COMMITMENT & INTEGRITY
DRIVE RESULTS

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September 24, 2010

Edward Moore
New York State Department of Environmental Conservation
21 South Putt Corners Road
New Paltz, NY 12561-1620

Re: Taylors Lane Composting Site
Site ID: 360021
Interim Remedial Measure Work Plan (IRMWP) Dated November 6, 2009
Leachate Recovery Well Design

Dear Mr. Moore:

As a condition of the approval of the above referenced IRMWP indicated in a correspondence dated November 10, 2009 by the New York State Department of Environmental Conservation (NYSDEC), Woodard & Curran is providing this letter to transmit the leachate well design specifications based on field data.

BACKGROUND

In a letter dated November 10, 2009, the NYSDEC approved the IRMWP for the Taylors Lane Composting Site in Mamaroneck, NY. However, as indicated in the November 2009 letter, NYSDEC required the submittal of the final leachate design specifications prior to initiating the final implementation of the IRMWP. The IRM consists of the installation of a leachate recovery well and associated appurtenances. The preliminary leachate well specifications were provided in Figure 4B of the IRMWP.

SAMPLING METHODOLOGY

The leachate well was located in the field as indicated in Figure 3 of the IRMWP using Global Positioning System (GPS) technology. A hollow-stem auger rig was mobilized to the Site and a pilot hole was initiated with continuous split spoon sampling. However, after two attempts at completing the pilot hole with poor recovery, the pilot hole was completed using a direct-push drill rig. The pilot hole was completed to a depth of approximately 14-feet below existing grade, which corresponds to the top of the lower sand unit. Upon completion, the pilot hole was backfilled with approximately three feet of bentonite chips and drill cuttings pending the well design and approval.

As shown on the attached boring log for the leachate well pilot hole, the material encountered was generally black fine to medium sand with trace of gravel and fines (silt and clay) and miscellaneous debris (Attachment A). Based on the lack of distinct stratigraphy, three representative samples from depth intervals of 3 to 5 feet (below landfill liner), 5 to 10–feet and 10 to 13.7 feet below grade were submitted to Alpha Analytical of Westborough, MA for grain size distribution analysis.

In addition to the leachate recovery well, four piezometers PZ-A, PZ-B, PZ-C, and PZ-D were installed in accordance with the IRMWP. Monitoring well MW-C was not installed as it was confirmed that monitoring well cluster MW-2S/2D was in close proximity and therefore, monitoring well MW-C is unnecessary.

RESULTS

The results of the grains size distribution analysis is provided in Attachment A. The grain size distribution curves indicate consistent but heterogeneous fill material. As indicated by visual descriptions and confirmed by grain size analysis, the fill material contained between 74 and 80 percent sand with the predominant grain size being medium sand. Each of the samples contained less than 10 percent fines (i.e., silt and clay). Also noted were various amounts of debris such as brick, wood and evidence of compost materials.

The ground water level was encountered at an approximate depth of three feet below grade, which is at approximately elevation 11.7 feet.

WELL DESIGN

The following are the well design specifications for the leachate recovery well and the detailed calculations are provided in Attachment A.

Well Diameter – As indicated in the approved IRMWP, the well diameter is proposed to be 14-inches and no change is proposed for the well diameter. Although, the leachate recovery well is a passive well (i.e., gravity drainage), the entrance velocity calculations indicate that based on the well diameter and anticipated screen length, the entrance velocity will remain below 0.1 feet per second (ft/s) at flow rates of up to 250 gallons per minute (gpm), which is a recognized industry standard (Driscoll, 1986). Although based on the estimated hydraulic conductivity, flow rates would not likely exceed 10 gpm if the well were pumped.

Screen and Casing Materials – The proposed well screen material is Type 304 stainless steel, which is a common stainless steel formulation for water wells. The casing materials will be carbon steel. As shown on Figure 4B of the IRMWP, the initial casing design included 1/8-in drilled holes; however, this design feature is being revised. The casing will no longer have the drilled holes. Once the leachate well is installed and it begins to flow under gravity, a cone of depression will form around the leachate well and the area within the cone of depression will dewater under gravity drainage to establish an operational water level elevation of approximately 9.2 feet above mean sea level (amsl). Therefore, a screened or perforated area above elevation 9.2-feet amsl will not be necessary.

Screen Slot Type – As indicated in the approved IRMWP, the screen slot type will be continuous wire-wound to maximize the screen open area.

Screen Length – Based on the field observations, the screen length will be 6 feet. This configuration will result in the placement of the well bottom at approximately elevation 1.7, which is approximately two feet above the lower sand layer. A revised leachate well drawing updating Figure 4B of the IRMWP is provided in Attachment A (Figure 1).

Screen Slot Size – Based on the finest materials encountered during the pilot hole completion, the finest materials were encountered at a depth of 10 feet to 13.7 feet below existing grade. This was the basis for the design of the screen slot size. The screen slot size was determined to be 0.03-in and is based on the 30 percent passing formation grain size multiplied by a factor of between 3 to 6. Due to the heterogeneous nature of the formation as indicated by an average uniformity coefficient of approximately 12, a conservative factor of 3 was utilized for design proposes.

Filter Pack Material – Based on the formation grain size distribution, the filter pack will be a number one sand (No. 1 Sand). The filter pack specification are: effective grain size (d10) of 0.035-in, greater

than 90 percent silica composition, well rounded grain size, and a uniformity coefficient of approximately 1.4. The filter pack thickness will be approximately five inches thick, which is within the recommended industry standard of between three and eight inches.

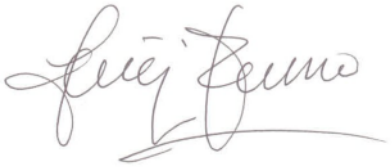
CLOSURE

The Village of Mamaroneck requests approval of this proposed leachate well specification prior to continuing with the implementation of the IRMWP.

If you have any questions regarding this matter, please feel free to call me or Hugh Greechan at 914-448-2266.

Sincerely,

WOODARD & CURRAN INC.



Lou Russo, PG, LEP
Project Manager

LR/cp
213733.00

Enclosure(s)

cc: Hugh Greechan, P.E., Woodard & Curran
Keith W. Furey, P.E., Mamaroneck Village Engineer
Richard Slingerland, Mamaroneck Village Manager

Attachment A

Laboratory Report

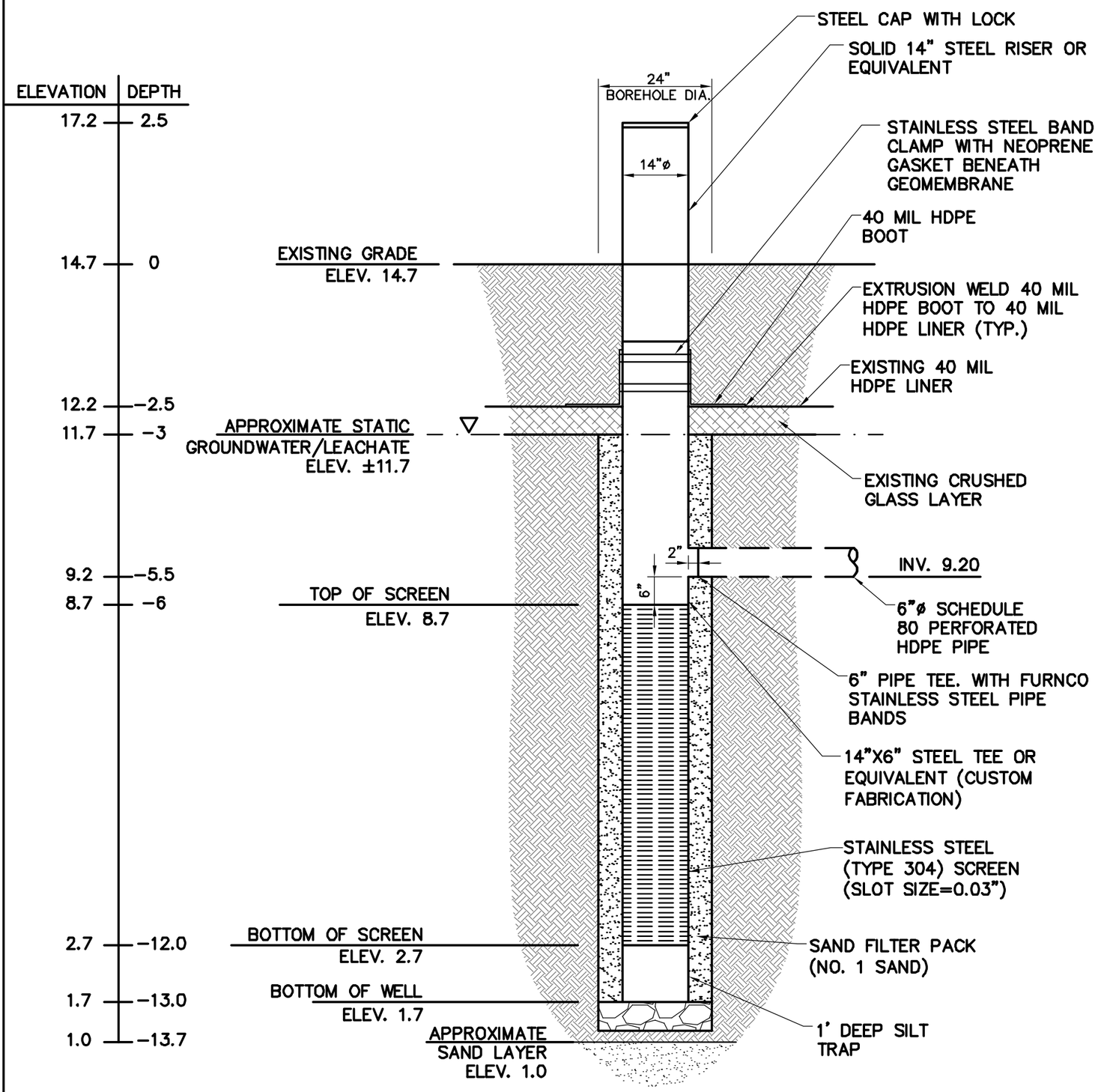
Leachate Well Boring Logs

Leachate Well Design Specifications

Revised Leachate Well Design Drawing

Well Design Specifications
Taylors Lane Compositing Site - Mamaroneck, NY

Criteria		Basis of Design
Well Diameter	14-in	Well diameter must be large enough to accomodate the pump and to maintain uphole velocity of 5 ft/s or less From Driscoll (1986) for wells with anticipated discharges of 100 gpm or less, the range of casing diameters is 5 to 6 in. Also, need to maintain <0.1 ft/s entrance velocity (see below).
Screen Material	Stainless Steel Type 304	From Driscoll (1986) this type of stainless steel has excellent corrosion resistence and is most commonly used stainless steel material for water well screens
Casing Material	Carbon Steel	
Screen Slot Type	Continuous wire-wound	Provides greatest amount of open area
Well Depth (ft)	14	The well depth will extend to the top of the lower sand layer, which was encountered at approximately 13.7 feet below existing grade.
Screen Length (ft)	6	From Driscoll (1986), theoretical considerations and experience have shown that screening 1/3 to 1/2 of an aquifer less than 150 ft. thick provides the optimum design for homogeneous and hetergeneous unconfined aquifers. Additional consideration as it relates to entrance velocity is also needed. Must balance between well diameter, screen length and required yield to achieve the appropriate entrance velocity of < = 0.1 ft/s (see below). This will allow the well to produce up to 365 gpm without having an entrance velocity above 0.1 ft/s.
Filter Pack Material		Determined from grain size distribution. The finest materials were encountered at 10 to 13.7 ft from boring LWB, sample S3, which was used to detemine the slot size and filter pack design. Taking d30/D70 grain size from the finest sample which is 0.3459 mm (0.014 in) multiple this value by factor of 3 to 6 depending on formation characteristics.
effective grain size (d10)	0.035	
uniformity coefficient	1.4	
chem. Composition	> = 90% silica	
thickness	3 in < t < 8 in	
type	No. 1	
Screen Slot Size (in)	0.03	slot size retaining 90% to 99% of filter pack



2' 0 2' 4'

BAR SCALE
1" = 4'
CHECK GRAPHIC SCALE BEFORE USING

JOB NO: 213733 DATE: Sept. 21 2010 SCALE: 1"=2'	VILLAGE OF MAMARONECK 123 MAMARONECK AVENUE MAMARONECK, NEW YORK 10543	LEACHATE WELL DESIGN	WOODARD & CURRAN 709 Westchester Avenue	Suite L2 White Plains, New York 10604 914.448.2266 | www.woodardcurran.com COMMITMENT & INTEGRITY DRIVE RESULTS
FIGURE 1	TAYLORS LANE LANDFILL INTERIM REMEDIAL MEASURE VILLAGE OF MAMARONECK, NEW YORK	DESIGNED BY: DRAWN BY: 213733_Details.dwg	CHECKED BY: