3.3 WATER RESOURCES

This section identifies and discusses the existing water resources on the La Center Interchange and Ridgefield Interchange Sites. Specific areas discussed include watershed setting, floodplain, groundwater resources, surface water quality, and drinking water quality.

3.3.1 SETTING – LA CENTER INTERCHANGE SITE

WATERSHED SETTING

The La Center Interchange Site lies within the western portion of the Lewis Water Resource Inventory Area watershed basin (WRIA 27), as identified by the Washington State Department of Ecology (DOE) (**Figure 3.3-1**). WRIA 27 is located within the counties of Clark, Cowlitz, Skamania, and Yakima. The major surface water body in the project area is the East Fork Lewis River, which is located within the East Fork Lewis River Watershed, a sub-shed of the greater WRIA 27 (**Figure 3.3-2**). The East Fork Lewis River is the largest tributary of the Lewis River and is located north-northeast of the La Center Interchange Site. Major tributaries to the East Fork Lewis River in the vicinity of the site include Mason Creek, Jenny Creek, Breeze Creek, and McCormick Creek. Elevation along the East Fork Lewis River ranges from 4,400 feet in the eastern portion of the river to close to sea level in the west at its confluence with the Lewis River (DOE, 2005b).

There are three main drainage basins on the La Center Interchange Site.

1) The northern portion of the site drains to the seasonal unnamed stream running along the northwest boundary of the site;
2) The southern portion of the site discharges into a piped drainage system located within the Washington State Department of Transportation (WsDOT) right-of-way and travels north along Interstate 5 (I-5) until it also discharges into the seasonal unnamed stream;
3) The southeast corner of the site adjacent to the west side of I-5 drains to a 48-inch culvert that crosses under I-5 and then continues to flow through a different unnamed drainage into McCormick Creek to the east. Both McCormick Creek and the northern seasonal unnamed stream flow approximately 1.5 miles to the northeast to empty directly in to the East Fork Lewis River (Olson Engineering, 2006b) (DEIS Vol. II, **Appendix G**). **Figure 3.3-3** shows the drainage pattern of the project vicinity.

Existing stormwater runoff from the La Center Interchange Site for the 100-year peak storm event is estimated at 46.2 cubic feet per second (cfs).

Figure 3.3-1

Figure 3.3-2

Figure 3.3-3

FLOODPLAIN

As shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (**Figure 3.3-4**) the La Center Interchange Site is located in Flood Zone X (FEMA, 1986). Zone X is designated as "an area that is determined to be outside the 1% and 0.2% annual chance flood plains." The 100-year and 500-year floodplains correspond to a 1% and 0.2% annual chance of a flood, respectively.

GROUNDWATER RESOURCES

Groundwater in the vicinity of the La Center Interchange Site is influenced by three groundwater aquifers. These aquifers are the Upper Troutdale Aquifer (UTA), the Sand and Gravel Aquifer (SGA), and the Pleistocene Alluvial Aquifer (PAA) (Appendix B in Olson Engineering, 2006b [DEIS Vol. II, **Appendix G**]).

The UTA is found approximate 75 feet below ground surface (bgs). It is an important source of supply to many domestic, irrigation, and agricultural users throughout Clark County. The most productive portions of the UTA occur south of the La Center Interchange Site where well yields have been known to exceed 1,000 gallons per minute (gpm). The production of this aquifer generally declines as it flows north. In the vicinity of the La Center Interchange Site, well yields are productive enough to provide for the current domestic water supplies but not known to be large enough to support larger community supplies.

The SGA is a deep unconfined aquifer that occurs within the lower portion of the Troutdale formation deposits at approximately 200 feet bgs. This aquifer is the most important source of ground water supply in the vicinity of the site and has been extensively developed in the southern part of the county for municipal and industrial supplies. The SGA aquifer consists of a thick layer of fine sand and silty sand deposits confined within thin layers of silt and clay. The aquifer may exceed 400 feet in thickness in some areas. Individual well yields of up to 1,000 gpm can be obtained through this aquifer.

The PAA occurs within the coarse grained Pleistocene alluvium that underlies the Lewis River floodplain. Well logs indicate that the PAA occurs at depths of approximately 200 feet bgs in the lowland areas between I-5 and the Columbia River. The groundwater quality and hydraulic characteristics are not well defined for this aquifer in the vicinity of the La Center Interchange Site since extensive testing of this aquifer has not been undertaken.

Groundwater recharge in the vicinity of the La Center Interchange Site occurs primarily through infiltration of precipitation. Precipitation recharge is estimated to be about 17 to 22 inches per year. Recharge is transported downward and laterally through the Pleistocene alluvial and Upper Troutdale deposits where a portion is discharged to nearby rivers and streams. The remaining recharge migrates

Figure 3.3-4

to the SGA and then flows laterally towards regional discharge points such as the Columbia River, Lewis River and the lower portions of the East Fork Lewis River. Large-scale municipal water supply withdrawals from the SGA in 1995 resulted in some decline of water levels throughout Clark County. The capture of water by public supply wells has also reduced some of the discharge to regional surface water. The reduced discharge has had an adverse effect on upstream habitat. As a result, the DOE, the State Department of Fish and Game, and the Lower Columbia Fish Recovery Board (LCFRB) have recently completed their WRIA 27/28 Watershed Plan, which encompasses the Lewis River Basin. The plan provides a recommended set of protocols for processing future water rights applications within the Basin, including the establishment of stream closures, instream flow requirements, and regulations governing the allocation of new water-right permits within the Basin (Appendix B in Olson Engineering, 2006b [DEIS Vol. II, **Appendix G**]).

Three domestic water wells on the La Center Interchange Site serve the existing on-site residences. Additionally, there are approximately 15 identified wells within 1 mile of the La Center Interchange Site. Most of the wells in the vicinity of the site are used for domestic purposes and have depths ranging from 200 feet to approximately 400 feet (DOE, 2003). Other, shallower, wells in the area are primarily used for environmental monitoring.

3.3.2 SETTING – RIDGEFIELD INTERCHANGE SITE

WATERSHED SETTING

There are two main drainage basins on the Ridgefield Interchange Site. All but the west quarter of the site adjacent to NW 11th Avenue flows to the drainage course which discharges from the site to the north. The west quarter of the site adjacent to NW 11th Avenue discharges to the west. All runoff from the site eventually flows to the East Fork Lewis River or the Lewis River (**Figure 3.3-3** above) (Olson Engineering, 2006b).

Existing storm water runoff from the Ridgefield Interchange Site for the 100-year peak storm event is estimated to be 44.7 cfs.

FLOODPLAIN

The Ridgefield Interchange Site is located in Flood Zone X (**Figure 3.3-5**) (FEMA, 1986). As stated in **Section 3.3.1**, Flood Zone X is designated as "an area that is determined to be outside the 1% (100-year) and 0.2% (500-year) annual chance flood plains."

GROUNDWATER RESOURCES

Groundwater for the Ridgefield Interchange Site is obtained from the same aquifers as described for the La Center Interchange Site. Refer to the description in **Section 3.3.1** for more detail.

Figure 3.3-5

There are two domestic water wells on the Ridgefield Interchange Site and approximately 22 identified wells within 1 mile of the site. Similar to the La Center Interchange Site, most of the wells in the vicinity of the site are used for domestic purposes and have depths ranging from 200 feet to approximately 600 feet (DOE, 2003). Other, shallower, wells in the area are primarily used for environmental monitoring.

3.3.3 WATER QUALITY

SURFACE WATER

Regulatory Setting

The Federal Clean Water Act (CWA), 33 U.S.C. Section 1301(a)(2), sets forth national goals that waters shall be "fishable, swimmable" waters (CWA Section 101 (a)(2)). The CWA addresses both point and non-point sources of pollution (Sections 402 and 319, respectively). It requires that a National Pollution Discharge Elimination System (NPDES) permit be obtained for all discharges from point sources into "Waters of the U.S." The CWA also directs states to establish water quality standards and to review and update them on a triennial basis (Section 303(c)).

As a result of the 1972 Federal Water Pollution Control Act (FWPCA), the U.S. Environmental Protection Agency (USEPA) established the NPDES program. Later, the 1987 Clean Water Act amendments to the FWPCA extended the scope of the NPDES program. NPDES is a national program for regulating and administering permits for discharges to receiving waters, including non-point sources. In some states, the USEPA has delegated permitting authority to the regional water quality agency, in this case the DOE. However, the USEPA retains authority to regulate discharges to waters on tribal lands. The goals and policies relating to water quality standards for surface waters of the State of Washington are summarized to characterize the water quality issues in the project area. In 2003, the DOE proposed a major revision of the State of Washington water quality standards. The USEPA has only partially approved the revised surface water quality standards proposed by the DOE. As a result, the State will use the 2003 standards for the parts that the USEPA has approved, and the prior 1997 standards for the revised parts that the USEPA has not yet approved (DOE, 2005b).

The primary surface water within the vicinity of the alternative project sites is the East Fork Lewis River. The East Fork Lewis River has been classified by DOE as Class AA (Extraordinary Waters). Beneficial uses of Class AA waters include:

- Water Supply
- Stock Watering
- Fish and Shellfish Habitat
- Wildlife Habitat
- Recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment)

- Commerce and Navigation

The surface water quality standards for Washington State include both narrative and numerical water quality objectives. The water quality objectives for Class AA waters are summarized in **Table 3.3-1**.

TABLE 3.3-1
WASHINGTON STATE WATER QUALITY OBJECTIVES FOR CLASS AA WATERS

Constituent	Water Quality Objective
Fecal Coliform	Freshwater – fecal coliform levels shall both not exceed a geometric mean value of 50 colonies/100mL and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 100 colonies/100mL.
Dissolved Oxygen	Freshwater – dissolved oxygen shall exceed 9.5 mg/L.
Total Dissolved Gas	Total dissolved gas shall not exceed 110% of striation at any point of sample collection.
Temperature	Temperature shall not exceed 16 degrees Celsius (ºC) (freshwater) for core summer salmonid habitats. No temperature increase will be allowed which will raise the receiving waters temperature by 0.3ºC.
pH	pH shall be within the range of 6.5 to 8.5 (freshwater) with a human-caused variation within the above range of less than 0.2 units.
Turbidity	Turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10% increase in turbidity when the background turbidity is more than 50 NTU.
Toxicity	Toxic, radioactive, or deleterious material concentrations shall be below those that have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health as determined by the department.
Aesthetics	Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

NOTES: mL = milliliters; mg/L = milligrams per liter; NTU = Nephelometric Turbidity Units
Source: DOE, 2006.

Section 303(d) of the CWA requires states to periodically prepare a list of all surface waters in their respective jurisdictions for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These include water bodies that do not meet state surface water quality standards and are not expected to improve within the next two years. States establish a priority ranking of these impaired waters for purposes of developing plans

that include Total Maximum Daily Loads (TMDLs). These plans describe how an impaired water body will meet water quality standards through the use of TMDLs. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards and an allocation of that amount to the pollutant's sources.

The antidegradation provisions of the State of Washington Administrative Code (WAC 173-200-030), in compliance with the Clean Water Act, state that existing beneficial uses of water bodies (fishing, recreation, drinking) shall be protected and maintained. The Code further states that all substances discharged into water bodies shall be provided with all known, available, and reasonable methods of prevention, control and treatment by new sources before discharge. Non-point pollution shall be provided with all known, available, and reasonable best management practices for control and reduction.

Stormwater discharges from industries and construction sites are regulated by DOE, with oversight by the USEPA, under Phase I NPDES general permits. These permits require the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). SWPPPs for construction sites address erosion and sediment control, and containment of fuels and solvents. SWPPPs for industrial facilities identify, prevent, and control the contamination of stormwater discharges from spills and leakage of industrial chemicals and fuels.

Disposal of treated wastewater may also contribute to the impairment of surface waters. The USEPA regulates wastewater disposal on tribal lands with consideration given to water quality standards established by local agencies. Wastewater effluent discharge to surface waters requires an NPDES permit consistent with the local agency water quality objectives including monitoring requirements.

Treatment as State Program

Under Section 518 of the Clean Water Act, Tribes may establish their own water quality standards for, and regulate discharges to, bodies of water within their reservations. The requirements to receive Treatment as State (TAS) status are that a tribe must be federally recognized, have a governing body that is currently carrying out substantial duties and powers, and have adequate jurisdiction and capabilities to carry out the water quality program as least as stringently as the USEPA. A tribe would have to develop their own regulatory program including water quality criteria and waste discharge requirements and submit the program for USEPA approval. According to the most recent update (2002), the USEPA lists 27 tribes as being approved under the TAS program. At this time the Cowlitz Indian Tribe is not considering TAS and jurisdiction over water quality on the site if taken into trust would remain with the USEPA.

Surface Water Quality

The East Fork Lewis River and McCormick Creek, both within the watershed in which the alternative project sites are located, are listed as Category 5 impaired waters based on fecal coliform numbers and Category 2 impaired waters based on temperature issues, respectively (DOE, 2005b). Category 5 impaired waters mean that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan in place. The Category 5 designation is the highest priority ranking given by the State to recognize the need for implementation of a TMDL. Category 2 impaired waters exhibit some evidence of a water quality problem, but not enough by themselves to require development of a TMDL. The East Fork Lewis River is currently in the study phase of TMDL development for fecal coliform and temperature (DOE, 2005b). This is the first step in TMDL development and will help determine how much existing pollution needs to be reduced to keep the water healthy.

Ecological Land Services (ELS) collected baseline water quality data from the seasonal unnamed stream on the La Center Interchange Site and the East Fork Lewis River (**Table 3.3-2** and **Appendix T** of the FEIS). Surface water samples were collected in January, October, November, and December of 2006 and January of 2007. Samples were analyzed for pH, turbidity, temperature, dissolved oxygen, ammonia as nitrogen, total Kjeldahl nitrogen, and total phosphorus. Baseline water quality samples were collected during the winter months. Water samples were not collected during the summer months, as the unnamed stream is dry during summer months. During the sampling events, the unnamed stream was still dry for the October sampling event.

Fecal Coliform

Averaged results for each sample site indicate fecal coliform concentrations are higher in the unnamed seasonal stream as compared to the East Fork Lewis River. Sources of fecal coliform from the La Center Interchange Site include cattle, domestic animals including dogs and cats, and three septic systems. Fecal coliform numbers increased from Sample Location (S)-1 (the seasonal unnamed stream, at a point just outside the project boundaries of the La Center Interchange Site) to S-3 (Onsite Wetland). The coliform levels then decreased from S-3 to S-4 (wetlands to the mouth of the unnamed stream). The East Fork Lewis River fecal colony coliform counts appear to remain constant from S-5 to S-6 (upstream of the outfall of the unnamed stream to downstream of the outfall). These results indicate the area that includes the project site is a source of contamination of fecal coliform to the unnamed stream. This result is further highlighted by the results of the coliform sampling for the onsite wetland. During the sampling events of December 06 and December 07, coliform levels were reported at 1600, 900, and 500 MPN per 100 ml of sample water. The results indicate that a source of fecal coliform currently exists on the site and may be associated with the location of three septic tanks on site. Both the unnamed stream and the East Fork Lewis River do no currently meet water quality criteria for Class AA waters for fecal coliform.

TABLE 3.3-2
AVERAGED BASELINE WATER QUALITY DATA

Sample Location	pH	Turbidity (NTU)[2]	Temp (°C)	Fecal Coliform (MPN/ 100 mg/l)[3]	Dissolved Oxygen (mg/l)	Ammonia as N[4] (mg/l)	TKN[6] (mg/l)	Total P[7] (mg/l)
S-1 Background - Unnamed Stream	6.5	11.9	7.4	116	10	<0.05[5]	0.55	0.12
S-2 Downstream of Site - Unnamed Stream	6.6	22.6	7.8	174	11	<0.05	0.45	0.15
S-3 Onsite Wetland	6.3	10.2	7.9	441	9.3	<0.05	0.9	0.15
S-4 Mouth of Unnamed Stream	6.8	23.3	7.6	147	11	<0.05	0.52	0.12
S-5 East Fork Lewis River- Upstream of Unnamed Stream	6.7	9.9	7.7	72	11	<0.05	0.38	0.05
S-6 East Fork Lewis River - Downstream of Unnamed Stream	6.6	9.9	7.7	71	11	<0.05	0.28	0.04

NOTE:
1= Unnamed stream was dry, no sample collected
2= Nephelometric Turbidity Units
3= Most Probably Number per 100 milliliters of sample water
4= Ammonia as Nitrogen
5= Actual level is below the Minimal Reporting Limit of 0.05 mg/l
6= Total Kjeldahl Nitrogen, a measurement that includes ammonia nitrogen and organic nitrogen (nitrate/nitrite)
7= Total phosphorous

Source: ELS, 2007; AES, 2007.

Ammonia as N

Ammonia, identified through the analysis of nitrogen, was not identified above the minimal reporting limit by the laboratory. This indicated ammonia levels were not identified above .05 mg/l, however it may be present at lower concentrations.

Turbidity

The average turbidity for the East Fork Lewis River was 9 NTU upstream and 8 NTU downstream from the mouth of the unnamed stream. The unnamed stream averaged a turbidity of 10 NTU upstream from the project site, while downstream from the project site and at the mouth of the stream, average turbidity was calculated at 19 and 21 NTU, respectively. The results indicate the project site is located within an area that contributes turbid water to the unnamed stream. This is consistent with the current land use as well as the seasonal flow patterns of the stream. The results of the East Fork Lewis River turbidity readings indicate the unnamed stream is not a significant source of turbidity for the river.

Temperature

The temperature of surface waters can impact the ability of to sustain the existing ecosystem. Increases in surface water temperature can adversely impact aquatic organisms such as fish that rely on cooler water temperatures for spawning. Therefore, in accordance with the State Environmental Policy Act, a water quality criterion of 16ºC has been established for maximum temperature during the summer for surface waters that contain core salmonid habitat throughout the State of Washington.

Water temperature of the East Fork Lewis River was obtained from the City of La Center WWTP. Monitoring data was collected by the City during the summer months of 2004 and 2005 approximately 1.6 miles downstream of the discharge point of the unnamed stream that traverses the project site. Results of the summer monitoring indicate ambient water temperature of the river exceeds the water quality criterion during summer months.

Other Parameters

Other measured parameters were similar in the unnamed stream compared to upstream and downstream samples of the East Fork Lewis River, and are consistent with DOE guidelines (ELS, 2006) (DEIS Vol. II, **Appendix P**). For all sample points within the unnamed stream and the East Fork Lewis River, dissolved oxygen (DO) and pH complied with the water quality criteria identified above in **Table 3.3-1**. DO and pH averages were relatively constant throughout sample points for both the unnamed stream and the East Fork Lewis River

DRINKING WATER QUALITY

Under the mandate of the Safe Drinking Water Act, the USEPA defines National Primary Drinking Water Regulations (primary standards). These are legally enforceable standards that apply to public water systems. These standards are established to protect human health by limiting the levels of contaminants in drinking water. The USEPA also defines National Secondary Drinking Water Regulations (secondary standards). These secondary standards are non-enforceable. They regulate contaminants that cause cosmetic and aesthetic effects, but not health effects. The USEPA recommends that these secondary standards be met but does not require systems to comply with them. Both primary and secondary drinking water standards are expressed as either Maximum Contaminant Levels (MCLs), which define the highest level of a contaminant allowed in drinking water, or Maximum Contaminant Level Goals (MCLGs), which define the level of a contaminant below which there is no known or expected risk to health.

Clark Public Utilities (CPU) is the proposed water service provider for both alternative project sites. CPU supplies approximately 27,000 homes and businesses within Clark County and has a service area of approximately 200 square miles (CPU, 2005). The communities that CPU serves include Hazel Dell, Salmon Creek, Lakeshore, Felida, Mt. Vista, La Center, Brush Prairie, Hockinson, Venersborg, Heisson, Meadow Glade, Dollars Corner, Duluth, Pioneer, Manor, Amboy and Yacolt.

The majority of the water supply within the CPU service area is provided through 34 groundwater wells with a reliable pumping capacity during maximum demand days of approximately 27 million gallons of water per day (gpd) (Olson Engineering, 2006b). Groundwater is stored in 26 water storage reservoirs with a combined capacity of 17 million gallons (Olson Engineering, 2006b). **Table 3.3-3** provides a water quality summary for the CPU regional water system. The existing water supply characteristics for both the La Center Interchange and the Ridgefield Interchange Sites are described in **Section 3.10,** Public Services.

TABLE 3.3-3
WATER QUALITY SUMMARY FOR CLARK PUBLIC UTLITIES REGIONAL WATER SYSTEM

Substance (Measuring Unit)	Highest Level Allowed (MCL)	Range of Level Detected	Description & Origin of Substance
Regulated at the Well			
Fluoride (ppm)	4	0 – 0.5	Naturally Occurring Mineral
Nitrate, as N (ppm)	10	0 – 1.8	Fertilizers, Septic Systems, Animal Waste
Cyanide (ppm)*	0.2	0 – 0.29	Discharge from Steel/Metal, Plastic and Fertilizer Factories
Arsenic (ppb)	10	0 – 3.6	Naturally Occurring Mineral
1,1,1 – Trichloroethane (ppb)**	200	0 – 0.69	Degreasing Chemical
1 – Tetrachloroethylene (ppb)**	5	0 – 2	Dry Cleaners
Toluene**	1,000	0 – 1.6	Discharge from Petroleum Factories
Regulated in the Distribution System			
Total Coliform Bacteria	Presence of coliform bacteria in 5% or less in monthly samples	Not Detected	Naturally Occurring Bacteria used as an indicator of Water Quality
Regulated at the Consumer's Tap			
Lead (ppm) (2000)	0.015 (AL)	0 –0.005	Household Plumbing
Copper (ppm) (2000)	1.3 (AL)	0 – 0.47	Household Plumbing
Unregulated at the Well			
Sodium (ppm)	Not Regulated	3.6 – 21.6	Occurs Naturally in Soils

NOTES: * Substance was detected one time in one well. However, it was not detected in three follow-up samples. Most likely detected as a result of sampling error.
** These substances were detected in one well. The well is tested quarterly, and an investigation is under way to determine the source of the contaminants.
MCL – Maximum Contaminant Level – The highest contaminant level allowed in drinking water.
AL – Action Level – Concentration of a contaminant that triggers additional treatment measures if exceeded.
ppm – parts per million
ppb – parts per billion

Source: CPU, 2004.