

February 7, 2024

By email:

Michael Wiggins, Esq. – Weston Patrick, P.A.
One Liberty Square, Suite 600
Boston, MA 02109

RE: Proposed Residential Development, 24 School Street, Wayland, MA
Request for Preliminary Review of Applicant's MODFLOW Model

Dear Mr. Wiggins,

In response to your request, I have completed a preliminary review of the MODFLOW files provided¹ by the Applicant's consultant GeoHydroCycle, Inc. (GHC). Through this review, I discovered a variety of inconsistencies when comparing model input to output and when comparing model input to descriptions provided in GHC's July 23, 2020 modeling (letter) report². Examples include the following:

- The input files are representative of a simulation with a 90-day duration that appears to only have active loading (i.e., infiltration represented using the MODFLOW Recharge Package) from the proposed wastewater disposal system. There is no evidence that stormwater infiltration was included in this simulation. Based on these observations, the provided information appears to be incomplete, inconsistent with the July 23, 2020 GHC report, and not representative of an analysis that meets the stormwater mounding analysis requirements detailed in the Massachusetts Stormwater Handbook³.
- The provided files indicate use of a specified infiltration rate for the wastewater disposal system of approximately 2,680 gallons per day (gpd), as opposed to the 2,860 gpd rate stated in the July 23, 2020 GHC report (see Table 2, p. 4). The rate specification error appears to be confirmed by the wastewater infiltration rate indicated in the "Notes" section of Figure 6 from GHC's July 23, 2020 modeling report. This observation highlights the existence of notable errors within model inputs that contribute to low bias in wastewater mounding predictions.

Beyond the specific inconsistency examples described above, the model does not appear to have been appropriately designed to predict groundwater level changes in the

¹ Transferred by email, February 6, 2024

² Letter to Desheng Wang from Stephen Smith, *re: Groundwater Mounding Analyses, 24 School Street, Wayland, MA 01778*. Dated July 23, 2020.

³ Massachusetts Stormwater Handbook, Volume 3, Chapter 1 – *Documenting Compliance*.

vicinity of the bordering vegetated wetland (BVW), nor is it clear that mounding results are being properly interpreted (e.g., in terms of being indications of potential adverse hydraulic effects to the proposed stormwater infiltration practice). Furthermore, the model does not – and inherently cannot – agree with certain site-specific data, including water levels measured within site monitoring wells. This limitation is directly attributable to relied upon assumptions and decisions made in the process of designing the model. As suggested by American Society of Testing and Materials (ASTM) guidance⁴, it is unreasonable to expect such a model to provide reliable site-specific predictions.

For these reasons, the applicant’s MODFLOW model does not appear to meet the MODFLOW analysis requirement(s) detailed in MassDEP’s affirmation of the Commission’s permit denial, as reflected in the following excerpted quote: “*Because of the constraints on the site such as the size of the lot, the retaining wall and the amount of hydraulic loading, it was the opinion of the Commission that a more robust analysis of the hydraulic loading using **the USGS MODFLOW method should be used to model site conditions to determine if the proposed project is capable of protecting the interests of the BVW. MassDEP agrees that this information is necessary to properly evaluate the proposed project*** [emphasis added]”.

The review described herein is preliminary and based on information made available to MMA as of the indicated transmittal date. MMA therefore reserves the right to amend and/or extend this commentary based on expanded review and/or review of new information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael Mobile', with a stylized, flowing script.

Michael Mobile, Ph.D., CGWP
President, McDonald Morrissey Associates, LLC

MAM/SCS

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⁴ *Standard Guide for Application of a Numerical Groundwater Flow Model to a Site-Specific Problem.* ASTM International Standard Guide D5447-17. January 2018.