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July 22, 2016

Mr. Glenn Garber
Sudbury Interim Planning Services
Town of Sudbury
278 Old Sudbury Road
Sudbury, Massachusetts 01776

Re: Peer Review - Village at Sudbury Station 40B Application, Sudbury, MA

Dear Mr. Garber:

The Horsley Witten Group, Inc. is pleased to provide the Sudbury Zoning Board of Appeals (ZBA) with this letter report summarizing our review of the Comprehensive Permit Application submitted on behalf of the Sudbury Station LLC. The plans were prepared for Christopher Claussen (Applicant) by Sullivan, Connors and Associates. The proposed site consists of approximately 41 acres and the project as designed will disturb approximately 26.4 acres. The majority of the site is currently undeveloped and wooded. The project site is accessed from Concord Road and Hudson Road, including an extension of Peter's Way. The Applicant proposes a 250 unit residential housing development, with access drives, parking, landscaping, utilities, and stormwater management. The stormwater collection system includes swales, catch basins and a closed drainage system. Stormwater will be treated by two Stormceptors, and detained by two separate subsurface detention systems. Drywells will be installed to provide recharge and the detention systems will discharge towards the on-site wetland resource area via a 40 foot long level spreader proposed to control velocities.

The project site includes a large bordering vegetated wetland (BVW) to the north, bordering land subject to flooding (BLSF), and an intermittent stream, known as Mineway Brook. The project as designed appears to be located outside the 100-foot buffer zone to these wetland resource areas.

The HW high level review focused on the stormwater and wastewater aspects of the project. It was not our intent to review the specific details of the stormwater system previously reviewed by Hancock Associates or others.

HW has identified the following primary topic areas for the ZBA's consideration with regards to the Village at Sudbury Station project:

- The precipitation data set used in the stormwater calculations and other aspects of the stormwater management system may not accurately reflect current conditions.

- There are unanswered questions about the extent of wastewater disposal and consequential groundwater mounding that will occur at the site and the impact of this mounding on the design of the leaching facilities and the design of the parking areas proposed to be located on top of the leaching facilities.
- It appears that this project meets the review thresholds that trigger the Massachusetts Environmental Policy Act (MEPA) review process, and it does not appear that this has occurred.

Each of these topics is explained further below. As part of our analysis we conducted a file review of documents available at <https://sudbury.ma.us/pcd/2016/02/09/village-at-sudbury-station-40b-comprehensive-permit-application/> which includes documents, correspondence and plans submitted by Sudbury Station LLC during the Comprehensive Permit process in the Town of Sudbury. The materials HW specifically reviewed included the following:

- Sudbury Station LLC, January 2016. The Village at Sudbury Station, Sudbury, MA, Comprehensive Permit Application.
- Provencher Engineering, LLC, May 18, 2016. Summary of Wastewater Treatment & Effluent Disposal Design, Village at Sudbury Station – Sudbury, Massachusetts, Project No. PE271.01.
- Sudbury Board of Health, May 18, 2016. Board of Health Review of Sudbury Station.
- Sudbury Water District, May 20, 2016. Village at Sudbury Station Water Connection Requirement.
- Sullivan, Connors and Associates, revised July 14, 2016. Preliminary Site Plan for the Village at Sudbury Station, Sudbury, MA (10 Sheets).
- William C. Henchy, P.C., June 13, 2016. Village at Sudbury Station Stormwater Management Plan – Cover Letter.
- Sullivan, Connors and Associates, June 10, 2016, revised July 14, 2016. Hydrologic & Hydraulic Analysis for the Village at Sudbury Station, Hudson Road & Concord Road, Sudbury, MA.
- Hancock Associates, June 29, 2016. Village at Sudbury Station Peer Review – Stormwater Management Plan.
- Soil Test Log conducted by the Sudbury Board of Health on July 13, 2016.
- Sullivan, Connors and Associates, July 14, 2016. Response letter referencing the June 29, 2016 peer review conducted by Hancock Associates.
- Hancock Associates, July 21, 2016. Village at Sudbury Station Peer Review – Stormwater Management Plan.

Stormwater Management

The Applicant has noted that it has a Superseding Negative Determination of Applicability from the Massachusetts Department of Environmental Protection (MassDEP) dated April 16, 2016, proving that the proposed stormwater management system does not need to meet the requirements of the Massachusetts Stormwater Management Standards. However, the Applicant then goes on to claim that the proposed stormwater management system does meet those standards, as well as the standards of Section 8.0 of the Town of Sudbury Stormwater By-law Regulations. The one notable exception to Section 8.0 raised by the Applicant is the precipitation data set used in its stormwater analysis.

1. Precipitation Data: HW believes that the stormwater management plan prepared by Sullivan, Connors and Associates potentially underestimates the amount of stormwater runoff to be generated by the project. Although the Applicant is correct in stating that it may use the precipitation data contained in the U.S. Department of Commerce Technical Paper 40 (TP-40), given the concerns related to stormwater runoff and flooding in the project area (particularly at Ti Sales at 36 Hudson Road and Parkinson Field), it would be sound engineering practice for the Applicant to use the most accurate precipitation data allowed by the MassDEP. In HW's opinion, these would be both the precipitation data contained in the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 and the precipitation data prepared by the Northeast Regional Climate center (NRCC) at Cornell University, whichever is greater. The table below compares the data that HW recommends using for a revised stormwater analysis of the Village at Sudbury Station to the values utilized by the Applicant and those that are required per Section 8.0 of the Sudbury Stormwater Management Bylaw Regulations.

24-hour Rainfall Event Return Period	TP-40* (in)	Atlas 14 (in)	NRCC (in)	Sudbury Regulations (in)
2-year	3.2	3.3**	3.1	3.2
10-year	4.8	5.1**	4.7	4.8
100-year	6.8	8.0	8.3**	8.6

* These data are provided by Applicant and used in the current stormwater management analysis

** Data recommended by HW to be used in a revised stormwater management analysis

As can be seen in the table above, these rainfall data are inconsistent with one another depending on the data source used. However, MassDEP does allow an applicant to use either the Atlas 14 or the NRCC data in their stormwater calculations so long as the values used are higher than those found in TP-40. Given the concerns with flooding in the project area, HW recommends that the Applicant use the recommended data above to design a stormwater management system based on the published precipitation data

allowed by MassDEP. This should allay any concerns related to stormwater runoff and flooding from the proposed project.

2. Environmentally Sensitive Site Design: The Massachusetts Stormwater Handbook states that to meet the Stormwater Management Standards, an applicant must first implement low impact development (LID) techniques at the site. HW recommends that the Applicant incorporate LID techniques, including but not limited to, minimizing impervious cover and managing stormwater to mimic natural hydrology. LID management tends to include dispersed, smaller practices close to the stormwater source and integrating vegetation. By contrast, the proposed stormwater management plan includes conventional “pipe-and-basin” systems that direct stormwater from 28 acres of drainage area through two underground detention systems, two proprietary water quality units, and one underground recharge system before discharging off site. HW recommends that the Applicant consider integrating LID stormwater practices in the open spaces around buildings as a way to reduce total runoff, improve water quality treatment, and reduce the water quality and/or flooding risk if one of the two detention systems or water quality units fails. In addition, HW recommends that the Applicant consider using alternate, porous surfaces for the proposed sidewalks and parking spaces. By designing the site to mimic natural hydrology and reducing total runoff, the Applicant would also be able to reduce the size and cost of the proposed detention system.
3. Stormwater Detention System - A: Stormwater Detention System A is comprised of over 2,000 linear feet of 12-foot diameter corrugated metal pipe set in a bed of crushed stone. A “drainage blanket” of stone and perforated underdrain pipe is proposed to “mitigate against any potential impacts to the detention system from groundwater.” It appears that the eastern portion of the detention system will be located in groundwater. The Applicant should provide buoyancy calculations to prove that the detention system will not “float” due to groundwater, as well as a detailed analysis that the proposed drainage blanket will be sufficient to safely convey displaced groundwater. A consequence of the drainage blanket will be the dewatering of groundwater across a substantial area and the potential continual or frequent discharge to the surface in another location. This is contrary to the principle of maintaining groundwater recharge and has the potential to adversely impact adjacent water resources.

Wastewater Design Flow

4. Calculations: The Applicant claims that wastewater flow from the project will be “approximately 48,000 gpd.” However, there does not appear to be any detailed calculation showing how this estimate was derived. Assuming that the details contained in the Applicant’s January 2016 Comprehensive Permit application are still current, it appears that there will be 409 bedrooms included with the project, resulting in a design

flow of 44,990 gpd. Presumably the remaining ~3,000 gpd of design flow will be claimed by facilities such as the clubhouse, but this is only an assumption. As the Board of Health notes, the Applicant needs to provide a complete accounting for the wastewater design flow.

If the design flow tips over the 50,000 gpd point, the Applicant will have to file for an individual groundwater discharge permit, which carries more requirements than the general programmatic permit they are currently planning to apply for. These requirements include:

- A complete engineering report stamped and signed by a Massachusetts Registered Professional Engineer.
- Certification Statement for the engineering report, plans and specifications, and the hydrogeologic report.
- A Groundwater Monitoring Well Plan.
- Documents clearly identifying the legal entity responsible for the ownership, proper operation, and maintenance of the proposed facility.

Wastewater Treatment Plant

5. Underground Tanks: The Applicant is proposing to use subsurface tanks, including an equalization basin, sludge storage, trash trap, and bioreactors installed around the membrane bioreactor (MBR) container. It appears that there are no test pits in the area of the MBR to establish the depth to groundwater in this area. Depth to groundwater in this area should be established early in the design process, since if subsurface tanks are to be installed in groundwater, buoyancy calculations will need to be performed by the Applicant to show that the tanks will not "float" above the groundwater elevation. If tanks shift or partially rise out of the ground, pipes connecting the components will break or separate from tanks. The ability of the plant to treat wastewater will be disrupted, leaving the residents of the development without a source of wastewater disposal. More relevant are the public health issues raised by any discharge of untreated effluent to groundwater or to the ground surface.

Wastewater Disposal Groundwater Mounding

6. Separation from Groundwater: The Applicant must maintain a four-foot separation distance between the estimated high groundwater table and the bottom of the proposed soil absorption systems (SASs) for both the primary and the reserve areas. However, the Applicant has not completed a mounding analysis, so the height of the wastewater disposal mound is unknown. This mounding height needs to be added to the estimated high groundwater table plus the four-foot separation distance. Depths to groundwater in the area of the SASs appear to be shallow, averaging around 44 inches

below ground surface according to witnessed test pit data (Test Pits 18, 21 and 23). At this stage it is not known if the SASs will need to be constructed within fill and mounded significantly to meet the four-foot separation requirement. Additionally, based on the preliminary site plans Sheet 7 (July 14, 2016) it appears that not all testing has been completed to fully prove both the primary and reserve proposed leaching areas. DEP requires at least two test pits at each proposed primary and reserve disposal area, and Sheet 7 indicates that this has not been yet been done.

If the SASs must be mounded and built in fill, it is not clear that parking can still occur on top of the SASs as currently planned. On constrained sites such as this, many times retaining walls must be used to enable a mounded SAS to meet setback requirements.

7. Mounding Analysis: The Applicant states that a mounding analysis will be performed. Based on the constraints of the proposed SAS site, and the Town's concerns regarding flooding, HW recommends that the Applicant construct a three-dimensional hydrologic model of the site using an accepted modeling code such as the U.S. Geologic Survey's MODFLOW. The Applicant will be installing monitoring wells and conducting hydraulic conductivity testing, so it should be fairly straightforward to gather the data needed for the modeling effort. When the Applicant constructs the MODFLOW model, it should not claim any more aquifer thickness than that proven by its drilling program. For example, if the monitoring wells are drilled to 20 feet in depth and encounter no bedrock, the Applicant should only use a saturated thickness in their model that does not extend below 20 feet deep. This is because saturated thickness greatly affects aquifer transmissivity. If transmissivity is low, the wastewater disposal mound will be higher.

Additionally, HW recommends that the Applicant perform a field loading test in both the area of the prime and reserve disposal facilities. This will help to verify that the mounding analysis performed by the Applicant is a reliable indicator of the groundwater mound that will form beneath the leaching facilities.

8. Inclusion of the Proposed Reserve Area in the Mounding Analysis: The reserve area is provided to replace the primary disposal area when it fails. The hydrogeologic report submitted by the Applicant should contain an analysis of the groundwater mounding effects from the use of the reserve area. MassDEP's *Guidelines for the Design Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal* (May 2013) states that "a reserve area tested and shown to be sufficient to replace the capacity of the original leaching area shall be provided." The reserve area is identified on a site plan, but no testing or analysis has been provided yet to prove that it can be constructed to MassDEP's requirements.

Massachusetts Environmental Policy Act

9. MEPA Review: The project appears to be subject to the Massachusetts Environmental Policy Act (MEPA) review process. The potential threshold triggers include, but are not limited to:
- If the project receives financial assistance from a state agency (such as the Massachusetts Housing Finance Agency)
 - Or the project will require a state permit (such as a groundwater discharge permit)
 - And the project will create five or more acres of impervious area.

At the very least the Applicant must submit an Environmental Notification Form to MEPA. Depending on final design, the Applicant may also be required to file an Environmental Impact Report. It appears that no MEPA filings for the project have yet occurred. The MEPA filing should occur at the earlier stages of the project planning and design project as the review often triggers comments that can dramatically affect the project design. As noted at <http://www.mass.gov/eea/agencies/mepa/about-mepa/>:

“MEPA review is not a permitting process. MEPA requires public study, disclosure, and development of feasible mitigation for a proposed project. It does not pass judgment on whether a project is environmentally beneficial, or whether a project can or should receive a particular permit. Those decisions are left to the permitting agencies. MEPA review occurs before permitting agencies act, to ensure that they are fully cognizant of environmental consequences of their actions.”

HW recommends that the Applicant file with MEPA Office and receive comments so that the ZBA has sufficient information to render a decision on this application.

In general, steep slopes and high groundwater levels on portions of this site create significant challenges to development. The Applicant needs to be able to prove to the Town of Sudbury that it can develop the project at the density proposed within all applicable laws and regulations, or, reduce aspects of the project to better fit the environmental conditions present at the site.

Sincerely,

HORSLEY WITTEN GROUP, INC.



Tom Noble
Principal



Janet Carter Bernardo, P.E.
Senior Project Manager