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CIVIL/ENVIRONMENTAL ENGINEERS

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October 17, 2011

Mr. Paul M. Gildersleeve, P.E.
Solid Waste Management Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095

RE: AVRRDD – Mt. Carberry Secure Landfill, Bean Brook Rd, Success, NH
Type I-A Modification to Solid Waste Management Facility Permit
Mt. Carberry Secure Landfill – Phase III North
WMD Doc Logs # 200900133, 2010563, 2010634
Response to NHDES Comments dated April 7, 2011
CMA #777

Dear Mr. Gildersleeve:

On behalf of the Androscoggin Valley Regional Refuse Solid Waste District (the District), CMA Engineers, Inc. has prepared this letter to provide information requested by the New Hampshire Department of Environmental Services (NHDES) as outlined in your correspondence dated April 7, 2011. Our responses to NHDES's comments are presented in normal type, following the corresponding NHDES comment in bold italic type. Three copies of an additional site plan, GW-1, are provided to supplement this response letter.

1. ***Sheet C-102 indicates that the seasonal high water table and depth to bedrock is less than the required 6 foot minimum required by Env-Sw 804.02(d). Sheet C-102 must be submitted showing an approvable design. The application states that "fill can be brought in to raise the surface grade and establish six feet of separation above the wet season groundwater table prior to construction of the liner. Alternately or in combination with the fill, an underdrain system can be installed to maintain the required 6-foot separation between the wet season phreatic surface and the secondary landfill liner." An approvable design shall consist of providing six feet of fill above the seasonal high groundwater table and the confirmed bedrock surface or installing an underdrain system and providing measurements to verify that the required separation distances have been achieved.***

The design as presented provides six feet of separation between the seasonal high groundwater table and the bottom of the lining system. Bedrock is greater than six feet below the lining system throughout Phase III as shown on Sheet C-102. Sheet C-108 depicts an underdrain system to be installed beneath the entire footprint of Phase III. The required six feet of separation will be provided by a combination of lowering the groundwater table by the underdrain, and raising the base grades in select areas. Although not readily apparent by review of Sheet C-102 alone, the landfill sections shown on Sheet C-200 of the permit drawings illustrate the combination of underdrains and fill that will result in anticipated post landfill liner construction groundwater levels being six feet below secondary liner. The proposed depth of underdrain collection pipes is a minimum of seven feet below the secondary liner. This underdrain design is similar to designs

successfully implemented in earlier landfill construction at the site, as documented by regular monitoring of groundwater levels beneath lined landfill areas.
The District requests to submit the final underdrain design for each future landfill stage as a part of the Type II permit modification for construction of the stage. The final design will include the proposed base grades and underdrain system design specific for the landfill cell(s) being constructed, along with provisions to account for future planned construction as necessary.

Similar to the practices of previous landfill expansions at this facility, the District will construct the underdrain system and excavate/fill to liner base grades during the construction season prior to the landfill liner system construction for each landfill stage of Phase III. During the period between underdrain construction and landfill liner construction, the District will monitor groundwater elevations for the proposed landfill stage and provide the Department with data demonstrating the underdrain system is functioning properly and that at least six feet of separation between groundwater and the landfill liner system will be maintained following construction. The actual groundwater data will be provided to NHDES at the time of submission of engineering construction drawings for the landfill liner system for the landfill stage to be constructed.

For each landfill stage, the submission and approval process will therefore be as follows:

a. District to prepare dewatering drawings, and submit for NHDES review, comment and approval;
b. District to construct dewatering measures for proposed landfill stage, and monitor groundwater levels after installation;
c. District to prepare and submit landfill liner construction drawings for the proposed landfill stage, with associated actual groundwater data for that stage documenting required separation;
d. NHDES to review and approve landfill liner construction drawings as part of a Type II permit application.

The above process will be repeated for each stage of landfill liner construction. In this fashion, NHDES is assured that separation distances are provided.

2. ***Additional multi-level monitoring well locations shall be proposed adjacent to the Phase III North Expansion area and approved by the Department in addition to the 4 proposed in the Response document. Depending upon final bedrock grades and proposed construction phasing, bedrock well couplets may be required. If approval to construct is granted, installation and a minimum of two full permit sampling rounds will need to be obtained from any and all wells in advance of any waste placement.***

One additional monitoring well pair is proposed for monitoring the Phase III North landfill expansion in addition to those proposed in the application. Existing well CMW-201 A&B is located east of Phase III and currently serves as the upgradient monitoring well for Phases I and II. This well will remain in service in that role until Phase III North is operated. At that time, CMW-201 will be situated downgradient of Phase III North and will serve as a new downgradient monitoring well couplet. An additional monitoring well is proposed to the north of CMW-201 to provide an additional Phase III North downgradient monitoring location. The location of each of these wells is shown on Figure 1. Each new well will be installed at least one year prior to landfill construction in order to collect at least two sampling rounds of groundwater elevation and quality data.

Given the considerable depth to bedrock in downgradient areas (200+/- feet), the new wells will be installed as couplets. In the absence of strong downward flow gradients or evidence of a potential deep contaminant migration flow path, monitoring of bedrock water quality is not warranted at this time.

3. ***The two detention ponds on the north side of the proposed expansion shall be submitted as an approvable design to minimize recharge to the groundwater flowing beneath the facility.***

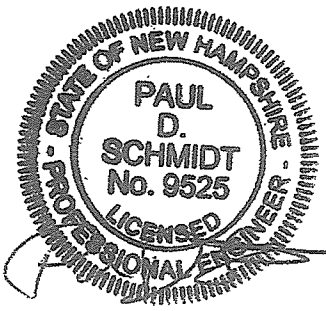
Pond 13 located to the north of the landfill expansion will be lined with a geosynthetic clay liner (GCL) to essentially eliminate groundwater recharge upgradient of the landfill. Pond 15 has been relocated to the north and will remain unlined and be used as a stormwater infiltration pond. Pond 15 has been relocated to an area which groundwater gradients direct flow away from the landfill. The stormwater drainage areas and flow routing will remain unchanged so that stormwater which is not infiltrated by Pond 15 will cascade to existing Pond 17, as presented in the original permit application. The relocated configuration of Pond 15 has essentially the same storage capacity as originally submitted in the permit application.

In addition, proposed stormwater detention ponds P1, P3, and P4 will also be constructed with a GCL liner in order to avoid raising groundwater elevations near the limits of the landfill. Pond P2 to the southeast of the landfill expansion will remain unlined and function as an infiltration pond. However, Pond P2 has been relocated to minimize potential impacts to groundwater flow pathways under the landfill. The relocated configuration of Pond 2 also has essentially the same storage capacity and stormwater flow routing as originally submitted in the permit application.

A new design drawing GW-1 is provided showing the revised location of pond P15 and pond P2 along with seasonal high groundwater contours and the proposed groundwater monitoring well pairs. Also please note that the underdrain system outfall pipe has been extended below proposed Pond 1 so that it will discharge to the south of Pond 1 rather than into the pond itself. Extending the underdrain pipe will hydraulically separate the underdrain discharge from Pond 1 stormwater storage and avoid potential groundwater recharge through the underdrain system beneath the landfill.

If you have any further questions, please do not hesitate to contact us.

Very truly yours,
CMA ENGINEERS, INC.



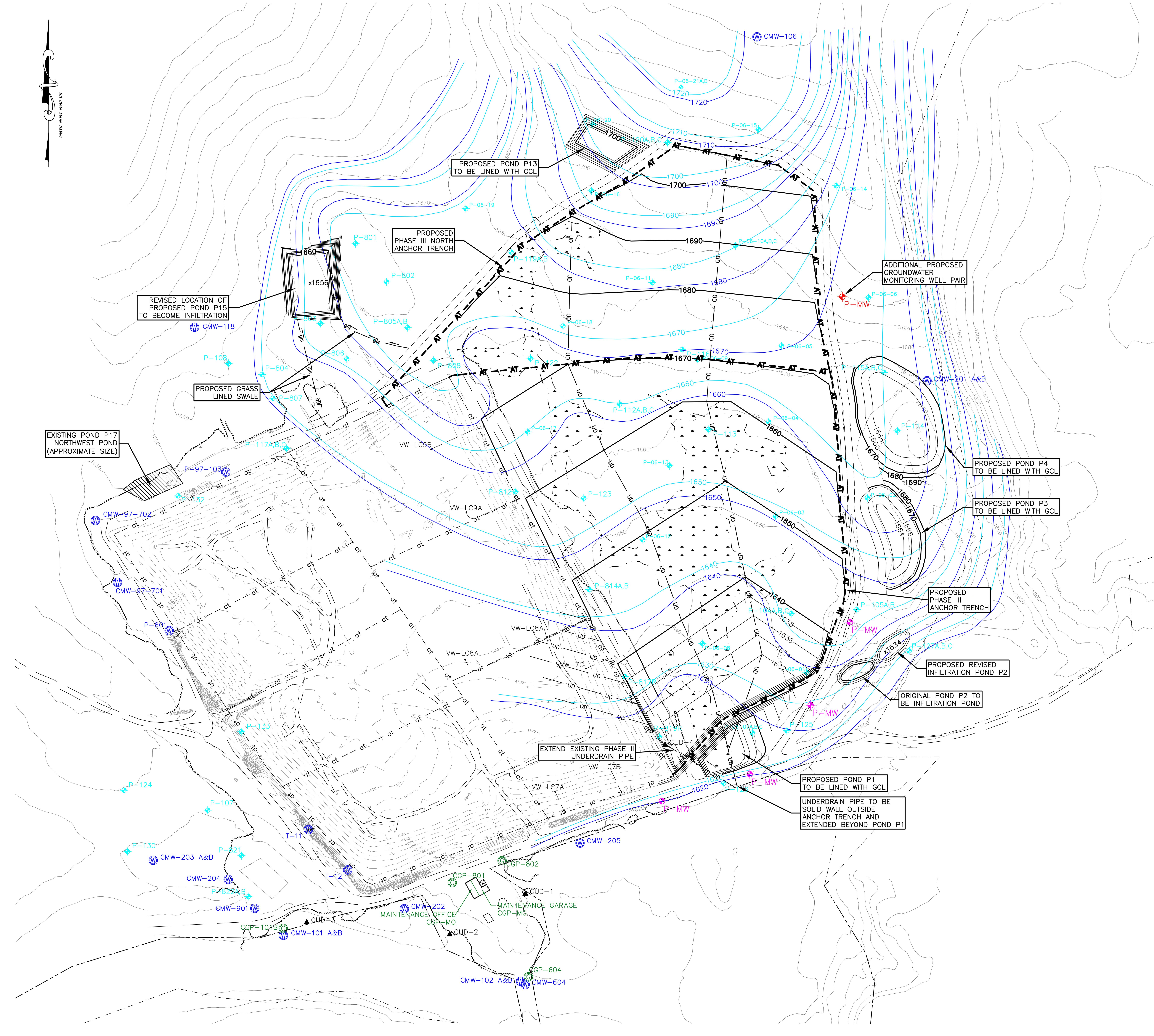
Paul Schmidt, P.E.
Project Manager

Brad Sullivan, E.I.T.
Project Engineer

BWS/cak

Enclosures

cc: Sharon Gauthier, AVRRDD Executive Director



Notes:

1. Existing topography is a compilation of field work performed in the active filling area of Stage 9 on February 14, 2011 by York Land Services of Berlin, NH and with topography of Phase I & II of the landfill dated October 4, 2010 provided by Sevee & Maher Engineers. Existing topography outside the landfill anchor trench is approximate and has been provided by Sevee & Maher Engineers.
2. This plan is supplemental to the Phase III North Expansion Type IA permit originally submitted by Sevee & Maher Engineers in August 2009 and has been issued to address comments provided by NHDES.

Legend:

Symbol	Description
1700	Existing 10' Contour (Outside Anchor Trench)
1700	Existing 5' Contour (Inside Anchor Trench)
1700	Proposed 10' Contour
	Proposed 2' Contour
	Existing Edge of Gravel Road
at — at — at — at	Anchor Trench
UD — UD — UD	Existing Underdrain Pipe
CMW-205	Existing Groundwater Monitoring Well
CUD-1	Existing Underdrain Outfall
CGP-801	Existing Gas Probe
VW-LC9A	Existing Vibrating Wire
P-805A,B	Existing Piezometer
P-MW	Originally Proposed Groundwater Monitoring Well Pair
P-MW	Additionally Proposed Groundwater Monitoring Well Pair
1700	Wet Season Groundwater 10' Contour
1700	Dry Season Groundwater 10' Contour
UD — UD — UD	Proposed Underdrain Header Pipe
gls — gls — gls — gls	Proposed Grass-Lined Swale
AT — AT — AT — AT	Proposed Anchor Trench

no.	revision	date	by
1	Issued for NHDES Review - Not for Construction	10/11	PDS

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STATE OF NEW HAMPSHIRE, PAUL D. SCHMIDT, No. 9525, PROFESSIONAL ENGINEER

designed by: PDS/RJG
drawn by: BWS
approved by: PDS/RJG
date: October 2011
project no: 777
file name: 777-Revised PSP-1110.dwg
scale: 1" = 200' (in feet) 0 100 200

Androscoggin Valley Regional Refuse Disposal District

Mt. Carberry Landfill

Phase III North Expansion Proposed Groundwater Monitoring Locations & Stormwater Management Plan

drawing no. GW-1

sheet: 1 of 1

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