

Environmental Engineers/Consultants

**LOMBARDO ASSOCIATES, INC.**

49 Edge Hill Road

Newton, Massachusetts 02467

(617) 964-2924

Portable: (617) 529-4191

Fax: (617) 332-9477

E-mail: [pio@LombardoAssociates.com](mailto:pio@LombardoAssociates.com)

June 8, 2007

Mr. Paavo Ogren, Deputy Director  
San Luis Obispo County  
Department of Public Works  
1050 Monterey Street  
San Luis Obispo, CA 93408

Re: Los Osos Wastewater Project  
Decentralized Wastewater Management Option

Dear Mr. Ogren:

Lombardo Associates, Inc. (LAI) has reviewed the Los Osos Wastewater Project Viable Project Alternatives Fine Screening Analysis prepared by Carollo Engineers, dated May 2007 along with many of the numerous reports on the wastewater and water resource issues in Los Osos. We are intimately familiar with the Los Osos wastewater situation as we proposed to assist the LOCSO with its engineering study in 2006 with the team of Professor George Tchobanoglous, Robert Jaques of Monterey County (who were both on the NWRI project review team) along with other national experts. We have also contacted Carollo Engineers offering our services, as we are nationally recognized on decentralized wastewater systems and have over \$200 million of project experience as the Engineer of Record on projects similar to Los Osos. Based upon our extensive and detailed review of the May 2007 Alternatives Fine Screening Analysis and previous documents prepared under the County sponsored project, we note that there is no identification and evaluation of a Decentralized Wastewater Plan. Based upon our investigation, it appears that a Decentralized Wastewater Plan is technically viable, economically competitive and environmentally very attractive, as compared to the other options that have been considered in the current and previous studies.

The Decentralized Wastewater Management Option would serve all of the existing development and build-out, capable of producing reusable water complying with Title 22 standards and would address in a very positive manner (we believe solve) the water supply imbalance in Los Osos that has led to salt water intrusion and thereby endangering the community's groundwater water supply.

Based upon our review of existing development in Los Osos which included examining the aerial photos and lot sizes and performing a significant amount of preliminary engineering analysis, we are of the opinion that due to the large number of small lots, complete reliance on individual systems is not technically feasible. Consequently it is our opinion that communal/cluster systems need to be the core of a Decentralized Wastewater Management Option. An optimized Decentralized Wastewater Management Plan could be a combination of communal and individual systems, however for analytical simplicity we start by assuming all existing developed properties and build-out would be served by a complete wastewater collection, treatment and dispersal communal/neighborhood system. Where use of

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individual systems would be economically attractive would then be determined for the definition of the optimized Decentralized Wastewater Management Plan.

At the conceptual level, the Decentralized Wastewater Option would consist of a number of communal wastewater systems that would total the wastewater design flow of 1.2+/- MGD with the following components:

- Septic Tank Effluent Collection System – maximizing the use of gravity (i.e. STEG) and using pumps (STEP) when necessary
- Recirculating Media Filters for Advanced Secondary Treatment
- Nitrex™ system for nitrogen removal – which could have emergent wetlands if desired, however not necessary for treatment
- Disinfection with UV-Ozone that additionally addresses emerging contaminant issues
- Dispersal by returning the treated wastewater to the individual properties generating wastewater, for drip/landscape irrigation. Additional drainfields would be provided for “excess” treated effluent that is not disposed of via drip irrigation to individual wastewater generating properties. Drip irrigation is a year round activity and not subject to seasonal issues associated with surface land application, i.e. spray irrigation. Connection between communal systems for effluent dispersal would be used to address wastewater production-dispersal imbalances in any communal areas.

We have examined the topography of Los Osos, depth to groundwater, soils, and existing development patterns and have concluded at this level of planning, that sufficient undeveloped land exists throughout the community to site the needed communal wastewater treatment facilities. At each of the communal treatment sites, virtually all wastewater treatment facilities would be below ground. With appropriate landscaping, the communal systems could be an open space amenity in the community.

Operation and maintenance of these wastewater systems is simple, requiring little operator attention. Our current comparable facilities operate with monthly visits – primarily to collect samples for performance monitoring. Electrical needs are predominately to operate small pumps that operate intermittently. No chemicals are needed. There is little sludge production in the treatment system – significantly less than an activated sludge plant. Odor issues are mitigated as there is no sludge processing and soil or carbon filters are used for air venting of treatment processes. Our experience includes engineering a 0.9 MGD wastewater collection, treatment and dispersal system that has 11 sub-areas, some of which have multiple small cost-effective pump stations to address serving properties in areas with flat and undulating terrain.

The benefits of the Decentralized Option are:

1. Cost competitive. Some centralized wastewater systems costs are eliminated or traded for more productive/valued uses, such as:
  - a. Elimination of force main to treatment plant

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- b. Dispersal system costs are traded for a water reuse/drip irrigation system that lowers property owners' water supply costs and produces the highest saltwater intrusion mitigation level. It is noted that landscape irrigation is a major water user in Los Osos, and, from what we can deduce, the major cause of saltwater intrusion.
    - c. Centralized sludge treatment, usually a major source of odors and costs, is significantly diminished if not eliminated, as slightly more than septage pumping is necessary. At 7,000 - 10,000+/- gpd of septage, simple subsurface land application or disposal at a centralized treatment site may be optimal. For your information, I co-authored the US EPA Septage Design Manual.
  2. Modularity enables the project to be easily segmented and the individual total communal systems can be implemented quickly. Due to the lower bonding requirements, it may be wise to bid communal systems separately and sequentially to attract a wider number of contractors, many of which may be local, and to increase construction competition. Also, it may be desirable to have Proposition 218 votes on different communal areas. We have experience on all of these, and other innovative approaches, including design-build-operate (DBO), in CA as well, approaches. Our DBO experiences include being the Chief Engineer for municipalities procuring the DBO service as well as being part of the proposing organization.
  3. Environmentally Benefits
    - a. Low energy use
    - b. No chemicals needed
    - c. Working predominately within existing developed area, thereby eliminating impacts on new sites
  4. Community Acceptability – although we cannot speak for the community, we anticipate acceptance with this simple, passive and effective treatment system that solves the water supply challenge and reduces their property water supply costs.

Although we have reviewed in detail the cost estimates in the Los Osos Wastewater Project Viable Project Alternatives Fine Screening Analysis and have prepared very conceptual economic comparison, the Decentralized Wastewater Option needs to be taken to the next level of analysis for full public comparison with the other options.

For your information, LAI received the national ACEC Engineering Excellence Award for our innovative wastewater project that served 3,000 connections with a septic tank effluent system (combination STEG & STEP), recirculating media filter, constructed wetlands and UV disinfection. We have engineered over 40 miles of septic tank effluent sewer systems in a number of states – which systems have been operating for over 20 years. LAI is intimately familiar with Federal and State funding program requirements and protocols for similar projects as Los Osos, as many of our projects have been funded by the USEPA and various States. I chaired the Water Environment Federation Small Community Committee, co-authored the upcoming WEF Alternative Sewers Manual and am author of many US EPA publications on

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Mr. Paavo Ogren  
June 8, 2007  
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decentralized wastewater management issues. We have championed the use of the passive Nitrex™ system, which produces Total Nitrogen levels < 5 mg/l, averaging 3 mg/l, in numerous applications throughout the US, including California installations, and Canada. We recently prepared the Cluster (i.e. Communal) Wastewater Systems Planning Manual for a national USEPA funded project – available at our web site [www.LombardoAssociates.com](http://www.LombardoAssociates.com). I have chaired and spoken at numerous WEFTEC workshops on decentralized wastewater systems, including the one scheduled for October 2007 in San Diego, <http://www.weftec.org/Education/Workshops/>.

We will welcome the opportunity to meet with you to discuss the Decentralized Approach and to discuss our assisting the County further develop a Los Osos Decentralized Option. Attached for your information are representative reference letters that speak to our unique engineering expertise. We have an office in the San Francisco Bay area.

I look forward to hearing from you.

Respectfully submitted,



Pio S. Lombardo  
President

cc: Technical Advisory Committee  
John Fouche  
Rob Miller  
Gail McPherson  
Lidia Holmes, Carollo Engineers  
Professor George Tchobanoglous  
Supervisor Bruce Gibson

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**LOMBARDO ASSOCIATES, INC.**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY  
CINCINNATI, OH 45268

January 20, 1998

OFFICE OF  
RESEARCH AND DEVELOPMENT

To Whom It May Concern:

I am pleased to offer a letter of recommendation for Mr. Pio Lombardo. Mr. Lombardo is one of the pioneers in the area of alternative decentralized wastewater treatment technologies, and has experienced it in the broadest possible fashion. as a researcher, designer, a builder, and a salesman. I believe that he has no peer in his ability to convince others of the value of these alternative technologies. Many of us who have dealt with these systems for the last 30 years have had the luxury of working in the more isolated research microcosm, but Mr. Lombardo actually went to the places which needed such technologies, and did not realize it, to convince them of that. This is a most difficult task, at which he has excelled.

Personally, I have always found Mr. Lombardo to be a gentleman and a man of his word. This quality has also been the hallmark of any professional dealings we have had over the years.

I would most heartily endorse Pio Lombardo in any role as an interface or spokesman for an alternative technology concept or project with local and regional governments.

If further details are required, I would happily supply them.

Sincerely,

A handwritten signature in cursive script that reads "James F. Kreissl".

James F. Kreissl  
Environmental Engineer

April 28, 2003

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**STATE OF CONNECTICUT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**



January 9, 1998

To Whom It May Concern:

I am both delighted and honored to write a letter of recommendation for Mr. Pio Lombardo, whom I consider one of the pre-eminent national figures in the area of wastewater management.

My own experience in this field covers 29 years in the areas of research, engineering, regulation, writing and public speaking at sessions of virtually every major conference on small-scale wastewater management issues. I am also co-inventor of the highly successful Infiltrator<sup>™</sup> leaching system.

Pio has a thorough grasp of all technological and business issues and solutions in the field of wastewater treatment. This knowledge forms the solid foundation for his work. What is unique is that he can apply technology with a sure and far reaching vision that is rare in the field of engineering. One only needs to examine some of his past projects to gain an understanding of this outstanding skill.

Based on sure technical knowledge, Pio has an unequalled ability to take on the difficult issue of wastewater system management. His ability to work with multiple levels of government and with citizens to create effective wastewater management solutions is without equal. My Department was so impressed with Pio's ability to create effective wastewater management systems that we asked him to share his insights with us on a pro-bono basis. This unusual request, and his helpful response, is a strong tribute to his skill, intelligence and commitment to the field.

I strongly endorse Pio Lombardo as a man of integrity, brilliance and possessed of unique insight and ability in the integration of citizenry in wastewater management issues. Please do not hesitate to call me at 860-424-3719 if further particulars are required

Sincerely

Randy May  
Supervising Sanitary Engineer  
Bureau of Water Management

RM/hs

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