

EXECUTIVE SUMMARY

LFPWD COMPREHENSIVE WATER SYSTEM PLAN 2015

Part One – General information

Part One is intended as reference for general information. Much of the content of this chapter is discussed with greater detail in later chapters.

Lake Forest Park Water District operates a community water system serving about 900 customers within the City of Lake Forest Park; a suburban, residential community rising from the north shore of Lake Washington, near Seattle. Policies of the District are set by three elected Commissioners: Bill Donahue, David Hammond and Eli Zehner. The Commissioners have retained a General Manager; Alan Kerley who directs an administrative assistant, field operations staff and outside contractors in the operation of the District.

This Comprehensive Water System Plan (CWSP) 2015 offers a plan of action to meet many of the administrative and physical challenges that will confront the District over the next two decades. This plan complies with Washington State Department of Health regulations. The District is financially solvent and owns rights to an excellent water source that includes both deep and artesian wells. It is under no legal or regulatory order, is managed by qualified staff and directed by an experienced and committed Board of Commissioners. There are many interesting questions and challenges that will face the District over the life of this plan this document provides a summary reference to adequately support these situations.

This plan replaces the 2005 Comprehensive Water System Plan and is oriented to address internal needs as a summary reference document. Organization of Plan follows Washington State Department of Health 10-part format. There was a name change from King County Water District #83 in '2000 to *Lake Forest Park Water District* to help correlate with the identity of the surrounding community. Potential ownership and management changes are briefly mentioned but not considered in planning.

The identity of "Lake Forest Park" was created by real estate developer Ole Hanson as early as 1910 with strong emphasis on natural environment and *pure water* supply. This legacy remains a cornerstone of the District's identity to this day. A timeline of significant *physical* and *administrative* developments over the last century are presented and include considerable detail regarding early development of the District and McKinnon Creek wellfield.

A high priority is to replace all remaining thin wall steel pipe installed in the 1940's as rapidly as possible. Water quality considerations are also critical for long term. The District has implemented in-house bacterial analysis to augment Department of Health required tests.

Part Two – Water Use and Demand Forecasts

Part Two summarizes historical water use since 1971 and projected water use through 2033. Development in the District is slow and only marginal growth in water use is expected. Some relevant details are:

- ◆ Average and peak day production is dropping over the past several decades due to ongoing pipe replacement, metering replacement, rate increases, conservation and maintenance programs.
- ◆ System production. Peak Day Production remains 775,000 (0.75 MG) gallons and Average Day Production is 260,000 gallons (0.26 MG) and is expected to decrease marginally over the plan period as unaccounted for water [leakage] is reduced. Peak day production is expected to increase marginally due to increases in projected household size.
- ◆ Equivalent Residential Unit (ERU) consumption; currently 197 gallons per day (10-year historical average).
- ◆ Table 2-1 summarizes all historical and projected water production and consumption.
- ◆ Water production and consumption forecasts do not include:
 - Capture of additional areas presently served by NUD and NCWD that would increase demand nearly 10%.
 - Re-development of LFP Towne Center to include 300 residential units

Part Three – Facility Condition and Performance Analysis

Part Three contains a descriptive evaluation of District facilities along with a hydraulic analysis of the network and forms the basis for the Capital Improvement Program outlined in Part Eight. Design and performance standards are developed for each class of infrastructure and there is discussion of condition, deficiencies and proposed improvements. These are summarized here:

- ◆ *Source and supply*
 - Water wells and intertie capacity are more than adequate to supply the peak hour needs of the District although in the short term a fire in a large facility would deplete storage. A redundant intertie from Seattle Tolt pipeline is proposed where the Tolt pipeline crosses 193rd Street to meet peak demand during a commercial fire.
 - Water sources (1202 ac-ft/year) are more than adequate to supply the annual average needs of the District (233.3 ac-ft/year)
 - *Jurisdiction issues* at the McKinnon Creek wellfield need to be resolved in order to comply with WAC 246-290-135. The District is taking action in this regard. Significant improvements are planned at McKinnon Cr. wellfield including:
 - Replace pump house, transmission piping, and upgrades to existing controls.

- Retrofit Deep Well#3 casing
- Refurbish Deep Well#2 for better performance well screen
- Replace well pump Deep Well#1 high hours
- ◆ *Water quality and treatment:* Water quality from the District's sources remains excellent. However, coliform bacteria have been detected in the distribution system on occasion. Operational measures including standby chlorination, in-house water testing and reservoir circulation management have been implemented to reduce the risk of reoccurrence. Detectable levels of nitrates in the shallow artesian well water are being watched closely for trends. Iron removal from deep wells 3 and 4 is being contemplated in the long term.
- ◆ *Distribution reservoirs.* Several upgrades have been completed on reservoirs at McKinnon Creek wellfield including mixing manifold, interior, exterior coatings and corrosion anode protection. However these reservoirs were built in the 1960's (excepting the 12,000 gal standby tank) and are not constructed to current seismic standards. A new 50,000 gal reservoir at Horizon View wellfield was constructed in 2013. This reservoir feeds the "Horizon View" pressure zone and also feeds water into the "High" zone.
- ◆ *Water supply and distribution piping.* Steel and galvanized iron pipe make up approximately 21.4% of the network (15,223 feet). This pipe is experiencing an increase in failures and needs to be replaced. There are also about 6,500 feet of asbestos cement, PVC, and cast iron pipe which while not failing presents other risks and should be replaced at a lower priority.
- ◆ *Hydraulic modeling* of the supply, storage and distribution network shows that:
 - The supply and distribution network can provide adequate *instantaneous* capacity for existing residential and commercial fire requirements with a few exceptions.
 - Fire suppression at a major establishment (such as the LFP Towne Center or LFP Elementary School) could excessively deplete reservoirs if the fire lasted longer than 2 hours. ISO guidelines require a minimum of 3 hours duration for such facilities. Infrastructure improvements have been identified in the CIP to remedy this deficiency.
 - Water aging analysis showed that 90% of the system contains water that is a maximum 120 hours or less.
- ◆ *PRV stations.* The District operates a total of 8 (eight) pressure reducing stations. One station (178th Street) is considered at end of service life and needs to be upgraded or replaced. A total of 8 (eight) additional PRV stations are proposed over the plan period to increase commercial fire flow capacity and improve network circulation.
- ◆ *Customer services.*
 - Service pressure at customer meters tends to be on the high side compared with Department of Health guidelines. *Average* pressure is 83 psi, *Maximum* 129 psi and *Minimum* 45 psi. WSDOH recommends a maximum service pressure of 80 psi and minimum 30 psi. The steep topography of the District and other factors justify using higher pressures and no change is recommended.
 - Meter replacements are ongoing

Part Four – Water Rights, Conservation and Reliability

Part Four summarizes the current status of District water rights. There is also discussion of water conservation measures which became part of the water rights discussion since 2003 Municipal Water Law. System reliability is also discussed. Some relevant details from Part Four are summarized here:

- ◆ Instantaneous Water rights total 973 gallons per minute and were recently amended to include all sources (wells) as additional points of withdrawal subject only to physical limitations. Annual withdrawal is projected to be 252 ac-ft/year ('2033) compared with existing water rights of over 1202 ac-ft/year.
- ◆ District adopted a water use efficiency program in 2010. Principal supply side goal is to reduce unaccounted for water which is largely caused by leaks in aging steel water mains. In recent years unaccounted water has averaged around 22%, which is more than double the statewide requirement of 10%. Demand side goal is a 1% reduction in ERU consumption over three years.
- ◆ The recent addition of Horizon View wellfield (2014) and completion of the SPU-Tolt intertie on 195th Street (2012) have greatly improved the District's water supply reliability. In addition the District has had an intertie with Northshore Utility District at the McKinnon Creek wellfield since the 1980's.

Part Five – Source Protection Program

LFPWD sources all its water from two wellfields and is required under state and federal law to implement a wellhead protection program. "Lake Forest Park aquifer" is in a comparatively well documented area with over 20 wells appearing in records. There was recent study of the aquifer during construction of the King County Brightwater tunnel. The LFP aquifer is formed by interconnected sand and gravel bodies flowing southward possibly from a Critical Recharge Area (CRA) in south Brier near Abbeyview pond where surface geology records suggest the sands and gravels of the aquifer extend to the surface. Thickness of the aquifer ranges from 40 to 150 feet and east-west width is about 1000 feet near 195th Street.

Susceptibility ratings by WSDOH have assessed the McKinnon Creek shallow artesian wells as "Highly Susceptible" while the McKinnon Creek deep wells are rated "Moderately Susceptible" and Horizon View wells are rated "Low Susceptibility"

A combined Well-Head Protection Area (WHPA) for the wellfields was created in this plan based on results of aquifer flow modeling for 10-year travel time as well as surface topography and geology. The result is a north-south rectangle approximately 8,000 feet in length and 3,000 feet wide. The southern limit is at the McKinnon Creek wellfield and the northern limit is believed to be in Brier near 236th Street, subject to further study.

Field surveys, and a search of historical records and hazardous materials databases reveal around 15 potential contaminant sources that are important including: NUD sewer in

McKinnon, surface runoff – especially near McKinnon Creek wellfield, abandoned wells, and private operations such as Abbeyview Cemetery in Brier.

Public meetings were held in December 2014 and April 2015 to discuss findings and gain input from the community. The District is working to clarify its control over the immediate area surrounding wells at McKinnon Creek wellfield and to address concerns over City of LFP plans to construct a public trail. Further investigation with the assistance of a professional geologist is needed to define the Critical Recharge Area (CRA) for the LFP aquifer which is believed to lie in the southern part of Brier. A review of contingency options suggests the District is relatively well equipped to continue to provide safe drinking water in the event of disruption or contamination at one of its wellfields.

Part Six – Operation and Maintenance Program

Part Six outlines the organization of the District and defines staff responsibilities and various operations functions during normal and emergency conditions. Other items include safety concerns, monitoring plan, customer complaint record, vulnerability assessment and operations improvement plan. Some notable information from this chapter includes:

- ◆ Organizational chart showing elected and hired staff titles and names
- ◆ Detailed breakdown of staff responsibilities
- ◆ Summary list of outside support entities critical to District
- ◆ Staff certifications
- ◆ Emergency response and safety call handling
- ◆ Emergency response and safety list developed; assessment of high-risk activities completed.
- ◆ Record keeping plan is developed for regulatory compliance.
- ◆ Customer complaints are summarized and average about 32 complaints/1000 customers per year
- ◆ Operation and maintenance improvements include:
 - Leak detection program improvements
 - Customer meter management
 - Annual maintenance of valves and fire hydrants / water main flushing
 - Distributed access maintenance records
 - Zone metering of flow and pressure

Part Seven – Construction Standards

Construction Standards are essential for internal projects as well as infrastructure projects carried out by others on behalf of the District. Developer extension policies are presented, as well as detailed construction contract specifications and standard detail drawings. Objective is to support a common standard with nearby water purveyors as much as possible while still retaining the flexibility needed for economical construction.

Part Eight – Capital Improvement Program

Part Eight outlines a schedule and budget for capital facility and administrative improvements that were identified in Part Three. This plan prioritizes replacement and upgrade of the existing, failing, leak prone steel and galvanized iron distribution mains which are beyond end of life and are experiencing increased failure rate. Some of the improvements planned here have been recommended in earlier studies. These include studies by the WSRB in 1968 and 1975, Comprehensive System Plans for the District in 1973, 1985, and 2005.

The capital improvement plan delineates four time windows:

TIME PERIOD	CAPITAL IMP. COSTS
1. Recent improvements 2004 – 2014	
2. Near term 2015 – 2020	\$2.419 Million
3. Intermediate 2021 – 2026	\$1.651 Million
4. Long term 2027 – 2034	\$3.443 Million

Total improvements over the 20-year period 2015 – 2034 are valued at \$7.5 million.

Projects in the near-term (2015 – 2020) scaled down and prioritized by their assessed urgency in order to normalize debt servicing costs over the entire planning window. Projects in the intermediate planning window (2021 – 2026) include some steel pipe replacement projects that show a lower failure rate. Long term projects (2027 – 2034) reflect other less urgent priorities such as replacing PVC, cast iron and asbestos cement pipe as well as projects that improve network reliability and circulation and those necessary to reach customers in LFPWD now served by NUD and NCWD.

Part Nine – Financial Plan

Part Nine first orients the reader to several important factors in financial and administrative planning at the District such as having a well water source, the failing steel piping, and lifespan of new ductile iron pipe. Next there is a rate review and revenue requirement analysis to ensure adequate funds to operate the District (as discussed in Part Six) and construct the improvements identified in Part Eight (Capital Improvement Plan). This concludes that increases to the District's Capital Improvement fee are needed to continue funding required improvements. There is also a rate comparison with other water utilities in the region and with regional consumer cost indices. Financial viability is discussed and figures are presented and compared with state government recommendations for cash reserves. In addition, there are calculations of System Development Charge (SDC) resulting in a system "buy-in" value of \$8,820,650 or \$8,727 per residential unit. Calculations of infrastructure "health" as required by GASB 34 are presented showing that the value of depreciable assets has increased to about \$12.5 Million over the past 20 years and will remain near this over the next 20 years as upgrades called for in the CIP are completed.