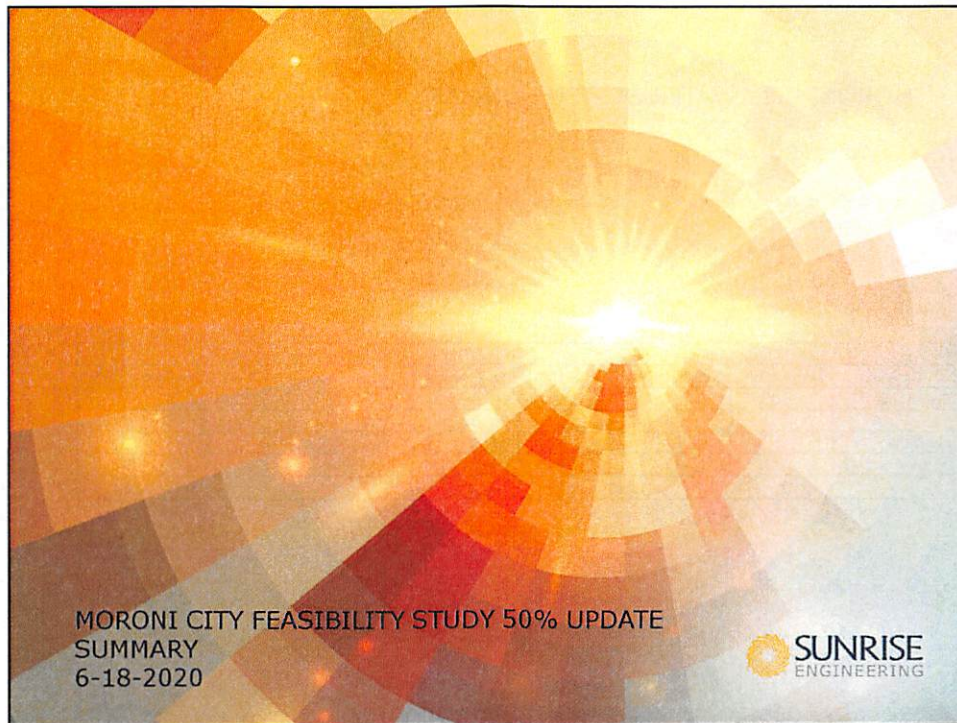




1

MORONI CITY WATER SYSTEM SUMMARY

SELECTED GROWTH RATE:

- A growth rate of 2% was chosen to stay consistent with the current Water Master Plan

PROJECTED GROWTH RATE

Moroni City Population Projection		
Year	Population	Projected Annual Increase
2020	1,497	2.00%
2030	1,825	2.00%
2040	2,225	2.00%

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MORONI CITY WATER SYSTEM SUMMARY

Existing ERC Sources:

- ERC multiplier values are based on a general comparison of categorical water usage compared to average residential usage
- Data for connections was found from the Department of Water Rights

Current ERC's				20 Year Projected ERC's			
Category	Connections	ERC/Connection	Total ERCs*	Category	Connections	ERC/Connection	Total ERCs*
Residential	503	1.00	503	Residential	747	1.00	747
Commercial	18	1.40	25	Commercial	27	1.40	37
Industrial	7	2.52	18	Industrial	10	2.52	26
Institutional	13	7.53	98	Institutional	19	7.53	146
			Total				957
			644				

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MORONI CITY WATER SYSTEM SUMMARY

SYSTEM EVALUATION:

System evaluation is a function of comparing the capacities of the water system's components with current DDW requirements for public water suppliers based on estimated ERC's and water usage.

Specific components that were evaluated include:

- Water Rights
- Source Capacity
- Storage Capacity
- Potential New Well Sites
- Potential Treatment Options

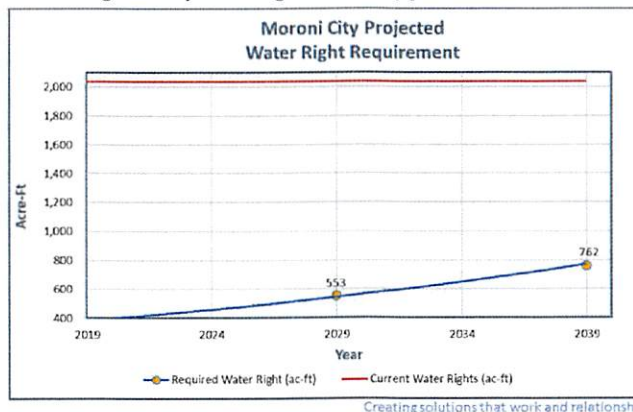
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MORONI CITY WATER SYSTEM SUMMARY

WATER RIGHTS:

- Current Water Right: 2,036.5 ac-ft
- Current Water Right Required: ~381 ac-ft; Current Surplus: ~1655 ac-ft
- Projected Water Right Required (20 Years): ~762 ac-ft; Projected Surplus: ~1,275 ac-ft
- Current water right is adequate throughout the study period.

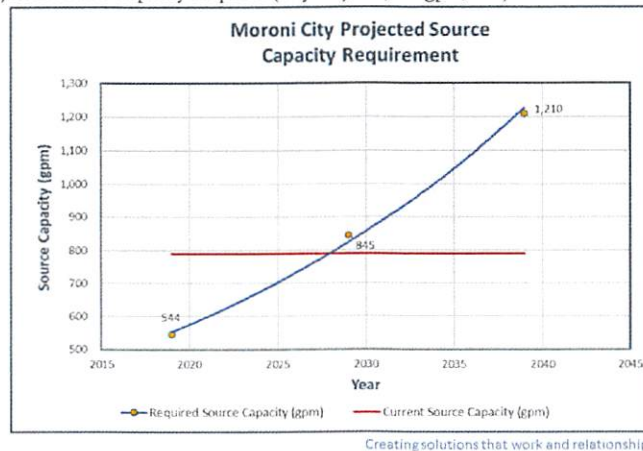


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MORONI CITY WATER SYSTEM SUMMARY

SOURCE CAPACITY:

- Current Water Source Capacity: 790 gpm
- Current Source Capacity Required: ~544 gpm; Current Surplus: ~246 gpm
- Projected Source Capacity Required (20 years): ~1,210 gpm; Projected Deficit: ~420 gpm



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MORONI CITY WATER SYSTEM SUMMARY

STORAGE CAPACITY:

- Current Storage Capacity: 780,000 gal
- Current Water Storage Required: ~578,560 gal; Current Surplus: ~201,440 gal
- Projected Water Storage Required (20 years): ~1,070,784 gal; Projected Deficit: ~290,784 gal



Recommendations:

- Additional storage prior to 2040
- These projections assume that all current connections irrigate with secondary water and all future connections use culinary water to irrigate. This could change based on the City's choice of action.

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MORONI CITY WATER SYSTEM SUMMARY

DISTRIBUTION SYSTEM :

- This amendment did not analyze the existing distribution system as the scope of this amendment was to investigate solutions for the current nitrate problem.

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MORONI CITY HYDROGEOLOGICAL SUMMARY

OVERVIEW OF AREA HYDROGEOLOGY:

- The hydrogeological study focuses on the hydrogeology within and around the Moroni City area.
- The aquifers in the area flow down the valleys from the North and converge in a Y shape.
- The water in these aquifers pool near the location of Wells #1 and #2. This pool does not allow nitrates to move so the nitrates build up in this area, causing the high concentrations.

POTENTIAL NEW WELL SITES:

- Test Well A is near Well #3 in the northwest of the City property. If the City can acquire the land then this well can be moved even further northwest to optimize the potential this site has.
- Test Well B is southwest of Test Well A and adjacent to two roads. This well may have higher potential if the City can obtain this land.
- Test Well C is west of the 100-yr floodplain of Silver Creek.

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MORONI CITY HYDROGEOLOGICAL SUMMARY

POTENTIAL NEW WELL SITES:

- The State requirement is to have a nitrate concentration less than 10 mg/L. A system should try to reach 5 mg/L in order to be conservative in estimating just in case there are spikes in the system.
- The only wells in the area with concentration above the recommended limit are in the area where the aquifers pool. These are City Well #1 and City Well #2.
- The cost of the drilling the new well will change based on how much pipe is needed and the cost of acquiring new land if any land is needed, but a rough estimate is that a new well costs \$1,254,700 with annual operating and maintenance cost of \$5,980*.

Table 1. Available Nitrate Concentrations at Wells within the Study Area

Well	Recent Sampling Date	Nitrate Concentration (mg/L)
City Well #1	3/8/1999	11.27
City Well #2	12/17/2019	10.12
City Well #3	12/17/2019	1.24
Turkey Plant Well #1	9/25/2019	2.55
Turkey Plant Well #2	9/25/2019	2.61
Turkey Plant Well #3	9/25/2019	0.80

Note: Red values indicate the concentrations are above the MCL for nitrate (10 mg/L)

*All operating and maintenance costs do not include the cost of pumping water from the well, because this will need to happen regardless of what alternative is chosen. The cost of pumping from the well will be around \$24,000 a year.

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MORONI CITY HYDROGEOLOGICAL SUMMARY

POTENTIAL NEW WELL SITES:



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MORONI CITY WATER SYSTEM SUMMARY

WATER TREATMENT ALTERNATIVES:

- Reverse Osmosis
 - A reverse osmosis system consists of pressing the water through a system of membrane filters that do not allow contaminants through them. This would reduce the nitrates from Well #2.
 - A reverse osmosis system would lower the amount of source available from Well #2 to 260 gpm. The concentrate effluent would need to be piped to the San Pitch River and a discharge permit would need to be acquired.
 - This would cost about \$2,570,800 with an annual operating and maintenance cost near \$63,655.
- Ion Exchange
 - An ion exchange system consists of passing the water over resin beads that remove the nitrates. This resin needs to be regenerated after 33.5 hours of use.
 - This may not be a possibility if the water hardness tests show that the hardness is over 120 mg/L, because the hardness will precipitate and clog the resins.
 - This would cost about \$2,341,100 with an annual operating and maintenance cost of \$45,647.

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QUESTIONS, COMMENTS, AND DISCUSSION ITEMS

- Are there any capital improvements that the City would like Sunrise to include in the amendment?
Please think about this and let us know at by sending an email or calling either:
Collin Pace at 435-201-6606 or cpace@sunrise-eng.com
Trent Brown at 435-201-6703 or tbrown@sunrise-eng.com
- Any other questions?

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