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October 11, 2011

Rachel Kovesdi
Kirk Consulting, Inc.
8830 Morro Road
Atascadero, CA 93422

Subject: **Wastewater System Improvements for Celebration of the Arts Camp, Cantinas Ranch, Lake Nacimiento, California**

Dear Rachel:

Fall Creek Engineering, Inc. (FCE) has prepared this letter to describe the wastewater system improvements proposed for the Celebration of the Arts Camp at the Cantinas Ranch at Lake Nacimento in Central California. The following project description provides a brief description of the proposed collection, treatment and disposal/reuse systems as shown in the accompanied engineering design plans.

Wastewater System Improvements

In consideration of the limited water resources on the property, and the plan to obtain a Leadership in Environment and Energy Design (LEED) certification from the U.S. Green Building Council, the wastewater system has been designed to produce reclaimed wastewater to allow the reuse of treated effluent for a variety of uses at the camp. FCE has included the use of a constructed wetland to meet water quality goals, to enhance wildlife habitat on the site, and to possibly obtain additional points under the LEED program.

The new onsite wastewater system is planned to serve the majority of the facilities for the new camp , including the Security Main Entry Gate, Mission, Camper Village/Lodging, Chapel, Celebration of the Arts Buildings, Staff Housing, Recreation Buildings, and Staff Lodging. During the summer, the camp is expected to house and provide facilities for 200 people including staff and guests. To allow for future camp growth over the next 20 years, FCE has calculated wastewater flow estimates for a maximum occupancy of 300 staff and guests.

Collection System

The collection system will be a Septic Tank Effluent Gravity (STEG) system. The STEG system will be composed of several septic tanks located at the various developed sites on the property. The septic tanks will collect wastewater, settle solids, and discharge effluent by gravity to a duplex booster pump system near the meadow. From there the effluent will be pumped to the treatment system for secondary and tertiary treatment.

The septic tanks have been sized to handle peak flows from each of the developed areas. The design flows were calculated by multiplying the number of occupants by the assumed average daily demand for each facility. The average daily demand was determined from the number of sinks, showers, and toilets at each facility. The design flow for each tank was then multiplied by

two (2), to allow for two days of detention time, to determine the design capacity (volume). Table 2 summarizes the calculated design flows and corresponding septic tank volumes for each developed area (see Figure 2 for developed area designations).

Table 2. Septic Tank Design Flows and Volumes

Tank #	Design Flow (GPD)	Tank Volume (Gal.)
Tank #1	1485	3000
Tank #2	4275	9000
Tank #3	4950	10000
Tank #4	4950	10000
Tank #5	3418	7000
Tank #6	3418	7000
Tank #7	3600	8000
Tank #8	1000	1000

The sanitary sewer pipes are sized to convey the design flow with a peaking factor of two (2). The sewer system was analyzed to insure conveyance with a minimum velocity of 2 feet per second (fps), and a maximum velocity of 10 fps in each sewer pipe. The sub-mains will employ 6-inch sewers and the main gravity lines will include 8-inch sewer lines.

Wastewater Treatment System

A Two-Stage Trickling Filter and free water surface constructed wetland treatment system has been selected for the site. The treatment system is designed to achieve tertiary level treatment to allow for the direct reuse of water at the camp for a variety of beneficial uses, including landscape irrigation, fire water, toilet flushing, dust control, and for water features. The system is also designed to conform to standards promulgated by the CRWQCB and the County of San Luis Obispo, including Title 22 of the CCR, the Basin Plan, and LEED.

Based on flow data obtained for similar projects completed in the Central California Coast, FCE estimates that the daily wastewater flow per visitor or staff will range from 65 to 75 gallons per person per day (gppd). Using 75 gppd at the maximum projected occupancy of 300 people, FCE estimates that the daily flow will be approximately 22,500 gallons per day (gpd). Applying a peaking factor of 1.3 to account for peak flow conditions that occur during the morning and evening, the adjusted design flow rate for the treatment system is approximately 30,000 gpd.

Disposal System

The majority of treated water will be pumped to the proposed fire/irrigation water tank for reuse. When the tank is full or during emergencies, the treated water will be diverted to a series of leachfields. The leachfields are designed to dispose of the design flow of 30,000 gpd with an application rate of 0.6 gpd/ft^2.

Wastewater Recycling

The final effluent from the biological treatment plant will be filtered and disinfected so that it can reused for a variety of purposes on the property, including landscape irrigation, fire suppression, toilet flushing and other potential reuses. The recycled water will be treated to meet California Water Recycled Water Laws established in Title 17 and 22 of the Code of Regulations.

This concludes the wastewater system description. Thank you for the opportunity to prepare this letter report and assist you with this project. If you have any questions or require additional information, please contact me at (831) 426-9054.

Sincerely,

PETER HAASE, P.E.
Principal Engineer

Cantinas Ranch
Wastewater Treatment Options

Peter Haase

Fall Creek Engineer

August 2010

Trickling Filter Project Examples

- **Parkhurst Terrace, Aptos, CA**
  - Affordable housing project
  - 68 homes with population 335 to 400 people
- **Salvation Army Redwood Glen Camp and Conference Center, Scotts Valley, CA**
  - Year round camp
  - Scotts Valley, California
  - Population ~300 Max. Occupancy
- **JMC Fiji Island Resort, Savu Savu, Fiji**
  - Full service resort – 30 bures, restaurant, spa
  - Daily Flows 10,000 to 15,000 gallons
- **Post Ranch Inn, Big Sur, CA**
  - Full service resort – 40 guest units, restaurant, 24 staff apartments, central laundry, spa
  - Daily flows 14,000 to 22,000 gpd
- **San Lorenzo School Complex, Felton, CA**
  - Three campus – 2,500 students
  - Design Flows ~ 16,000 to 20,000 gpd
- **Allianza School, Watsonville, CA**
  - Elementary school and school of the arts
  - 600 student population- Design Flows 12,000 to 16,000 gpd
- **Villas de Paraiso, Watsonville, CA**
  - 61 unit affordable housing project
  - Design Flow ~ 16,000 to 20,000 gpd

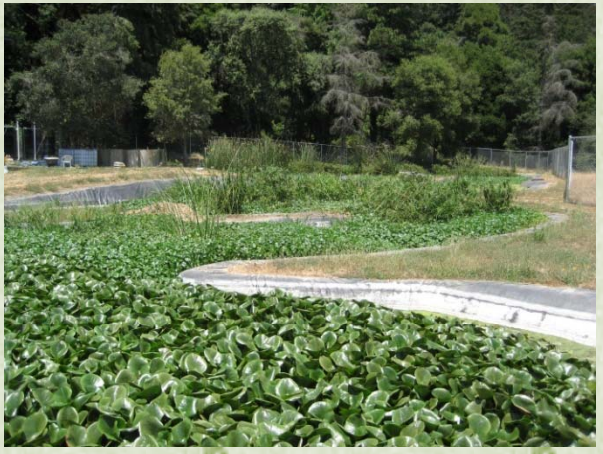
Other Projects

- Felton Faire Shopping Center, Felton, CA
- Prunedale Shopping Center, Prunedale, CA
- Bear Creek Estates Community, Boulder Creek, CA
- Brookdale Lodge, Brookdale, CA
- Mission Springs Camp and Conference Center (Designed)
- Sea Ranch Lodge, Sea Ranch, CA (Designed)
- Parkway RV Park, Morgan Hill, CA (Designed)

Why use constructed wetlands

- Free surface water wetlands emulate natural systems
- Complex and diverse biology – stable and resilient to change or shock loading
- Achieve high level of treatment with low input
- Passive treatment for suspended solids, nutrient and pathogens
- Advantages – create habitat value, enhance site conditions, can take a very natural or irregular form to fit site conditions or to revitalize underutilized areas, attract wildlife
- Disadvantage is the land area required

San Lorenzo Valley School
Felton, California



Small Community Systems
New Zealand

City of Arcata WWTP