



State of Maine
Department of Environmental Protection
Bureau of Remediation and Waste Management



Memorandum

TO: Linda J. Butler, Project Manager, Technical Services

FROM: Kathleen E. Tarbuck, P.E., ^{KT} Senior Environmental Engineer, Technical Services

DATE: April 24, 2020

SUBJ: Waste Management Disposal Services of Maine, Phase 14 Expansion
Application, Volume IV Engineering Review

As requested, an engineering review of the following document has been completed:

Phase 14 Solid Waste Permit Application, Volume IV Landfill Engineering Report for Crossroads Landfill at Norridgewock, Maine (Application, Vol. IV) prepared by Geosyntec Consultants and dated October 2019.

The Application, Vol. IV sets forth the landfill design for the proposed Phase 14 expansion to meet the requirements of the Department's regulation *Landfill Siting, Design, and Operation* 06-096 C.M.R. ch. 401. The landfill footprint will be approximately 48.6 acres. Phase 14 will be divided into 5 cells and will be constructed sequentially, with the initial two cells, Phases 14A and 14B, constructed concurrently.

The following comments are submitted based on review of the Application, Vol. IV. Volumes V and VI review comments will be included in a separate document.

Volume IV:

Report

1. Section 2.2 Liner System (page 4). The proposed liner system does not include a leak detection system and this was noted by the Department in comment 12(e) of the Department's February 14, 2020 review letter. In WMDSM's March 31, 2020 response to comments, it was stated that the proposal meets the requirements of 06-096 C.M.R. 401, including design requirements and time-of-travel performance standards. The Department and WMDSM continue to discuss this issue.
2. Section 2.6 Final Cover System (page 6 and Appendix IV (i)). WMDSM submitted a proposed alternative final cover design which will not include a compacted barrier soil layer, but does include all other required components, consisting of a gas vent layer, GCL, geomembrane, geocomposite, and top

protective and vegetated soils. The alternative includes the use of leachate recirculation to degrade and stabilize the waste resulting in potentially less environmental risk after closure. The documentation for the proposed alternative was thorough and included narrative, calculations, and comparisons. Although leachate recirculation is often used for the purpose of accelerated and efficient landfill gas generation, additional benefits were noted in support of the proposed cover system. Based on the information presented, approval of the proposed alternative final cover design is recommended.

3. Section 3.2 Slope Stability Assessment (page 12) and Appendix IV(c).
 - a. The slope stability analysis utilizing the Slide® software appears to be comprehensive and appropriate. The Department intends to utilize Tony Hersh, P.E. of S.W. Cole, Engineering, Inc. to review the stability specifics for the individual cell construction submittals as has been done for previous projects at the WMDSM site.
 - b. The application states that consolidation may be necessary in two of the eight stability sections to meet the construction factor of safety (FOS) value. One or more of three potential options to accomplish the consolidation prior to construction were stated: (1) additional testing of clay foundational strength gain, (2) partial installation of the Mechanically Stabilized Earth (MSE) berm with a wait timeframe of 6 to 9 months prior to completing the berm, and/or (3) pre-loading the localized areas with stockpiled materials. The construction documents to be submitted for each affected cell should detail the consolidation option selected and reasons for the selection in greater detail, as appropriate.
 - c. Appendix IV(c)(i) General Slope Stability (page 10). The statement is made that an additional ground survey beyond the limits of the MSE berm and landfill is recommended prior to development of construction documents, specifically for Section VII. The basis for this statement should be explained in greater detail, describing what the survey would entail and what information would be expected to be gained.
4. Sections 3.8 and 3.9 Landfill Cell Development Plans and Phased Landfill Final Cover System (page 21). Understanding that specific Phase 14 Cell Development plans will be provided with the Annual Reports once waste disposal activities commence in the future, at this time WMDSM should provide a narrative overview of approximate expected timeframes for Phase 14 sequential stages of cell construction and eventual phased final cover construction (i.e. the expected years of occurrence). It is recognized that timeframes may change based on waste disposal amounts and other operational factors.

5. Section 3.14 Special Construction Requirements (page 22). Special requirements for addressing groundwater during construction should be clearly detailed in the construction documents to be submitted for each cell.
6. Section 4.4 (pages 24 and 25) and Appendix IV (f)(i). Stormwater Analysis and Design Methodology. The regulations require that the stormwater management system be designed to manage stormwater from a 25-year, 24-hour storm, although recent trends show increasing storm intensities. The rainfall/runoff simulations were run for the 25-year, 24-hour and 100-year, 24-hour storms. It is stated that the stormwater management conveyance components were sized for the 25-year, 24-hour storm event. On pages 2 and 3 of Appendix IV (f)(i), it is further described that peak flow for the 100-year, 24-hour designed storm is not expected to top channels, downchutes, ditches, and swales or Erosion Control Structure (ECS) basin emergency spillways. The statements did not include piping and catch basins. Clarification should be provided on the fact that the conveyances are all expected to be able to handle the 100-year, 24-hour storm, but piping and catch basins are sized only for 25-year, 24-hour storms.
7. Section 4.6 Stormwater Conclusion (page 26). The second bulleted paragraph references the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices, 1991. The updated Maine Erosion and Sediment Control Handbooks should be referenced and used: the March 2015 Field Guide for Contractors and the October 2016 Manual for Designers and Engineers. These can be found on the Department's website:
<https://www.maine.gov/dep/land/erosion/escbmps/index.html>
8. General Comment. In various sections of the Application it is stated that changes will be made to the Site Operations Manual to incorporate specifics pertaining to Phase 14 and will be submitted to the Department prior to commencement of waste placement. Additionally, specific construction design and documentation will be submitted prior to each cell construction for Department review and approval. The Department may have additional comments on operations and specific cell design during these review periods.

Drawings

9. Sheets 14, 15, and 35. The paved landfill access road appears go over a portion of the rip rap of ECS-23. Clarification should be provided on the details of the contact between the road and the ECS basin.
10. Sheet 15. The buried stormwater pipes from the perimeter drainage ditch catch basins to the ECS basins are at 1% grade except for the buried pipe along the northern perimeter which is at 0.5% and the pipe into ESC-22A at 0.6%. An explanation should be provided for the reduced pipe slopes in these areas.

11. Sheet 19, Detail 5. The note states that the HDPE boot shall be extrusion welded to the 60-mil HDPE liner or to the 40-mil to 60-mil geomembrane operational cover. It is clear from detail 4 that there will be a pipe penetration in the operational cover at the leachate cleanouts, but clarification is needed on where there will be a penetration in the 60-mil HDPE liner.
12. Sheet 21, Detail 2. The detail shows an access road slope surface of 1% across the MSE ramp to a Cape Cod Berm on the road edge. A clarification should be provided regarding water flow discharge from the ramp, as the road surface appears to be sloped to the road's edge berm without a way for the water to leave the roadway.
13. Sheets 24-28. Leachate system details. A detail should be provided for the tie-in of the leachate discharge from each vault to the main transmission double-walled leachate header pipe.

Please let me know if there are any questions.

cc: Gail Lipfert, PhD, C.G., DEP