Lakehaven UTILITY DISTRICT

2009 COMPREHENSIVE WASTEWATER SYSTEM PLAN

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ENGINEER'S CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers Inc. under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.

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LAKEHAVEN UTILITY DISTRICT
COMPREHENSIVE WASTEWATER SYSTEM PLAN
EXECUTIVE SUMMARY

This Comprehensive Wastewater System Plan is a summary of the conclusions and findings completed by PACE Engineers, Inc. and District staff in analyzing Lakehaven Utility District's existing wastewater collection and treatment systems. The Plan updates and supersedes the District's previous (1999) Comprehensive Wastewater Plan and periodic amendments completed through 2005, and has been prepared in accordance with all applicable regulatory requirements. The primary goals of the planning effort were to:

- Determine the adequacy of the existing wastewater collection and treatment system to meet the current and projected needs of Lakehaven's customers in accordance with all state, federal and local regulations, as well as current industry standards.

- Develop recommendations for system improvements which meet the wastewater collection and treatment system needs in an environmentally conscious manner, all while protecting public health and welfare.

- Identify potential mechanisms for funding recommended studies, improvements and other recommendations of the Plan.

The following is a summary of the key elements of the planning process and sections of the Plan:

Introduction

This section presents an overview of the study, history and objectives of the District, and a summary of the rules and regulations which govern the operation of the District and the development of the Comprehensive Plan document.

Basic Planning Data

Lakehaven Utility District currently serves within the corporate limits of eight jurisdictions. The existing sewer service area identified in the Plan is not coincidental with the District's corporate boundary, but efforts continue to provide the most feasible consistency between the two boundaries as possible. Growth Management Act planning has established an Urban Growth Area (UGA) within which urban levels of service are to be provided in a timely and reasonable manner by Lakehaven Utility District. The entire corporate boundary of the District is within the UGA and Lakehaven is therefore responsible for planning accordingly.

Demographics

Population and employment forecasts are based on the adopted land use plans of the various

jurisdictions within which the District operates. They are presented by drainage basin to allow for evaluation of the system and consideration of future improvement alternatives. In 2008, there were an estimated 120,100 residents and 29,800 employees within Lakenhaven's Sewer Service Area (SSA). Population has increased less than projected in the prior Plan, but is expected to be accelerated by changes in the City of Federal Way's zoning code to allow for more dense development and redevelopment to occur within the City, particularly in its Downtown Core. The population is projected to increase to nearly 126,410 by 2015, and almost 140,000 by the year 2030. Employment is expected to increase to more than 33,600 by 2015 and more than 41,800 by 2030. Some areas of the SSA remain unserved, particularly in the southeast, but plans to expand to unsewered areas as on-site systems become less viable to maintain and/or new development occurs is anticipated over the next 20 years and beyond.

Flow Projections

Section 4 of this Plan discusses current and projected flows for the six major drainage basins identified in this Plan. Average base sanitary flow for all customers in Lakehaven is currently (2008) estimated at 7.1 MGD, and is expected to increase to nearly 8.1 MGD by 2015, 9.8 MGD by 2030, and potentially up to 18.2 MGD at full development (Buildout). Peak flows, including infiltration and inflow (I & I), are estimated at 33 MGD in 2008, 40 MGD by 2015, 51 MGD by 2030, and nearly 74 MGD at Buildout.

Existing Wastewater Collection System

The existing collection system consists of approximately 340 miles of sanitary sewer pipes, 8,300 manholes, 28 pump stations, five siphons and two secondary wastewater treatment facilities. The system has been constructed over a number of years, and from a wide variety of materials, as dictated by development trends in the area. The system is divided into six primary basins and 56 smaller sub-basins. The two largest basins, Lakota and Redondo, flow to the District's wastewater treatment plants. The remaining basins currently discharge to other utilities for treatment and disposal.

Collection System Recommended Improvements

Analysis of the collection system was accomplished with a computer modeling system using the design criteria established in the Plan. Primary issues resulting from analysis of the collection system were related to normal renewal and replacement programs, I & I control in the older areas of the system (especially Redondo), and capacity issues related to various growth scenarios. Collection system improvement projects identified in the Capital Facilities Plan are representative of these findings, as well as extension of service to currently unsewered areas. One particular challenge of this plan was to analyze the Downtown Core of Federal Way, which may see large increases in population and employment resulting from the City's Planned Action SEPA adopted in 2007. Major recommended improvements for the collection system are primarily centered around Lakehaven's desire to treat as much sanitary flows within its corporate boundaries as feasible. Several projects that will cost effectively re-route flows currently flowing to Pierce County are discussed in Section 7. The District's efforts to provide back-up power at all pump stations has made significant progress since the previous Plan, and

further upgrades are discussed and budgeted for in the Capital Facilities Plan.

Treatment Facilities

The Lakota Plant was constructed as a primary treatment plant in 1967 and upgraded to secondary treatment in 1991. The Lakota plant was designed for a peak month flow of 10 mgd and a peak hour flow of 22.2 mgd. The Redondo plant was constructed as a primary treatment plant in 1962 and upgraded to secondary treatment in 1983. The Redondo plant was designed for an annual average flow of 5.6 mgd and a peak hour flow of 13.8 mgd. The Redondo Plant has limited room for expansion at its current site, while Lakota has room for expansion when dictated by growth and development.

Recommended Treatment Facility Improvements

The recommended improvements fall into two categories, general improvement requirements and capacity expansion requirements. General improvements are those needed to improve individual processes and provide improved control of the plants. Capacity improvements are those needed to accommodate future wastewater flows, particularly peak hour and month flows. Some capacity improvements, particularly at the Redondo Treatment Plant, may be avoided if ongoing efforts to study and reduce I & I are successful. Lakehaven continues to study the effects of their successful water conservation efforts on the treatment process, and have evaluated options for re-routing flows from the Redondo collection system to the Lakota system in order to optimize the treatment process. At the current (2008) time, re-routing flows is not anticipated to occur in the near term.

Hydraulic Capacity Analysis

Analyses were performed using 1999-2006 data during which period annual wastewater flow to Lakota increased 16% to 4.8 mgd and to Redondo increased 3% to 3.09 mgd. Peak hour flows for 2006 were 12 mgd at Lakota, and unmeasured at Redondo due to flowmeter limit. Hydraulic capacity at both plants is estimated to be available up to the original design peak hour capacities of 22.2 mgd for Lakota and 13.8 mgd for Redondo. Both plants operate well within their permit limits. BOD loadings at Lakota have exceeded the 85% threshold of permit limits for 3 months in a row. The District is in conversation with Ecology on this matter.

Lakota Process Capacity Analysis

Analyses were performed on 1999 to 2006 data and individual process unit capacities were compared to Washington State Ecology Department design criteria. Primary treatment comprises screening, grit removal and primary clarifiers and has adequate capacity. Grit and primary scum removal need improvement to protect and optimize downstream processes. Secondary treatment comprises aeration basins, secondary clarifiers and UV disinfection. Process analysis showed peak month capacity at 10.5 mgd peak month flow for the aeration process and 12.5 mgd for the secondary clarifier process vs. the overall

design capacity of 10 mgd. Solids treatment comprises thickening, digestion and dewatering. Of the three solids processes, digestion is near design capacity. The digesters will be overcapacity when the peak month flow exceeds 6.5 mgd based on the design volatile solids loading. In 2006 the peak month flow was 6.07 mgd. No other process improvements due to capacity are required to meet the 2015 flow and solids projections.

Redondo Process Capacity Analysis

Analyses were performed on 1999-2006 data and individual process unit capacities were compared to Washington State design criteria. The peak hour flow for the year 2015 is projected to be 15.1 mgd which exceeds the current design capacity for many of the processes. Primary treatment comprises screening (13.8 mgd peak hour capacity), grit removal (14.5 mgd peak hour capacity) and primary clarifiers (12.1 mgd peak hour capacity. Secondary treatment is comprised of aerating trickling filters, secondary clarifiers and UV disinfection. Secondary capacity, and consequently overall process capacity, is limited by clarifier capacity (10.1 mgd peak hour) and UV disinfection capacity (13.8 mgd peak hour). Solids treatment comprising digestion and dewatering has adequate capacity. Limited thickening is achieved in the process tanks rather than a separate thickening process so new. New dewatering systems are recommended.

Biosolids

Dewatered biosolids cake from both plants, stabilized to Class B quality in the digesters, is trucked to Eastern Washington to be utilized by farmers on their crop lands. Metals content in the biosolids has been consistently well below EPA regulatory limits for land application and is currently below EPA limits for "clean" biosolids.

Water Reuse

Lakehaven has evaluated the feasibility of municipal wastewater reuse to replenish ground water resources extracted for potable water use. The most recent Comprehensive Water System Plan provided an evaluation of the feasibility of wastewater reuse. Landscape irrigation and groundwater recharge are the two potential reclaimed water uses identified within the District. Future reclamation treatment facilities would be located at the Lakota WWTP and possibly the Redondo WWTP, if implemented.

Financing Options

Several typical funding options are available to the Lakehaven Utility District. These include the following: State and Federal Grants and Loans; Bond Financing, both General Obligation Bonds and Revenue Bonds; Privatization; Leasing; Pay-As-You-Go; Capital Reserve Funds; Development Based Funding; and Connection Fees.

An appropriate funding mix is needed by the District to finance the proposed Capital Facilities Plan summarized in Section 11 of this Plan. Given the current (2008) economic climate, the

District should continue to aggressively pursue government loan funding, economic recovery funding as it becomes available, and build reserve funds to finance scheduled system repairs and upgrades. The District should continue to evaluate the benefit of inter-local contracts with Agencies who may share in the cost of the improvements.