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May 4, 2007

Mr. Gary Woody
General Manager
CPWSD No. 1 of Boone County
1500 N. 7th Street
Columbia, MO 65201

Re: Bon-Gor Lake Estates Water Service Study

Dear Gary:

We have performed a water service study for the Bon-Gor Lake Estates subdivision as requested at the district's last board meeting on April 12, 2007. It is our understanding that the subdivision's privately owned water system is in need of some repair, primarily focused on the system's water supply and storage. The Public Service Commission has requested that the CPWSD consider assuming ownership and operation of the system or providing wholesale water service to the system. This study summarizes the analysis we have performed to investigate water availability and other issues associated with either the consolidation of the private system with the district's system, or the ability to provide wholesale water service to the private system.

First, our analysis focused on water availability as if the system was provided a master meter connection (a 2" meter is believed to already exist to this subdivision) for wholesale water supply.

Water Demand

There are 43 residential homes and 108 multi-family dwelling units in the proposed service area. Only the residential homes are being metered currently. Water consumption data was obtained from Vista Homes Management Company's roughly daily meter readings from the well pump at the well house. See Table 1. Flow rates were derived from the meter readings and compared to the surrounding CPWSD water service area in Pressure Zone 7.

Table 1 – Water Usage Demands

Factor	Bon-Gor	CPWSD Zone 7	Difference
Users	151	151	------
Average per User	0.173 gpm	0.169 gpm	2% higher
Peak per User	0.258 gpm	0.353 gpm	36% lower
Peaking Factor	1.488	2.092	41% lower
Average Demand	26.14 gpm	25.52 gpm	2% higher
Peak Demand	38.90 gpm	53.30 gpm	36% lower

The existing hydraulic computer model for Pressure Zone 7 was modified by adding a connection for the Bon-Gor Lake Estates subdivision at Wade School Road and Cunningham Drive. Three conditions were evaluated and summarized below.

Peak Demand Condition

A peak demand of 53.3 gpm for Zone 7 was used in the model for the Bon-Gor Lake Estates subdivision to determine if the water system can produce the additional water to the subdivision assuming that peak demand

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would reach the demand currently seen in Zone 7. This was a conservative approach as the current peak demand for Bon-Gor is 36% lower than that of Zone 7. The results of the analysis showed that pressures were acceptable throughout Zone 7 with the addition of the Bon-Gor connection. Figure 1 shows the pressures produced in the area surrounding the Bon-Gor connection.

Water Supply and Storage

A review of the CPWSD's water supply and storage capabilities was performed. Well production from Zone 7 is limited, but with the interconnection with Zone 2, there is sufficient well supply. The tanks in Zone 7 have ample capacity to accommodate the peak demand for the addition of Bon-Gor Lake Estates to the system.

Static Pressure

Static pressure was modeled to determine the highest pressure the Bon-Gor water system would experience. This simulates the system with the tanks full and no demand (flow) on the system, such as during the early hours of the morning. Additional piping representing the existing water line locations and sizes within the subdivision was added to the model. Figure 2 shows the static pressures within the subdivision ranging between 66 psi and 73 psi. Typically, these pressures would be acceptable with the CPWSD's standard system. However, because of the unknown material and condition of the existing water lines and joints, and that the existing system's pressure is currently about 30 psi (reported in the last board meeting), these static pressures could present the potential for leaks and failure of system components. Should the existing Bon-Gor system be connected to the CPWSD for water supply, we would recommend the system be pressure tested prior to connection, and if necessary, a pressure reducing valve (PRV) could be installed on the existing system to maintain pressures close to those it experiences today.

Fire Flow Capabilities

In addition to the peak demand model, fire flows were introduced at the entry point of the subdivision. It was determined that a minimum 250 gpm fire flow could not be achieved with a minimal DNR residual pressure of 20 psi in the water system. Therefore, CPWSD is unable to provide fire protection for the subdivision.

Considerations for Upgrading the Bon-Gor System

If the CPWSD were to assume ownership and management of the existing system, it is likely that distribution system upgrades would be needed in the near future. The Bon-Gor system has been in place for approximately 35 years (plan dated 1972), and it is unknown if the system was installed with proper inspection and materials.

A Bon-Gor system upgrade would need to include the water line installations throughout the subdivision as shown in Figure 3 and the items listed in the project cost estimate shown in Figure 4. The total project cost for the system upgrade in 2007 dollars is approximately **$400,000**. These items include not only the water line installations, but also the setting of new meters on the front side of the lots (and associated service line extensions), costs for easements to be acquired and recorded, and demolition of the existing standpipe.

If you have any questions please do not hesitate to contact me at this office.

Sincerely,

Bob Gilbert, P.E.

cc: Peggy Whipple, Missouri Public Service Commission
Attachments

Bon-Gor Lake Estates
Well Production

Date	Reading (gal)	Weekly Production (gal)
1/8/2006	8246000	
1/15/2006	8465710	219710
1/22/2006	8687870	222160
1/29/2006	8900750	212880
2/5/2006	9108050	207300
2/12/2006	9316000	207950
2/19/2006	9508500	192500
2/26/2006	9731680	223180
3/5/2006	9900780	169100
3/12/2006	69890	169110
3/19/2006	261810	191920
3/26/2006	406160	144350
4/2/2006	563570	157410
4/9/2006	740420	176850
4/16/2006	950670	210250
4/23/2006	1122910	172240
4/30/2006	1248660	125750
5/7/2006	1431680	183020
5/14/2006	1708630	276950
5/21/2006	2100740	392110
5/28/2006	2395090	294350
6/4/2006	2736470	341380
6/11/2006	3092900	356430
6/18/2006	3437660	344760
6/25/2006	3782420*	344760
7/2/2006	4170000*	387580
7/9/2006	4498360	328360
7/16/2006	4827760	329400
7/23/2006	5176420	348660
7/30/2006	5499190	322770
8/6/2006	5837210	338020
8/13/2006	6190500	353290
8/20/2006	6510030	319530
8/27/2006	6849930	339900
9/3/2006	7190220	340290
9/10/2006	7560900	370680
9/17/2006	7902060	341160
9/24/2006	8227310	325250
10/1/2006	8534270	306960
10/8/2006	8805450	271180
10/15/2006	9021830	216380
10/22/2006	9232090	210260
10/29/2006	9425020	192930
11/5/2006	9645010	219990
11/12/2006	9840460	195450
11/19/2006	32790	192330
11/26/2006	226560	193770
12/3/2006	446870	220310
12/10/2006	642270	195400
12/17/2006	836610	194340
12/24/2006	1038400	201790
12/31/2006	1253900	215500
1/7/2007	1472720	218820
1/14/2007	1717760	245040
1/21/2007	1983710	265950
1/28/2007	2210330	226620
2/4/2007	2416000	205670
2/11/2007	2662890	246890
2/18/2007	2880580	217690
2/25/2007	3083970	203390
3/4/2007	3270300	186330
3/11/2007	3455470	185170
3/18/2007	3641440	185970
3/25/2007	3826510	185070

*Readings estimated by interpolation

average week (gal)	**263,510**
peak week (gal)	**392,110**
peaking factor	**1.488**
Customers	**151**
Avg Demand per User (gpm)	**0.173**
Peak Demand per User (gpm)	**0.258**
Avg Demand (gpm)	**26.142**
Peak Demand (gpm)	**38.900**

CPWSD No. 1 User Rates

Avg Demand per User (gpm)	**0.169**
Peak Demand per User (gpm)	**0.353**
peaking factor	**2.092**
Avg Demand (gpm)	**25.519**
Peak Demand (gpm)	**53.303**