

Appendix Material

- Employment Appendix
- Housing Appendix
- Education and Child Care Appendix
- Transportation Appendix
- Land Use Appendix
- Public Safety Appendix
- **Utilities/Infrastructure Appendix**
- Health Care Appendix
- Social Services Appendix
- Quality of Life Appendix

Contents

- Utilities/Infrastructure Existing Conditions
Technical Memorandum
- Utilities/Infrastructure Needs Assessment
Technical Memorandum



Utilities and Infrastructure

Existing Conditions Technical Memorandum



Date: April 5, 2010
To: Utilities and Infrastructure Expert Panel Members
From: Chuck Linders, AECOM
Re: Existing Conditions for Utilities and Infrastructure within the JBLM Growth Coordination Study Area

INTRODUCTION

The Utilities and Infrastructure study for the Joint Base Lewis McChord (JBLM) Growth Coordination Plan will assess the impact of expected population and employment growth on the region's utilities and related infrastructure. The specific objectives of the study are to:

1. Examine the ability of existing utilities to meet the needs of their customers;
2. Address specific challenges faced by utilities in the study area; and
3. Identify utility capacity issues that exist.

When completed, the Utilities and Infrastructure study will focus on major issues, general recommendations, and community-specific solutions.

As part of the study, this technical memorandum characterizes the existing conditions of the major utilities and infrastructure systems located within the JBLM Growth Coordination study area. Utilities examined include water, wastewater, storm drainage, solid waste, natural gas, power, and telecommunications. This memo provides an overview of the existing conditions of utilities and infrastructure in the study area, focusing on the key issues that were identified with regard to utility service. Issues that require further review are also identified. This memo will be followed by a second

(the Utilities and Infrastructure Preliminary Needs Assessment Technical Memorandum) and a Draft Utilities and Infrastructure report section that will be included in the final Growth Coordination Plan at the end of 2010.

METHODOLOGY

The information collected and reviewed for this analysis included documents and maps provided by members of the Utilities and Infrastructure Expert Panel, publically available planning documents and other information, as well as through internet research. Valuable information was also obtained from interviews with representatives of public and private utilities.

The expert panel was established as part of the stakeholder engagement program developed to support the JBLM Growth Coordination Plan. The expert panel is made up of staff from the larger communities and utility providers within the study area and the JBLM. The panel has met several times to date, and panel members have provided valuable insight on the existing condition of their systems and on the challenges they face to meet the demands of their customers. To ensure the accuracy and relevance of this analysis, panel members have reviewed and commented on draft versions of this document. A list of the Utilities and Infrastructure Expert Panel members is provided at the end of this technical memorandum.

FINDINGS

Utilities within the JBLM study area are provided by a range of service providers, both public and private sector. These utility providers must continually plan for future expansion, improved service, and maintenance of their systems. Most utilities in the area surrounding JBLM have expanded over time to respond to population growth. Some of this expansion can be attributed to growth within JBLM, while some is a result of organic growth not related to the JBLM. **Table 1** below summarizes the major utility service providers that were identified within the study area.



Table 1
Major Utility Service Providers

Provider	Potable Water	Sanitary Sewer	Storm-Water	Solid Waste	Natural Gas	Power	Telecom
City of DuPont	X		X				
City of Lacey	X	X	X				
City of Lakewood			X				
City of Roy							
Spanaway							
City of Tacoma	X	X	X	X		X	
City of Yelm	X	X	X				
Comcast							X
JBLM	X	X	X				
Lakeview Light & Power						X	
Lakewood Water District	X						
Lemay Inc.				X			
Parkland Light & Water						X	
Pierce Co Public Works		X	X				
Puget Sound Energy					X	X	
Rainier View Co.	X						
Spanaway Water	X						
Summit Water & Supply	X						
Town of Steilacoom	X	X	X			X	

Potable Water

For potable water utility service, this analysis examines both supply and distribution. In general, water supplies across the study area are adequate; however some providers lack sufficient groundwater rights to meet their demands and must purchase some or all of the water they need to meet demands. Still other water suppliers have such limited water supplies that moratoriums on new connections have been made. Tacoma Water, a major supplier within the study area, produces water from both surface water



and groundwater sources; however, the majority of the demand within the study area is met utilizing groundwater sources.

Regulatory Framework

Washington law (RCW 70.119A.020) defines a public water system as any water system except for that which serves a single-family residence or a water system with four or fewer connections, all of which serve residences on the same farm. Under state law, public water systems range from a few homes sharing a well to utilities that deliver millions of gallons of water each day.

The Washington Administrative Code (WAC) 246-290 classifies Group A public water systems as those serving 15 or more households or equivalent, businesses with 25 or more customers per day, or facilities such as schools that serve 25 or more people per day.

WAC 246-291 classifies Group B public water systems as those serving 14 or fewer households or equivalent, or very small businesses with fewer than 25 customers per day.

Water Supply

Adequate potable water supplies are essential to support both existing and future development. To meet demand, a constant, reliable source of high quality water is needed. Approximately 62 water providers are located within the JBLM study area; however, a handful of these suppliers produce water for the majority of the population in the study area.

The largest suppliers, shown in **Table 2** below, are located in the more densely populated north portion of the study area. These include Tacoma Water, Lakewood Water District, Parkland Light and Water, Summit Water and Supply, Spanaway Water System, and the cities of Puyallup, DuPont, and Steilacoom.

In the densely populated areas of the northern portion of the study area, the numerous interties between providers' pipe networks allow access to adequate water supply for new service connections as development occurs. Interties also provide supply redundancy to these providers. **Figure 1** and **Figure 2** (presented at the end of this memo) show the location of the larger water systems in the study area.

Table 2
Largest Group A Water Suppliers in the
JBLM Growth Coordination Study Area*

Water System Name	No. of Connections	Population
Tacoma Water	131,255	311,500
Lakewood Water District	28,009	69,705
City of Puyallup	14,640	34,030
Parkland Light and Water	11,120	25,050
Summit Water and Supply	4,448	13,370
Spanaway Water Company	9,495	22,948
Ft. Lewis Cantonment (JBLM)	8,163	13,000
City of DuPont	3,350	7,650
Town of Steilacoom	2,264	6,220

*Source: Washington State Department of Health (website).

The Green River supplies most of the drinking water for Tacoma Water (Tacoma Public Utilities website). Two Water Diversion water rights supply up to 138 million gallons of water daily (MGD) to the water system. This water flows by gravity to Tacoma, minimizing expensive pumping costs. Tacoma Water supplements its Green River supply with groundwater from more than 20 wells located in Tacoma and central Pierce county.

For most of the small communities in the study area, water is supplied by small water providers, with many water systems serving only one or two properties. The source water for almost all of the water systems in the south is from groundwater production wells. The communities of Yelm, Roy, and Lacey are located in this less densely populated portion of the study area. These communities are relatively isolated, and interties with neighboring water providers are less feasible due to the large distances between systems, making it impossible to purchase water from outside sources. Providers in the southern area must rely on their own water rights to meet demand in their service areas. Insufficient water rights can constrain development if water demands exceed the supply provided via the water rights.

Water Rights

Water rights are one the most difficult issues facing water providers in the study area. Insufficient water rights pose a significant barrier to providing an adequate water supply to support population growth and future development. Water rights are required to withdraw waters of Washington State for beneficial uses, including municipal water supply.

The Washington State Department of Ecology (Ecology) describes water rights as follows:

“The waters of Washington State collectively belong to the public and cannot be owned by any one individual or group. Instead, individuals or groups may be granted rights to use them. A water right is a legal authorization to use a predefined quantity of public water for a designated purpose. This purpose must qualify as a beneficial use. Beneficial use involves the application of a reasonable quantity of water to a non-wasteful use, such as irrigation, domestic water supply, or power generation, to name a few. An average household uses about 300 gallons of water per day. State law requires certain users of public waters to receive approval from the state prior to using water - in the form of a water right permit or certificate.”

Water rights in western Washington, an area long thought to have a sufficient water supply, have become increasingly significant as water supplies have dwindled, and the inter-relationship among water quantity and use, water quality, land use planning and development regulations, and habitat for fish and wildlife has gained recognition. These competing interests for water supplies can and do affect the ability of some water providers in the JBLM study area to support future development.

The Revised Code of Washington (RCW) 90.44.050 legislates that a permit (i.e., permitted groundwater right) is required to withdraw public groundwater of the state. However, an exemption to RCW 90.44.050 allows “for single or group domestic uses in an amount not exceeding five thousand gallons a day” to withdraw groundwater without a permit. This exemption has allowed the development of small groups of homes that withdraw water without a permit. Such development is considered by some as working against the intent of the Growth Management Act (GMA), which directs growth to urbanized areas where public services and utilities are more readily provided. Typically, these areas include existing incorporated areas, unincorporated urban growth areas (UGAs), and limited areas of more intense rural development.

In 1997, the Washington State Attorney General (AG) issued a formal opinion on water rights and water withdrawals that are exempt from permits. In response to questions relative to the administration of RCW 90.44.050 posed by Ecology and the Department of Health, the AG noted that a broad reading of the exemption provision would “significantly increase the size of the ‘exempt’ sector of appropriated groundwater and would encourage the drilling of multiple wells...precisely to escape the permit application requirement.” Therefore, the AG stated that “where water is withdrawn by a property owner for a single housing development, within a reasonable short period of time, a single ‘withdrawal’ occurs for purposes of applying RCW 90.44.050...” As stated above, the exempt withdrawal threshold by law is set at 5,000 gallons per day (gpd); the AG synopsis clarifies that a project with numerous wells is in fact a single withdrawal when each well pumps less than 5,000 gpd but where together the wells pump more than 5,000 gpd.

Thurston County Deputy Prosecutor Jeffrey Myers explained in a writing that the AG opinion referenced above affects development proposals that use a well configuration commonly referred as a “six pack,” where six homes are connected to a single well. Because Department of Health standards allocate 800 gpd per connection, the total withdrawal of a “six pack” represents a withdrawal of only 4,800 gpd. Because this is less than the 5,000 gpd legal threshold, a “six pack” would remain exempt. Myers pointed out two critical interpretive points: (1) If withdrawals are made independently by different persons, a project may circumvent the requirement by leaving well-drilling responsibility to individual purchasers of lots; and (2) If a development is phased over a long period of time, it may circumvent the requirement because no guidance is offered on the time period.

This situation appeals to developers, who prefer to remain exempt from permitting to avoid the cost, time, and process of obtaining water rights. A proliferation of such “six pack” developments can contribute to drawing down an aquifer that is intended to serve a larger population over a longer period of time. Areas intended to serve a future urban land use that had planned to draw on the same aquifer could find they are unable to secure the water rights that are necessary to support that growth (pers. comm., Deborah Johnson 2010).

City of Lacey

With several pending water rights applications, the City of Lacey has invested considerable resources in the form of staff time, legal fees, and studies to support these applications. The city has entered into a “cost recovery agreement” with Ecology to process some of the pending applications. Costs associated with securing additional water rights have become a significant portion of the city water utility’s budget. Recent growth has made this an urgent matter and has led to the restriction of new service connections in areas within the UGA, but outside of the city limits. Additional water rights are needed to support future growth.

Lacey produced a Comprehensive Water Rights Mitigation Plan (CWRMP) in September 2008, which prioritized 11 water rights applications then on file with Ecology intended to provide sufficient quantities of water to meet projected demand for future build-out of Lacey’s UGA at urban densities. The two highest-priority applications would enable Lacey to continue to allow development just within its current city limits. Together with the next two highest-priority applications, issuance of these permits would enable Lacey to begin implementing mitigation actions immediately to support sufficient water supply to serve projected growth on a 20-year horizon. Approval of additional applications would round out the Lacey water rights portfolio and provide assurance for future water supply to serve a fully built-out UGA and to enable the city to plan financially for subsequent actions requiring significant study, planning, and funding. The CWRMP emphasized that the city’s 2008 portfolio was sufficient to meet projected demand only through 2009, “although supplies could be stretched to supply additional connections through 2010.” The CWRMP is still pending before Ecology.

A de facto moratorium is in place in Lacey that has slowed growth in the UGA as the city waits for Ecology’s approval of its CWRMP. However, the City of Lacey notes that developers who are not willing to wait for the city to secure water rights are arranging to supply their projects from exempt wells,

which will be the most readily available supply source in some areas if the city cannot provide water within the UGA due to water rights limitations. At the same time, the use of exempt wells is not consistent with the Coordinated Water System Plan for North Thurston County or the Nisqually Watershed Management Plan (Ecology and the Nisqually Indian Tribe 2003). The latter finds that reducing the proliferation of exempt wells and relying, instead, on regional water supplies helps to direct projected growth to urban areas.

City of Yelm

The City of Yelm requires additional water rights to meet future demand. Groundwater is the sole source of the city's water supply. The city's *Draft Water System Plan* states that "anticipated future water demands could exceed the City's water rights by 2012" (City of Yelm 2009). The city has applied to Ecology for additional water rights to supplement the rights it currently holds. Until additional rights are secured, the city may not be able to meet future demands, a situation that can hinder further development.

City of Roy

The City of Roy is currently facing serious water limitations and needs to acquire additional water rights to increase its groundwater supply. The city administration is currently facing the challenging task of determining how to best secure new rights with very limited funds. No new connections to the system are currently allowed.

JBLM Supply

Water is supplied on JBLM via groundwater production wells. The base Public Works Department reports that supply is adequate to meet both current and future demands.

Water Distribution

Drinking water throughout the study area is conveyed through a network of distribution pipes and pumps. Water is stored in reservoirs to provide adequate pressure and meet the variable demands that occur throughout the day, and to meet fire flow demands. As the condition of water facilities deteriorates with age, all water suppliers must replace facilities before they reach the end of their useful life. All water providers face the challenges of generating adequate revenue to systematically replace aging infrastructure. The providers interviewed stated that their distribution and storage systems were generally adequate to meet current demands. There are, however, isolated areas of low residual pressure when fire flows are provided.

JBLM Distribution

The water distribution system at JBLM was not studied as part of this analysis. The system is known to be aging and, as with all distribution systems, upgrades will likely be required; however, the extent and timing of any necessary system improvements are not known. The JBLM Public Works Department reports that there is a need for additional water storage on base.

Reclaimed Water

Reclaimed water is high quality wastewater produced from advanced sewage treatment processes. Throughout the western states, including western Washington and within the JBLM study area, reclaimed water is increasingly being used to supplement inadequate surface and groundwater supplies.



In Washington, reclaimed water must meet Class A standards, which define the required level of treatment for its use. Reclaimed water is suitable for non-potable uses such as landscape, parks, and golf course irrigation. Other common uses include agriculture, industrial cooling, toilet flushing, street sweeping, constructed wetlands, and aquifer recharge. Reclaimed water is not suitable for drinking or direct contact such as bathing. Using reclaimed water for non-potable uses frees up higher quality water for potable uses.

Facilities that treat wastewater to Class A standards are unique and relatively expensive. With the development of new treatment technologies, however, the cost of new facilities is becoming more affordable. Ecology has currently permitted 14 Class A treatment facilities in the state, nine of which are located in western Washington. Two of these facilities are located within the JBLM study area.

The recently constructed Hawks Prairie Satellite plant (owned by the LOTT Alliance [i.e., Lacey, Olympia, Thurston County and Tumwater]) located in Lacey produces reclaimed water for landscape irrigation and groundwater recharge. The City of Yelm also has an active reclaimed water program; the Yelm facility is able to utilize all of the treated water it produces. Yelm uses this water for irrigation, vehicle washing, constructed water features, and for wetland and groundwater recharge. The City of Yelm planned for and constructed the reclaimed water facility in response to the following challenges and conditions, many of which are shared by other communities in the study area:

- Rapid growth
- Limited water resources
- Permit restrictions on discharge to Centralia Power Canal/Nisqually River
- Environmental responsibility

Future reclaimed water treatment facilities are also being planned by Pierce County Public Works for the Chambers Creek Regional Wastewater Treatment Plant (WWTP) and are under consideration at JBLM.

Sanitary Sewer

Centralized and Decentralized Wastewater Treatment

The densely populated portions of the study area are served by centralized public wastewater utilities (see **Figure 3**). These centralized wastewater systems collect, convey, treat, and dispose of wastewater via a network of pipes, pumps, treatment plants, and discharge facilities. Pierce County Public Works is the largest wastewater service provider in the study area, serving the entire northern portion of the study area. The City of Tacoma owns and operates a significantly large system; however, only a relatively small portion of their system falls within the study area. The JBLM operates its own collection and treatment facilities, as do Yelm, the LOTT Alliance, and Puyallup.



The remaining rural areas of the study area, including the City of Roy, are served in a decentralized manner utilizing on-site septic systems, which typically discharge to the ground. Treatment is provided in two stages, first by gravity separation via detention in a storage/septic tank; additional treatment allows contact between the discharged wastewater and the soil. On-site septic systems are successfully used throughout the country. In its 1997 Report to Congress, the U.S. Environmental Protection Agency (EPA) concluded that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas."(EPA website-a).



The Pierce County Public Works sewer utility is structured as an enterprise fund, which operates similar to a business where customers receive a service in return for a fee. The Pierce County Comprehensive Plan (Pierce County 2009) directs that sewer service be provided almost exclusively to urban areas. However, prior to the implementation of GMA, the county sewer system had already been extended well into what is designated today as rural area. Today's system

includes existing service connections, prior binding service agreements, and locations where on-site systems have failed. This urban level of service has supported additional growth in rural portions of Pierce County as well as the urban area. As a result, existing sewer service is adequate to meet existing needs in portions of the study area served by the Pierce County Public Works system.

The eastern portion of Lacey's service area (synonymous with Lacey's UGA) falls within the JBLM study area. The City of Lacey Public Works Department operates a traditional gravity collection system and a Septic Tank Effluent System (STEP), both of which connect to the LOTT system for subsequent treatment. New homes and businesses constructed within Lacey's UGA are required to connect to the municipal sewer system if sewage from the new structure originates within 200 feet of an existing sewer main. In outlying areas, new residential developments have been connecting to the sewer system using

STEP systems. Large tracts of rural land in Thurston County and isolated single-family homes continue to rely on individual on-site septic systems.

Similar to Lacey's 200-foot rule, Pierce County only requires properties to connect to the sanitary sewer system if the property is within 300 feet of an existing sewer line AND (1) if there has been a septic failure in the past, or (2) new development is constructed on the property.

The population sizes of Yelm and Roy could also support wastewater collection and treatment facilities. Yelm recently upgraded its wastewater treatment plant. It is now capable of producing up to one million gpd of Class A reclaimed water and has a reuse system capable of using 100 percent of the water generated by the plant (City of Yelm website). All of the sewage generated within the city limits is conveyed to the treatment plant utilizing STEP systems, similar to Lacey.

The City of Roy does not currently have a centralized wastewater system. Homes and businesses are served by individual on-site septic systems. As described above, on-site septic systems are common in the U.S. In 2007, an estimated 20 percent of total U.S. housing units was served by septic systems (EPA Undated). Soil type plays an important role in the successful treatment of septic tank effluent. The soils in the vicinity of Roy were formed by the retreat of glaciers. These highly permeable glacial outwash soils are comprised of sand and gravel that were carried by running water from the melting glacial ice and laid down in stratified deposits. As a result, the contact time for wastewater discharged into such well-draining soils can be insufficient to provide adequate treatment, which creates a risk of contaminating groundwater.

In the unincorporated rural areas of the southern portion of the study area, homes and businesses are served almost exclusively by individual on-site septic systems. Further review of the impact of septic systems on groundwater quality should be conducted.

JBLM

JBLM owns, operates, and maintains its own wastewater collection, conveyance, treatment, and discharge facilities. Wastewater generated within JBLM, including Madigan Hospital and the former McChord AFB and Fort Lewis, is conveyed to the Tatsolo Point WWTP (identified as Solo Point in the National Pollutant Discharge Elimination System [NPDES] permit), treated, and discharged to Puget Sound. The *Fort Lewis Wastewater Feasibility Study*, dated July 2009, was prepared to determine recommendations concerning future sewer improvements and wastewater treatment needs at (then) Fort Lewis. The analysis concluded that the treatment plant has an overall remaining service life of around 5 to 7 years, based on an evaluation of critical treatment processes.

The study also evaluated several alternatives to treat wastewater at JBLM, such as conveying wastewater to an off-base treatment facility (the Chambers Creek Regional WWTP), upgrading the existing plant at Tatsolo Point, reclaimed water reuse, and replacing the existing plant with a new facility.

The study made the following recommendations:

- Proceed with securing funding for a membrane bioreactor (MBR) treatment system as the preferred alternative for future wastewater treatment.
- Begin negotiations with Pierce County for the county to construct, own, and operate the new treatment system.
- Implement short-term improvements to the existing wastewater treatment plant that will allow JBLM to successfully operate the existing plant until construction of the new facility is completed.

Since the study was prepared, the negotiations with Pierce County have not produced an agreement and may have been concluded. Short-term improvements to the wastewater treatment plant are currently under construction.

Treatment Facilities within the Study Area

The NPDES permit program controls water pollution by regulating industrial, municipal, and other facilities that discharge pollutants into waters of the United States (EPA



website-b). In Washington, the discharge of wastewater requires an NPDES permit from Ecology. As listed in **Table 3**, four permitted wastewater treatment facilities are located within the study area.

Table 3
Treatment Facilities within the Study Area

Treatment Plant	Location	Owner
Chambers Creek Regional Wastewater Treatment Plant	University Place	Pierce County Public Works & Utilities
Hawks Prairie Reclaimed Water Satellite	Lacey	LOTT Alliance
Tatsolo Point Wastewater Treatment Plant	Tatsolo Point	JBLM
Yelm Reclaimed Water Facility	Yelm	City of Yelm

Stormwater

Stormwater and drainage services throughout the study area are comprised of ditches, swales, conveyance pipes, and retention and detention facilities. Drainage facilities are provided to control flooding and to protect water quality in rivers, streams, and Puget Sound, as well as to protect wildlife habitat. Drainage facilities within incorporated areas are owned and maintained by each municipality. The cities of Tacoma, Lakewood, Lacey, Puyallup, DuPont, and Steilacoom and Pierce and Thurston counties each own and maintain extensive surface water management systems.



Solid Waste and Recycling

Thurston and Pierce counties both plan and manage comprehensive solid waste programs, carefully managing the amount of garbage sent to landfills. Household recycling, hazardous waste disposal, and yard waste recycling programs have been implemented in both counties to reduce the volume of garbage that is hauled to landfills.

Garbage and recycling collection and disposal are provided by LeMay, Inc. which operates a family of companies that includes Harold LeMay Enterprises, Inc., Pacific Disposal Inc., and Lakewood Refuse, Inc. These businesses serve all of the JBLM study area, with the exception of the area within the City of Tacoma corporate boundaries.

LeMay disposes of solid waste at Pierce County's landfill located near the town of Graham. Recycling is brought to a recycling center located in Fredrickson for processing. Both facilities are in good condition and have adequate capacity to meet existing and near future demands. Growth at JBLM is not expected to significantly affect the area's solid waste programs (pers. comm., Schooler 2010).

Natural Gas

Natural gas service within the study area is provided by Puget Sound Energy (PSE). A network of pumping facilities and pipelines delivers natural gas to PSE customers. Adequate supplies are currently available to meet existing demands. Growth at JBLM is not expected to adversely impact this condition (pers. comm., Nomensen 2010).

Power

Electrical service is provided to the study area by Tacoma Power, Lakeview Light and Power, Parkland Light and Water, PSE, and the Town of Steilacoom. Representatives from Tacoma Power and PSE attended the expert panel meetings and indicated that they both have sufficient power available and adequate distribution systems with capacity for future development. Growth at JBLM is not expected to adversely impact this condition (pers. comm., Nomensen, 2010).

Telecommunications

Telecommunications in the study area were not studied in depth. An extensive network of telecommunication providers offers a variety of wired and wireless systems for voice and data, internet, and video services. The larger carriers are AT&T and Comcast, Inc. Growth at JBLM is not expected to adversely impact this condition.

SUMMARY OF EXISTING CONDITIONS FOR UTILITIES AND INFRASTRUCTURE

The key findings of this analysis are as follows:

- **Groundwater and Water Rights:** Groundwater is the primary source of drinking water in both Pierce and Thurston counties within the study area. Inadequate groundwater rights for some water systems are limiting residential and commercial development. The larger communities in the east and southern portions of the JBLM study area are particularly impacted. The cities of Lacey and Roy have imposed a moratorium on new connections. In isolated locations, water system interties with other water suppliers have not been feasible to construct. This in turn leaves these communities with inadequate water supplies to support new development.
- **“Six-Pack” Exemptions:** An exemption provision of RCW 90.44.050 allows single groundwater withdrawals of less than 5,000 gpd without requiring the acquisition of water rights. This provision can encourage the drilling of single wells, precisely to avoid the permit application requirements. If the wells are drilled independently by different persons, yet grouped together to serve a large number of homes, a project can circumvent the water rights requirement. This situation appeals to developers, who prefer to remain exempt from permitting to avoid the cost, time, and process of obtaining water rights. A proliferation of “six pack” developments can contribute to drawing down an aquifer that is intended to serve a larger population over a longer period of time. Areas intended to serve a future urban land use that had planned to draw on the same aquifer could find they are unable to secure the water rights that are necessary to support that growth.
- **Wastewater Service:** The majority of the urban and suburban areas within the study area, including JBLM, are served by centralized wastewater facilities. Rural areas and areas with low population density are served in a decentralized manner with individual on-site wastewater systems and a relative few community on-site wastewater systems. A proliferation of failed septic systems could increase the potential for groundwater contamination. Further review of the impact of septic systems on groundwater quality should be conducted.

Opportunities with the potential to provide regional benefits to utility providers include the following:

- Utilities are frequently required to secure new capital funds or redirect approved capital funds to relocate utilities or construct new facilities in coordination with new transportation projects. Too often, the transportation and utility programs are not well coordinated, requiring the expenditure of utility capital funds in a reactive manner. Such programs could be better coordinated.
- The cost of water and sewer service directly affects the ability to create affordable housing. Methods should be developed to offset the costs for off-site and on-site facility installations and to pay connection charges. Existing ratepayers should not be held responsible for these costs.

- Securing new groundwater rights is very costly and time consuming, which is particularly difficult for small communities even if sufficient supplies are available. Increased cooperation among neighboring agencies and communities could facilitate the joint sharing of the cost to identify new water sources or secure new rights, as well as evaluating the potential for interties between existing systems.

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ACKNOWLEDGEMENTS

The following people provided information or contributed directly to the development of this analysis.

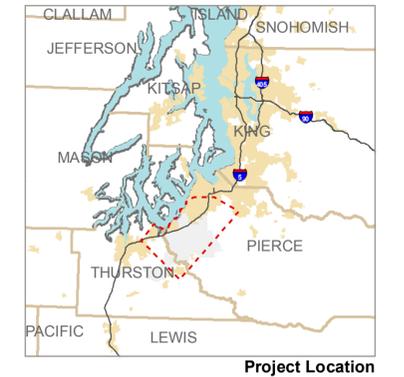
JBLM Utilities and Infrastructure Expert Panel Members		
Name	Title	Agency/Organization
Randy Black	General Manager	Lakewood Water District
Vince Bozick	Community Planner	McChord AFB CES
Christie Butler	Exec Asst to GM, Human Resources Officer/Payroll	Lakewood Water District
Jim Curley	Military Customers Account Executive; Power Mgmt	Tacoma Power
Mark Hadman	Operations Supervisor	Lakeview Light & Power
Randy Hanna	Deputy Director	Fort Lewis Public Works
Hans Hechtman	Government Affairs Manager	Comcast
Gaylord Higa	Deputy Base Civil Engineer	McChord AFB
Kip Julin	Strategic Planning & Assets Mgr	Pierce County Public Works & Utilities
John Kirner	Water Superintendent	Tacoma Water
Brandon McAllister	Public Works, Water Resources Div.	City of Lacey
Travis Metcalfe	Power Analyst in Power Management	Tacoma Power
Gary Nomensen	Government/Community Relations Manager	Puget Sound Energy
Jim Parvey	Public Works Assistant Director	City of Tacoma
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Stephanie Smith	62nd Civil Engineering Squadron	McChord AFB CES
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Greg Vigoren	Surface Water Division Manager	City of Lakewood

FIGURES

Figure 1: Group A Water Providers – Study Area North

Figure 2: Group A Water Providers – Study Area South

Figure 3: Areas Currently Served By Centralized Wastewater Utilities



- WATER SERVICE AREAS**
- LAKEWOOD WATER DISTRICT
 - WESTERN STATE HOSPITAL
 - SUMMIT WATER AND SUPPLY COMPANY
 - TOWN OF STELLACOOM
 - TACOMA WATER DIVISION
 - PARKLAND LIGHT AND WATER COMPANY
 - SPANAWAY WATER COMPANY
 - RAINIER VIEW WATER COMPANY-SOUTHWOOD
 - FIRCREST
 - ABITIBI CONSOLIDATED WATER SYSTEM
 - CITY OF FIFE
 - CITY OF MILTON
 - CITY OF PUYALLUP
 - FRUITLAND MUTUAL WATER COMPANY
 - CURRAN ROAD MUTUAL WATER
 - VALLEY WATER DISTRICT
 - CITY OF SUMNER
 - MOUNTAIN VIEW-EDGEWOOD WATER COMPANY
 - FIRGROVE MUTUAL
 - ALDERWOOD ESTATES
 - CITY OF BONNEY LAKE
 - LAKEWOOD RETAIL WATER SERVICE AREA BOUNDARY
 - LAKEWOOD WHOLESALE WATER SERVICE AREA BOUNDARY

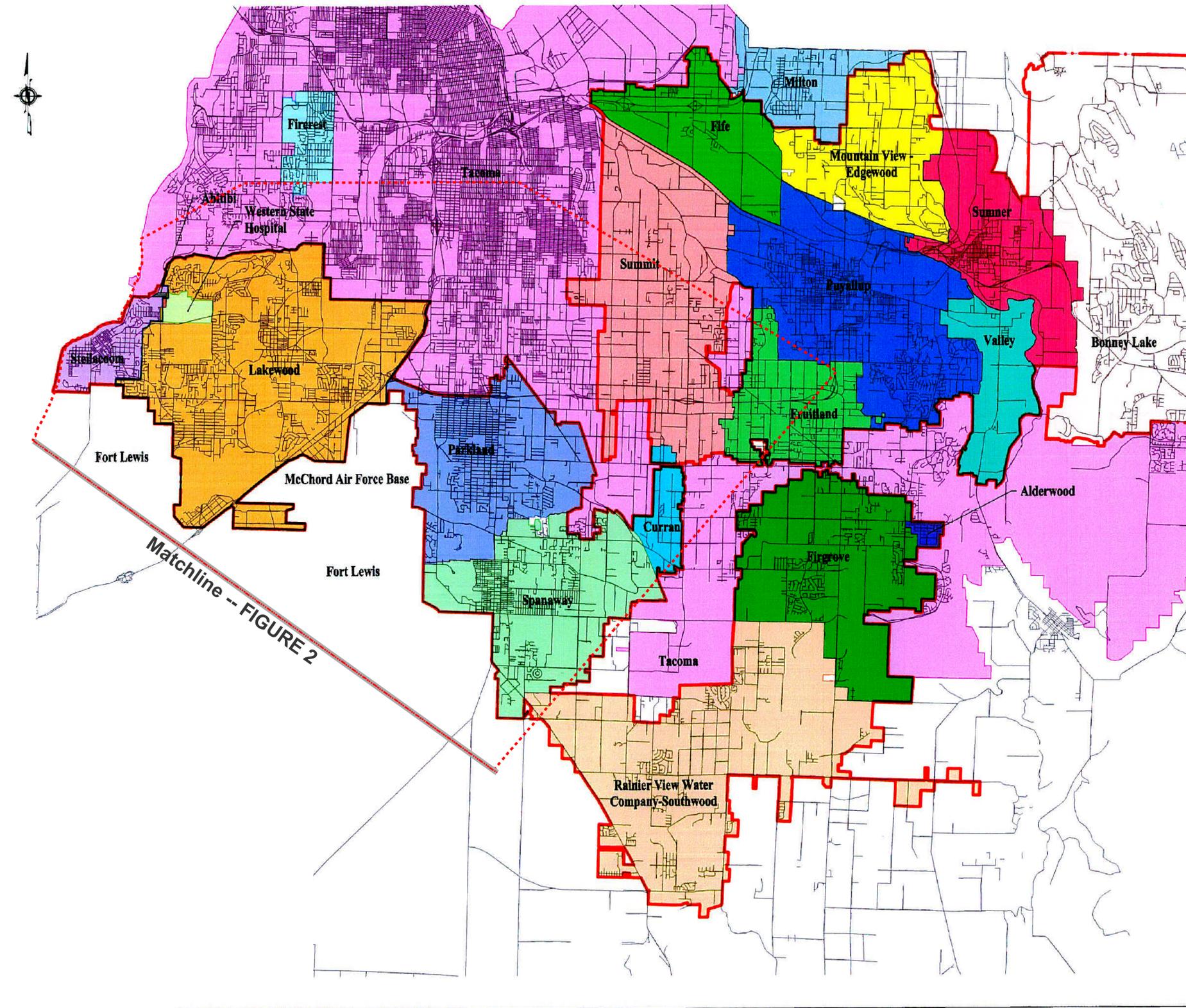
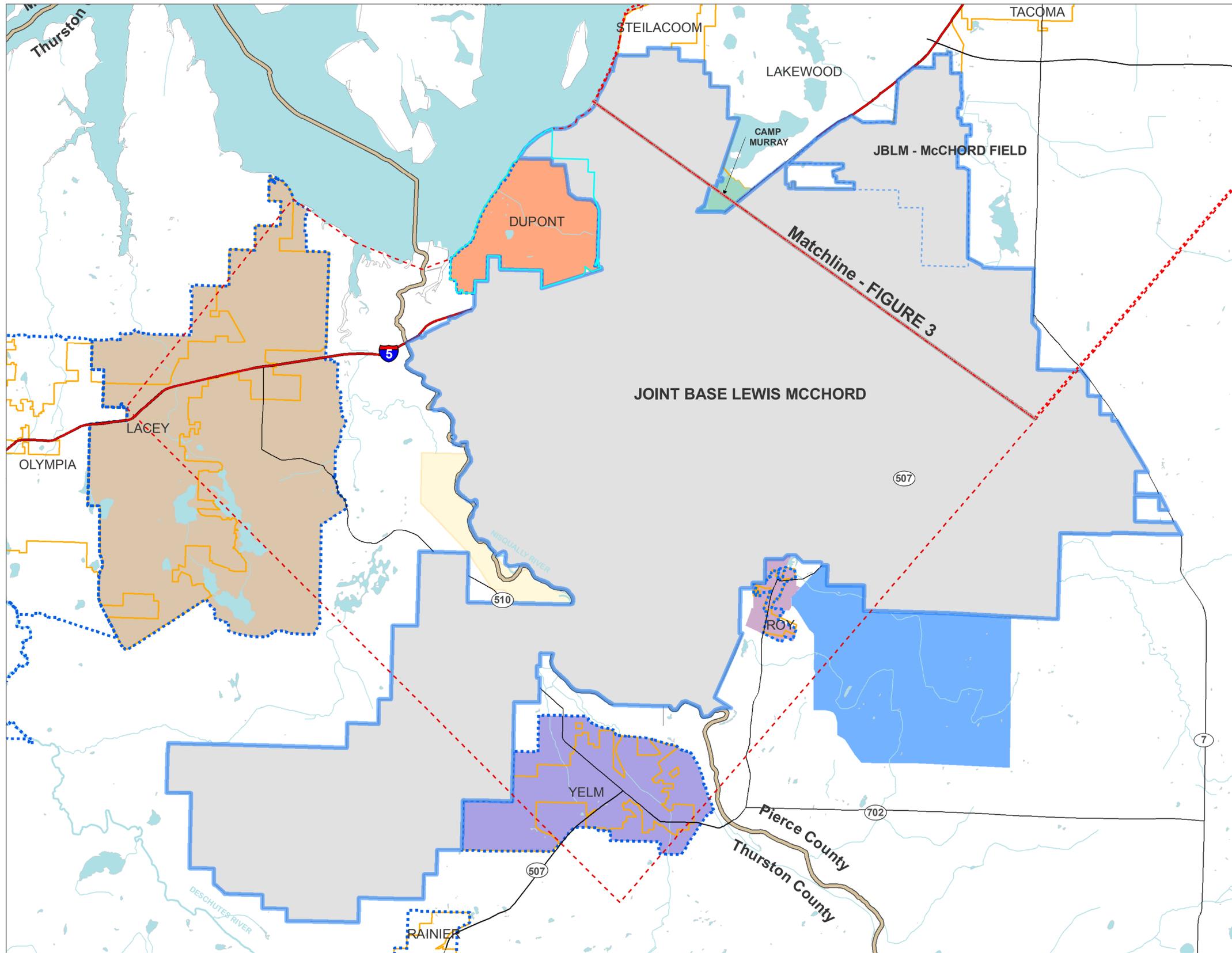
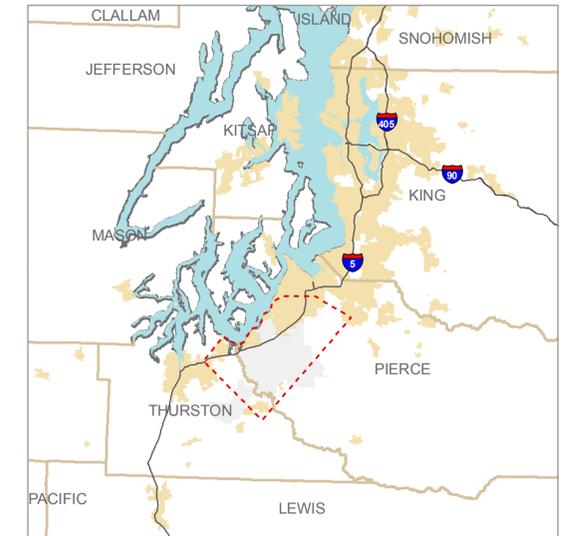


FIGURE 1 - Group A Water Providers - Study Area North



JBLM_WaterProviders_South_2010Apr06_22x34.mxd (Howard)

AECOM



Project Location

LEGEND

- Project Study Area
- City Limits
- Urban Growth Area Boundary
- County Boundaries
- Tribal Lands
- JBLM Installation Boundary
- Camp Murray National Guard
- Interstates
- Highways & Major Roads
- Water Bodies
- Rivers & Streams
- Service Areas**
- City of Lacey
- City of Yelm
- City of Dupont
- City of Roy
- Lacamas Farmsteads Water System

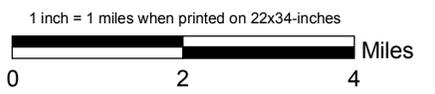
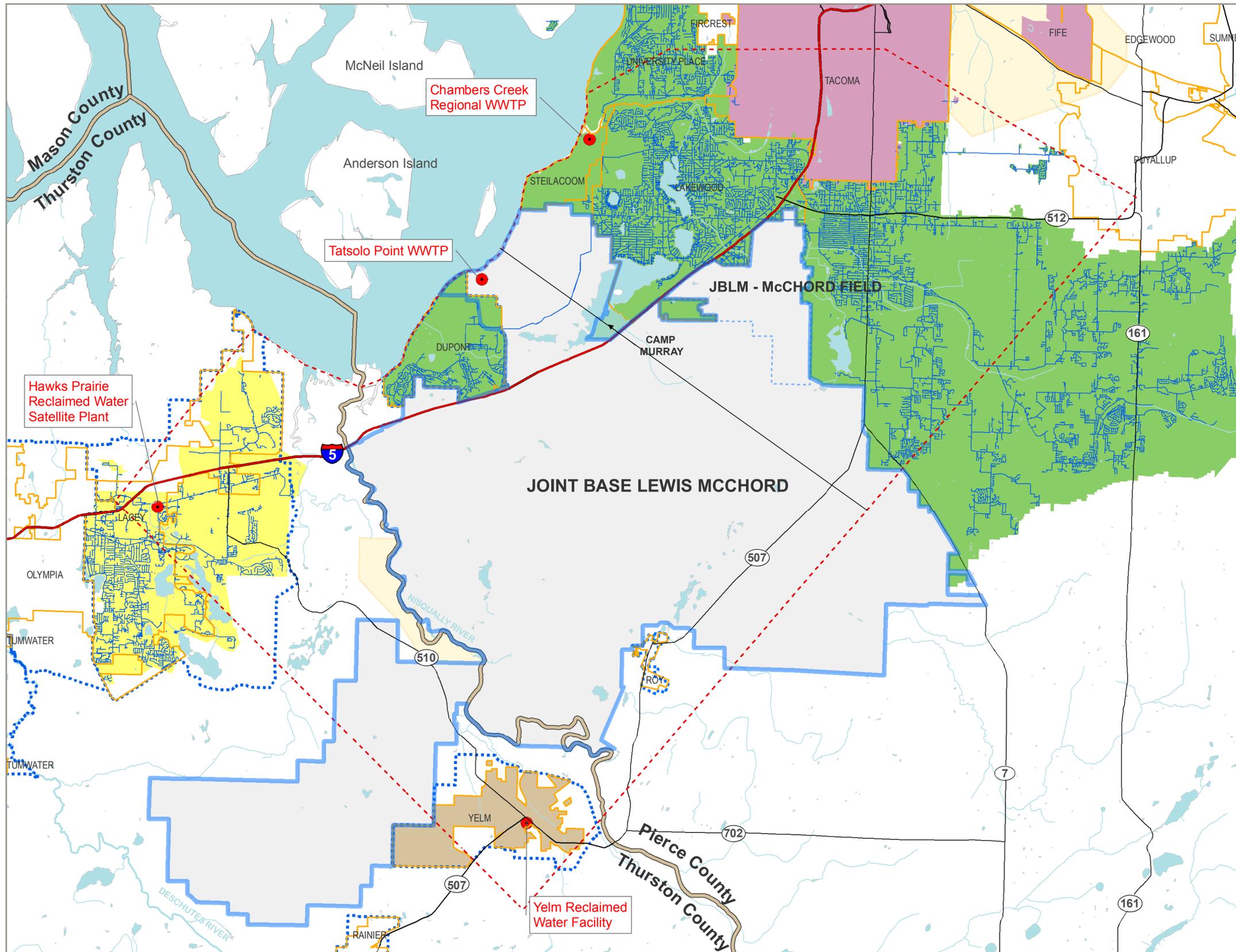


FIGURE 2 - Group A Water Providers - Study Area South



AECOM



Legend

- - - Project Study Area
- City Limits
- Urban Growth Area Boundary
- Tribal Lands
- JBLM Installation Boundary
- Camp Murray National Guard
- Wastewater Treatment Facilities
- ~ Sewer Lines
- Areas served by Pierce County Public Works & Utilities
- Areas served by City of Tacoma
- Areas served by City of Yelm
- Areas served by City of Lacey
- Areas served by JBLM
- ↔ Interstates
- ↔ Highways & Major Roads
- ~ Water Bodies
- ~ Rivers & Streams

Sources: Pierce County 2010, Lacey 2010, AECOM Seattle 2010

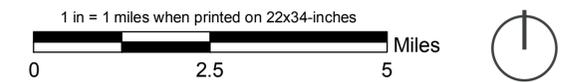


FIGURE 3 - Areas Currently Served by Centralized Wastewater Utilities

Utilities and Infrastructure

DRAFT Needs Assessment Technical Memorandum



Date: May 26, 2010
To: Utilities and Infrastructure Expert Panel Members: Randy Black, Vince Bozick, Christie Butler, Jim Curley, Mark Hadman, Randy Hanna, Hans Hechtman, Gaylord Higa, Kip Julin, John Kirner, Brandon McAllister, Travis Metcalfe, Gary Nomensen, Jim Parvey, Dan Schooler, Thomas Sena, Stephanie Smith, Stephen Standley, Greg Vigoren
From: Chuck Linders, AECOM
Re: Sector Needs Assessment of the JBLM Growth Coordination Plan

INTRODUCTION

This technical memorandum is the second in a series of three Utilities and Infrastructure studies prepared as part of the development of the Joint Base Lewis-McChord (JBLM) Growth Coordination Plan to be completed December 2010. The first study, the Utilities and Infrastructure Existing Conditions Technical Memorandum, was issued on April 5, 2010 for the Utilities and Infrastructure Expert Panel, Growth Coordination Committee, and Regional Steering Committee to review and provide the consultant team with feedback. The stakeholders engaged in this process had the following input on the Utilities and Infrastructure Existing Conditions Technical Memo:



- During the April 9, 2010 Growth Coordinating Committee meeting a comment was made that the analysis, and especially the summary, appears to be heavily focused on water, with other utilities not as well studied. A stakeholder present at the meeting noted that other utilities were analyzed in the full technical memo, but that all of the

key issues identified were related to water use, so the summary document reflects these findings. It was also noted that growth and development are contingent upon the availability of water.

- A stakeholder questioned whether there is additional information to be shared about where the groundwater is being extracted (i.e., is it being extracted from a sole source aquifer)?
- Water right issues are in the court system at present and allocation could change within the next 5-years. However, it should be noted that for this study, which has a 5-year planning horizon, we are working within the current water right allocation system.
- Smaller communities, such as Roy, lack the planning resources available to the larger communities in the study area.
- The analysis should reflect the numerous factors beyond our control that affect water supply, such as variability in rainfall/snowpack (short term) and climate change (long term).
- Solid waste capacity is fine in the short term, as noted in the analysis; however the county landfill will eventually reach capacity. Despite the short-term planning horizon, the analysis could reflect the region's long-term needs.

This feedback is considered in the needs and potential opportunities of Utilities and Infrastructure and will be carried forward in the final study, which will be issued in September as a draft section of the JBLM Growth Coordination Plan.

NEEDS ASSESSMENT METHODOLOGY

Information used for the Needs Assessment analysis was gathered from informational interviews, telephone conversations and email communication with the Utilities and Infrastructure Expert Panel, and from meeting summary notes from the Growth Coordination Committee meeting held on April 9, 2010.



NEEDS ASSESSMENT

Utilities within the JBLM study area are provided by a wide range of utility providers, both public and private. As discussed in the Utilities and Infrastructure Existing Conditions Technical Memorandum, these utility providers must continually plan for future expansions, for improved service and for maintenance of their systems. In order to meet the needs of a growing population and economy and to adequately plan for its future needs, each utility must envision the demands that will be placed on their supply and distribution systems in the foreseeable future.



Future demand increases are typically a function of population growth. Within the JBLM study area, this growth will be derived from an increase in residential population, increased employment population and from military staff and their families that choose to live off-base or use goods, services and utilities located off-base.

Many of the key issues identified in the Utilities and Infrastructure Existing Conditions Technical Memorandum and in subsequent discussions in preparation of this Needs Assessment are related to water use. As a result, much of the discussion in this document focuses on regional and local needs in regard to water supply, treatment, use, and discharge issues. The following section provides a description of the utility and infrastructure needs that were identified in the study area. Due to the extensive number of utility providers and associated infrastructure located in the study area, a comprehensive list of all planned capital improvement projects is beyond the scope of this study. Rather, a discussion addressing utility needs within the study area is provided.

Potable Water Supply & Water Rights Needs Assessment / Opportunities



The study area's capacity to accept new development is directly related to access to clean water supplies. Population growth in some areas of the study area is causing a strain on water supplies, particularly in the communities of Roy, Yelm and Lacey.

As discussed in the Utilities and Infrastructure Existing Conditions Technical Memorandum, the majority of the study area's supply water is provided by

groundwater sources. Groundwater is used for a variety of reasons including potable water and irrigation; however the largest use by far is for potable drinking water.

Access to groundwater as a municipal water source requires a water right. A water right is basically a legal right to use a certain amount of public water for a beneficial purpose, such as water supply. Cities that do not own sufficient water rights to meet the future demands of their service area may find it necessary to limit water use by not allowing new connections to their water systems. This, in turn, can limit the future tax base that is necessary to fund expansion and operation and maintenance activities.

Currently the cities of Roy, Yelm and Lacey have each needed to limit connections to their public water systems. Each has pending water rights applications on file with the Department of Ecology (DOE). Research on water rights is well summarized below by the Municipal Services Research Council of Washington State:

“The law of water rights in Washington is complex. The law is based on "common law" (law based on custom and tradition and court decisions) as well as on state statutes enacted by the legislature... An additional and uncertain factor necessary to understanding water rights is Indian tribal water rights issues. As a result of federal law and the treaty rights of several Pacific Northwest Indian tribes, the tribes are major stakeholders in water resource issues. Tribal treaty rights include fishing and hunting rights as well as rights to the protection of the water habitat necessary to realize those treaty rights.” (MSRC website).

Due to their proximity to JBLM, military families are moving to Roy, Yelm and Lacey. As a result, those city’s water systems are experiencing increased demands on their water systems at a time when supply water to those systems is already fully utilized. An adequate water supply is required to meet the needs of existing customers, to meet demands for customers that wish to, but cannot currently be served, and for future growth.

Potential Strategies for Pursuing

In general, the potential strategies identified below all call for an increased level of cooperation among neighboring agencies and communities to facilitate the joint sharing of the cost to identify new water sources or to secure new water sources or secure new rights. Some possible strategies include:

1. Conduct Joint planning sessions aimed to address common water supply challenges with the cities of Roy, Yelm and Lacey
2. Further explore the possibility of constructing water system interties with nearby water systems that have adequate water supply. Interagency agreements will be required.
3. Coordinate with Indian Tribes
4. Investigate the possibility of sharing legal assistance with regard to securing water rights
5. Investigate groundwater recharge. Some water districts are considering the benefits of aquifer recharging. Generally, if a utility puts water into the ground, it is a beneficial use and can become that utility’s water right. (Julin).



6. Investigate wetland treatment/restoration
7. Investigate other uses for reclaimed water (wastewater treated to Class A standards)
8. Regulatory issues must be dealt with to address items 5 through 7 above
9. Water right issues are in the court system at present and it is possible that allocation regulations could change in the future; however the nature and scope of those changes are not currently known. For the purposes of the JBLM Growth Coordination Study, it is assumed that the current regulatory system will remain in place for the duration of the 5 year planning horizon of this study.

**Watershed/Aquifer-Based Water Resource Planning is Needed
Needs Assessment / Opportunities**

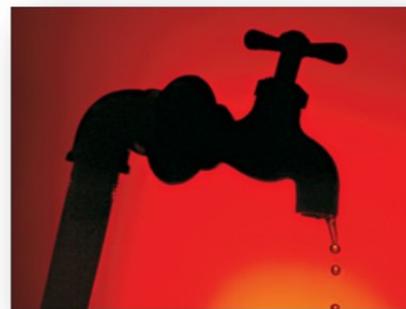
The majority of the public water systems in the study area have adequate water rights (and water supply) for the foreseeable future. Even though this condition currently exists, regional water supplies are not infinite. There is concern that current water sources may be inadequate at some time in the future and that groundwater and surface water may need to be managed differently. There is also concern that inter-basin transfer of flows may disrupt groundwater aquifers. More than one stakeholder felt that there is a need for watershed and aquifer-based planning for water resources. (McDonald). (Julin, Vigoren).

Potential Strategies for Pursuing

Further discussion with expert panel is warranted.

**Reduce Unplanned Draw Impacts on Aquifers
Needs Assessment / Opportunities**

An exemption provision of RCW 90.44.050 allows single groundwater withdrawals of less than 5,000 gallons per day without requiring the acquisition of water rights. This allows a cluster of up to six residences to utilize a single well, a condition sometimes referred to as “six pack” developments. Some developers have utilized this exemption to construct multiple clusters of these “six pack” residences immediately adjacent to each other, effectively creating a large development.



There is concern that the overall impact of these clusters, which can be equivalent to large developments, can adversely impact the volume of water that is available to other aquifer users. There is a need to reduce unplanned Draw Impacts on aquifers within the study area. Providing a regulatory structure that would disallow aquifer withdrawals that can result from this type of cluster housing would encourage developers to locate residential developments in areas where the infrastructure is planned to accommodate higher urban/suburban densities.

Potential Strategies for Pursuing

Further discussion with expert panel is warranted.

**Study Impacts of Proliferation of Septic Tanks on Groundwater Quality
Needs Assessment / Opportunities**

Residences and commercial development located in those portions of the study area that are not presently served by centralized

wastewater facilities are served with individual on-site wastewater treatment systems (septic systems). A

proliferation of failed septic system can increase the potential for the contamination of

groundwater. This issue has not been thoroughly studied within the JBLM study area. Due to growth within the study area, which is partly a result of military-related growth, there is concern that septic tank discharge could contaminate shallow aquifers.



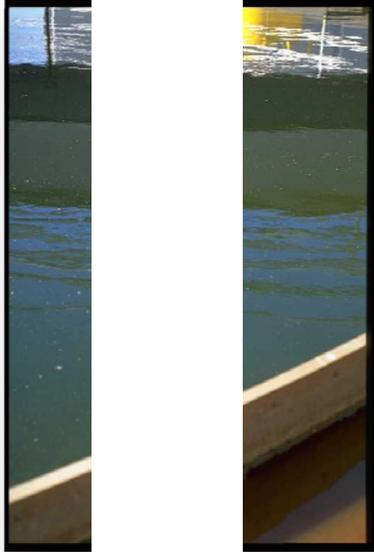
Potential Strategies for Pursuing

Further review of the impact of septic systems on groundwater quality should be conducted.

**JBLM Wastewater Treatment Facility at Solo Point
Needs Assessment / Opportunities**

The Utilities and Infrastructure Existing Conditions Technical Memorandum presented the current status of the Tatsolo Point Wastewater Treatment Plant (WWTP). Tatsolo Point WWTP is operated by JBLM and treats wastewater from Madigan Army Medical Center, the Veteran’s Hospital at American Lake, and from the former Fort Lewis Army Post, McChord Air Force Base and Camp Murray National Guard Station. A document prepared for JBLM titled the *Fort Lewis Wastewater Feasibility Study*; dated August 2009 presented the results of an in-depth evaluation that was conducted to determine the physical and operational status of the treatment facility. Additionally, recommendations were made for continued wastewater treatment at JBLM with a new WWTP.

As reported in the Existing Conditions Technical Memorandum, the analysis concluded that the WWTP has an overall remaining service life of around 5 to 7 years and made a series of short and long term recommendations.



Since the WWTP is located on base and treats only wastewater generated within JBLM, it could be viewed as outside the subject matter of this study. However, the existing WWTP discharges treated effluent to Puget Sound through Outfall #001, which extends 500 feet off-shore at a depth of approximately 70 below mean lower low water. As such, the surrounding communities and Puget Sound could potentially be impacted by the plant effluent.

Although the WWTP is reaching the end of its service life, Fort Lewis has generally maintained a good compliance record with their effluent limits and permit conditions as identified in their National Pollution Discharge Elimination System (NPDES) permit.

In order to protect the waters of Puget Sound, and given the age and physical condition of the existing Tatsolo Point WWTP, the facility should be upgraded or replaced.

Potential Strategies for Pursuing

Construction of short term, interim repairs can extend the service life of the plant until a new wastewater treatment plant can be constructed. Funding is required to implement these recommendations, which were made in the *Fort Lewis Wastewater Feasibility Study*.

Coordinate Transportation and Utilities Planning & Programs Needs Assessment / Opportunities

When major roadwork is constructed, it is often preferable to upgrade underground utilities at the same time, in order to avoid damaging the newly laid road surface for utility work before its service life is complete. Electrical, wastewater and water underground utility providers mentioned during expert panel meetings and during telephone



discussions that they frequently find it necessary to construct or upgrade utility assets before they had planned to do so.

When projects are constructed that is not part of a planned and adequately funded capital improvement program (CIP) it can impact the utility's ability to construct the remaining CIP projects. There is a need for better coordination between local utility providers in order to avoid or minimize impacts to other utilities.

Potential Strategies for Pursuing

Strategies for pursuing this need primarily involve increasing the level of communication and coordination between transportation and underground utilities.

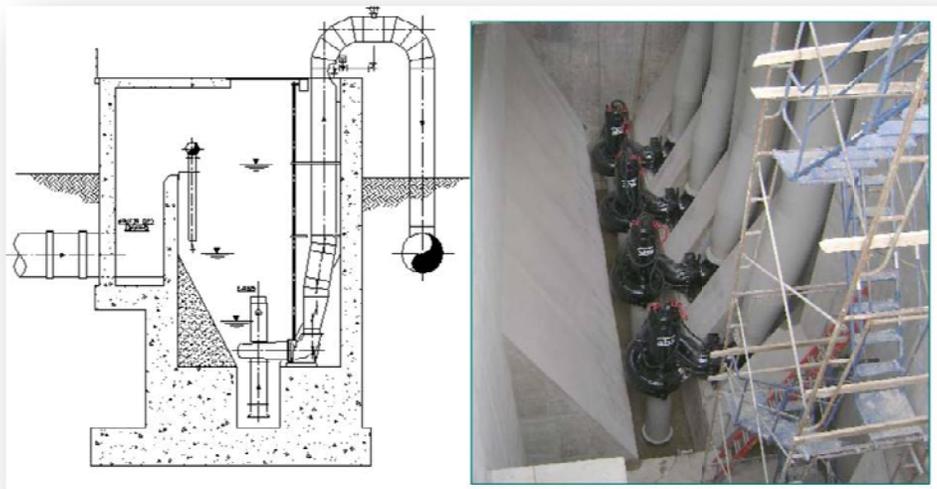
1. Currently there are groups located in the South Puget Sound area that endeavor to accomplish this. Active involvement by all utility providers could minimize unforeseen impacts as different utilities expand or maintain service. The Pierce County Utility Coordination Council meets monthly to discuss utility coordination matters in the greater Pierce County area. They have members who are active with the WA Utilities and Transportation Committee (WUTC), the Underground Utility Location Center (UULC), and the legislature. Meetings are held monthly in Tacoma (Vigoren).
2. Utilities should make their capital improvement plans available to each other
3. Provide overarching project management to utilities activities in the study area

**Incorporate Accurate Military Population & Employment Data into Local Plans
Needs Assessment / Opportunities**

Most utility planning is based on population projections from US Census data or regional planning agencies where military growth is often not specifically identified. There is a need to incorporate accurate military population growth, in a manner similar to the JBLM Growth Coordination Plan, into local utility planning.

Potential Strategies for Pursuing

This would require ongoing population planning and coordination between



JBLM, regional planning agencies, and neighboring utilities.

**Reduce Long Term Solid Waste Impacts
Needs Assessment / Opportunities**

Existing landfills have adequate capacity for the short term and solid waste utilities have implemented active recycling programs; however much recyclable material is still being directed to landfills. Pierce and Thurston counties could be looking at reasonable, sustainable approaches to increase their recycling programs even further. It may be possible to capture over 90% of solid waste that currently goes to landfills; however there is a high cost to accomplish this. Currently the high cost outweighs the benefits. (Julin).

Potential Strategies for Pursuing

Discuss this further with the expert panel and the GCC.

SUMMARY OF NEEDS ASSESSMENT

Need	Opportunity	Potential Strategies
1. Potable Water Supply and Water Rights	Improve access to adequate drinking water	<ol style="list-style-type: none"> 1. Joint planning between Yelm, Roy and Lacey 2. Water system inerties 3. Coordinate with Tribes 4. Share legal resources 5. Investigate groundwater recharge and wetland restoration 6. Investigate other reclaimed water uses
2. Watershed/Aquifer-Based Water Resource Planning is Needed	Protects aquifer recharge	<ol style="list-style-type: none"> 1. Further discussion is warranted
3. Reduce Unplanned Draw Impacts on Aquifers	Protects aquifer water supply	<ol style="list-style-type: none"> 1. Further discussion is warranted
4. Study Impacts of Proliferation of Septic Tanks on Groundwater Quality	Protects aquifer water quality	<ol style="list-style-type: none"> 1. Study impact of septic system discharges on groundwater quality
5. JBLM Wastewater Treatment Facility at Solo Point	Protects the public, Puget Sound beaches & water quality	<ol style="list-style-type: none"> 1. Provide funding source for Solo Point WWTP upgrade
6. Coordinate Transportation and Utility Planning & Programs	Minimizes underfunded and unplanned capital improvements	<ol style="list-style-type: none"> 1. Encourage utility participation in regional utility groups such as Pierce Co. Utility Coordination Council, WUTC and UULC. 2. Make each utility’s capital improvement plan available to other utilities. 3. Provide regional planning and project management services to utilities.
7. Incorporate Accurate Military Population & Employment Data into Local Plans	Minimizes underfunded and unplanned capital improvements	<ol style="list-style-type: none"> 1. Incorporate military population & employment data into local and regional utility plans
8. Reduce Long Term Solid Waste Impacts	Increases recycling and conserves landfill volume	<ol style="list-style-type: none"> 1. Further discussion with EP and GCC is warranted

NEXT STEPS

The needs summarized above should be discussed with the Utilities and Infrastructure expert panel, the GCC and with other stakeholders. The viability of attempting to meet these needs should be discussed. These and other potential strategies for meeting those needs should be thoroughly examined.

REFERENCE LIST

MSRC website. Municipal Research and Services Center website. Overview of Water Rights in Washington. Updated 12/09. Available online at <http://www.mrsc.org/Subjects/Environment/water/WAT-INTR.aspx> accessed May 24, 2010.

Information gathered from *Ft. Lewis Wastewater Feasibility Study, Executive Summary*, prepared for United States Army Corps of Engineers and Fort Lewis Public Works, July 2010.

NPDES permit. United States Environmental Protection Agency (EPA) website. Proposed Wastewater Permit for Fort Lewis Solo Point Wastewater Treatment Plant. Available online at http://yosemite1.epa.gov/r10/water.nsf/NPDES+Public+Notices/solo_point accessed February 24, 2010.

Julin, Kip. Strategic Planning and Assets Manager, Pierce County Public Works and Utilities. Telephone communication. May 20, 2010.

Julin, Kip. Strategic Planning and Assets Manager, Pierce County Public Works and Utilities and Greg Vigoren, Surface Water Division Manager, City of Lakewood, Washington. Telephone communication. May 20, 2010.

McDonald, Bill. 2010. City of DuPont, City Administrator. Telephone interview. April 23, 2010.

Julin, Kip. Strategic Planning and Assets Manager, Pierce County Public Works and Utilities. Telephone communication. May 20, 2010.