

BLACK & VEATCH CORPORATION

TECHNICAL MEMORANDUM

**Fountain Sanitation District
Master Plan Enhancement Study
Task 802 - Wastewater Treatment Plant Options**

**B&V Project 137033
November 22, 2004**

To: Jim Heckman
Prepared By: Robert Schweiger
Reviewed By: John Snitzmier

Introduction

This task was to perform a desk top analysis to determine the best location to add WWTP capacity. There were three options that were considered. The following is a summary of the analysis and the results.

Data Used for Analyses

The flow rates used for the analysis were taken from a combination of the June 2003 Master Plan and Task 400 of this memorandum. The flow rates used for the analysis are summarized in Table 6-1.

Table 6-1 – Summary of Flows Used for Analysis		
Collection Area	Peak Flow (mgd) ⁽¹⁾	Source of Peak Flow
Fountain Creek Basin Tributary to Existing WWTP	2.72	June 2003 Master Plan
Jimmy Camp Creek Basin Tributary to Little Ranches Pump Station, includes Colorado Centre	5.58	June 2003 Master Plan
Valley Ranches Proposed Development	17.25	Task 400
Christian Ranch Proposed Development	10.91	Task 400

⁽¹⁾ Peak flow is based on the 5-Year peak wet weather flow for Build Out conditions of the collection area.

As part of the desk top analysis the following assumptions were made:

- During the design of the existing treatment plant several of the components of the plant were designed and constructed with an ADF capacity of approximately 2.7 mgd or a hydraulic capacity of 5.0 mgd. The existing treatment plant can be expanded from the current ADF of 1.3 mgd to approximately 2.7 mgd with lower

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than typical treatment plant construction costs. (Since the writing of the draft memorandum, the maximum month, 30-day average flow for the treatment plant has been adjusted through an amendment to the District's discharge permit to 1.56 mgd).

- The cost of adding additional treatment capacity at the existing treatment plant above the 2.7 mgd would generally be comparable in costs of constructing a second plant at a different site. The typical cost of constructing a conventional treatment plant is approximately \$3 to 4\$ per gallon of treatment capacity. However, the cost of constructing additional treatment capacity above the 2.7 mgd may actually be higher than the cost of constructing a plant at a different location due to site work that would be needed to keep the expansion out of the flood plain.
- A minimum pipe slope with a full flow average velocity of 2 ft/s was used for sizing interceptor sewers.

Analyses Results

The options are summarized in the paragraphs below.

The first option considered the expansion of the existing treatment plant to treat all the flows generated. This would include the expansion of the existing plant to 2.7 mgd and the construction of additional facilities (a new plant) at the site of the existing plant. In order for all flows to be treated at the site of the existing treatment plant, the Little Ranches pump station and force main will have to be upsized, and the construction of two pump stations and force mains serving the Valley Ranch and Christian Ranch developments would have to be constructed. The probable capital cost is approximately \$21.84 million. This cost includes the probable capital cost of the Little Ranches pump station and force main expansions and the construction of the two new pump stations and force mains.

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The second option considered the expansion of the existing treatment plant to 2.7 mgd and the construction of a second treatment plant at a site approximately 1.5 miles south of Birdsall Road at Fountain Creek. The assumptions made for this analysis includes:

- The sight of the second treatment plant would be approximately 1.5 miles south of Birdsall Road at Fountain Creek in order to convey the Christian Ranch flows by gravity sewers.
- Gravity sewers will be able to convey the flows from the Christian Ranch and Valley Ranch developments to the second treatment plant. The actual site that will be selected for the second treatment has not been determined and may need to be moved in order to convey the Christian Ranch flows by gravity.
- Little Ranches Pump Station will be taken out of service and all flows conveyed to the pump station will be directed by gravity sewer to the Valley Ranch Development and the Valley Ranch west line shown in Task 400 will be increased in size to handle the additional flow.

The probable capital cost for this option is approximately \$15.06 million. This cost includes the cost to construct gravity sewers from the Christian Ranch and Valley Ranch developments to the site of the proposed second treatment plant and the cost to upsize the west line of the Valley Ranch west line shown in Task 400 to handle the additional flows from the area tributary to the Little Ranches pump station.

With the recent consideration for a Lower Fountain Metropolitan Sewage disposal District (LFMSDD) treatment plant being located immediately to and south of Birdsall Road the probable cost for option two would increase by approximately \$4.9 million. This increased cost would include an 11mgd pump station and force main in lieu of a gravity sewer from Christian Ranch to this treatment plant site and a 4,000 foot force main and a small, 3 mgd or less pump station to transfer the flows from the southern part of the Valley Ranch development to this treatment plant site which otherwise could not flow by gravity.

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The third option considered was to maintain the existing treatment plant and to build the interceptors to transport all the Christian Ranch, Valley Ranch, and Little Ranches Pump Station flows to a regional treatment plant. This treatment plant would be used mostly by the Colorado Springs Utility. It appears that this option is not a viable option because it was estimated that the regional treatment plant will most likely come on line several years after the District will need the additional treatment capacity. Based on the June 2003 Master Plan and Task 400 of this memorandum, the District will need more treatment capacity than the expanded existing plant before the regional plant comes on line. With this assumption, either the existing treatment plant will have already been expanded a second time or a second treatment plant will already be operational.

Conclusions

Options 1 and 2 will require the expansion of the existing treatment plant to 2.7 mgd and the construction of additional treatment either at the existing plant site or at a new site. Based on the above assumptions and analysis it appears that option two will be the least cost for the District for build out conditions. The probable capital cost savings is approximately \$6.78 million. The total cost savings will be even greater because the cost savings does not include the cost that would be required to run and maintain the three large pump stations and the possible costs of site work to flood proof the expansion that are part of option one.