

WATER RESOURCES & WASTEWATER REPORT

For

**Grandview Reserve
Sketch Plan**

**April 2020
Revised: August 2020**



CONSULTANTS, INC.

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1.0 INTRODUCTION

The purpose of this report is to address the specific water and wastewater needs of the proposed Grandview Reserve subdivision in Falcon, CO.

Development at Grandview Reserve by Land Development Companies consists of 768.23 acres and roughly 3,261 Single Family Equivalent (SFE) wastewater users (made up of single family residents, commercial, a church, and a school), located between Eastonville Rd and Highway 24, within Sections 21, 22, 27, and 28, all in Township 12 South, Range 64 West of the 6th Principal Meridian. Residential properties within the development will be provided water services through the proposed district formed as a part of the land use process.

A draft of the Sketch Plan including adjacent roadways is included in *Appendix A*.

At this point, five (5) phases are anticipated, but not yet ordered or sequenced.

2.0 PROJECTED WATER DEMANDS

It is expected that each SFE in Grandview Reserve will require an average of 0.353 annual acre-feet of water. This anticipated water demand is consistent with historic needs for nearby developments.

Table 1 below summarizes the water demand estimations for Grandview Reserve.

Table 1: Water Supply and Demand Summary

Description	SFE's	Demand/SFE (AF/Year)	Total Demand (AF/Year)
Single Family Residences	3,260	0.353	1,150.78
School	10		3.53
Church	5		1.7
Commercial	59.5		21.00
Grant Totals	3,334.5		1,177.08

Notes:

- Commercial demand is anticipated at 3.5 SFE's per acre ($3.5 \times 17 = 59.5$ AF)
- Church and school SFE's are anticipated to be similar to other churches and schools in the Falcon area.

Demand for housing, commercial, and institutional development is dynamic, and buildout will commence as market demands dictate.

The Water Supply Information Summary is located in *Appendix B*.

3.0 WATER SYSTEM FACILITIES & PHYSICAL SUPPLY

3.1 Source of Supply:

Future local wells, mostly in the Arapahoe and Laramie-Fox Hills formations, will provide water for the Grandview Reserve subdivision. Off-site wells will likely be needed (from neighboring lands owned by 4-Site Investments, LLC) for full build-out.

- The total annual water demand for 3,332.4 SFE's is calculated to be 1,177.08 AF.
- 4 Site Investments, the property owner, owns 1,400 AF of Arapahoe non-tributary water.
- The adjoining 4 Way Ranch owns 2,023 AF of Laramie-Fox Hills non-tributary water, and 1,011 AF of Arapahoe non-tributary water.
- Any additional water, should it be needed, will be derived from the 4 Way Ranch water.
- Water from the Arapahoe and Laramie-Fox Hills formations is Non-Tributary, Non-Renewable water.
- A breakdown of demand vs. supply is below:

4 Site Water	1,400 AF
<u>4 Way Ranch Water</u>	<u>3,034 AF</u>
<i>Total Supply</i>	<i>4,434 AF</i>
<i>Grandview Demand:</i>	<i>1,177.08 AF</i>
<i>300-Year Quantity:</i>	<i>3,531.24 AF (Less than the available supply)</i>

Copies of the water rights listed above are located in *Appendix E*.

In order to produce 1,177.08 AF of water (which equates to 1.05 million gallons per day, MGD), approximately 14 well sites will be needed. A well site will consist of an Arapahoe well and a Laramix-Fox Hills well with a total production rate of about 110 gallons per minute.

If the wells are pumped 12 hours per day, that equates to 79,200 gallons produced by each well site each day. Fourteen (14) well sites can produce 1.11 MGD (when only pumping half the time) in order to satisfy the demand of 1.05 MGD.

Grandview is to build the infrastructure on their land as well as on future off-site wells in 4-Way Ranch withholdings. A future IGA will be implemented between the parties.

3.2 Water Treatment:

Water treatment will be in the form of a single or multiple treatment facilities utilizing pressure-sand filtration. Ideally, a single centralized facility is easier for operation and maintenance. However, construction of a single facility capable of meeting buildout demands is not always economical in early stages. Therefore, two or more facilities may be constructed as building progresses.

Pressure-sand treatment systems are utilized by many other metropolitan districts in the Falcon area. They are typically used to treat secondary contaminant levels in source water (iron and manganese), primarily for aesthetics (taste and odor).

3.3 Water Storage

Water storage will have to be sized for the largest commercial building in the development and meet International Fire Code standards. That volume of water, referred to as “fire-flow volume,” will be added to the Maximum Daily Demand to establish the required water storage volume.

3.4 Distribution & Transmission Lines:

Distribution lines will likely be PVC, adequately-sized to convey fire-flows throughout the subdivision. They will be constructed by Grandview. No other districts are planned to provide water or infrastructure for Grandview’s water system. Only water from 4-Way Ranch withholdings will be used to supplement Grandview’s supply, and, as mentioned above, Grandview will be responsible for building are required infrastructure.

3.5 Water Quality

Water quality must meet Colorado Department of Public Health & Environment (CDPHE) regulations for primary drinking water standards.

4.0 WASTEWATER REPORT

4.1 Projected Wastewater Loads:

Wastewater projections are based on similar districts' historical use in this area. It is expected that each SFE in Grandview Reserve will generate an average of 172 gallons/day of wastewater. Table 2 below summarizes the projected wastewater loads for Grandview Reserve.

Table 2: Projected Wastewater Loads Summary

Description	SFE's	Unite Base Flow (<i>GPD</i>)	Average Daily Flow (<i>GPD</i>)
Single Family Residences	3,260	172	560,720
School	10		1,720
Church	5		860
Commercial	59.5		10,234
Grant Totals	3,334.5		573,534

4.2 Treatment Facilities:

The regional wastewater treatment provider in the area of Grandview Reserve is the Woodmen Hills Metropolitan District (WHMD). WHMD has constructed a new regional wastewater treatment facility which was placed online in the spring of 2019. The new plant is an advanced wastewater treatment plant with a rated hydraulic capacity of 1.3 MGD. WHMD is currently in compliance with its discharge permit and the treatment facility has adequate capacity for the additional flows.

Current loading at the facility is roughly 68%, but adequate capacity does not currently exist to handle the additional expected flows from Grandview.

As the regional wastewater treatment provider in the area, the District may possibly have excess capacity to serve future development contingent upon a potential service agreement, a future Inter-governmental Agreement (IGA) between the two agencies, and possible inclusion into the District.

Please refer to **Appendix C** for a map showing possible location of connection to WHMD's system, as well as the location of WHMD's treatment facility.

4.3 Collection and Pumping Facilities:

This project will be required to install gravity sewer facilities in accordance with certain standards and approvals. Said gravity sewer facilities could connect to existing collection systems owned and operated by WHMD.

Wastewater pumping facilities will be necessary to serve the Grandview Reserve Subdivision. A potential wastewater service letter from WHMD is included in **Appendix D**.