Environmental Checklist
State Environmental Policy Act

2006 Facility Master Plan Update
Bow Lake Transfer/Recycling Station

December 2006

King County
Department of Natural Resources and Parks
Solid Waste Division

Environmental Checklist
State Environmental Policy Act

2006 Facility Master Plan Update
Bow Lake Transfer/Recycling Station

December 2006

King County
Department of Natural Resources and Parks
Solid Waste Division

King Street Center
201 S. Jackson Street
Seattle, WA 98104
www.metrokc.gov/dnrp/swd

This material will be provided in alternate formats upon request by contacting:
King County Solid Waste Division
206-296-4466
1-800-325-6155, ext. 6-4466
TTY Relay: 711
www.metrokc.gov/dnrp/swd

Table of Contents

Acronyms iii

A. Background 1

B. Environmental Elements 22

1. Earth 22
2. Air 28
3. Water 30
4. Plants 40
5. Animals 41
6. Energy and Natural Resources 42
7. Environmental Health 43
8. Land and Shoreline Use 50
9. Housing 52
10. Aesthetics 53
11. Light and Glare 60
12. Recreation 60
13. Historic and Cultural Preservation 61
14. Transportation 61
15. Public Services 79
16. Utilities 79

C. Signature 80

References 81

List of Appendices

Appendix A – Potential Environmental Permit Matrix

Appendix B – Alternative Layouts

Appendix C – Tonnage and Vehicle Forecast Methodology

Appendix D – Geotechnical Engineering Studies
- Slope Geotechnical Issues
- HWA Geosciences Memo
- Historical Studies

Appendix E – Air Quality Assessment

Appendix F – Water Resources
- Conceptual Stormwater Management Plan
- Leachate Memorandum

Appendix G – Wetland Correspondence
- Wetland Reconnaissance
- Stream Bank Flagging

Appendix H – Environmental Health
- Operations Plan: Bow Lake Transfer/Recycling Station
- Environmental Protection Plan
- Hazardous Materials Emergency Response Plan
- Public Health Memorandum

Appendix I – Noise
Noise Assessment Letter
Noise Assessment Addendum

Appendix J – Transportation Documentation
Traffic Study
Queuing Technical Memorandum
Construction Traffic Technical Memorandum
WSDOT Property Acquisition Meeting
Impacts of I-5/SR 509 Project
Local Street Traffic Impact Evaluation
Summary of Preliminary Transportation Assessment

List of Tables

Table 1. Slope Summary 23
Table 2. Hydrologic Results – Developed Conditions 37
Table 3. Existing Traffic Volumes: S 188th St/Orillia Rd S/Transfer Station 62
Table 4. Existing (2006) LOS Summary: Weekday Am, Pm, and Sat. Peak Hours 63
Table 5. Baseline (2011) LOS Summary: Weekday AM and PM Peak Hours 64
Table 6. Baseline (2011) LOS Summary: Saturday Peak Hour 64
Table 7. 2011Trip Generation Estimate Summary 69
Table 8. 2011 Project Traffic Volume Impacts 70
Table 9. With-Project LOS Summary: Weekday AM and PM Peak Hours 71
Table 10. With-Project LOS Summary: Saturday Peak Hour 72
Table 11. 2030 Trip Generation Estimate Summary 72
Table 12. 2030 With-Project and Baseline LOS Summary Weekday PM Peak Hour 73
Table 13. 2011 Existing Intersection Queue Summary: Weekday AM and PM Peak Hours 74
Table 14. Intersection Queue Summary: 2030 Baseline and With-Project 74
Table 15. Construction Traffic – Site Facilities Work 76
Table 16. Tonnage and Traffic Summary 2001-2005 and 2030 Forecast 77

List of Figures

Figure 1. Vicinity Map 6
Figure 2. Aerial Photo 7
Figure 3. Aerial Photograph of Bow Lake Transfer/Recycling Station 8
Figure 4. Existing Scale Facility 9
Figure 5. Existing Waste Pit 9
Figure 6. Preferred Site Plan 11
Figure 7. Transfer Building Main Floor Plan 14
Figure 8. Transfer Building South and West Elevations 15
Figure 9. Transfer Building North and East Elevations 16
Figure 10. Construction Site Plan Phase 1 18
Figure 11. Construction Site Plan Phase 2 19
Figure 12. Construction Site Plan Phase 3 20
Figure 13. Parcel Map 21
Figure 14. Existing Viewpoints 54
Figure 15. Photo Simulation (1A) 55
Figure 16. Photo Simulations (2A, 4A) 56
Figure 17. Viewpoints Locations on Valley Floor 58
Figure 18. Existing Viewpoints from Valley Floor 59
Figure 19. Traffic Circulation Plan 66

ACRONYMS

BMPs – Best Management Practices

EPP – Environmental Protection Plan

FMP – Facilities Master Plan

HOV – High Occupancy Vehicle

HPA – Hydraulic Project Approval

KCSWD – King County Solid Waste Division

KCSWDM – King County Surface Water Design Manual

LOS – Level of Service

MSL – Mean Sea Level

MSW – Municipal Solid Waste

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollutant Discharge Elimination System

PHS – Priority Habitats and Species

PSCAA – Puget Sound Clean Air Agency

SPCC – Spill Prevention Control and Countermeasure

SEPA – Washington State Environmental Policy Act

TESC – Temporary erosion and sediment control

TIR – Technical Information Report

TMC – Tukwila Municipal Code

TSP – Tukwila South Project

TVS – Tukwila Valley South

USFWS – U. S. Fish and Wildlife Service

WDFW – Washington State Department of Fish and Wildlife

WDNR – Washington State Department of Natural Resources

WSDOT – Washington State Department of Transportation

A. Background

1. Name of the proposed project, if applicable:

Bow Lake Transfer/Recycling Station: Facility Master Plan and Expansion Project

2. Name of applicant:

Solid Waste Division, King County Department of Natural Resources and Parks (DNRP)

3. Address and phone number of applicant and contact person:

Kevin Kiernan
Engineering Services Section
Solid Waste Division
King County DNRP
201 South Jackson Street, Suite 701
Seattle, WA 98104-3855
(206) 296-4411

4. Date checklist prepared:

December 2006

5. Agency requesting checklist:

King County Solid Waste Division (KCSWD) is the SEPA lead agency for the project.

6. Proposed timing or schedule (including phasing, if applicable):

King County Council adoption of the Facility Master Plan (FMP) is anticipated to occur in the first quarter of 2007.

Construction of the buildings and site features shown in the Facility Master Plan is expected to be implemented in phases. Phase 1 construction is anticipated to begin in April 2008 with completion in June 2010. The existing station will continue to be fully operational during Phase 1 construction. Phase 2 construction is anticipated to begin in June 2010 with completion in April 2011. During this phase, residential self-haul customers will be redirected to other county transfer stations at Algona or Renton. Phase 3 construction is anticipated to begin in April 2011 with completion in June 2011. Commercial and self-haul customers will have full access to the station during this phase, which is expected to last 1 to 2 months.

7. Do you have any plans for future additions, expansions or further activity related to or connected with this proposal? ☒ **Yes** ☐ **No** *If yes, explain.*

The KCSWD is currently revising its Local Hazardous Waste Management Plan and its Comprehensive Solid Waste Management Plan. These plans may call for changes in services at KCSWD's transfer stations, and if so, additional evaluation including SEPA review may be conducted as appropriate.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- *Final 2001 Comprehensive Solid Waste Management Plan,* prepared by King County Solid Waste Division. 2001.
- *Final Supplemental Environmental Impact Statement: Transfer and Waste Export System Plan for King County, Washington,* prepared by King County Solid Waste Division. 2006.
- *Draft Geotechnical Evaluation Report: WSDOT Property, Bow Lake Transfer Station/ Recycling Facility, King County, Washington,* prepared by HWA Geosciences, Inc. for R.W. Beck. 2004.
- *Geotechnical Engineering Study: Bow Lake Transfer Station Improvements Facilities Master Plan, King County, Washington,* prepared by Hong West & Associates, Inc. for R.W. Beck and Associates. 1993.
- *Impacts of I-5/SR 509 Project on the Bow Lake Transfer Station,* prepared by The Transpo Group for King County Solid Waste Division. 2006.
- *King County's Bow Lake Transfer/Recycling Station Upgrade – Noise Assessment Memorandum,* prepared by Geomatrix for Adolfson Associates, Inc. May 5, 2006.
- *King County's Bow Lake Transfer/Recycling Station Upgrade – Air Quality Assessment Memorandum,* prepared by Geomatrix for Adolfson Associates, Inc. May 5, 2006.
- *Local Street Traffic Impact Evaluation for King County Transfer Stations,* prepared by HDR Engineering for King County Solid Waste Division. 2005.
- *Summary of Preliminary Transportation Assessment – Bow Lake Transfer Station,* prepared by The Transpo Group for R.W. Beck. 2004.
- *Supplemental Subsurface Investigation: Bow Lake Transfer Station Improvements Facility Master Plan, King County, Washington,* prepared by Hong West & Associates for R.W. Beck and Associates. 1994.
- *Wetland Reconnaissance for Bow Lake Transfer Station and WSDOT Property,* prepared by Adolfson Associates, Inc. for R.W. Beck. 2004.
- *Conceptual Stormwater Management Plan, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by R.W. Beck. 2006.
- *Summary of Preliminary Inbound Customer Queuing Evaluation, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation – Technical Memorandum,* prepared by R.W. Beck. 2006.
- *Public Health Procedures and Requirements, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by King County SWD. 2006.
- *Construction Traffic Forecast, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by R.W. Beck. 2006.
- *Evaluation of Potential for Leachate Generation at the Project Site During Construction and During Operation of the Completed Facility, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by R.W. Beck. 2006.
- *Slope Geotechnical Issues, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by HWA Geosciences, Inc. 2006.
- *Traffic Impact Analysis, Bow Lake Transfer/Recycling Station Facility Master Plan,* prepared by Transpo Group. 2006.

There are several investigations related to the expansion of the transfer station that will be conducted in the future:

- Detailed Geotechnical Study conducted during the design phase.
- Phase I and II environmental site assessment reports during the design phase and prior to WSDOT property purchase.
- Environmental Protection Plan (EPP) during the design phase.

9. Do you know whether applications are pending for government approvals of other proposals directly affecting the property covered by your proposal?

☐ **Yes** ☒ **No** *If yes, explain.*

No applications or other approvals directly affecting the property are currently pending for government approval.

10. List any government approvals or permits that will be needed for your proposal, if known.

Federal Highway Administration

- NEPA Categorical Exclusion for transfer of WSDOT property to King County Solid Waste Division

Washington State Department of Ecology

- National Pollutant Discharge Elimination System (NPDES) Permit
- Notification of Onsite Hazardous Materials

Washington State Department of Transportation (WSDOT)

- Developer Permit

Puget Sound Clean Air Agency (PSCAA)

- Notice of Construction

King County Industrial Waste Program

- Industrial Waste Discharge Permit

King County Department of Transportation

- Right of Way Use Permit

Public Health - Seattle and King County

- Solid Waste Transfer Station Operating Permit
- Solid Waste Excavation Approval

City of Tukwila

- Unclassified Use Permit
- Clearing and Grading Permit
- Building Permit
- Sensitive Areas Review
- Right of Way Use Permit

- Tree Clearing Permit
- Demolition Permit

City of SeaTac
- Right of Way Use Permit
- Building Permit

A detailed inventory and summary of permits and approvals that would be required for the proposed project is attached as **Appendix A**.

11. Give brief complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Background

In 2001, King County issued the *Final 2001 Comprehensive Solid Waste Management Plan (2001 Plan)* (KCSWD, 2001). That document presented King County's strategy for managing the region's solid waste collection, disposal, and recycling services over the next 20 years. The *2001 Plan* was the culmination of a system-wide planning effort developed with input from local governments, private industry and citizens. The *2001 Plan* emphasized use of existing facilities and optimization of capital resources by concentrating investments at expandable stations. In its analysis of regional transfer facilities, expandable stations were described as those that can be enlarged and upgraded to serve both commercial and self-haulers and to provide primary and some secondary (i.e. appliances and yard waste) service for self-haulers. The *2001 Plan* identified the Bow Lake Transfer/Recycling Station as one of several expandable stations identified within King County.

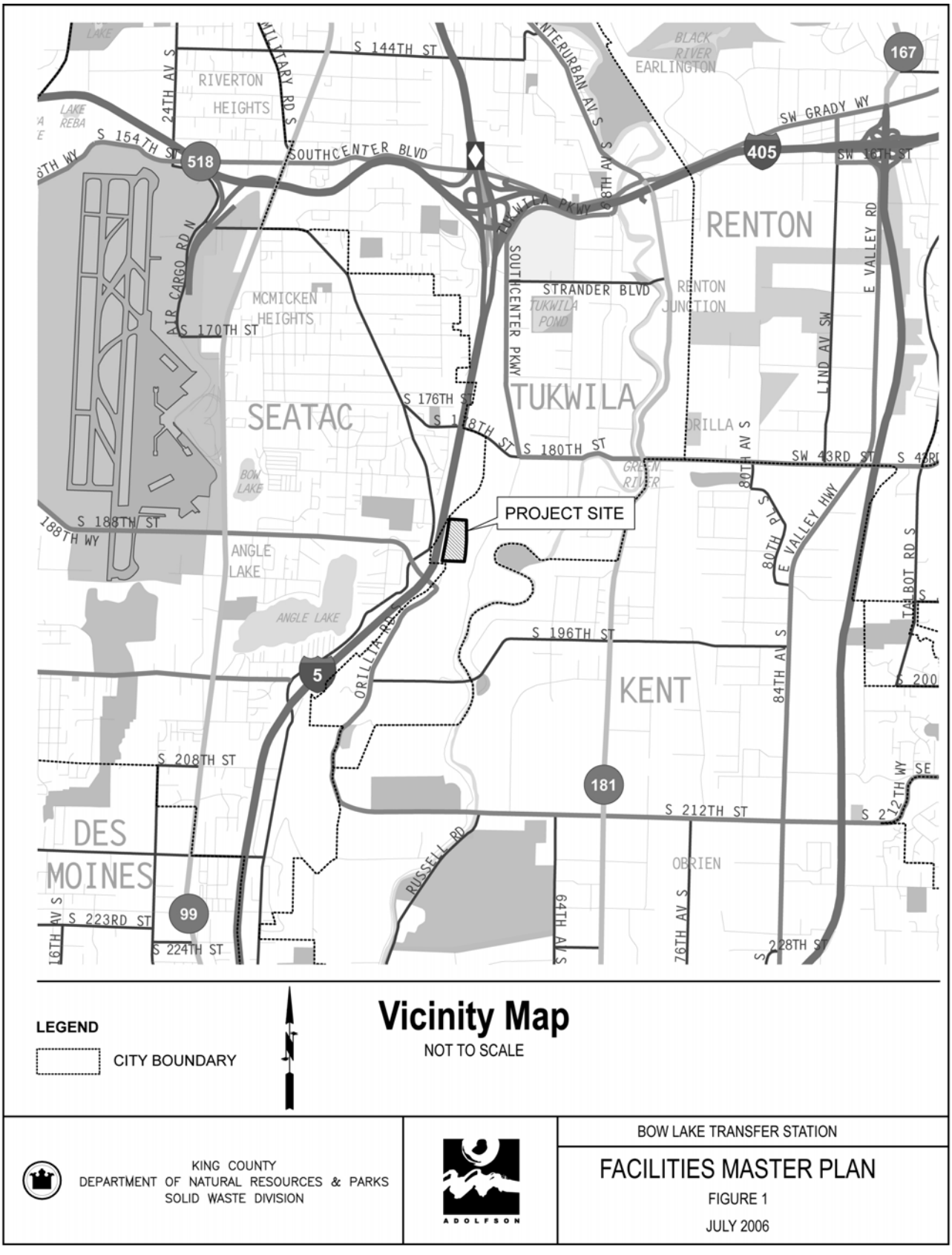
Policies adopted in the *2001 Plan* included those related to future transfer and export of wastes, which is expected to occur about 2016 when the capacity of the Cedar Hills Regional Landfill is anticipated to be reached. Details of this effort are described in the *Solid Waste Transfer and Waste Export System Plan (2006 Waste Export Plan)* (KCSWD, 2006a). As part of the development process for the *2006 Waste Export Plan,* four intermediate milestone reports were issued. These were: Milestone Report #1 – *Transfer System Level of Service Standards and Criteria*; Milestone Report #2 – *Analysis of System Needs and Capacity*; Milestone Report #3 – *Options for Public & Private Ownership & Operation of Transfer & Intermodal Facilities*; Milestone Report #4 – *Preliminary Transfer & Waste Export Facility Recommendations and Estimated System Costs, Rate Impacts & Financial Policy Assumptions.* Report #4 includes consideration of a commercial-only option but rejects it. Alternatives for the Transfer Station System, including the preferred alternative, provide for a new expanded transfer facility at the existing Bow Lake Transfer/Recycling Station.

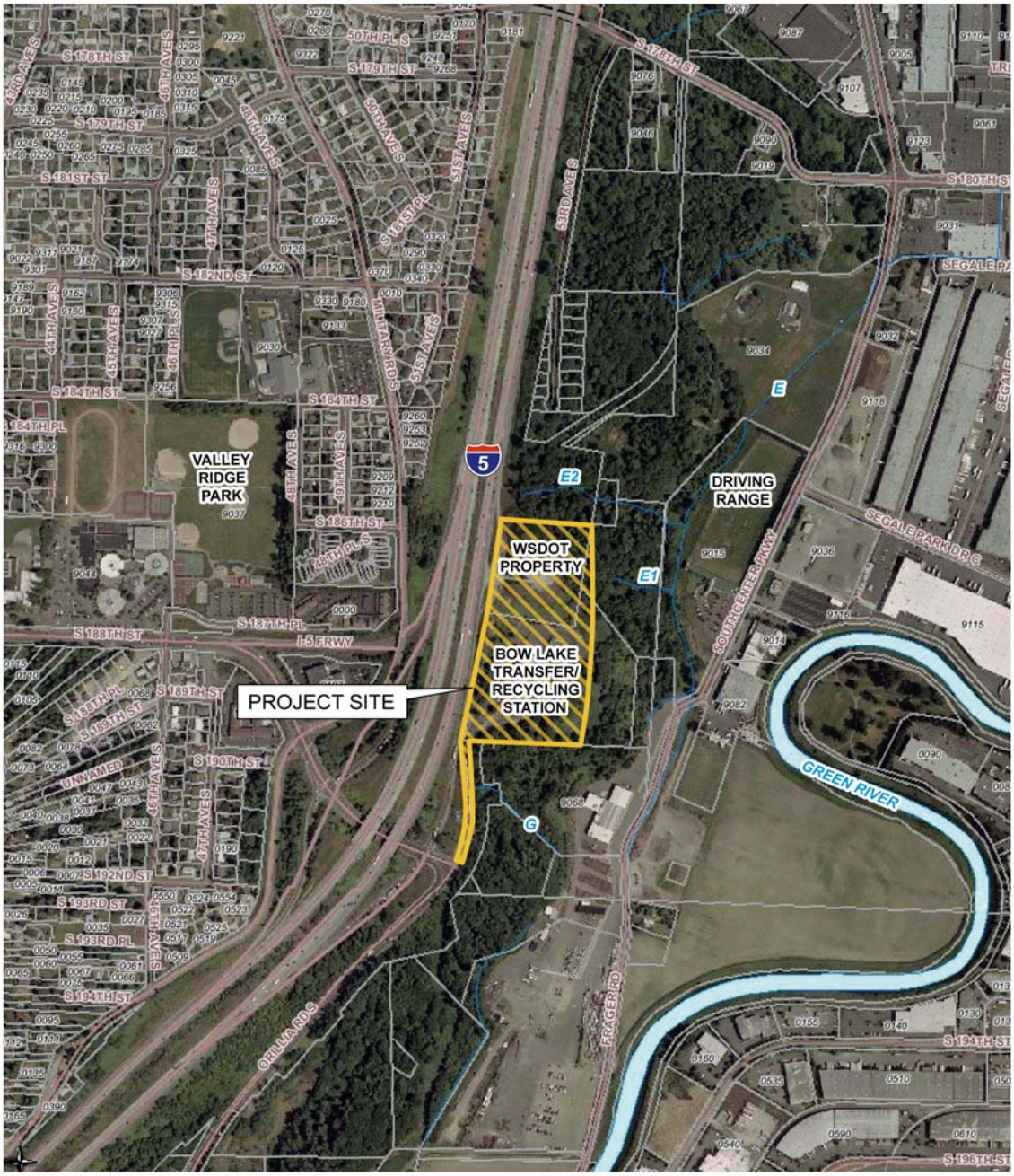
The 2006 update to the *1998 Bow Lake Transfer/Recycling Station Facility Master Plan* (1998 FMP) (KCSWD, 1998) has prepared a blueprint for expanding the existing Bow Lake Transfer/Recycling Station. Proposed improvements will result in improved operational efficiency, compliance with current building and environmental standards, enhanced customer service, upgraded customer and employee safety, and capability for eventual out-of-county waste export. See **Figures 1 and 2** for the location of the Bow Lake Transfer/Recycling Station.

The current Bow Lake Transfer/Recycling Station was constructed in 1977 on an 8-acre, closed landfill site (**Figure 3**). Principal assets include: (a) a 33,100-square-foot, open-sided concrete and steel Transfer Building, (b) a 500-square-foot employee facility located under the Transfer Building roof, (c) a 180-square-foot scale building with two, 50-foot-long pit-type vehicle scales, (d) a transfer trailer yard, (e) a free recycling area, (f) a fee or paid recycling area, (g) underground water, sewer, and electrical utility distribution systems, (h) a surface water management system, and (i) a network of asphalt paved roads and 8 parking stalls (KCSWD, 1998) **(Figures 4 and 5)**.

The Bow Lake Transfer/Recycling Station currently operates 24 hours per day between 12:00 a.m. Monday through 7:00 a.m. Saturday, and from 8:30 a.m. to 5:30 p.m. on Saturdays and Sundays. It is closed on Thanksgiving, Christmas, and New Years Day. According to data collected, the facility is the busiest transfer station in King County and processes average and peak volumes of approximately 800 tons and 1,250 tons per day, respectively (KCSWD, 2006b). The existing station is experiencing several operational deficiencies that require upgrades including:

- A recycling area that is inadequate in size, location, and accessibility;
- A transfer trailer yard that has insufficient parking and inadequate trailer maneuvering room;
- Scale facility and operations buildings that do not meet statutory requirements for accessibility or King County's standards for size, functionality, security, and employee welfare;
- A receiving waste pit that requires upgrading; and
- A need for an equipment maintenance shelter (KCSWD, 1998).


PROJECT SITE
RENTON
TUKWILA
SEATAC
KENT
DES MOINES
S 144TH ST
SOUTHCENTER BLVD
STRANDER BLVD
S 154TH ST
S 170TH ST
S 176TH ST
S 180TH ST
SW GRADY WY
SW 16TH ST
SW 43RD ST
S 188TH ST
S 196TH ST
S 208TH ST
S 212TH ST
S 223RD ST
S 224TH ST
S 228TH ST
MCMICKEN HEIGHTS
RIVERTON HEIGHTS
RENTON JUNCTION
TUKWILA POND
ANGLE LAKE
BOW LAKE
EARLINGTON
OBRIEN
LEGEND
CITY BOUNDARY
Vicinity Map
NOT TO SCALE
KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION
ADOLFSON
BOW LAKE TRANSFER STATION
FACILITIES MASTER PLAN
FIGURE 1
JULY 2006



LEGEND

PARCELS

WATER COURSES

Aerial Photo

NOT TO SCALE

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

ADOLFSON

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 2

JULY 2006

Figure 3. Aerial Photograph of Bow Lake Transfer/Recycling Station

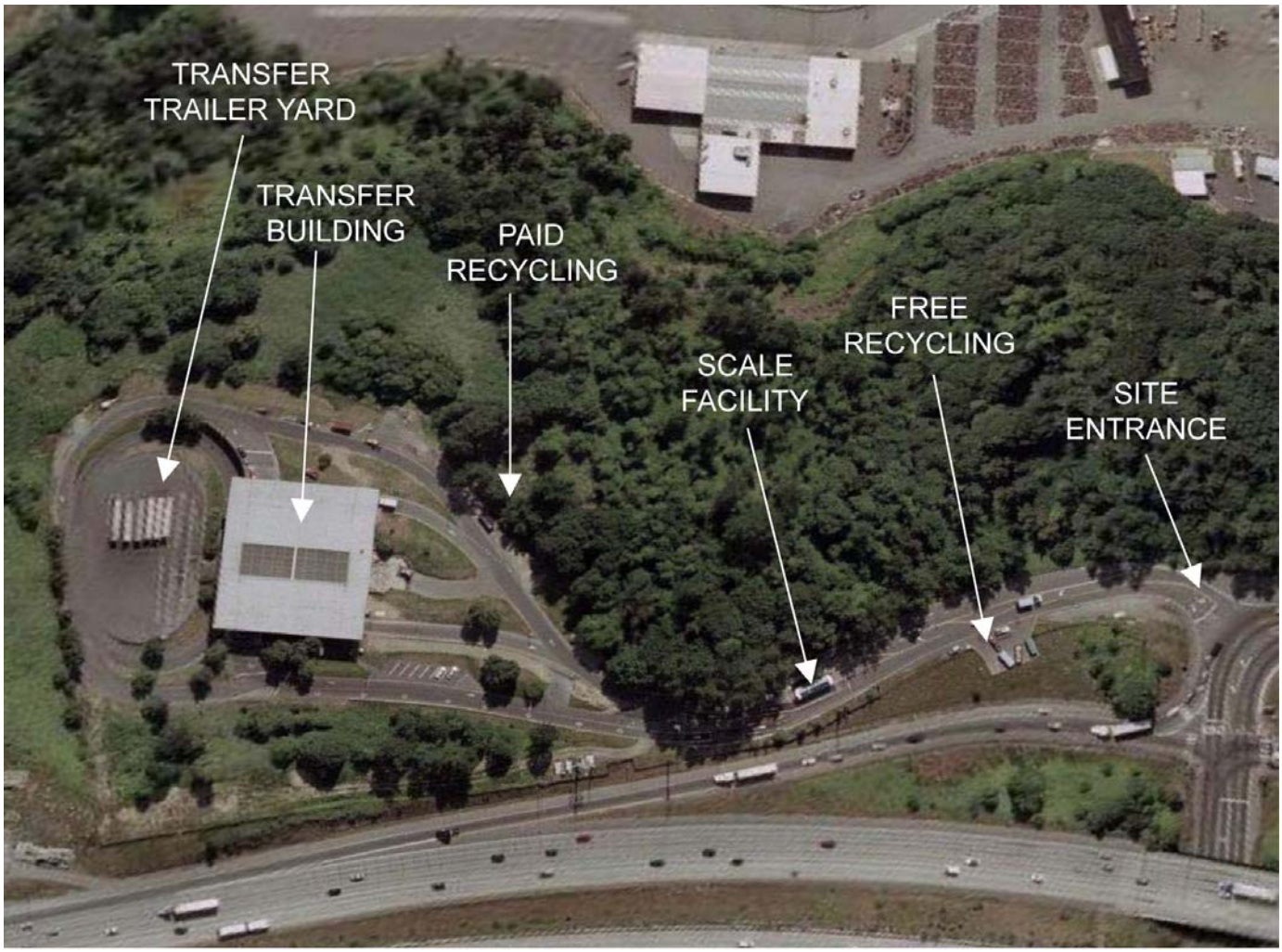


Figure 4. Existing Scale Facility

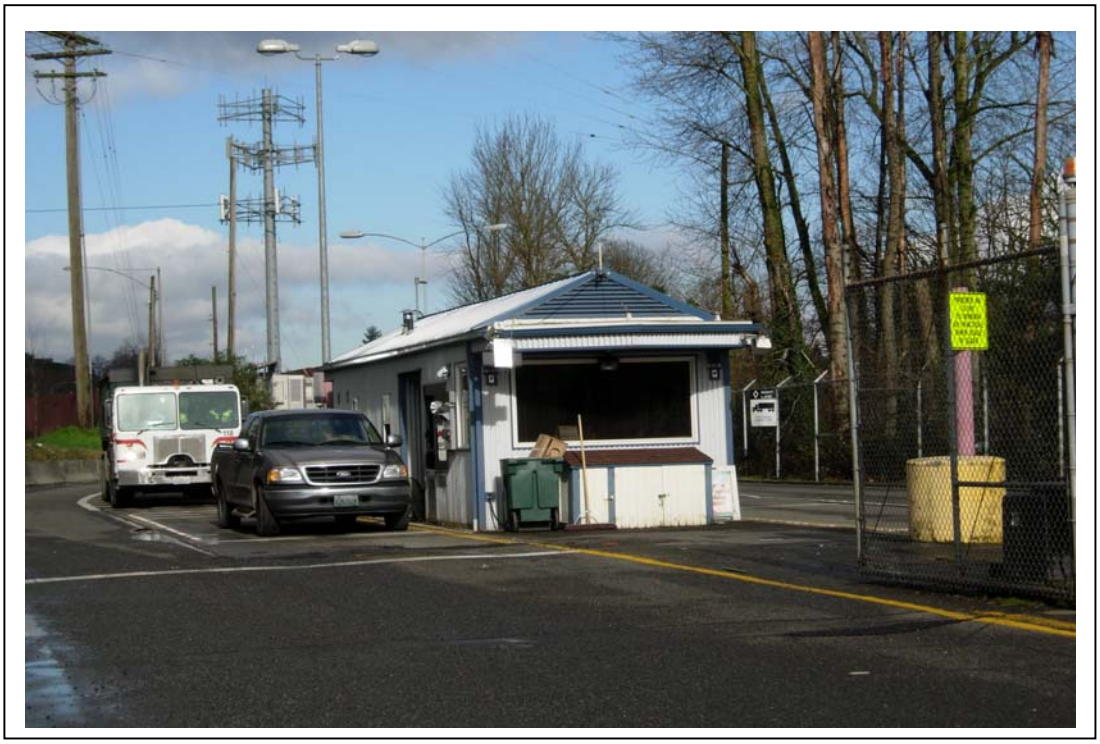
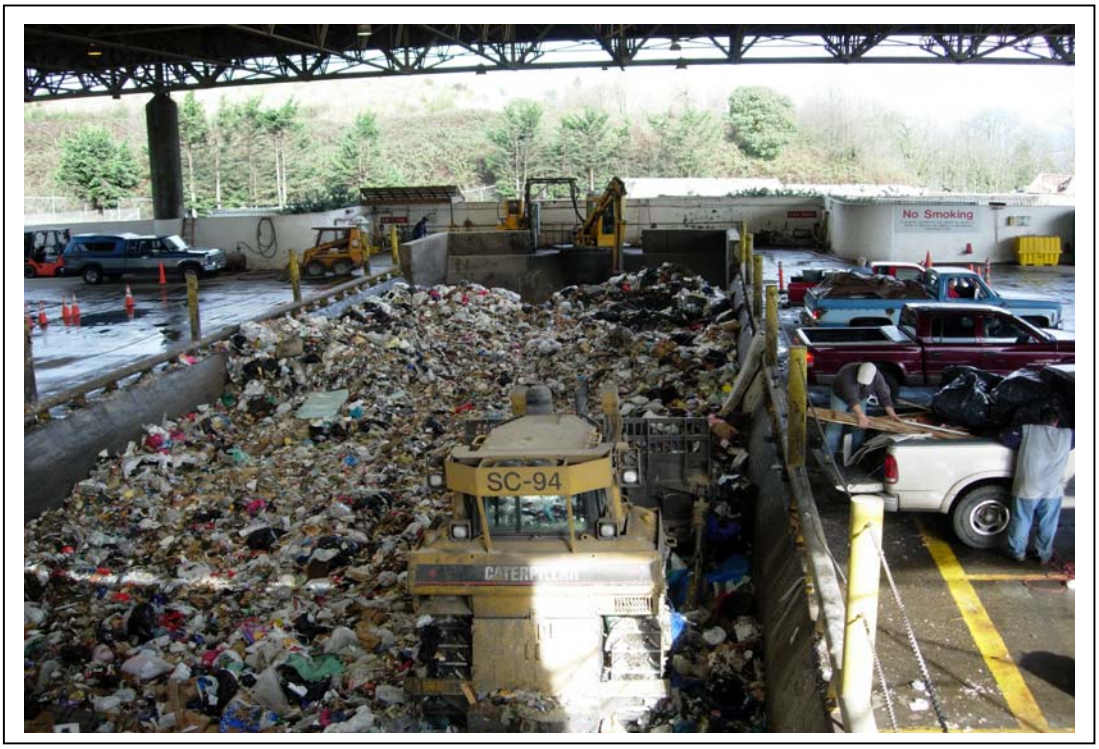


Figure 5. Existing Waste Pit



Alternative Discussion

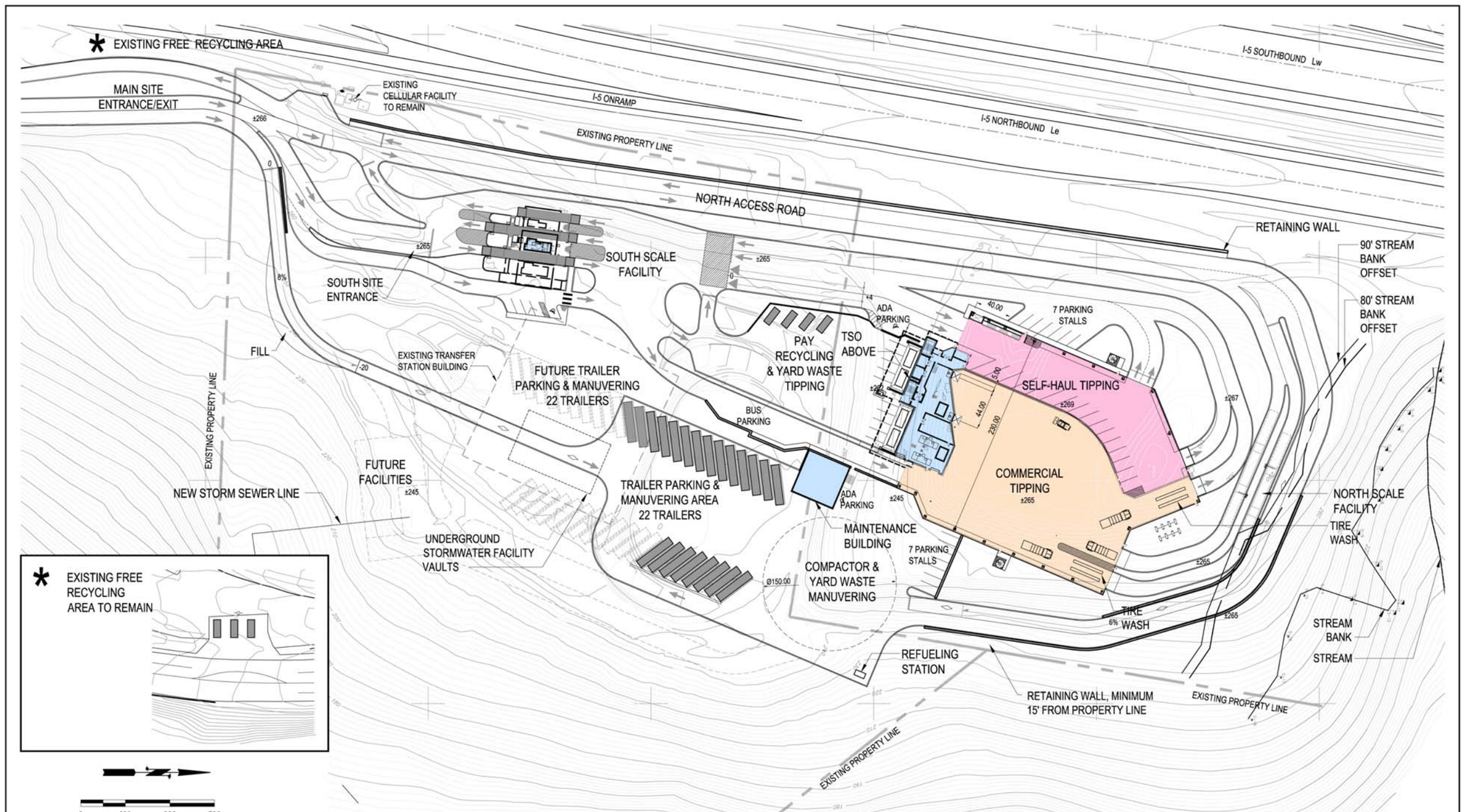
As discussed above, a number of alternatives were considered for KCSWD transfer stations (including Bow Lake Transfer/Recycling Station) as part of the planning for the 2006 Waste Export Plan (KCSWD, 2006a). *Milestone Report #4 – Preliminary Transfer & Waste Export Facility Recommendations and Estimated System Costs, Rate Impacts & Financial Policy Assumptions* (KCSWD, 2006a) included consideration of a commercial-only option but rejected it.

KCSWD has considered over two dozen alternatives for the expansion of the Bow Lake Transfer/Recycling Station. The 1998 FMP focused on making maximum use of existing facilities (KCSWD, 1998). Several alternatives were developed which modified facilities within the existing footprint of the site. These alternatives involved establishing free and pay recycling areas and improving the efficiency of the Transfer Trailer Yard. These alternatives included a perimeter road, and the purchase of only a small portion of the WSDOT site was to be purchased. Scheme A in Appendix B is a representative example of the alternatives considered at that time.

Following completion of the 1998 FMP, KCSWD added a number of elements to the requirements for the Bow Lake site. These included replacement of the existing Transfer Building, adding a second compactor, and constructing a perimeter service road, among other features. The KCSWD considered additional site plans including Scheme H (see **Appendix B**). The end result of these evaluations is the 2006 Preferred Site Plan (**Figure 6**).

Proposed Action

The proposed project would result in a 6.5-acre expansion to the north of the existing site on approximately 8.9 acres currently owned by WSDOT (**Figure 2**). KCSWD needs to acquire a portion of the WSDOT property to accommodate all of the functional requirements of the Bow Lake Transfer/Recycling Station.



KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

Preferred Site Plan

KPG
R·W·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 6

JULY 2006

When complete, the expanded facility will cover approximately 11.5 acres (501,000 square feet). Approximately 9 acres (392,000 square feet) of the station property will be covered by buildings and associated impervious surfaces. Vegetated areas that would include planters, landscaped islands, and vegetated slopes are planned to cover the remaining 2.5 acres (109,000 square feet). The new facility will accommodate both municipal solid waste (MSW) and yard waste drop-off. Transfer station operator (TSO) activities will be accommodated in a series of rooms located in the southern portion of the new building in approximately the center of the site. Employee parking will be provided to the west (7 stalls) and east (7 stalls) of the Transfer Building and at the South Scale Facility (5 stalls). A transfer trailer maneuvering area will be located to the southeast of the Transfer Building (**Figure 6**).

Access to the Bow Lake Transfer/Recycling Station is currently provided from South 188th Street and Orillia Road. The proposed project will continue to access the station from this location. With the expanded facility, there will be two scale facilities (**Figure 6**). Business and residential self-haul customers and oversized commercial vehicles will enter at the South Scale Facility, and commercial customers will enter at the North Scale Facility. Self-haul customer and oversize commercial traffic will pass through the South Scale Facility before proceeding to the self-haul and commercial customer entrances of the Transfer Building, or self-haul customers could proceed to the yard waste and paid recycling area located south of the Transfer Building. General commercial traffic, excluding oversized vehicles, is planned to pass through the unattended North Scale Facility and enter the Transfer Building from the north (**Figure 6**).

A key element to the success of the proposed expansion of the existing station is the creation of a commercial customer access road parallel to the freeway corridor. The new road would provide the opportunity for multiple site access points for the Transfer Building. The access road will be 30 feet wide, two 12-foot-wide paved lanes with shoulders (**Figure 6**). Retaining walls would be required in some areas along the west side of the new perimeter road due to the grade separation between the freeway corridor and the service road.

Self-haul customers would exit the facility from the west and north sides of the Transfer Building, returning to the South Scale Facility and main entrance/exit. Commercial customers would exit the Transfer Building at the northeast corner, drive back through the North Scale Facility and pass the South Scale Facility before exiting the site. Transfer trailer traffic would normally be one directional, by entering at the south and exiting to the north (**Figure 6**).

The new 68,000-square-foot Transfer Building would be located near the center of the north half of the site, with a main axis that is generally oriented north-south. The Transfer Building consists of a two-level, cast-in-place concrete substructure and floor system with a clear span metal building superstructure with concrete panels on the lower wall areas. A large canopy area would extend from the south wall to cover the yard waste drop-off hoppers and customer unloading stalls. The main (upper) floor of the Transfer Building would consist of a stepped concrete floor with a self-haul customer tipping floor located

approximately 4 feet above the commercial tipping/receiving floor, which occupies the largest area of the building (**Figure 7**). The building includes separate unloading stalls for residential self-haul customers and commercial customers. The receiving floor would include a hardened corundum aggregate-cementitious topping to extend the life of the floor. Interior illumination would be enhanced through the use of large translucent panel areas on walls and the roof to provide significant natural light.

The lower level of the Transfer Building will include two double-width, back-in tunnels, housing two stationary MSW preload compactors and two top-load chutes for yard waste. An enclosed service room in the lower level will house hydraulic power units (HPU) to provide power to the two compactors. Dust collection equipment and electrical and mechanical rooms will be located on the floor above the compactor bay.

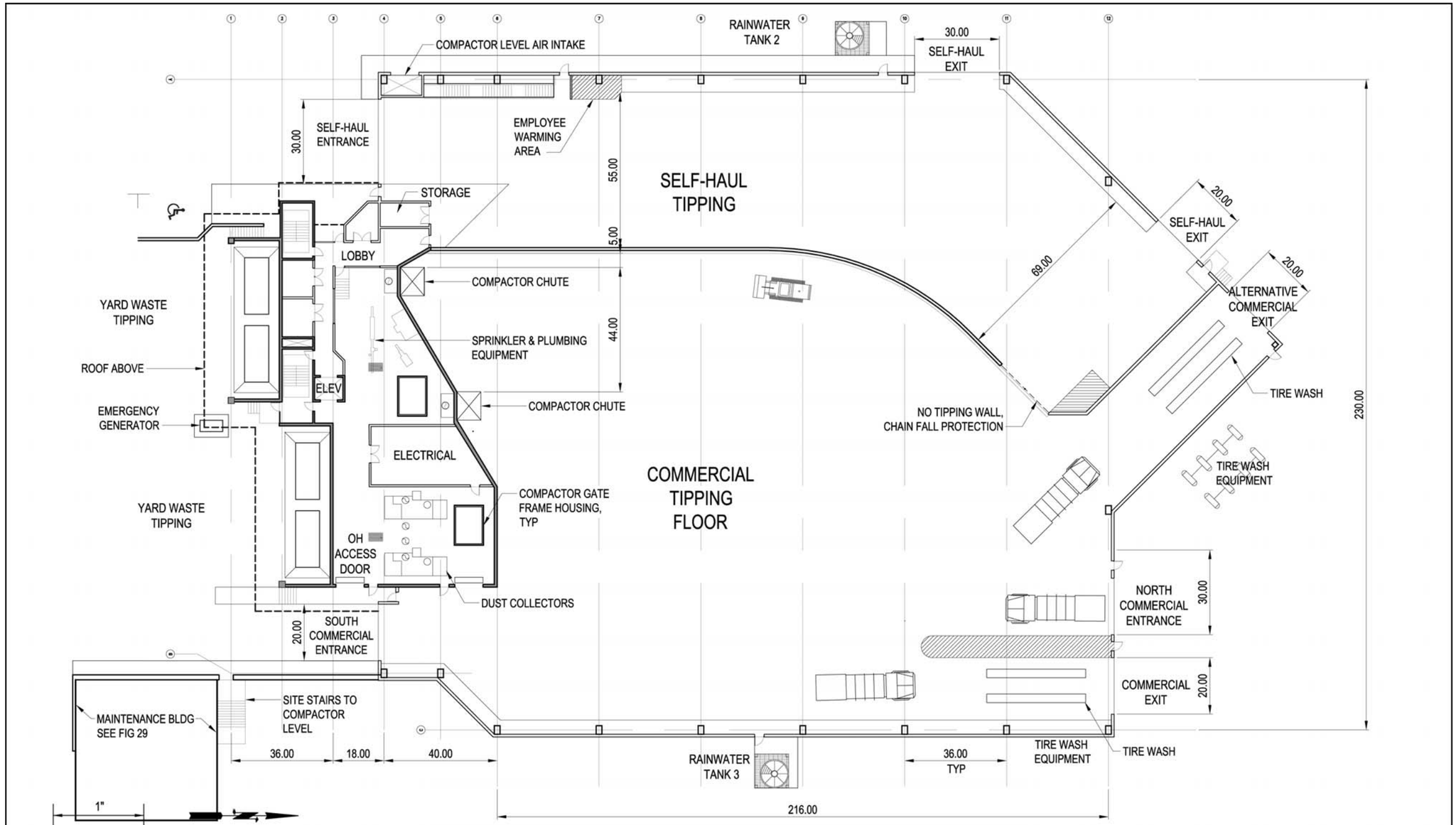
Figure 7 shows the detailed main floor plan. Building elevations are shown on **Figures 8 and 9**.

Underground stormwater detention vaults will be located in the transfer trailer maneuvering yard (**Figure 6**).

Several other amenities associated with the expanded station will be provided. These are listed below and shown in **Figure 6**.

- A Refueling Station for KCSWD equipment to be located east of the Transfer Building;
- TSO areas that include offices, a break room, locker rooms, restrooms, mechanical and storage rooms;
- An approximately 136,000-square-foot paved maneuvering and storage yard for trailers located southeast of the Transfer Building;
- An approximately 17,000-square-foot paved, paid recycling area, which includes a yard waste drop-off with 8 uncovered unloading stalls, located south of the Transfer Building;
- The existing approximately 2,000-square-foot, paved free recycling area located south of the main site entrance/exit; and with a new informational kiosk; and
- A 2,500 square-foot equipment maintenance building.

The new station is expected to handle an average of approximately 1,400 tons of MSW in the year 2030 with peak daily volume of up to 2,500 tons. The station should serve approximately 1,050 vehicles on an average day by the year 2030, and up to 2,100 vehicles on a peak day. Customers would include approximately 26 percent commercial vehicles (trucks), 71 percent self-haul vehicles (pickups and cars) and 3 percent business self-haulers (smaller trucks). By 2030, there are expected to be an average of 46 transfer trailer vehicles per day, with peak days of approximately 82 vehicles. See **Appendix C** for KCSWD's methodology for forecasting tonnage and vehicles.



KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

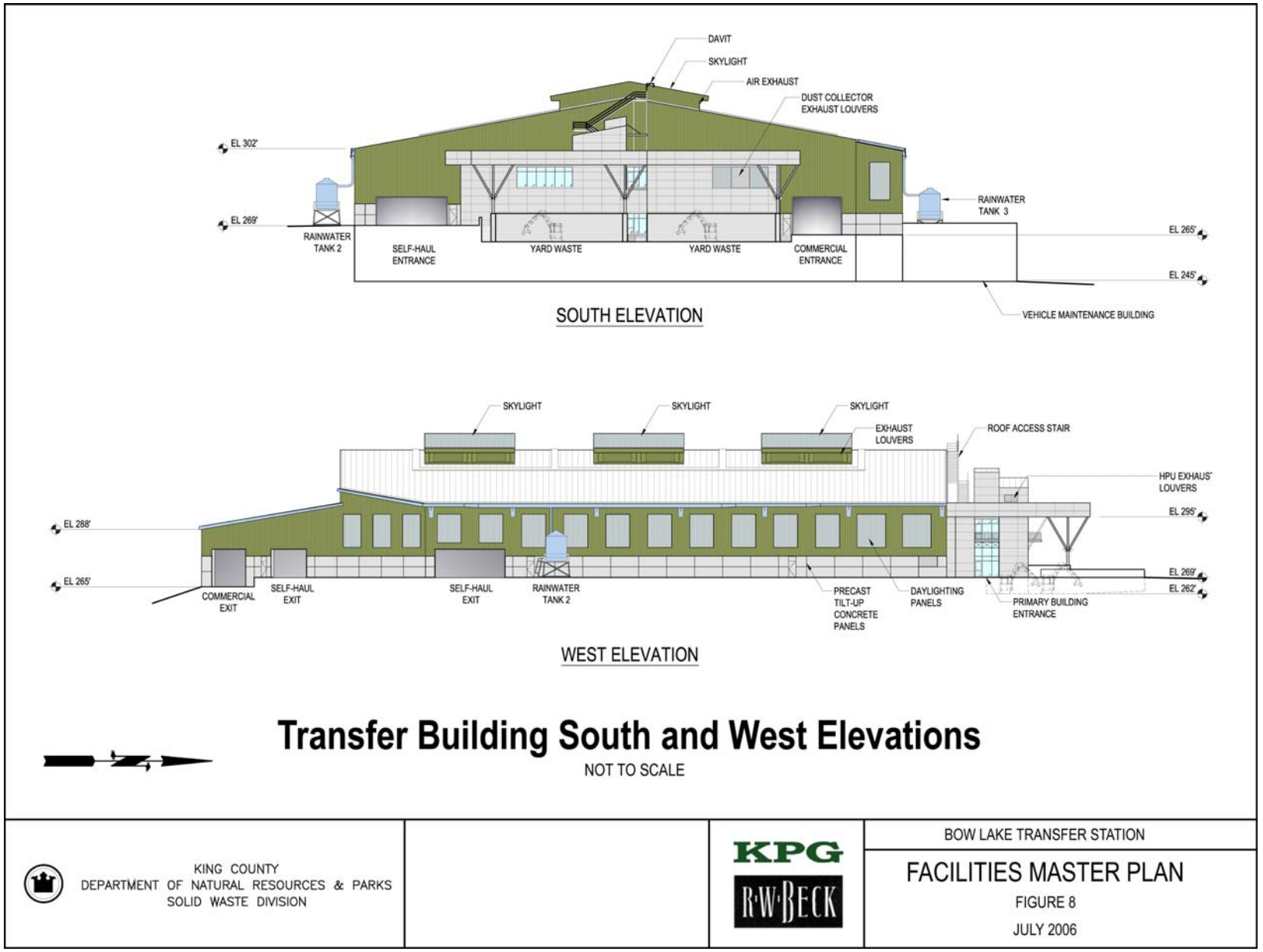
Transfer Building Main Floor Plan

SCALE: 1/32" = 1'-0"

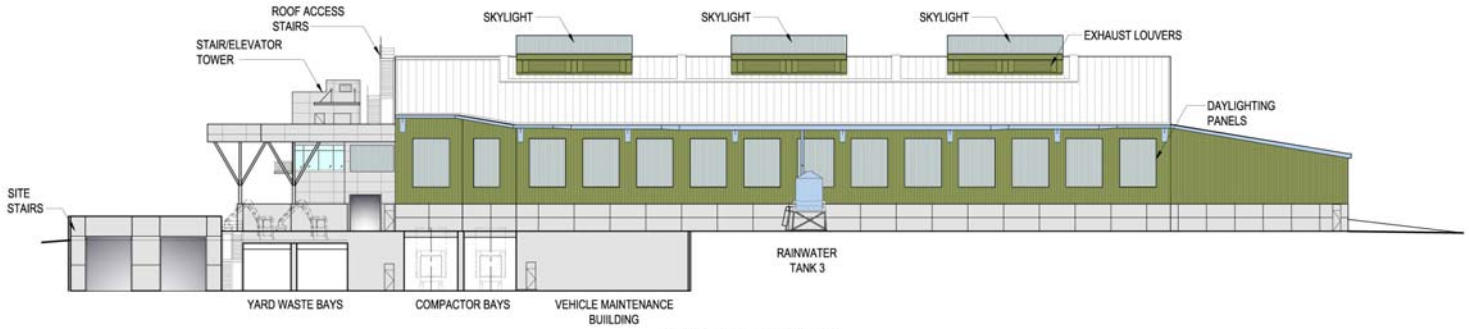
KPG
R·W·BECK

BOW LAKE TRANSFER/RECYCLING STATION

FACILITIES MASTER PLAN
FIGURE 7
JULY 2006


DAVIT
SKYLIGHT
AIR EXHAUST
DUST COLLECTOR EXHAUST LOUVERS
EL 302'
EL 269'
RAINWATER TANK 2
SELF-HAUL ENTRANCE
YARD WASTE
YARD WASTE
COMMERCIAL ENTRANCE
RAINWATER TANK 3
EL 265'
EL 245'
VEHICLE MAINTENANCE BUILDING
SOUTH ELEVATION
SKYLIGHT
SKYLIGHT
SKYLIGHT
EXHAUST LOUVERS
ROOF ACCESS STAIR
HPU EXHAUST LOUVERS
EL 295'
EL 288'
EL 265'
EL 269'
EL 262'
COMMERCIAL EXIT
SELF-HAUL EXIT
SELF-HAUL EXIT
RAINWATER TANK 2
PRECAST TILT-UP CONCRETE PANELS
DAYLIGHTING PANELS
PRIMARY BUILDING ENTRANCE
WEST ELEVATION
Transfer Building South and West Elevations
NOT TO SCALE
KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION
KPG
RW BECK
BOW LAKE TRANSFER STATION
FACILITIES MASTER PLAN
FIGURE 8
JULY 2006

NORTH ELEVATION



EAST ELEVATION

Transfer Building North and East Elevations

NOT TO SCALE

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

KPG
RW·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 9

JULY 2006

Project Schedule

Phase 1. Phase 1 construction will include the completion of the commercial customer access road, the Transfer Building, the North Scale Facility, and all adjacent roads and site work on the WSDOT parcel to the north of the existing site. A temporary scale house will be placed at the North Scale Facility. Phase 1 will also include construction of the new stormwater detention and treatment vault(s) and discharge system (**Figure 10**). During the 24- to 26-month Phase 1 construction period, the existing station will continue to operate for both commercial and self-haul customers.

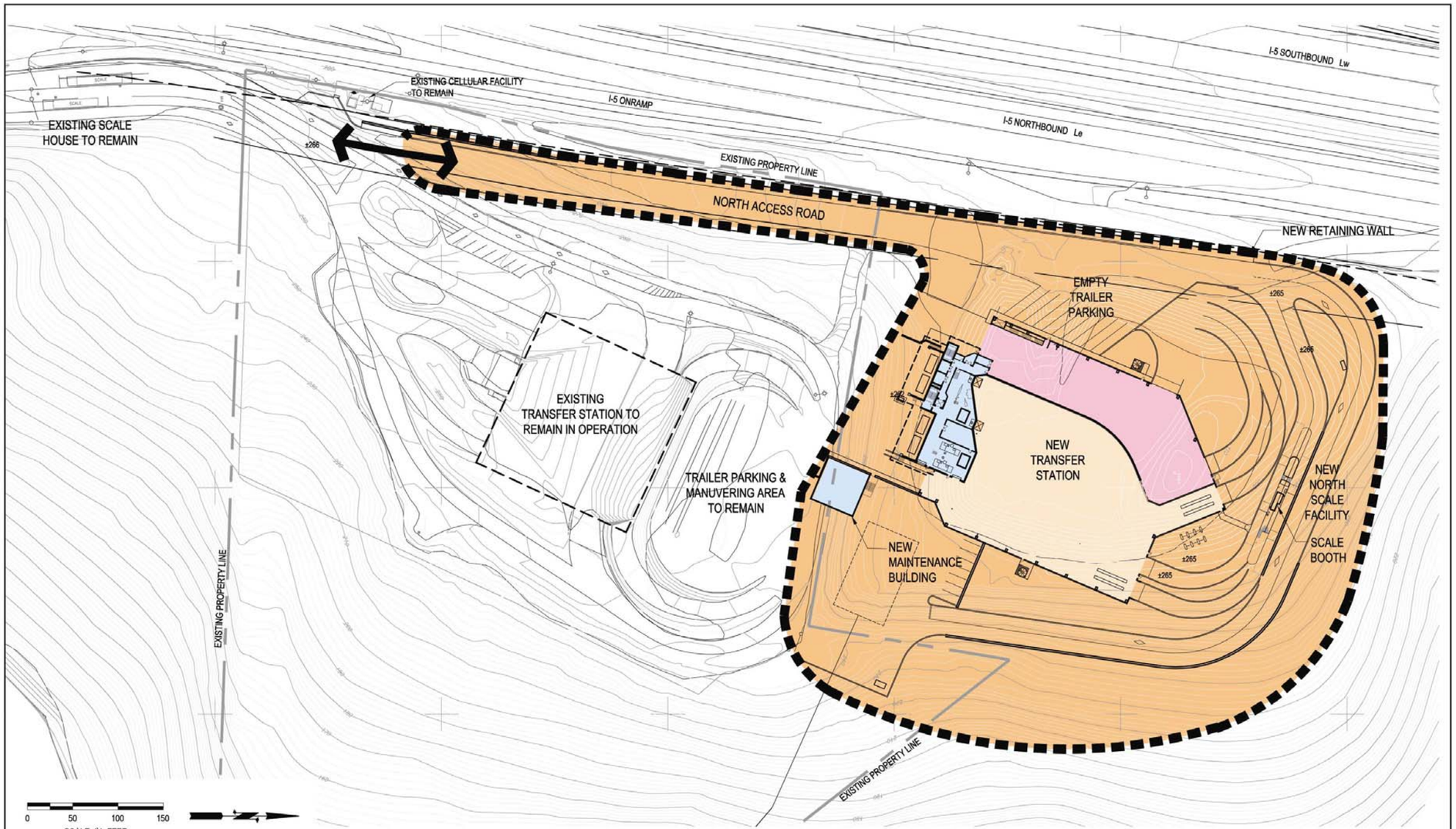
Phase 2. Phase 2 construction will require commercial and business self-haul customer traffic to be redirected to the North Scale Facility and new transfer station building during the 10- to 12-month construction period. Residential self-haul customers may not be able to use the facility during Phase 2 construction and may be redirected to other KCSWD stations at Algona and Renton. During Phase 2 construction, the existing Transfer Building and scale facility will be demolished to complete the transfer station. Some transfer trailers may be parked in the area of the existing trailer yard, and some trailers may have to be parked at other areas of the site or at a temporary yard that could be developed at the north end of the new perimeter service road (**Figure 11**). Sanitary sewer flow will be collected in a temporary holding tank and transferred to the wastewater treatment facilities at the Cedar Hills Regional Landfill for pretreatment. It will then be conveyed by pipeline to King County South Regional Treatment Plant at Renton.

Phase 3. Phase 3 construction involves the completion of the work in the permanent Transfer Trailer Yard and along the return road from the Transfer Building to the South Scale Facility, including the creation of new parking stalls and possibly the removal of the north scale house (**Figure 12**). Commercial and self-haul customers will have full access to the station during this phase. Phase 3 is anticipated to last approximately 1 to 2 months.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site or sites. Provide a legal description, site plan, vicinity map and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications to this checklist.

The existing Bow Lake Transfer/Recycling Station is located in south Tukwila near the intersection of Orillia Road and South 188th Street (**Figures 1 and 2**). The project site is located in Section 35, Township 23 North, Range 4 East.

The parcel number for the property is 3523049037 (see **Figure 13**). The legal description of the existing King County property is as follows: 352304 37 BEG W 1/4 COR TH S 87-56-00 E 960 FT TH S 53-24-59 W 727.57 FT TH S 38-42-02 E 1144.63 FT TH S 04-04-00 W 490 FT TH N 87-57-00 W 1238.31 FT TH N 05-44-13 E 1815.11 FT TO BEG TGW THAT POR OF N 490 FT OF SE 1/4 OF SE 1/4 SEC 34-23-4 LY E OF OLD MILITARY RD & OF ORILLIA RD EXTN LESS ST HWY.



KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

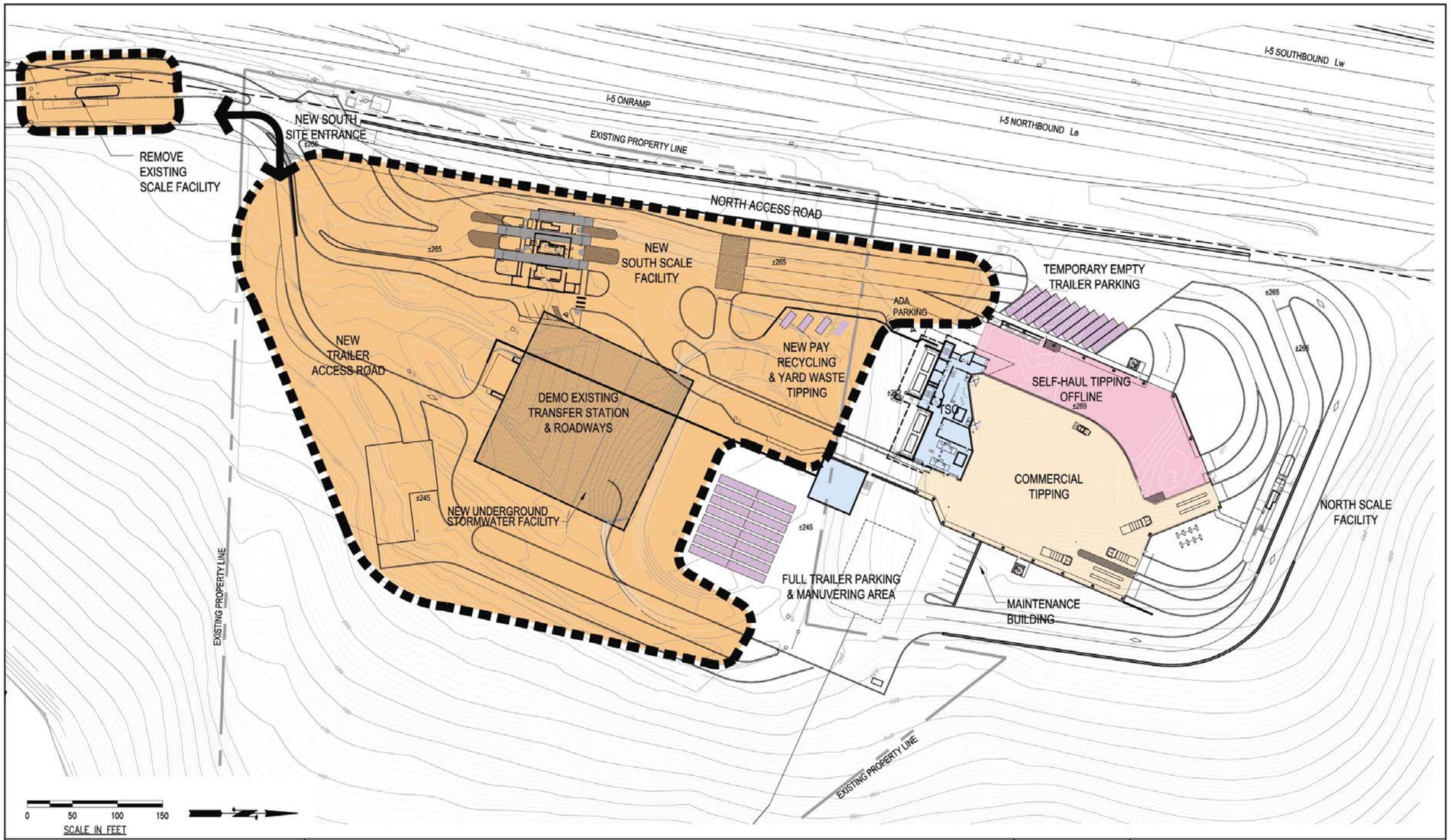
Construction Site Plan Phase 1

Scale 1"=100'

KPG
R·W·BECK

BOW LAKE TRANSFER/RECYCLING STATION

FACILITIES MASTER PLAN
FIGURE 10
JULY 2006



KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

Construction Site Plan Phase 2

Scale 1"=100'

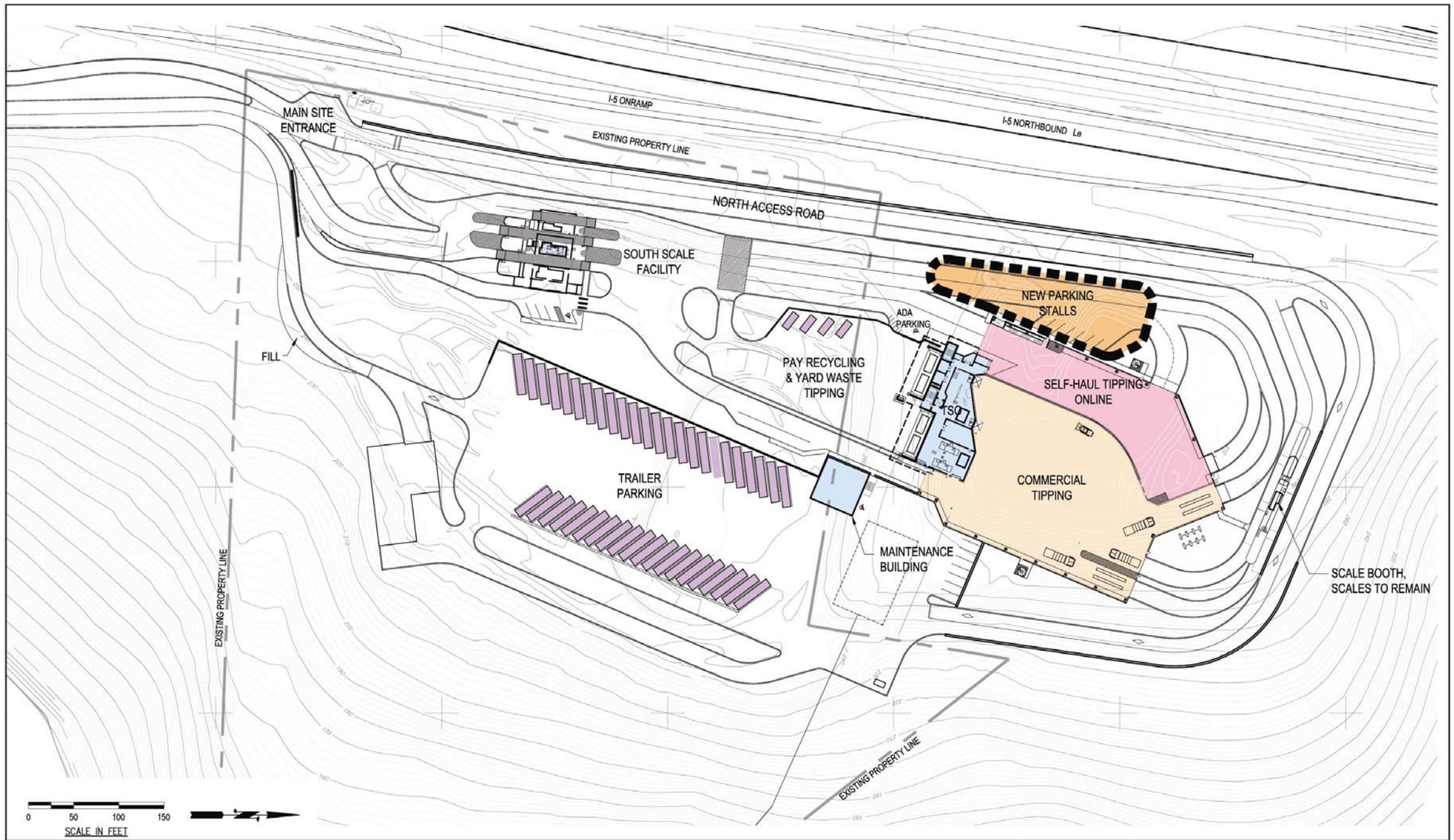
KPG
R·W·BECK

BOW LAKE TRANSFER/RECYCLING STATION

FACILITIES MASTER PLAN

FIGURE 11

JULY 2006


MAIN SITE ENTRANCE
I-5 ONRAMP
EXISTING PROPERTY LINE
I-5 NORTHBOUND Le
NORTH ACCESS ROAD
SOUTH SCALE FACILITY
NEW PARKING STALLS
ADA PARKING
PAY RECYCLING & YARD WASTE TIPPING
SELF-HAUL TIPPING ONLINE
ISO
FILL
TRAILER PARKING
COMMERCIAL TIPPING
MAINTENANCE BUILDING
SCALE BOOTH, SCALES TO REMAIN
EXISTING PROPERTY LINE
EXISTING PROPERTY LINE
0 50 100 150
SCALE IN FEET
KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION
Construction Site Plan Phase 3
Scale 1"=100'
KPG
R·W·BECK
BOW LAKE TRANSFER/RECYCLING STATION
FACILITIES MASTER PLAN
FIGURE 12
JULY 2006

Parcel Map

Vicinity of Bow Lake Transfer/Recycling

NOT TO SCALE

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

ADOLFSON

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 13

JULY 2006

The WSDOT parcel is located directly north of the existing Bow Lake Transfer/Recycling Station. It is adjacent to, and directly east of I-5. The parcel number for the WSDOT property is 3523045555 (see **Figure 13**). KCSWD is currently negotiating with WSDOT for purchase of a portion of parcel 352304555. This negotiation will include the exact boundaries of the parcel. As part of their surplus property process, WSDOT will develop an exact legal description for the parcel to be purchased.

B. Environmental Elements

1. Earth

King County Solid Waste Division has conducted a number of geotechnical investigations on the site of the Bow Lake Transfer/Recycling Station site and adjacent properties over the last fifteen years. Principal among these are the *Geotechnical Engineering Study: Bow Lake Transfer Station Improvements Facilities Master Plan, King County, Washington* (Hong West & Associates, Inc., 1993) and the *Draft Geotechnical Evaluation Report: WSDOT Property, Bow Lake Transfer Station/Recycling Facility, King County, Washington* (HWA Geosciences, Inc., 2004). The information provided in Section 1. Earth is based on these documents as reviewed and updated in the recent *Slope Geotechnical Issues: Bow Lake Transfer/Recycling Facility, King County, Washington – Technical Memorandum* (HWA Geosciences, 2006b). See **Appendix D** for the complete document.

a. General description of the site (check one)

- ☒ Flat (developed portion of site)
- ☐ Rolling
- ☐ Hilly
- ☒ Steep slopes (to the north, south and east)
- ☐ Mountainous
- ☐ Other: _____

b. What is the steepest slope on the site (approximate percent of slope)?

Along most of the southern boundary of the site (King County property), the slope is traversed by a 50-foot wide bench, which then traverses north-northeast along the contour, sloping to an approximately 100-foot wide cut bench at the northeast property corner. Slope inclinations above the bench vary from 10 to 48 percent over short distances, indicative of modified land. The slope below the bench is more consistent with gradients ranging from 40 to 45 percent.

The WSDOT property (to be acquired) north of the existing Transfer/Recycling Station is dominated by a large fill stockpile with dimensions of about 300 feet by 220 feet at the top of the stockpile. The highest elevation is about 315 feet, dropping to about 276 feet on the I-5 side and 230 feet on the east side. The base of the stockpiled fill is about 250 feet and the thickness of the stockpile about 65 feet. As shown on **Figure 3,** there is a steep-sided ravine on the north side of the WSDOT property. The ravine bottom extends east-west at an elevation of approximately 170 feet due north of the high point of the stockpiled fill.

To the northeast of the WSDOT property, the ravine bottom descends to the approximately 90-foot elevation.

The side slopes of the stockpile on the north side are inclined at about 20 percent in the upper half and about 30 percent in the bottom half. The fill is setback from the natural slope to the north and there is a gently-sloping bench at the toe of the fill. The outer edge of this bench is the crest of the naturally-steep ravine slope, which descends at gradients of approximately 55 to 60 percent in the upper portion, steepening to 75 to 80 percent for the remainder of the slope to the ravine bottom.

The eastern slope of the WSDOT stockpile is inclined at gradients up to 55 percent. At the toe of the stockpile is the gently-sloping bench, which extends from the north side. The bench is approximately 100 feet in width and sloped at about 20 percent. The outer edge of the bench forms the crest of the steep natural slope, inclined at approximately 85 percent in the upper portion, sloping more gently into a bowl-shaped area. A second bowl extends downslope from the first bowl.

The slopes on the north, south, and east sides of the project site are summarized in **Table 1**.

Table 1. Slope Summary

Property	Slope Description	Inclination (%)	Slope Designation[1]
WSDOT	North face, stockpile fill	20 to 30	Class 2
WSDOT	North face, native	55 to 80	Class 3, 4
WSDOT	East face, stockpile fill	20 to 55	Class 2, 3
WSDOT	East face, native	20 to 85	Class 3, 4
King County	East face, fill	10 to 55	Class 2, 3
King County	East face, native	20 to 45	Class 2, 3
King County	South face, fill	10 to 48	Class 2, 3
King County	South face, native	40 to 45	Class 3

1. Per City of Tukwila Environmentally Sensitive Areas Designation (TMC 18.45.120A).

c. What general types of soil are found on the site (i.e., clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

The upland area west of the station site is mantled primarily with Vashon till. This material consists of an unsorted mass of silt, gravel, and sand, typically with high density/strength and low permeability. The surficial geology of the side slope of the river valley, including the station site, consists of kame-terrace deposits. Kame-terrace deposits consist of stratified sand and gravel deposited by melt-water from retreating glaciers. Inclusions of till are common and deposits are frequently mined for sand and gravel (HWA Geosciences, Inc., 2004).

Numerous soil investigations have encountered three general material types on the station site: fill soil, refuse material, and kame terrace deposits (Hong West & Associates, Inc.,

1993). Fill soil is present at and within a few feet of the surface across most of the developed portions of the site. This fill is thought to have been deposited as (a) fill cover over the old landfill and (b) new fill placed during the construction of the station. This material consists of loose to medium dense, brown, medium to fine sand, with gravel and silt. Some gravelly sand zones are also present.

Refuse materials are present over most of the developed portions of the site. The refuse deposit thickens from west to east with a maximum depth of approximately 46 feet (Hong West & Associates, Inc., 1993) and consists of varying amounts of paper, glass, plastic, metal, asphalt fragments, construction debris, and organic debris.

Glacial deposits are present across the site below the fill and refuse deposits. These glacial deposits, identified as kame terrace deposits, typically consist of medium dense to very dense, gray, medium to fine sand, with varying amounts of silt and gravel. Typically, the upper 5 to 10 feet of the glacial deposits are medium dense to dense, while deeper deposits are dense to very dense.

No agricultural activities are known to have occurred on the site, nor is any prime farmland known to exist on the site.

For additional detail, see **Appendix D**.

d. Are there surface indications or history of unstable soils in the immediate vicinity?
☒ **Yes** ☐ **No** *If yes, explain.*

King County Parcel

Generally, the slopes on the east and south sides of the existing facility exhibit no evidence of deep-seated sliding, and none have been documented in the site investigations conducted over the last twenty years (HWA Geosciences, Inc., 2006). See **Appendix D**.

The Bow Lake Transfer/Recycling Station site has experienced considerable settlement since the landfill was closed in the late 1950s. Settlement was estimated to be 3.6 feet in the 10-year period between 1966 and 1976, and it was estimated that settlement might be occurring at a maximum rate of 0.24 foot per year (Hong West & Associates, Inc., 1993). This settlement was attributed to loose placement of refuse, decomposition of refuse materials, and increased loading on landfill refuse by traffic and structures. Cracks in roadway pavement about the site and settlement of floor slabs have been noted periodically and attributed to landfill settlement (Hong West & Associates, Inc., 1993).

The slopes to the east and south of the existing facility are considered Class 2 and 3 under the City of Tukwila's Sensitive Areas designation (TMC 18.45.20A). These slopes are also mapped as an erosion hazard area.

Recent site investigations have shown that along much of the southern property line, the slope is traversed by a 50-foot wide bench, which turns northeast along the contour and slopes to an approximately 100-foot bench at the northeast property boundary. Above the bench, the slope inclinations range from 10 to 48 percent over short distances, an indication of modified land (i.e. former landfill). Below the bench, slopes are more consistent with gradients ranging from 40 to 45 percent. Trees in this area are bent or pistol-butt shaped, indicative of soil creep.

WSDOT Parcel

Overall, no evidence of deep-seated sliding is evident on the north and east sides of the WSDOT parcel, only surficial soil creep and isolated shallow sliding. The shallow slope movement can be expected to occur periodically over time as the underlying very dense sand mechanically weathers. Most of this movement will occur in the steep lower portions of the ravine slope, in locations where ground water seepage is present. Natural processes of soil creep and skin sliding will continue to occur with or without the project.

The slopes on the north and east sides of the WSDOT parcel are considered Class 2, 3 and 4 under the City of Tukwila's Sensitive Areas designation (TMC 18.45.20A). The ravine slope to the north has a convex profile with the steepest portions at the bottom of the ravine. The north and east slopes are also mapped as an erosion hazard area.

Many of the trees on the ravine slope on the north side of the WSDOT parcel have straight trunks indicating that slope creep is minimal. There is, however, evidence of at least two shallow slides near the 15- to 20-foot walls at the west end of the ravine near a culvert outlet.

East of the toe of the WSDOT soil stockpile is a gently-sloped bench, approximately 100 feet in width and inclined at approximately 20 percent. This feature transitions to a steep natural slope, which forms the upper portion of a bowl-shaped area, with a second bowl further down slope. These bowls are typical expressions of former land sliding.

e. Describe the purpose, type and approximate quantities of any filling or grading proposed. Indicate source of fill.

Site construction will occur under two consecutive contracts: 1) A site preparation contract; and 2) A site facilities contract. Estimated volumes of excavation and fill are described below. See **Appendix J** for additional detail on truck trips and schedule.

Site Preparation

This is primarily an earthworks contract with some retaining wall and stormwater system construction.

Soil Removal. There will be an estimated 148,000 cubic yards (cy) of material excavated and removed from the site. Material will be hauled to an approved disposal site.

WSDOT Material. Based on recent geotechnical investigations (HWA Geosciences, Inc., 2004), it appears that most, if not all of the material stored on the WSDOT property can be used for fill material. Preliminary estimates indicate that a total of approximately 40,000 cy of fill material will be needed from on-site stockpile (WSDOT property) and imported (off-site) material (see below).

Imported Material. There will be approximately 20,000 cy of soil material imported for use as fill at the site. Contract specifications will state that this material must be clean and appropriate for use on the site.

Site Facilities

Under this contract, the Transfer Building will be constructed, pavement and utilities will be installed, along with some additional earthwork and retaining wall construction.

Grading. Grading necessary to achieve desired finish elevations on the site is expected to involve approximately 77,000 cy of material.

f. Could erosion occur as a result of clearing, construction or use? ☒ Yes ☐ No
If so, generally describe.

Recognizing the potential for erosion, KCSWD has made erosion control measures an integral part of the construction plan. Best Management Practices (BMPs), intended to control or eliminate erosion, will be implemented during construction. The extensive site work needed for construction of the expanded Bow Lake Transfer/Recycling Station and the steep slopes on and adjacent to the eastern portion of the site indicate that the potential for erosion during construction is high. Most of the site work will be conducted in Phase 1, and is expected to take between 24 and 26 months. Work in this phase will involve excavation and disposal of remnant refuse materials from the old landfill, and grading and filling of the site with imported material and existing material from the WSDOT stockpile. Construction documents will include detailed specifications regarding the implementation of erosion-related BMPs. These are summarized in Section 1(h) below.

g. About what percent of the site will be covered with impervious surfaces after project construction (i.e., asphalt or buildings)?

Approximately 46% of the combined King County-WSDOT site will be covered with impervious surfaces after project construction.

There is approximately 189,000 square feet (4.34 acres) of impervious surface area at the existing Bow Lake Transfer/Recycling Station. Impervious surfaces are composed of structures (Transfer Building, scale facility) and paved surfaces used for on-site circulation, the Transfer Trailer Yard, the recycling areas, and parking areas.

The proposed project would result in approximately 382,500 square feet (8.78 acres) of impervious surface. The new Transfer Building accounts for approximately 66,000 square feet (1.52 acre) of this area (Figure 3). The new South Scale Facility and North Scale Facility account for additional impervious surfaces. The remainder consists primarily of paved surfaces for on-site circulation, the new Transfer Trailer Yard, the new paid recycling and yard waste area, the new Refueling Station, and parking areas.

h. Proposed measures to reduce or control erosion or other impacts to the earth, if any:

Construction

In order to comply with City of Tukwila and Ecology requirements, KCSWD will implement a Temporary Erosion and Sediment Control (TESC) Plan. Ecology will require a Stormwater Pollution Prevention (SWPP) Plan as part of NPDES Permit conditions. Each of these plans has specific measures intended to reduce or eliminate potential stormwater impacts during construction. These measures may include:

- An Environmental Protection Plan (EPP) will be developed that will describe procedures for managing and monitoring excavation activities, including procedures for identifying, testing, and handling of contaminated materials should they be encountered during site work;
- As far as practical, earthwork will be conducted during dry months of the year;
- Silt fencing, straw bales, check dams or similar sediment containment facilities will be installed prior to demolition and site work;
- Matting or mulch will be used to control erosion of exposed soils;
- The contractor(s) will be required to minimize the extent of soils exposed at any given time;
- Crushed gravel or equivalent will be used to stabilize temporary access and staging/mobilization areas;
- Material stockpiles will be covered when not in use;
- Storm drains inlets and discharges will be kept clear of obstructions and/or sediment to ensure proper operation;
- Construction vehicle tires will be cleaned prior to exiting the construction site;
- During dry periods, disturbed areas will be sprayed with water to control dust;
- Exposed areas will be revegetated (e.g. hydroseeded) as soon as practical following disturbance.

Operation

Based on the preliminary investigations conducted over the last several years, there do not appear to be any slope conditions on the proposed site that present slope stability or erosional problems that cannot be handled through the application of conventional geotechnical design practices and construction BMPs (HWA Geosciences, Inc., 2006b). Although final design will await more detailed geotechnical investigations, a number of proposed measures are expected to be incorporated into final design to address slope stability and erosional concerns.

- A geotechnical report appropriate both to site conditions and proposed development will be prepared in accordance with TMC 18.45.040 Sensitive Areas Special Studies.
- Geotechnical borings will be conducted as necessary to develop a geologic profile for slope and seismic stability calculations.
- Geotechnical borings will be advanced through old refuse to determine the appropriate foundation type for the Transfer Building;
- A buffer distance will be established between the crest of steep natural slopes and site development in accordance with TMC 18.45.120C.
- The outer edge of the perimeter road will be supported on several feet of fill. Geotechnical borings will determine the appropriate means for construction (e.g. sidecast fill, mechanically-stabilized earth, soldier pile wall).
- Removal of 40 to 60 feet of the existing fill stockpile on the WSDOT property will eliminate long-term issues of erosion and slope stability for that portion of the on-site slopes.
- The removal of fill will reduce the net loading at the top of the slopes and generally improve the overall deep-seated stability of the natural slopes below.
- Collection of stormwater runoff from the site will eliminate current uncontrolled site runoff. Runoff will either be directed downslope to the valley floor through a pipeline system or discharged through an engineered spreader system on the slope, as

appropriate to geotechnical slope stability considerations. Either method will be designed in accordance with Ecology's 2005 Manual.

- Pervious areas on the site will be planted with ground cover, shrubs, and trees to reduce erosion potential.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known?

The proposed project would result in short-term emissions from construction/redevelopment of the existing site and long-term emissions during operation of the upgraded facility. Both types of emissions are addressed below. An air quality report describing impacts is included in **Appendix E**.

Construction Emissions

Construction of the proposed project would result in temporary, localized increases in pollutant emissions from construction activities and equipment. Construction of the project will require the use of heavy equipment, trucks, and smaller equipment such as generators and compressors. These engines will emit air pollutants that might slightly degrade local air quality. Dust from excavation and grading may contribute to ambient concentrations of suspended particulate matter in the project vicinity.

During construction of the facility, existing buildings will be demolished. Demolition contractors will be required to comply with the Environmental Protection Agency (EPA) and the PSCAA regulations concerning the safe removal and disposal of any asbestos-containing materials, if applicable.

Some construction phases may cause odors, particularly during paving operations using tar and asphalt. The construction contractor(s) will be required to comply with the PSCAA regulations requiring the control of odorous emissions so as to prevent undue interference with nearby uses (Regulation I, Section 9.11). Such odors would be short-term and unlikely to affect the nearest residences. In addition, no slash or demolition burning will be permitted in association with this project.

With good construction management practices, emissions related to construction will be short-term and relatively minor. As a result, no significant air quality impacts are expected from construction.

Operational Emissions

Off-Site Traffic Emissions. The proposed project is unlikely to significantly impact air quality due to increased vehicular emissions. There may be a slight increase in vehicle emissions due to an increase in traffic traveling to and from the expanded Bow Lake Transfer/Recycling Station. However, estimated traffic delays and volumes at the most affected signalized intersections in 2030 are about the same in the future both with and without the facility upgrade, which indicates that the proposed facility expansion is

unlikely to affect the operation of the nearest intersections. In addition, with the use of compactors, which increase trailer payload from 17 tons currently to approximately 27 tons, the number of trailer loads leaving the site will be reduced, resulting in less vehicular emissions.

On-Site Traffic, Dust, and Odor Emissions. Potential emissions from on-site operations are unlikely to impact air quality because the upgraded facility would be designed to minimize dust and odor emissions. For example, the Transfer Building would be enclosed and incorporate a dust suppression/misting system coupled with a mechanical exhaust ventilation system. The proposed site design would provide more efficient on-site traffic flows to reduce vehicle queuing.

The types of waste accepted at a transfer facility are strictly controlled by KCSWD through King County Public Rule PUT 7-1-4(PR), Waste Acceptance Policy. This rule prohibits disposal of hazardous or dangerous waste, burning or smoldering material, infectious waste, excessively odorous or dusty material, and various other materials.

Finally, odor impacts at off-site locations are unlikely because of the distance to nearby residences and because the potential to generate odors would be minimized by removing storage trailers on a daily basis. Therefore, no significant air quality impacts are expected due to the proposed facility expansion and upgrade (Geomatrix, Inc., 2006a).

b. Are there any off-site sources of emissions or odor that may affect your proposal? ☐ **Yes** ☒ **No** *If so, generally describe.*

The predominant source of air pollution in the project area is traffic on I-5, the surrounding surface streets, and interstate ramps. With recent monitoring trends for carbon monoxide (CO) decreasing (the pollutant emitted from vehicles in the largest quantities), the air quality for CO and other pollutants is generally good, indicating air quality impacts from off-site sources are not likely (Geomatrix, Inc., 2006a).

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Construction

Under the Puget Sound Clean Air Agency's (PSCAA) Regulation I, Section 9.15, contractor(s) will be required to take all reasonable precautions to avoid or minimize fugitive dust emissions during construction. These precautions and control measures may include:

- Spraying exposed soil with water or other suppressant to reduce emissions of particulate matter;
- Street cleaning and wheel washing of trucks to prevent dirt, mud and other debris deposits on paved roadways open to the public; and
- Limiting the amount of time construction trucks are allowed to idle on-site.

With such control measures in place, the potential for off-site air quality impacts is small.

Operations

The following proposed design and operational features would mitigate air quality and odor impacts during operation of the facility:

- The Transfer Building will be fully enclosed except for the entry/exit points, reducing off-site dust and odor impacts;
- The Transfer Building will incorporate a mechanical exhaust ventilation system for dust and odor control;
- There will be a high-pressure, low-volume misting system for dust and odor control in the Transfer Building;
- The hydraulic compactor system with the upgraded facility will eliminate the need to macerate the waste in the receiving pit, thereby reducing dust produced by the maceration process;
- The new design will incorporate additional weigh scales and would segregate commercial, business, and self-haulers, thereby reducing vehicle queuing into the facility and reducing vehicular emissions resulting from idling vehicles;
- Wheel-washers and truck washout facilities will be provided inside the Transfer Building for commercial haulers exiting the facility to reduce the potential to carry dust off-site;
- The haul-out of full storage containers will occur daily, minimizing the extent and length of on-site storage and potential odor impacts related to long-term storage of waste;
- Rear-load containers will be sealed prior to transport to off-site locations; The facility will be thoroughly cleaned on a regular basis, reducing the potential for odor emissions; and
- Minimizing the potential for wastes affecting air quality, KCSWD will follow its established procedures to screen wastes, and implements requirements for waste clearance and acceptance in accordance with King County Public Rules PUT 7-2-1 (PR) and PUT 7-1-5 (PR). **See Appendix H.**

Given the project's proposed design features, in conjunction with KCSWD's policies and rules, no operational air quality impacts are identified. Therefore, no additional measures are proposed (Geomatrix, Inc., 2006a).

3. Water

a. Surface:

1. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, salt water, lakes, ponds, wetlands)? ☒ **Yes** ☐ **No** *If yes, describe type and provide names. If appropriate, state what stream or river it flows into.*

There are no surface water bodies on the existing Bow Lake Transfer/Recycling Station site. A wetland reconnaissance performed by Adolfson Associates, Inc.(2004) in February 2004 confirmed no wetlands are present on the existing Bow Lake Transfer/Recycling Station site or the adjacent WSDOT property. The reconnaissance report is provided in **Appendix G.**

The following streams, though not on the site, are located in the vicinity of the project. First, a stream exists on the property to the north. It is a steep, highly erosive drainage feature and appears to originate in part from I-5 runoff. This stream is referred to as Stream E2 by the downstream property owner, La Pianta LLC (Figure 2). Stream E2 is considered a non-fish bearing stream because of the steep gradient and lack of suitable habitat (Cedarock Consultants, Inc., 2005). It discharges on the valley floor to Stream E, a drainage feature that discharges to the Green River near river mile (RM) 16.6 and South 180th Street. Of the four drainage basins in the surrounding area, Stream E2 is located within the north basin (sub-basin N) as identified in the *Tukwila South Preliminary Master Drainage Plan* (Hugh G. Goldsmith & Associates, Inc. and Northwest Hydraulic Consultants, Inc., 2005) and presented in the *Tukwila South Project Draft Environmental Impact Statement* (Associated Earth Sciences, Inc., 2005).

The discharge of Stream E to the Green River is via a pump station and flow control structure referred to as the S 180th Pump Station. The pump station is located just east of the intersection of S 180th Street and Southcenter Parkway. The pump station pumps surface water from Stream E2 through approximately 1,600-foot long culverts to the Green River.

Stream E2 flows through a mixed deciduous and coniferous forest. It is classified as a Type 3 stream under the City of Tukwila's watercourse rating system (Whiting, personal communication, 2006) although city maps indicate the stream as Type 2 (City of Tukwila, 2004a). Type 3 streams are afforded an 80-foot wide standard buffer.

As part of this project, Adolfson staff flagged the south bank of Stream E2 on the top of the slope and documented the field efforts in a memorandum dated August 22, 2006. This memorandum is included in **Appendix G**. The buffer line is drawn from the stream bank as marked on the site plans **(see Figure 6.)**.

A second stream, Stream E1, originates in a small wetland area located on a property east of the station site. Similar to Stream E2, Stream E1 is also located within the north basin drainage area (Hugh G. Goldsmith & Associates, Inc. and Northwest Hydraulic Consultants, Inc., 2005). Stream E1 is considered a non fish-bearing stream because of the very steep channel gradient and lack of habitat (Cedarock Consultants, Inc., 2005). Stream E1 drains east, discharging to Stream E near the driving range facility, where it is directed through existing drainage facilities to the Green River. Stream E1 flows through mixed deciduous and coniferous forest and is classified as a Type 2 stream under the City of Tukwila's watercourse rating system (City of Tukwila, 2004a). However, Associated Earth Sciences, Inc. (2005) classifies Stream E1 as an Type 3 stream. Water quality within Stream E1 is assumed to be similar to that of E2, although water quality testing was not performed (A.C. Kindig & Co., 2005). Raedeke & Associates, Inc. identified a small, off-site wetland down slope of the proposed station site. This small wetland is referred to as Wetland 4 in the Tukwila South Draft EIS, Volume 1 (April 2005). This wetland is 0.04 acre in size and is considered a palustrine emergent wetland. The wetland appears to be located approximately 100 feet northeast of the eastern property line. Stream E1 appears to originate

from the small Wetland 4. According to the Tukwila South Draft EIS, Volume 1, Wetland 4 receives water primarily from seeps on the forested hillside and runoff from surrounding uplands.

A third stream, Stream G, is located on the adjacent La Pianta property, just east of the existing scale facility. Stream G is a Type 3 stream and is not thought to be fish-bearing because of its long-term isolation from fish-bearing waters, the steep gradient and lack of suitable habitat (Cedarock Consultants, Inc., 2005). Several wetlands are located along this drainage feature. Stream G is located entirely within the Central (sub-basin C) basin (Hugh G. Goldsmith & Associates, Inc. and Northwest Hydraulic Consultants, Inc., 2005). Stream G drains in a southwest direction, discharging to Stream E and ultimately the Green River. Riparian vegetation consists of a native shrub layer with a dense, moderate-aged mixed deciduous, coniferous forest. Water quality is thought to be similar to that of streams E1 and E2, although not verified with quantitative measurements (A.C. Kindig & Co., 2005). Stream E, which is the receiving waterbody for streams E1, E2, and G is considered a Type 2 stream, and is assumed to be fish bearing (Cedarock Consultants, Inc., 2005). However, due to the presence of the pump station on Stream E, anadromous fish are not able to enter the stream from the Green River.

2. Will the project require any work over, in or adjacent to (within 200 feet) the described waters? ☒ **Yes** ☐ **No** *If yes, please describe and attach available plans.*

Expansion of the Bow Lake Transfer/Recycling Station would require some construction within 200 feet of streams E2, and possibly E1, if the tightline discharge option for the site stormwater is implemented (**See Appendix F** and Section 3.c.1 below). **Figure 2** shows the location of the site with respect to off-site streams E. E1. E2. and G. The E2 stream buffer is measured from top-of-bank. Adolfson Associates, Inc. has delineated the top-of-bank conservatively (Adolfson Associates, Inc., 2006). As shown in Figure 6, the major features of the expanded station in closest proximity to off-site water bodies are the retaining walls and peripheral paved roadways on the north and northeast margins of the site.

3. Estimate the amount of fill and dredge material that would be placed or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

No wetland areas are located on the expanded Bow Lake Transfer/Recycling Station site. Consequently, no fill or dredged material would be placed in or removed from wetland areas. Further, fill and dredge materials will not be placed in or impact off-site streams or their buffers except as noted above for Stream E2. If the tightline stormwater discharge outfall option to Stream E is implemented (**see Appendix F** and Section 3.c.1 below), some energy dissipation rock or a concrete energy dissipation structure would be placed beside the stream.

4. **Will the proposal require surface water withdrawals or diversions?** ☐ **Yes** ☒ **No** *Give general description, purpose and approximate quantities if known.*

   The proposal would not require any surface water withdrawals or diversions.

5. **Does the proposal lie within a 100-year floodplain?** ☐ **Yes** ☒ **No**

   If so, note location on the site plan.

   The proposal does not lie within a 100-year floodplain.

6. **Does the proposal involve any discharges of waste materials to surface waters?** ☐ **Yes** ☒ **No** *If no, describe the type of waste and anticipated volume of discharge.*

   The proposal does not involve any discharge of waste materials to surface waters. See Section 3(c) Water Runoff, below, and Section 16 Utilities regarding sanitary sewer issues.

b. Ground

1. **Will groundwater be withdrawn or will water be discharged to groundwater?** ☐ **Yes** ☒ **No** *Give general description, purpose and approximate quantities if known.*

   The proposed expansion does not involve withdrawal of groundwater nor does it include any discharge to groundwater.

2. **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (i.e., domestic sewage; industrial, containing the following chemicals:… ; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans expected to be served by the system or systems.**

   Sanitary Sewage

   No sanitary sewage will be discharged into the ground at the site.

   During construction, the contractors will be required to provide temporary sanitary toilets on site for use by workers and visitors. These facilities will be maintained by a designated subcontractor.

   The new facility will include restrooms for SWD workers. Wastewater from these facilities will be pretreated on-site, then hauled by truck to Cedar Hills and discharged into the wastewater pretreatment lagoons. The pretreated wastewater will then be conveyed via pipeline to the Renton Wastewater Treatment Plant.

   Leachate

   No leachate (water that has come into contact with or may potentially come into contact with refuse) will be discharged to the ground at the site.

Portions of the existing Bow Lake Transfer / Recycling Station are located over an old municipal waste landfill that operated in the 1940s and 1950s (Seattle – King County Department of Public Health, 1985). When the landfill closed in 1961, the site was capped with soil and the existing transfer station constructed on top of the soil cap. The current Transfer Building is constructed on timber piles that penetrate through the refuse layer.

During construction of the new Transfer / Recycling Station, the existing Transfer Building and other structures will be demolished, pavements removed and the site regraded. It is expected that some of the old refuse material that lies beneath proposed structures, an estimated 20,000 cy, will be removed as part of site work. While construction work is in progress, there is potential for precipitation to infiltrate through exposed soils to old refuse layers and to generate leachate, which could become mixed with groundwater. A number of measures will be incorporated into the construction contracts to minimize leachate generation and associated impacts. These are described below in Section 3.d.

Once construction is completed, large areas of the old landfill site will be covered with highly impervious surfaces including concrete and asphalt paved areas and concrete and steel structures. This new construction will provide an effective cap over a significant portion of the old refuse deposits. It is estimated that the expanded Bow Lake Transfer / Recycling Station will reduce groundwater flow from precipitation by approximately 8.4 million gallons per year **(see Appendix F.)**. This will significantly reduce the potential for leachate generation at the site. This reduction is based on collected storm water flows from the site being conveyed downslope via pipeline and discharged either to Stream E on the valley floor or being discharged through an engineered dispersal system at locations on the site where flows would be directed away from old refuse deposits.

When the expanded facility becomes operational, precipitation falling on the 1.5-acre roof of the new Transfer Building will be diverted to a detention system. This water will be used for washdown of Transfer Building floors and other surfaces that come in contact with refuse. This wash water, as well as any water draining from full refuse trailers and intermodal containers, will drain to the sanitary sewer system. In addition, all parking areas for all loaded waste trailers/containers and any outdoor areas where open top bins for recycled materials are placed will be designed to drain to the sanitary sewer system. This collected wash and drain water will be pretreated on-site and hauled to an approved treatment facility. **See Appendix F**.

c. Water runoff (including stormwater):

1. Describe the source of runoff (including stormwater) and method of collection and disposal, if any. Include quantities, if known. Where will this water flow? Will this water flow into other waters? If so, describe.

In all areas on the site where water runoff may come in contact with solid waste refuse (e.g., Transfer Trailer Yard parking stalls, inside the Transfer Building, paid recycle area), it will be collected and conveyed to an on-site vault. This

wastewater will be pretreated on-site and hauled by truck to Cedar Hills where it will be discharged to the wastewater pretreatment lagoons. The pretreated wastewater will then be conveyed by pipeline to the King County South Wastewater Treatment Plant at Renton.

Stormwater from the Transfer Station site drains to what is referred to as the North Basin in the *Tukwila South Project Final Environmental Impact Statement* (TSP Final EIS) (City of Tukwila, 2005). Surface water and any re-emergent groundwater east of the Transfer Station site eventually discharge to an existing ditch at the base of the slope. This ditch, referred to as "E", flows north adjacent to a golf driving range and through pasture land before connecting to a culvert system along South Center Parkway. The flow is conveyed north discharging to the Green River at the South 180th Street pump station. Although the TSP Final EIS assumes that Stream E is fish-bearing, the document further states that no fish have been observed during recent habitat surveys. The TSP Final EIS states that Stream E is an entirely man-made feature and notes that it is isolated from fish-bearing waters due to the downstream pump station. The document states that the stream is highly degraded as a result of periodic cleaning and states that a portion of the stream is used for watering livestock.

Based on conversations with the City of Tukwila, there are no known drainage problems downstream of the Bow Lake Transfer/Recycling Station.

As part of a larger plan to develop properties south and east of the Transfer Station, the TSP has proposed improvements to Southcenter Parkway. Although no plans are approved to date, it is possible that the development and Southcenter Parkway improvements may move forward in the next few years. The proposed improvements involve realignment of South Center Parkway to the west through the existing golf driving range. The new roadway would have a piped storm drainage system that would run parallel to the existing ditch and culvert system. A new detention pond would be constructed to provide Level 1 runoff control for the new system. The detention pond outlet would connect to the existing drainage system. Because the proposed detention pond has been designed to detain flows from the new roadway only, discharge from the new Bow Lake Transfer/Recycling Station could not be conveyed to the new roadway and detention pond. Flows from the new Bow Lake Transfer/Recycling Station would have to be discharged into the existing drainage system via Stream E. King County has initiated discussions with the City of Tukwila in order to coordinate with the South Center Parkway improvement project.

Regulatory Requirements. The City of Tukwila has adopted the *King County Surface Water Design Manual* (King County, 1998) (KCSWDM) as amended by the Tukwila Public Works Development Guidelines and Design and Construction Standards (Tukwila Municipal Code [TMC] 14.30.070). The City of Tukwila is likely to adopt an updated manual with higher standards, the 2005 King County Surface Water Design Manual, prior to submittal of permit applications (likely in late 2007) for the expansion of the Bow Lake Transfer/Recycling Station. For this reason, design of stormwater facilities would follow the 2005 KCSWDM.

Expansion of the station would create more than 2,000 square feet of new impervious surface and would therefore require a Full Drainage Review. Under Full Drainage Review, the project is required to meet all eight of the Core Requirements described in the KCSWDM. Core requirements include:

1. Discharging surface water at the natural location;
2. Providing an off-site analysis;
3. Providing flow control;
4. Providing a conveyance system;
5. Providing erosion and sediment control measures;
6. Maintaining and operating the surface water facilities;
7. Complying with financial guarantees; and
8. Providing water quality treatment.

For additional information on how the stormwater facilities will meet these requirements, see **Appendix F**.

In addition to the Core Requirements, the project would have to meet Special Requirement 4, Source Controls. These water quality controls would be required to prevent runoff from coming into contact with solid waste-related pollutants, thereby reducing the potential for introduction of contaminants into public waterways. Compliance with Core and Special Requirements will be developed in a Technical Information Report (TIR), which will include drainage design as well as the proposed Erosion and Sediment Control (ESC) Plan. Any water that contacts, or potentially contacts, refuse will be handled as potentially-contaminated water and conveyed to an on-site facility for pretreatment prior to hauling by truck to Cedar Hills. It will be discharged to the pretreatment lagoons at King County's Cedar Hills Regional Landfill and then conveyed by pipeline to the King County South Wastewater Treatment Plant at Renton.

An NPDES Permit will be required for stormwater associated with construction activities such as clearing, excavation of refuse material from the old landfill, filling, and grading. This permit requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP).

King County will adhere to and comply with all applicable local and state regulations. Any construction activity that will use, divert, obstruct, or change the bed or flow of state waters must do so under terms of a Hydraulic Project Approval (HPA) permit issued by the Washington State Department of Fish and Wildlife (WDFW). If site runoff is conveyed to Stream E, the outfall may include construction at Stream E, with the possible requirement of an Hydraulic Project Approval (HPA), issued by the Washington Department of Fish and Wildlife. Typically, HPA permits also require that the project comply with provisions of the *Stormwater Management Manual for Western Washington* (Ecology, 2005). This document's standard flow control requirement is more stringent than that of the KCSWDM. For example, stormwater discharges must meet pre-development durations for discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow. The pre-developed condition would likely be forested land cover unless an exception is granted. Because Stream E is tributary to a pump station and there is minimal potential for fish access, Ecology's level of flow control may not be necessary. Based on discussions with City of Tukwila

staff, recent development in the North Basin requiring an HPA has not been held to Ecology's flow control standard. If an HPA is required for the project, the applicability of Ecology's standards will be discussed with WDFW during the design phase.

Hydraulic analysis and conceptual design described below assume adherence to King County requirements. Where appropriate, discussion of possible Ecology requirements is provided.

Proposed Stormwater Facilities. The runoff from the expanded Bow Lake Transfer/Recycling Station was modeled using the King County Runoff Time Series model. The results, shown in Table 2, indicate post-construction impervious surfaces and peak flows for 2-, 10-, 25-, and 100-year events. Note that runoff from approximately 0.45 acres would be collected and diverted to the sanitary sewer.

Table 2. Hydrologic Results – Developed Conditions

Impervious Area (acres)	8.78
Till Grass Area (acres)	2.32
Diverted to Sanitary Sewer (acres)	0.45
Total (acres)	11.54
Peak Flow (cfs)	
2-year	4.38
10-year	7.48
25-year	9.72
100-year	14.13

Source: *2006 Facility Master Plan Update* (KCSWD, 2006b).

The on-site collection and conveyance systems for the expanded Bow Lake Transfer/Recycling Station are discussed in detail in **Appendix F**.

Collection, Conveyance and Detention. Collection and conveyance systems will be designed to convey the 25-year peak flow. Runoff from impervious surfaces including paved areas and building roofs, except the Transfer Building roof, will be collected and conveyed to 12- to 24-inch drains. This runoff will be directed to an underground vault(s). An underground detention vault was selected rather than an infiltration facility or open pond because of unsuitable soils and lack of available space on the site. Preliminary modeling indicates that a vault approximately 18 feet by 50 feet by 11 feet in size will be sufficient to meet applicable requirements of the KCSWDM. As discussed in **Appendix F**, additional detention vault capacity could be utilized if necessary to meet more stringent regulatory requirements and space exists on site for this additional vault capacity.

Detained stormwater flows will be directed to a water quality treatment system, which meets the applicable Basic Treatment requirement as described in the KCSWDM (See **Appendix F.)**. A StormFilter system consisting of media-filled cartridges would likely be used. Depending on the type of pollutant to be treated, an array of media can be selected. In this application, the StormFilter cartridges would contain media designed to remove sediment.

Areas on the expanded station site with higher potential for contaminants will be provided with additional water quality treatment measures. As part of source control, drainage from the drip zones of Transfer Trailer Yard parking stalls and the open-top bin placement pads in the paid recycling area will be isolated with the capability of directing flows to either the storm drainage system or to the sanitary sewer system. Although not required by the KCSWDM, the Transfer Trailer Yard, the North and South Scale Facilities, and main queuing areas will be drained to oil/water separators for additional treatment prior to release to the site drainage system. Automatic wheel washes, truck washout facilities, and track-off grates will be provided at receiving floor exits to prevent commercial customer vehicles from tracking waste to outside paved areas.

A rainwater harvesting system will be installed on the Transfer Building roof for use as washdown water for operations. This roof runoff will be collected and stored for reuse as wash water in a series of tanks. This water conservation feature is an important element in the project sustainable design (green building) portfolio. Any roof runoff from the Transfer Building that exceeds the storage capacity of these tanks will overflow to the stormwater detention and treatment system. To be conservative, the design of the stormwater system assumes that all roof runoff will be collected and treated.

Discharge. Following treatment, stormwater will be discharged by one of two alternatives. The first involves a tight-lined pipe, designed to convey a 100-year peak flow. Treated stormwater would then be discharged to Stream E near South Center Parkway. The pipeline from the expanded station down the slope to the valley floor would require an easement(s) from property owner(s) along the proposed pipeline corridor.

In the second alternative,, treated flows would be discharged to the downstream drainage system via overland flow on the eastern slope. This option would consist of an engineered flow spreader and dispersion system(s) that would discharge flows along the property line near the toe of the slope or elsewhere along the slope. The system would be designed to minimize erosion and mimic the current dispersed stormwater discharge conditions at the site and careful consideration would be given to slope stability and avoiding generation of leachate within refuse deposits in the old landfill.

Decisions regarding the discharge method and specific design details will be made during development of the TIR and during design based on input from the City of Tukwila and other agencies having regulatory or oversight responsibilities, as well as the possibility of obtaining an easement from the adjacent property owner. The dispersion option will only be considered feasible if slope stability analysis by a licensed geotechnical engineer shows that discharge flows will not create erosion or slope stability problems downstream of the project site. As previously indicated, an HPA may be required for discharge to Stream E. If a dispersion option were implemented on the project site, consideration would be given to planting high water consumption trees on the unforested slope below the dispersion system as an additional means of groundwater uptake and slope stabilization.

2. Could waste materials enter ground or surface waters? ☐ Yes ☒ No

If so, generally describe.

Given the controls and treatment described above, it is unlikely that waste materials could enter ground or surface waters.

d. Proposed measures to reduce or control surface, ground and runoff water impacts, if any:

Construction

- An Environmental Protection Plan (EPP) will be developed that will describe procedures for managing and monitoring excavation activities, including procedures for identifying, testing, and handling of contaminated materials should they be encountered during site work;
- A TESC Plan and SWPP Plan will be developed prior to initiation of construction to reduce soil-related and stormwater-related impacts during site work;
- The NPDES Permit issued for construction activities on the site will include BMPs designed to reduce potential impacts related to stormwater and sediments;
- Exposed soils and stockpiles will be covered when not in use;
- Silt fencing, straw bales, check dams will be installed to protect downstream drainages and water courses;
- During construction, runoff will be directed to temporary sediment traps or portable treatment tanks for treatment prior to discharge to downstream systems;
- Petroleum products, solvents, etc. will be stored in a dedicated location designed to contain potential spills;
- A wheel-washing facility and track-off site entrances will be provided for construction traffic to prevent tracking waste to off-site roadways; As soon as practical following construction, exposed area will be hydroseeded and/or replanted;
- Impacts will be minimized to the E2 stream buffer in accordance with applicable City of Tukwila Sensitive Areas Ordinance requirements;
- Any unavoidable impacts to stream buffers will be mitigated through the implementation of a Stream Buffer Enhancement Plan as approved by the City of Tukwila. The Stream Buffer Enhancement Plan will include removal of non-native invasive plants such as ivy and holly in remaining buffer areas, planting of native shrubs and trees to increase species diversity, and installation of wildlife habitat structures such as downed logs, brush piles, and snags.
- To minimize sediment transport to the streams, construction within the stream buffers will be limited to the dry season as required by regulation.

Operation

- County staff will comply with all provisions of the *Bow Lake Transfer/Recycling Station Operating Plan* (KCSWD, 2006c), which describes operations and maintenance measures intended to prevent impacts on local drainages and streams;
- A Spill Prevention Control and Countermeasures (SPCC) Plan will be implemented to control any accidental spills or fuel leaks. Provisions of the Plan are likely to include:

- Storage of petroleum products, solvents, paints, and other potentially hazardous liquids in a secured location with secondary containment;
- Maintenance of emergency response contact information on-site;
- Maintenance of spill response materials and equipment in a readily accessible location;
- Training of all workers in spill control and emergency response procedures;
- Designation of a specific individual as primary on-site contact for emergency response to spills;
- Regular maintenance of heavy equipment and vehicles to prevent leakage of fuel or lubricants;
- Immediate cleanup of spills, however small in accordance with established procedures; and
- Adherence with established reporting procedures for all spills, regardless of size.

- The drip zone of all full container parking stalls will be drained to the sanitary sewer system with capability for diverting to the stormwater system when these stalls are used for empty trailers;
- Drainage from open-top drop boxes pads at the paid self-haul recycling area will be drained to the sanitary sewer system; and
- Pervious areas on the site will be maintained with mulch and/or planted with native grasses, shrubs and trees intended to control erosion and to enhance infiltration of precipitation into soils.

4. Plants

a. Check or circle types of vegetation found on the site:

☒ Deciduous tree: alder, maple, aspen, other: cottonwood
☒ Evergreen tree: fir, cedar, pine, other
☒ Shrubs: blackberry, salmonberry, Indian plum, Scot's broom
☒ Grass
☐ Pasture
☐ Crop or grain
☐ Wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
☐ Water plants: water lily, eelgrass, milfoil, other
☒ Other: English Ivy, Holly, sword fern

b. What kind and amount of vegetation will be removed or altered?

The proposed project would require the removal of approximately 189,000 square feet (4.34 acres) of existing vegetation. Most vegetation removal would occur north of the existing Bow Lake Transfer/Recycling Station, on the WSDOT property. A significant amount of grading would be required on the vacant portion of the WSDOT property, which is primarily covered with grass, Himalayan blackberry, and Scot's broom. Additional vegetation removal would be required along heavily vegetated and forested slopes within the WSDOT property. Tree removal in these areas is anticipated. Per Tukwila Municipal Code (TMC) Chapter 18.54.080, a tree clearing permit will be

required for removal of all trees over four-inches in diameter at breast height, which would include the preparation of a landscape plan, professional review and recommendations, and measures for mitigation for impacts to sensitive areas such as the buffer for Stream E2 per the Sensitive Overlay District chapter of TMC Chapter 18.

c. List threatened or endangered species known to be on or near the site.

A review of 2006 Washington Department of Natural Resources (WDNR, 2006) National Heritage Program (NHP) data revealed no presence of rare or threatened plant species within the project area or nearby vicinity.

d. Proposed landscaping, use of native plants or other measures to preserve or enhance vegetation on the site, if any:

The proposed project would result in a net loss of vegetation at the project site, specifically relating to existing invasive vegetation that would be removed from the WSDOT property. Retaining walls have been used wherever feasible to reduce the fill footprint of the project and minimize impacts to existing natural forested areas. The final landscape plan would include several vegetated areas throughout the site, including landscaped planters, medians, and existing native vegetated areas on the WSDOT property that would be preserved during the design phase of the project.

5. Animals

a. Check or circle any birds and animals which have been observed on or near the site:

☒ Birds: hawk, heron, eagle, songbirds, other
☒ Mammals: deer (scat), bear, elk, beaver, other
☒ Fish: bass, salmon, trout, herring, shellfish, other

b. List any threatened or endangered species known to be on or near the site.

According to the 2006 Washington State Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database, no threatened or endangered species are known to be on the project site. However, the WDFW database documents the presence of a bald eagle nest located approximately 0.5 mile west of the site, near the north end of Angle Lake. Bald eagles are currently designated as threatened on both state and federal species lists. The nest was documented in 1999 but was not active during WDFW surveys conducted in 2001 (City of Tukwila, 2005). Even if the bald eagle nest is still active, the project site is separated from the nest by I-5, which would negate any potential noise impacts during construction or operation of the Bow Lake Transfer/Recycling Station.

According to the Tukwila South Draft EIS, Stream E is a presumed fish-bearing watercourse (Cedarock Consultants, Inc., 2005). However, no fish are documented or have been observed in Streams E, E1 or E2 (WDFW, 2006; Raedeke Associates, Inc., 2005).

The Green River, located about a quarter mile directly east of the project site (Figure 2), provides habitat to numerous fish species including salmon (fall Chinook, coho,

chum, sockeye), steelhead, bull trout, Dolly Varden, and various other species (WDFW, 2006; City of Tukwila, 2005). The Puget Sound Evolutionarily Significant Unit (ESU) Chinook salmon is currently federally listed as a threatened species and is a state candidate species (NOAA Fisheries 2006; WDFW 2006). The Puget Sound Distinct Population Segment (DPS) bull trout is currently listed as a threatened species by the United States Fish and Wildlife Service (USFWS) and has been observed in the lower Green River historically, but now observations are rare and generally only include individual specimens.

c. Is the site part of a migration route? ☐ Yes ☒ No *If so, explain.*

The project site is not part of a migration route. Washington State is located within the Pacific Flyway, a flight corridor for migrating waterfowl and other avian fauna. No part of this site is used as part of this flyway, however, due to lack of suitable habitat.

d. Proposed measures to preserve or enhance wildlife, if any:

A loss of a portion of native forest associated with the slopes on the WSDOT property would reduce the amount of potential habitat available in the near vicinity of the site for wildlife species. As previously discussed, the proposed project is not anticipated to directly affect any listed wildlife species. Measures that would be incorporated during construction to ensure minimal impact to the surrounding areas, including potential wildlife habitat, would include use of BMPs including sediment fencing, erosion protection measures, stormwater controls, and practices to minimize impacts to air quality. In addition mitigation for impacts may include the removal of non-native invasive species such as Himalayan blackberry, English ivy, and holly and replacement with native trees, shrubs, and groundcover. Providing habitat features such as downed logs, snags, and brush piles in impacted areas may enhance wildlife habitat. Appropriate mitigation will be provided for tree removal in sensitive areas such as the Stream E2 buffer in accordance with TMC 18.54.080 (**Appendix G**)

Measures to ensure minimal impacts to nearby sensitive areas, including the Green River, would be incorporated into the final design of the new facility. Effective water quality controls, including stormwater treatment and detention, will ensure runoff impacts are minimized downslope from the facility. Stormwater facilities would be designed in accordance with the *King County Surface Water Design Manual* (King County, 2005).

Depending on the stormwater discharge alternative chosen, impacts could potentially occur to receiving waters. If work occurs within any stream, a Hydraulic Project Approval (HPA) will be required from WDFW and the work will comply with the conditions set forth in any approval.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The completed project will require energy in the form of electricity and diesel fuel. There will be no natural gas usage at the expanded Bow Lake Transfer/Recycling Station. Electricity demand is estimated at 114,000 kilowatt hours (kWh) per year.

The project also incorporates installation of a photovoltaic solar array on the roof of the Transfer Building. This is expected to generate approximately 11,000 kWh per year, which will be sold to the electrical power grid.

Similar to other KCSWD facilities, biodiesel fuel will be required to power on-site equipment (e.g., front end loader and yard tractor) (Long, personal communication, 2006). These vehicles would require an estimated 21,700 gallons per year. This figure does not include fuel requirements of the transfer trucks which haul compacted waste from the station since these are not included in the proposed project.

b. Would your project affect the potential use of solar energy by adjacent properties? ☐ Yes ☒ No *If so, generally describe.*

The Bow Lake Transfer/Recycling Station expansion project will not affect any potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

A number of measures that reduce energy usage have been incorporated into the design of the expanded station. These measures include the following:

- The Transfer Building will be oriented in a manner that captures prevailing winds for cross-ventilation, thereby reducing the need for mechanical ventilation.
- Energy-efficient fans in the Transfer Building will be designed to operate in conjunction with natural ventilation.
- Translucent panels will be installed in the roof and sides of the Transfer Building in order to reduce the need for artificial lighting.
- The high bay lights in the tipping floor area will have daylight sensors to eliminate use of the lights during periods when natural light is sufficient.
- Smaller buildings at the expanded station will include efficient lighting, energy-efficient HVAC systems, and operable windows designed to enhance energy efficiency.
- The project design will incorporate sustainable design principles that would be measured through the Leadership in Energy and Environmental Design (LEED™) rating system.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill or hazardous waste that could occur as a result of this proposal? ☒ Yes ☐ No *If so, describe.*

Construction or operation of the proposed expanded Bow Lake Transfer/Recycling Station will not pose any significant risks to workers or the public. Because municipal solid waste is stored at the site for a single day or less, the potential for spontaneous combustion is low. The risk of explosion associated with dust is low because of the design of the Transfer Building and ventilation systems to be installed. Screening of incoming wastes reduces the potential for explosion of compressed vessels. Any

compressed vessels passing through the Scale Facility undetected are likely to be empty or nearly so and less subject to explosion.

Excavation of old refuse material from the old landfill has some potential for release of landfill gases (e.g. methane) and odors. Contractors will be required to prepare an Environmental Protection Plan (EPP) and a Health and Safety Plan prior to initiation of excavation at the site. These plans specify procedures for managing and monitoring excavation, including methods for identifying, testing, and handling of constituents of concern should they be encountered during construction. Excavation and construction will also comply with the Seattle and King County Public Health regulations regarding construction in the vicinity of abandoned landfills (Section 10.36.300 Rules and Regulations.). Assuming that contractors adhere to these plans and applicable regulations and follow generally-accepted construction practices, no significant impacts associated with landfill gases are anticipated.

Exposure of workers or the public to liquids or gases associated with solid waste is not expected to present significant health risk. The risk to health of individuals exposed to liquid wastes (ingestion or skin contact) has been shown to be very low (KPG, Inc., 2003). Because of the short period of time that solid waste is stored at the Transfer/Recycling Station, local generation of waste gases is negligible. The ventilation systems to be installed in the Transfer Building and the gas detection alarm systems that will be employed further reduce the potential for gas-related impacts.

The expanded Transfer/Recycling Station is not expected to present significant health risks to workers, the public, or the surrounding community by disease vectors such as birds, rodents, and other vermin. The new facility will incorporate design features that will discourage the presence of birds and rodents (See Section 7.c below). In addition, good housekeeping procedures and regular maintenance and inspections of the premises will further reduce health risks associated with these vectors. See Section 7.c. below and **Appendix H. Appendix H** also includes the Public Health Procedures and Requirements – Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation: Technical Memorandum (KCSWD, 2006d), prepared in support of this Environmental Checklist. The Technical Memorandum summarizes procedures and requirements related to environmental health as they relate to the construction and operation of the new Transfer Station.

1. Describe special emergency services that might be required.

No special emergency services are required at the existing Bow Lake Transfer/Recycling Station, nor would they be required for the proposed expansion of the facility. As described in Section 7.a.2 below, public health and safety are an integral part of the design of the new Transfer/Recycling Station and its long term operation. As shown below, accident prevention and provision of emergency services as they may be needed are an essential focus of station operations. In addition, KCSWD cooperates with other local emergency service providers to ensure that the facility is well-served in the event of an emergency. Overall, the potential need for emergency services is not expected to be significant nor any greater than currently exists.

2. Proposed measures to reduce or control environmental health hazards, if any.

KCSWD has a number of plans in place that are intended to reduce or control potential environmental health hazards at their transfer stations and other solid waste facilities throughout the county. The primary document in this regard is the *Bow Lake Transfer & Recycling Station Operating Plan, King County Solid Waste Division* (Operating Plan) (KCSWD, 2006c). **See Appendix H.** This plan and other procedures that are in place at the existing Transfer/Recycling Station relating to environmental health are described below.

Construction

Environmental Protection Plan. Prior to excavation of old refuse at the Bow Lake Transfer/Recycling Station site, SWD will prepare an Environmental Protection Plan (EPP). The EPP will describe procedures for managing and monitoring the excavation of refuse, including measures for identifying, testing, and handling of materials with potential contaminants of concern, should they be encountered during excavation. The EPP is an integral part of the planning and construction provisions for environmental preparedness for the Bow Lake Transfer/Recycling Station project. It documents the respective understanding between environmental health and safety regulatory agencies and SWD for protection measures to be implemented during construction. An example of an EPP is provided in **Appendix H.**

Health and Safety Plan. Prior to construction, the contractor will be required to prepare a Health and Safety Plan that describes emergency procedures that will be implemented in the event of encountering landfill gases (e.g. methane) or other hazardous materials. This would include measures to be incorporated into the work plan to avoid on-site accidents, and as well, measures intended to provide rapid response in case of accidents that may occur on the site.

Operations

Operating Plan. The existing Operating Plan provides a guide to operating characteristics at the Bow Lake Transfer/Recycling Station. **See Appendix H.** It describes procedures for control of materials, safety and emergency plans, maintenance requirements, inspections, environmental controls, and regulatory compliance. With the expansion of the proposed station, an updated Operating Plan will be developed for approval by Seattle and King County Public Health.

Inspections. The Operating Plan describes inspection requirements, stating:

"Routine and periodic inspections are performed by regulatory agencies and the Solid Waste Division through self-audit to ensure operational and facility compliance with environmental, public health, and waste management regulations. Facility inspection reports are a component of the operating record. Records are kept for a minimum of five years. The Health Department may review records upon request to the Transfer Station Supervisor or Operations Manager."

Regulatory agency inspections are conducted periodically by:

- Seattle-King County Health Department
- Puget Sound Clean Air Agency (PSCAA)
- Fire Marshall
- City of Tukwila
- Washington State Department of Ecology (Ecology)
- Washington State Department of Labor and Industries
- Washington State Boiler Inspector

Nuisance Animals and Insects. In order to control birds, rodents, and insects, the expanded Transfer/Recycling Station will incorporate a number of deterrent measures.

- Receipt and handling of MSW will occur in the fully-enclosed Transfer Building; doors will be low in height to discourage birds from entering building;
- Automatic wheel washes and vehicle wash off stations will be included for commercial vehicles to minimize the tracking of waste material outside the building;
- Anti-bird perching devices (wires and spikes) will be installed on the roof of the Transfer Building and all perching surfaces;
- The site will not include any open stormwater ponds that could attract wildlife;
- Plant materials selected as part of site landscaping will minimize habitat for rodents and similar vermin; and
- Retaining wall systems on the site will be designed to avoid openings that might provide harborages for rodents and other vermin.

Health and Safety. A number of measures are incorporated into the design and operation of the new Transfer/Recycling Station to ensure the health and safety of workers and customers.

- Maneuvering and unloading areas for customer vehicles will be designed to maximize separation between vehicles and visibility in order to minimize vehicle-to-vehicle and vehicle-pedestrian accidents;
- Monitoring and warning systems will be installed in occupied areas of the facility in order to determine levels of methane, carbon monoxide, and nitrogen dioxide;
- Curbs and railings will be provided in locations throughout the facility where accidents from falling are possible;
- Non-slip surfaces will be installed in frequently wet areas where workers and customers frequently walk;
- Cautionary and hazard warning signage will be provided throughout the facility;
- Spill detection, protection and emergency eyewash and shower equipment will be located throughout the facility and appropriate signage provided;
- Lighting levels will exceed code requirements in order to better illuminate hazards and reduce worker fatigue; and
- Staff will be provided with radios in order to facilitate communication in the event of an emergency.

Odor and Dust. Incorporated into the design of the new facility will be a number of measures intended to control dust and odors.

- Handling of MSW will occur within the fully-enclosed Transfer Building;
- A dust extraction system will be provided for the two solid waste compactors;
- The Transfer Building will include a dust and odor control system consisting of a high pressure, low volume misting system that will have the ability to introduce odor neutralizing agents that molecularly combine with odor molecules to maintain a non-odorous atmosphere in the Transfer Building;
- The washout and automated tire wash systems and track off grates will be designed to minimize tracking of dust and debris outside the Transfer Building;
- The drain system in the Transfer Building will be designed to collect contaminated water from the waste processing areas; it will be equipped with water seal type traps and debris/fines collection and removal sumps to control the buildup of odor-generating debris and to prevent the escape of sewer gas; deodorizers and disinfectants will be added as needed;
- Floors and other surfaces in the Transfer Building will be designed to be easily washed down to eliminate areas of debris buildup and odor generation;

Waste Screening. The types of waste accepted at a transfer facility will continue to be strictly controlled by KCSWD through King County Public Rule PUT 7-1-4(PR), Waste Acceptance Policy. This rule prohibits disposal of hazardous or dangerous waste, burning or smoldering material, infectious waste, excessively odorous or dusty material, and various other materials.

The Bow Lake Transfer/Recycling Station does not accept toxic chemicals or other wastes that are considered hazardous to environmental health. In accordance with established operating procedures, KCSWD conducts a proactive program for screening toxic materials and other hazardous materials from the waste stream. Signage will be provided at the scale houses describing the types of waste that are not allowed at the station and indicating alternative locations where toxic and/or hazardous wastes may be taken for disposal.

Scale house operators will continue to conduct visual screening of waste loads. If toxic or hazardous wastes are observed, customers are informed of locations where these materials can be taken. Station operators on the tipping floor conduct similar screening, with the intention of intercepting toxic or hazardous wastes prior to disposal by customers. In addition, full-time waste screeners visit the station periodically to observe the solid waste stream and determine whether any toxic or hazardous materials are present.

Emergency Response. KCSWD has developed the *Hazardous Materials Emergency Response Plan, King County Solid Waste Division Transfer Facilities* (KCSWD, 2004). This plan describes the procedures and resources used by KCSWD to respond to hazardous materials emergencies at transfer facilities should they occur. Copies of this plan are maintained at each transfer facility and a copy is assigned to the individual acting on site as Emergency Coordinator. Use of the plan and its provisions is an integral part of employee training at transfer facilities. A copy of the plan is provided in **Appendix H.**

KCSWD retains an emergency response contractor on a 24-hour-per-day, 7-day-per-week basis for all of its solid waste facilities . This contractor would respond to spills or accidental discharges of petroleum products and hazardous wastes at the existing Bow Lake Transfer/Recycling Station, if they were to occur. This emergency response capability will continue to remain in place with the expanded facility. In the event of a minor spill, absorbent pads and other absorbent materials would be stored in convenient locations for use by employees. Impervious areas where spills could occur would be graded in a manner that any flows would be directed to an oil/water separator. These measures are intended to control potential emergency spills and prevent any discharge to drainages or adjacent vegetated areas. In addition, employees will be trained in emergency response procedures, including emergency contacts, as part of implementation of the Spill Prevention, Control, and Countermeasure (SPCC) Plan.

Storm Drainage. The on-site stormwater collection system will be designed to direct stormwater from impervious surfaces to detention vault(s) and subsequently to on-site stormwater treatment facilities. On-site treatment facilities would be designed for oil/water separation and/or sediment removal. In the unlikely event of an emergency spill, these facilities will facilitate control and removal of contaminants. See Section 3(c) Water Runoff for additional details on proposed stormwater collection and treatment systems.

b. Noise

1. What types of noise exist in the area which may affect your project (i.e., traffic, equipment, operation, other)?

The existing sound levels in the project vicinity are dominated by noise from traffic traveling on I-5. These sound levels are typically in the 60 to upper 70 dBA range at the residential locations nearest and most exposed to the station site. Noise from I-5 would not directly affect the project, except that it would obscure noise from the facility at the nearest residential locations, reducing the potential for noise impacts (Geomatrix, Inc., 2006b). A detailed noise assessment and a supplemental memorandum prepared for this project are included as **Appendix I**.

2. What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (i.e., traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short-Term Construction

During construction, noise would be generated by heavy equipment used for grading, excavating, paving, and erection of new facilities. Because project construction would occur only during daytime hours (i.e., between 7 a.m. and 10 p.m.) and is temporary, noise from construction is not anticipated to result in significant noise impacts.

Long-Term Operation

The upgraded station proposes to operate 24 hours per day, seven days per week. It currently operates 24 hours per day between 12:00 a.m. Monday through 7:00 a.m. Saturday and from 8:30 a.m. to 5:30 p.m. on Saturdays and Sundays.

Noise sources associated with the upgraded station would be similar to the sources at the existing facility. Primary noise sources would include heavy-duty equipment, trucks, and trailers. In the future, the majority of activities and equipment would occur inside of the facility, and the building structure would provide a substantial noise reduction for interior activities. Currently, there are no walls on the Transfer Building to act as noise barriers for much of the equipment and activities. The primary noise-producing equipment or activities are listed below:

- A top-pick or reach stacker for containers that might be used in the future in the Trailer Yard;
- Forklifts in outdoor recycling areas;
- Two compactors, with hydraulic power units installed in the building;
- Two rubber-tired front end loaders working in the building;
- Two yard tractors (i.e., yard goats) moving trailers in and out of the loading bays on the lower level; and
- Approximately 1,000 vehicles on an average day in 2030 and 2,100 vehicles on a peak day. Approximately 26 percent commercial vehicles (trucks), 71 percent self-haul vehicles (pickups and cars) and 3 percent business self-haulers (smaller trucks). By 2030, there are expected to be an average of 46 transfer trailer vehicles per day, with peak days of approximately 82 vehicles.

Noise from the expanded facility is not anticipated to result in noise impacts to the nearest existing residences to the site on the hillside west of the facility across I-5. First, noise from the expanded facility was estimated to be 52 dBA or less during peak daytime operations and 50 dBA or less at night. These predicted levels would comply with the applicable daytime and nighttime noise limits of 60 and 50 dBA, respectively. Daytime hours for the purposes of the noise assessment are between 7 a.m. and 10 p.m., and nighttime hours are between 10 p.m. and 7 a.m. Second and more importantly, noise from vehicles traveling on I-5 dominates the noise environment at the residences on the hillside, and traffic noise would be at least 10 dBA louder than noise from the facility, even during the quietest nighttime hours. Therefore, noise from the upgraded station would rarely, if ever, be audible at these hillside residences.

Potential noise impacts on the undeveloped residential property north of the Bow Lake Transfer/Recycling Station and east of I-5 were also analyzed. As with the existing residences on the hillside west of I-5, noise from the expanded Transfer/Recycling Station is not anticipated to result in adverse noise impacts to potential future residences at this location.

First, noise from the expanded facility was estimated to be 49 dBA during peak daytime operations and 48 dBA during nighttime operations. These predicted levels would comply with the applicable noise limits. The noise limits for this residential receiving property are the same as for the existing residences west of the site, 60 dBA during the day (7 a.m. to 10 p.m.) and 50 dBA at night (10 p.m. to 7 a.m.). Second and more importantly, this residential property is approximately the same distance from I-5 as the hillside residences west of I-5 and would be subject to similar levels of freeway traffic noise.

Existing background sound levels (L_{90}S) during the day range from 68 to 71 dBA, at least 19 dBA higher than noise levels predicted from the expanded Transfer/Recycling Station during peak daytime operations. Similarly, existing background sound levels (L_{90}S) at night range from 61 to 72 dBA, at least 13 dBA higher than noise levels predicted during nighttime operations. Therefore, during both daytime and nighttime operations, noise from the freeway would obscure noise from the Transfer/Recycling Station and it is unlikely that noise from the expanded facility would be audible, except during rare lulls in I-5 traffic.

3. Proposed measures to reduce or control noise impacts, if any:

Construction activities would be restricted to daytime hours when traffic noise from I-5 is greatest.

During operation, many of the potential noise emitters at this site would be located inside enclosures or buildings, which would greatly reduce the noise received at the nearest residences from this equipment. These buildings and enclosures may also serve as noise barriers for other equipment operating outside. With the project as proposed, no significant adverse noise impacts were identified. Therefore no operational noise mitigation is proposed (Geomatrix, Inc., 2006b,c).

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The proposed project area encompasses two separate parcels located in the City of Tukwila. An active solid waste transfer and recycling station owned and operated by KCSWD currently occupies the project area's southern parcel. The project area's northern parcel, currently owned by the WSDOT, is an undeveloped parcel consisting of existing fill, and a small storage lot that houses several jersey barriers located adjacent to I-5.

b. Has the site been used for agriculture? ☐ **Yes** ☒ **No** *If so, describe.*

The site has not previously been used for agriculture.

c. Describe any structures on the site.

The existing facility includes a 33,100-square-foot open-sided concrete and steel Transfer Building, a 500-square-foot employee facility located under the roof of the Transfer Building, a 180-square-foot scale building with two 50-foot-long pit-type vehicle scales, and two 40 CY free recycling drop boxes.

d. Will any structures be demolished? ☒ **Yes** ☐ **No** *If so, what?*

The existing 33,100-square-foot Transfer Building and employee facility will be demolished during Phase 2 of the project. Other on-site structures that will be demolished include the existing scale facility.

e. What is the current zoning classification of the site?

The current Bow Lake Transfer/Recycling Station parcel is zoned Tukwila Valley South (TVS) in the Tukwila Zoning Code (City of Tukwila, 1995b). The parcel to the

north of the site is currently right-of-way owned by WSDOT; the site does not have a specified zoning classification. Under the Tukwila Municipal Code (TMC 18.08.020), lands not classified according to the official zoning map, are considered unclassified, and pending future classification, are subject to the restrictions and regulations of the Low Density Residential (LDR) District.

A small portion of the WSDOT parcel (northwest corner) is located in the City of SeaTac and zoned UL-9,600 (Urban Low Density Residential 9,600).

f. What is the current Comprehensive Plan designation of the site?

The *City of Tukwila Comprehensive Plan* (City of Tukwila, 1995a) designation of the existing station site is TVS. The majority of the project site owned by WSDOT is undesignated.

The portion of the WSDOT property located in the City of SeaTac is designated Residential Low Density.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area?
☒ **Yes** ☐ **No** *If so, specify.*

According to the City of Tukwila Geologic Hazard Maps (City of Tukwila, 2004a), portions of the existing site, the WSDOT site to the north, and most of the adjacent slope to the east have been designated Slope Classifications 2, 3 and 4. Slope Classification 2 is defined as slopes where "Landslide potential is moderate; slope is between 15% and 40% and underlain by relatively permeable soils." Slope Classification 3 is defined as slopes where "Landslide potential is high; slope is between 15% and 40% and underlain by relatively permeable soils or by bedrock; also includes all areas sloping more than 40%." Slope Classification 4 areas are those where landslide potential is very high, including sloping areas with mappable zones of groundwater seepage, and which also include existing mappable landslide deposits regardless of slope. Portions of the site are also mapped as erosion hazard areas. See Section B.1. Earth for additional information on slopes and soils.

The Sensitive Areas Map (City of Tukwila, 2004a) shows a Type 2 stream (Stream E2) north of, and adjacent to the WSDOT property to be purchased as part of the Bow Lake Transfer/Recycling Station expansion. Another stream (Stream E1) is shown east of the site, flowing downslope to the valley floor where it discharges to another stream (Stream E) near Southcenter Parkway South. The Sensitive Areas Map indicates "Verified Salmonid Use" for each of these streams. However, the recent *Tukwila South Project Final EIS* (Cedarock Consultants, Inc., 2005) indicates that Streams E1 and E2 are not considered fish-bearing because of steep gradients and lack of suitable habitats. Although this document indicates that Stream E is fish-bearing, fish use is limited by obstructions and lack of suitable habitat. See Section B.3. Water and B.5. Animals for additional discussion regarding streams and fish use.

i. Approximately how many people would reside or work in the completed project?

Construction. The average work force during site preparation work is expected to be approximately 30 workers with a peak work force of approximately 50 workers. Material deliveries, vendor trips, and visits by County staff, inspectors, labor union staff, engineers, and consultants are expected to vary between 25 and 30 each working day. During the site facilities contract, the average work force is expected to be approximately 50 workers with a peak number of approximately 150 workers. Miscellaneous visits are likely to range between 30 and 40 each working day.

Operations. Staffing requirements of the new transfer facility are not expected to significantly change from current practices. KCSWD currently employs eight full-time attendants at the existing Bow Lake Transfer/Recycling Station. Following expansion of the facility, an estimated 13 attendants would be required to operate the station. It is assumed that janitorial services would be contracted out. No persons would reside on the site.

j. Proposed measures to avoid or reduce displacement impacts, if any:

The proposed project would not result in the displacement of any residential uses.

k. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

As previously mentioned, the Bow Lake Transfer/Recycling Station is designated as TVS in the City of Tukwila's Zoning Code. Chapter 18.40 of the Tukwila Zoning Code allows transfer stations as Unclassified Uses (City of Tukwila, 2004b). The proposed expansion of the station to the north would transform this unimproved parcel to a solid waste facility. KCSWD is currently in discussions with WSDOT regarding the transfer of WSDOT property.

9. <u>Housing</u>

a. Approximately how many units would be provided, if any? Indicate whether high, middle or low-income housing.

The project does not provide any housing.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle or low-income housing.

No residential units currently exist on-site; therefore, no units would be eliminated by the proposed project.

c. Proposed measures to reduce or control housing impacts, if any:

No housing impacts would result from the proposed project; therefore, mitigation measures are not proposed.

10. Aesthetics

a. What is the tallest height of any proposed structure or structures, not including antennas? What is the principal exterior building material or materials proposed?

The new Transfer Building will be the largest structure on the site, with a maximum height of approximately 65 to 70 feet above grade. The Transfer Building will consist of a two-level, cast-in-place concrete substructure and a pre-engineered, clear span metal superstructure. Precast tilt-up concrete panels may be used on the lower exterior walls for a durable surface. The upper portions of the superstructure will be metal-clad with large translucent panel areas to provide natural lighting of the interior. The roof will consist of a highly reflective metal surface with daylighting panels at the peak to provide natural lighting for the waste handling areas below. A solar panel array may be constructed on the south side of the roof area. Green roofs may be installed above the Maintenance Building and the Overlook on the east and south sides of the Transfer Building, respectively.

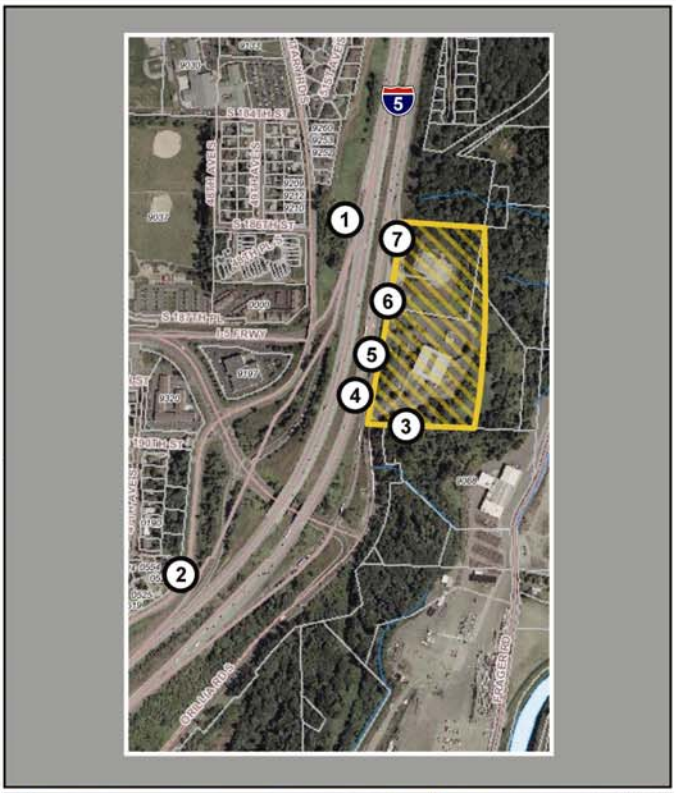
b. What views in the immediate vicinity would be altered or obstructed?

As part of the design effort for the expanded Bow Lake Transfer/Recycling Station, a photo simulation was conducted in order to determine potential visual impacts of the project on adjacent properties (KPG, Inc., 2006). Photographs of the existing facility were taken from selected viewpoints on the west and east sides of I-5 and from selected locations on the valley floor. Using physical dimensions and elevations of proposed structures, simulation techniques were used to superimpose the new Transfer Building on the existing photographs to show how the new facility would appear from these viewpoints.

Views from the Vicinity of Transfer/Recycling Station

In Photo 1 in **Figure 14**, taken from the residential area west of I-5, the WSDOT property and jersey barriers in the foreground can be seen to the east across the freeway. In the simulated Photo 1a, the new Transfer Building to be constructed is shown on the WSDOT property, including the new green roof with skylights and the earth-toned walls and translucent panels (**Figure 15**). Most of the other portions of the expanded Bow Lake Transfer/Recycling Station will be obscured by on-site landscaping and/or topography. Views of the Cascade Mountains to the east will not be obstructed and most of the Duwamish – Green River Valley will remain visible from this viewpoint.

Photo 2 in **Figure 14** was taken southwest of the existing Bow Lake Transfer/Recycling Station near a residential area on the west side of I-5. Views from this location would not be substantially affected by the new facility. As shown in simulated Photo 2a, only a small portion of the new Transfer Building is visible (Figure 16). Other views of the mountains and valley across the freeway to the northeast are unaffected.



Existing Viewpoints

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

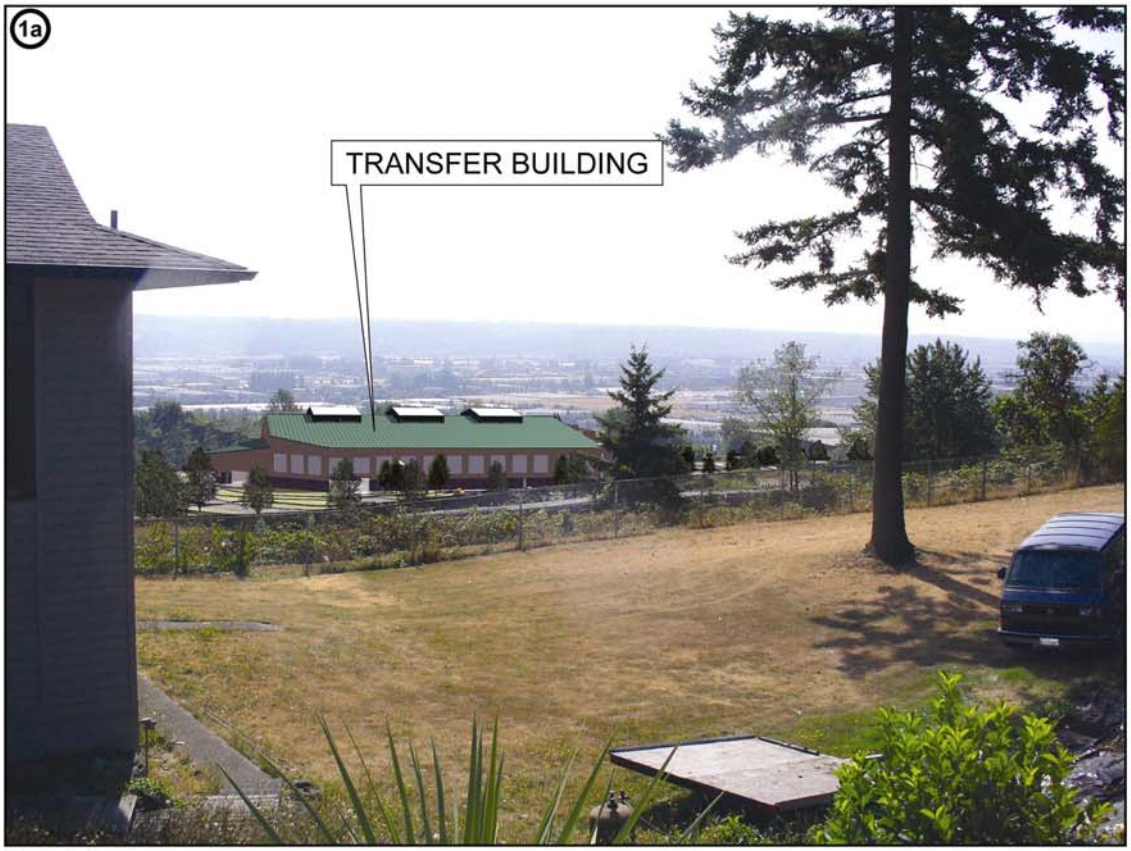
KPG
R·W·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 14

JULY 2006



Simulation.

Photo Simulation (1A)

NOT TO SCALE

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

KPG
R·W·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 15

JULY 2006

Simulation.

Simulation.

Photo Simulations (2A, 4A)

NOT TO SCALE

KING COUNTY DEPARTMENT OF NATURAL RESOURCES & PARKS SOLID WASTE DIVISION	KPG RW·BECK	BOW LAKE TRANSFER STATION FACILITIES MASTER PLAN FIGURE 16 JULY 2006

Photo 3 in **Figure 14** shows the entrance to the existing Bow Lake Transfer/Recycling Station near the scale facility. The appearance of the entrance is not expected to change in any material way, other than relocation of the scale facility north of its present location.

In Photo 4 in **Figure 14**, the view is to the east across the northbound I-5 entrance ramp toward the existing facility. Photo 4a in **Figure 16** simulation shows no visual change of consequence. Note the existing cell tower in Photo 4a is located just off-camera south of Photo 4.

Views from the Floor of the Green/Duwamish River Valley

Additional photo simulations were conducted from the Green/Duwamish River valley floor to the east in order to determine whether the expanded facility will be visible from various valley floor locations, and if so, whether views from these locations will be altered. Locations of viewpoints on the valley floor are shown in **Figure 17.**

Views from selected locations on the valley floor are shown in **Figure 18.** Photo 2 shows a view to the southwest from the bridge at West Valley Highway and S. 180th Street. The photo is a composite of several photographs combined to depict a panorama view. The arrow shows the location of the expanded Transfer/Recycling Station, which is not visible from this viewpoint. Photo 4 is a view to the west from the intersection of Southcenter Parkway and Andover Park West. The Transfer/Recycling Station is barely visible near the crest of the slope that rises to the west above the valley floor. Photo 7 is taken from a viewpoint looking west from Briscoe Park on the Green/Duwamish River in Kent. The new facility is only slightly visible near the top of the forested slope on the far horizon. Photo 10 shows a panoramic view to the north from a vehicle turnoff on Southcenter Parkway. The new facility is barely visible above the trees in the far right portion of the composite photograph. The final Photo12 presents a view to the southwest across the valley from near S. 26th Street in Renton. The expanded Transfer/Recycling Station is essentially invisible from this location.

None of the photo simulations from locations on the valley floor show indications of adverse effects of the expanded facility on views. In most locations, the expanded facility will not be visible or barely so. In those locations where the expanded facility will be visible, it will not be of a scale or color that will affect views to any meaningful degree.

c. Proposed measures to reduce or control aesthetic impacts, if any:

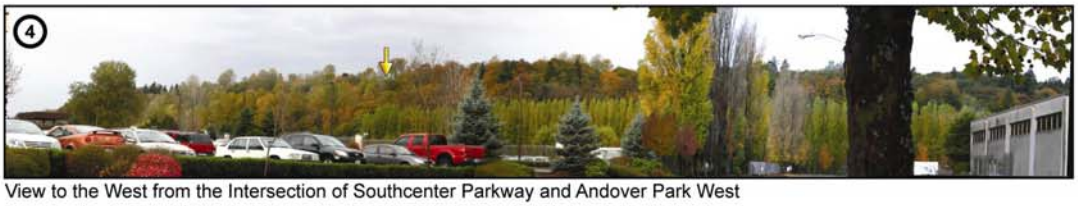
A number of measures have been incorporated into the project design to reduce or control aesthetic impacts.

- Structural materials and colors have been selected to be compatible with the forested setting of the facility.
- Elevations and locations of structures have been designed to ensure that views of the Cascade Mountains and Mount Rainier to the east-southeast are not obstructed.
- The new site will be landscaped in a manner that enhances the natural characteristics of the site. It is expected that trees of an appropriate height will be used to provide visual screening of the Transfer Building from the west.

Viewpoint Locations on Valley Floor

KING COUNTY DEPARTMENT OF NATURAL RESOURCES & PARKS SOLID WASTE DIVISION	KPG R·W·BECK	BOW LAKE TRANSFER STATION FACILITIES MASTER PLAN FIGURE 17 JULY 2006

View to the Southwest from the Bridge at West Valley Highway and S 180th Street



View to the West from the Intersection of Southcenter Parkway and Andover Park West

View to the West from Briscoe Park in Kent

View to the North from Vehicle Turnoff on Southcenter Parkway

View to the Southwest from S 26th Street in Renton

Existing Viewpoints from Valley Floor

KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

KPG
R·W·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 18

JULY 2006

- As much as possible, existing trees will be maintained on the perimeter of the site and new trees and shrubs will be planted where perimeter areas are disturbed during construction.
- Closed, end-loaded containers will be used for solid waste, reducing the potential for spillage of waste and litter about the site.

11. Light and Glare

a. What type of light and glare will the proposal produce? What time of day would it mainly occur?

The proposed project is expected to produce minimal lighting impacts, similar to existing conditions. Because the facility operates 24 hours per day, interior and exterior lighting is required for hours of darkness throughout the year.

b. Could light or glare from the finished project be a safety hazard or interfere with views? ☐ Yes ☒ No *If yes, explain:*

The expanded Bow Lake Transfer/Recycling Station is not expected to generate light and glare that might cause a safety hazard or interfere with any views.

c. What existing off-site sources of light or glare may affect your proposal?

No off-site source of light or glare would affect the proposed project.

d. Proposed measures to reduce or control light and glare impacts, if any:

All lighting at the expanded Bow Lake Transfer/Recycling Station (interior and exterior) would be designed in accordance with local design standards. Exterior lighting would be installed to ensure minimal light spillover onto adjacent properties, especially to avoid impacts to I-5 traffic. Exterior colors, gloss levels, and surfaces will be selected to reduce or eliminate glare.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

A driving range is located approximately 650 feet east of the site, downslope of the transfer facility (Figure 2). The only other recreational opportunity within the project vicinity is Valley Ridge Park, an active use park (baseball/softball fields, tennis courts, etc.), located approximately 1,100 feet west of the site in the City of SeaTac.

b. Would the proposed project displace any existing recreational uses? ☐ Yes ☒ No *If so, describe.*

No existing recreational uses would be displaced by the project.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Although construction is not expected to result in a direct impact to recreational opportunities (e.g., temporary recreational facility closures, access restrictions, etc.), noise could be a concern for users of the nearby golf driving range. However, construction noise is not anticipated to result in an adverse effect to users of the golf driving range since the general area is susceptible to noise associated with industrial businesses east of the site and distant I-5 traffic. The contractor could implement additional BMPs during construction of the facility to attenuate noise impacts such as using temporary noise barriers if necessary.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, the national, state or local preservation registers known to be on or next to the site?
☐ **Yes** ☒ **No** *If so, generally describe.*

No places or objects listed on, or proposed for, the national, state or local preservation registers are know to be on or near the site.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific or cultural importance known to be on or next to the site.

No landmarks or evidence of historic, archaeological, scientific or cultural importance are known to be on or next to the site (DAHP, 2005; and NPS 2006).

c. Proposed measures to reduce or control impacts, if any:

Should historic or cultural resources be discovered during construction, construction activities would immediately cease and the Washington State Department of Archaeology and Historic Preservation (DAHP) would be contacted.

14. Transportation

In order to determine the potential impacts of the expanded Bow Lake Transfer/Recycling Station on transportation systems in the vicinity, KCSWD conducted a traffic study. The *Traffic Impact Analysis: Bow Lake Transfer/Recycling Station* (The Transpo Group, 2006a) evaluates existing traffic conditions, year 2011 (when the project is planned for completion) and year 2030 traffic conditions with and without the project, and future conditions including the proposed Tukwila South Project. The study includes analysis of queuing at intersections near the entrance to the Transfer/Recycling Station. The complete traffic study is provided in **Appendix J.**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Access to the Bow Lake Transfer/Recycling Station is provided by a number of surface transportation facilities. These include:

I-5. WSDOT classifies I-5 as an urban interstate highway. In the immediate vicinity of the Bow Lake Transfer/Recycling Station, it consists of four general-purpose lanes and a high occupancy vehicle (HOV) lane in both north and south directions. Lanes are typically 12 feet wide with 3- to 10-foot shoulders. Northbound and southbound lanes are separated by medians and concrete median barriers. The posted speed limit is 60 miles per hour (mph). An off-ramp and on-ramp for northbound traffic on I-5 are located just west of the entrance to the station connecting to South 188th Street. Traffic exiting I-5 on the off-ramp can turn left onto westbound South 188th Street or turn right onto eastbound South 188th Street and Orillia Road.

South 188th Street. Where the roadway passes under I-5, west of the entrance to the station, South 188th Street is a principal arterial. It is a four-lane roadway with a center left-turn lane. In the immediate vicinity of the station, South 188th Street provides access to northbound I-5. There is a signal at the intersection of South 188th Street and the off-ramp from and on-ramp to northbound I-5.

Orillia Road South. Orillia Road South is a principal arterial located directly southwest of the entrance to the Bow Lake Transfer/Recycling Station. It connects South 188th Street and I-5 with the valley floor to the east via South 200th Street and South 212th Street. Orillia Road South is a four-lane roadway consisting of 11- and 12-foot lanes with a posted speed limit of 40 mph.

Traffic Volumes

Existing traffic volumes at the Transfer/Recycling Station are shown in **Table 3** for AM and PM peak hour weekday and Saturday peak hour conditions.

Table 3. Existing Traffic Volumes: S 188th St/Orillia Rd S/Transfer Station

	Accessing Station[1]	TEV[2]	% Vol. Related to Station[3]
AM Peak Hour	73	2,833	2.6%
PM Peak Hour	44	3,457	1.3%
Sat. Peak Hour	181	1,222	14.8%

1. Total trips in/out from transfer station during peak hour counted.
2. TEV = total entering volume of intersection.
3. The percentage of intersection volume accessing the transfer station.

As indicated, the traffic volumes (combined self-haul and commercial customers) entering the Transfer/Recycling Station is lowest during the PM peak hour, a period when background traffic volumes are highest. The highest traffic volumes accessing the Transfer/Recycling Station occur on a Saturday peak hour because of the higher number of self-haul residential customers.

Traffic Operations

A level-of-service (LOS) analysis was conducted to determine the performance of intersections in the vicinity of the Transfer/Recycling Station. Level-of-service values range from LOS A, indicative of good operation and low vehicle delays, and LOS F, indicative of congestion and comparatively longer vehicle delays. King County has a

standard of LOS E for urban areas, while WSDOT and the City of SeaTac has a standard of LOS D.

The results of the LOS analysis for intersections in the vicinity of the Transfer/Recycling Station are shown in **Table 4.**

Table 4. Existing (2006) LOS Summary: Weekday Am, Pm, and Sat. Peak Hours

Intersection	AM Peak Hour			PM Peak Hour			Sat. Peak Hour		
	LOS[1]	Delay[2]	V/C[3] or WM[4]	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM
S 188th St/Military Rd S	D	51.8	0.92	D	38.4	0.76	C	28.3	0.59
S 188th St/I-5 SB Ramps	B	16.8	0.64	D	40.3	0.88	B	10.9	0.39
S 188th St/I-5 NB Ramps	C	23.3	0.79	C	30.8	0.86	B	15.7	0.51
Orillia Rd S/S 200th St	C	32.2	0.77	C	26.1	0.77	B	16.8	0.36
Unsignalized									
S 188th St/Orillia Rd S	A	4.0	NA	A	4.2	NA	A	1.4	NA
Worst Movement	*F*	*>120*	*SB*[5]	*F*	*>120*	*SB*	*B*	*13.2*	*SB*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.
5. SB = Southbound approach.

Table 4 indicates that all of the signalized intersections operate at LOS D or better during the weekday peak hour period. All intersections operate well during the Saturday peak hour. As shown, the unsignalized intersection of S. 188th Street/Orillia Road S. (site entrance) operates at LOS A as a whole. Only the southbound movement at the unsignalized intersection operates at LOS F during the weekday peak hours analyzed. The S. 188th Street/Orillia Road S. southbound exit does not affect operations along S. 188th Street – Orillia Road S. corridor, only the ability for vehicles to exit the Transfer/Recycling Station.

Future Conditions Without Project

An evaluation of future conditions without the expanded Transfer/Recycling Station was conducted as a means for developing baseline conditions for assessing the project impacts. Year 2011 traffic volumes were developed using a regional traffic forecasting model derived from the Puget Sound Regional Council model. Based on forecasted 2011 traffic volumes, future traffic operations were evaluated for weekday AM and PM peak hour periods and Saturday peak hour periods for year 2006 and year 2011. These results are shown in **Tables 5 and 6.**

As shown in **Table 5**, under future baseline conditions, all signalized intersections are projected to operate at LOS D or better. The unsignalized S. 188th Street/Orillia Road S. (site entrance) intersection continues to operate at LOS A as a whole, with the southbound movement expected to continue to operate at LOS F during the weekday peak hours.

Table 5. Baseline (2011) LOS Summary: Weekday AM and PM Peak Hours

Intersection	AM Existing (2006)			AM Baseline (2011)		
	LOS[1]	Delay[2]	V/C[3] or WM[4]	LOS	Delay	V/C or WM
S 188th St/Military Rd S	D	51.8	0.92	D	46.7	1.03
S 188th St/I-5 SB Ramps	B	16.8	0.64	B	15.4	0.67
S 188th St/I-5 NB Ramps	C	23.3	0.79	C	24.0	0.78
Orillia Rd S/S 200th St	C	32.2	0.77	C	21.6	0.78
Unsignalized						
S 188th St/Orillia Rd S	A	4.0	NA	A	5.7	NA
Worst Movement	*F*	*>120*	*SB*	*F*	*>120*	*SB*
	PM Existing (2006)			**PM Baseline (2011)**		
Intersection	**LOS**	**Delay**	**V/C or WM**	**LOS**	**Delay**	**V/C or WM**
S 188th St/Military Rd S	D	38.4	0.76	C	33.5	0.82
S 188th St/I-5 SB Ramps	D	40.3	0.88	D	35.2	0.94
S 188th St/I-5 NB Ramps	C	30.8	0.86	C	30.3	0.90
Orillia Rd S/S 200th St	C	26.1	0.77	C	29.3	0.82
Unsignalized						
S 188th St/Orillia Rd S	A	4.2	NA	A	6.4	NA
Worst Movement	*F*	*>120*	*SB*	*F*	*>120*	*SB*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.

Table 6 summarizes Saturday peak hour conditions for both year 2006 and year 2011. As indicated, all intersections operate well during the Saturday peak hour conditions.

Table 6. Baseline (2011) LOS Summary: Saturday Peak Hour

Intersection	Existing (Sat. 2006)			Baseline (Sat. 2011)		
	LOS[1]	Delay[2]	V/C[3] or WM[4]	LOS	Delay	V/C or WM
S 188th St/Military Rd S	C	28.3	0.59	C	27.8	0.61
S 188th St/I-5 SB Ramps	B	10.9	0.39	A	9.3	0.41
S 188th St/I-5 NB Ramps	B	15.7	0.51	B	16.4	0.54
Orillia Rd S/S 200th St	B	16.8	0.36	B	17.3	0.38
Unsignalized						
S 188th St/Orillia Rd S	A	1.4	NA	A	1.4	NA
Worst Movement	*B*	*13.2*	*SB*	*B*	*13.6*	*B*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.

b. Is the site currently served by public transit? ☐ Yes ☒ No *If not, what is the approximate distance to the nearest transit stop?*

The Bow Lake Transfer/Recycling Station is not currently served by public transit. A Park and Ride Lot is located approximately 0.75 mile west of the Bow Lake Transfer/Recycling Station on South 188th Street near 42nd Avenue South. This Park

and Ride Lot connects Sea-Tac Airport and other areas in south King County with I-5 and other locations along the I-5 corridor via a number of Metro and Sound Transit bus routes.

King County Metro Transit (MT) and Sound Transit (ST) provide service to an eastbound stop at the near side of S. 188th Street/Military Road. Transit service is provided by three routes:

- MT 180 provides service on 30-minute headways between Burien and Auburn;
- MT 194 provides service on 45-minute headways between Seattle and Federal Way;
- ST 574 provides service on 30-minute headways between SeaTac and Lakewood.

The project is not expected to have any noticeable effect on public transit.

c. How many parking spaces would the completed project have? How many would the project eliminate?

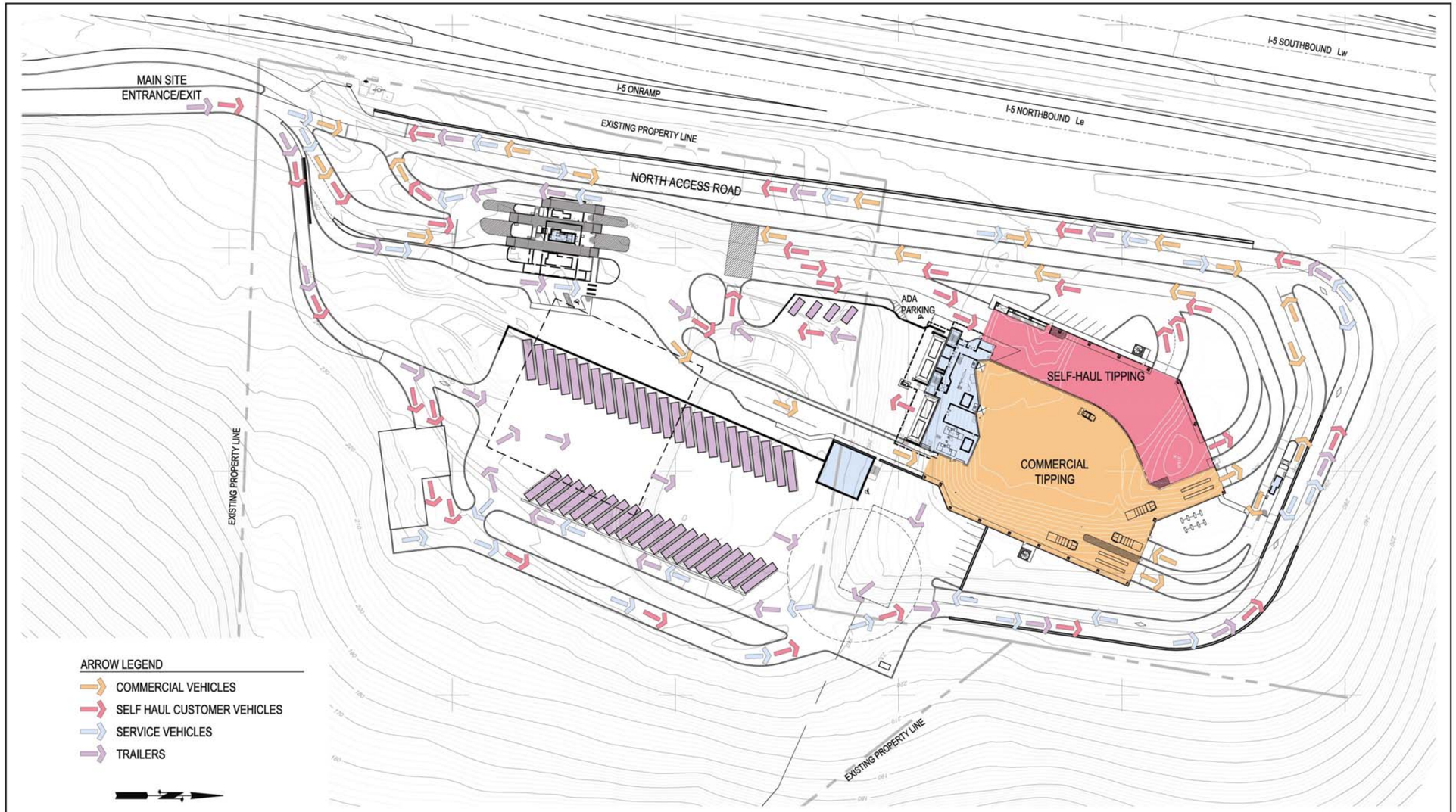
The existing station has several tipping/loading and parking areas including:

- Two tipping stalls for commercial customers on weekdays;
- Nine tipping stalls for self-haul customers on weekdays (18 stalls on weekends);
- A Transfer Trailer Yard north of Transfer Building with a capacity for 16 trailers;
- Parking spaces for eight vehicles southwest of the Transfer Building;
- Unloading area for several vehicles at the free recycling area; and
- Unloading area for several vehicles at the paid recycling area.

The completed project would expand capacities of tipping/loading and parking areas as follows **(Figure 19)**:

- Parking spaces for five vehicles at the South Scale Facility;
- A minimum of five tipping stalls for commercial customers;
- A minimum of 16 tipping stalls for self-haul customers;
- An expanded recycling and new yard waste tipping area (eight stalls);
- Parking stalls for 22 trailers (expandable to 44) at the Transfer Trailer Yard;
- Parking spaces for 15 vehicles near the Transfer Building; and
- Parking for two school or tour buses south of the Transfer Building.

The additional parking spaces will not create any additional traffic demand; the additional parking spaces will better accommodate current and future demands than does the existing facility.



KING COUNTY
DEPARTMENT OF NATURAL RESOURCES & PARKS
SOLID WASTE DIVISION

Traffic Circulation Plan

0 50 100 150
SCALE IN FEET

KPG
RW·BECK

BOW LAKE TRANSFER STATION

FACILITIES MASTER PLAN

FIGURE 19

JULY 2006

On-Site Queuing

It is important that inbound traffic to the Transfer / Recycling Station not back up to a point where movement of traffic is impeded on the S. 188th Street / Orillia Road intersection. For this reason, design of the expanded Transfer / Recycling Station has incorporated a number of features to minimize any potential for adverse impacts to S. 188th Street, Orillia Road, and the on- and off-ramps to I-5. The proposed site plan has been designed to provide a high level of operational flexibility that will allow the facility to respond positively as the waste quantities and traffic volumes increase over the next 25 years. This flexibility includes the capability to add a fourth scale at the south scale facility as the need arises in the future.

As part of site planning, a queuing analysis has been conducted to determine backup characteristics given forecasted self-haul traffic volumes. For more detailed discussion, see **Appendix J** and Section 4.3 of the *2006 Facility Master Plan Update.*

- Year 2020 peak weekday hour self-haul traffic: 136 vehicles
- Year 2030 peak weekday hour self-haul traffic: 158 vehicles
- Year 2020 peak weekend hour self-haul traffic: 163 vehicles
- Year 2030 peak weekend hour self-haul traffic: 190 vehicles

The new South Scale Facility will have three scales, two of which operate for inbound self-haul customers. During peak use periods (i.e. weekends), the North Scale Facility can also be used for inbound self-haul customers. The South and North Scale Facilities have approximately 440 feet and 1,250 feet of inbound pre-scale queuing length, respectively. There is any additional 240 feet of queuing length available between the entrance gate and the point where incoming trailer traffic and self-haul customer traffic diverge.

Weekday Assessment

The peak hour weekday self-haul traffic forecast is 136 vehicles per hour. With two inbound scales processing self-haul customers at an average rate of 40 seconds per vehicle and assuming at vehicle queue length of 22 feet, the South Scale Facility will be able to process approximately 180 vehicles per hour. At this rate, there should be no queue in the peak traffic hour. The capacity of the two scales provides in excess of a 30 percent margin of error in the traffic forecast and in the transaction time estimate.

When the fourth scale is added, three inbound scales will be able to process 270 vehicles per hour. The peak hour weekday traffic forecast in 2030 is 158 vehicles, which means that there should be no queue in the peak traffic hour. The capacity of the two scales provides in excess of a 70 percent margin of error.

Weekend Assessment

The peak hour weekend self-haul traffic forecast is 163 vehicles per hour. With two inbound scales at the South Scale Facility and one at the North Scale Facility processing self-haul customers, the scale facilities will be able to process approximately 270 vehicles per hour. At this rate, there should be no queue in the peak

traffic hour. The capacity of the two scales provides in excess of a 65 percent margin of error in the traffic forecast and in the transaction time estimate.

When the fourth scale is added, four inbound scales will be able to process 360 vehicles per hour. The peak hour weekday traffic forecast in 2030 is 190 vehicles, which means that there should be no queue in the peak traffic hour. The capacity of the three scales provides over a 40 percent margin of error.

Consequently, in all cases, there should be no significant backup of queued inbound self-haul traffic into the intersection at S. 188th and Orillia Road. At the same time, it is important to recognize that self-haul traffic will not arrive at the Transfer / Recycling Station at a uniform rate. Groups of vehicles can arrive over a fraction of an hour. In these instances, which can happen randomly and not just at peak hour, there will be short periods where traffic queues form and dissipate at the scale facilities. For this reason, it is desirable to maintain a significant margin of error in queuing estimates and more importantly to have generous traffic queuing provisions, which this station will have.

d. Will the proposal require any new roads or streets or improvements to existing roads or streets, not including driveways? ☒ **Yes** ☐ **No** *If so, generally describe (indicate whether public or private).*

The proposal will entail on-site road and traffic circulation improvements. As supported by the Traffic Impact Analysis for Bow Lake Transfer/Recycling Station, (see Appendix J), no off-site road improvements are required or proposed.

On-Site Circulation

Circulation on the new station site would be substantially changed as part of the expansion **(Figures 3 and 6)**. The access to the station at the Orillia Road South/South 188th Street/I-5 intersection will remain the same. Customers would be directed to one of two scale facilities. Business/residential self-haul customers and oversize commercial vehicles would enter at the South Scale Facility and commercial customers would enter at the North Scale Facility. Self-haul customers would proceed from the South Scale Facility to the self-haul and commercial entrances of the Transfer Building or to the paid recycling and yard waste area on the south side of the Transfer Building. Self-haul customers would exit the west and north sides of the Transfer Building, returning to the South Scale Facility for reweighing and payment.

Commercial customers will follow the North Access Road to the North Scale Facility and then to the commercial tipping section in the Transfer Building. Commercial customers will exit the northeast corner of the building and return to the North Scale Facility for reweighing. Commercial customers will then exit the station via the North Access Road. Oversize commercial vehicles will access the commercial tipping section of the Transfer Building via the South Scale Facility. These vehicles will exit and return to the South Scale Facility for reweighing and payment. Typically, transfer trailer traffic will access the trailer parking/staging area from the south and exit via the North Access Road; however, it will be possible for transfer trailers to enter via the North Access Road. Employees will be able to enter the Transfer Building from either direction.

A number of features incorporated into the design of the new facility are intended to reduce the potential for vehicles to queue onto Orillia Road South and South 188th Street as they await weigh-in at the South Scale Facility. The new South Scale Facility will be located further north, providing 440 feet (approximately 20 vehicles) of pre-scale queuing length for incoming customers.

Circulation within the site has been designed to be more efficient and to reduce time spent on-site by customers. The maximum time spent on-site, excluding waste tipping, is expected to be 16 minutes and 60 minutes for commercial and self-haul customers, respectively. Maximum wait times at scales and for unloading are expected to be 5 minutes and 10 minutes for commercial and self-haul customers, respectively. These reductions in time spent on-site will also decrease the potential for vehicle queues extending onto off-site surface streets during periods of high use.

Off-Site Traffic Conditions

2011 Trip Generation

As part of the Traffic Study, future traffic volumes generated by the Transfer/Recycling Station were projected based on KCSWD's solid waste forecasts. These forecasts are based on historical data and expected economic development and population growth. Factors influencing forecasts include personal incomes, tip fees, employment, household size, and location of facility. Based on econometric modeling by KCSWD, it is estimated that the tonnage of solid waste will increase by a factor of about 16 percent over the period 2006 through 2011. The Traffic Study assumes that traffic volumes accessing the Transfer/Recycling Station will increase at a corresponding rate. **Table 7** presents existing 2006 traffic volumes at the Transfer/Recycling Station and projected increases in traffic volumes through 2011.

Table 7. 2011Trip Generation Estimate Summary

Land Use	AM Peak Hour			PM Peak Hour			Sat. Peak Hour		
	Total	In	Out	Total	In	Out	Total	In	Out
Existing Traffic Volumes[1]	73	44	29	44	19	25	181	93	88
Increased by 16.0%[2]	85	51	34	51	22	29	210	108	102
Total Net New Project Trips	**12**	**7**	**5**	**7**	**3**	**4**	**29**	**15**	**14**

1. Based on existing year 2006 peak hour turning movement counts.
2. Growth rate based on County econometric model forecasts.

As indicated, by year 2011, there will be12, 7, and 29 net new trips during the AM peak hour, the PM peak hour, and the Saturday peak hour, respectively. As this data demonstrates, net new trips generated by the expanded Transfer/Recycling Station through year 2011 are relatively low. Weekend traffic is higher reflecting self-haul residential customer use.

Estimates shown in **Table 7** are likely slightly high, since no adjustments were made for more efficient loading of waste trailers. New compactor technology is expected to increase the tonnage of waste trailers from the current 17 tons to approximately 27 tons. This will serve to reduce the number of haul trips from the Transfer/Recycling Station by 50 to 67 percent.

It should be noted that net new project trips are reflected as all growth between year 2006 and 2011. In fact, there are no plans to close the facility. Therefore, these volumes would occur with or without the planned expansion.

2011 Traffic Volumes

Project-generated traffic volumes were combined with baseline-generated traffic to determine the percent impact of the expanded Transfer/Recycling Station on local intersections. The results are shown in **Table 8.**

Table 8. 2011 Project Traffic Volume Impacts

Intersection	**Intersection Total Entering Volume**			
AM Peak Hour	**2011 Baseline**	**Project Traffic**	**2011 With-Project**	**% Impact**
S 188th St/Military Rd S	3,100	1	3,101	>0.1
S 188th St/I-5 SB Ramps	3,055	3	3,058	0.1
S 188th St/I-5 NB Ramps	3,675	6	3,681	0.2
S 188th St/Orillia Rd S	2,973	12	2,985	0.4
Orillia Rd S/S 200th St	3,200	6	3,206	0.2
PM Peak Hour	**2011 Baseline**	**Project Traffic**	**2011 With-Project**	**% Impact**
S 188th St/Military Rd S	3,545	1	3,546	>0.1
S 188th St/I-5 SB Ramps	3,930	3	3,933	0.1
S 188th St/I-5 NB Ramps	4,445	4	4,449	0.1
S 188th St/Orillia Rd S	3,634	7	3,641	0.2
Orillia Rd S/S 200th St	4,015	3	4,018	0.1
Sat. Peak Hour	**2011 Baseline**	**Project Traffic**	**2011 With-Project**	**% Impact**
S 188th St/Military Rd S	2,540	5	2,545	0.2
S 188th St/I-5 SB Ramps	2,225	13	2,238	0.6
S 188th St/I-5 NB Ramps	1,960	20	1,980	1.0
S 188th St/Orillia Rd S	1,276	29	1,305	2.3
Orillia Rd S/S 200th St	1,500	9	1,509	0.6

Table 8 demonstrates that during the AM and PM peak hours, the expected increases in project-related traffic are expected to have an effect on local intersections of less than 1.0 percent. On Saturday peak hours, the effects of the expanded Transfer/Recycling Station on the site entrance (S. 188th Street/Orillia Road S.) by about 2 percent. Typically, traffic volumes fluctuate plus or minus 5 percent from day-to-day, depending on factors such as day of the week, weather, and traffic conditions elsewhere in the area. Based on the results shown in **Table 8,** it is unlikely that the average motorist will notice any change in traffic volumes as a result of the expanded Transfer/Recycling Station.

2011 Traffic Operations

An LOS analysis was conducted to determine future traffic operations with the expanded Transfer/Recycling Station. **Table 9** summarizes traffic operations at local intersections with and without the project for both AM and PM peak hour conditions.

Table 9. With-Project LOS Summary: Weekday AM and PM Peak Hours

	AM Baseline			AM With-Project		
Intersection	**LOS[1]**	**Delay[2]**	**V/C[3] or WM[4]**	**LOS**	**Delay**	**V/C or WM**
S 188th St/Military Rd S	D	46.7	1.03	D	46.6	1.03
S 188th St/I-5 SB Ramps	B	15.4	0.67	B	15.4	0.67
S 188th St/I-5 NB Ramps	C	24.0	0.78	C	24.0	0.79
Orillia Rd S/S 200th St	C	21.6	0.78	C	21.7	0.79
Unsignalized						
S 188th St/Orillia Rd S	A	5.7	NA	A	8.1	NA
Worst Movement	*F*	*>120*	*SB*	*F*	*>120*	*SB*
	PM Baseline			**PM With-Project**		
Intersection	**LOS**	**Delay**	**V/C or WM**	**LOS**	**Delay**	**V/C or WM**
S 188th St/Military Rd S	C	33.5	0.82	C	33.5	0.82
S 188th St/I-5 SB Ramps	D	35.2	0.94	D	35.3	0.94
S 188th St/I-5 NB Ramps	C	30.3	0.90	C	30.4	0.90
Orillia Rd S/S 200th St	C	29.3	0.82	C	29.3	0.82
Unsignalized						
S 188th St/Orillia Rd S	A	6.4	NA	C	22.2	NA
Worst Movement	*F*	*>120*	*SB*	*F*	*>120*	*SB*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.

Table 9 shows that all of the intersections are expected to remain at the same LOS levels as reported for baseline conditions during the weekday AM peak hour. During the PM peak hour, the overall operation of S. 188th Street/Orillia Road S. (site entrance) is expected to degrade from LOS A to LOS C. This change in LOS does not affect commuter traffic on S. 188th Street. The change in LOS is a result of the increased southbound delay at the site entrance, which results in increased delays for vehicles existing the expanded Transfer/Recycling Station during PM peak hour conditions.

A summary of the Saturday peak hour LOS is shown in **Table 10.** All intersections are likely to continue to operate well at Saturday peak hour when project-related traffic volumes are added to projected baseline conditions.

Table 10. With-Project LOS Summary: Saturday Peak Hour

	Baseline (Sat.)			With-Project (Sat.)		
Intersection	**LOS[1]**	**Delay[2]**	**V/C[3] or WM[4]**	**LOS**	**Delay**	**V/C or WM**
S 188th St/Military Rd S	C	27.8	0.61	C	27.8	0.61
S 188th St/I-5 SB Ramps	A	9.3	0.41	A	9.4	0.41
S 188th St/I-5 NB Ramps	B	16.4	0.54	B	16.5	0.54
Orillia Rd S/S 200th St	B	17.3	0.38	B	17.3	0.38
Unsignalized						
S 188th St/Orillia Rd S	A	1.4	NA	A	1.6	NA
Worst Movement	*B*	*13.6*	*B*	*B*	*14.2*	*SB*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.

For both weekday and Saturday conditions, it is noted that the impact of the project is characterized as all waste stream growth between year 2006 and year 2011. While impacts are negligible as presented, they overestimate actual impacts insofar as waste stream growth would occur with or without the project.

Year 2030 Analysis

In order to provide perspective on longer term impacts, a traffic analysis was also provided for the year 2030. Projected trip generation for the expanded Transfer/Recycling Station in year 2030 is shown in **Table 11.** The figures in the table are based on an increase in waste tonnage of 2 percent per year and a corresponding increase in the number of vehicles accessing the expanded Transfer/Recycling Station.

Table 11. 2030 Trip Generation Estimate Summary

Land Use	PM Peak Hour		
	Total	**In**	**Out**
Existing Traffic Volumes[1]	44	19	25
Increased by 2.0% Annually[2]	71	31	40
Total Net New Project Trips	**27**	**12**	**15**

1. Based on existing year 2006 peak hour turning movement counts.
2. Growth rate based on County waste tonnage forecasts.

As indicated, by year 2030, the project is projected to generate 27 new weekday PM peak hour trips. However, as described previously, these new trips would be generated with or without the expansion as projected growth in the waste stream occurs.

An LOS analysis was conducted for year 2030 to quantify projected traffic operations for baseline and with-project conditions. **Table 12** shows that during the PM peak hour period, the overall operation of S. 188th Street/Orillia Road S. (site entrance) is expected to degrade from LOS C to LOS D. This change in LOS does not affect commuter traffic on S. 188th Street. Rather, the change is LOS is because of increased southbound delay at the site entrance, which results in increased delays for vehicles existing the Transfer/Recycling Station during the PM peak hour. Project-related

traffic volumes have a negligible affect on all local intersections under 2030 conditions.

Table 12. 2030 With-Project and Baseline LOS Summary Weekday PM Peak Hour

	PM Baseline (2030)			PM With-Project (2030)		
Intersection	**LOS[1]**	**Delay[2]**	**V/C[3] or WM[4]**	**LOS**	**Delay**	**V/C or WM**
S 188th St/Military Rd S	D	48.7	0.97	D	49.1	0.97
S 188th St/I-5 SB Ramps	E	56.5	1.12	E	58.5	1.13
S 188th St/I-5 NB Ramps	E	67.0	1.14	E	67.9	1.14
Orillia Rd S/S 200th St	D	49.2	0.97	D	49.5	D
Unsignalized						
S 188th St/Orillia Rd S	C	16.2	NA	D	25.4	NA
Worst Movement	*F*	*>120*	*SB*	*F*	*>120*	*SB*

1. Level of service, based on 2000 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Volume-to-capacity ratio reported for signalized intersections.
4. Worst movement reported for unsignalized intersections.

As noted for year 2011, the impacts shown in Table 11. are overstated in that the changes in traffic will occur with or without the expansion of the Transfer/Recycling Station.

Off-Site Queuing

Because of the close spacing of the intersections in the vicinity of the entrance to the Bow Lake Transfer/Recycling Station, queues can occur that may inhibit adjacent intersections from functioning properly. Intersection queuing was modeled to determine queuing characteristics at intersections eastbound and westbound along S. 188th Street for both weekday AM and PM peak hour conditions. **See Appendix J** for additional detail.

The results are shown in **Table 13.** During the AM and PM peak hour in the westbound direction, the I-5 SB Ramps/S. 188th Street and S. 188th Street/Orillia Road S. intersections will experience blockages from adjacent intersections. During the PM peak hour in the eastbound direction, the S. 188th Street/Military Road S. intersection will experience blockages resulting from the I-5 SB Ramps/S. 188th Street intersection.

During the AM and PM peak hour, the east-to-north left-turn into the Transfer/Recycling Station site (S. 188th Street/Orillia Road S.) does not queue into the adjacent intersection based on model calculations. However, the left-turns would be blocked because of the queues on the westbound approach at the I-5 NB Ramps/S. 188th Street intersection. Eastbound left-turns into the station will depend on westbound traffic not blocking the site access during the weekday AM and PM peak hours.

Table 13. 2011 Existing Intersection Queue Summary: Weekday AM and PM Peak Hours

AM Peak Hour			
Direction/Intersection	**Capacity[1] (ft)**	**95th Percentile[2] Queue (ft)**	**Available Capacity? (ft)**
Westbound			
S 188th St /Military Rd S	205	260	No
S 188th St /I-5 SB Ramps	490	200	Yes
S 188th St /I-5 NB Ramps	65	365	No
Eastbound			
S 188th St/Orillia Rd S	65	20	Yes
S 188th St /I-5 NB Ramps	490	330	Yes
S 188th St /I-5 SB Ramps	205	160	Yes
PM Peak Hour			
Westbound			
S 188th St /Military Rd S	205	245	No
S 188th St /I-5 SB Ramps	490	230	Yes
S 188th St /I-5 NB Ramps	65	600	No
Eastbound			
S 188th St/Orillia Rd S	65	20	Yes
S 188th St /I-5 NB Ramps	490	335	Yes
S 188th St /I-5 SB Ramps	205	255	No

1. Distance between intersections.
2. 95th percentile queue length in feet as reported by Synchro 6.0.

The model also projected queuing conditions in year 2030. The results are shown in **Table 14.** Assuming no improvements, queuing capacities between all intersections will be exceeded. Most of the projected queuing is the result of background traffic volume growth unrelated to Bow Lake Transfer/Recycling Station traffic. The addition of Transfer/Recycling Station traffic to future traffic volumes is shown to have a negligible effect on queuing along the S. 188th Street corridor. **See Appendix J.**

Table 14. Intersection Queue Summary: 2030 Baseline and With-Project

PM Peak Hour			
		95th Percentile[2] Queue	
Direction/Intersection	**Capacity[1] (ft)**	**2030 Baseline (ft)[3]**	**2030 With-Project (ft)**
Westbound			
S 188th St /Military Rd S	205	315	315
S 188th St /I-5 SB Ramps	490	520	525
S 188th St /I-5 NB Ramps	65	1,105	1,115
Eastbound			
S 188th St/Orillia Rd S	65	325	330
S 188th St /I-5 NB Ramps	490	605	605
S 188th St /I-5 SB Ramps	205	800	805

1. Distance between intersections.
2. 95th percentile queue length in feet as reported by Synchro 6.0.
3. Baseline conditions include the volumes from the proposed Tukwila South Project.

Tukwila South Project

An analysis of future traffic conditions that includes project-related traffic volumes and those generated by the Tukwila South Project was also conducted. The proposed Tukwila South Project consists of approximately 14 million square feet in a large-scale

campus setting on approximately 498 contiguous acres. Proposed uses include office, commercial, research, retail, residential, hotel, and recreation. There are proposed access points at S. 180th Street/Southcenter Parkway, S. 180th Street/Andover Park W., and S. 200th Street/Frager Road S. Sixty percent of the Tukwila South traffic is forecast to access the site through the S. 200th Street/Frager Road S. intersection. From this location, 20 percent of the Tukwila South traffic is forecast to travel on Orillia Road S. between S. 200th Street and S. 188th Street.

The analysis shows that, in year 2011, with the inclusion of projected Tukwila South traffic volumes, the expanded Transfer/Recycling Station is expected to have an insignificant impact on calculated LOS's at local intersections. The roadways and intersections are expected to operate essentially the same with or without traffic volumes generated by the expanded Transfer/Recycling Station. The year 2030 analysis results in a similar conclusion, with minimal impacts from the expanded Transfer/Recycling Station. **See Appendix J** for additional detail.

e. Will the project use (or occur in the immediate vicinity of) water, rail or air transportation? ☐ Yes ☒ No *If so, generally describe.*

The project would not use or occur in the immediate vicinity of water, rail or air transportation.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Construction

Construction of the expanded Bow Lake Transfer/Recycling Station is likely to be divided into two separate contracts: a site preparation contract, and a site facilities contract. The site preparation work is expected to occur from April through October, 2008 and the site facilities work is expected to run from April, 2009 through July, 2011. See **Appendix J** for additional detail.

Site Preparation

Soil Removal. Preliminary estimates indicate that approximately 148,000 cy of material will be excavated and removed from the site. Assuming 20 cy capacity per dump truck and pup trailer, this work is likely to require 7,400 truck round trips over an estimated five-month period. Assuming that work is limited to weekdays, this will mean approximately 68 truck trips per day for approximately 108 hauling days.

Imported Material. Approximately 20,000 cy of soil will be hauled to the site over a one-month period. At 20 cy per haul truck and pup trailer, this will require approximately 1,000 truck round trips. Assuming that work occurs on weekdays, this will mean an average of 45 truck trips per day for approximately 22 hauling days.

Concrete. An estimated 1,000 cy of concrete will be delivered to the site, primarily for construction of retaining walls. Assuming 10 cy per truck, this will require 100 truck round trips. Assuming placement of approximately 100 cy per day, this will mean 10 truck round trips per day for 10 days. These trips are expected to coincide with soil removal and soil import trips.

Construction Workers. The average workforce during site preparation is anticipated to be approximately 30 workers with a peak of 50. These workers are expected to park on site with an average 1.5 round trips to the site each workday. Peak workforce days are expected to coincide with soil removal, soil import, and concrete delivery trips.

Miscellaneous. There will likely be an estimated 25 to 30 miscellaneous trips to the site over the course of site preparation. These trips will include equipment and materials deliveries and visits by vendors, SWD staff, union representatives, inspectors, and engineers/consultants.

Total. During the five months of the site preparation contract when soil is being excavated and hauled from the site, average daily construction traffic are expected to be approximately 223 trips. For the remaining two months, this number is expected to drop to approximately 155 trips.

Site Facilities

Demolition Material Removal. It is estimated that approximately 20,000 cy of rubble from demolition of existing structures (e.g. Transfer Building) and pavements will be removed from the site. Assuming capacity of 20 cy per truck, this work will result in approximately 1,000 truck trips over a two-month period, or about 25 truck trips per work day.

Imported Materials. Estimated types of construction material to be delivered to the site, projected quantities, expected load sizes, and number of truck trips are shown in **Table 15.**

Table 15. Construction Traffic – Site Facilities Work

Material Type	Estimated Quantity	Average Load Size	Number of Trips
Concrete	7,700 CY	10 CY	770
Road Aggregates	7,100 CY	20 CY	355
Structural Fill, Drain Rock	2,000 CY	20 CY	100
Hot Mix Asphalt	3,700 CY	20 CY	185
Roadway Appurtenances	---	---	20
Topsoil & Amendments	1,500 CY	20 CY	75
4” and larger Utility Pipe	15,000 LF	2,000 LF	8
Manholes/CBs	80 EA	6 EA	14
Metal Building	---	---	50
Electrical Equipment	---	---	50
Plumbing Pipe & Fixtures	---	---	20
Compactors	---	---	10
Industrial Wastewater Treatment System	---	---	20
Miscellaneous	---	---	1000
Total			**2677**

These material delivery trips are expected to occur on weekdays over the full 27-month site facilities construction period (585 days). Average daily trips would be about 5, with an estimated peak day of 30 trips.

Construction Workers. The average workforce during site facilities work is expected to be approximately 50 workers with a peak workforce of 150. These workers are likely to park on site with an average 1.5 round trips to the site each workday.

Miscellaneous. There will likely be an estimated 30 to 40 miscellaneous trips to the site over the course of site facilities work. These trips will include equipment and materials deliveries and visits by vendors, SWD staff, union representatives, inspectors, and engineers/consultants.

Total. Excepting the two-month period when demolition rubble is being hauled from the site, average daily construction traffic is expected to be approximately 110 trips, with a peak of approximately 295 trips.

Operations

Table 16 shows Bow Lake Transfer/Recycling Station tonnage and traffic generation over the 2001 – 2005 period and the year 2030 forecast. Average and peak daily customer roundtrip traffic volumes in 2005, composed of both self-haul and commercial users, were 528 and 767 vehicles, respectively. These numbers are expected to increase to 1,047 and 2,104 vehicles, respectively, by the year 2030.

Table 16. Tonnage and Traffic Summary 2001-2005 and 2030 Forecast

Description	2001	2002	2003	2004	2005	2030
Average Daily Tonnage	354	414	374	628	792	1,384
Peak Hourly Tonnage	264	168	144	248	174	346
Peak Daily Tonnage	603	854	599	1,109	1,235	2,468
90th Percentile Peak Daily Tonnage	417	465	425	890	977	1,696
Total Annual Tonnage	129,303	150,974	136,347	229,883	288,936	505,000
Average Daily Customer Traffic	332	411	398	475	528	1,047
Peak Hourly Customer Traffic	104	121	108	120	108	295
Peak Daily Customer Traffic	797	822	794	781	767	2,104
90th Percentile Peak Daily Traffic	421	488	453	488	495	1,219
Total Annual Customer Traffic	121,014	150,115	145,273	173,861	193,251	382,000

Source: *2006 Facility Master Plan Update* (KCSWD, 2006a).

In 2005, average truck traffic used for hauling compacted MSW to Cedar Hills Regional Landfill was approximately 44 trips per day, based on an 18-ton capacity for the average top-load container. By 2030, this number is expected to increase to approximately 51 trips per day, based on a 27-ton capacity for the intermodal container expected to be in use after the Cedar Hills Regional Landfill closes. These figures should be doubled to include empty haul trucks returning to the site.

The expansion of the station would include the capability to accept yard waste. By 2030, average and peak daily yard waste volumes are expected to be 15 and 25 tons,

respectively. Based on an average capacity of 18 tons of yard waste for a top-load container, these volumes would generate 0.8 and 1.4 haul truck trips per day. Because of high seasonality, these figures can be expected to be significantly higher in spring and summer, and correspondingly lower in fall and winter.

Following expansion, an estimated 13 people would work at the station over a 24-hour period. These employees can be expected to generate approximately 30 to 40 vehicle trips per day to and from the site. An additional 10 trips per day would be generated by miscellaneous maintenance and delivery vehicles.

g. Proposed measures to reduce or control transportation impacts, if any:

The Traffic Impact Analysis for Bow Lake Transfer/Recycling Station (The Transpo Group, 2006a), page 39, demonstrates that no mitigation is required to existing off-site roads. (**Appendix J**).

On-Site

A number of measures have been proposed to reduce or eliminate potential on-site transportation impacts, including:

- Site circulation has been designed to separate self-haul and commercial customers, resulting in more efficient movement of vehicles about the site and shorter residence times for all users.
- Site layout with generous on-site queuing lane length and the use of two scale facilities with multiple scales, some of which will be reversible, will allow the station to function without incoming traffic backing up beyond the project boundary.
- Retaining walls would be installed on the west side of the North Access Road in order not to infringe upon WSDOT property in the vicinity of the northbound on-ramp to I-5. KCSWD has initiated discussions with WSDOT on this issue.
- The North Access Road and associated retaining walls would be designed to avoid any conflict with the existing cell phone tower.

Off-Site

Based on the identified negligible off-site impacts, no off-site mitigation measures are proposed. The negligible impacts are a result of the low volume of new site-generated traffic volume when compared to the total entering volume of traffic (TEV) at the study intersections. During the weekday AM peak hour, site-generated future new traffic volume impacts the study intersections total traffic volume with a range of 0.1 to 0.4 percent. During the weekday PM peak hour, site-generated future new traffic volume impacts the study intersections total traffic volume with a range of 0.1 to 0.2 percent. As these results show, during peak commuter travel times the future new site-generated trips comprise a very small part of the traffic stream. The transfer station generates the highest traffic volumes on a Saturday, which coincides with the lowest volume of traffic volumes on the adjacent streets. During the Saturday peak hour site-generated future new traffic volume impacts the study intersections total traffic volume with a range of 0.2 to 2.3 percent. The 2.3 percent is at the site access. Traffic volumes typically fluctuate about plus or minus 5 percent from day-to-day depending on factors such as the day of the week, weather, and traffic conditions elsewhere in the roadway

network. Based on these results, it is unlikely that the average motorist would notice the forecast impact of increased site-generated traffic volume. These conclusions are also verified through the LOS analysis. In addition, even the negligible increases due to the site are an overstatement of actual impacts, since there is no probable difference in site traffic demand anticipated between the proposal and "no action".

Under year 2011, four of the study intersections experienced no LOS change when comparing baseline to with-project conditions. LOS calculations show that the calculated delay is expected to change by less than 0.1 seconds at the four intersections. Only the intersection of S 188th Street/Orillia Road S (site access) experienced changes in LOS during the PM peak hour. During the weekday AM peak hour S 188th Street/Orillia Road S operates at LOS A under both baseline and with-project conditions. During the weekday PM peak hour S 188th Street/Orillia Road S changes from LOS A under baseline conditions to LOS C under with-project conditions. The southbound approach operates at LOS F under both weekday AM and PM conditions. As noted in the analysis, S 188th Street/Orillia Road S is an unsignalized approach to an arterial that operates at LOS F with average weekday peak hour delays in excess of 2 minutes, and will do so in the future with or without the growth increment added by the continued operation of the transfer facility. The proposed action itself will result in no impact to these conditions, especially for outbound traffic, since the waste stream expected at the site is forecast to grow at approximately 2 percent annually with or without the project, and there are no plans to close the transfer station. Even with no transfer station, and potential development to the north, delays would be very significant for any new development traffic.

15. Public Services

a. **Would the project result in an increased need for public services (i.e., fire protection, police protection, health care, schools, other)?** ☐ **Yes** ☒ **No** *If so, generally describe.*

The project is not expected to result in the increased need for public services.

b. **Proposed measures to reduce or control direct impacts on public services, if any:**

Impacts to public services are not anticipated; therefore, mitigation measures have not been developed.

16. Utilities

a. Check utilities currently available at the site:

- ☒ Electricity
- ☐ Natural gas
- ☒ Water
- ☒ Refuse service
- ☒ Telephone
- ☐ Sanitary sewer
- ☐ Septic system
- ☐ Other: _____

_____

b. Describe the utilities that are proposed for the project, the utility providing the service and the general construction activities on the site or in the immediate vicinity which might be needed.

The expanded station would require new water, wastewater, stormwater, fire protection system, electrical, telephone, security and data systems that would all be connected as underground systems. Wastewater would be collected and trucked by tanker to a wastewater treatment plant. Stormwater would either be extended to the conveyance system located near Southcenter Parkway at the bottom of the slope to the east of the site (R.W. Beck, 2006a) or will be discharged on site as in the current system. Stormwater issues were previously discussed in Section 3 Water and **Appendix F**.

Power

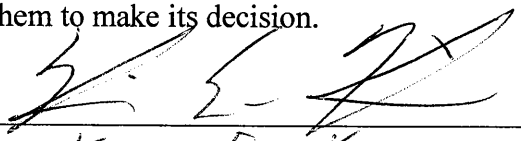
The station service power transformer and a standby engine generator with integral fuel tank will be located between the two yard waste loading bays south of the Transfer Building. The new facility will require an upgraded generator that would be sized to handle the entire project site electrical needs with the exception of the two compactors. Energy production could also include the use of a photovoltaic generation system that would be considered part of the sustainable building features during design to help achieve KCSWD's goal of a LEED™ Silver Rating. The photovoltaic arrays will likely be mounted on the south-facing canopy over the Transfer Building (KCSWD, 2006b).

Water Service

A looped water supply and fire main system will be provided around the site with fire hydrants situated at various locations. Hydrants will be sited during the design phase of the project. Design of the Transfer Building will incorporate a dry pipe fire sprinkler system that will reduce the overall fire flow requirements for the site (KCSWD, 2006b).

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: 

Name (print): KEVIN E. KIERNAN

Title: ENGINEERING SERVICES MANAGER

Date Submitted: DEC. 21, 2006

References

Adolfson Associates, Inc. 2004. *Wetland Reconnaissance for Bow Lake Transfer Station and WSDOT Property*. Prepared for King County Solid Waste Division and R.W. Beck. Seattle, Washington. 8 p.

Adolfson Associates, Inc. 2006. Letter report to Karl Hufnagel, R.W. Beck, regarding stream bank flagging, Bow Lake Transfer/Recycling Station, King County Solid Waste Division. Seattle, Washington. 4p.

Associated Earth Sciences, Inc. 2005. *Technical Report on Geology, Soils, and Ground Water: Tukwila South Environmental Impact Statement, Tukwila, Washington*. Prepared for La Pianta LLC and Blumen Consulting Group, Inc. In *Tukwila South Project Draft EIS: Volume II Technical Appendices*, City of Tukwila, April 2005.

Cedarock Consultants, Inc. 2005. *Fisheries Technical Report: Tukwila South Project, Tukwila, Washington*. Prepared for la Pianta, LLC and Blumen Consulting Group. In *Tukwila South Project Final EIS: Volume III Technical Appendices*, City of Tukwila, April 2005

City of Tukwila. 1995a. *City of Tukwila Comprehensive Plan Map*. Available online at http://www.ci.tukwila.wa.us/dcd/compplan/COMP%20plan%20map.pdf. Accessed April 2005.

City of Tukwila. 1995b. *City of Tukwila Zoning Map*. Available online at: http://www.ci.tukwila.wa.us/dcd/zonemap1.jpg. December 4, 1995. Accessed May 2005.

City of Tukwila. 2004a. *Sensitive Areas Map*. SW Quarter 35-23-04. December 13, 2004.

City of Tukwila. 2004b. *Tukwila Municipal Code*. Current through Ordinance Number 2080, passed December 13, 2004. Available online at: http://www.ci.tukwila.wa.us/dcd/zonemap1.jpg. Accessed May 2005.

City of Tukwila. 2005. *Tukwila South Project Final EIS*. April, 2005. Tukwila, Washington.

Federal Emergency Management Agency. 1995. Flood Insurance Rate Map (FIRM), King County Washington and Incorporated Areas. Panel 967 of 1725. Map Number 53033C0967 F, Revised May 16, 1995.

Geomatrix, Inc. 2006a. *King County's Bow Lake Transfer/Recycling Station Upgrade – Air Quality Assessment Memorandum*. Prepared for King County Solid Waste Division and Adolfson Associates, Inc. May 5, 2006. 8p.

Geomatrix, Inc. 2006b. *King County's Bow Lake Transfer/Recycling Station Upgrade – Noise Assessment Memorandum*. Prepared for King County Solid Waste Division and Adolfson Associates, Inc. May 5, 2006. 11p.

Geomatrix, Inc. 2006c. Response to La Pianta Appeal Comment Regarding Noise, Bow Lake Transfer/Recycling Station Upgrade. Memorandum prepared for King County Solid Waste Division and S. Bingham, ESA Adolfson. Lynnwood, Washington. 2p.

HDR Engineering, Inc. 2005. *Local Street Traffic Impact Evaluation for King County Transfer Stations*. Prepared for King County Solid Waste Division. Bellevue, Washington.

Hong West & Associates, Inc. 1993. *Geotechnical Engineering Study: Bow Lake Transfer Station Improvements Facilities Master Plan, King County, Washington.* Prepared for King County Solid Waste Division and R.W. Beck and Associates. Lynnwood, Washington. 20 p.

Hong West & Associates, Inc. 1994. *Supplemental Subsurface Investigation: Bow Lake Transfer Station Improvements Facility Master Plan*, King County, Washington. Prepared for King County Solid Waste Division and R.W. Beck and Associates. Lynnwood, Washington. 4 p.

Hugh G. Goldsmith & Associates, Inc. and Northwest Hydraulic Consultants, Inc. 2005. *Tukwila South Project: Preliminary Draft Master Drainage Plan and Preliminary Infrastructure Site Work Summary*. Prepared for LaPianta LLC. In *Tukwila South Project Draft EIS: Volume II Technical Appendices*, City of Tukwila, April 2005.

HWA Geosciences, Inc. 2004. *Draft Geotechnical Evaluation Report: WSDOT Property, Bow Lake Transfer Station / Recycling Facility, King County, Washington*. Prepared for King County Solid Waste Division and R.W. Beck. Seattle, Washington. 16 p.

HWA Geosciences, Inc. 2006a. Technical Memorandum: Field Visit – Observations and Conclusions, Bow Lake Transfer/Recycling Facility, King County, Washington. Prepared for King County Solid Waste Division and R.W. Beck. Lynnwood, Washington. 4 p.

HWA Geosciences, Inc. 2006b. *Technical Memorandum: Slope Geotechnical Issues, Bow Lake Transfer/Recycling Facility, King County, Washington*. Prepared for King County Solid Waste Division and R.W. Beck. Lynnwood, Washington. 8 p.

Kindig, A.C. & Co. 2005. *Tukwila South Project: Water Quality Technical Report, Draft EIS*. Prepared for Segale Properties. In *Tukwila South Project Draft EIS: Volume II Technical Appendices*, City of Tukwila, April 2005.

King County. 1998 and 2005. *King County Surface Water Design Manual*. Seattle, Washington.

King County GIS Center. 2006. King County Online iMap Database. Available online at: http://www.metrokc.gov/gis/mapportal/iMAP_main.htm#. Accessed May 2005.

King County Solid Waste Division. 1989. *Adopted 1989 Comprehensive Solid Waste Management Plan*. Volume 1. July 1989.

King County Solid Waste Division. 1998. *Bow Lake Transfer/Recycling Station Facility Master Plan*. Prepared by R.W. Beck, Inc. for King County Solid Waste Division. April 1998.

King County Solid Waste Division. 2001. *Final 2001 Comprehensive Solid Waste Management Plan*. Department of Natural Resources and Parks, Seattle, Washington.

King County Solid Waste Division. 2004. H*azardous Materials Emergency Response Plan, King County Solid Waste Division, Transfer Facilities*. Department of Parks and Natural Resources. Seattle, Washington. 13 p.

King County Solid Waste Division. 2006a. *Final Supplemental Environmental Impact Statement: Transfer and Waste Export System Plan for King County, Washington*. Department of Natural Resources and Parks, Seattle, Washington.

King County Solid Waste Division. 2006b. *Draft 2006 Facility Master Plan Update Bow Lake Transfer/Recycling Station*. Prepared by R.W. Beck. July 2006. Seattle, Washington.

King County Solid Waste Division. 2006c. *King County Solid Waste Division Bow Lake Transfer & Recycling Station Operating Plan*. Seattle, Washington. 9 p.

King County Solid Waste Division. 2006d. Public Health Procedures and Requirements, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation – Technical Memorandum. Prepared by Tom Creegan, Engineer III for S. Bingham, ESA Adolfson. Seattle, Washington.

KPG, Inc. 2003. *Final Draft Environmental Checklist: First Northeast Transfer/Recycling Station Facility Master Plan* Implementation. Prepared for King County Department of Natural Resources. Seattle, Washington.

KPG, Inc. 2006. Photo Simulation of Expanded Bow Lake Transfer/Recycling Station. Prepared for R.W. Beck. Seattle, Washington.

R.W. Beck. 2006a. Conceptual Stormwater Management Plan, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation. Prepared for King County Solid Waste Division. Seattle, Washington.

R.W. Beck. 2006b. Evaluation of Potential for Leachate Generation at the Project Site During Construction and During Operation of the Completed Facility, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation – Technical Memorandum. Prepared for King County Solid Waste Division and S. Bingham, ESA Adolfson. Seattle, Washington.

R.W. Beck. 2006c. Summary of Preliminary Inbound Customer Queuing Evaluation, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation – Technical Memorandum. Prepared for King County Solid Waste Division and S. Bingham, ESA Adolfson. Seattle, Washington.

R.W. Beck. 2006d. Construction Traffic Forecast, Bow Lake Transfer/Recycling Station Facility Master Plan Update and Implementation – Technical Memorandum. Prepared for King County Solid Waste Division and K. Gahnberg, Transpo Group and S. Bingham, ESA Adolfson. Seattle, Washington.

Raedeke Associates, Inc. 2005. *Tukwila South Project Draft EIS – Volume III Technical Appendices.* Prepared for City of Tukwila.

Seattle – King County Department of Public Health. 1985. *Abandoned Landfill Study in King County*. Seattle, Washington. 150 p.

The Transpo Group. 2004b. *Summary of Preliminary Transportation Assessment – Bow Lake Transfer Station*. Prepared for King County Solid Waste Division and R. W. Beck. Kirkland, Washington. 5 p.

The Transpo Group. 2006a. *Traffic Impact Analysis: Bow Lake Transfer/Recycling Station.* Prepared for King County Solid Waste Division. Kirkland, Washington. 38 p.

The Transpo Group. 2006b. *Impacts of I-5/SR 509 Project on the Bow Lake Transfer Station*. Memorandum. Prepared for King County Solid Waste Division. Kirkland, Washington. 3 p.

U.S. Department of the Interior, National Parks Service (NPS). 2006. *National Historic Landmarks Survey List of National Historic Landmarks by State*. Available online at: http://www.cr.nps.gov/nhl/designations/Lists/LIST06.pdf. May 2006.

Washington State Department of Archaeology and Historic Preservation (DAHP). *Historic Places in Washington Report*. January 24, 2005. Available online at: http://www.oahp.wa.gov/pages/HistoricSites/documents/HistoricPlacesinWashingtonReport.pdf. Accessed May 2006.

Washington State Department of Ecology. 2005. *Stormwater Management Manual for Western Washington*. Olympia, Washington.

Washington State Department of Fish and Wildlife. 2006. *Priority Habitats and Species (PHS) Database*.

Washington State Department of Natural Resources. 2006. *Washington Natural Heritage Program GIS Data*.

Whiting, Sandra. Personal communication with Teresa Vanderberg (Adolfson Associates, Inc.) during site visit of July 6, 2006. City of Tukwila.

APPENDICES