Schwyn Environmental Services

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MEMORANDUM

TO: Doug Beagle – Town of Eatonville

FROM: Craig Schwyn – Schwyn Environmental Services, LLC

DATE: September 30, 2014

RE: TECHNICAL REVIEW OF EATONVILLE LANDFILL CLOSURE OPTIONS

Schwyn Environmental Services, LLC (Schwyn) has prepared this memorandum to summarize previously explored closure options, and discuss the closure option constraints for the Eatonville Landfill, located in Pierce County, Washington. Significant work has been performed to evaluate various closure plans for the landfill, including evaluations by Parametrix, Inc. (Parametrix) in 1996, EMCON in 1999 with an update in 2002, and two evaluations by PES Environmental, Inc. (PES) in 2013. Schwyn was contracted by the Town of Eatonville, Washington (Eatonville) to perform a site walk, review available documents, and consider potential difficulties that could be encountered if the landfill was closed by one of the methods described in the previous reports.

SITE OBSERVATIONS

Schwyn, along with Eatonville, Joyce Ziker Parkinson, PLLC, Weyerhaeuser, and Washington State Parks personnel conducted a site visit on July 15, 2014. The landfill was accessed from gated single lane unimproved access road. The access road branched from a public gravel road near the northern corner of the Weyerhaeuser property line, approximately 0.6 mile west from Highway 7. The landfill was located approximately 400 feet southeast from the gate on the south side of the access road. No perimeter fencing or signage was observed around the landfill.

The landfill parcel is owned by Weyerhaeuser, and the parcel is completely surrounded by land owned by the Washington State Parks. During the site walk, the Washington State Parks personnel indicated that the surrounding land is scheduled for development as the Nisqually Mashel State Park. Planned developments (possibly as soon as 2015 depending on funding availability) include a nearby trailhead parking area, trails, and camping facilities that could be used as overflow camping from Mount Rainier National Park.

Overall, access to all but the top (north end) of the landfill was difficult due to steep slopes, thick vegetation, and both flowing and ponded surface water. The landfill surface consisted of irregular terrain and exposed refuse. Sharp metal objects and debris were present on much of the surface and edges of the fill area, particularly in the lower elevation (southern) extent. Limited soil cover was present on the upper

(northern) reaches of the landfill and the lower reaches were mostly uncovered. Scattered car bodies, appliances, drums, and tires were observed on the western edge of the landfill, outside of the main fill area. The lower face of the landfill was very steep (reported by others at slopes approaching 1 horizontal to 1 vertical (1H:1V) or steeper). The toe of the landfill terminated in a wetland. In 2002, the wetland was classified as a class II jurisdictional wetland based on the *Washington State Wetland Rating System for Western Washington* and Pierce County definitions (Shaw 2002). The wetland is reported to extend to the Mashel River located 500 to 600 feet south of the landfill; however, the river could not be seen through the dense understory during the site walk. Productive springs were present on the northwestern side of the refuse. The surface water flowed into the refuse and exited the landfill at the base of the fill into the wetland. The observations indicated the presence of high quality wetland and validated the nature of the landfill described in detail by PES.

SUMMARY OF CLOSURE OPTIONS

In 2013, Weyerhaeuser contracted PES to perform an evaluation of the former closure options prepared by Parametrix and EMCON, make a waste volume estimate, assess other closure alternatives that could be applicable for the landfill, summarize probable permitting requirements, and prepare cost estimates for the closure alternatives considered. PES did not evaluate the site in the event that Washington State Model Toxics Control Act (MTCA), Chapter 173-340 WAC (Ecology 2007) cleanup regulation might apply. PES did conduct limited field activities to characterize the waste type. Based on physical observations with no sample collection or laboratory analyses, PES described the waste as typical household trash for the time frame of disposal (1950 to 1980). PES's efforts culminated in a discussion of the closure options described in the following sections of this memorandum (PES 2013a & b).

Most of the closure options considered by PES assume that the landfill was operated and closed under the *Washington State Department of Ecology (Ecology) Regulation Relating to Minimum Functional Standards for Solid Waste Handling*, Chapter 173-301 Washington Administrative Code (WAC). Chapter 173-301 WAC became effective in 1972, and therefore, from 1972 until 1980 the Eatonville Landfill was operated and closed during the effective period of the regulation. However, based on observations during the site walk, the soil cover and slope of the face did not appear to be compliant with the regulation. Additionally, PES was not able to locate a copy of a solid waste handling permit for the landfill, although previous review of records at the Town hall by others (EMCON/OWT, 2002) indicated that the "Town of Eatonville was listed as the permit holder" (PES 2013a).

Chapter 173-301 WAC does stipulate that recurrent inspection and maintenance (including necessary leveling and repairs) be conducted after landfill closure until the fill becomes stabilized or for a

minimum of 5 years. Therefore, the soil cover could be rehabilitated in accordance with Chapter 173-301 WAC. However, any waste movement or re-placement of waste on the property would need to comply with the current solid waste regulation; *Criteria for Municipal Solid Waste Landfills,* Chapter 173-351 WAC (Ecology 2012).

OPTION 1: IN-PLACE CLOSURE

EMCON's 1999/2002 rehabilitation approach expanded upon Parametrix' s design from 1999. The approach included the construction of a buttress fill at the toe of the landfill within the wetlands, regrading the surface slope of the refuse to create a uniform 2H:1V landfill slope from the buttress to the top of the landfill, and covering the waste in-place.

In 2013 PES reviewed the closure methods and costs for EMCON's approach. With several construction modifications and the assumptions and limitations described in the Technical Memorandum (PES 2013a) the total revised estimated cost for the EMCON cover rehabilitation approach ranged from $976,000 to $1,433,000, depending on where the fill material was obtained.

EMCON's rehabilitation approach assumes that the work would be conducted consistent with the closure, post-closure requirements of Chapter 173-301 WAC. However, Schwyn's interpretation of the approach indicates that it likely could not be constructed under Chapter 173-301 WAC because the waste movement and regrading would require compliance with current waste disposal regulations (Chapter 173-351 WAC). Compliance with Chapter 173-351 WAC would have a high cost that is not considered in the estimated construction cost for this option.

OPTION 2: ON-SITE WASTE RELOCATION CLOSURE

PES developed an alternative cover rehabilitation approach that included excavation of a soil borrow area on site, relocating a significant portion of the waste mass into the borrow pit, regrading the slope of the refuse, and use of soil excavated from the borrow pit to cover the relocated and regraded refuse. The alternative was developed to minimize work within the wetland, among other goals. PES's rehabilitation approach was based on the assumption that the historical use of a portion of the property as a landfill implies that the use of the entire property for landfill purposes is an existing conforming use of the property and would therefore not be subject to additional land use permitting requirements. Thus, this rehabilitation approach assumes that implementation of the remedy would be regulated by the requirements of Chapter 173-301 WAC. PES's estimated cost for the alternative was approximately $788,000; however, PES noted that there were significant permitting requirements that could affect the cost and it was not certain that the agencies would accept the approach. This rehabilitation approach is fully described in the PES technical memorandum dated April 23, 2013 (PES 2013a), with additional

development of the rehabilitation approach and costs described in a letter to Weyerhaeuser dated July 25, 2013 (PES 2013b).

The rehabilitation approach assumes that a significant portion of the waste mass would be excavated and moved to an on-site borrow area. It is unlikely that the waste could be moved without complying with Chapter 173-351 WAC. Compliance with the current landfill regulation would affect the estimated cost for this option considerably.

OPTION 3: WASTE REMOVAL AND SITE RESTORATION

PES also evaluated the full removal of the waste with disposal at an off-site Chapter 173-351 WAC permitted landfill, followed by surface soil grading and restoration. The waste removal approach is fully described in the PES technical memorandum (PES 2013a).

PES estimated the order of magnitude cost for waste removal and site restoration at $2,145,000 to $8,177,000. PES indicated that the biggest factor in estimating construction costs was whether or not the waste can be classified as "Special Waste". If it can be classified as "Special Waste" then the total estimated construction cost was between $2,145,000 and $2,647,000. If it must be classified as MSW then the standard gate fee for solid waste disposal would likely apply, which was $142.00 per ton, raising the estimated construction costs to between $5,830,000 and $8,177,000.

The cost range was also dependent on the soil backfill source and the in-place volume calculations. PES increased the waste volume with a 50% contingency due to their limited knowledge of the original disposal site topographic profile, and their assumption that a clear defined contact point between waste and original ground will not be evident during excavation, which will increase the excavated volume.

OPTION 4: LOW COST RESTORATION

Lastly PES developed an alternative lower-cost approach for permitting and cover rehabilitation. This approach involved regrading and compacting portions of the waste surface where access is clearly practical and not impacted severely by the attendant steep slopes, and in a manner where expanding the waste footprint would not be required. The regraded waste surface, but not the steep lower area of the landfill, would be covered with a 2-foot minimum thick soil cover as required by a Chapter 173-301 WAC closure. Construction efforts would be performed to partially cover the steeper waste slopes with fallen trees and vegetation where grading could not be accomplished. A 6-foot high chain link fence with three rows of barbed wire was proposed on three sides of the re-graded waste surface.

DISCUSSION OF CLOSURE OPTION CONSTRAINTS

SOLID WASTE REGULATORY CONSTRAINTS

Options 1, 2, and 4 all involve waste movement by regrading or excavation and replacement of the waste on site, and assume that the work will be conducted consistent with the land use, closure, and post-closure requirements of Chapter 173-301 WAC. Reconstruction of a soil cover surface would be permitted in accordance with the post-closure requirements of Chapter 173-301 WAC, as long as the MSW is not moved. Any waste movement by regrading, excavation, or placement of waste on site, will trigger compliance with the current solid waste regulations: *Criteria for Municipal Solid Waste Landfills,* Chapter 173-351 WAC (Ecology 2012). A practical way to comply with the current solid waste regulation is to dispose of any waste that is handled in a Chapter 173-351 WAC compliant landfill cell, such as the LRI Landfill located approximately 15 miles north in Graham, Washington. The site could also be permitted as a Chapter 173-351 WAC compliant landfill; however, obtaining a WAC 173-351 solid waste disposal permit for the site is considered unrealistic both from a cost and permitting perspective.

Based on this constraint, the waste manipulation involved in Options 1, 2, and 4 would not be allowed unless the manipulated waste was removed from the site and placed in a landfill permitted under WAC 173-351, or the site was otherwise made into compliance with WAC 173-351. This constraint eliminates Options 1, 2, and 4 from consideration in their present design and the estimated construction costs are likely significantly underestimated. Options 1 and 4 might be viable if the work could be conducted without the movement of the MSW. Due to the very steep, and potentially unstable landfill face, it may be difficult to rehabilitate the cover without impacting large expanse of the wetland. Encroachment into the wetland would trigger the wetland regulation, permitting, and mitigation actions that PES diligently tried to avoid. Further engineering evaluation would be required to assess the design modifications that would be needed to implement Option 1 or 4 without waste movement.

Option 3, waste removal and site restoration is feasible as described by PES, as long as the MSW is disposed of in a WAC 173-351 compliant facility. The uncertain waste volume and characterization of the waste as either special waste or MSW significantly impact the project cost.

CLEANUP ACTION DISCUSSION

In 1996, Parametrix collected limited samples of surface water from seeps, springs, and wetlands in the vicinity of the landfill, and analyzed the samples for a few common landfill leachate parameters. No soil or groundwater samples were collected, and in today's regulatory environment, common leachate parameter analyses are generally far more extensive.

Based on the limited sampling effort (Parametrix, 1996), Parametrix concluded that while the results showed some slightly elevated concentrations of the iron, zinc, and biological oxygen demand, the

results indicated no appreciable impacts from the landfill on the wetlands at the time of the sampling. Comparison of the historical surface water data to the MTCA cleanup levels does not indicate any direct exceedance of the MTCA Method B cleanup criteria for surface water; however, as mentioned above common leachate parameter analyses are generally far more extensive today. In contrast, several zinc concentrations [up to 490 micrograms per liter (µg/L)] do exceed Chapter 173-201A WAC, Water Quality Standards of Surface Waters of the State of Washington for fresh water aquatic life (which is 32.3 µg/L for chronic conditions). The regulatory criteria are, however, based on dissolved fraction, while the analytical results are reported as the total fraction, and therefore the historical results could be biased high.

In November 2010, the Tacoma-Pierce County Health Department (TPCHD) conducted a site visit during a study of closed landfills in the region. The TPCHD conducted methane monitoring in the upper portion of the landfill and the results indicated methane levels below the lower explosive limit range. The methane readings were consistent with previous TPCHD monitoring results conducted during annual inspections from 1992 through 1998 (TPCHD 2010).

Based on the historical surface water data and reported methane monitoring levels, it appears that there is limited need to remediate the site from a toxic or explosive environment; understanding that the available monitoring results are limited and dated and soil and groundwater data have never been collected. Significant additional sampling would likely be required by the regulatory agencies before a no further action opinion would be prepared by the agencies.

However, in the event that a landfill remedial action was conducted under MTCA, rather than landfill regulation, there may be an opportunity to move, regrade, and/or leave the waste on site using a containment remedy. In a MTCA closure, ARARs (applicable, relevant and appropriate requirements) must be considered, and therefore the closure must still meet the substantive requirements of the landfill regulations, but the site may be exempt from some of the procedural elements of the permitting requirements. Remedial actions of this nature typically require entry into a formal agreement with the Washington State Department of Ecology (Ecology) in the form of an Agreed Order or Consent Decree. Such formal agreement would be in contrast to an independent cleanup action performed under Ecology's Voluntary Cleanup Program. Under such a formal agreement, remedial action grant (RAG) funds might also be available to Eatonville or the State Parks, but not to Weyerhaeuser. However, RAG funds are limited, and Ecology prioritizes sites partially on the toxicity and likely exposure that is posed to human health and the environment by the facility. Based on the historical surface water and methane monitoring results, the site would likely have a low priority for receiving RAG funds based on the available historical data set. A MTCA containment action would likely also require an environmental covenant for the site.

ASSOCIATED LIABILITIES

To varying degrees, each option addressed herein has associated liabilities, either long-term and/or short-term. Schwyn's discussion of the liabilities associated with the rehabilitation options are discussed in general terms below, are not intended to provide legal advice, and are preliminary only. Thorough liability assessment should be addressed by appropriate counsel.

Based on the limited historical surface water data and methane monitoring reports, it appears that in the short term there is limited need to remediate the site from a toxic or explosive environment. Observations of the landfill surface and configuration do present immediate physical hazards to any persons that may enter the site. State Parks personnel indicated that construction of nearby parking and trail facilities may begin in the spring of 2015, which will increase the likelihood that people and their pets may reach the somewhat remote area of the landfill. Public access to the landfill and the resulting safety issues were of concern to all parties present during the site visit. At a minimum, construction of a perimeter fence with signage to keep the public out of the site would be beneficial immediately.

Long-term liabilities would exist for any approach that leaves the waste on site. Because the refuse would be left on site, the landfill would be subject to long term post-closure maintenance, and the associated maintenance cost liability. Post-closure maintenance would also be required until the fill is stable, which is an indeterminate period of time. In addition to the long term post-closure maintenance liability, if the landfill were shown to be impacting the environment in the future the facility could also be subject to MTCA remediation liability.

For this site, all rehabilitation approaches present challenges with access and working in the vicinity of the springs and wetlands. The high estimated costs for site rehabilitation efforts are reflective of the challenges. The access to, and configuration, of the waste create difficulties for a rehabilitation project that would be fully protective of human health and the environment.

Full waste removal and site restoration would be most protective of human health and the environment. This option is the most costly in the short-term, but would eliminate most, if not all, long-term liability for maintenance or remediation. This option also has added value because it would immediately remove the public safety hazards, and the property could be turned over to State Parks for community uses.

CONCLUSION

The Eatonville Landfill was operated by the Town circa 1950 to 1980, on land leased from Weyerhaeuser. The landfill closed during the effective period of Chapter 173-301 WAC (former Regulation Relating to Minimum Functional Standards for Solid Waste Handling); however, full compliance with the closure requirements of the regulation may not have been possible due to the difficult access and over-steepened face of the refuse. In 2014, the refuse was only partially covered by soil and the landfill surface consisted of irregular terrain and exposed refuse, with sharp metal objects and debris exposed on much of the surface and edges of the fill area. Additionally, the refuse area extends over surface water springs and the toe of the landfill terminates in a Class II wetland that is connected to the Mashel River.

Land surrounding the landfill is scheduled for development as the Nisqually Mashel State Park in the near future. The remote landfill will soon become very accessible to the public and actions to protect the public and environment are prudent. Washington State Parks has indicated that if the landfill was appropriately closed, that a possible land transfer from Weyerhaeuser to the Washington State Parks would be considered.

Landfill regulations have changed considerably since the 1980's. Chapter 173-301 WAC has been replaced by Chapter 173-351 WAC, which is significantly more restrictive and costly to execute. PES and others have devised possible methods and costs to upgrade the landfill cover, redirect the springs, reduce impacts on the wetland, and limit the permitting requirements. All evaluated containment options (except complete refuse removal) involve the movement and redistribution of the waste on site in some manner. The proposed waste redistribution and cover rehabilitation alternatives assume that the work would be performed as maintenance under Chapter 173-301 WAC. However, it is probable that waste movement will initiate compliance with Chapter 173-351 WAC. Therefore, the proposed containment alternatives likely could not be completed as proposed and would be more costly to construct. Rehabilitation of a Chapter 173-301 WAC compliant cover without redistribution of waste would likely cause significant intrusion into the wetland and prompt higher permitting and wetland mitigation costs, and therefore this alternative has always been eliminated in the preliminary alternative evaluations.

Full waste removal has the highest cost of the evaluated alternatives, but also is a viable site closure, limits long-term liabilities, and would allow possible land transfer to Washington State Parks when completed under the existing terms of the Purchase and Sale Agreement between Weyerhaeuser and Washington State Parks. However, full waste removal is not without its own difficulties, such as construction worker safety, steep terrain and limited access, and environmental protection of the springs

and wetland during construction. Additionally, the uncertain waste volume and characterization of the waste as either special waste or MSW have huge impacts on the estimated project cost.

The landfill presently has limited signage and no fencing to restrict access to the landfill. In its present configuration the landfill is a potential hazard to the public. As the surrounding land is developed into a state park the potential for public interaction with the landfill may increase. Therefore, additional signage and fencing around the landfill are recommended.