applying a 2% growth rate to the 2021 WTP production data for a 20-year planning horizon.

*Table 2-1. Potable Water Production, 20-Year Growth Scenario at 2% Annual Growth Rate*

YEAR	EQR	AVERAGE DAY DEMAND (MGD)	MAX DAY DEMAND (MGD) <sup>1</sup>
2021	617	0.16	0.36
2022	630	0.17	0.36
2023	642	0.17	0.37
2024	655	0.17	0.38
2025	668	0.18	0.39
2026	682	0.18	0.39
2027	695	0.18	0.40
2028	709	0.19	0.41
2029	723	0.19	0.42
2030	738	0.19	0.43
2031	753	0.20	0.44
2032	768	0.20	0.44
2033	783	0.21	0.45
2034	799	0.21	0.46
2035	815	0.21	0.47
2036	831	0.22	0.48
2037	848	0.22	0.49
2038	865	0.23	0.50
2039	882	0.23	0.51
2040	900	0.24	0.52
2041	918	0.24	0.53

*Notes: Utilizes an average day to max day peaking factor of 2.2 as used in the 2011 WMP*

## 2.2 Water Supply

### 2011 Recommendation

Raw water for the NSA WTP is diverted from the lower Fraser River through a concrete diversion structure located adjacent to the WTP. The 2011 WMP recommended the addition of another physical water supply, with water quality independent of the lower Fraser River, to provide redundancy in raw water supply for the NSA system. The Town currently has no meaningful back-up water source for its intake on the lower Fraser River. It has the right to use 10 acre-feet of off-channel raw water storage in Klein Fish Pond No. 1 in the Edgewater development in the event of a water supply emergency. In the summer, this volume represents a roughly 10-day potable water supply for the Town. Furthermore, depending on when this pond's headgate is closed, it may or may not serve as a usable backup supply during a Fraser River contamination event. This limits the reliability of potable water service.

### Status

Minimal work has been performed over the last decade in improving the raw water supply for the NSA. The Town remains optimistic that agreements made with developers of the Linke Parcel will yield approximately 101.5 acre-feet of raw water storage in the future



Linke Lake. 101.5 acre-feet would allow the NSA water system to operate for 3 to 7 months or more, depending on the time of year and watering restrictions put in place during drought or emergency. It is estimated that a 101.5 acre-foot reservoir would require 10-12 acres of land.

The West Service Area (WSA) was formed to serve the River Run Ranch and Smith Creek Crossing developments, formerly known as the Shorefox development. The original Shorefox agreement stated that the development would provide up to 54 acre-feet of treated water to the NSA per year, providing some system redundancy for the NSA. The Town is currently finalizing agreements with the new developer of this parcel, Sun River Run Ranch RV, LLC, that will formalize the terms under which the WSA can provide treated water to the NSA. This will likely involve a per-1,000 gallons water rate for water transferred across a connection point between the WSA and NSA. This connection provides some redundancy for both systems. The Town is working to confirm the suitability of this connection as a backup water supply from a water rights perspective.

Finally, the Town has explored the ability to convey raw water through the Vail Ditch as a benefit of their partnership in the Grand County Mutual Ditch and Reservoir (GCMD&R) Company. Additional infrastructure would be required to convey water from the Vail Ditch to the NSA WTP.

The WSA connection provides some redundancy to the NSA system that can likely be utilized in case of an emergency. However, the flow of water that can be supplied through the WSA-NSA interconnect is limited by existing connections and the costs to the Town would be high, currently estimated at \$20/1,000 gallons. The Town will continue to monitor the Linke Parcel development and capitalize on the agreed upon raw water storage when possible.

## 2.3 Water Treatment

### 2011 Recommendation

In 2011 the NSA WTP was already over 25 years old with many limitations, including:

- Obsolete and limited process and monitoring capabilities
- A filtration process designed to meet outdated regulatory standards
- Multiple clearwell issues
- A likely inability to effectively treat raw water with quality significantly affected by future watershed fire events
- An ineffective residual handling system
- An inability to remove seasonal taste and odor compounds or dissolved manganese
- Labor-intensive chemical storage and feed systems
- An energy-inefficient finished water pumping system
- A need for improved flood protection
- A lack of functional space to support efficient day-to-day O&M activities
- A lack of back-up power

The 2011 WMP recommended replacing the existing WTP with either a new WTP located north of the airport or upgrading the existing WTP with new technologies, reusing some facilities where possible. Replacement of the WTP was considered a medium priority in 2011.

### Status

Replacement of the existing WTP is currently the highest priority item for the NSA. Town staff have indicated a preference for upgrading the existing WTP and constructing new facilities at the current site. The existing WTP has continued to age and currently has a firm capacity of approximately 0.3 MGD due to filter limitations, a significant decrease from the WTP's original firm capacity of 1.0 MGD. SGM toured the existing WTP and noted several equipment and facility upgrades preferred by Town staff, detailed later in this report. Costs for design and construction of a new WTP are the primary driver for an increase in water service rates for the NSA.

## **2.4 Water Storage**

### 2011 Recommendation

The NSA has two buried concrete storage tanks, 200,000 gallons and 275,000 gallons in capacity, located on 11<sup>th</sup> Street just south of the airport. The 475,000 gallons of potable water storage falls 145,000 gallons (31%) short of the recommended volumes in the 2011 WMP and 255,000 gallons (54%) of projected future needs. This puts the Town at risk of running out of potable water in the event of a major fire, equipment failure, or water supply emergency. The 2011 WMP recommended constructing a new potable water storage tank to address this deficiency.

### Status

While portions of the WSA storage volume are now available to the NSA via the interconnect, the NSA remains deficient in potable water storage based on industry standards. Town staff indicated that constructing a new storage tank should be included in a design and construction package along with the upgraded WTP. A buried concrete tank, adjacent to the existing tanks, is the preferred option. The existing tanks would continue to be used and rehabilitated as needed. This study assumes only minor tank rehabilitation costs funded by annual repair budgets.

## **2.5 Distribution System**

### 2011 Recommendation

Several locations throughout the NSA were identified as being deficient in available fire flow, including the high school and middle school. In addition, water service pressures on the mesa areas fall below the recommended minimum pressure of 50 psi. The 2011 WMP identified multiple projects to address these deficiencies including:

- Construction of 2,785 LF of new 8" water line to improve system connectivity and looping, the primary benefit being improved fire flows at the high school, middle school, E. Topaz Avenue and 8<sup>th</sup> Street areas, and the Solar Senior Center.
- Implement small improvement projects to prepare system for division into high and low pressure zones including check valves, PRVs, and additional water lines.
- Construct new high zone storage tank, pump station, and 12,725 LF of water lines to facilitate a new high pressure zone.
- Split the NSA into low and high pressure zones, providing high water service pressure to the mesa areas.

### Status

None of the recommended 8" water line projects have been implemented, so the system is still deficient in available fire flows in multiple areas. The proposed projects required to split the NSA into low and high pressure zones were based upon plans to construct a new

WTP north of the airport. The projects, and the plan to split the NSA into two pressure zones, need to be reassessed given the Town's preference for rehabilitating and upgrading the existing WTP.

## 2.6 Other Issues

Other issues addressed in the 2011 WMP include the following:

- Raw water irrigation system: The Town's raw water irrigation system has no storage, reducing service reliability. Reliance purely on the pressure pumping system increased the risk of service interruptions. The WTP upgrade includes new raw water pumps and variable frequency drives (VFDs) for the irrigation system.
- Non-revenue water: Non-revenue (i.e. "unaccounted for") water averages 15% of potable water production. This is comparable to other similarly sized water systems. The WTP's treatment process requires large volumes of backwash water which can increase the non-revenue water percentage. The Town should continue to monitor non-revenue water trends, particularly after construction of an upgraded WTP.

## 3.0 Capital Improvement Projects

Many of the projects recommended in the 2011 WMP are still currently applicable and necessary. SGM reviewed these projects and the current state of the NSA water system to develop a list of recommended capital improvement projects that will drive the water service rate study presented in Section 4. This section details the recommended capital improvement projects for two time horizons: 2022-2026 and 2026+.

### 3.1 Capital Improvement Projects: 2022-2026

SGM recommends that the Town begin planning and budgeting for the rehabilitation and upgrading of the existing WTP and for a new buried concrete potable water storage tank in the next five years. These two projects address the highest priority needs for the NSA and provide resiliency that the current system is lacking.

#### 3.1.1 Water Treatment Plant

As discussed, improving the WTP is the highest priority project for the NSA. The Town's preference is to rehabilitate and upgrade the existing WTP, incorporating membrane filter technology and modernizing many components of the treatment process. This section presents preliminary designs and costs for the upgraded WTP.

##### Preliminary Design

A preliminary upgraded WTP process flow schematic was presented in the 2011 WMP, shown in **Figure 3-1**. This design presents one alternative for upgrading the existing WTP; a final treatment scheme and design will be developed with additional input from the Town when the WTP enters the engineering and design phase.

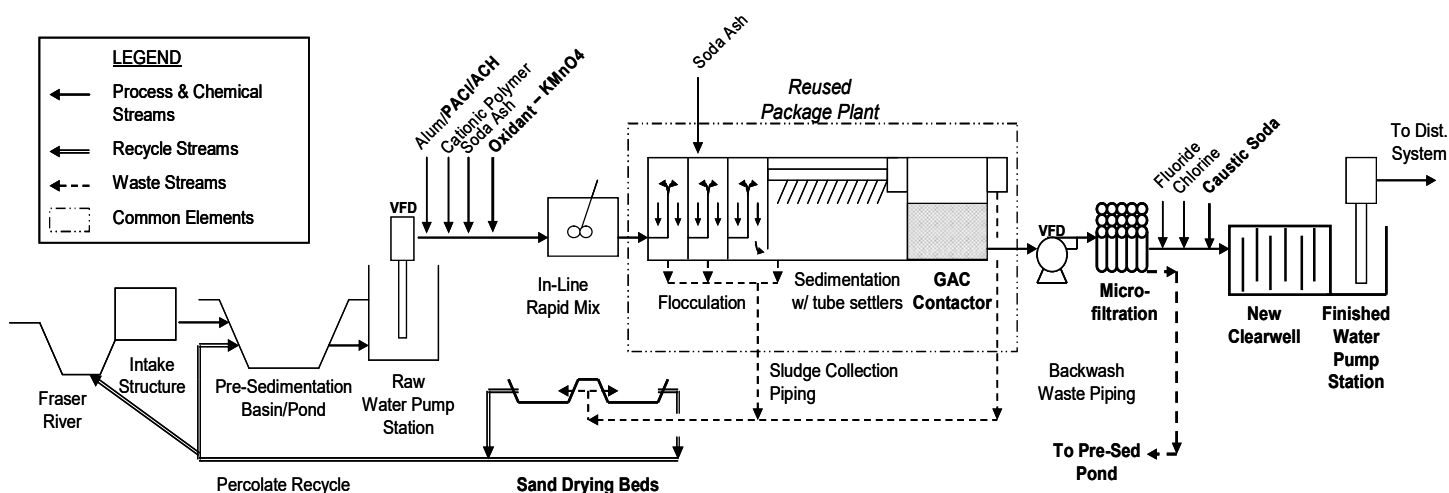


Figure 3-1. Upgraded Existing WTP Process Schematic

Several noteworthy items reflected in this schematic include:

- Existing treatment units would remain in-service, but with the filters either removed or converted to granular activated carbon (GAC) biofilters for taste/odor removal, additional organic carbon reduction and membrane pretreatment. If design-level analyses determined that biofilters were impractical, taste/odor removal could be

accomplished through powder activated carbon (PAC) feed upstream of flocculation.

- A comprehensive condition assessment of the existing equipment is needed to determine the suitability of retrofitting.
- The existing finished water clearwell could potentially be converted to a membrane filtration feed pump wetwell. Existing finished water pumps would be removed.
- A new facility housing the processes noted above would be constructed. A pressure-driven membrane filtration process is envisioned as the heart of the upgraded treatment process. Membrane filtration systems are highly automated and provide consistently low filtered water turbidity levels that are independent of raw water quality swings. There are several membrane filter plants already in operation by Fraser River valley water utilities, including the Town's South Service Area.
- Spent backwash water would be equalized before being routed to the head of the existing pre-sedimentation pond.

Alternatively, the Town is considering constructing a new WTP at a greenfield site. This would likely require a new raw water pump station and transmission main to bring raw water from the Fraser River to the new WTP. The design of a new WTP would utilize similar treatment equipment as an upgraded NSA WTP including flocculation, sedimentation, and microfiltration. A siting study would be needed to identify an appropriate parcel for the new WTP.

#### Timeframe and Costs

Based on conversations with Town staff, the timeframe for design and construction of the upgraded WTP is as follows:

- Engineering and Design: 2022-2023 (15 months)
- Bid Project: Winter of 2023-2024
- Construction: Spring of 2024 through 2025

Estimated capital costs for design and construction of the upgraded WTP were presented in the 2011 WMP with a total estimated construction cost of \$4.0M. SGM has facilitated design and construction of multiple membrane filtration WTPs since that report, including the new SSA WTP constructed in 2017. Estimated design and construction costs for an upgraded or new NSA WTP were developed based on SGM's recent experience with similar facilities and by scaling the actual SSA WTP design and construction costs to 2022 dollars while considering the relative water production capacities for the two WTPs and estimated facility footprints. Breakdowns of the estimated costs are presented in **Table 3-1** and **Table 3-2**.

*Table 3-1. Estimated Capital Costs – Upgraded WTP at Existing Site*

IMPROVEMENT ITEM	ESTIMATED CAPITAL COSTS – 11/21
CONTRACTOR OVERHEAD, BONDS, INSURANCE, GCs, ETC.	\$2.98M
SITWORK AND YARD PIPING	\$0.75M
NEW TREATMENT BUILDING	\$4.20M
PROCESS EQUIPMENT (MEMBRANES, INTERIOR PIPING, ETC.)	\$1.50M
NEW SAND DRYING BEDS FOR RESIDUALS	\$0.75M
MISC. IMPROVEMENTS (FLOOD PROTECTION, GRADING, RAW WATER PUMP VFDs, EXISTING CLEARWELL REPAIR, PIPING, ELECTRICAL & CONTROLS/SCADA UPGRADES, ETC.)	\$0.85M
CONSTRUCTION CONTINGENCY (25%)	\$2.31M
DESIGN ENGINEERING ESTIMATE	\$1.66M
GEOTECHNICAL, MATERIALS TESTING, UTILITIES	\$0.10M
<b>TOTAL</b>	<b>\$15.10M</b>

*Table 3-2. Estimated Capital Costs – New WTP at Greenfield Site*

IMPROVEMENT ITEM	ESTIMATED CAPITAL COSTS – 11/21
CONTRACTOR OVERHEAD, BONDS, INSURANCE, GCs, ETC.	\$2.98M
SITWORK AND YARD PIPING	\$1.13M
NEW TREATMENT BUILDING	\$7.07M
PROCESS EQUIPMENT (MEMBRANES, INTERIOR PIPING, ETC.)	\$3.46M
NEW SAND DRYING BEDS FOR RESIDUALS	\$0.75M
CONSTRUCTION CONTINGENCY (25%)	\$3.26M
DESIGN ENGINEERING ESTIMATE	\$2.25M
GEOTECHNICAL, MATERIALS TESTING, UTILITIES	\$0.10M
<b>TOTAL</b>	<b>\$21.0M</b>

Additional inflation of construction costs is considered in the water service rate study presented in Section 4 of this report at an annual rate of 4%. For example, with construction of the upgraded WTP slated for 2024 the overall price escalates from \$15.1M to \$16.2M; the construction cost for a new WTP escalates from \$21.0M to \$22.5M.

### 3.1.2 Potable Water Storage Tank

Each service area should have its own water storage volume connected to transmission mains (12" and larger) within the distribution system. A new potable water storage tank for the NSA would ensure adequate fire, emergency, and equalization storage. The new tank should be sized to accommodate the existing and likely ultimate future demands in the NSA based on the 20-year growth scenario presented in Section 2.1 showing an average day demand of 0.24 MGD and a maximum day demand of 0.53 MGD.

#### Tank Sizing

Industry-standard and SGM-recommended potable water storage capacity consists of three main components:

- *Demand Equalization Volume:* It is typically most cost-efficient to size water production, treatment, and pumping facilities to meet maximum day demands, but nothing greater, such as peak hour demands. Therefore, storage facilities are

relied upon to meet any increment of demand exceeding the average demand over the maximum demand day. For a municipal system such as the NSA, this volume is generally assumed to be equal to a maximum day demand over a period of 6 hours. This equals **25% of the maximum day demand volume**.

- **Emergency Storage Volume:** Emergency storage is used to meet the community's water needs in the event of a protracted interruption in the supply of treated water. This might occur due to a power outage, failure of a critical water transmission line, mechanical failure(s) at the WTP, or a source water contamination event. A typical emergency supply volume is **one day of average day demand**.
- **Fire Storage Volume:** This is the water volume needed to fight the controlling (largest) fire event in the system at the **target flow rate and duration** in the relevant service area of the given tank(s). The controlling fire for the NSA, as listed in the 2011 WMP, is assumed require a 2,750 gpm suppression flow for 2-hours, resulting in a required storage volume of 330,000 gallons.

**Table 3-3** presents an analysis based on the above criteria of potable water storage needs for the NSA under current and future conditions.

*Table 3-3. Current and Future Potable Water Storage Needs*

VOLUME COMPONENT	CURRENT (GALS.)	FUTURE (GALS.) <sup>1</sup>
EQUALIZATION	90,000	132,500
EMERGENCY	160,000	240,000
FIRE	330,000	330,000
<b>TOTAL</b>	<b>580,000</b>	<b>702,500</b>
CURRENTLY AVAILABLE STORAGE	475,000	
STORAGE DEFICIENCY	105,000	227,500

*Notes: Based on 2041 projections shown in Table 2-1.*

As shown in **Table 3-3**, the NSA is deficient in potable water storage under current and future demand scenarios. A new, 500,000-gallon storage tank would increase the available storage to 975,000 gallons which would allow for either of the existing tanks to be taken offline for maintenance or replacement in the future while maintaining adequate storage volume.

#### Preliminary Design

The 2011 WMP considered multiple options for a new storage tank. All those options involved splitting the NSA into high and low zones and constructing a new high zone tank; either at an elevation suitable for the new high zone or an elevated tank that would achieve the needed hydraulic grade. Based on conversations with Town staff, developing a new high zone, and implementing the necessary system improvements to achieve this, is not a priority. The preferred alternative for a new storage tank is constructing an additional buried concrete storage tank adjacent to the two existing tanks. SGM's recommended size for the new tank is 500,000 gallons.

The existing tanks are on a parcel of land owned by Grand County. Upon cursory analysis, there appears to be adequate space on this parcel for an additional buried storage tank. The Town prefers buried concrete tanks due to their long life span and ease of maintenance.

### Timeframe and Costs

The Town's preference is to include the new storage tank in the design and construction packages for the upgraded WTP. This would allow funding and loans for both projects to be consolidated.

Estimated capital costs for design and construction of the new buried concrete storage tank are presented in **Table 3-4**.

*Table 3-4. Estimated Capital Costs – Buried Concrete Storage Tank*

IMPROVEMENT ITEM	ESTIMATED CAPITAL COSTS - 2011	ESTIMATED CAPITAL COSTS - 2022
500,000 GALLON BURIED CONCRETE STORAGE TANK	\$1.30M	\$2.50M

The costs shown in **Table 3-4** include design and engineering. Additional inflation of design and construction costs is considered in the water service rate analysis presented in Section 4 of this report.

### 3.2 Capital Improvement Projects: 2026+

Once a new WTP and storage tank are constructed, the Town can begin focusing on improvements to the raw water supply and distribution system. **Table 3-5** details the recommended capital improvement projects for 2026+ along with the project purpose and estimated costs in 2022 dollars. Additional information for these projects can be found in the 2011 WMP.

*Table 3-5. Capital Improvement Recommendations: 2026+*

#	PROJECT DESCRIPTION	PROJECT PURPOSE	ESTIMATED CAPITAL COST - 2022
<b>RAW WATER SUPPLY</b>			
1	RESERVOIR FEASIBILITY STUDY <sup>1</sup>	IDENTIFY TECHNICAL, LEGAL, LOGISTICAL AND ECONOMIC FEASIBILITY OF DEVELOPING A NEW ROUGHLY 100-AF RAW WATER RESERVOIR IN THE GRANBY AREA.	\$0.10M
2	100-AF RESERVOIR WITH APPURTENANCES <sup>1</sup>	PROVIDE PHYSICAL WATER SUPPLY REDUNDANCY FOR THE TOWN'S POTABLE SYSTEM.	\$2.90M
3	12" PIPELINE: RESERVOIR TO WTP (ASSUMED TO BE 2 MILES LONG)	CONNECT NEW RESERVOIR TO EXISTING WTP	\$3.30M
4	RAW WATER PUMP STATION AT WTP SITE	PROVIDE ABILITY TO FILL NEW RESERVOIR WITH WATER DIVERTED FROM THE FRASER DURING ACCEPTABLE RAW WATER QUALITY PERIODS.	\$0.90M
<b>TOTAL</b>			<b>\$7.20M</b>
<b>DISTRIBUTION SYSTEM</b>			
5	1,100 LF OF NEW 8" LINE TO CONNECT THE EXISTING 8" LINE N. OF THE MIDDLE SCHOOL TO THE EXISTING 6" &	IMPROVE FIRE FLOWS TO MIDDLE AND HIGH SCHOOLS	\$0.30M



	4" LINES DIAMOND AVENUE AND MESA STREET		
6	485 LF OF NEW 8" LINE TO CONNECT THE EXISTING 6" LINE IN TOPAZ AVE. TO THE EXISTING 8" LINES IN N. 6 <sup>TH</sup> STREET AND GARNET AVENUE	RAISE FIRE FLOWS TO E. TOPAZ AVENUE AND 8 <sup>TH</sup> STREET AREAS TO GFPD TARGET LEVELS.	\$0.20M
7	1,200 LF OF NEW 8" LINE IN COUNTY RD. 60 & 200 LF OF NEW 6" LINE IN SOLAR SENIOR CENTER	RAISE FIRE FLOWS TO SOLAR SENIOR CENTER TO NEAR GFPD TARGET LEVELS.	\$0.50M
<b>TOTAL</b>			<b>\$1.00M</b>

*Notes: 1 – The Town should also explore opportunities for development to pay for and construct a raw water reservoir, as discussed in Section 2.2.*

There will likely be capital needs, such as water line or valve replacement projects, that will become evident over the coming years. These capital needs should be monitored and budgeted for along with the projects outlined in **Table 3-5**.

## 4.0 Water Service Rate Study

SGM recommends revenue and Water Operations and Capital Fund (Water Fund) reserve targets to maintain operations, fund necessary capital improvement projects, fund debt payments with a secure source of revenue, and maintain an adequate emergency reserve balance. The following section includes a summary of current and future expenditures (including the capital improvements discussed in Section 3.0) and sources of revenue associated with the NSA water system operations.

A cash flow model (CFM) was developed using this information to estimate future Water Fund reserve balances when considering the expected operating and capital costs facing the NSA in the coming years. SGM assessed the current water service rates and presents revenue alternatives to meet Water Fund balance goals in this section of the report. The Town has budgeted for an NSA Water Fund balance of \$1,397,286 at the end of 2022.

### 4.1 Existing Water Service Rate Summary

The NSA water service rate structure utilizes a facility charge base rate for each meter with an additional consumption charge for potable, raw, and construction water billed at \$/1,000 rates. The rates are summarized in **Table 4-1**.

*Table 4-1. Existing NSA Water Service Rates*

FEE COMPONENT	RATE
FLAT FEE	\$86.85 PER METER PER QUARTER
IN-TOWN	\$6.62/1,000 GALLONS
OUT-OF-TOWN	\$11.73/1,000 GALLONS
RAW WATER	\$3.52/1,000 GALLONS
CONSTRUCTION	\$16.50/1,000 GALLONS

The Town has collected the following revenue from potable, raw, and construction water sales during the past three years:

- 2019: \$615,675
- 2020: \$697,488
- 2021 (Projected): \$645,277

The Town has budgeted for \$643,750 in revenue collected from water service fees in 2022. The Town collects additional revenue through the sale of meters, penalty assessments, and other miscellaneous revenues.

### 4.2 Expenditures

The expenditures modeled into the water service rate study include operations and maintenance (O&M) costs, outlay for capital projects, and debt service from existing loans; budgeted expenditures for 2022 are summarized in **Table 4-2**.

Table 4-2. NSA Expenditures

EXPENSE CATEGORY	BUDGETED EXPENSE 2022
OPERATIONS AND MAINTENANCE (O&M)	\$702,288
CAPITAL PROJECTS	\$50,000
DEBT SERVICE	\$20,461
<b>TOTAL EXPENSES 2022</b>	<b>\$772,749</b>

#### 4.2.1 Operations and Maintenance (O&M)

O&M expenditures include employee salaries and benefits, supplies (including chemicals), repairs, and purchased services. 2022 O&M expenditures are based on the Town's 2022 budget for the NSA. For the purposes of this study, O&M expenditures are expected to increase 4% each year.

#### 4.2.2 Capital Projects

The Town has budgeted for \$50,000 in capital project expenses for the NSA in 2022. Capital expenses for future years were estimated based on the expected capital projects and their respective design and construction timeframes. The estimated design and construction costs for the capital projects, detailed in Sections 3.1 and 3.2, are assumed to increase at an annual inflation rate of 4%.

For the purposes of this rate study, capital project projections were made for years 2022 through 2030 based on the projects identified in Section 3.0. Different scenarios were developed incorporating either an upgraded WTP at the existing site or a new WTP at a greenfield site. A yearly capital improvement cost of \$50,000 (in 2022 dollars) was assigned to years 2031+. **Table 4-3** summarizes the capital projects entered into the CFM.

Table 4-3. Capital Projects Entered into the Cash Flow Model (CFM)

YEAR	CAPITAL IMPROVEMENT PROJECT	COST, 2022 DOLLARS UPGRADED WTP	COST, 2022 DOLLARS NEW WTP
2022	WTP & TANK DESIGN	\$550,000	\$660,000
2023	WTP & TANK DESIGN	\$1,110,000	\$1,320,000
2024	WTP & TANK CONSTRUCTION	\$16,450,000	\$23,530,000
2025	RESERVE BUILDING <sup>1</sup>	\$0	\$0
2026	MISCELLANEOUS REPAIRS <sup>2</sup>	\$50,000	\$50,000
2027	485 LF 8" WATER LINE, TOPAZ AVE.	\$170,000	\$170,000
2028	MISCELLANEOUS REPAIRS <sup>2</sup>	\$50,000	\$50,000
2029	MISCELLANEOUS REPAIRS <sup>2</sup>	\$50,000	\$50,000
2030	1,100 LF 8" WATER LINE, MIDDLE SCHOOL	\$330,000	\$330,000

Notes: 1 – Assumes a year with zero capital projects to build Water Fund reserves.

2 – Capital outlay for miscellaneous system repairs

### Capital Project Funding

Multiple funding sources were reviewed for applicability in funding the design and construction of the WTP and storage tank. New guidance has recently been published concerning the incorporation of Bipartisan Infrastructure Law (BIL) funds into the Colorado Department of Public Health and Environment (CDPHE) Drinking Water Revolving Loan Fund (DWRF) program. Based on an initial review of the eligibility criteria, the NSA may qualify for the DWRF BIL principal forgiveness program. Eligible applicants can receive a loan forgiveness grant worth 49% of the loan principal through the BIL general supplemental fund. Additionally, through the DWRF emerging contaminants fund, additional loan subsidization may be available. The new WTP would include equipment to treat manganese, which is included in USEPA's Contaminant Candidate Lists (CCLs), thus qualifying it as an emerging contaminant for the purposes of BIL grant funding under the DWRF program.

The Department of Local Affairs (DOLA) Energy/Mineral Impact Assistance Fund (EIAF) provides grants to assist political subdivisions of the state that are socially and/or economically impacted by the development, processing or energy conversion of minerals and mineral fuels. The Town previously was successful in acquiring a significant EIAF grant for the South Service Area WTP. A Tier II Grant through the EIAF program can be awarded in an amount up to \$600,000.

The CDPHE DWRF loan program is assumed to be available to provide the capital needed to design and construct the new WTP and tank. The loan terms utilized in the cash flow model are an amortization period of 30 years and an annual interest rate of 4.75%.

Two funding scenarios were modeled for the purposes of this rate study:

- Funding Scenario 1
  - Town acquires \$600,000 in grant money through DOLA's EIAF program. The Town will be required to match this grant amount.
  - NSA *does not* qualify for DWRF BIL principal forgiveness.
- Funding Scenario 2
  - \$600,000 in DOLA EIAF grant money. The Town will be required to match this grant amount.
  - NSA *does* qualify for DWRF BIL principal forgiveness and receives grant worth 49% of loan principal.

### **4.2.3 Debt Service**

The Town continues to make yearly debt service payments of \$20,461 for the existing NSA WTP. These payments will continue through 2024. Debt service payments for loans to pay for future capital projects are modeled in the CFM based on anticipated loan terms described above.

### **4.3 Revenues**

The revenues modeled into the utility rate study include those generated by water services fees, grant funding, loans, and other miscellaneous revenue sources. Tap fees were entered into the CFM at an assumed rate of 8 per year for the years 2023 through 2028.

Annual tap fee increases of 3% were included. **Table 4-4** details the budgeted revenues for 2022.

*Table 4-4. NSA Revenues*

REVENUE CATEGORY	BUDGETED REVENUE 2022
WATER SALES	\$643,750
GRANTS	\$0
LOANS	\$0
MISCELLANEOUS REVENUE	\$12,198
TOTAL REVENUES 2022	\$655,948

#### 4.3.1 Water Sales

As detailed in Section 4.1, the current water service rates are expected to generate \$643,750 in revenues from water sales for 2022. Adjustments to these rates were modeled for this rate study to maintain a proper Water Fund balance for O&M, emergency funds, and the planned capital projects. It was assumed that the water customer base would remain stable and not increase over time.

The Town has begun discussions to increase water service rates by 64% beginning in the third quarter (Q3) of 2022. The scenarios presented in Section 4.5 reflect this proposed increase and detail additional rate increases necessary to properly fund the NSA and its capital needs.

#### 4.3.2 Grants and Loans

There is currently no revenue from grants or loans budgeted for 2022. Future grants and loans, as described in Section 4.2.2, were modeled to reflect the estimated timing and terms from the funding sources.

#### 4.3.3 Miscellaneous Revenue

Other miscellaneous revenue sources for the NSA include the sale of meters, penalty assessments, and various other contracts. The miscellaneous revenue is not expected to increase year-to-year.

### 4.4 Recommended Water Fund Reserve Balance

An adequate Water Fund reserve balance is necessary to maintain operations, fund necessary capital improvement projects, fund debt payments with a secure source of revenue, and maintain an adequate emergency reserve balance. SGM recommends maintain a Water Fund reserve balance equal to 9 months of O&M costs plus the cost of the most expensive piece of equipment. For the year 2022, the recommended balance is as follows:

$$\$526,716 \text{ (9 mos. O\&M)} + \$250,000 \text{ (assumed equipment cost)} = \$776,716$$

This recommended balance increases year-to-year to reflect increasing O&M and equipment replacement costs.

### 4.5 Water Fund Cash Flow Model (CFM)

The CFM is the critical component of this water service rate study, incorporating the historic and expected expenses, revenues, and water service rates described above to determine how changes in the rates will impact the Water Fund reserve balance for the NSA. The CFM is built as a tool that can be easily modified and updated year-by-year to provide real-time budgeting feedback, determining how modifications to the water rate structure, capital projects, increased operating costs, etc. will impact the NSA Water Fund. All of the alternatives evaluated in this section assume a 4% annual increase in operating costs. Alternatives incorporating rate increases were structured to maintain adequate Water Fund reserve balances.

#### 4.5.1 Alternative 1: Upgraded WTP at Existing Site

The alternatives presented in this section all assume that the existing NSA WTP is upgraded at its existing site, as described in Section 3.1.1.

##### Alternative 1.1: Funding Scenario 1

The following assumptions and estimations are utilized in Alternative 1.1:

- Town pursues an upgraded WTP on the existing site.
- The NSA *does not* qualify for DWRP BIL principal forgiveness.
- A 64% water service rate increase is implemented in Q3 of 2022.
- A 62% water service rate increase is implemented in Q1 of 2023.
- Additional rate increases in future years to match increases in operating costs.

**Figure 4-1** shows projections of the water revenues, expenses, and Water Fund reserves under Funding Scenario 1. It is then recommended to increase water service rates yearly to match increases in O&M costs.

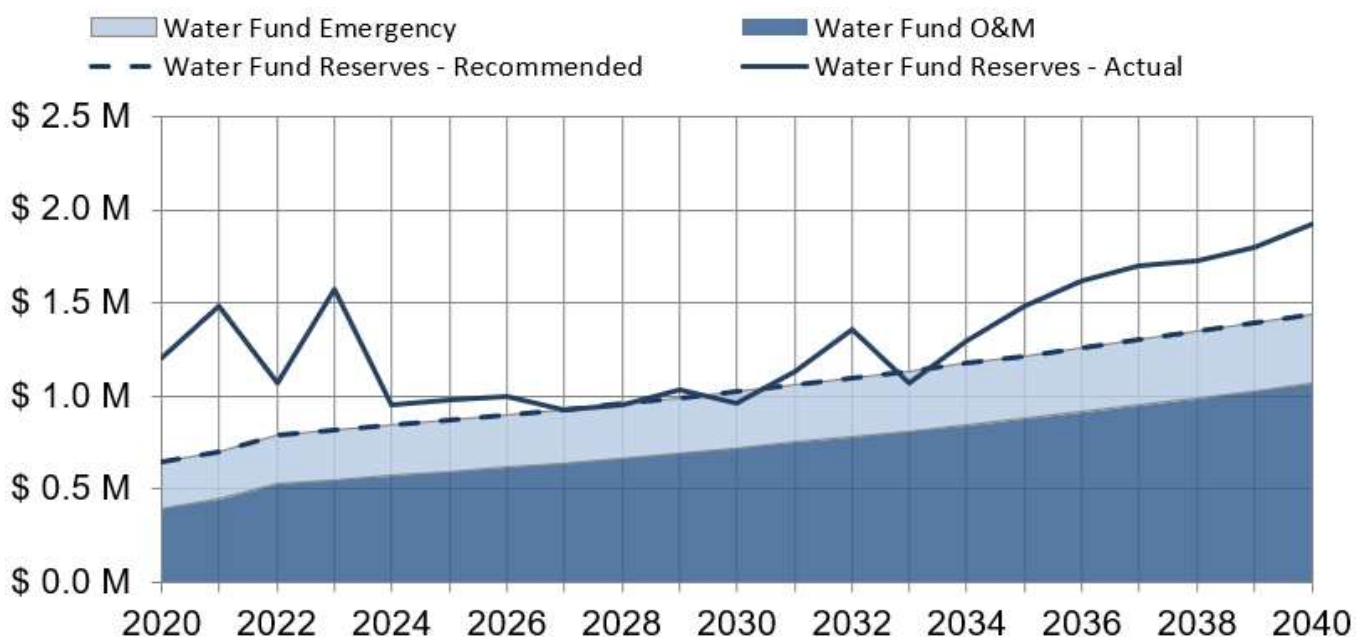


Figure 4-1. Alternative 1.1 Water Fund Balance Projections

**Alternative 1.2: Funding Scenario 2**

The following assumptions and estimations are utilized in Alternative 1.2:

- Town pursues an upgraded WTP on the existing site.
- The NSA *does* qualify for DWRFBIL principal forgiveness.
- A 64% water service rate increase is implemented in Q3 of 2022.
- A 42% water service rate increase is implemented in Q1 of 2023.
- Additional rate increases in future years to match increases in operating costs.

**Figure 4-2** shows projections of the water revenues, expenses, and Water Fund reserves under Funding Scenario 2. It is then recommended to increase water service rates yearly to match increases in O&M costs.

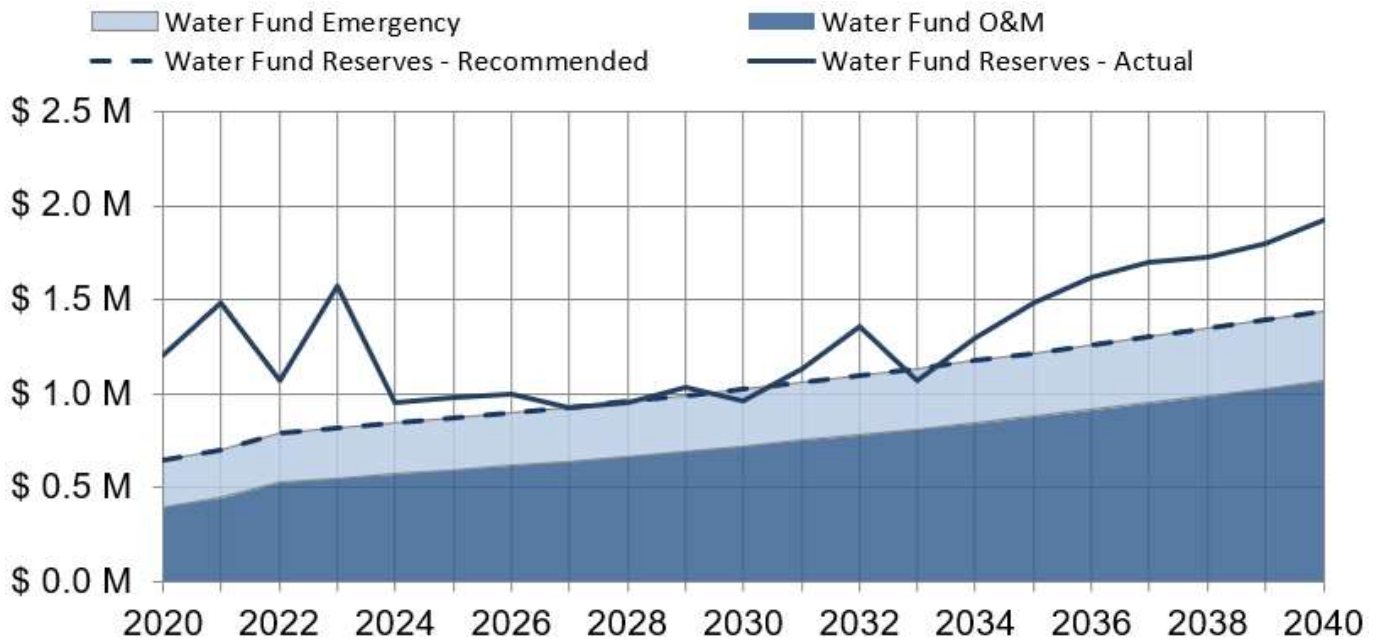


Figure 4-2. Alternative 1.2 Water Fund Balance Projections

### 4.5.2 Alternative 2: New WTP at Built at Greenfield Site

The alternatives presented in this section all assume that a new NSA WTP is constructed at a greenfield site. This will likely require construction of a new raw water pump station at the existing WTP site and a transmission main to convey water to the new WTP. These additional costs are built into the CFM.

#### Alternative 2.1: Funding Scenario 1

The following assumptions and estimations are utilized in Alternative 2.1:

- Town pursues a new WTP at a greenfield site.
- The NSA *does not* qualify for DWRFBIL principal forgiveness.
- A 64% water service rate increase is implemented in Q3 of 2022.
- An 80% water service rate increase is implemented in Q1 of 2023.
- Additional rate increases in future years to match increases in operating costs.

**Figure 4-3** shows projections of the water revenues, expenses, and Water Fund reserves under Funding Scenario 1. It is then recommended to increase water service rates yearly to match increases in O&M costs.

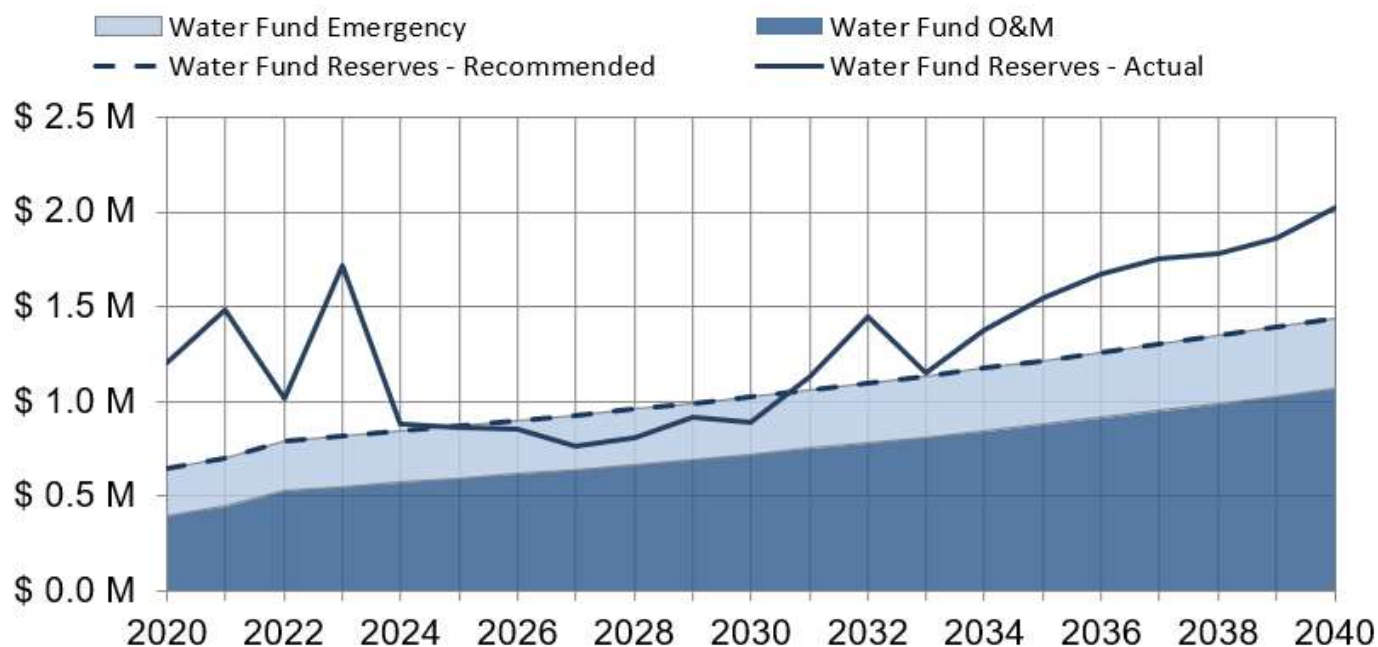


Figure 4-3. Alternative 2.1 Water Fund Balance Projections



**Alternative 2.2: Funding Scenario 2**

The following assumptions and estimations are utilized in Alternative 2.2:

- Town pursues a new WTP at a greenfield site.
- The NSA *does* qualify for DWRFBIL principal forgiveness.
- A 64% water service rate increase is implemented in Q3 of 2022.
- A 52% water service rate increase is implemented in Q1 of 2023.
- Additional rate increases in future years to match increases in operating costs.

**Figure 4-4** shows projections of the water revenues, expenses, and Water Fund reserves under Funding Scenario 2. It is then recommended to increase water service rates yearly to match increases in O&M costs.

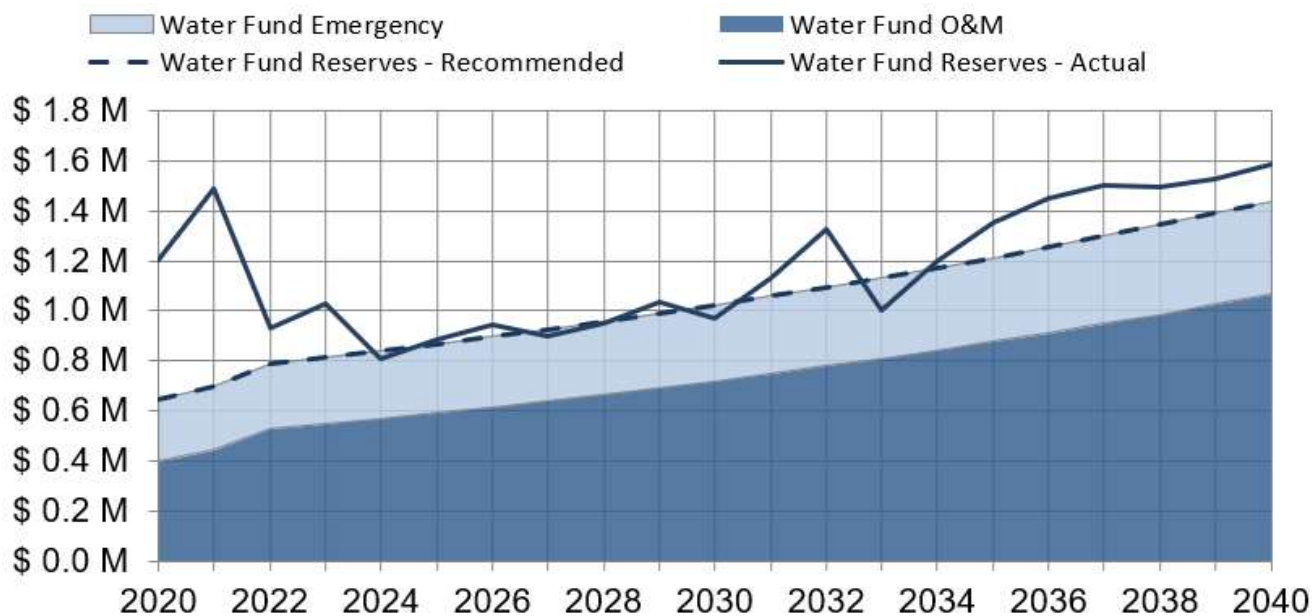


Figure 4-4. Alternative 2.2 Water Fund Balance Projections

**4.6 Discussion**

This section presents multiple alternatives for funding and construction of a new WTP and other capital projects for the NSA while maintaining adequate reserve funds. The DWRFBIL funding is an attractive program for the Town as it may be able to offset the impact of increases in construction costs due to inflation. It is unknown if the NSA will qualify for the loan forgiveness program at this stage in the process, but preliminary reviews of eligibility criteria performed by SGM suggest reasons to be optimistic.

The proposed initial water service rate increase of 64% is a productive step in building reserves and increasing cash flows to fund the WTP and future capital projects. SGM can now work with the Town to begin the DWRFBIL pre-qualification process. Once an eligibility determination is made, SGM will work with the Town to identify the additional rate increases necessary to fund the improvements.

A WTP siting study is also needed to determine the best location and arrangement for a new or upgraded WTP. This study will include a comprehensive assessment of the existing WTP and equipment, an evaluation of treatment processes and building footprints for a new or upgraded WTP, and a review of potential locations and parcels for the WTP. This siting study can be performed in parallel with the DWRP pre-qualification process.

The CFM and its Water Fund reserve projections are inherently sensitive to escalating construction costs and the grant and loan programs and terms available to the Town. Due diligence was performed to determine the CFM's cash flow assumptions, but the Town may consider selecting water service rates to build larger reserves than those shown in this report to ensure the NSA has adequate funds to continue effective operations and complete the necessary capital improvement projects.

The CFM is meant to be a tool that is continually updated with actual data, updated budgets, and proposed capital improvement projects to provide real-time feedback to the Town on the current and forecasted states of the Water Fund. Once a utility rate program is selected, the Town can update and review the CFM to determine if any changes to the program would be beneficial on a year-to-year basis.