WATER RESOURCES REPORT –RETREAT AT PRAIRIERIDGE FILINGS NO 1-3 PRELIMINARY PLAN

TOPICAL REPORT

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PREPARED FOR
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EXECUTIVE SUMMARY

This report is a submittal for Retreat at PrairieRidge Filings 1-3 Preliminary Plan.. The land is to be provided central water and sewer services through the Falcon Area Water and Wastewater Authority (FAWWA), which will become the overall service entity for, not only Sterling Ranch, but also the Retreat and the future Ranch.

It is expected that an urban residential home the Falcon Area Water and Wastewater Authority will require an average of 0.353 annual acre-feet, which is the adopted user characteristic for FAWWA. This is consistent with historic needs for nearby developments. Note that for the smaller high-density lots, FAWWA has adopted an SFE equivalency ratio to account for substantially reduced water needs, although this is partially offset by estimation of common area irrigation needs.

Retreat at PrairieRidge Filings 1-3 Preliminary Plan includes 193 lots, 24 of which fall into high-density development ratios for small lots, and roughly 3.30 annual acre-feet of water set aside for irrigated landscaping.

The resulting water demand on the central water system is 70.93 acre-feet.

The total 300 year water supply for FAWWA is shown in Table 3 and totals 1962.23 annual acre-feet $_{300\ year}$, Appendix F is an accounting of active water commitments, which total 1033.87 acre-feet including all subdivisions committed through September 11, 2024.

This leaves a net excess of currently available water of 928.36 $AF_{300\ year}$ and therefore there is more than sufficient water supply to meet the needs of Retreat at PrairieRidge Filings 1-3 Preliminary Plan on the 300-year basis.

Highlights of this Revision;

- 6 Large lots on central water
- Pending Case 24 CW 3007 withheld from Water Supply

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this study is to provide a preliminary outline of the water resources and wastewater needs that would be necessary for the Retreat at PrairieRidge Filings 1-3 Preliminary Plan development.

1.1 NEW DEVELOPMENT DESCRIPTION

The Retreat at PrairieRidge Filings 1-3 Preliminary Plan development is located east of Vollmer Road and north of Woodmen Road. This 108.89 acre area will include 193 single family lots.

Appendix A contains the *Overall Service Area Map* for FAWWA,

Appendix B contains the proposed Retreat at PrairieRidge Filings 1-3 Preliminary Plan

2.0 PROJECTION OF WATER NEEDS

2.1 ANALYSIS OF WATER NEEDS

It is expected that the residential lots on central water will be developed with single-family housing with anticipated turf grass landscaping.

For the last five years, there has been a trend in land use that provides for much smaller lots and much denser development in certain areas. Lots smaller than 7,000 square feet are anticipated in certain areas. This is resulting in much lower water needs for these types of developments. The standard SFE adopted in Sterling Ranch has been 0.353 annual acre-feet. However, this is for the formerly typical household anticipating 1500 square feet or more of landscaping. In order to adjust for such increases in density, we are adopting a scaled down equivalency to meet the changes in lot sizes. For instance, lot areas less than 3500 sf have reduced water use that roughly is equivalent to apartments or townhomes where water use is indoor only.

Based on data from other areas, we have established a SFE equivalency factor scale as follows for these smaller lot sizes;

Table 1. SFE Equivalency for High Density Lots

Lot Size	SFE Ratio	Effective Annual Demand
Lots < 2000 SF	0.65	0.23
Lots < 3500 SF	0.75	0.265
Lots < 7000 SF	0.90	0.318
Lots > 7000 SF	1.0	0.353

Retreat at PrairieRidge Filings 1-3 Preliminary Plan has irrigated areas within the common areas or tracts that total roughly 1.32 acres. The landscaping plan specifies a Park on Tract B that we estimate to require 57,636 SF of active or permanent active irrigated landscaping.

Using the above criteria, there are 24 lots in the <7000 SF category and 169 lots in the >7000 SF category. The expected water demands are shown in Table 2 following:

Table 2. Projected Water Demands for **Retreat at PrairieRidge Filings 1-3**

# of Units	Land Use	Water Use Per Unit (AF/Unit)	Annual Demand (AF)	Average Daily Flow (ADF) (GPD)	Maximum Daily Flow (MDF) (@2.45 x ADF) (GPD)	Peak-Hour Flow (@ 1.5 x MDF) (GPM)
0	Residential < 2000 SF	0.23	0	0	0	0
0	Residential < 3500 SF	0.265	0	0	0	0
24	Residential < 7000 SF	0.318	7.632	6813	16,693	17
169	Residential > 7000 SF	0.353	59.995	53560	131,222	137
1.32	Acres-Active Net Irrigation	2.5	3.30	2946	7218	8
Total			**70.93**	**63,319**	**155,132**	**162**

The total annual demand of the subdivision is 70.93 AF.

NOTE ON POSSIBLE FUTURE ALTERNATE WATER SUPPLY

This report bases all water supply for this subdivision on the central water system. It is noted that FAWWA has a pending water case 24 CW 3007, that would provide augmentation for six single family wells that might be used in the future as an alternate supply. If and when that case is complete, FAWWA may wish to apply to the County to shift water supply for six rural size lots in this subdivision to single family wells. Such shift would be insubstantial in terms of overall FAWWA supply and demand as it would represent less than 0.1 % of FAWWA overall supply and demand. If so, 5 of the lots will be served with new wells and 1 existing lot will continue to be provided service through its existing well which will be re-permitted after case approval. FAWWA will set aside an additional 2.6 annual acre-feet for augmented NNT Dawson water for the 5 new wells and one existing well. Additionally, FAWWA will reserve 4.8 Annual AF of LFH water for post pumping depletions for the five new wells.

3.0 WATER RIGHTS AND SYSTEM FACILITIES

3.1 WATER RIGHTS

Water rights adjudications have been decreed by the State of Colorado, Water Division 2 District Court, Water Division 1 District Court, and the Colorado Groundwater Commission. The comprehensive rights for the FAWWA service include both decrees and determinations. Local groundwater rights are associated with the service area components, Sterling, Retreat, and Prairie Ridge. Each of these sites has existing decrees and/or determinations outlining the rights associated with the development lands.

Both the water decrees and determinations are included in **Appendix C** as well as the deeds for the water.

Table 3 on the following page details all of the water rights currently available for the FAWWA service area which now total 1962.23 acre-feet $_{300\ year}$.

Update September 11, 2024

Table 2
Falcon Area Water and Wastewater Authority
Comprehensive Water Supply Inventory
Current Legal Supply

Land Formation/Aquifer	Reference Finding/ Determination/ Decree	Tributary Status	Volume	Annual Allocation 100 Year	Annual Allocation 300 Year	Reference Deed	Notes	Saturated Sand Thickness	Specific Yield
			Acre-Feet	A-F/Year	A-F/Year				
On-Site Sterling Water Legal Sources									
Laramie Fox Hills	86-CW-19	NT	53,900	539.00	179.67		Under 1410 acres	255	15%
	08 CW113	NT	40	0.40	0.13	FAWWA Assignment from SR Water	Under 41.44 acres, reduced to 1.44 acres		
Arapahoe	86-CW-18	NT	57500	575.00	191.67		Under 1410 acres	240	17%
Laramie Fox Hills	91 CW35	NT	3623	36.23	12.08	Quit Claim	Raygor Water	183	15%
Arapahoe	91 CW35	NT	4936	49.36	16.45	Quit Claim	Raygor Water	220	15%
Total NT On-Site					**400.00**				
20 CW 3059 Additional On-Site and Augmented Sterling Water Legal Sources									
Laramie Fox Hills	20CW 3059	NT	2780	27.80	9.27		97.54 acres SR Quarry (Note 5)	190	
Arapahoe	20CW3059	NNT	4311	43.11	14.37		97.54 acres SR Quarry (Note 5)	260.5	
Denver	20CW3059	NNT	4556	45.56	15.19	FAWWA Assignment from SR Water See Bar-X below for Post Pumping Depletions	97.54 acres SR Quarry (Note 5)	295.2	
Denver	08CW113 Aug 20CW 3059	NNT	72893	728.93	242.98		Sterling Ranch 1410 acres	0.158228464	
Arapahoe	08CW113 Aug 20CW 3059	NNT	60	0.60	0.20		Sterling Ranch 41.44 reduced to 1.44 acres		
Total from 20 CW 3059		84600			**282.00**				
Jaynes Parcel Water (PrairieRidge) and Rhetoric									
Laramie Fox Hills	07 CW56	NT	3850	38.50	12.83		135 Acres Parcel A	190	15%
	07 CW56	NT					135 Acres Parcel B		
Arapahoe	07 CW56	NT	5810	58.10	19.37		135 Acres Parcel A	253	17%
	07 CW56	NT					135 Acres Parcel B		
Denver	07 CW56	NNT	6920	69.20	0.00	Not augmented	135 Acres Parcel A	301.7	17%
	07 CW56						135 Acres Parcel B		
Dawson	07 CW56	NNT	3490	34.90	0.00	Not augmented 12 AF withheld for exempt wells	135 Acres Parcel A	173.8	20%
	07 CW56						135 Acres Parcel B		
Total from Jaynes/Rhetoric Parcel-					**32.20**				
Off site Bar-X Ground Water Sources (Note 4)									
Laramie Fox Hills	93-CW-018/(85 CW 445)	NT	42,700	427.00	142.33		Water purchased in First Tranche from Bar-X	200	15%
			12,500	125.00	41.67		Special Warranty Shamrock/Bar-X Rights	1840 acres	
Arapahoe	93-CW-018/(85 CW 445)	NT	74250	742.50	247.50		Special Warranty Shamrock/Bar-X Rights	260	17%
			4800	48.00	16.00		Water purchased in First Tranche from Bar-X	1840 acres	
Denver	93-CW-018/(85 CW 445)	NT	119900	1199.00	399.67		Special Warranty Shamrock/Bar-X Rights	435	17%
		NT	6100	61	20.3		Water purchased in First Tranche from Bar-X	1840 acres	
		NT	-82167	-821.67	-273.89	Net Set Aside for Sterling Ranch Post Pumping Depletions (20 CW3059)			
Dawson	93-CW-018	NNT	128800	1288.00	0.00		Need Augmentation Plan	490	20%
Total Net Supply from Bar-X			178,083	1780.83	**593.61**				
Shamrock West Ground Water Sources									
Dawson	85 CW131	NNT	49,800	498	0.00		Needs Augmentation		
Denver NNT	85 CW131	NNT	105,700	1057	0.00		Needs Augmentation		
Denver NT	85 CW131	NT	18,700	187	62.33	Special Warranty Deed Bar-X Shamrock West			
Arapahoe NNT	85 CW131	NNT	2,500	25	0.00		Needs Augmentation		
Arapahoe NT	85 CW131	NT	47,400	474	158.00				
Total Shamrock West			66,100	661.00	**220.3**				
Off site McCune Ground Water Sources (Note 5)									
Laramie Fox Hills	1689-BD	NT	26,300	263.00	87.67		900.52 acres		
Arapahoe	1690-BD	NT	39800	398.00	132.67	Special Warranty Deed McCune	900.52 acres		
Denver	1691-BD	NT	51300	513.00	171.00		900.52 acres		
							1500 AF Retained		
Total Net Supply McCune			117,400	1,174.00	**391.33**				
On-Site Retreat Water Legal Sources (Note 1)									
Laramie Fox Hills	17CW3002	NT	6,440				Under 225.97 acres	190	15%
LFH (Retained water by predecessor in title)		NT	-612						
LFH (Relinquishment)	18CW3002	NT	-2,796				PPD Augmenting 29 wells		
Arapahoe	17CW3002	NT	3,032 9,796	30.32 97.96	10.11 32.65		Under 225.97 acres	255	17%
			12,828	128.28	**42.76**				
Augmentation (Dawson NNT)	[illegible]	Aug	2,796	27.96	9.32	29 Single Family Wells (Phase 2 (excluding Lots 11-12); Lots 39, 40 & 41 of Phase 4; & 5)	Replace a min of 4% of pumping		
Legal Supply Phase 2 (excluding Lots 11-12), Lots 39-41 of Phase 4, and Phase 5					9.32				
Augmentation (Dawson NNT)	[illegible]	Aug	[illegible]	[illegible]	[illegible]		Replace actual depletions		
Legal Supply Phase 1					[illegible]	(Phase 1)			
Currently Available Off-Site Ground Water Legal Sources									
Augmentation (Dawson NNT)	[illegible]	Aug	[illegible]	[illegible]	[illegible]	Single Family Wells (Phase 2 - Lots 11 & 12)	Replace a min of [illegible] of pumping		
Legal Supply Lots 11 & 12 (Phase 2)			[illegible]	[illegible]	[illegible]				

Note 1. The water listed in the hatched area will be used to serve single family wells and is not included in the Total Available for the Central System

Total Current 300-Year Water Supply (AF)	**1962.23**	**Acre-Feet: Legal Water Supply For Falcon Area Water and Wastewater Authority Central System**

FAWWA On-Site Supplies

FAWWA Off-Site Supplies

FAWWA Retreat Water Supplies

Retreat Wells private wells not included in Calculation

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3.2 ADEQUACY OF WATER RIGHTS CURRENT SUPPLY

The current water rights inventory by area is as follows:

/	Sterling original on-site non-tributary (NT) water rights		399.80 $AF_{300\ year}$
/	02 CW 3059		283.16 $AF_{300\ year}$
/	Retreat at Timber Ridge on-site rights –		42.76 $AF_{300\ year}$
/	Jaynes/Rhetoric (07 CW56; 23CW3009) –		32.20 $AF_{300\ year}$
/	McCune	BD-1689, BD-1690, BD-1691	391.33 acre-feet $_{300\ year}$
/	Bar-X Ranch	85CW-445 and 93 CW-018	592.78 acre-feet $_{300\ year}$
/	Shamrock West	85 CW 131	220.10 acre-feet $_{300\ year}$

FSAWWA-owned and currently available on-site NT and adjudicated not non-tributary (NNT) water totals are 1962.23 $AF_{300\ year}$, which would be adequate supply to meet the needs of roughly 5,500SFE.

As of this report September 11, 2024, the total water commitment within FAWWA requires **1033.87** $AF_{300\ year}$. See Appendix F – FAWWA detailed Water Supply vs Current Water Commitments.

This leaves a net excess of currently available water of 928.36 $AF_{300\ year}$ and therefore there is more than sufficient water supply to meet the needs of Retreat at PrairieRidge Filings 1-3 Preliminary Plan on the 300-year basis.

3.3 MASTER PLANNING AND LONG-TERM AND FUTURE SOURCES OF SUPPLY

The FAWWA water system has only been in operation forfiveyears, so little-to-no usable historic information would be reliable for unique, long-term planning. However, substantial nearby data from the Falcon area is available for use. As of the end of 2023, the system had approximately only 500 active users. Therefore, initial projections have been based on area-wide water user characteristics and a linear buildout rate. This rate is considered to be an average annual rate that might be reasonably maintainable over a 10-year period. The average growth rate is projected as 180 units added per year.

- **2040 Scenario:** Based on the above factors, the FAWWA system might conservatively anticipate serving 3,710 SFEs in the year 2040. This number is a FAWWA service area projection. This would require no additional water.
- **2060 Scenario:** Based on the same factors, the FAWWA system might be expected to serve 7,310 SFEs within its expanded service area, which includes all service area components.. This would be substantially greater than the actual Sterling Ranch. The annual acre-foot requirement might be 640 annual AF, but supply would include water from The Ranch which has not yet been added to inventory.

In addition to adding off-site sources, potential, additional supplies include renewable resources and/or regional projects bringing new water to the area

Long-Term Planning: Future water supply has already been contracted for and plans for implementation are underway. The first project recently completed provides augmentation for certain on-site NNT water, so that that water may be used in existing and expanded well fields on-site.

1. **Regionalization Opportunities:** FAWWA's main supply source is centralized at a point that both Cherokee Metropolitan District and Woodmen Hills Metropolitan District have adjacent major storage and delivery facilities. There are currently no arrangements in place to make connections, but in the future, FAWWA may seek to have interconnections and possibly share supply.

   The second element is a much broader regionalization: conducting cooperative actions with Colorado Springs Utilities (CSU), which FAWWA has been open to. CSU is potentially also open to shared physical facility utilization, which would enable Sterling to expand its scope in seeking water rights. While it is not expected that Sterling will provide actual water, the access to facilities opens greater doors for FAWWA.

2. **Indirect, Reuse, Lawn Irrigation Return Flows (LIRF) Credits, Aquifer Storage/Recharge, and Direct Reuse:** Regarding return flows, initial development is being planned around sourcing available physical supplies. These supplies are all fully-consumable and ultimately result in potential return-flow capabilities. Since FAWWA wastewater is discharged to the Meridian system, which in turn has the potential to convert some reusable flows to available physical supplies, those options will be available and considered by Sterling. With regard to LIRF credits, Sterling has already initiated a case that will make augmentation use of its potential LIRF credits.

3.4 SYSTEM INTERCONNECTS

FAWWA currently has no system interconnections. However, as discussed previously, FAWWA's main supply source is centralized at a point that both Cherokee Metropolitan District and Woodmen Hills Metropolitan District have adjacent major storage and delivery facilities. It is possible that future agreements could be made.

3.5 SOURCE OF PHYSICAL SUPPLY

Municipal water demand would be met using primarily Arapahoe and Laramie-Fox Hills formation wells in the FAWWA area. Two on-site wells are active and three more have been completed, awaiting equipping. Existing well permits are included in **Appendix D**.

FAWWA has begun the process of filing to drill the first set of wells on the McCune site which will possibly be needed in 2027.

Off-site water to the north of the FAWWA service area is generally in the Denver and Arapahoe formations.

3.6 WATER QUALITY AND TREATMENT

Appendix E contains the water quality reports for the initial wells drilled at FAWWA. The quality is generally consistent with Denver Basin water typically encountered in the Falcon area. The quality of water in these aquifers in this area has typically been suitable for potable use with the addition of iron and manganese treatment.

3.7 WATER STORAGE, DISTRIBUTION, AND TRANSMISSION LINES

An initial 1.0-million-gallon tank has already been constructed at the FAWWA site.

For the purpose of fire protection, we recommend eight-inch lines throughout the residential subdivision. The lines should be looped wherever the street layout allows. A transmission line of 24-inches in diameter has been extended south-southwesterly along one of the major roadways from the storage tank into Phase One of the development.

3.8 PUMPING FOR SERVICE PRESSURES

Ground elevations within the development service area range from approximately 6,970 feet to 7,320 feet. Adequate service pressures are generally considered 60 psi for residential service. The tank site is on the Sterling property at a base elevation of approximately 7,310 feet, which would be capable of supplying acceptable service pressures to ground elevations of approximately 7,190 feet. Initial development is anticipated to be at elevations below 7,190 feet, so the tank site will be able to provide adequate pressure.

Development construction has progressed such that the pressure system is likely to be needed sometime in 2023, FAWWA is currently constructing the pressure pump station so that it will be ready when needed next year.