



Memorandum

TO: Ted Cherry, Town Manager

FROM: Spronk Water Engineers, Douglas H. Clements, P.E.

DATE: March 3, 2022

RE: Proposed additional Granby Ranch residential units and commercial space

Introduction

As requested, we have performed an analysis of water requirements to serve additional proposed residential and commercial development on Granby Ranch¹. The additional proposed development consists of 1,201 additional residential units and 497,000 additional square feet of non-residential space. The additional residential proposed residential units are within Planning Areas 8, 9, and 12 of the Planned Development Overlay District (PDOD). The water service would be provided by the Town of Granby from the South Service Area wells (a.k.a. Val Moritz Wells, herein “wells”). The wells operate pursuant to the Val Moritz plan for augmentation, which is discussed further below.

Val Moritz Plan for Augmentation

The Val Moritz plan for augmentation was originally decreed in Case No. W-1881 on August 1, 1974. The plan was amended and updated in Case No. 97CW290, which was decreed on July 31, 2013. Copies of those Water Court decrees are included as Appendix A and Appendix B to this memorandum. The plan for augmentation allows the wells to be pumped for residential and other uses, and the portion of the water pumped from the wells that is depleted from the stream system is quantified based on the type of use to which the water is put.

¹ Granby Ranch has gone by other names in the past, including variations of “Sol Vista.”

Paragraph 29 of the 97CW290 decree includes the following formula to determine consumptive use, i.e. stream depletions, from use of the well water:

$$\text{Consumptive Use (Acre-Feet)} = 1.44 \times A + 0.03 \times B + 0.10 \times C + 2.13 \times D + E + F + 2.37 \times G$$

Where:

A is the total number of acres of lawn, golf course, landscape or other irrigation supplied by the central water system and the number of acres of historic hay meadow that continue to be irrigated. Each acre of irrigated area is assumed to result in consumptive use of 1.44 acre-foot per year.

B is the total amount of domestic in-house water (expressed in acre-feet) delivered to those residential and commercial units connected to the central sewer system. Three percent of such water use is assumed to be consumptively used.

C is the total amount of domestic in-house water (expressed in acre-feet) delivered to those residential units on septic tanks. Ten percent of such water use is assumed to be consumptively used.

D is the acreage of lakes or other water surfaces to be constructed in the course of development of the project at their design high-water levels. Annual lake evaporation is assumed to be 2.13 acre-foot per acre.

E is the total amount of additional water impounded in storage during the year expressed in acre-feet.

F is the total of any other consumptive uses, expressed in acre-feet.

G is the total acreage of the Lake Val Moritz Wetlands. Consumptive use at the wetlands is assumed to be 2.37 acre-feet per acre.

The stream depletions are replaced using various water supplies, including senior irrigation water rights that were changed in Case No. W-1881 to augmentation uses. In addition, non-irrigation season stream depletions are to be replaced with water released from storage, which is currently done from Wolford Reservoir pursuant to a lease with the Colorado River Water Conservancy District.

Augmentation Water

In Case No. W-1881, the annual amount of augmentation water from the senior irrigation rights was quantified as 400 acre-feet. As a result of various agreements and decrees in the late 1990s and early 2000s, the ownership of this augmentation water is divided as follows:

Town of Granby	126 acre-feet
Silver Creek Water and Sanitation District	70 acre-feet
Granby Ranch	204 acre-feet

Granby uses its portion of the augmentation water to serve uses within the Town from the wells, including residential and commercial development on Granby Ranch. This area is sometimes referred to as the Joint Exclusion Area, which is the portion of the original Val Moritz service area described in Case No. W-1881, excepting the portion within the Silver Creek Water and Sanitation District (Silver Creek).

The wells also serve Silver Creek, and depletions from that use are replaced with Silver Creek's 70 acre-feet of augmentation water.

Granby Ranch uses its augmentation water for golf course irrigation, forage crop irrigation, lake and pond evaporation and snowmaking. Those uses are from raw water, and not the wells.

SFEs

Pursuant to the November 24, 2004 Joint Exclusion Plan between the Town of Granby and Silver Creek (Case No. 82CV67), there were a total of 6851.5 existing and projected single family equivalents (SFEs)² within the Joint Exclusion Area. Of those, 5125 SFEs are on the Granby Ranch, and 1726.5 SFEs are elsewhere on the Joint Exclusion Area. A copy of the Joint Exclusion Plan is included in Appendix C.

Exhibit 2 to the 97CW290 decree, which was entered by the Water Court on July 1, 2013, shows a total of 6852 residential and commercial SFEs planned on the Joint Exclusion Area, which is in close agreement with the total SFEs in the Joint Exclusion Plan.

² Each single-family residence equates to one SFE. We understand that engineering performed for the Joint Exclusion Plan assumed that each 1000 square feet of non-residential building space is equivalent to 0.59 SFEs.

The PDOD in effect for Granby Ranch provides for 4349 residential units and 1,310,000 square feet of commercial space. Using the 0.59 SFE per 1000 square feet of commercial space ratio, this amounts to 4349 residential SFEs and 773³ commercial SFE's, for a total of 5122 SFEs.

The proposed Sixth Amendment seeks to increase residential units by 1201 to a total of 5550. The proposed amendment seeks to increase commercial square footage by 497,000 square feet to 1,807,000 square feet. This increase is equivalent to 293⁴ commercial SFEs. In total, 1494⁵ additional residential and commercial SFEs are proposed on the Granby Ranch. Table 1, attached to this memorandum, summarizes these proposed increased development numbers for each planning area (PA-1 through PA-12).

Water Use Projections

We understand that the proposed residential and commercial development in Granby Ranch is to only allow in-house use. That is, no outside use, including lawn watering would be permitted. In-house water use for residential and commercial SFEs is assumed to be 350 gallons per day per SFE, based on the Joint Exclusion Plan and the 97CW290 decree. This 350 gallon per day per SFE value is widely used in the area for water planning purposes and is generally regarded as being conservatively high. We believe that actual water use will likely be less on the average, especially considering seasonal occupancy on a portion of the residences and the now prevalent use of water saving appliances and fixtures in modern construction.

We understand that the municipal wastewater from 1389 of the additional SFEs is to be sewerred to, and treated at, the Granby Sanitation District's Wastewater Treatment Plant. The other 105 SFEs will use individual sewage disposal systems (ISDS). Therefore, consumptive use for this additional development is calculated based on the "B" and "C" factors in the equation from Paragraph 29 of the 97CW290 decree (as set forth above). Consumptive use for sewerred wastewater and ISDS is calculated as three percent and ten percent of water use, respectively. Consequently, consumptive use for each sewerred SFE is three percent of 350 gallons per day, which equates to 10.5 gallons per day per SFE, or approximately 0.01176⁶ acre-feet per SFE per year. Consumptive use for each ISDS SFE is ten percent of 350 gallons per day, which equates to 35 gallons per day per SFE, or approximately 0.03921⁷ acre-feet per SFE per year. The additional 1494 SFEs proposed on the Granby Ranch would therefore consume about 20.5⁸ acre-feet. The stream depletion from this additional water

³ $1,310,000 * 0.59 / 1000 = 772.9$

⁴ $497,000 * 0.59 / 1000 = 293.2$

⁵ $1201 \text{ residential} + 293 \text{ commercial} = 1494 \text{ SFEs}$

⁶ $3\% * 350 \text{ gallons/day} * 365 \text{ days} / 325,851 \text{ gallons per acre-foot} = 0.01176 \text{ acre-feet per year.}$

⁷ $10\% * 350 \text{ gallons/day} * 365 \text{ days} / 325,851 \text{ gallons per acre-foot} = 0.03921 \text{ acre-feet per year.}$

⁸ $1389 * 0.01176 + 105 * 0.03921 = 20.5$

consumption would need to be replaced from the Town's 126 acre-feet of senior augmentation water from the Val Moritz plan for augmentation.

As mentioned above, there were 6851.5 total SFEs planned for the entire Joint Exclusion Area at full buildout, based on the Joint Exclusion Plan. If the proposed additional SFE's on Granby Ranch are approved, there would be a total of 8345.5 SFEs. In-house consumptive use for these 8345.5 SFEs would total 101.0⁹ acre feet. The Town's augmentation water supply of 126 acre-feet can meet this demand at full buildout, with 25 acre-feet of augmentation water to spare to meet other municipal demands, including lawn irrigation, as discussed below.

Irrigation Demands

Stream depletions from well water used to irrigate lawns and gardens are required to be replaced pursuant to the Val Moritz plan for augmentation. It was contemplated in the original plan that there would be significant lawn irrigation within the Joint Exclusion Area. Due to changed attitudes in the Town regarding lawn irrigation and the Town's past insistence that developers provide additional water supplies as a condition of lawn irrigation, actual and future lawn irrigation is now, and is projected in the future, to be significantly less than originally planned. A current formal measurement of irrigated land within the Joint Exclusion Area has not been made, which should be done at some point in the very near future.

A rough estimate of current irrigated lawn area within the Joint Exclusion Area is on the order of 8 to 10 acres. Much of this irrigation was not authorized and is contrary to agreements with developers that required additional water be provided to the Town. This unauthorized irrigation uses up a significant portion of the 126 acre-feet of the Town's augmentation water which could otherwise be used elsewhere and to provide a needed factor of safety. At 1.44 acre-feet of consumption per irrigated acre, as calculated based on the "A" factor in the equation from Paragraph 29 of the 97CW290 decree (as set forth above), total irrigation consumption could currently be on the order of 15 acre-feet per year¹⁰.

Assuming 10 acres of lawn irrigation at full buildout within the Joint Exclusion Area, total water consumption would be 116 acre-feet per year¹¹. This assumes that the Town is able, through enforcement, to hold total irrigated lawn area to 10 acres. If unauthorized irrigation increases over time, Granby could approach or exceed its total augmentation water supply and deplete its factor of safety. In addition, current and future outside uses such as car washing, hot tubs and pools would cut into available augmentation supplies.

⁹ $(8345.5 - 105) * 0.01176 + 105 * 0.03921 = 101.0$ acre-feet

¹⁰ For example, 10 acres * 1.44 acre-feet/acre = 14.4 acre-feet

¹¹ 101.0 acre-feet of in-house consumption + 15 acre-feet of lawn irrigation consumption = 116.0 acre-feet per year.

Conclusions

- Based on the analyses described above, from a water rights standpoint, the Town can meet the additional water demands for the proposed additional residential and commercial SFEs on Granby Ranch, and still have a factor of safety on the order of 10 acre-feet.
- This assumes that the Town is able to limit, reduce, or eliminate unauthorized lawn and garden irrigation and other outside uses which adversely affect the available augmentation water supply.
- If the additional SFEs are approved, the Town should require that all commercial uses be “in-house” only, should ensure that the consumptive characteristics of those uses are commensurate with the three percent consumption of other residential in-house uses, and require that return flows are conveyed to the wastewater plant. Otherwise, the water consumption would be higher than estimated herein¹².
- The Town should monitor uses on Granby Ranch to ensure that outside use does not occur. Otherwise, residential water consumption would be higher than estimated herein.¹³
- The Town should insure that adequate non-irrigation season water in the form of on-site storage or long-term lease water is acquired from the Granby Ranch. If the additional SFEs are approved, the amount of winter replacement should include additional amounts to cover the additional SFEs.
- This memorandum does not address the possible effects on the size or timing of infrastructure to serve the additional SFEs. These could include well and pumping capacities, treatment capacities, system storage and conveyance facilities. The Town should consider these matters in its review of the proposal for additional SFEs.
- The opinions and recommendations expressed herein are by nature, related to Colorado water law. Therefore, we recommend this memorandum be reviewed from a legal standpoint by Granby’s attorneys.

Closing

If you should have any questions or comments regarding the analyses describe herein, please do not hesitate to contact us.

¹² For example, a bottled water operation would be fully consumptive.

¹³ For example, car washing or outside hot tubs would not return unconsumed water via sewer to the wastewater plant.

Table 1**Proposed Increase of Residential Units and Commercial Space
Granby Ranch**

Planning Area	Current PDOD		Proposed		Difference	
	Residential Units	Commercial Sq Ft	Residential Units	Commercial Sq Ft	Residential Units	Commercial Sq Ft
PA-1	526	100,000	526	225,000	0	125,000
PA-2	192	20,000	192	150,000	0	130,000
PA-3	50	0	50	0	0	0
PA-4	416	0	416	90,000	0	90,000
PA-5	0	0	0	0	0	0
PA-6	250	0	250	0	0	0
PA-7	0	892,000	0	217,000	0	-675,000
PA-8	141	88,000	165	100,000	24	12,000
PA-9	331	10,000	572	75,000	241	65,000
PA-10	615	100,000	615	450,000	0	350,000
PA-11	788	20,000	788	250,000	0	230,000
PA-12	1,040	80,000	1,976	250,000	936	170,000
Total	4,349	1,310,000	5,550	1,807,000	1,201	497,000