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Water Resources Report

Rolling Hills Ranch North PUD

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PCD Project No.: PUD-SP-235

INTRODUCTION

Purpose

This document addresses the water resources for the Meridian Service Metropolitan District (MSMD) as it relates to the Meridian Ranch development and Rolling Hills Ranch North PUD in particular. MSMD is the entity responsible to finance construction and ensure the continuing operation and maintenance of the potable water delivery improvements. MSMD has been providing treated water to the Meridian Ranch development since 2003. Treatment of the water consists of disinfection of the water as required for all community water systems in addition to addressing iron, manganese and turbidity commonly found in Denver basin ground water wells. Monthly reporting is provided to the Colorado Department of Public Health and Environment (CDPHE) as required, to date there have been no deficiencies.

Description of the Service Area

Meridian Ranch encompasses 2,650 acres of proposed residential, commercial and business development. It is located approximately 12 miles northeast of downtown Colorado Springs, three miles north of the town of Falcon and immediately north of the Woodmen Hills development. The development is located within Township 12 South, Range 64 West, Sections 19-21 and 28-30 and consists of a mixture of residential, commercial, business, school and open space/park uses. The water system that serves Meridian Ranch is classified as a “public water system” (PWSID# CO0121455), and meets the applicable requirements of the Colorado Department of Public Health and Environment.

Meridian Ranch is situated in the Upper Black Squirrel Creek Designated Groundwater Basin which is managed by the Upper Black Squirrel Creek Management District. MSMD currently services over 12,000 in equivalent population in several filings within Meridian Ranch, Falcon High School and portions of Latigo Trails as an out of district user.

QUANTITY OF WATER

From land use information derived from the approved Meridian Ranch Sketch Plan, a permanent resident and employment forecast for the Meridian Ranch Development may be obtained for the ultimate build-out of the project. By applying the El Paso County unit water demand factors to the land use forecasts, the quantity of water required for the development may be forecast for the proposed project and the ultimate development. The estimated service population and land use can be found in Table 1 - Land Use/Population below.

Table 1 - Land Use/Population

Land Use	MSMD Master Plan 5,443 SFEs Total				Existing/Approved Projects: Meridian Ranch Filings 1 - 11 Estates 2 & 3, Latigo Trails 2A, 7 - 9 Stonebridge Filing 1 - 4, The Vistas Filing 1 Windingwalk, RHR 1-3, Sanctuary Filing 1, ERHR 1 & 2				Proposed: ROLLING HILLS RANCH NORTH PUD				Projected Total			
	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.
Meridian SFE ¹	5,000	13,750	-	13,750	4,559	12,537	-	12,537	441	1,213	-	1,213	5,000	13,750	-	13,750
Latigo SFE ¹	292	803	-	803	151	415	-	415	-	-	-	-	151	415	-	415
School ²	113	5,330	506	5,836	83	2,830	268	3,098	-	-	-	-	83	2,830	268	3,098
Commercial ³	15	-	73	73	10	-	57	57	-	-	-	-	10	-	57	57
Civic	23	-	30	30	14	-	21	21	-	-	-	-	14	-	21	21
Park/ Streetscape	85	-	-	-	80	-	-	-	5	-	-	-	85	-	-	-
Golf Course	174	-	12	12	174	-	12	12	-	-	-	-	174	-	12	12
TOTAL		19,883	621	20,504		15,783	358	16,140		1,213	-	1,213		16,995	358	17,353

¹ Maximum of 4500 single family dwelling units in Meridian Ranch, 292 for Latigo Trails. 2.75 persons/single family dwelling unit per El Paso County Falcon-Peyton Master Plan, Chapter 2.3.3 Population Projections

²Falcon Schools: High school current enrollment - 1,350, planned expansion - 1,780, Meridian Ranch Elem. enrollment – 600, Future middle school & elem. – 1,600. Staffing based on 9.5% staff-student ratio. (Source: Falcon School District).

³Commercial building area equals 18% of gross commercial area. One employee/1250 sq. ft. of commercial area.

Water Demand

Unit water demands are based on industry standard factors and MSMD historic water demand figures. Demand is first calculated in acre feet per year (AFY) to determine the water supply needs. This value is then factored to determine the average daily demand (ADD) in gallons per minute (GPM). This figure is used to project the maximum daily demand (MDD) and peak hour demand (PHD) and can be used to estimate revenues and operating costs. The maximum daily demand and the peak hour demand have been determined by applying the accepted peaking factors of 2.5 and 4.0 to the ADD respectively. The MDD is used to determine the storage needs and the PHD is used for modeling the system delivery pressures and to size the distribution mains. See Table 2 - Water Demand below for more information.

The total water demand for single family residential homes sites is based on 0.31 acre-feet per year (includes outside irrigation), 25 gallons per day for students and staff at the school sites and 45 gallons per day per person for all other uses. The irrigation demand for irrigation is based on 0.0566 acre-feet per year for every 1,000 square feet of irrigated landscape. The irrigation demand for the open space is based on five percent of irrigated land and the commercial/business at ten percent of irrigated land at 0.0566 acre-feet per year for every 1,000 square feet.

Table 2 - Water Demand

Land Use	Master Plan 5,292 SFEs Total				Existing/Approved Projects				Proposed: ROLLING HILLS RANCH NORTH PUD				Projected Current Demand			
	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD
	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>	<i>gpm</i>
<i>Potable</i>																
Meridian SFE ¹	1550	961	2,402	3,843	1,413	876	2,190	3,504	136.7	85	212	339	1,550	961	2,402	3,843
Latigo SFE ¹	91	56	140	224	47	29	73	116	-	-	-	-	47	29	73	116
School	163	101	253	405	87	54	134	215	-	-	-	-	87	54	134	215
Commercial	4	2	6	9	3	2	4	7	-	-	-	-	3	2	4	7
Civic	2	1	2	4	1	1	2	3	-	-	-	-	1	1	2	3
Paint Brush Hills Metro ²	85	-	-	-	85	-	-	-	-	-	-	-	85	-	-	-
Golf Course	1	0.4	1	2	1	0.4	1	2	-	-	-	-	1	0.4	1	2
Subtotal	1895	1,122	2,805	4,488	1,636	962	2,404	3,847	136.7	84.7	211.9	339	1,773	1,046	2,616	4,186
<i>Irrigation</i>																
Single Family Residential	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
School	15	9	24	38	11	7	17	28	-	-	-	-	11	7	17	28
Commercial	2.0	1.3	3.2	5.0	1.4	0.9	2.2	3.5	-	-	-	-	1.4	0.9	2.2	3.5
Civic	3.1	1.9	4.8	7.7	1.8	1.1	2.8	4.5	-	-	-	-	1.8	1.1	2.8	4.5
Park/ Streetscape	12	7	18	29	11	7	17	27	0.7	0.4	1.1	1.7	12	7	18	29
Regional Park ³	25	15	39	62	25	15	39	62	-	-	-	-	25	15	39	62
Golf Course ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	57	35	88	141	50	31	78	125	0.7	0.4	1.1	1.7	51	32	79	127
Total	1,952	1,157	2,893	4,629	1,687	993	2,482	3,972	137.4	85	213	341	1,824	1,078	2,695	4,313

¹ Single Family Residential water demand is based on 0.31 AFY (10-yr ave. residential consumption per SFE is 0.29 AFY). This amount includes both domestic indoor use and outside irrigation.

² Perpetual lease to Paint Brush Hills Metropolitan District

³ Perpetual lease to El Paso County for Falcon Regional Park

⁴ Golf Course irrigation is provided by surface water diversion. Absolute Decree Case No. 2005CW43

WATER SUPPLY

The service area is located in the Upper Black Squirrel Creek Groundwater Management District and the water bearing formations in descending stratigraphic order are the Dawson, Denver, Arapahoe, and Laramie Fox Hills. These four aquifers are collectively known as the Denver Basin aquifers and are found approximately at depths of 500, 1,400, 1,900, and 2,500 feet below the ground surface.

Table 3 Water Supply (below) shows the maximum annual yield of water currently appropriated by the Colorado Ground Water Commission for use within the MSMD.

The Meridian Ranch development has water rights and appropriation for the Denver Basin groundwater and renewable alluvial ground water.

Table 3 Water Supply

Well No.	Permit No.	Appropriation	State Maximum Annual Appropriation (100-yr) (AFY)	El Paso County Maximum Annual Appropriation (300-yr) (AFY)	Replacement Obligation (AFY)	Net El Paso County Maximum Annual Appropriation (AFY)
Meridian Ranch						
DA-1	60140-F	157-BD	31.9	10.6	0.2	10.4
FUTURE DAWSON			820.0	273.3	26.0	247.3
D-3	64496-F	156-BD	1171.0	390.3	15.6	374.7
A-1	56516-F	155-BD	942.0	314.0	6.3	307.7
A-2	56517-F					
A-4	59680-F					
A-5	84844-F					
A-6	82765-F					
A-7	84556-F					
A-8	84557-F					
A-9	59681-F					
LFH-1	56513-F	154-BD	755.0	251.7	5.0	246.7
LFH-2	56514-F					
LFH-3	56515-F					
LFH-4	59678-F					
LFH-5	84845-F					
LFH-6	82766-F					
LFH-7	84558-F					
LFH-8	84559-F					
LFH-9	59679-F					
TOTAL	Meridian Ranch		3719.9 AFY	1239.9 AFY	53.1 AFY	1186.8 AFY
Guthrie Ranch						
G LFH-1 ³	61234-F ²	228-BD	289.5	96.5	1.9	94.6
G LFH-2 ³	61235-F ²	4436-BD				
G A-1 ³	61236-F ¹	229-BD	241.6	80.5	1.6	78.9
G A-2 ³	61237-F ¹	4437-BD				
G No. 1 ⁴	612-RFP-R	Permit Date 8/26/03	170.0	170.0		170.0
G No. 2 ⁴	27554-FP-R	Permit Date 7/28/05	30.0	30.0		30.0
TOTAL	Guthrie Ranch		731.1 AFY	377.0 AFY	3.5 AFY	373.5 AFY
Latigo Trails						
FUTURE ARAPAHOE		568-BD	124.6	41.5	0.8	40.7
FUTURE DENVER		569-BD	276.9	92.3	3.7	88.6
			92.7	30.9	0.6	30.3
DA-2	74410-F	570-BD	130.0	43.3	0.9	42.4
DA-3	74409-F					
FUTURE DAWSON						
LFH-1	46406-F	Permit Date 8/07/06	453.0	151.0	3.0	148.0
TOTAL	Latigo Trails		1301.1 AFY	433.6 AFY	9.4 AFY	424.2 AFY
Hart Ranch						
FUTURE LARAMIE FOX ³		2099-BD	125.0	20.8	0.4	20.4
FUTURE ARAPAHOE ³		2100-BD	103.0	17.2	0.3	16.9
TOTAL	Hart Ranch		228.0 AFY	38.0 AFY	0.8 AFY	37.2 AFY
TOTAL WATER AVAILABLE TO MSMD			5980 AFY	2089 AFY	67 AFY	2022 AFY

¹ Well permit number for well appropriation 229-BD (Total appropriation of 483.2 AFY).

² Well permit number for well appropriation 228- BD (Total appropriation of 579 AFY).

³ Total appropriation is an equal split of ground water with Woodmen Hills Metropolitan District (WHMD).

⁴ Total appropriation is split with WHMD, 69% Meridian Ranch, 31% Woodmen Hills

MSMD is currently extracting groundwater from eleven (18) onsite wells, three (3) off-site wells located within the Latigo Trails development, and six (6) wells from the offsite area known as Guthrie Ranch.

Water System Improvements

The water system that serves Meridian Ranch is classified as a “public water system”, and meets all the applicable requirements of the CDPHE.

The water system uses groundwater as its primary source of supply. Filtration and disinfection facilities have been constructed at a central location to ensure good water quality. Elevation differences that exist throughout the property require that the distribution system is divided into two pressure zones to ensure that the water is delivered at no less than 40 psi during peak hour flow and at no more than 120 psi during periods of low use. Storage facilities and distribution piping are provided to ensure that the residual pressure requirements are achieved both during peak hour demands and during maximum day demands with a superimposed fire flow of 1500 gpm for the residential areas and up to 3500 gpm for commercial areas. The upper pressure zone (Zone 1) is a closed loop distribution system served by pumps that provide the required pressures, these are in the same location as the filtration and disinfection facilities. The lower pressure zone (Zone 2) is a conventional gravity system served by storage tanks to provide the required pressures.

MSMD currently provides water service to 151 Latigo Trails home sites as out of district users. Latigo Trails is located within Zone 1 north of and adjacent to Meridian Ranch. The water used to provide this service comes from a Laramie Fox Hills well under permit no. 46406-F. This well is permitted for use within the Meridian Service Metropolitan District as well.