

Fluoride

The Master Plan medium-priority recommendation to provide a roof cover over the fluoride tanks has not been addressed in this study.

Space Requirements

SPU wishes to retain the existing spaces dedicated to chlorine treatment in the treatment building, as well as the adjacent gas cylinder platform. The acid room associated with the fluoridation process, located in the existing treatment building, should be retained.

Future Space Requirements

A new liquid chlorine tank facility similar in size to the fluoride tank facility will be required. The existing fencing surrounding the treatment building will not be required after conversion to liquid chlorine.

No future expansion of the fluoride facility is currently planned. Retention of the existing treatment building gas cylinder storage platform will provide a potential future chlorination tank location if needed. The roof cover recommended for the fluoridation tanks should be addressed in the Water Quality treatment improvements project.

SCADA and Communications

Photo 2-28 shows the space used for SCADA and telemetry equipment in the treatment building. The following sections describe information provided in the interview.



Photo 2-28. Treatment Building SCADA/Telemetry Space

Staff

There are no regular on-site staff for SCADA and communications. Communications equipment and SCADA support the Operations group activities.

Future Staff

There are no plans to add staff in the future.

Function

SCADA equipment and other telemetry equipment monitor river and diversion flows and functions at the dam site.

Space Requirements

As the use of SCADA and computers has grown at the site, the control room in the treatment building has become crowded with equipment. Most of this is installed in a narrow and crowded closet cavity opposite the Operations work stations. A dedicated and secure equipment room with external access or internal access that will not disturb operations is desirable. This room will provide space for SCADA, telephone equipment, UPS equipment and security equipment. The room should provide an area of 150 square feet.

There is currently only one fiber link to Landsburg. It is not yet a redundant system. The line crosses the river near the location of the new salmon hatchery. Many of the monitoring systems located in the Operations Room are older analog devices. According to SPU staff, the transition to digital will eventually happen but there is currently no hard timeline for replacement.

Shared Facilities

Shared facilities will be used by the Operations and Fish Program staff but will also provide support space for visitors and SPU staff temporarily working at the site:

- Fish operations can bring up to 100 people to the site in one day during fall season.
- Tours typically bring up to 3,000 people total, in groups of up to 30, typically in October. Most walk up the road from the park, but some buses do come up to the site.
- Flooding and storm events can bring up to 20 people to the site, including a crane for clearing logs on the upstream side.

There is no janitorial service to these facilities. Garbage is currently generated at the rate of 4-5 cans per week. This is brought to the park for pickup.

Table 2-3 summarizes space requirements for the shared facilities.

Storage Facilities

Current general storage facilities include the park garage (500 square feet), the yard tool shed (80 square feet), the old analyzer building (145 square feet storage for hazmat equipment), the green garage (771 square feet used for storage) and the green fish storage building (240 square feet). The Master Plan encouraged removal of these facilities and replacement with a consolidated storage facility at the dam/treatment area. No increase in total storage was determined to be necessary but the need for a small shared shop/tool space was identified during the interview process.

**TABLE 2-3.
SPACE REQUIREMENTS FOR GENERAL SHARED FACILITIES**

Use	Space Requirement (square feet)
Entry Vestibule	50
Lobby.....	120
Men’s Lockers/Showers/Restroom.....	320
Women’s Lockers/Showers/Restroom.....	320
Break/Conference Room.....	300
Copy Room/paper storage	90
Electrical Room (1-hour construction, inside and outside access with 2 leaf outside doors, ~10-foot width) ^a	200
Mechanical Room (including fire sprinkler riser)	120
Mud Room Vestibule (working entrance/wet gear storage/toilet).....	120
Janitor’s Closet	25
Office Storage Closet.....	80

a. Electrical room would also provide a distribution function currently present in the Old Generator Building. Power quality and drop-out issues at the site are currently solved with UPS systems at each computer or communications or monitoring device. With a new electrical/server room, a centralized UPS might make sense. Generator has one week capacity, 800 gallons of diesel stored on site.

Current storage facility space requirements are as follows:

- 240 square feet for the Fish Program:
 - Fish refrigerator
 - External Storage (currently in shed)
 - Space for raft storage
 - Small shop to be shared with Operations staff
- 1,496 square feet for the Operations group (including 150 square feet of shared shop space).

Parking Requirements

Current parking space requirements are as follows:

- 4 covered spaces for utility vehicles (Operations supervisor, seasonal, shared and future tractor)
- 7 standard vehicle spaces for staff
- 3 visitor spaces
- 16 overflow/event vehicle spaces (along road or in other informal parking areas)
- Occasional school bus parking for fish tours.

Circulation Requirements

Current circulation space requirements are as follows:

- Retain turn-around space at the dam.
- Improve chemical delivery truck circulation so that vehicles can enter and exit from the same driveway off the 9 Road (often trucks have to leave the site on the Park Road because of the existing tight turn at the south end of the treatment building).
- Paving of drives with a surface that does not create dust during summer.

Landsburg Park Requirements

For most of the year, Landsburg Park sees only occasional visitors. During summer, the park can become crowded with local residents looking for relief from the heat and a spot to picnic. Immediately adjacent to the park, the Cedar River provides a permanent competitive white water kayak course, and a major local competition is held there annually. During autumn, the park is a staging area for organized tours of SPU's fish program.

The park's current restroom facilities are rented portable toilets, some of which are covered by a wood and plastic shelter. An unused and deteriorated older restroom building is present on the site. The 2008 Master Plan suggested that this building and the portable toilets be removed and replaced by permanent restrooms. The park has a small interpretive area that provides information about water diversion and the natural environment. Current facilities also include a stone and wood barbeque shelter. While the 2008 Master Plan recommended retaining this structure, SPU staff have subsequently suggested removal. SPU staff feel that the shelter attracts vandalism, rowdy behavior, and the use of drugs and alcohol.

The park has no full or part-time staff. Portable toilets are serviced by the rental company. Lawns and grounds are minimally maintained by Operations crew.

The park currently has a requirement for two composting or pit toilets.

UPDATED PROGRAM

Program Matrix

Table 2-4 summarizes the space requirements identified in the 2008 Master Plan and by the investigations performed for this preliminary engineering report.

Recommended Changes to the Facility Inventory at Landsburg

Table 2-5 summarizes proposed changes to the facility inventory.

**TABLE 2-4.
LANDSBURG FACILITY PROGRAM SPACE REQUIREMENTS**

	Program	Required Area (square feet)		Change	Comments
		2008 ^a	2010 ^b		
Enclosed Spaces					
1. Operations Supervisor Office	Operations	120	120	0	
2. Operations Monitoring Room	Operations	160	160	0	130 +30 exist SCADA space
3. Office Supplies Storage	Operations	100	80	-20	Some storage in copy room
4. Water Quality Lab	Operations	80	100	20	Larger to meet ADA circulation
5. Sr. Environmental Analyst Office	FISH	120	120	0	
6. Group Office (4)	FISH	128	240	112	Workstation count increased from 2 to 4
7. Server Room	SCADA	30	150	120	Master Plan did not address; 30 is current size
8. Entry Vestibule (air lock)	Shared	0	60	60	Required for LEED compliance
9. Lobby	Shared	0	120	120	Not addressed in 2008 MP
10. Men's Lockers/restroom	Shared	140	320	180	Concept design shows 2008 figure inadequate
11. Women's Lockers/restroom	Shared	140	320	180	Concept design shows 2008 figure inadequate
12. Break/Conference Room	Shared	430	300	-130	Shared space reduces total requirement
13. Copy Room	Shared	0	90	90	Need not addressed in 2008 Master Plan
14. Electrical Room	Support	190	200	10	Remove Old Generator Bldg
15. Mechanical Room	Support	0	120	120	Need not addressed in 2008 Master Plan
16. Mud Vestibule (wet gear & WC)	Shared	0	120	120	Need not addressed in 2008 Master Plan
17. Janitor's Closet	Support	0	25	25	Need not addressed in 2008 Master Plan
18. Office Storage Supplies Closet	Operations	100	80	-20	Smaller area adequate
19. General Fish Program Storage	FISH	240	240	0	
20. Fish Program Electronics Room	FISH	0	120	120	Not addressed in 2008 MP
21. General Storage and (shared) Shop	Operations	1,496	1,496	0	
Total for enclosed spaces^c		3,474	4,581	1,107	
Parking					
22. Covered Parking	Shared	4 spaces + shop			
23. Visitor Parking	Shared	3 spaces			
24. Staff Parking	Shared	7 spaces			
25. Overflow Parking	Shared	16 informal spaces			
<p>a. Taken from 2008 SPU Watershed and Transmission Facilities Master Plan</p> <p>b. Developed for this Preliminary Engineering Report</p> <p>c. Circulation areas, wall thickness etc. are not included in above totals</p>					

**TABLE 2-5.
PROPOSED CHANGES TO FACILITY INVENTORY**

	2008 Master Plan Recommendation	2010 Preliminary Engineering Recommendation	Size SF
Treatment Building	Retain or replace—consolidate Operations & Fish	SPU will retain for treatment function	1,170
Fluoride Storage	Function moves to Lake Youngs	SPU will retain	800
Old Analyzer Building	Retain or replace—consolidate Operations & Fish	Remove - provide equipment enclosure	145
Compressor Building	Function moves to Lake Youngs	SPU will retain	80
Emergency Generator	Retain	Retain	
Screen House	Retain or replace	Retain (historic)	1,539
Yard Tool Shed	Remove—consolidate in new facility	Remove - consolidate in new facility	80
Stone Shelter @ Park	Retain	SPU wants to remove roof only	270
Generator Building	No recommendation	Remove - consolidate in new facility	190
Green Garage	Retain—relocate office	Relocate building, expand as required, relocate office	1,142
Green Fish Storage Building	Remove, provide function in new facility	Remove - provide function in new facility	240
Fish Trailer	Remove—consolidate in new facility	Remove - consolidate in new facility	320
Garage at Park	Remove, provide function in new facility	Remove - consolidate in new facility	500
Old Men’s Toilet Building	Remove	Remove	48
Old Women’s Toilet Building	Remove	Retain and restore (historic)	48
Old Park Restrooms	Remove	Remove	160
Portable Toilet @ Park	Remove, provide function in new facility	Remove, provide permanent pit toilets	270

CHAPTER 3. SITE INVESTIGATIONS

PLANNING ZONES

The Landsburg site is naturally composed of the following planning zones (see Figure 3-1):

- **Landsburg Park/9 Road Gate**—This 7-acre area includes the parking lot and entry drive off Landsburg Road SE and Landsburg Park. It is generally bounded by the river, Landsburg Road SE, the private 9 Road and the fence line at the south side of the new hatchery site. Vehicle entry control is through a monitored motorized sliding gate. Entry to the park is limited to pedestrian access through a fence chicane. Current issues include the undesirable ability of park visitors to access the 9 Road and then other protected areas inside the watershed. The park area includes what is termed the “Park Road,” which joins the 9 Road at the 9 Road gate. From there it traverses the park and passes through a manual gate at the south hatchery fence line, continuing to the dam/treatment site through another manual gate.
- **New Cedar River Sockeye Hatchery**—This 8-acre site is bounded by a fence bordering the park to the west, the 9 Road to the north, the river to the south and another fence to the east at the edge of the dam/treatment site. Currently under construction, this facility will be self-contained, with hatchery operations and two full-time residences for staff. It will be the largest facility at the Landsburg site. Orientation and access will be from the Park Road through monitored motorized gates.
- **Dam/Treatment Site**—The dam/treatment site is about 6 acres, with about 2 acres currently developed. The site is bounded by the 9 Road to the north and the river to the south. The new hatchery abuts it to the west at a common fence line. To the east is the watershed, about 3 acres of which are included in the 6-acre total. The center of this site is the most highly developed. Access is from a driveway off the 9 Road through a new monitored motorized gate. Secondary access is possible through manual gates from the Park Road and from an informal backdoor driveway farther east on the 9 Road. Near the entrance from the 9 Road, vehicle circulation is restricted by a bottleneck of structures, including the fluoridation facility and the green garage building. The treatment building, emergency generator and old generator building are directly ahead, with the river beyond. An old water tank lies on a rise to the east and the dam, treatment building and fish operations area are at the river on a lower level. The fish trailer, a temporary office and old restroom structures are southwest of the green garage. The functions at this site are generally independent of those at the park and new hatchery sites. The constraints on further development of this site currently are the location of the green garage, the site boundaries and the topography, which rises to the east and north. To the east beyond the rise that is home to the water tank and upstream from the dam adjacent to the river is a relatively flat and somewhat treeless area that has development potential, as does the relatively flat area west of the green garage and east of the hatchery site.
- **Old Hatchery and Area South of Cedar River**—This site is a narrow band of approximately 12 acres stretching along the south side of the Cedar River. It includes the old sockeye hatchery and some spring wells.
- **Forest and Staging Area North of 9 Road**—This area is larger than the entire rest of the Landsburg site. It is mostly wooded but includes a cleared area currently in use as a contractor staging area for the construction of the new hatchery. It is also the site of the new hatchery domestic water well.

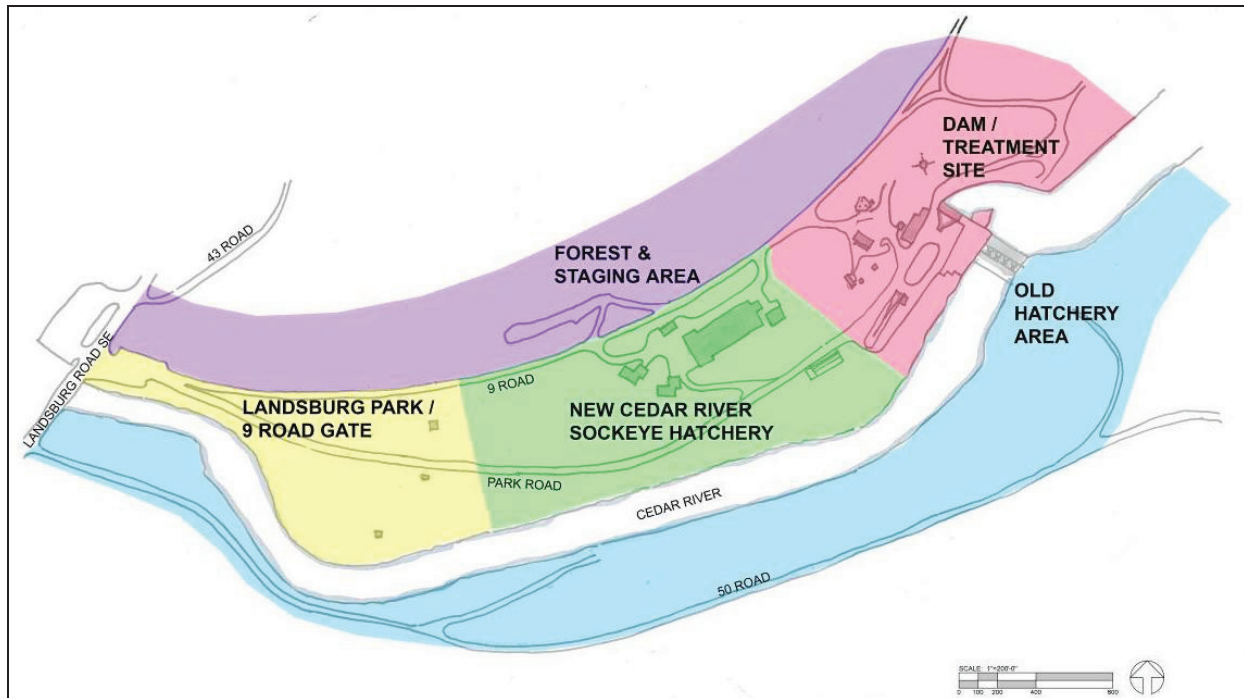


Figure 3-1. Landsburg Site Planning Zones

SITE GEOTECHNICAL CONDITIONS

Geotechnical analysis of the Landsburg site for this preliminary engineering report is based on previous investigations performed for the new Cedar River Sockeye Hatchery, as summarized below.

Geotechnical Information

Site geology adjacent to and east of the sockeye hatchery site is depicted in test pit logs contained in the *Geotechnical Report for the Cedar River Sockeye Hatchery* (Shannon & Wilson, 2002). Figure 3-2 shows the locations of borings made for the report. Test pits A, B, C and D are close to the proposed development area at the dam/treatment site. The soils at this location consist of a 3- to 4-foot thick layer of loose to dense sand and sandy gravel, with abundant cobbles and boulders, overlying a thick (>7 feet) deposit of medium dense to very dense gravelly sand and sandy gravel with scattered cobbles. A thin (<12 inches) surface topsoil layer of silty, gravelly sand overlies much of the site.

Implications for Future Development

Buildings located east of the hatchery site will likely be supported on shallow spread-footing foundations bearing in the medium dense to dense sandy gravel/cobble layer. This may require removal of large cobbles and boulders that interfere with the footing construction; however, these soils can bear pressures up to 3,500 pounds per square foot. Geotechnical studies indicate no significant geologic hazards at the site. Site excavations for basements or daylight basements would likely encounter competent granular soils with cobbles and boulders. Groundwater is expected to be more than 10 feet deep.

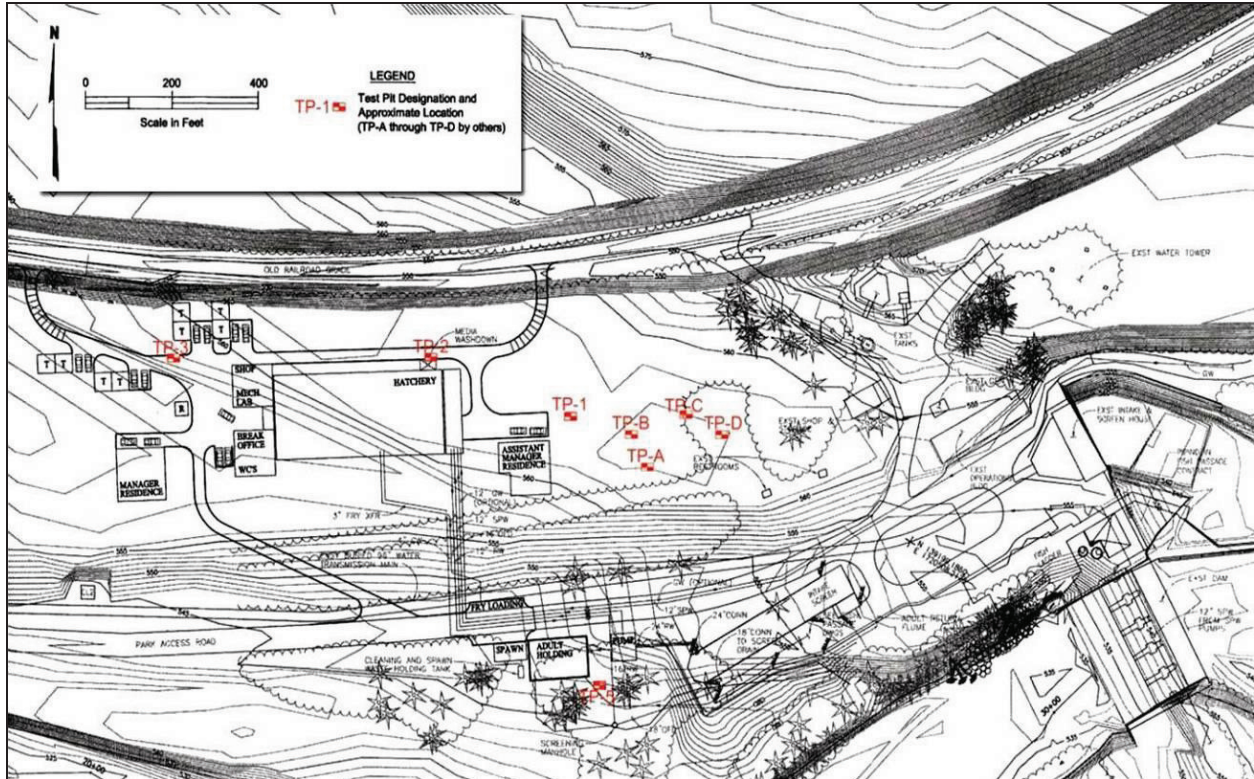


Figure 3-2. Location of Test Pits Bored for Geotechnical Investigation

SITE TOPOGRAPHIC CONDITIONS

The Landsburg site is a low-lying area in the western foothills of the Cascade mountains. The site is approximately 23 acres bounded by the 9 Road to the north, the Cedar River on the south, Landsburg Road SE on the west and the secondary dam/treatment site access drive to the east. The surrounding area is primarily undeveloped, forested Cedar River watershed, and it includes pockets of steep slopes. The course of the Cedar River is the most prominent natural topographic feature. The river's edge includes low and medium banks with slopes ranging from 5 percent to nearly 50 percent in places. The steepest banks at the site are between the Landsburg bridge and the park, and adjacent to the hatchery and dam/treatment sites.

The most prominent man-made topographic feature of the site is the 9 Road. This flat gravel road bed is bordered by drainage ditches on each side. The former railroad bed makes a distinct cut through the natural grade, which is typically 10 to 15 feet higher. Driveways accessing the 9 Road and serving the hatchery and dam/treatment site and the cleared area north of the roadway cut through these steep cuts to reach those facilities.

The site is relatively flat, with much of it at approximately the 560-foot contour elevation. The existing water tower and the new Cedar River Sockeye Hatchery are at elevations about 30 feet above the river, which is roughly the maximum elevation of the site. There is a slight rise on the south side of the shop and shed storage building and the grade begins to gradually decline on the north side of this building. The area in the vicinity of the treatment building has a gradual decline in elevation (approximately 4-percent grade change) to the area north of the fish ladder. From this point, the elevation changes at approximately 13.5 percent to the river's edge. The area south of the existing drain fields (on the western edge of the site) slopes south at approximately a 12-percent grade to approximately the 547-foot contour at the roadway into the site. The screen house building on the edge of the river at the eastern edge of the site has

a floor elevation of 556 feet. From the screen house to the site's main gate, which is the western limit of the site, there is a change in elevation of 4.5 feet, about a 1-percent change in elevation. The site topographic conditions are best viewed in the three facility site maps included at the end of this chapter. Topographic contours are shown at 1-foot increments.

SITE SURFACE WATER CONDITIONS

Surface Water Flow and Management

Except for a small area on the north end of the site near the fluoride storage area and the truck washdown that is part of the fish ladder area, surface water on site is collected by a network of 48-inch-deep catch basins, 8-inch storm drains and an 80-foot bioswale that runs along the roadway on the western portion of the site. Water that is collected in these storm drains flows west through a bioswale along the north side of Park Road before crossing the road west of the main gate and discharging into an infiltration trench.

Surface water from the small area on the north portion of the site flows north to the ditch on the south side of the 9 Road. Water that collects in the fluoride storage area also flows north into a storm drain before discharging into the ditch on the south side of the 9 Road. It was noted during the site inspection that the culvert that crosses under the north entrance into the site from 9 Road was occluded with soil build-up. Surface water from the truck loading area adjacent to the fish ladder flows through a 12-inch storm drain and discharges south, to the Cedar River.

Floodplain Mapping

Federal Emergency Management Agency (FEMA) flood mapping begins just downstream of the project site. This map (see Figure 3-3) delineates a floodway generally contained within typical river boundaries.

Flood Control Plans

SPU is in the process of developing plans for flood passage improvements at the diversion dam. The objective is to avert damage during extreme flood events. The plans include modifications to the dam gate, construction of a high-flow bypass spillway around the dam's south abutment, and the possible construction of a log boom across the river at a point about 100 yards east of the dam. According to SPU's project manager, this work may be constructed as soon as 2013. Temporary flood control provisions are currently under consideration and may involve the placement of concrete ecology blocks at the north side of the dam. According to SPU staff, flooding at the site has occurred at a level above the paved area adjacent to the screen house and the dam.

Wetlands

Field investigations conducted by the Watershed Company identified two distinct riparian fringe wetland areas at the Landsburg site. These wetlands are located along the north bank of the Cedar River in areas east of the dam/treatment site and west of the proposed hatchery. More detailed descriptions of these riverine class wetlands are provided in the Environmental Investigation section of this chapter.

Rainfall

The average annual precipitation for the project site as measured at SeaTac Airport and as compiled by the Western Regional Climate Center (1931–2000) is 37 inches. The Technical Information Report for the Cedar River Sockeye Hatchery (Tetra Tech, 2009) gives an average annual rainfall for the area of 42 inches. The peak rainfall typically occurs between November and February.

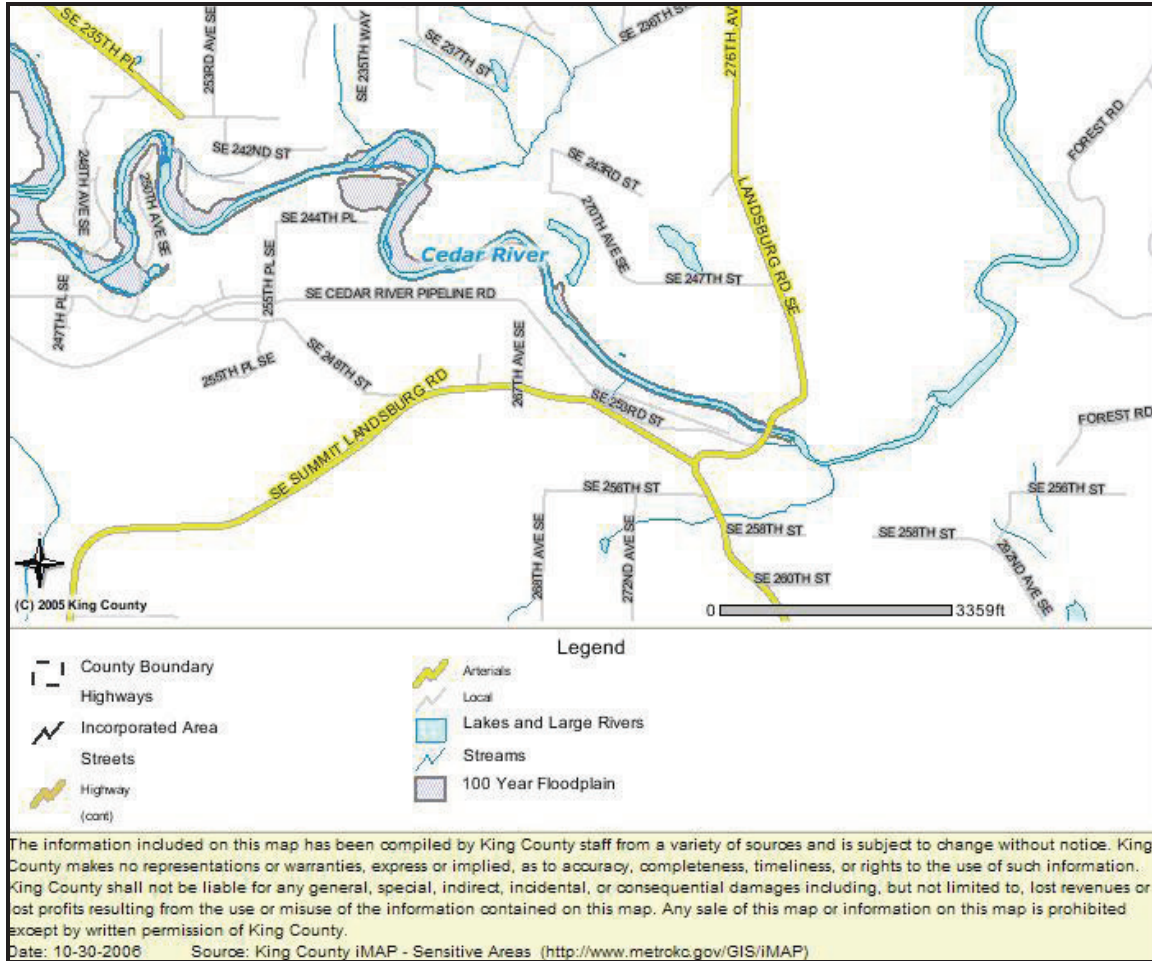


Figure 3-3. Mapped 100-Year Floodplain in Vicinity of Landsburg Site

APPLICATION OF LEED PRINCIPALS

The City of Seattle is committed to sustainable development and design. Any new facility or major renovation at Landsburg will be required to be LEED (Leadership in Energy and Environmental Design) Silver-certified at a minimum. The executive steering committee has encouraged a high standard embracing green design principals and making the project a model of sustainability.

A green design forum was conducted for the project, including presentation of a conceptual approach to achieving a LEED Silver rating. A printout of the team’s LEED PowerPoint slide presentation is included in the appendix. Figure 3-4 shows the initial LEED checklist presented at the forum. Concepts that emerged from this meeting were subsequently incorporated into conceptual pricing documents for the selected site development alternatives. These include the following:

- Use of pervious pavement for surface water quantity and quality
- Use rain gardens for surface water quantity and quality
- Use of low-emitting materials
- Use of designated recycling storage areas
- Use of rapidly renewing materials and certified wood