December 2, 2008

Comments on the Los Osos Wastewater Project Draft Environmental Impact Report, November 14, 2008, by Don Bearden.

I searched high and low in the Fine Screening Report (**Att. 1)** and the Draft EIR (**Att. 2**) and can not find anywhere a 100% vacuum collection system has been analyzed for the Los Osos Wastewater Project. In fact, the DEIR Table 7-5, "Screening of Collection System Alternatives" (**Att. 2**), rules out a Vacuum System due to:

- Highest energy demand.
- Highest maintenance cost.
- Vacuum system pumps and 4,769 vacuum interface valves to maintain.

One supplier of Vacuum Systems, Tom LaHue of AIRVAC, at a town hall meeting in Los Osos on November 21, 2008, said that they can collect all of the Prohibition Zone with three Vacuum Stations and 1,590 Valve Pit packages for 4,769 connections (an average of 3 homes per Valve Pit package). Each Vacuum Station would have two vacuum pumps, two sewage pumps, and a standby power facility. The following table compares a gravity collection system to a vacuum collection system.

Gravity System (**Att. 2**)	Vacuum System
• 4,769 connections from property line to gravity main in street • 907 manholes	• 4,769 connections from property line to 1,590 valve pits in the county right-of-way then to the vacuum main in the county right-of way
• 8-18 inch pipeline, most at depths of less than 8 feet	• 4-10 inch pipeline at depths less than 6 feet
• 5 duplex pump stations • 2 triplex pump stations • 12 pocket pump stations	• 3 vacuum stations
• 7 standby power facilities for 7 of the pump stations	• 3 standby power facilities

As can be seen above, the Vacuum System has far fewer pumps and backup power facilities; also, the pipes are smaller and can be installed in shallower trenches. AIRVAC estimates the construction costs for a Los Osos Vacuum System to be approx. 32 million dollars compared to the 83-90 million dollars for a Gravity Collection System as shown in Table 7.4 of the Fine Screening Analysis (**Att. 1**). If you add contractor overhead, profit, and 30% design contingency, there is still a potential for saving tens of millions of dollars in construction costs.

As far as high Operation and Maintenance costs are concerned, the EPA Manual on Alternate Wastewater Collection Systems, October 1991, page 20 (**Att. 3**) says: "MYTH: Vacuum sewers are operation and maintenance intensive. REALITY: In general, vacuum sewers may be less costly to construct than conventional sewers, but may be more expensive to operate and maintain. However, the magnitude of the O&M effort has been greatly overstated."

PDHengineer.com, course No. C-4029, "Vacuum Sewers – Operation and Maintenance and Management Guidelines" (**Att. 4)** documents a 2003 survey of O&M data from 22 selected projects with a total of 49 operating vacuum systems. Page 22 says: "A review of operating records of systems discussed in this chapter suggests that previously published O&M figures may no longer apply. Reasons for this are twofold. First, the previous figures were based on a very limited data on a few early systems. Second, component improvements have resulted in significantly fewer service calls and lower O&M costs."

There are many communities that have researched gravity vs. vacuum sewers. Here are three large communities that opted to install vacuum sewers:

1. Sarasota County, Florida – "Considering the relatively dense urban development in the project area, Sarasota County selected central sewer collection systems as the design alternative for all 16 communities within the Phillipi Creek Study Area, with vacuum collection chosen for approximately 80% of the areas." From an article titled "Septic vs. Sewer: A Cost Comparison for Communities in Sarasota County, Florida", by Burden, Daniel G., et al, WEFTEC 2003, pp 319-343 (**Att. 5**).

2. Albuquerque, New Mexico – "Extensive use of vacuum sewers allowed the City of Albuquerque to develop a sanitary sewer collection system that would work effectively and cost efficiently in the unincorporated portions of Bernalillo County. Over the past 12 years, the City has implemented a program that ultimately has a construction cost of $140 million. The program will ultimately serve over 8,000 residences as septic systems will all be demolished and the groundwater will be provided protection from human pollution." From an article titled "Vacuum Sewers – Engineered Solution for a Multitude of Problems" by Paulette, Robert J., WEFTEC 2006, pp3609-3620 (**Att. 6**).

3. York County, Virginia – "The vacuum sewers comprise about 25 percent of our sewer infrastructure. We have 36 people who are in operations, but only two or three are required for vacuum sewer maintenance." From an article titled "Vacuum Sewer Saves York", www.govengr.com, Government Engineering magazine, September – October 2004 (**Att. 7**).

In summary, I think the Vacuum System alternative in the DEIR Table 7-5, Screening of Collection System Alternatives, needs a more extensive evaluation. I would fill in the vacuum system column as follows:

Baseline Criteria	**Vacuum System**
Level Designation	Level A
Groundwater Quality & RWQCB Waste Discharge Requirements	• Meets RWQCB requirements for elimination of pollution to groundwater. • No exfiltration due to vacuum always in the header. • Septic tank effluent that currently recharges aquifer is removed.
Water Resources	• In a vacuum sewer system, the only potential source of inflow and infiltration is the homeowner's building sewer. Old piping from house foundation to the valve pit stub out should be replaced to prevent I/I. • Septic tank effluent that currently recharges aquifer is removed.
Energy/Air Quality	• ???,??? kWhr/year • Odors – minimal due to sealed system and short retention time. • Low GHG emissions due to sealed system.
Costs	• 3 vacuum system stations to maintain. • 1,590 interface valves to maintain. • Low maintenance costs due to less equipment to maintain and fewer operators needed. • Low construction costs due to smaller piping and shallower depths.
Permitability	• Noise – Comparable to gravity during construction. Moderate operation noise from vacuum pumps, can be muffled by enclosures. • Cultural Resources - Lowest potential impact due to shallow trenching , small valve pits and fewest pump stations. • Aesthetics: Least impact. Valve pits below ground like manholes. Only 3 vacuum station buildings that can be designed like other buildings in the neighborhood.

The vacuum collection system appears to be the environmentally superior alternative.

List of Attachments

Attachment 1 - LOWWP Viable Project Alternatives Fine Screening Analysis, August 2007, pages 1-4, 3-1, 7-8.

Attachment 2 - LOWWP Draft Environmental Impact Report, November 14, 2008, pages 3-50, 3-51, 7-23, 7-24, 7-25.

Attachment 3 - EPA Manual on Alternate Wastewater Collection Systems, October 1991, pages 17, 18, 19, 20, 93.

Attachment 4 - PDHengineer.com, course No. C-4029, "Vacuum Sewers – Operation and Maintenance and Management Guidelines", pages 1-36

Attachment 5 - "Septic vs. Sewer: A Cost Comparison for Communities in Sarasota County, Florida", by Burden, Daniel G., et al, WEFTEC 2003: Session 51 through 60, pp 319-343
and Phillippi Creek Septic Replacement Program, Quarterly Executive Summary, March 2008.

Attachment 6 - "Vacuum Sewers – Engineered Solution for a Multitude of Problems" by Paulette, Robert J., WEFTEC 2006, pp3609-3620.

Attachment 7 - "Vacuum Sewer Saves York", www.govengr.com, Government Engineering magazine, September – October 2004.