HILDALE CITY CULINARY WATER IMPACT FEE FACILITIES PLAN

SEPTEMBER 2021

PREPARED BY:

SUNRISE ENGINEERING

11 North 300 West
Washington, UT 84780

Hildale City, Utah

CULINARY WATER IMPACT FEE FACILITIES PLAN

Introduction

Sunrise Engineering, Inc. has been retained by Hildale City to complete an Impact Fee Facilities Plan (IFFP) and an Impact Fee Analysis (IFA) for the culinary water system.

This IFFP incorporates by reference associated portions of the "Hildale City and Town of Colorado City Culinary Water Master Plan" (WMP) completed by Sunrise Engineering, Inc. and dated January 2021 which provides a plan for Capital Improvements over the design horizon of 20 years. Additionally, the IFFP incorporates the "Feasibility Study for Hildale Groundwater System" (FSHGS) prepared by Bowen Collins and dated May 2020 which proposes potential water source improvements from the water canyon area of the community. This IFFP may share specific information of both incorporated reports by text, tables, charts, calculations, etc.

According to the State of Utah Impact Fee Act a community that is less than 5,000 people as of the last census need not conform to all the requirements of the IFFP. Regardless, any impact fee from the entity with less than 5,000 people should still be based on a "reasonable plan".

A. LENGTH OF PLANNING PERIOD

- 20-year planning period– FY2021-FY2041 (from the beginning of FY2019 to the end of FY2038)

B. PROJECTED GROWTH RATE

Per the WMP we will focus on the growth rate in Equivalent Residential Units (ERUs). Those are identified in the WMP as follows:

Year 2021 Projected Number of Connections:	$847(1+0.00)^{1}$ = **847 Connections**
Year 2022 Projected Number of Connections:	$847(1+0.01)^{1}$ = **855 Connections**
Year 2024 Projected Number of Connections:	$855(1+0.01)^{3}$ = **873 Connections**
Year 2031 Projected Number of Connections:	$873(1+0.018)^{7}$ = **989 Connections**
Year 2041 Projected Number of Connections:	$954(1+0.018)^{15}$ = **1,182 Connections**

As identified in the WMP the number of ERU's is actually lower than the number of the connections because of the relatively higher use in the residential connections than the commercial, industrial, or other.

Figure 1: ERU Per Connection Type

Residential	Commercial	Industrial / Manufacturing	Other
1	1.003	0.578	0.889

Therefore, the number of ERUs are projected as follows:

Figure 2: Growth Projections

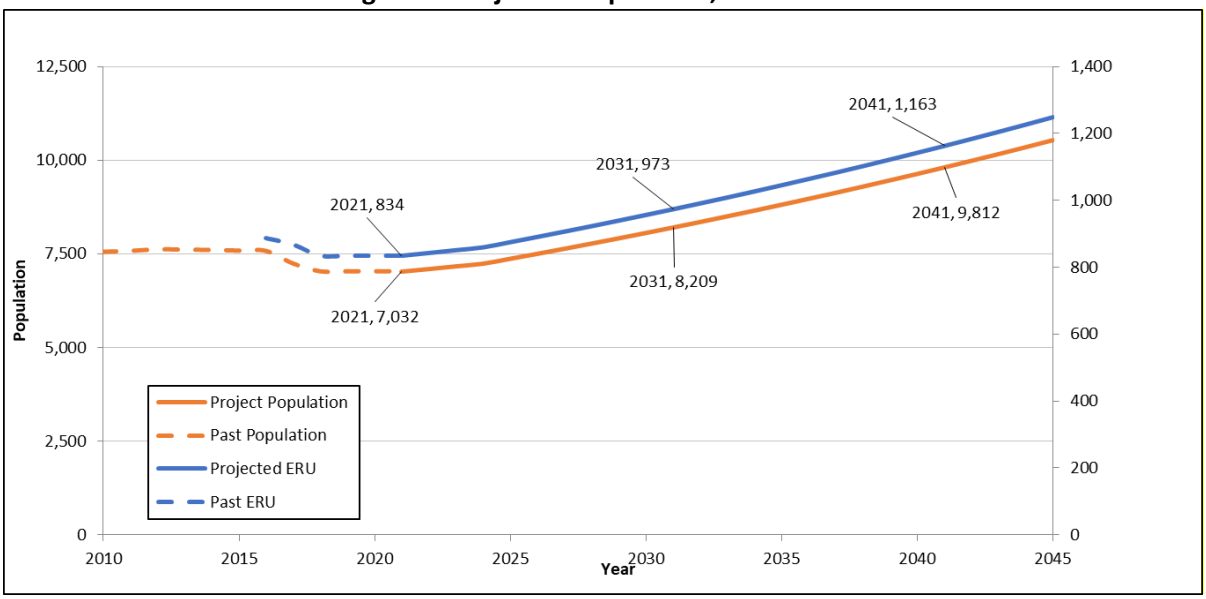
Calendar Year	Est. Growth Rate	Number of connections	Number of ERUS
2021	0.00%	847	834
2022	1.00%	855	842
2023	1.00%	864	850
2024	1.00%	873	859
2025	1.80%	888	874
2026	1.80%	904	890
2027	1.80%	921	906
2028	1.80%	937	922
2029	1.80%	954	939
2030	1.80%	971	956
2031	1.80%	989	973
2032	1.80%	1,007	991
2033	1.80%	1,025	1,008
2034	1.80%	1,043	1,027
2035	1.80%	1,062	1,045
2036	1.80%	1,081	1,064
2037	1.80%	1,100	1,083
2038	1.80%	1,120	1,103
2039	1.80%	1,140	1,122
2040	1.80%	1,161	1,143
2041	1.80%	1,182	1,163

The total ERU growth for the 20 year planning horizon is 329 ERUs.

Population Projections

Hildale is a unique community that shares their water system with their sister community on the Arizona side. Although their combined population is more than 5,000, Hildale's population is estimated to be below 3,000 according to the US Census Bureau estimates. Therefore, Hildale is not required to comply with all the requirements of the IFFP.

Figure 3: Projected Population, Number of ERU



Level of Service (LOS)

The level of service utilized for this IFFP will be those identified in the WMP as state required capacity numbers and/or actuals as the case may be. They are as follows:

Water Rights

1,079 gallons per day per ERU

Water Source

2,158 gallons per day per ERU

Water Storage

2,951 gallons per ERU with 1.1 MG excess capacity

Water Distribution

Peak Instantaneous = 3.298 gpm/ERU

Water Treatment

1.43 gpm/ERU or 2,071 gpd/ERU

Capital Improvements

Taking into consideration the findings of both reports (WMP and FSHGS), the feedback from Hildale, our professional judgement and opinions, then balancing all that with the requirements of the Impact Fee Act, this issue can be a little complicated. Additionally, the high turnover at Hildale City in the past several years has increased the complexity. Before quantifying the capital improvements identified by the two plans, it is our opinion that we need to look carefully at the recommendations and move forward with an IFFP that can be flexible and valid regardless of the direction taken by the community.

As noted in the WMP by Sunrise Engineering and the FSHGS by Bowen Collins, most of the water currently used as source water is either shallow well water high in iron and manganese or deeper well water high in radium. No well water in the area has proven to be high enough quality that it does not require treatment.

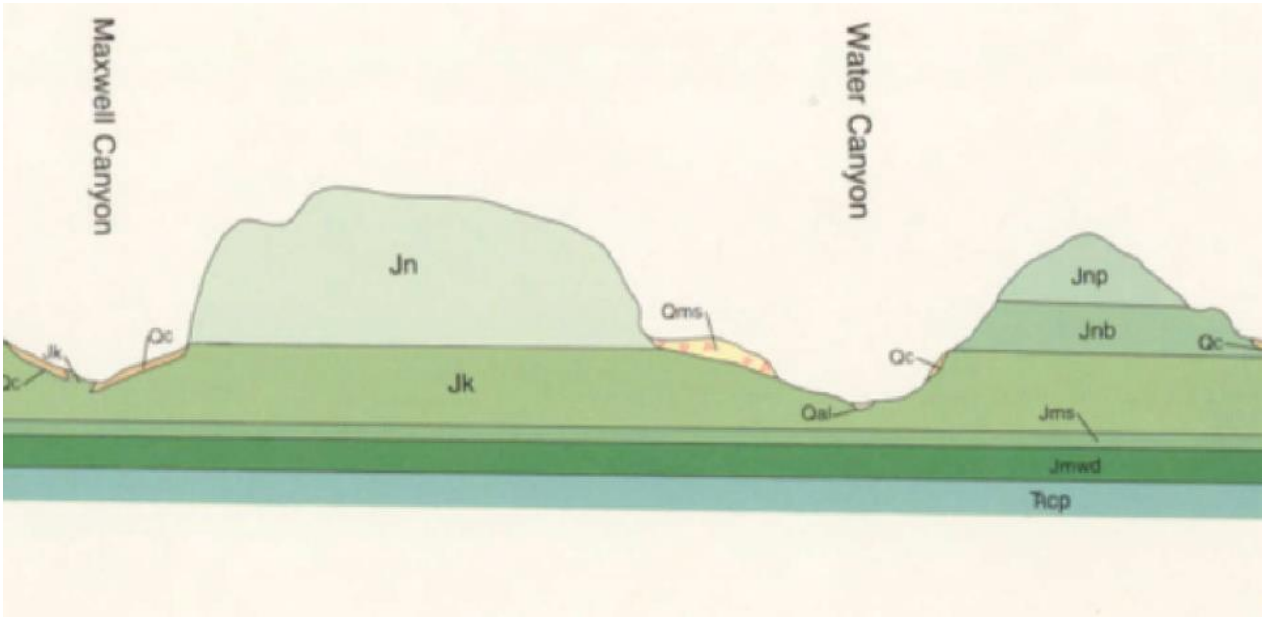
There have been numerous investigations and studies to find a feasible source of water that would not need to be treated. The expressed goal of Hildale City and the Town of Colorado City to find a higher quality water supply has not been achieved nor have any efforts found an easy viable path to accomplish this goal.

The springs/horizontal wells up Jans and Maxwell Canyon represent that desired quality. The FSHGS study went to great lengths to study the potential of horizontal wells tying into the Navajo Sandstone aquifer, known for its pristine high-quality water. Ultimately that study found that the existing horizontal wells tied into the exposed Navajo Sandstone represent the approximate maximum sustainability level. From page 2-7 of that report:

> *"Not all of that infiltrated water will recharge the Hildale side or south side of the Canaan Mountain where horizontal wells would be located. BC&A estimates the area of influence for potential future horizontal wells installed in Water Canyon to be approximately 800 acres, with an annual aquifer recharge volume of only 110 ac-ft. The potential to withdraw more groundwater than is annually recharged raises concerns about the sustainability of the withdrawals. Further analysis of the deficit between the recharge and withdrawal volumes indicates that aquifer water levels would decline about 9 feet per year over the 800 acres area. Based on this finding we have concern about the long-term sustainability of horizontal wells tapping the Navajo Aquifer."*

Additionally, it recommended drilling in 3 zones for a total of 5 wells at the mouth of Squirrel Canyon, in Maxwell Canyon and in Water Canyon trying to tie into the Kayenta or Moenave formations. The report points out that there are no local wells drilled in the Kayenta or Moenave to provide good data on quality or quantity. Quantity estimates were made by evaluating wells near the town of Leeds. The quality of this water is unknown but because the shallower wells in town are above the Shinarump they may be an indication that the proposed wells may have the same iron and manganese problems. We will look at these wells in addition to additional wells down in town both as potential future water sources.

Figure Error! No text of specified style in document.**4: Geologic Map Cross Section**



Jnb, Jnp	Navajo Sandstone Formation	Jmwd, Jms	Moenave Formation
Jk	Kayenta Formation	TRcp	Triassic Formation
Qc, Qmsc, Qad	Quaternary Alluvial Deposits		

Considering the above background, we can prepare the Capital Facilities Plan portion of the IFFP.

Water Rights

Sunrise Engineering was not asked to evaluate the water rights issue as part of the WMP, however the BC&A FSHGS recommendations for source would require some water rights acquisition. The City has requested that we not include costs of new water rights in this analysis because the United Effort Plan (UEP) trust has indicated a desire to work with the town for any needed culinary water rights. Regardless, there was a purchase of 88.9 acft of water rights in 2016 from the Canaan Gap area that could be transferred to wells in Town. The $355,600 cost of this water right could be considered an impact fee eligible expense.

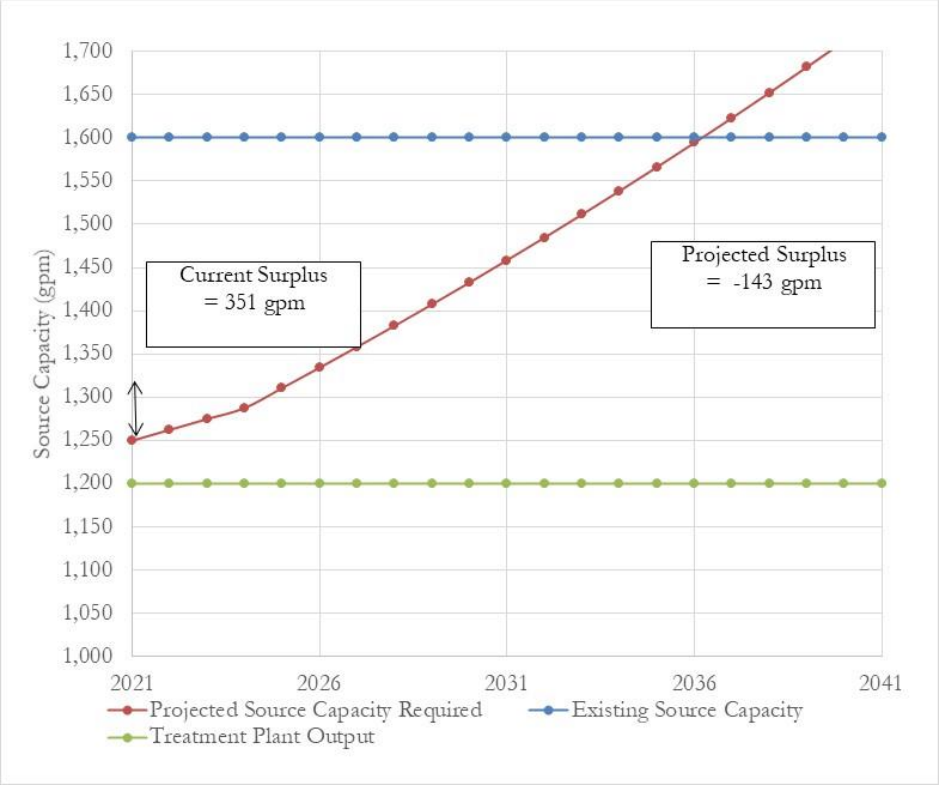
Water Source

There are several options available to choose from to satisfy the future water source needs. As mentioned in the background above the source issue has been one of quality in addition to making sure the community has the needed quantity of water. The shallow alluvial aquifer(s) are high in iron and manganese and deeper aquifer (Shinarump) high in radium. We don't know the quality of the Moenave and Kayenta. Both problematic waters are treated by the existing treatment plant using potassium permanganate filter media. The water operators indicate that the least desirable of the two is the shallower water with regards to problems with the treatment plant. They have periodic

episodes that include complaints of colored water, implying an issue with the treatment plant's efficient removal of the iron and manganese.

There is a projected reduction through conservation (see WMP by Sunrise) as the community normalizes with surrounding areas. With that reduction and with the inclusion of the Academy Well in the system there are no needed source projects within the 20-year design horizon. However, if we assume the same LOS for water usage then the existing sources would be in the deficit by 2036 and in need of 143 gpm by 2041.

Figure 5: Existing and Projected Source Capacity



Water source projects include the 5 new wells in the mouths of the canyons (may replace the need for the current treatment plant). Those source projects are shown below. The treatment plant improvements (to be discussed in the Water Treatment subparagraph) may not be needed at all or at least only needed on a smaller scale if the new wells in Zones 1, 2, 3 as recommended by BC&A are completed. On the other hand, if the wells are not done, or if they are done and the water is similar to the shallow aquifer wells currently in operation, then the treatment plant project would be necessary.

Figure 3: Cost Estimate for Source Projects

Source Projects	Current Costs	Year	Costs w/ Inflation
Trail Head Zone 1 Wells (2)	$ 1,453,000.00	2024	$ 1,635,364
Two Pump Station	$ 600,000.00	2024	$ 675,305
Conveyance Pipe	$ 160,000.00	2024	$ 180,081
Maxwell Canyon Zone 2 Well	$ 1,017,000.00	2024	$ 1,144,642
Two Pump Station	$ 300,000.00	2024	$ 337,653
Conveyance Pipe	$ 339,000.00	2024	$ 381,547
Water Canyon Zone 3 Wells (2)	$ 1,481,000.00	2024	$ 1,666,879
Two Pump Station	$ 600,000.00	2024	$ 675,305
Conveyance Pipe	$ 390,000.00	2024	$ 438,948
Zone 1 & 3 Combined Water Canyon Pipe	$ 308,000.00	2024	$ 346,657
New Treatment Plant (1500 gpm)	$ 4,400,000.00	2024	$ 4,952,239
		Sub total	$ 12,434,621

Water Storage

Based on the client coordination and preferences during the WMP there was only one water storage project recommended by the WMP; a new 300,000 gallon tank to have the same high-water elevation as the system's other tanks. This tank would help alleviate existing pressure problems in that area during peak instantaneous demand and fire flows. However, this tank would not be impact fee eligible as it would be set to alleviate an existing problem.

The elevations of the existing tanks are such that the maximum water elevation would be approximately 5,226 ft. Therefore, the existing water system can only realistically serve developments at or below the 5,110 ft. elevation line. The current water system will not be able to serve developments that are placed above this elevation. Storage tanks at a higher elevation would be required for any potential development above the 5,110 ft elevation. The utility board has directed us to include a 1 million gallon storage tank in the IFFP. The tank will be located above the existing Elm Street 1 million gallon tank at approximately 5350ft. The justification for this tank is that it will benefit growth in that area and allow the development of approximately 240 acres. This new tank would require a booster pump station to get water from near the Elm Street tank to the new tank. Figure 7 Shows the approximate location of the new tank.

Figure 4: Approx. Location of 1MG Tank Improvement

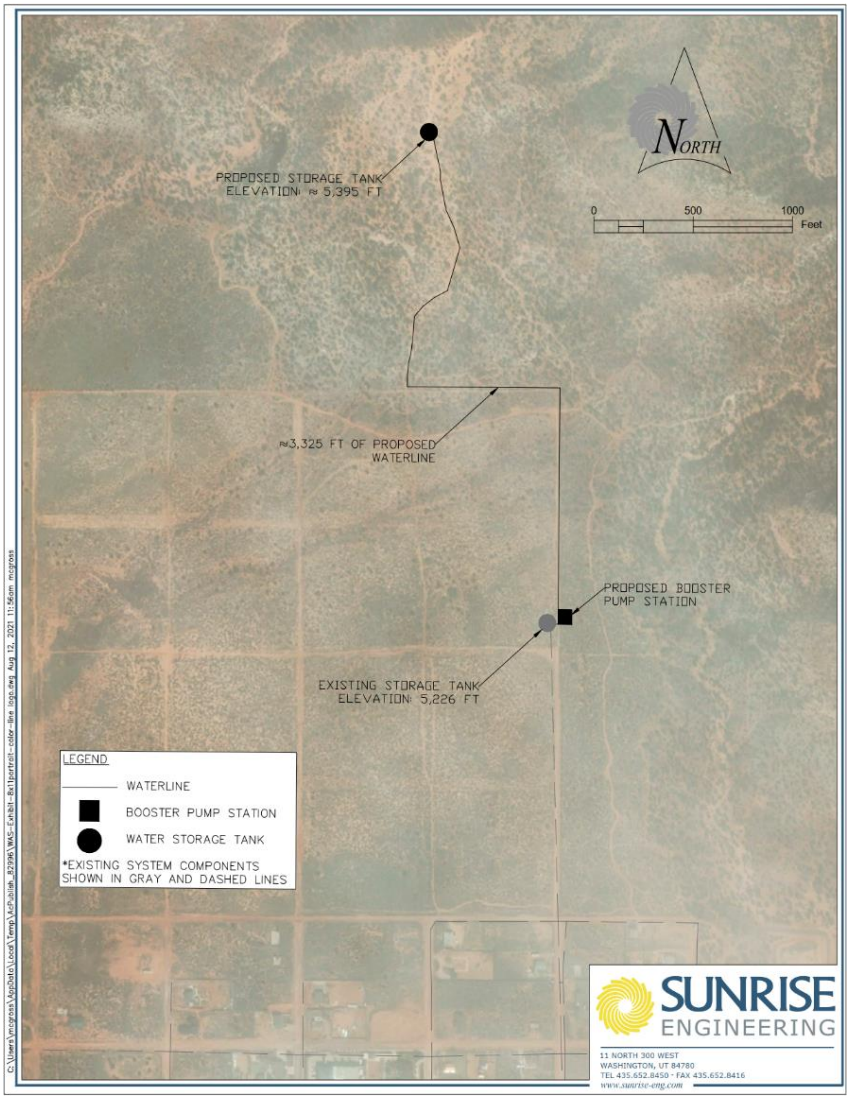


Figure 5: Cost Estimate for Storage Projects

Storage Projects	Current Costs	Year	Costs w/ Inflation
New 300,000 Gallon Tank	$ 747,920.00	2028	$ 919,847.26
New 1M Gallon Tank NW Growth	$ 2,275,900.00	2025	$ 2,561,545.50

Water Distribution

There are several areas within the system that need improvements to provide the required distribution pressures and flows, with fire protection. Some of these improvements will benefit growth and therefore are partially impact fee eligible. The Northwest Hildale improvements include upsizing old pipes and installing new pipes in areas previously unserved which will allow new residences in an already subdivided area.

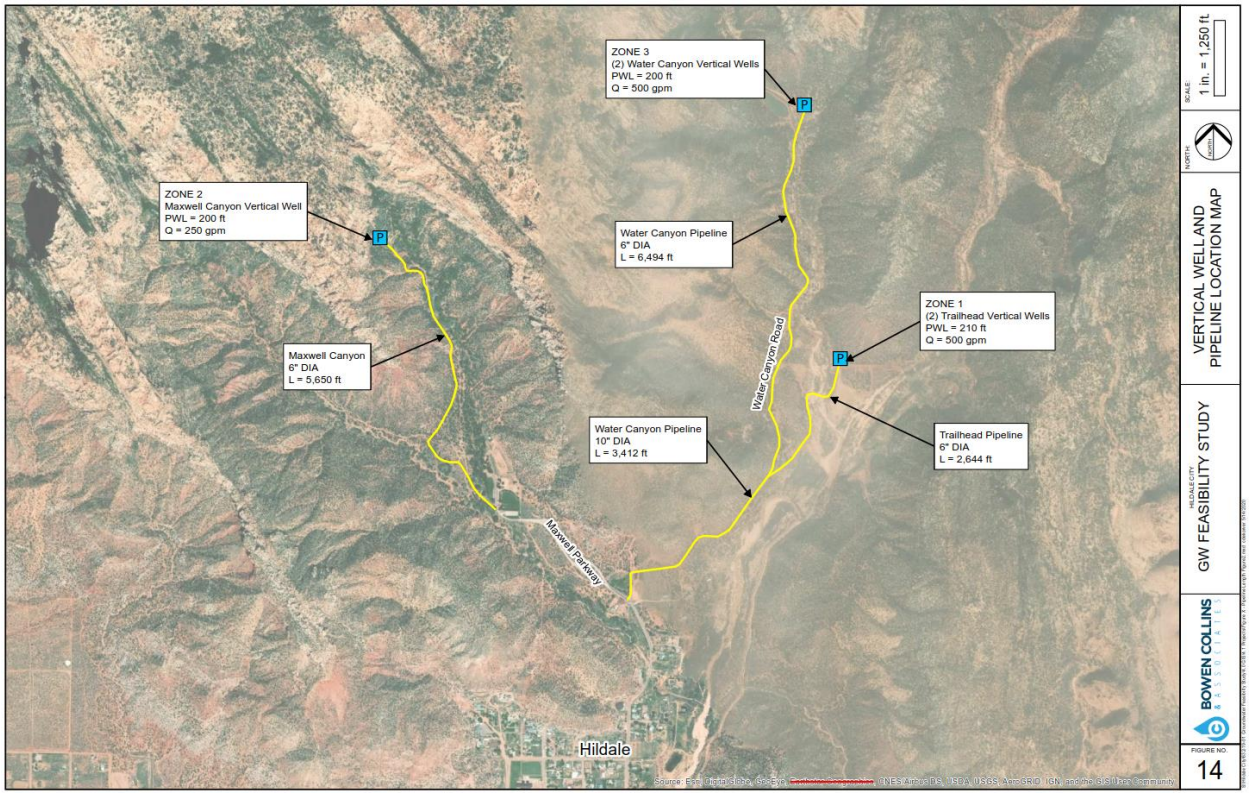
Figure 9: Cost Estimate for Distribution Projects

Distribution Projects	Current Costs	Year	Costs w/ Inflation
Additional Fire Hydrants	$ 1,250,000.00	2021-2031	$ 1,679,895
Northwest Hildale Water Improvements	$ 492,900.00	2023	$ 522,918
Canyon Street Line	$ 205,300.00	2025	$ 231,067
University to Township Line	$ 147,900.00	2026	$ 171,457

Water Treatment

As described above there are two distinct paths that are available for the future water treatment needs of the community. One is to work toward the potential elimination of the need for water treatment through better sources. Two is to upgrade/replace and expand the existing treatment plant. Neither one is 100% impact fee eligible. If option one was to be chosen, we would recommend at least one more well be drilled over and above what the BC&A recommended to provide for growth as BC&A's recommendations were more in line with just replacement source.

Figure 10: Proposed locations for New Wells



1. **Eliminate Water Treatment through better ground water sources.**
   As mentioned in the above subsection on water source, water treatment is dependent on the type of source projects that are integrated into the system. The community has operated a treatment plant for over 30 years and desires to be able to eliminate that ongoing responsibility and expense. If they chose to implement the water wells up the canyons, they might be able to get the water necessary to eliminate the treatment plant. However, there is

a significant risk and stack of hurdles necessary to accomplish this. These are mostly lined out in the WMP and the FSHGS and include:

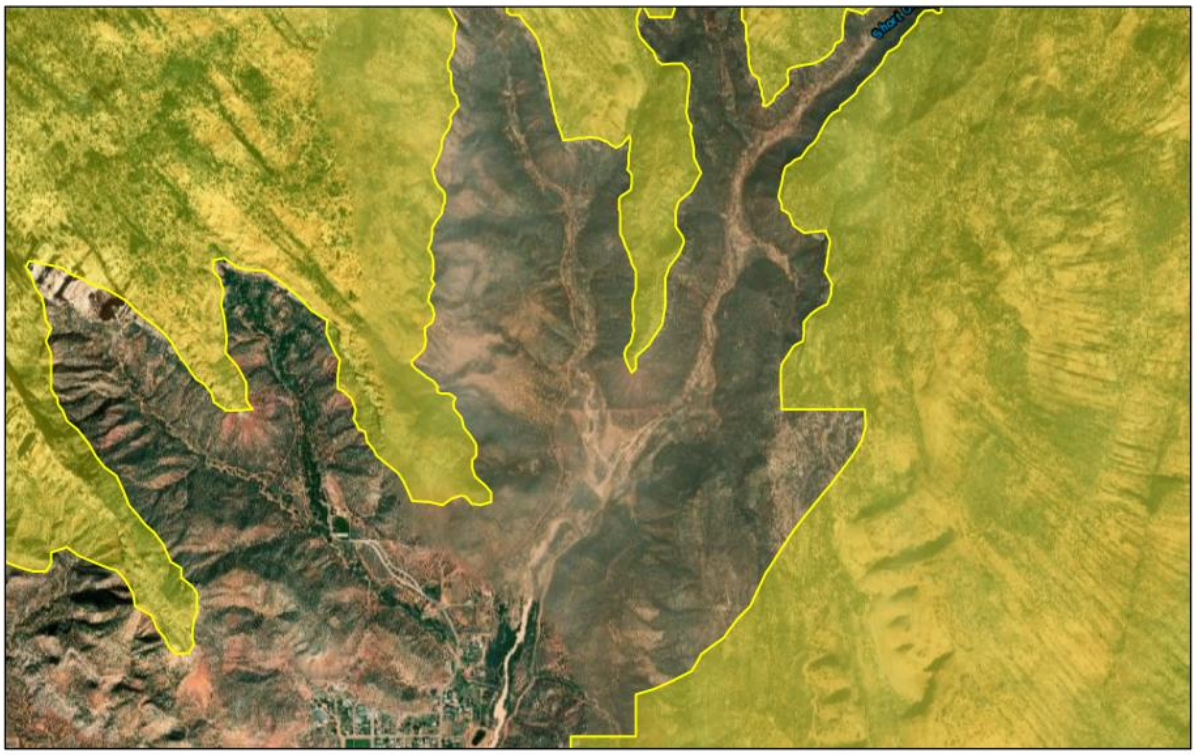
a. Water Quality
   The water that is in the alluvial aquifer has proven to be very high in iron and manganese. So much so that it requires to be treated. There are no known water samples from the aquifers to be reached via vertical wells at the mouth of the canyon. This water may be free of the iron and manganese levels that plague the alluvial aquifers in the valley.

b. Water Rights
   For the purpose of this report, we would assume that all new water rights needed for these wells would be available at no cost from the UEP. If not, the water rights would need to be procured and could present difficulties transferring to this point of diversion.

c. Land Requirements
   All the targeted well sites are on BLM property and the project(s) would need to acquire that land and/or easements through the federal process.

d. Environmental Impacts and Approvals
   Although the Canaan Mountain Wilderness boundary appears to be in the cliffs above, that may still provide environmental headwinds for approval of a water project. See figure below:

Wilderness Map



e. <u>Time</u>

Finally, there is the time issue. If this project is meant to be accomplished in order to eliminate the treatment plant, then it would be best to happen over a short period of time. However, the above hurdles all can add to the amount of time required to accomplish this task and could complicate the phasing and feasibility.

Table 1
Alternative 1 - Opinion of Probable Construction Costs

Item	OPCC
Zone 1 Well Construction	$1,453,000
Zone 1 Two Pump Station	$600,000
Zone 1 Conveyance Pipeline	$160,000
Zone 2 Well Construction	$1,017,000
Zone 2 Pump Station	$300,000
Zone 2 Conveyance Pipeline	$339,000
Zone 3 Well Construction	$1,481,000
Zone 3 Two Pump Station	$600,000
Zone 3 Conveyance Pipeline	$390,000
Zone 1 & 3 Conveyance Pipeline	$308,000
TOTAL CAPITAL COSTS	**$6,648,000**

One of the first requirements would be to confirm that the quality of water is such that it would allow the elimination of the treatment plant. If the quality is not sufficient, then this discussion is likely moot as the intent is to replace the treatment plant.

2. **Upgrade or replace and expand the existing treatment plant.**
   Currently the treatment plant does not perform at an optimum level. Sunrise Engineering is currently working with the Town of Colorado City on a Preliminary Engineering Report (PER) funded by USDA Rural Development to provide options for improvements to the existing treatment plant.

   If the treatment plant upgrade and expansion is elected as the preferred alternative, then it should be built with 1500 gpm capacity with consideration for ease of expansion. With 1500 gpm capacity, the treatment plant would partially impact fee eligible.

Proportionate Share Analysis

Impact fee law in Utah and Arizona require that only that portion of the facility, whether existing, new, or future, that is required for growth may be included in the impact fee calculations. A proportionate share analysis must be made of all the facilities to determine a reasonable and logical ratio of cost for each improvement.

Because of the uncertainty of the proposed water source/treatment projects listed above, we have formulated two separate analyses.

Water Rights

It was determined that the water right purchase in 2016 is 100% impact fee eligible.

Distribution

It was determined that the Northwest Hildale water improvements project would greatly benefit growth in existing blocks of that portion of town that do not currently have homes built. It was estimated that this project proportion to new growth would be 50%.

Storage

The new 300,000 gallon saddle tank replacement project is not deemed impact fee eligible for reasons listed above. The new 1,000,000 gallon tank above the NW area would be 100% impact fee eligible as it would not be necessary if no growth occurs.

Water Source and Water Treatment

These two issues are intertwined and must be considered together. In both scenarios identified above the base flow of the current treatment plant is 1200 gpm and the proposed flow for either scenario is 1500 gpm. The simple math on this difference gives us the proportionate share of the improvements that would be impact fee eligible is 20%

Impact Fee Analysis

Option A

Misc WMP Projects	Current Costs	Year	Costs w/ Inflation	Financed Costs	% IF El.	Impact Fee El. Cost
Power Plant Well to Treatment Plant	$ 586,500	2045	$ 1,192,234	$ 1,362,232	0.0%	$ -
New 300,000 Gallon Tank	$ 747,920	2028	$ 919,847	$ 1,051,006	0.0%	$ -
New 1M Gallon Tank NW Growth	$ 2,364,900	2025	$ 2,661,716	$ 3,041,244	100.0%	$ 3,041,244
Additional Fire Hydrants	$ 1,250,000	2021-2031	$ 1,679,895	$ 1,919,428	0.0%	$ -
Northwest Hildale Water Improvements	$ 492,900	2023	$ 522,918	$ 597,479	50.0%	$ 298,740
Canyon Street Line	$ 205,300	2025	$ 231,067	$ 597,479	0.0%	$ -
University to Township Line	$ 147,900	2026	$ 171,457	$ 296,446	0.0%	$ -
Source Projects	**Current Costs**	**Year**	**Costs w/ Inflation**	**Financed Costs**	**% IF El.**	**Impact Fee El. Cost**
Trail Head Zone 1 Wells (2)	$ 1,453,000	2024	$ 1,635,364	$ 2,098,078	20.0%	$ 419,616
Two Pump Station	$ 600,000	2024	$ 675,305	$ 866,378	20.0%	$ 173,276
Conveyance Pipe	$ 160,000	2024	$ 180,081	$ 231,034	20.0%	$ 46,207
Maxwell Canyon Zone 2 Well	$ 1,743,500	2024	$ 1,962,325	$ 2,517,550	20.0%	$ 503,510
Two Pump Station	$ 300,000	2024	$ 337,653	$ 433,189	20.0%	$ 86,638
Conveyance Pipe	$ 339,000	2024	$ 381,547	$ 489,504	20.0%	$ 97,901
Water Canyon Zone 3 Wells (2)	$ 1,481,000	2024	$ 1,666,879	$ 2,138,509	20.0%	$ 427,702
Two Pump Station	$ 600,000	2024	$ 675,305	$ 866,378	20.0%	$ 173,276
Conveyance Pipe	$ 390,000	2024	$ 438,948	$ 563,146	20.0%	$ 112,629
Zone 1 & 3 Combined Water Can Pipe	$ 308,000	2024	$ 346,657	$ 444,741	20.0%	$ 88,948
Water Rights						
Canaan Gap (88.9 acft)		2016	$ 355,600	$ 355,600	100.0%	$ 355,600
					Impact Fee Amount	$ 5,825,284
					Number of New ERUs	329
					Impact Fee per ERU	**$ 17,706**

Option B

Misc WMP Projects	Current Costs	Year	Costs w/ Inflation	Financed Costs	% IF El.	Impact Fee El. Cost
Power Plant Well to Treatment Plant	$ 586,500	2045	$ 1,192,234	$ 1,362,232	0.0%	$ -
New 300,000 Gallon Tank	$ 747,920	2028	$ 919,847	$ 1,051,006	0.0%	$ -
New 1M Gallon Tank NW Growth	$ 2,364,900	2025	$ 2,661,716	$ 3,041,244	100.0%	$ 3,041,244
Additional Fire Hydrants	$ 1,250,000	2021-2031	$ 1,679,895	$ 1,919,428	0.0%	$ -
Northwest Hildale Water Improvements	$ 492,900	2023	$ 522,918	$ 597,479	50.0%	$ 298,740
Canyon Street Line	$ 205,300	2025	$ 231,067	$ 597,479	0.0%	$ -
University to Township Line	$ 147,900	2026	$ 171,457	$ 296,446	0.0%	$ -

Source Projects	Current Costs	Year	Costs w/ Inflation	Financed Costs	% IF El.	Impact Fee El. Cost
New Treatment Plant (1500 gpm)	$ 4,400,000	2024	$ 4,952,239	$ 5,658,367	20.0%	$ 1,131,673
Water Rights						
Canaan Gap (88.9 acft)	$ -	2016	$ 355,600.00	$ 355,600	100.0%	$ 355,600
					Impact Fee Amount	$ 4,827,256
					Number of New ERUs	329
					Impact Fee per ERU	**$ 14,673**

Impact Fee

There remain several unknowns with Option A including the following:

- Quality – Although the water quality is expected to be high in the canyons, it has not been tested or verified. The water may require treatment at the treatment plant to satisfy the requirements for culinary water. Further exploration and testing will be required to determine the water quality.
- Quantity – The quantity of water that may be obtained from wells in the canyons is unknown. The quantity of water may not be sufficient to supply current and future needs. In that case, additional water from the existing wells and treatment plant would be needed to supplement water from the new source.
- Source – Additional water rights will be required for sources in the canyons. Hildale City has indicated that additional water rights may be available from UEP. A commitment from UEP would be required and the water rights would have to be converted and moved to a new point of diversion.
- Property – Easements/property will be required from the BLM. This represents a cost and an unknown duration. The land required is also adjacent to environmentally sensitive lands which may present some challenges in developing the wells and pipeline.
- Cost – Option A has a higher development cost and requires further exploration with accompanying costs and time impacts. However, it may reduce future treatment costs if the quality and quantity are sufficient.

The design of Option B can begin as soon as funding is secured with construction commencing immediately after design. It has a lower implementation cost and fewer unknowns. For these reasons, Option B is recommended.

However, if further exploration is performed that demonstrates the canyons have a sufficient quantity of water to satisfy current and future demand and sufficient quality to satisfy culinary water requirements without treatment and if easement/property is obtained from BLM to develop the wells, Option A would then become the recommended option.

APPENDIX A

Impact Fee Certification

CERTIFICATION OF IMPACT FEE ANALYSIS BY CONSULTANT

In accordance with Utah Code Annotated, § 11-36a-306 Vern Maloy, P.E., on behalf of Sunrise Engineering, Inc., makes the following certification:

I certify that the attached impact fee analysis:

1. Includes only the costs for qualifying public facilities that are:
    a. Allowed under the Impact Fees Act; and
    b. Actually incurred; or
    c. Projected to be incurred or encumbered within six years after each impact fee is paid;
2. Does not include:
    a. Costs of operation and maintenance of public facilities;
    b. Costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
    c. An expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and that methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Offsets costs with grants or other alternate sources of payment (if grants or other sources of payment have been applied for and received and such information was made available when the Impact Fee Analysis was prepared); and
4. Complies in each and every relevant respect with the Impact Fees Act.

Vern Maloy, P.E. makes this certification with the following qualifications:

1. All the recommendations for implementations of the Impact Fee Facilities Plan ("IFFP") made in the IFFP documents are followed in their entirety by Hildale City, Utah staff and elected officials.

2. If all or a portion of the IFFP's or Impact Fee Analyses are modified or amended, this certification is no longer valid.

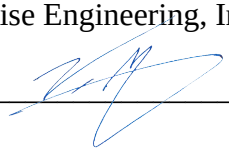
3. All information provided to Sunrise Engineering, Inc., its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by Hildale City, Utah, and outside sources.

4. The undersigned is trained and licensed as a professional engineer and has not been trained or licensed as a lawyer. Nothing in the foregoing certification shall be deemed an opinion of law or an opinion of compliance with law which under applicable professional licensing laws or regulations or other laws or regulations must be rendered by a lawyer licensed in the State of Utah.

5. The foregoing Certification is an expression of professional opinion based on the undersigned's best knowledge, information and belief and shall not be construed as a warranty or guaranty of any fact or circumstance.

6. The foregoing certification is made only to Hildale City, Utah and may not be used or relied upon by any other person or entity without the expressed written authorization of the undersigned.

Sunrise Engineering, Inc.

By: 

Dated: 9/13/2021