

Horsley Witten Group

Sustainable Environmental Solutions

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August 21, 2018

VIA EMAIL

Mr. Jack Hathaway
Town Administrator
1 Liberty Lane
Norfolk, MA 02056

Re: Proposed Abbyville Commons Development in Norfolk, MA – Closeout letter on Hydrogeologic and WWTF Topics

Dear Mr. Hathaway:

The Horsley Witten Group, Inc. (HW) is pleased to provide the Town of Norfolk (the Town) with this letter summarizing the status of our peer review comments and Applicant responses regarding the hydrogeologic and Wastewater Treatment Facility (WWTF) aspects of the proposed Abbyville Commons and Preserve at Abbyville projects off of Lawrence Street in Norfolk, MA (the “Site”). We submitted a prior peer review letter on this project dated February 13, 2018. That letter included the following three hydrogeologic topics:

- Wastewater Treatment Facility (WWTF): Our review of this topic focused on the potential groundwater mounding and water quality impacts from the proposed WWTF.
- Site Grading: Our review of this topic focused on the potential hydrogeologic impacts from site grading and the removal of sand and gravel from the site.
- Activity and Use Limitation (AUL) site: Our review of this topic focuses on the potential for the proposed WWTF to raise groundwater levels and mobilize contamination from the down-gradient AUL site to a significant degree beyond what may or may not currently occur.

The Applicant submitted a formal response to the issues raised in my February 13 letter in a letter dated February 28, 2018. A public meeting was held regarding the aforementioned hydrogeologic topics on March 1, 2018. The Applicant’s technical team responded to public comments submitted after that meeting in a letter dated March 15, 2018. Most recently, another series of calls was held to discuss any remaining issues between the Applicant’s technical team, a third party peer review consultant for the Town (Weston and Sampson, Inc. (W&S)), and myself. We understand that the W&S review broadly addressed the proposed development but focused on AUL issues. We have not seen the results of that W&S review.

A summary of the status of the three major hydrogeologic issues listed above is provided below:

A. PROPOSED WWTF

Potential Impacts to Sensitive Receptors:

The following potential sensitive receptors were cooperatively agreed to be assessed during this process by the Applicant, the Town, and HW:

- The Town of Franklin Mill River wells, which are located a little over a mile down-gradient from the proposed WWTF and on the same side of the Mill River as the proposed WWTF.
- Test wells for a potential Town of Norfolk public water supply location located approximately 1,730 feet from the proposed WWTF in a down- and cross-gradient direction.
- Private drinking water wells for existing residents along Lawrence Street, with the closest being approximately 400 feet away from the proposed WWTF leaching beds. The wells are located primarily in a cross-gradient direction from the WWTF, with some likely up-gradient and others also having a potentially down-gradient flow component from the proposed WWTF leaching beds. The private wells are all completed in the fractured bedrock aquifer a hundred to several hundreds of feet below the surficial sand and gravel aquifer where the proposed WWTF would discharge treated effluent.
- The Mill River and a tributary raceway channel likely built to serve the mill facility by delivering water from Bush Pond for power and other industrial processes before discharging back to the Mill River. The raceway and the river are located approximately 900 feet and 1,200 feet, respectively from the proposed WWTF in a down-gradient direction.
- An Activity and Use Limitation (AUL) area on site associated with contamination from past industrial practices. The AUL consists of a capped landfilled area and some former storage ponds (current wetlands) located approximately 1,000 feet down-gradient from the proposed WWTF.

During the peer review process, the Applicant gathered additional field data and conducted revised analyses to better refine an understanding of potential impacts from the proposed WWTF on these sensitive receptors. In addition, the Applicant agreed to a number of conditions regarding the design of the proposed WWTF and groundwater monitoring to further protect these sensitive receptors from potential impacts.

1. Town Test Well Site/ Franklin Public Wells:

Both the Town Test Well Site and the Franklin Public Supply Wells are located primarily cross-gradient from the proposed WWTF (the test well site is much closer than the Franklin wells), but with some potential down-gradient component of flow. A bedrock ridge has been identified by the Applicant's technical team between the proposed WWTF and both the Town Test Well Site and the Franklin Public Supply Wells, but the consistent presence of that ridge as a complete hydraulic barrier cannot be verified within

reasonable limits of cost and effort. The Applicant has agreed to the following conditions which we believe suitably address this issue:

- Supply, advanced water quality treatment at the proposed WWTF commensurate with a facility located within a two-year time of travel (TOT) to a public drinking water supply. Among other lower effluent limits, these requirements include enhanced treatment for turbidity, and for total organic carbon (TOC) down to 1 mg/L as a measure to protect drinking water supplies from pharmaceuticals and other emerging contaminants.
- Conduct pre and post construction water quality monitoring of monitoring wells located between the proposed WWTF and the Town Test Well Site. The Applicant identified suitable well locations for this purpose during the peer review process. HW recommends that the Town condition project approval to require HW of a final monitoring plan.

2. Lawrence Street Private Wells:

Based on the groundwater flow mapping and groundwater mounding analyses conducted by the Applicant, and the fact that the private wells tap a bedrock aquifer hundreds of feet below the surficial aquifer where the proposed WWTF would discharge treated effluent, it is unlikely that a significant portion of the water withdrawn from private wells along Lawrence Street will have originated at the proposed WWTF. In order to help allay any lingering concerns regarding impacts from the proposed WWTF to private wells along Lawrence Streets, the Applicant has agreed to the following conditions which we believe suitability address this issue:

- Include water quality treatment at the proposed WWTF commensurate with the requirements for a facility located within a two-year TOT to a public drinking water supply.
- Conduct pre and post construction water quality monitoring of monitoring wells located between the proposed WWTF and the private wells along Lawrence Street. The two wells approved by MassDEP for down-gradient post-construction monitoring (MW-11 and MW-12) appear suitably located for this purpose. A third monitoring well directly between the proposed WWTF and #51 Lawrence Street could also be added for additional protection. The Applicant identified suitable well locations for this purpose during the peer review process. HW recommends that the Town condition project approval to require HW of a final monitoring plan.
- Provide curbside public water supply shutoffs to those closest parcels along Lawrence Street so that owners may connect to Town water at their future discretion.

3. Mill River and Former Mill Raceway:

The primary issue that we raised for consideration by the Town, the Applicant, and MassDEP with regard to ultimate discharge to the Mill River of treated effluent from the proposed WWTF is the anticipated total maximum daily load (TMDL) requirement for phosphorus reduction for communities within the Upper Charles River watershed. The wastewater component of the TMDL is enforced by MassDEP through its wastewater permitting process. Our understanding is that MassDEP will not require this proposed WWTF to address the TMDL and does not, in general, require any GWDP WWTFs to address the TMDL. None-the-less, phosphorus load to the Mill River remains a general environmental concern and the Applicant has agreed to conditions to minimize their phosphorus load to the river.

One fortuitous characteristic of phosphorus, unlike nitrogen for example, is that it tends to bind to subsurface sediments when infiltrated to the ground. Therefore GWDP WWTFs are less damaging from a phosphorus loading standpoint than are surface water discharge WWTFs. The time required for phosphorus to migrate from a WWTF groundwater discharge to a river is maximized by minimizing the load of phosphorus actually discharged, maximizing the thickness of unsaturated sediment through which the discharge will infiltrate vertically, and maximizing the horizontal travel distance through groundwater before discharging to the river.

The Applicant has agreed to the following conditions which we believe suitability address this issue:

- Leave the maximum amount of unsaturated thickness between the bottom of the WWTF disposal beds and the mounded high groundwater table possible given other site development grading constraints. MassDEP requires a minimum of four feet of vertical separation. We understand from the Applicant that a minimum of approximately 15 - 20 feet of separation is currently planned. We recommend that the Town condition project approval to require HW final review of the disposal bed design to ensure that it utilizes the maximum separation practical within the site design.
- Maximize phosphorus treatment ability at the WWTF to the extent practical within the overall WWTF design process in order to minimize the actual load of phosphorus discharged over any given time period. Consideration of the advanced treatment requirements for WWTFs located within a 2-year TOT of a public drinking water supply, as recommended above to minimize potential impacts to other resources, should help to provide advanced phosphorus treatment.
- Design and build the WWTF with additional capacity beyond that required for the proposed project in order to allow for the potential future tie-in of existing septic systems from the surrounding area. The additional phosphorus

treatment provided by the WWTF in excess of that provided by traditional septic systems would represent an offset of existing load. We understand based on the Applicant's Sewer Narrative, dated March 8, 2018, that the WWTF will be designed for 64,000 gpd while the anticipated project flow will be only 42,000 gpd.

4. AUL Site:

The question concerning the AUL areas is whether or not the proposed WWTF discharge may raise the groundwater level beneath the AUL areas and accelerate movement of contaminants towards the Mill River. As noted above, Weston and Sampson, Inc. has completed a third party review of this topic from which we have not seen the results. However, based on the data that we have reviewed and the supplemental materials provided by the Applicant during this peer review process, our opinion is that the proposed WWTF will not significantly impact the potential for contamination from the AUL site to migrate faster than may or may not be already occurring. We cannot comment on any other aspects of the AUL site beyond the potential impacts of the proposed WWTF as that is beyond the scope of our peer review of the proposed WWTF. The following summarizes the rationale behind our opinion of no significant impact from the proposed WWTF:

- Based on available information, the portion of the AUL for the former settling ponds is already in contact with groundwater so any potential increase in average groundwater elevation beneath the former settling ponds as a result of the proposed WWTF is unlikely to accelerate the migration of contamination towards the river.
- The capped landfill portion of the AUL is located on the far side of the Mill raceway from the proposed WWTF and, therefore, any rise in the groundwater table that may occur from the proposed WWTF is unlikely to extend significantly beyond the raceway and its hydraulic influence. In addition, the Mill River itself is located on the other side of the AUL site and the combined hydraulic influence of the river and the raceway will tend to overshadow whatever groundwater level changes may occur from the proposed WWTF in the capped landfill area of the AUL.
- Survey and document research information submitted by the Applicant indicates that the base of the buried waste consolidation layer in the capped landfill is above the 100-year flood plain of the river and therefore also above whatever groundwater level changes may occur from the proposed WWTF.

WWTF Design

As of the date of this letter, to the best of our knowledge, no actual design of the WWTF has yet been completed. HW reviewed a short design narrative of the proposed treatment process, effluent limits, and monitoring requirements dated March 8, 2018. We understand that the Applicant intends to wait to submit actual design plans until after he has received local approval for the proposed development and moves on to the Engineering Report component of the GWDP process with MassDEP. We offer the following commentary on the WWTF design as we currently understand it:

- The Applicant's recommended approach of waiting to submit design plans until after receiving local approval is acceptable provided that Town approval is conditioned to require that the WWTF design be submitted for Town peer review prior to submittal to MassDEP, that the design be capable of meeting or exceeding all MassDEP requirements for locations within a 2-year TOT to a public water supply, and that the design be capable of meeting or exceeding all effluent limits and requirements as stated in the March 8, 2018 narrative.
- The narrative description of the treatment train seems generally appropriate for the stated effluent goals but those goals can be difficult to meet (particularly the 1 mg/L TOC) and we reserve comment of the actual ability for the proposed plant to meet this standard until after we have reviewed formal design plans and narrative. The effluent goals for BOD, total nitrogen, total suspended solids, oil and grease, fecal coliforms, and turbidity should be obtainable based upon the treatment train described in the design narrative.
- We offer the following preliminary technical thoughts for the Applicant's technical team to consider as they move into the WWTF design phase:
 - Since the flow is more than 40,000 gpd, the WWTF need to be designed in two trains per the redundancy requirement from MassDEP's Small WWTF Design Guidelines.
 - Poly aluminum chloride will help to precipitate part of the insoluble TOC. It will also remove some insoluble phosphorus in the waste stream which will be beneficial for the phosphorus reduction goals discussed above. For poly aluminum chloride addition, there should be a rapid mix step to provide for flocculation. The applicant showed that as flash flocculation and the contact time should be short.
 - The sizing of the primary tank is a critical item and should be reviewed further when the design is available.
 - The contact time in the biological carbon filter will be critical for removing the TOC and should be reviewed further when the design is available.

B. SITE GRADING

The potential concern with site grading in general is whether the removal of top soil and vegetation and a portion of the underlying parent material could potentially reduce the quantity or quality of water infiltrated through the ground to recharge the underlying aquifer to any significant degree. During our review, we noted the following:

- The proposed grading plan conforms with the Town's earth removal bylaw which forbids the removal of material within 10 feet of the seasonal high water table, with the exception of the three proposed infiltration basins. Infiltration basins need to be low in order to collect stormwater generated from across the site and the Town appropriately allowed for this exception.

- We did note potential issues with the infiltration basins not originally having adequate separation from seasonal high groundwater. During the peer review process, the Applicant's technical team collected additional groundwater level data and modified the design to appropriately address this issue.
- The actual storage volume of the aquifer will not be impacted by site grading because all of the excavation will be above the water table.
- The proposed project has a stormwater management plan that we understand has been peer-reviewed by other Town consultants and judged to be in compliance with the Massachusetts Stormwater Standards (MASWS) and local regulations. From a regulatory standpoint, compliance with the MSWMS is presumed to be protective of water quality.
- We made recommendations to better stabilize the steep 2:1 slope behind the properties on the northern side of Lawrence Street (street numbers 25, 45, 49, and 51). The Applicant agreed to those recommendations and modified their design plans accordingly. This issue has been appropriately addressed.

C. SUMMARY

The peer review process for the proposed Abbyville development was a lengthy but productive one that resulted in all of the hydrogeologic and site grading issues within the HW review purview being adequately addressed by the Applicant. If the Town decides to approve the proposed development, we recommend that the following conditions be included to address the hydrogeologic issues related to the WWTF and site grading that were discussed during the peer review process:

- The proposed WWTF be designed and constructed to meet all MassDEP standards for WWTFs located inside the two-year TOT for a public drinking water supply. Town peer review of WWTF design plans and narrative be required prior to Applicant's submittal to MassDEP. That review will include both the treatment plant and disposal bed components of the WWTF, as well as the groundwater monitoring plan.
- In anticipation of minimizing the potential phosphorus impacts from the proposed WWTF, use the following design strategies in the WWTF design and allow for Town peer review of these features:
 - Provide for advanced phosphorus treatment within the reasonable limits of the WWTF design necessary to meet the 2-year TOT standards discussed above.
 - Maximize the vertical separation of the disposal beds above the water table.
 - Design and build the WWTF with 64,000 gpd of capacity agreed to by the Applicant and state how much additional capacity is anticipated to be available to allow existing nearby septic systems to be tied into the WWTF at a future time.

August 21, 2018

Page 8 of 8

- Provide curbside public water supply shutoffs to allow for potential future connection of abutters to Town water.
- Conduct pre and post construction monitoring of monitoring wells between the WWTF and both the private wells and Town Test Site, as well as private wells themselves for those abutters who are interested. Allow for Town peer review of the final monitoring plan.

Thank you for the opportunity to assist the Town in reviewing this significant project. Please feel free to contact me at nprice@horsleywitten.com or 508-833-6600 with any questions.

Sincerely,

Horsley Witten Group, Inc.

Neal M. Price
Senior Hydrogeologist

cc: Mr. Daniel Hill, Esq.