

SCOPE OF ENGINEERING SERVICES
for
WASTEWATER MODELING & CAPACITY ANALYSES
LAKE COUNTY SPECIAL DISTRICTS (CLIENT)
prepared by
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PROJECT UNDERSTANDING

The primary objective of this project is to prepare sewer models for the various collection systems within the LACOSAN network and use the models to analyze for deficiencies and to recommend system improvements. Modeling would include gravity and pressure pipes in each of the five systems and identify cost-effective solutions for any noted deficiencies. Analyses would include current flows and future flows based on published or other available growth information.

A report of findings will be presented which includes recommendations for improvements to each of the 11 or so community systems, the overall larger systems including pumping improvements, and itemized cost estimates for any identified and recommended capital improvements. The report would be initially presented in draft form for Special Districts' review and comments, followed by preparation of a final report.

The target systems include the following overall areas and surrounding communities:

- Northwest Regional Wastewater Collection Areas (N. Lakeport, Upper Lake, Nice, Kono Tayee, Paradise Valley)
- Kelseyville Wastewater Collection Areas (Kelseyville, Corinthian Bay, Clear Lake SP)
- Middletown Wastewater Collection System
- South Lakeport Wastewater Service Area Collection System
- Southeast Regional Wastewater Collection Areas (Lower Lake, Clearlake)

Below is an outline description the Scope of Services for conducting modeling for each system and preparing a single report which includes the results and recommendations developed from modeling and other analyses of the individual systems, along with budgetary cost estimates for each of the five collection systems.

SCOPE OF SERVICES

Task 1 – NW Regional Wastewater Collection Area (90 Mi Gravity; 23 Lift Sta; 15 Mi FM)

The NW Regional system covers the communities and cities at the north end of the lake and sends treated effluent to the Geysers for recharge. It is assumed that only the collection system will be modeled. There are a total of 4088 connections with 1.6 MGD average dry weather flows, and 4.1 MGD wet weather flows.

1.01 Base Gravity Flow Model Development

Data provided by Lake County Special Districts (LCSD) will be used to create an accurate computer model (or models) of the collection system or systems. Available GIS data will allow creation of spatially correct models populated with pipe lengths, slopes, roughness factors, and diameters. Flow data is assumed to be provided by LCSD or will be estimated based on number of service connections.

1.02 Pressure Hydraulic Model – Force Mains

Pressure hydraulic modeling for force main flows will be created for flows between pump stations, between collection systems and/or to the treatment plant. Model input will be based on available metering data provided by LCSD or other data available. Models for varying demand conditions will be developed.

1.03 Modeling Analyses for Identifying Needed System Improvements

The gravity and pressure models will be used to identify system deficiencies, typically using the wet weather flows. A trial-and-error method will then be used to identify necessary or desired system improvements.

1.04 Improvements Cost Estimates & Priority Rankings

Based on the results and recommendations for improvements coming from the hydraulic analyses conducted to identify piping and flow deficiencies within the collections systems and force mains, each identified piping or pumping improvement will have a cost estimate prepared and a priority ranking applied to help LCSD determine future funding needs and timing for constructing noted improvements.

Task 2 – Kelseyville Wastewater Collection System (15 Mi gravity; 6 Lift Stations; 4 Mi. FM)

The Kelseyville WW Collection System has 947 service connections with 1,463 ESDs, but dry and wet weather flows have not been provided. It is assumed that flow data will be provided for modeling purposes.

2.01 Base Gravity Flow Model Development

Data provided by Lake County Special Districts (LCSD) will be used to create an accurate computer model (or models) of the collection system or systems. Available GIS data will allow creation of spatially correct models populated with pipe lengths, slopes, roughness factors, and diameters. Flow data is assumed to be provided by LCSD or will be estimated based on number of service connections.

2.02 Pressure Hydraulic Model – Force Mains

Pressure hydraulic modeling for force main flows will be created for flows between pump stations, between collection systems and/or to the treatment plant. Model input will be based on available metering data provided by LCSD or other data available. Models for varying demand conditions will be developed.

2.03 Modeling Analyses for Identifying Needed System Improvements

The gravity and pressure models will be used to identify system deficiencies, typically using the wet weather flows. A trial-and-error method will then be used to identify necessary or desired system improvements.

2.04 Improvements Cost Estimates & Priority Rankings

Based on the results and recommendations for improvements coming from the hydraulic analyses conducted to identify piping and flow deficiencies within the collections systems and force mains, each identified piping or pumping improvement will have a cost estimate prepared and a priority ranking applied to help LCSD determine future funding needs and timing for constructing noted improvements.

Task 3 – Middletown Wastewater Collection System (10 Mi Gravity; 3 Lift Stations; 3+ Mi FM)

The Middletown WW Collection System serves the Middletown area, including Harbin Springs. Prior to the 2015 Valley Fire, there were 492 connections with average dry weather flows of .128 MGD and wet weather flows of 0.24 MGD. Current flows and connections are assumed to be reduced from pre 2015 levels.

3.01 Base Gravity Flow Model Development

Data provided by Lake County Special Districts (LCSD) will be used to create an accurate computer model (or models) of the collection system or systems. Available GIS data will allow creation of spatially correct models populated with pipe lengths, slopes, roughness factors, and diameters. Flow data is assumed to be provided by LCSD or will be estimated based on number of service connections.

3.02 Pressure Hydraulic Model – Force Mains

Pressure hydraulic modeling for force main flows will be created for flows between pump stations, between collection systems and/or to the treatment plant. Model input will be based on available metering data provided by LCSD or other data available. Models for varying demand conditions will be developed.

3.03 Modeling Analyses for Identifying Needed System Improvements

The gravity and pressure models will be used to identify system deficiencies, typically using the wet weather flows. A trial-and-error method will then be used to identify necessary or desired system improvements.

3.04 Improvements Cost Estimates & Priority Rankings

Based on the results and recommendations for improvements coming from the hydraulic analyses conducted to identify piping and flow deficiencies within the collections systems and force mains, each identified piping or pumping improvement will have a cost estimate prepared and a priority ranking applied to help LCSD determine future funding needs and timing for constructing noted improvements.

Task 4 – South Lakeport Service Area Collection System (5 Mi. Gravity; 5 Lift Sta; 2+ Mi FM)

The South Lakeport Service Area includes 196 service connections with 223 ESDs. Average dry and wet weather flows have not been provided. It is assumed that flow data will be provided for modeling purposes.

4.01 Base Gravity Flow Model Development

Data provided by Lake County Special Districts (LCSD) will be used to create an accurate computer model (or models) of the collection system or systems. Available GIS data will allow creation of spatially correct models populated with pipe lengths, slopes, roughness factors, and diameters. Flow data is assumed to be provided by LCSD or will be estimated based on number of service connections.

4.02 Pressure Hydraulic Model – Force Mains

Pressure hydraulic modeling for force main flows will be created for flows between pump stations, between collection systems and/or to the treatment plant. Model input will be based on available metering data provided by LCSD or other data available. Models for varying demand conditions will be developed.

4.03 Modeling Analyses for Identifying Needed System Improvements

The gravity and pressure models will be used to identify system deficiencies, typically using the wet weather flows. A trial-and-error method will then be used to identify necessary or desired system improvements.

4.04 Improvements Cost Estimates & Priority Rankings

Based on the results and recommendations for improvements coming from the hydraulic analyses conducted to identify piping and flow deficiencies within the collections systems and force mains, each identified piping or pumping improvement will have a cost estimate prepared and a priority ranking applied to help LCSD determine future funding needs and timing for constructing noted improvements.

Task 5 – SE Regional Wastewater Collection Areas (100+ Mi Gravity; 22 Lift Stations; 18 Mi FM)

The Southeast Regional WW Collection Areas serve 6,277 connections with 8,167 ESDs along the southeast side of Clear Lake. Flows are reported at 1.9 MGD for average dry weather, and 6.1 MGD for wet weather.

5.01 Base Gravity Flow Model Development

Data provided by Lake County Special Districts (LCSD) will be used to create an accurate computer model (or models) of the collection system or systems. Available GIS data will allow creation of spatially correct models populated with pipe lengths, slopes, roughness factors, and diameters. Flow data is assumed to be provided by LCSD or will be estimated based on number of service connections.

5.02 Pressure Hydraulic Model – Force Mains

Pressure hydraulic modeling for force main flows will be created for flows between pump stations, between collection systems and/or to the treatment plant. Model input will be based on available metering data provided by LCSD or other data available. Models for varying demand conditions will be developed.

5.03 Modeling Analyses for Identifying Needed System Improvements

The gravity and pressure models will be used to identify system deficiencies, typically using the wet weather flows. A trial-and-error method will then be used to identify necessary or desired system improvements.

5.04 Improvements Cost Estimates & Priority Rankings

Based on the results and recommendations for improvements coming from the hydraulic analyses conducted to identify piping and flow deficiencies within the collections systems and force mains, each identified piping or pumping improvement will have a cost estimate prepared and a priority ranking applied to help LCSD determine future funding needs and timing for constructing noted improvements.

Task 6 – Report Preparation

6.01 Draft Report

The results of the modeling and other analyses for each of the collection systems and force mains will be combined into a Draft Report with all recommended and prioritized improvements, along with their estimated construction costs, separated into chapters for each of the five systems. The Draft would be submitted for review and comment to LCSD.

6.02 Final Report Preparation

Comments received from the Draft Report submission will be incorporated and resubmitted as a final version of the report.

FEES

Our fees for this work will be billed monthly on a time and materials basis per the rates provided and included in our On-Call contract with Lake County Special Districts. The overall budget for completing all tasks likely exceeds the available amount budgeted for Task Order 3 within LCSD's CIP plan. That budget is currently \$100,000. It is proposed that the modeling efforts for one of the medium-sized collection systems (e.g. Middletown or Kelyseville) could be initiated and mostly completed (no report task) well under the budget available (not to be exceeded without advance, written notice). Once the modeling and other analyses and cost estimating tasks for that system have been completed, and the size and layout of the other collection systems have been reviewed for comparison of effort needed, then an amendment would be prepared LCSD consideration providing more accurate budgets for the remaining collection system models and report preparation tasks.

ASSUMPTIONS AND LIMITATIONS

1. Data necessary for constructing the base models and conducting the initial modeling tasks are assumed to be available and will be provided by Lake County Special Districts.
2. Only the tasks for one collection system modeling effort are included, as described herein, and not additional services are currently included.