

Technical Memorandum

Date: 27 May 2020

To: Sherwood McKenney, District Engineer
Waste Management Disposal Services of Maine, Inc. (WMDSM)

From: Nicholas J. Yafrate, P.E.
Scott M. Luettich, P.E.

Subject: Response to MEDEP Comments
Phase 14 Solid Waste Permit Application - Volume IV
Crossroads Landfill, Norridgewock, Maine

The purpose of this memorandum is to provide responses to comments (RTCs) from the Maine Department of Environmental Protection (MEDEP) after their review of Volume IV of the Phase 14 Solid Waste Permit Application, dated 24 October 2019. MEDEP's review comments were presented in a memorandum transmitted as an attachment to an email from Linda Butler to WMDSM on 24 April 2020. The responses were prepared by Geosyntec Consultants (Geosyntec) and WMDSM. Clarifications to some of the review comments were provided by MEDEP during a conference call with WMDSM's project team on 6 March 2020. MEDEP's comments are presented below in italics followed by responses to each.

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.*

Response to Comment 1. WMDSM's project team and MEDEP continue to discuss this matter in an effort to resolve it in a timely manner. No further response needed at this time.

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.

Response to Comment 2. Understood. No further response needed at this time.

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.*

Response to Comment 3a. Understood. No further response needed at this time.

- 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.*

Response to Comment 3b. Understood. Where applicable, the construction documents for each cell will include the approach for consolidation and strength gain of the foundational clay at the two stability sections identified in Volume IV of the October 2019 Phase 14 Solid Waste Permit Application.

- 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.*

Response to Comment 3c. The geometry of the ground surface outside the toe could affect the calculated factor of safety (FS) in this area as identified in Appendix IV(c)(i) General Slope Stability (page 9). For example, a ground surface that slope down away from the exterior berm toe typically results in a lower factor of safety than a flat ground surface (all

other parameters being held constant). The subject ground survey will be performed prior to preparation and submittal of construction documents for Phase 14D.

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.*

Response to Comment 4. WMDSM has projected that landfilling in Phases 14A and 14B will commence in November of 2022, immediately after cell construction. Phases 14C, 14D, and 14E landfill construction are projected to start in approximately 2025, 2029 and 2035, respectively. Additionally, phased final closure of the Phase 14 Secure Landfill is projected to occur in 2032, 2037 and 2042 as depicted on Sheets 10,11, and 12 in Appendix IV(a) of Volume IV of the October 2019 Permit Application. The schedule for landfill cell and closure construction may change based on actual waste disposal rates, achieved waste density, clay consolidation times that may impact stability, and other operational constraints.

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.*

Response to Comment 5. Understood. Details for addressing groundwater during construction will be submitted with the landfill cell construction documents.

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.*

Response to Comment 6. Geosyntec designed the stormwater conveyance features to meet or exceed the capacity for the 25-year 24-hour storm, as set forth in 06-096 CMR Chapter 400, Section 4(M). However, as a means of understanding the conservatism of the design relative to other aspects of the landfill, Geosyntec also checked the effect of the 100-year 24-hour storm on select stormwater management components. Specifically, we confirmed that the open channels/ditches on top of the MSE berm would not overtop the MSE berm crest in very severe circumstances. Similarly, we confirmed that the ECS basins would not overtop during very severe storm events. The pipes and catch basins were not mentioned because they are not subject to overtopping. And other aspects of the stormwater conveyance features (e.g., erosion protection of the channel or ditch linings, etc.) were designed for the 25-year, 24-hour storm rather than for the 100-year, 24-hour event. Therefore, although our extra analyses had confirmed that overtopping will not occur during the 100-year, 24-hour event, the wording suggested by MEDEP would not be accurate since the confirmation analyses for the 100-year 24-hour storm did not include all other aspects of the fluid conveyance design.

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>*

Response to Comment 7. The March 2015 Field Guide for Contractors and the October 2016 Manual for Designers and Engineers were used by Geosyntec in the Phase 14 design. The reference to the 1991 Best Management Practices was an unintentional hold-over reference from a previous calculation submittal on a different project at Crossroads.

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.*

Response to Comment 8. Understood. No further response needed at this time.

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.*

Response to Comment 9. The alignment of the road will remain as shown and the lateral extent of the rip rap at the edge of ECS-23 will be trimmed accordingly to coincide with the edge of the new road. This edit, which does not have any effect on the performance of the ECS basin, will be shown on the construction drawings for the initial phase of construction.

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.*

Response to Comment 10. The solid-waste design regulations do not require the pipes to be sloped at 1%, however, Geosyntec used 1% as a target slope for most of the perimeter pipes to simplify the design process. There are two buried pipes with longitudinal slopes that are less than 1%: the buried pipe along the northern perimeter which will be installed at 0.5% to provide the minimum soil cover requirements at the upstream manhole structure while achieving the invert elevation into the receiving basin which was established based on groundwater levels; and the buried pipe from the south perimeter out to ESC-22A which will be installed at 0.6% to reduce pipe exposure above grade while allowing the upstream end of the pipe to penetrate under the MSE berm and to discharge into ESC 22A (i.e., the minimum slope that could be fit between these two fixed end elevations). It is noted that the sizes (diameters) of both of the subject pipes were designed to provide ample flow capacity for the design-storm peak flow at the slopes of 0.5% and 0.6%, respectively.

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.*

Response to Comment 11. There will be no need to penetrate the liner. As such, the words “to the 60-mil HDPE liner or” should not have been included in this note and will not be included in this note on the construction drawings.

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.*

Response to Comment 12. As indicated by the proposed road surface contours shown on Sheet 15 and in Detail 2 on Sheet 21 of the October 2019 Permit Drawings, stormwater falling on the

MSE ramp will drain via overland (sheet) flow down and toward the south gutter line of the ramp and then along the west side of the road to the double catch basin located adjacent to ECS-23. The cape cod berm will be installed along this entire edge of the ramp and road as shown in the revised Sheet 15 presented in Attachment RTC#12-1. Evaluation of a typical 10-inch wide by 8-inch tall cape cod berm indicates sufficient capacity to convey flow along the gutter line to the two double catch basins located adjacent to ECS-23. Further details of the cape cod berm will be provided in the construction packages for the initial phase of development¹.

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.*

Response to Comment 13. The tie-in detail of the pipe from each leachate vault into the forcemain will be designed to ensure back-pressure or back-flow does not occur to other upstream leachate vaults. This detail will be provided in the initial construction drawings for Phases 14A and 14B.

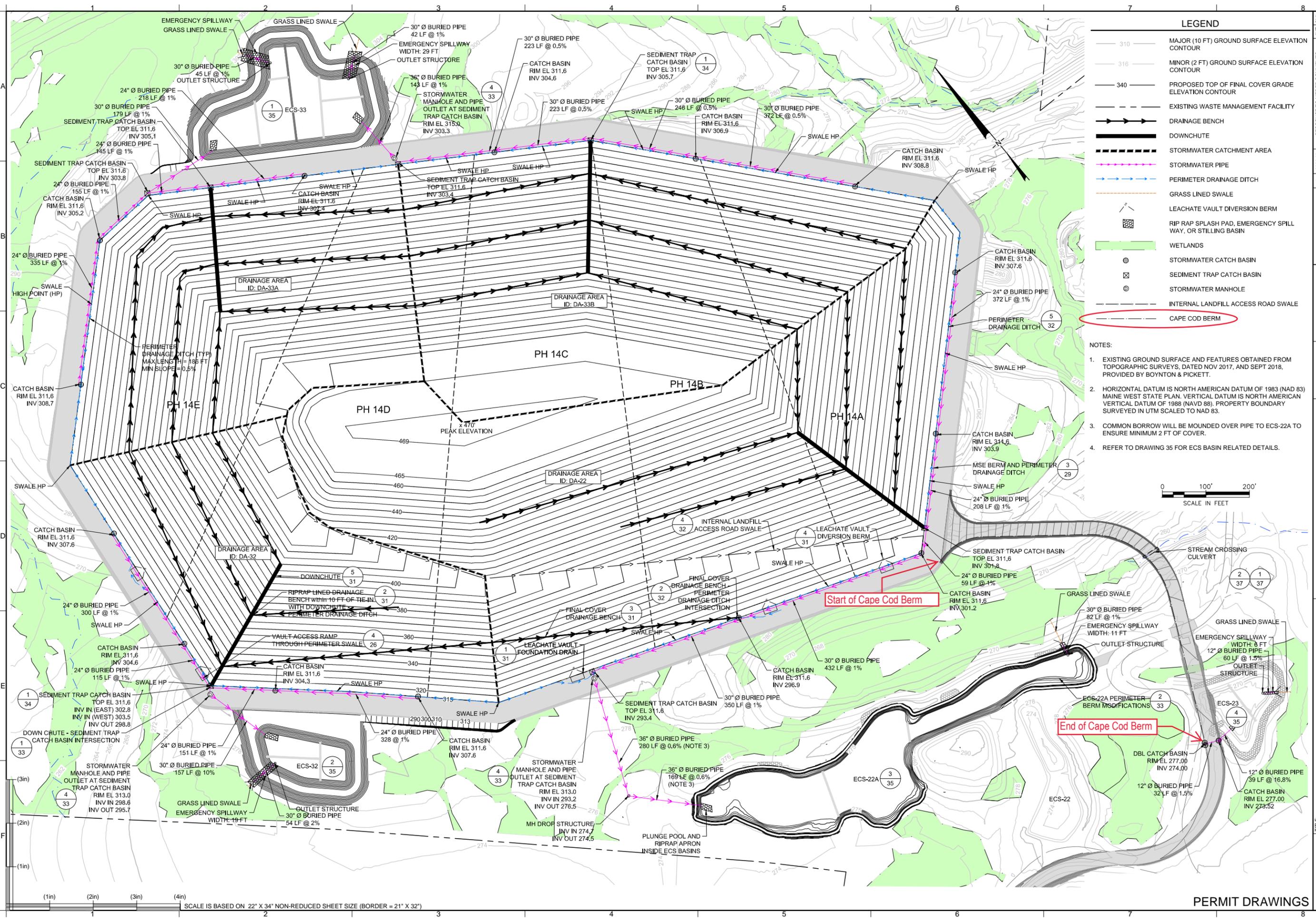
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List of Attachments:

ATTACHMENT RTC#12-1 – Permit Drawing - Sheet 15 (Rev1)

¹ It is noted that a cape cod berm should not have been included on Detail 1 of Sheet 21 on the October 2019 Permit Drawings since the road slopes inward from the outer edge of the road on top of the MSE berm. The cape cod will be removed from Detail 1 during preparation of construction drawings for the initial phase of development.

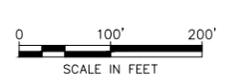
ATTACHMENT RTC#12-1
Permit Drawing - Sheet 15 (Rev1)



LEGEND

- 310 MAJOR (10 FT) GROUND SURFACE ELEVATION CONTOUR
- 316 MINOR (2 FT) GROUND SURFACE ELEVATION CONTOUR
- 340 PROPOSED TOP OF FINAL COVER GRADE ELEVATION CONTOUR
- EXISTING WASTE MANAGEMENT FACILITY
- DRAINAGE BENCH
- DOWNCHUTE
- STORMWATER CATCHMENT AREA
- STORMWATER PIPE
- PERIMETER DRAINAGE DITCH
- GRASS LINED SWALE
- LEACHATE VAULT DIVERSION BERM
- RIP RAP SPLASH PAD, EMERGENCY SPILLWAY, OR STILLING BASIN
- WETLANDS
- STORMWATER CATCH BASIN
- SEDIMENT TRAP CATCH BASIN
- STORMWATER MANHOLE
- INTERNAL LANDFILL ACCESS ROAD SWALE
- CAPE COD BERM

- NOTES:
- EXISTING GROUND SURFACE AND FEATURES OBTAINED FROM TOPOGRAPHIC SURVEYS, DATED NOV 2017, AND SEPT 2018, PROVIDED BY BOYNTON & PICKETT.
 - HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD 83) MAINE WEST STATE PLAN. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). PROPERTY BOUNDARY SURVEYED IN UTM SCALED TO NAD 83.
 - COMMON BORROW WILL BE MOUND OVER PIPE TO ECS-22A TO ENSURE MINIMUM 2 FT OF COVER.
 - REFER TO DRAWING 35 FOR ECS BASIN RELATED DETAILS.



RESPONSE TO MEDEP COMMENTS	JHT/SML
DATE	2020.05
REV	
DESCRIPTION	
DATE	

THIS DRAWING MAY NOT BE ISSUED FOR CONSTRUCTION, TENDER OR CONSTRUCTION, UNLESS SEALED.

DESIGN BY: NJY
DRAWN BY: JT/RC
CHECKED BY: NJY
REVIEWED BY: SML
APPROVED BY: SML

WWM
WASTE MANAGEMENT
DISPOSAL SERVICES OF
MAINE, INC.
307 MERCER ROAD
NORRIDGEWOCK, MAINE 04857
TELEPHONE: (207) 634-2714

Geosyntec
consultants
288 GREAT ROAD, SUITE 202
ACTION, MASSACHUSETTS 01720 USA
PHONE: 978.263.8588

TITLE: SURFACE WATER MANAGEMENT PLAN
PROJECT: PHASE 14 PERMIT APPLICATION
SITE: CROSSROADS LANDFILL NORRIDGEWOCK, MAINE

DATE: OCTOBER 2019
PROJECT NO.: BE0232C
DRAWING NO.: 15 OF 38

PROJECTS: CA02CROSSROADS LANDFILL PHASE 14 EXPANSION PERMIT DRAWINGS BE0232C.DWG Last Edited by: jhwy on 05/15/20

SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

PERMIT DRAWINGS