

Attachment E

Financial Assurance Documentation

Post Closure Maintenance Cost Estimate for Cedar Hills Regional Landfill

Background

WAC 173-351 requires owners and operators of Municipal Solid Waste Landfills (MSWLF) have a detailed written estimate, in current dollars, of the cost of hiring a third party to conduct post-closure care for the MSWLF unit or all MSWLF units in compliance with the post-closure plan developed under WAC 173-351-500(2). The post closure period is defined to last thirty years or as long as necessary for the landfill to become functionally stable. For the purposes of this cost estimate, thirty years is assumed.

The Post Closure Maintenance (PCM) estimates have been prepared for Cedar Hills Regional Landfill (CHRLF) previously. These estimates are prepared based on historical levels of effort required for tasks that will continue through the post closure period and levels of effort required for similar tasks conducted at closed landfills currently maintained by the King County Solid Waste Division (SWD). The last major revision was completed in 2012; annual reviews include reviewing the proposed activities and adjusting activities that have changed based on changes to operation and maintenance practices utilized by SWD.

Purpose

The purpose of this document is to provide the basis for the PCM estimate. This includes the underlying assumptions and the documented changes from previous years. The estimate is to be reviewed annually and updated as necessary.

2014 Update

The cost items were reviewed for completeness for 2014. No additional items were identified. The cost estimates remained the same and the total annual PCM cost was inflated to 2014 dollars.

2015 Update

The cost items were reviewed for completeness for 2015 by SWD Facility Engineering and Science Unit. No additional items were identified. The line-item detail cost estimates in Table 1 remained the same and the total annual PCM cost was inflated to 2015 dollars. A math error summarizing the Table 1 details was corrected and prior year balances restated accordingly.

Major PCM Elements

The cost estimate includes maintenance costs for the environmental control systems at the site. The main systems are the landfill gas collection system, the leachate collection system, the North Flare Station, the leachate aeration lagoons, the cover system and the groundwater monitoring network. All tasks from previous PCM estimates were reviewed to determine that all tasks are still necessary and that all necessary tasks are included. The itemized tasks were reviewed with SWD operations leads and or supervisors.

All tasks were reviewed to determine whether current estimates of levels of effort to complete the task are still current and to determine appropriate level of effort for any new tasks.

The estimate is based on tasks being performed by SWD staff or contractors in the same manner as currently performed. To compensate for the potential that all tasks may be performed by contractors, a project management cost was added to the overall estimate. The underlying assumption is that the cost of performing the work remains constant whether performed by SWD forces or contractors, but SWD would incur increased costs for managing contracts with the contractors.

The cost items in the PCM estimate include:

- Cover Maintenance & General Site Maintenance
 - Vegetation control
 - Geomembrane repair
 - Road maintenance
 - Fence Repair
 - Litter Control
 - Grading
 - Well Boot repair
- Leachate System Maintenance
 - Aerator repair and maintenance
 - Pump repair and maintenance
 - Leachate extraction well replacement
 - Periodic line cleaning
 - Air compressor repair and maintenance
- Stormwater System Maintenance
 - Stormwater conveyance system cleaning and maintenance
 - Catch basin cleaning and maintenance
 - Pond cleaning and maintenance
- Landfill Gas System Maintenance
 - Blower repair and maintenance
 - Flare repair and maintenance
 - Stack emissions testing
 - Routine testing and maintenance
- Environmental Monitoring
 - Groundwater and leachate samples
 - Laboratory analysis
 - Sample collection
 - Data analysis
 - Reporting
 - Data Management
- Electrical Utilities
- Permits
 - Operating Permit for Closed Landfill
 - Air Operating Permit
- Wastewater Utility Fees
- Project Management and Reporting
 - Sample collection

- Data management
- Reporting
- Project Management
- Investigation and Remediation
- Project management costs for third party contractor
- Contingency

Key Assumptions for Cost Estimates

Several key assumptions were made regarding the cost estimates. These assumptions are outlined below.

- ❖ The post closure period will be thirty years in length, beginning when the closure is approved by Public Health – Seattle and King County (PHSKC).
- ❖ At the time of closure, BEW or equivalent facility will be operating to utilize the landfill gas generated at the site. The facility will have scheduled downtime for maintenance, requiring use of the flares. The source testing requirement for this minimized use of the flares will be to test all flares once every five years.
- ❖ The closure project at the final closure will leave all systems in full working condition, with no anticipated major repairs.
- ❖ Support facilities and equipment currently located at CHRLF will either be relocated or will be supported through another funding source.
- ❖ Leachate recirculation is not included in the estimate. It is expected that if leachate recirculation is implemented, this will represent a cost savings.
- ❖ Operating and maintenance costs are included in the hourly rates for equipment.
- ❖ Overhead costs for employees include all costs associated with providing resources for employees to perform their tasks, including supervision.
- ❖ Equipment required to perform tasks is included in task budgets, including pickups for supervisors and leads. Equipment costs are based on federal approved rates, as available and California State approved rates otherwise.
- ❖ As is true with SWD's existing closed landfills, the Industrial General Stormwater Permit (IGSWP) will no longer be in effect after closure; no surface water sampling will be required.
- ❖ The estimate is based on tasks being performed by SWD staff or contractors in the same manner as currently performed. To compensate for the potential that all tasks may be performed by contractors, a project management cost was added to the overall estimate. The underlying assumption is that the cost of performing the work remains constant whether performed by SWD forces or contractors, but SWD would incur increased costs for managing contracts with the contractors.
- ❖ Contingency – The contingency included in this estimate includes known unknowns such as responses to changes in groundwater quality or need to address landfill gas in native soil. This contingency assumes there will be one major investigation and remediation project during the thirty year closure period. This activity is projected from years 5 through 10. Additional contingency is included to address the management of the risk that the landfill gas and leachate systems may have a failure requiring extensive repair or replacement and is assumed at 25% of the maintenance cost of the leachate and landfill gas systems.

- ❖ Major cost items that have more uncertainty include a 5-10% estimating contingency. These items are maintenance activities that are currently performed and therefore have reliable cost projections to perform the work, but the frequency that will be required is less certain. Higher contingency is applied to systems that have had more variable maintenance costs.
- ❖ Unknown unknowns are not included in the contingency and are assumed to be covered by management reserves. Examples of potential unknown unknowns include remediation due to Queen City Farms, changes to regulations and natural disasters.

Assumptions specific to the tasks are included in the detail tables that provide the supporting documentation for the estimate.

Summary of Costs

The summary of costs is provided in the table below.

Table 1: Cedar Hills Regional Landfill Post Closure Maintenance Cost Estimate

Task Group	Annual Costs	Contingency	Annual Amount	Basis
Cover Maintenance	\$443,042	5%	\$461,833	Based on current estimated hours for PCM; updated wage and benefit rates
Leachate System Maintenance	\$168,046	10%	\$178,844	Based on current estimated hours for PCM; updated wage and benefit rates; reduced aerator repair and replacement to reflect historical; adjusted for reduced leachate production in PCM
Stormwater System Maintenance	\$356,431	5%	\$382,209	Based on current estimated hours for PCM; updated wage and benefit rates
Landfill Gas System Maintenance	\$206,050	10%	\$226,655	Based on current estimated hours for PCM; updated wage and benefit rates; assumes BEW or alternative utilizing all LFG; flares operating intermittently requiring source testing every 5 yrs
Environmental Monitoring	\$143,150	10%	\$144,000	analytical lab, weather station maintenance
Electrical Utilities	\$250,000		\$250,000	Based on current costs
Permits	\$5,000		\$5,000	Based on current permit costs
Project Management and Reporting ¹	\$655,893		\$655,893	Includes project management, field staff for monitoring; database mgmt contract mgmt; field equipment
Project management	\$199,135		\$206,949	Assumes contractor can complete labor at same cost as KCSWD; KC

¹ See attached schedule "Project Management and Reporting Costs" for detail

costs for third party contractor				assumes 9% cost to manage - contingency is inherent to labor tasks
Wastewater utility	\$250,000		\$250,000	Assume reduced to average of 100 MG per year over the 30 years
Base Estimate	\$2,676,747		\$2,761,383	
Contingency	\$260,191		\$268,041	Contingency based on 25% of leachate & LFG system maintenance plus one \$5M project occurring between years 5 and 10
TOTAL	\$2,936,938		\$3,029,424	
2013 Total	\$2,898,170		\$2,989,436	2013 Adjustment (inflation -1.32%)
2014 Total	\$2,913,240		\$3,004,981	2014 Adjustment (inflation 0.52%)
2015 Total	\$2,917,319		\$3,009,188	2015 Adjustment (inflation 1.40%)

Exclusions

This estimate does not include costs of unknown risks. The risks addressed are identifiable and have some probability of occurring based on experiences at other closed sites. The estimate does not address the potential for the PCM period to extend beyond the minimum thirty years prescribed in the WAC 173-351.

Attachments

2015 Cedar Hills Cash Flow for Landfill Reserve Fund

2015 Cedar Hills Cash Flow for Landfill Reserve Fund

Revised Preparation Date: 12/04/15

Compiled by: Mizanur Rahman

PROJECT DESCRIPTION	Project Manager	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL COST (Since 2015)	
Low Org 7254 - CLOSURE																			
AREA 7 CLOSURE	Mizan Rahman	\$3,911,198	\$4,054,531	\$598,388	\$5,703,911	\$1,330,648	\$14,108,171	\$257,703											\$29,964,550
AREA 8 CLOSURE	Mike O'Neil								\$391,250	\$4,191,004	\$375,855	\$4,044,802	\$3,055,549	\$1,043,092	\$11,847,514	\$281,168			\$25,230,235
Area 5 TOP DECK CLOSURE	Mizan Rahman					\$1,446,265	\$7,607,356	9,603,203											\$18,656,824
AREA 6 TOP DECK CLOSURE	Mizan Rahman												1,115,139	5,865,633	7,404,526				\$14,385,299
A1. CLOSURE TOTAL W/O Contingency		\$3,911,198	\$4,054,531	\$598,388	\$5,703,911	\$2,776,913	\$21,715,527	\$9,860,906	\$391,250	\$4,191,004	\$375,855	\$4,044,802	\$4,170,688	\$6,908,725	\$19,252,040	\$281,168	\$0	\$0	\$88,236,908
A2. CONTINGENCY FOR CLOSURE PROJECTS		\$391,120	\$405,453	\$59,839	\$570,391	\$277,691	\$2,171,553	\$986,091	\$39,125	\$419,100	\$37,585	\$404,480	\$417,069	\$690,873	\$1,925,204	\$28,117	\$0	\$0	\$8,823,691
Low Org 7252 - NEW AREA DEVELOPMENT																			
SSWA Excavation (Part of Area 8 and Facility relocation Project)	Mike O'Neil	\$15,346,550	\$2,000,000																\$17,346,550
AREA 8 DEVELOPMENT AND FACILITY RELOCATION	Mike O'Neil	\$5,162,182	\$12,905,455	\$15,486,545	\$12,905,455	\$5,162,182		\$0	\$0	\$0	\$0	\$0	\$0	\$0					\$51,621,818
AREA 5 TOP DECK DEVELOPMENT	Rahman/O'Neil		\$0	\$0	\$0	\$153,846	\$230,769	\$0	\$0	\$0	\$0	\$0	\$0	\$0					\$384,615
AREA 6 TOP DECK DEVELOPMENT	Rahman/O'Neil		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$150,000	\$250,000						\$400,000
SITE DEVELOPMENT PLAN	Mizan Rahman	\$444,000	\$525,000	\$0	\$400,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0				\$1,369,000
																			\$0
B1. NEW AREA DEVELOPMENT TOTAL W/O CONTINGENCY		\$20,952,732	\$15,430,455	\$15,486,545	\$13,305,455	\$5,316,028	\$230,769	\$0	\$0	\$0	\$0	\$150,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$71,121,984
B2. CONTINGENCY FOR NEW AREA DEVELOPMENT PROJECTS		\$560,618	\$1,543,045	\$1,548,655	\$1,330,545	\$531,603	\$23,077	\$0	\$0	\$0	\$0	\$15,000	\$25,000	\$0	\$0	\$0	\$0	\$0	\$5,577,543
Low Org 7253 - FACILITY IMPROVEMENTS																			
LFG DELIVERY PIPELINE UPGRADE	Lynde Eller	\$870,042	\$4,060,196	\$870,042	\$0														\$5,800,280
ENVIRONMENTAL CONTROL SYSTEM IMPROVEMENTS	Toraj Ghofrani	\$2,386,923	\$547,692	\$88,462	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					\$3,023,077
NEW FLARE STATION	Toraj Ghofrani		\$0	\$0	\$0	\$0	\$1,042,071	\$3,126,213	\$5,210,355	\$1,042,071	\$0	\$0	\$0	\$0					\$10,420,710
FACILITY EVALUATION	Lynde Eller	\$15,000	\$1,488,375	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					\$1,503,375
SITELINE PUMP STATIONS UPGRADE	Mike O'Neil	\$0	\$0	\$0	\$0	\$0	\$1,538,462	\$0	\$0	\$0	\$1,538,462	\$0	\$0	\$0					\$3,076,924
																			\$0
C1. FACILITY IMPROVEMENT TOTAL W/O CONTINGENCY		\$3,271,965	\$6,096,263	\$958,504	\$0	\$0	\$2,580,532	\$3,126,213	\$5,210,355	\$1,042,071	\$1,538,462	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$23,824,365
C2. CONTINGENCY FOR FACILITY IMPROVEMENT PROJECTS		\$687,485	\$915,036	\$109,120	\$0	\$0	\$488,822	\$312,621	\$521,035	\$104,207	\$384,616	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,522,943
PROJECT TOTAL COST W/O CONTINGENCY (A1+B1+C1)		\$28,135,895	\$25,581,249	\$17,043,437	\$19,009,365	\$8,092,941	\$24,526,829	\$12,987,119	\$5,601,605	\$5,233,075	\$1,914,317	\$4,194,802	\$4,420,688	\$6,908,725	\$19,252,040	\$281,168	\$0	\$0	\$183,183,257
TOTAL PROJECT CONTINGENCY (A2+B2+C2)³		\$1,639,223	\$2,863,535	\$1,717,613	\$1,900,937	\$809,294	\$2,683,452	\$1,298,712	\$560,161	\$523,308	\$422,201	\$419,480	\$442,069	\$690,873	\$1,925,204	\$28,117	\$0	\$0	\$17,924,177
GRAND TOTAL COST WITH CONTINGENCY		\$29,775,118	\$28,444,784	\$18,761,050	\$20,910,302	\$8,902,236	\$27,210,281	\$14,285,831	\$6,161,766	\$5,756,383	\$2,336,518	\$4,614,283	\$4,862,757	\$7,599,598	\$21,177,244	\$309,285	\$0	\$0	\$201,107,434

Project Assumptions

- 1. All values are in 2015 dollars
- 2. All projects are based on the approved 2010 Cedar Hills Site Development Plan (SDP) that limits the landfill life approx. to 2030
- 3. Area 8 Development project has been contingent upon:
 - Excavation of South Solid Waste Area (SSWA) to restore the existing buffers
 - Relocation of the existing Stormwater pond and Contaminated Stormwater (CSW) pond to restores the SSWA.
 - Development of the Area 8 cell to the existing CSW and Stormwater pond locations
 - Special slope stability measure would be designed for the South slope of the Area 8, the last slope, that would take all the burden from the Area 2 to 7 in the event of seismic disturbance.
- 4. Area 8 Closure
 - *Operation life 5-6 years, first 2 years should nearly fill the subsurface storage. First staged closure construction would start from 2023 with planning work starting in 2022.
 - *There will be 4 closure stages
- 3. Based on historical data **top deck closure construction** cost is approx. \$410,000 per acre including design+CM+KCPM costs. This cost needs to be adjusted with the construction cost escalation rates per ENR.
- 5. A project contingency contingency of approx. 10% has been included in the project Total Cost.
- 6. Separate project contingencies have been assumed: @10% for ongoing project total and 15-25% for the future projects total (either planning or preliminary design level)
- 7. Respectively the cost for Design, CM, PM, sales tax, and contingency is based on the following percentages of construction cost 15-20%, 12%, 5%, 8.6%, and 15-25% (excluding the ongoing projects which is approx. 10%)