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DEPARTMENT OF ECOLOGY
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January 10, 2019

Aaron Claiborne
Operations Project Manager
City of Bainbridge Island
280 Madison Ave North
Bainbridge Island, WA 98110-1812

Response to the City of Bainbridge Island's Compliance Monitoring Revision Request at the Following Cleanup Site (Pursuant to Consent Decree #012013752):

- Name: Bainbridge Island Landfill
- Address: Vincent Rd, Bainbridge Island, Washington
- Facility/Site No.: 2602

Dear Aaron Claiborne:

We received the City of Bainbridge Island's letter request, dated May 30, 2018, to revise the compliance monitoring schedule at the Bainbridge Island Landfill site. The purpose of this letter is to officially respond to this request, and to document the monitoring plan revisions that are approved by the Department of Ecology (Ecology).

Please note that this letter supersedes all email correspondence regarding monitoring plan revisions that has occurred since October 2018.

City of Bainbridge Island's Requested Revisions

The monitoring revisions requested by the City of Bainbridge Island (City) included a reduction in monitoring frequency and an elimination of select chemical parameters. The City's request is summarized below.

- Reduce the groundwater and surface water monitoring frequency to an annual schedule.
- Discontinue alkalinity, bicarbonate, carbonate, chloride, and hydroxide from the groundwater monitoring schedule.
- Discontinue hydroxide, lead, bicarbonate, carbonate, and E. Coli from the surface water monitoring schedule.

Monitoring Frequency

The City should continue with the same monitoring frequency so that the remaining contaminants above applicable cleanup levels can continue to be thoroughly evaluated (for example, the increasing manganese concentrations).

The remediation that was conducted left fine materials that could not be reprocessed in place, and covered these remaining landfill materials with a permeable cap. Therefore, generation of leachate (though greatly reduced) likely has continued. Impacts of landfill leachate on groundwater quality can take decades to diminish, which is one of the reasons that landfill post-closure monitoring must continue for periods up to 30 years.

Surface Water Monitoring Parameters

The City should continue surface water monitoring of lead and E. Coli due to the continued elevated concentrations detected over the past 5 years.

The City may discontinue monitoring for hydroxide, bicarbonate, and carbonate in surface water.

Groundwater Monitoring Parameters

The City should continue groundwater monitoring for all parameters for monitoring wells MW-13 and MW-14.

The City may discontinue groundwater monitoring of alkalinity, bicarbonate, carbonate, chloride, and hydroxide for all other monitoring wells.

Manganese Investigation

Ecology has requested that the City investigate the elevated manganese concentrations in groundwater prior to the next 5-year report in 2021. In an email dated December 19, 2018, the City proposed conducting a manganese investigation in 2020 and presenting their findings in the 2021 report. This schedule is acceptable to Ecology.

The range of manganese concentrations in well MW-13 shows a possible increasing trend. Without conducting statistical analysis (commonly required at landfill sites), quantitative assessment of manganese trends (i.e., is an increasing trend confirmed) cannot be determined. Aspect Consulting proposed inclusion of statistics in future reports, and Ecology concurs.

Post-cleanup concentrations of manganese dropped in all downgradient monitoring wells except MW-14. Further evaluation in the next 5-year reporting period should include:

- Retain the "standard" geochemical parameters (cations and anions) in wells MW-13 and MW-14.
- Use the cation and anion data to create Stiff and trilinear geochemical diagrams, as is done for other landfills.
- Compete a natural attenuation analysis based on geochemical conditions at well MW-14. The discussion of geochemistry in the 2018 5-year report is minimal.

- In the next 5-year review report, include a hydrogeologic cross section that runs downgradient, from well MW-12 through MW-13 and the Stetson Acres well (BOW37).
- Check well MW-14 with a down-hole camera for evidence of bacterial growth that may be affecting groundwater geochemistry.
- Evaluate potential impacts from other activities on the site (decant facility, biofiltration swale, settling pond, surface water drainage channel, etc.).

We look forward to the next report that evaluates the above groundwater conditions. Please contact me (tawe461@ecy.wa.gov or 425-649-7023) or Ching-Pi Wang (cwan461@ecy.wa.gov or 425-649-7134) if you would like to discuss the groundwater conditions or have any questions regarding this letter.

Sincerely,

Tamara Welty, LG, LHG
Toxics Cleanup Program

Cc: Ching-Pi Wang, Ecology Toxics Cleanup Program

Louise Bardy, Ecology Toxics Cleanup Program

Peter Bannister, Aspect Consulting

Ecology Periodic Review Site File