



2 June 2011

David Quinn  
Melody Ranch Developments  
4750 South Park Loop Road  
Jackson, Wyoming 83001

RE: Third Well Report  
Melody Ranch Subdivision Water System  
JA Project No. 00085.27.24

Dear David,

I have attached to this letter a report outlining the status of the Melody Ranch Water System supply and distribution system in regards to the possible need for a Third Well. The report does not necessitate a Third Well but does raise some questions regarding water use within the development pertaining to high use and discrepancies in billing and metered supply. Please read this document carefully. I am available to answer any questions you may have.

The report brings to light two issues of water use at Melody Ranch. The maximum day demand is very high for a subdivision with 367 lots and the discrepancy in the volume of water the HOA is charging residents and the volume of water the system is pumping. These two issues have raised concerns there may be significant leakage in the system. The high demand may be a function of the type of development at Melody Ranch, large landscaped lots, and/or other factors. Other factors that may contribute to high demands include leaks in the system, meter calibration, and unmetered uses. A brief discussion of these factors follows:

With regards to leakage, all mains and service lines from the main to the lot lines were inspected and passed leakage tests as they were installed. Service lines from the lot lines to the buildings, the portion of the service line installed by the lot owner, were not tested. A process of detecting leaks in the system could be initiated to identify if and where leaks exist. In discussions with the leak detection company that works for the Town of Jackson, most leaks are found in the individual service lines to buildings.

The well supply and distribution meters at the booster pump building have been checked for calibration. With the help of the meter manufacturer both meters were recently checked and found to be accurate within specifications. Within the subdivision, there are meters at each residence. Some of these meters may be providing erroneous readings or are located after the irrigation connection.

There are at least four known unmetered uses on the system: the Chickadee Circle irrigation; Townhouse irrigation; RU2 berm irrigation and other RU2 entrance area irrigation; and irrigation in and around the RV Storage Site. As these uses are all irrigation and cover large areas they can be expected to use large amounts of water

We suggest a process be undertaken to identify leaks in the system and try and quantify the volumes used by the unmetered areas. As the accounting of these uses is determined the overall per lot water use will decrease and additional cushion in the capacity of the system will exist.

Again, please call with any questions you have concerning the report or water use at Melody Ranch.

Regards,  
JORGENSEN ASSOCIATES, P.C.



Thomas Kirsten

## THIRD WELL ANALYSIS MELODY RANCH SUBDIVISION WATER SYSTEM

Date: 6 April 2011 Jorgensen Associates Project No. 00085.27.24

### PURPOSE

As documented in the Statement of Outstanding Obligations and Conditions for the Melody Ranch PUD from June 2002, the need for a third well to serve the subdivision's domestic water system would be evaluated by the developer. In addition, a condition was attached to the Residential Unit Two – Phase Three (RU2-3) development that indicated a third well would be constructed if determined necessary by water use data.

As the transition progresses from a developer owned system to a system owned by the Homeowners Association, this analysis determines the developer's responsibility based on actual water use data..

### DESCRIPTION

The first phases of the Melody Ranch water system were constructed in 1995 with the platting of the first lots in the subdivision. There have been 14 phases of development at Melody Ranch. On the west side of Flat Creek in Residential Unit One (RU1) there have been 9 phases (RU1-1 through RU1-9) and on the east side of Flat Creek in Residential Unit Two (RU2) there have been 5 phases (RU2-1 through RU2-4 plus the Townhouses). In addition, the system serves residences in the Sage Meadows and Glory View developments. As of 2009 the system serves 332 residences and will serve 367 residences at buildout.

Two water supply systems provide domestic and irrigation water to the Melody Ranch development. A dedicated irrigation system, consisting of two wells, provides irrigation water to the open space areas of Residential Unit One. A separate domestic water system serves the domestic and irrigation demands of all the individual lots (RU1 and RU2) as well as the irrigation demands of the open space areas in RU2.

The domestic water supply consists of two domestic wells that supply water to a storage tank and from the storage tank the water is pumped into the distribution system for the subdivision. The water is metered as it is pumped from the storage tank to the distribution system (Distribution Meter; this meter has recently gone through a factory calibration routine and has been determined to be reading accurately). The data from this meter is compiled regularly throughout the year and has been for many years.

### DATA

Each supply well is designed to provide similar volumes of water. Meter readings have been taken monthly for several years and more recently on a weekly basis. These meter readings can be found in Exhibits A and B attached to this report. Based on recent actual use data, average and maximum day demands can be projected for the buildout condition (Exhibit A). When compared

with the more recent weekly data these monthly data represent a good measure of the actual maximum day demand (Exhibit B). The projected demands are also compared to the WyoDEQ default design values to provide a comparison with typical water demands used in the design stages for the development of new water systems.

Supply Well No. 1 <sup>1</sup>	375 gpm	540,000 gpd
Supply Well No. 2 <sup>1</sup>	375 gpm	540,000 gpd
Combined Flow Rate of Wells 1 and 2 <sup>2</sup>	675 gpm	972,000 gpd
Projected <sup>3</sup> Average Daily Demand at Buildout		361,000 gpd
Projected <sup>3</sup> Maximum Daily Flow at Buildout		968,000 gpd
Projected <sup>4</sup> Summer Maximum Daily Flow at Buildout		940,000 gpd
DEQ <sup>5</sup> Default Average Daily Demand at Buildout		161,000 gpd
DEQ <sup>5</sup> Default Maximum Daily Flow at Buildout		437,000 gpd

<sup>1</sup> Actual measurements taken several times throughout the year for several years

<sup>2</sup> Combined flow lower than two wells combined due to pipe losses

<sup>3</sup> Values from daily averages derived from actual monthly totals throughout the year 2007 through 2010

<sup>4</sup> Values from daily averages derived from actual summer weekly totals for 2009 and 2010

<sup>5</sup> Default design values from WyoDEQ Chap. 12, Sec. 8, (a) using 3.5 persons per residence (Exhibit C)

## CONCLUSION

The actual use data suggest the two existing domestic supply wells and storage tank of the Melody Ranch Water System satisfy the water supply requirements for the subdivision according to the Wyoming Department of Environmental Quality Rules and Regulations, Chapter 12, Section 9(b)(i); Source Development, Groundwater, Number and Capacity (Exhibit D).

There are currently two wells supplying the Melody Ranch Domestic Water System. Each well is independently capable of producing 540,000 gpd, which exceeds the projected average day demand at buildout. The total developed groundwater sources combined capacity of 972,000 gpd exceeds the projected maximum daily demand at buildout of 969,000 gpd. Further, the 300,000 gallon storage tank has 180,000 gallons of excess capacity above the 120,000 gallons of fire suppression water storage to supply high instantaneous demands above the maximum day or average day demands.



## EXHIBIT B

### JULY AND AUGUST 2009 and 2010 WEEKLY DATA METER READINGS AND FLOW CALCULATIONS MELODY RANCH WATER SYSTEM

Date: 6 April 2011 By: TK

Date	Days	Distribution Meter Reading (gal.)	Water Through Dist. Meter (gal.)	Water To System <sup>1</sup> (gal.)	Average Day (gpd)	Ave. Day Per Lot (gpd)
	a	b	c = b <sub>n</sub> - b <sub>n-1</sub>	d = c - 197,100	e = d / a	f = e / # Lots
31-Aug-10	7	770,238,000	4,522,000	4,324,900	617,843	1,861
24-Aug-10	8	765,716,000	5,930,000	5,732,900	716,613	2,158
16-Aug-10	7	759,786,000	4,843,000	4,645,900	663,700	1,999
9-Aug-10	7	754,843,000	4,817,000	4,619,900	659,988	1,988
2-Aug-10	7	750,128,000	5,346,000	5,148,900	735,557	2,216
26-Jul-10	7	744,780,000	5,794,000	5,596,900	799,557	2,408
19-Jul-10	6	738,988,000	5,298,000	5,100,900	850,150	2,561
13-Jul-10	7	733,688,000	5,275,000	5,077,900	725,414	2,185
6-Jul-10		728,413,000				
31-Aug-09	7	658,142,000	4,254,000	4,056,900	579,557	1,746
24-Aug-09	5	651,888,000	3,291,000	3,093,900	618,780	1,864
19-Aug-09	9	648,597,000	5,858,000	5,660,900	628,989	1,959
10-Aug-09	3	642,739,000	1,915,000	1,717,900	572,633	1,784
7-Aug-09	1	640,824,000	543,000	345,900	345,900	1,078
6-Aug-09	3	640,281,000	2,217,000	2,019,900	673,300	2,098
3-Aug-09	7	638,064,000	4,674,000	4,476,900	639,557	1,992
27-Jul-09	7	633,390,000	5,206,000	5,008,900	715,557	2,229
20-Jul-09	7	628,184,000	4,735,000	4,537,900	648,271	2,020
13-Jul-09	6	623,449,000	3,616,000	3,418,900	569,817	1,775
7-Jul-09	1	619,833,000	751,000	553,900	553,900	1,726
6-Jul-09	6	619,082,000	3,035,000	2,837,900	472,983	1,473
30-Jun-09		616,047,000				
Average			4,096,000	3,898,900	639,403	1,956
Minimum			543,000	345,900	345,900	1,078
Median			4,704,500	4,507,400	643,914	1,990
Maximum			5,930,000	5,732,900	850,150	2,561

UNIT COUNT (from TC GIS Aerial Photos, Updated each new photo revision; 2009 most recent)						
Vacant	RU1	RU2	Townhouses	Sage Meadows	Glory View	Total In Use
35	180	125	24	23	15	332
					<b>Bulkout Lots</b>	<b>367</b>

Maximum Summer Daily Flow at Bulkout 939,887 (= Max. Day \* Bulkout Lots)

**Notes:**

<sup>1</sup> 197,000 gpd goes through PLC Meter and Chlorine Meter not to Distribution System

# EXHIBIT C

(ii) The type, size, strength, operating characteristics, rating or requirements for all mechanical and electrical equipment, including machinery, valves, piping, electrical apparatus, wiring and meters; laboratory fixtures and equipment; operating tools; special appurtenances; and chemicals, when applicable.

(iii) Construction and installation procedure for materials and equipment.

(iv) Requirements and tests of materials and equipment to meet design standards.

(v) Performance tests for operation of completed works and component units.

(vi) Specialized requirements for tests, analyses, disinfection techniques, and other special needs.

(vii) Requirements for well construction and testing. The collection of the following must be recorded and reported to the Wyoming Department of Environmental Quality, Water Quality Division.

(A) Geological data.

(B) Well construction data. Well construction data shall include screen locations, size of screen openings, screen intervals, accurate records of drill hole diameters and depths, assembled order, size and length of casing and liners, casing wall thickness, grouting depths, formations penetrated, water levels, and location of any blast charges.

(C) Well test data. Well test data shall include test pump capacity-head characteristics; static water level; depth of test pump setting; time of starting and ending each test cycle; pumping rate; pumping water level; drawdown; and water recovery rate and levels.

(g) Technical specifications shall require that all water service connections will be provided with backflow prevention devices in accordance with the requirements of Section 14 (l) of these regulations.

## Section 8. General Design Considerations.

*From Wyo DEQ CHAPTER 12  
RULES AND REGULATIONS*

(a) Design basis. The capacity of the water treatment or water production system shall be designed for the maximum daily demand at the design year. Where water use records are not available to establish water use, the equivalent per capita water use shall be at least 125 gpd (475 liters per day) and 340 gpd (1,285 liters per day) to size facilities for average and maximum daily water demand, respectively.

(b) Siting requirements.

(i) Location. Treatment facilities shall be located such that no sources of pollution may affect the quality of the water supply or treatment system. The facilities shall not be located within 500 feet of landfills, garbage dumps, or wastewater treatment systems.

# EXHIBIT D

m/s). Where intakes are located in shady reaches of a stream, facilities shall be available to diffuse air into the flow stream at a point in front of the intake pipe.

(III) Inspection manholes shall be located a maximum of every 1,000 feet (304.8 m) for pipe sizes 24 inches (0.61 m) and larger. Where pipelines operate by gravity and the hydraulic gradeline is below the ground surface, concrete manholes may be used. Where the pipeline is pressurized or the hydraulic gradeline is above ground, bolted and gasketed access ways shall be used.

(IV) Devices shall be provided to minimize entry of fish and debris from the intake structure.

(B) Offstream reservoir. Offstream reservoirs shall be constructed to assure that:

(I) Water quality is protected by controlling runoff into the reservoir.

(II) Dikes are structurally sound and protected against wave action and erosion.

(ii) Impoundments and reservoirs. The site of any impoundment or reservoir shall be cleared of all brush, trees, and other vegetation to the high water elevation.

(iii) Raw water supply piping. No customer service connection shall be provided from the raw water transmission line to the treatment plant, unless there are provisions to treat the water to meet these standards, or the sole purpose of the service is for irrigation or agricultural water use.

(b) Groundwater.

(i) Number and capacity. The total developed groundwater source, along with other water sources, shall provide a combined capacity that shall equal or exceed the design maximum daily demand. A minimum of 2 wells, or 1 well and finished water storage equal to twice the maximum daily demand shall be provided. Where 2 wells are provided, the sources shall be capable of equaling or exceeding the design average daily demand with the largest producing well out of service.

(A) General considerations.

(I) Every well shall be protected from and remain operational during the 100-year flood or the largest flood of record, whichever is greater.

(II) All wells shall be disinfected after construction, repair, or when work is done on the pump, before the well is placed in service. Disinfection procedures shall be those specified in AWWA A-100 for disinfection of wells.

(B) Relation to sources of pollution. Every well shall be located further from any of the sources of pollution listed below. The isolation distances listed below apply when domestic wastewater is the only wastewater present.