Chapter 1: Introduction and Background

1.1 Introduction

This *Final Environmental Impact Statement: Cedar Hills Regional Landfill 2010 Site Development Plan* was prepared for the King County Department of Natural Resources and Parks, Solid Waste Division (KCSWD) to evaluate the potential environmental impacts of five action alternatives for future development of the Cedar Hills Regional Landfill (CHRLF). Environmental review was conducted by HDR Engineering, Inc. and its subconsultants Parametrix, Inc.; Hough Beck & Baird; Soil & Environmental Engineers, Inc.; and Northwest Archaeological Associates.

The purpose of the Environmental Impact Statement (EIS) is to identify any potential significant adverse environmental impacts associated with each alternative for future landfill development (Action Alternatives 1 through 5) and to propose reasonable mitigation measures to minimize any impacts identified. Under guidance of the State Environmental Protection Act (SEPA), the EIS examines the potential for impacts to earth; air and odor; surface water; groundwater; upland vegetation, wetlands and wildlife; noise and vibration; human health; land use; scenic resources (aesthetics, light, and glare); cultural resources; transportation; public services and utilities; and greenhouse gases. The EIS conducted for the CHRLF determined that none of the five action alternatives for the landfill poses any significant adverse environmental impacts compared with the No Action Alternative.

The examination of action alternatives for the CHRLF is consistent with the recommendation presented in the *Solid Waste Transfer and Waste Management Plan* and approved by King County Council in December 2007 to "explore opportunities for taking advantage of available landfill capacity to extend the life of this cost-effective disposal option."

Under the No Action Alternative, the CHRLF is expected to reach its permitted capacity in 2018, based on 2009 solid waste tonnage forecasts; this estimate assumes that no further landfill development would occur beyond what is planned in the 1998 Site Development Plan for the CHRLF. Action Alternatives 1 through 5 provide a range of development scenarios that would extend the life of the landfill from about 3 to 13 years beyond 2018.

Based on this environmental review and considerations of operational feasibility, cost, stakeholder interest, and flexibility, the division is recommending Alternative 2 (described in detail in Section 2.3) as the preferred alternative for extending the life of the landfill. This alternative was chosen for several key reasons:

- It offers landfill capacity to about 2024 with the least amount of disruption to existing landfill structures and the buffer zone, yet preserves the flexibility to implement further development if warranted in the future.
- It maximizes the use of readily available space at the landfill with no significant potential adverse impact on the environment. Additionally, it does not propose any solid waste disposal or relocation of facilities in the buffer zone.
- All proposed development under Alternative 2 is allowed under the existing Special Permit issued for the site in 1960.

- It presents significant cost savings over the No Action Alternative. Once the landfill reaches capacity and closes, KCSWD will transition to another method of disposal, such as transporting waste to an out-of-county landfill or to a waste-to-energy or other waste conversion facility(ies). Studies conducted for KCSWD (R.W. Beck 2007) and a comparison of rates paid by other local governments that transport waste to out-of-county landfills indicates that disposal at CHRLF is significantly less expensive than the projected cost of other disposal options. Thus by extending the life of the landfill and delaying the transition to a new disposal method, KCSWD can delay the expenses and subsequent rate increases that will be needed to accommodate this transition. A separate cost analysis will be prepared by KCSWD.

Following publication of this Final EIS, KCSWD will submit to the King County Council a Project Program Plan (PPP) that provides the rationale for selecting Alternative 2 and a preliminary schedule for its implementation. Upon Council approval of the PPP, KCSWD will prepare a Site Development Plan (SDP) that provides a detailed implementation plan and budget for the selected alternative.

1.2 Background

Since 1965, the CHRLF has provided for the safe and efficient disposal of the county's solid waste. The CHRLF is located on a 920-acre site in unincorporated King County at 16645 228th Avenue SE, Maple Valley. The site is approximately 4 miles south of Issaquah and 6 miles east of Renton (see Figures 1-1 and 1-2). The site is accessed from Cedar Grove Road and consists of the northern one-half of Section 28 and Section 21 (except the northeast quarter of the northeast quarter), Township 23 North, Range 6 East, Willamette Meridian. King County owns the landfill property; KCSWD pays rent to the county for use of the property.

Solid waste disposal at the CHRLF is allowed under a Special Permit, approved by the King County Board of County Commissioners in 1960 (Appendix A). The permit allows the operation of a sanitary landfill and specifies that a 1,000-foot-wide buffer be maintained around the perimeter of the site for the protection of the surrounding properties. The Special Permit stipulates that "no sanitary operations" (i.e., waste disposal) should be allowed within the buffer. As the property owner, King County, not KCSWD, may authorize other uses within the buffer.

KCSWD is responsible for the maintenance of the buffer, as it pertains to landfill-related activities. See Section 2.1.4 for more information on allowed land uses in the buffer.

In addition to the 920-acre parcel that defines the landfill boundary, the county owns a 20-acre parcel northeast of the landfill boundary (Figure 1-2). The 20-acre parcel provides added buffer between the East Main Hill Refuse Area of the landfill and adjacent properties, although it is not included in the Special Permit.

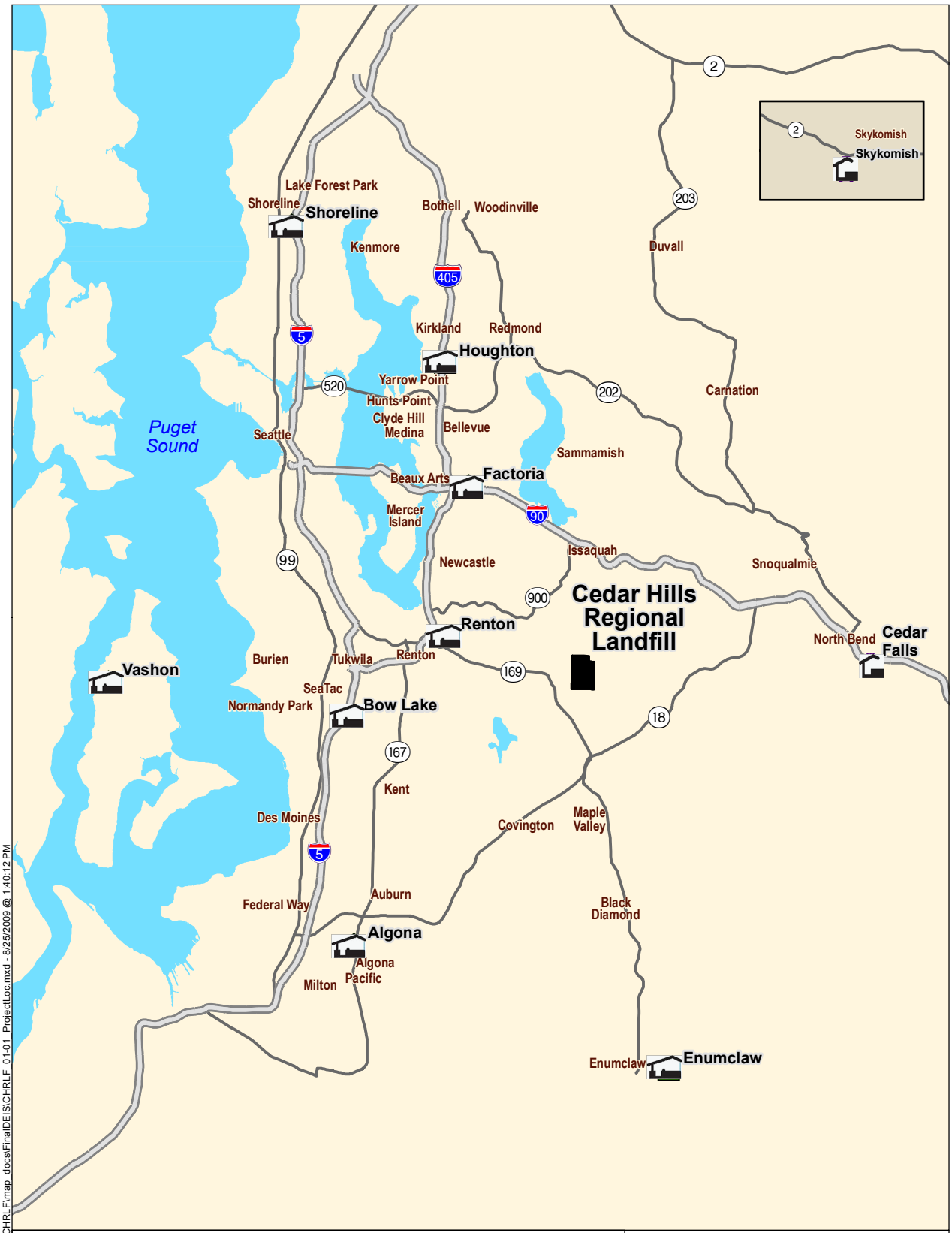

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FIGURE 1-1
Location of King County Solid Waste Facilities

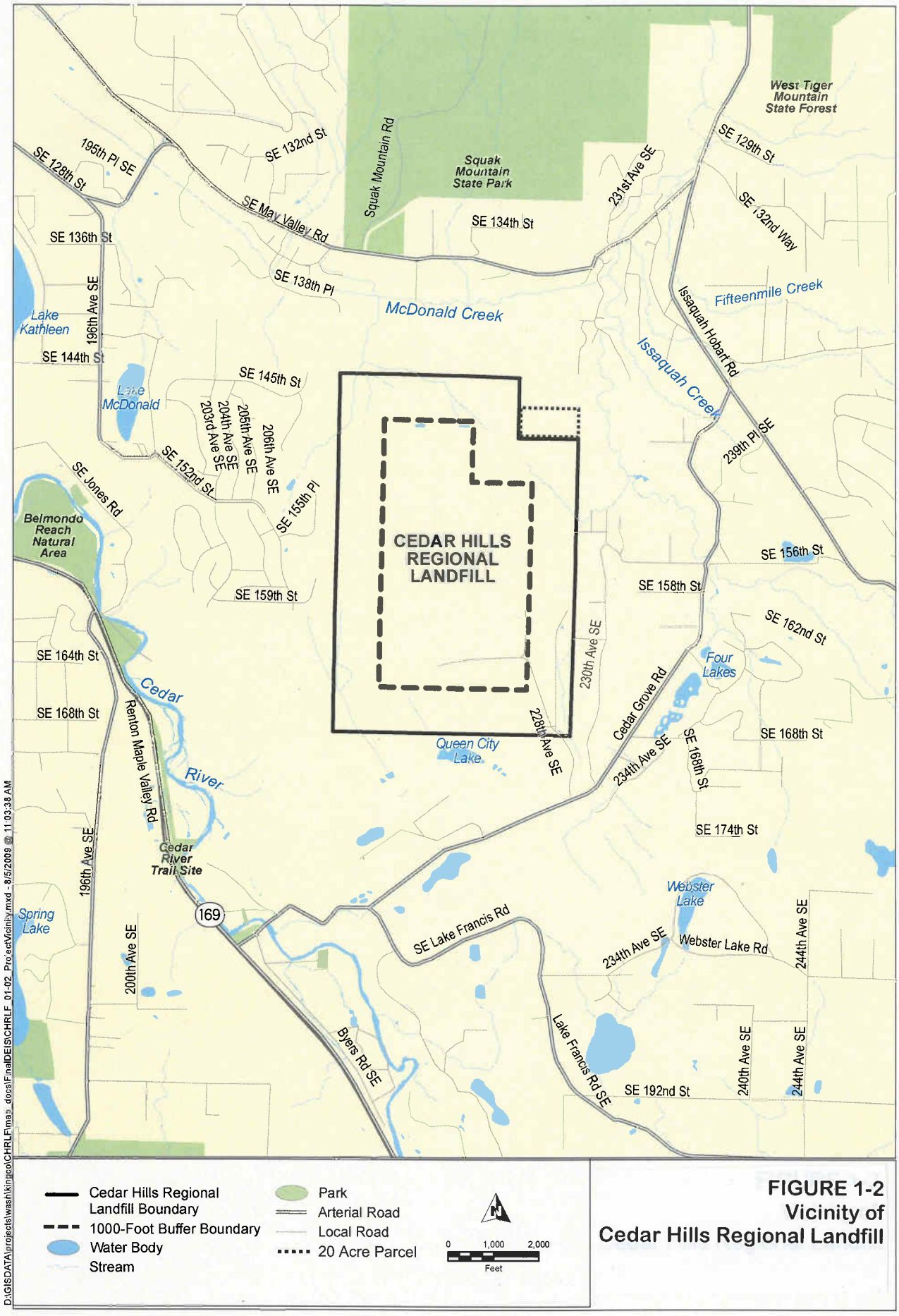

FIGURE 1-2
Vicinity of
Cedar Hills Regional Landfill

1.3 Environmental Review Process

In compliance with SEPA, in early 2009 KCSWD initiated the process for evaluating the potential environmental impacts of each of the five action alternatives for landfill development. On March 30, 2009 KCSWD issued a Determination of Significance and began a public scoping period to gather comments on the range of issues to be evaluated during the environmental review. The scoping period for the EIS ran from March 30 until May 1, 2009. On April 20, a scoping meeting was held, and comments were received from more than 45 individuals or agencies. Based on the comments received, additional studies related to air quality, noise, and vibration were included as part of the environmental review process (Appendix E).

The analysis of potential impacts included gathering information about existing conditions for each element of the environment, assessing potential impacts, and recommending mitigation measures if potential impacts were identified.

Environmental review under SEPA requires an analysis of impacts during all phases of a project, including construction and operation. Because of the dynamic nature of a sanitary landfill operation, these activities are very similar, particularly in terms of environmental controls. The operation of a landfill resembles a construction project with the sequential development and filling of refuse (or disposal) areas. Common activities include excavation, soil relocation, and the application of area-specific environmental controls (e.g., to mitigate erosion, dust, and noise). During new area construction, the environmental systems put in place for day-to-day operations are enhanced to mitigate impacts during periods of increased construction activity. For these reasons, this EIS addresses the impacts of construction and operation for each alternative concurrently.

A Draft EIS presenting the results of the environmental review was issued on September 30, 2009. Issue of the Draft EIS was followed by a public comment period from September 30 to November 6 to allow review and comment by regulators, other agencies, and the general public. The Draft EIS was published on the KCSWD Web site, distributed at several county libraries, and mailed to regulators, state agencies, cities, Unincorporated Area Councils, tribes, and school districts. On October 22, 2009, a public hearing was held, which included a presentation about the Draft EIS and an opportunity to ask questions and provide comment. About 22 citizens attended the public hearing. Throughout the public comment period, 28 written comments were received on the Draft EIS. The division considered all of the comments received and determined that no additional environmental studies were needed to proceed with preparation of this Final EIS.

As part of SEPA requirements, this Final EIS contains a Responsiveness Summary (following Chapter 16), which provides the public with responses from KCSWD to all the questions and comments that were received during the public comment period for the Draft EIS. The Responsiveness Summary groups the comments/questions by topic area and chapter and provides KCSWD's response. Each comment received is provided in its entirety following the summary. The text of the Final EIS was revised as needed to clarify or correct information. These changes are not substantive. KCSWD did, however, withdraw Alternative 4 from further consideration for reasons discussed in Chapter 2 of this plan. In addition, the Draft EIS included a chapter entitled *Comparative Cost Analysis*, which was removed because the cost analysis is not a required element of an EIS, and KCSWD is preparing a separate cost analysis.

1.4 Current CHRLF Operations

The CHRLF comprises 10 solid waste disposal areas (see Figures 1-3 and 1-4). Table 1-1 lists the status of each disposal area. Leachate and landfill gas are collected from all disposal areas.

Table 1-1. Cedar Hills Regional Landfill Disposal Areas

Disposal Area	Status
East Main Hill Refuse Area	Closed with final cover
Central Pit Refuse Area	Closed with final cover
Southwest Main Hill Refuse Area	Closed with final cover
SE Pit Refuse Area	Closed with final cover
South Solid Waste Area	Closed with final cover
Refuse Area 2/3	Closed with final cover
Refuse Area 4	Closed with final cover
Refuse Area 5	Closed on side slopes with final cover; interim cover on top area
Refuse Area 6	Active disposal area currently receiving solid waste – partially closed on side slopes
Refuse Area 7	Construction in 2009 with initial waste receipt in June 2010

CHRLF operates 7 days a week, 362 days per year. Operating hours vary depending on the type of activity, with normal operating hours as follows:

- Trucks arriving and departing – 6:00 a.m. to 9:30 p.m. weekdays, 6:00 a.m. to 5:30 p.m. Saturdays and Sundays.
- Landfilling operations – 6:00 a.m. to 7:00 p.m. weekdays, 6:00 a.m. to 4:30 p.m. Saturdays and Sundays.
- Maintenance staff hours – 5:30 a.m. to 11:00 p.m. weekdays, 6:00 a.m. to 4:30 p.m. Saturdays, Sundays, and holidays.
- Administrative staff hours – 7:00 a.m. to 5:00 p.m. weekdays. Closed holidays and weekends.

The landfill operates with a staff of approximately 160 employees during the week, with about 40 to 50 employees present on the weekends. Most of the waste delivered to the CHRLF is municipal solid waste (garbage) from residential and non-residential sources. Of the approximately 900,000 tons of solid waste disposed each year, between 6,000 and 9,000 tons is designated as special wastes. These wastes include asbestos-containing materials, industrial wastes, contaminated soil, treated biomedical wastes, treatment plant grit and vactor wastes, and other miscellaneous materials.

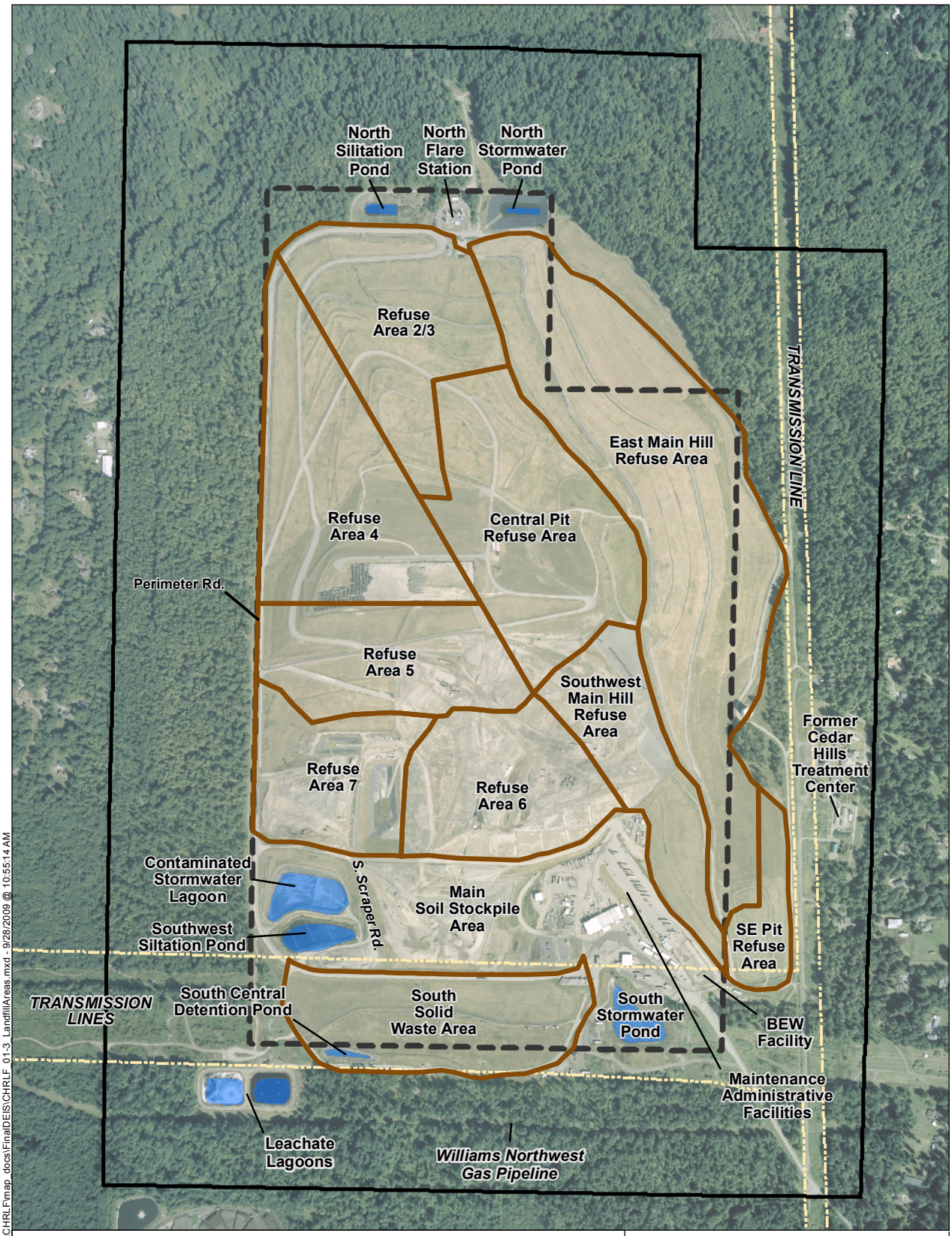

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FIGURE 1-3
Existing Landfill Areas

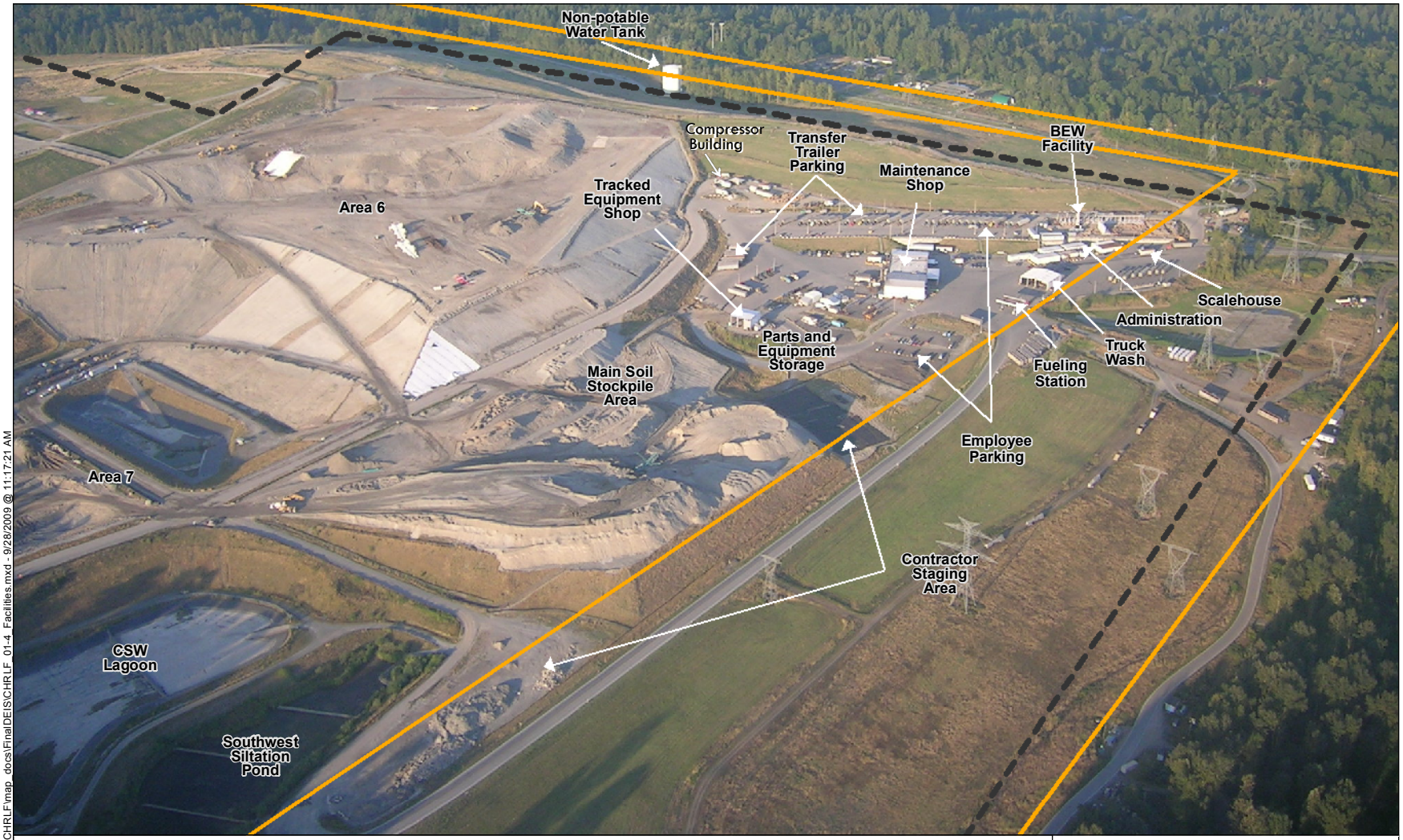

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FIGURE 1-4
Location of Cedar Hills Regional Landfill Facilities

Solid waste is delivered to the CHRLF primarily by KCSWD transfer vehicles and a few private vehicles. All vehicles arriving with waste are weighed at the scalehouse before traveling along designated on-site haul routes to the active area of the landfill where they deposit their loads. After the vehicles deposit their loads, they return along the on-site haul roads and may pass through a truck wash facility to clean their undercarriage and tires. Vehicles that do not have a recorded tare weight return to the scalehouse where they are weighed again so that landfill staff can determine the weight of deposited waste material.

Significant changes are planned and underway for KCSWD's transfer station system that will have a direct effect on the CHRLF. Nearly all of the county's urban transfer stations will be replaced with new facilities that will include equipment to compact the solid waste into enclosed transfer trailers or containers. As a result, payloads are expected to increase from approximately 18 tons per load (for open top trailers) to 25 tons per load (for enclosed trailers or containers). The increase in payloads is anticipated to result in 30 to 35 percent fewer transfer vehicles needed to transport a given amount of solid waste to the CHRLF. The enclosed transfer trailers or containers will also significantly reduce the potential for litter during transport.

In 2009, the landfill began using tippers to unload transfer trailers. The tippers have several benefits, including some reduction in heavy equipment use, a smaller active work area, increased operational efficiency (quicker unloading times), and reduced travel distances for transfer trailers over non-asphalt surfaces (reducing potential fugitive dust emissions).

In addition to the vehicles hauling solid waste to the active disposal area, or working face, typical equipment used in the landfilling operation includes bulldozers, compactors, scrapers, excavators, motor graders, tippers, and off-road dump trucks. At the end of each day, an approved daily cover material is applied over all waste received during the day.

Physical features of the CHRLF relevant to the operations of the landfill are detailed in the following subsections. These features are shown in Figure 1-3.

1.4.1 Buffer Zone

The buffer zone is a 1,000-foot-wide strip that separates the area of landfill activities from surrounding properties. It consists primarily of wooded area, but the density of the woods varies, with the highest densities in the northern buffer and the lowest densities in the southeastern buffer.

As discussed under *Background*, requirements for the buffer were stipulated in the 1960 Special Permit. Over the years, some land uses have been allowed in the buffer (more information about the history of these allowed uses is provided in Section 2.1.4).

The current status of activity in the buffer is as follows (refer to Figure 1-3):

West and North: The north and west buffer areas are heavily wooded and maintained in a natural state, and there are no disturbances to wetlands. Some gas probes and groundwater wells are installed for environmental monitoring. Dirt roads provide access to these environmental systems.

South: The buffer to the south is mostly wooded and maintained in a natural state. Allowed uses in this area of the buffer include two lined leachate treatment lagoons. Additionally, a

small portion of the South Solid Waste Area, which was landfilled in the 1970s, extends into the south buffer.

East: The buffer to the east is partially wooded. It contains power transmission lines and a number of allowed uses, including the landfill access road, 228th Avenue SE, in the southeast corner; a non-potable water tank; and the former Cedar Hills Alcohol Treatment Center, which was recently approved for renovation as Passage Point.

Aerial photographs taken in the 1970s and 1980s indicate that some solid waste disposal occurred in the east buffer (the SE Pit Refuse Area and portions of the East Main Hill Refuse Area).

1.4.2 Contaminated Stormwater Lagoon

The contaminated stormwater (CSW) lagoon collects surface water from the active area of the landfill (e.g., areas of refuse without intermediate or final cover) and subsequently discharges to the leachate lagoons. The existing CSW lagoon was constructed in 1997 to provide storage of CSW from the active portion of the landfill prior to discharge to the leachate lagoons. The CSW lagoon is located in the southwest corner of the site directly south of the southwest corner of Area 7. The CSW lagoon is lined with a 60-millimeter high-density polyethylene (HDPE) geomembrane. The CSW lagoon was designed to contain the runoff from 46.4 acres for a 100-year, 24-hour storm, resulting in a design volume of 12.8 acre-feet (4.17 million gallons). The design of the lagoon and associated conveyance facilities are documented in the *CHRLF Area 4, Stage 1 Closure Engineering Report* (KCSWD 1998a) and the *Area 7 Engineering Report* (KCSWD 2008c). In 2009 the perimeter of the CSW lagoon was raised to increase the volume of the lagoon to 28.4-acre feet.

1.4.3 South Stormwater Pond

The south stormwater pond is located west of the site entrance. It was constructed in 1987 and was designed to receive flows from up to 190 acres of landfilled area. Stormwater runoff from closed landfill areas at the southeast end of the CHRLF (including the SE Pit Refuse Area and the southern portion of the main hill) and from the support facilities area drains to this pond. Discharges from the south stormwater pond flow within pipes along the south side of 228th Avenue SE to a bioswale – bioswales are designed to remove silt and pollutants from surface water runoff. Flow in the bioswale discharges to a stormwater pipe and eventually to an open infiltration ditch south of the intersection of 228th Avenue SE and Cedar Grove Road.

1.4.4 South Central Detention Pond

The south central detention pond lies along the southern edge of the South Solid Waste Area (SSWA). Constructed in 1988, the pond's design includes receiving stormwater flows from the SSWA, which has final cover. The south central detention pond discharges along the south property line.

1.4.5 Southwest Siltation Pond

The southwest siltation pond is located north of the northwest corner of the SSWA. The southwest siltation pond was constructed in 1990 and was designed to detain stormwater flows from approximately 114 acres. The pond receives flows from the area generally

bounded on the south by the SSWA, on the north by Area 4, on the west by the Perimeter Road, and on the east by South Scraper Road. A small area west of the Perimeter Road also drains to the southwest siltation pond via a ditch along the west side of the perimeter road. The southwest siltation pond ultimately discharges along the south property line.

1.4.6 Leachate Lagoons

The leachate storage facilities consist of two leachate lagoons located in the southwest corner of the site. The lagoons receive all flow from the site that has been contaminated by refuse, including both CSW and leachate. The design capacity of the lagoons is 12.25 million gallons at a water surface elevation of 518 feet above mean sea level. Within the leachate lagoons, the CSW and leachate mix is aerated as preliminary treatment before discharge into the King County Wastewater Treatment Division's sanitary sewer system for final treatment and disposal.

1.4.7 Landfill Gas Processing Facility

In 2008, King County leased two acres to Bio Energy (Washington), LLC (BEW) to construct a facility to convert the landfill gas produced at the landfill into pipeline-quality natural gas for use in the region. The facility, owned and operated by BEW, will also generate supplementary electricity from the waste gas stream to run the landfill gas processing facility. The plant separates methane gas from the landfill gas and then pumps it into a commercial natural gas pipeline as pipeline-quality gas. Carbon dioxide and all other contaminant gases are removed and disposed by burning at the BEW thermal oxidizing unit. When the plant cannot conform to the pipeline gas quality or during any processing problem, landfill gas is flared in the BEW high-temperature flare, which is regularly tested to ensure that air emissions do not exceed applicable environmental regulatory levels. BEW emits flue gas from the engine generators that is dispersed through stacks to comply with Puget Sound Clean Air Agency permit requirements. It also produces a small quantity of liquid effluent (mainly landfill gas condensate) that is discharged into the CHRLF leachate collection system and complies with CHRLF industrial wastewater discharge permit requirements. BEW is committed to operating the plant following all applicable regulations and King County codes regarding noise and other environmental pollutants.

1.4.8 North Flare Station

The North Flare Station, a facility that flares landfill gas, is located at the north end of the landfill area. There are five flares at the station with a combined design capacity of more than 15,000 standard cubic feet of landfill gas per minute. With the opening of the landfill gas-to-energy processing facility in the southeast area of the CHRLF, use of the North Flare Station will be greatly reduced. However, the flares will remain in good operating condition to handle gas flaring during any time the BEW gas plant shuts down or is operating at partial capacity. The flare station has recently been automated to operate and control gas delivery to the BEW gas processing plant.

1.4.9 Maintenance and Administrative Facilities

A number of buildings and open areas support operation of the CHRLF. These include buildings for administrative offices, a maintenance shop, a truck wash building, a scalehouse, parking areas for employees and transfer trailers, contractor staging areas, soil stockpiles, and an area for storage of parts and equipment.

1.5 Future Solid Waste Disposal Volumes

In 2008, the CHRLF received 930,616 tons of solid waste and consumed 1,329,000 cubic yards of the CHRLF's capacity, resulting in a measured in-place waste density of 0.7 tons per cubic yard. KCSWD prepared the forecast shown in Table 1-2 in January 2009; this forecast reflects lower rates of solid waste generation than earlier forecasts, due to factors such as the recent decline in the regional economy.

Tentative dates of landfill closure have been provided for the alternatives based on January 2009 data; however, it should be noted that the forecast is adjusted regularly for fluctuations in solid waste tonnage and is subject to change.

Table 1-2. Solid Waste Forecast for King County to 2030

Year	Forecast Tonnage[1]	Forecast Landfill Volume Consumed[1,2] (cubic yards)
2008	930,616	1,329,000[1]
2009	895,000	1,279,000
2010	905,000	1,293,000
2011	910,000	1,300,000
2012	910,000	1,300,000
2013	930,000	1,329,000
2014	965,000	1,379,000
2015	990,391	1,415,000
2016	994,497	1,421,000
2017	1,013,460	1,448,000
2018	1,033,022	1,476,000
2019	1,047,805	1,497,000
2020	1,068,941	1,527,000
2021	1,073,949	1,534,000
2022	1,093,972	1,563,000
2023	1,092,424	1,561,000
2024	1,113,660	1,591,000
2025	1,135,415	1,622,000
2026	1,135,402	1,622,000
2027	1,157,693	1,654,000
2028	1,169,382	1,671,000
2029	1,192,627	1,704,000
2030	1,216,257	1,738,000

Notes: Excludes the City of Seattle and Milton.

Source of forecast tonnage by year: KCSWD 2009c

[1]Actual data provided for 2008 only; all other figures were estimated for the purposes of this analysis – the forecasted tonnage has been updated since this analysis was performed.

[2] Based on measured conversion rate of 0.7 tons per cubic yard