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April 6, 2021

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**Subject: Village at Grafton Woods
8 Pine Street, Grafton, Massachusetts
Site Plan and Special Permit Review**

Dear Chris:

We received the following documents on March 1, 2021:

- Plans entitled Village at Grafton Woods, Town of Grafton, Massachusetts dated February 26, 2021, prepared by Tighe & Bond for GSX-ODG, LLC. (23 sheets)
- Bound document entitled Village at Grafton Woods, 8 Pine Street, Grafton, Massachusetts Plan Approval Application dated February, 2021.
- Bound document entitled Village at Grafton Woods, Grafton, MA, Stormwater Management Report dated February 2021, prepared by Tighe & Bond.
- Architectural plans entitled Village At Grafton Wood, Grafton, Massachusetts dated February 26, 2021, prepared by Humphry & Partners Architects/Florida LLC. (15 sheets)

Graves Engineering, Inc. (GEI) has been requested to review and comment on the plans' and supporting documents' conformance with applicable "Grafton Zoning By-Law" amended through October 21, 2019; Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook and standard engineering practices. As part of our review GEI visited the site on March 10, 2021.

Our comments follow:

Zoning By-Law

1. GEI has no issues with compliance with the Grafton Zoning By-Law except as noted in the following six comments.
2. The approximate locations of driveways, buildings and parking areas within two hundred feet of the property lines need to be shown on the plans. More specifically, the Idexx Laboratories building needs to be shown as does the entire intersection of the MBTA Commuter Rail driveway at Pine Street. (§1.3.3.3.d.11)
3. The lot coverage calculations need to show the percentage of pavement. (§1.3.3.3.d.15)

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4. Once the design of the parking garage is advanced to the point that the number of parking spaces is determined, the Parking Calculation Table on Sheet G-003 needs to be updated to demonstrate compliance with the parking space requirements. By way of Note 1 in the Parking Calculation Table, GEI recognizes that the design engineer's intent is to provide the required number of parking spaces. (§1.3.3.3.d.16 & §1.3.3.3.d.19)
5. Calculations need to be provided to show the volume of earth material to be removed or filled on the property. (§1.3.3.3.d.17)
6. The plans need to address how dust will be controlled during construction. (§1.3.3.3.d.29)
7. The plans should include a sheet with a vehicle turning template for the Grafton Fire Department's largest vehicle (Tower 1) superimposed to demonstrate vehicle maneuverability around the buildings. Of particular concern is maneuverability around the eastern-most building corner; the inside curb radius is 20 feet, the outside curb radius is 40.5 feet, and the building corner and guard rail will be impediments to maneuverability. (§13.7.C.4.z.v)

Hydrology & MassDEP Stormwater Management

8. Due to the hydrology comments contained herein, revisions will be necessary. Please consider this as a preliminary review of the hydrology computations.
9. In the post-development hydrology during the 100-year storm event, Pond 3P, 5P, 6P and 14P (subsurface infiltration systems) exceed the storage range from fourteen to eighty feet.
10. In the post-development hydrology during the 100-year storm event, Pond CB4 has a peak elevation that is roughly two-and-a-half feet above the grate/rim elevation. On Sheet C-106, if this catch basin is designed to surcharge, then the surcharged water needs to be contained around the catch basin.
11. In the post-development hydrology modelling, Pond 6P (Subsurface Infiltration System 4) should be routed through Pond DMH-6, as shown on the site plans. The plans and the hydrology modelling need to coordinate with each other.
12. In the post-development hydrology for Pond 3P: Subsurface Infiltration System 2, the primary outlet is shown to be a twelve-inch culvert with an invert elevation of 431.00 feet whereas on Sheet C-506 the construction detail shows a fifteen-inch culvert with an invert elevation of 429.7 feet. The plans and the modelling need to coordinate with each other.
13. In the post-development hydrology Pond 5P: Subsurface Infiltration System 3, the primary outlet is shown to be a twelve-inch round culvert whereas on Sheet C-507 the construction detail shows a fifteen-inch round culvert. The plans and the modelling need to coordinate with each other.
14. In the post-development hydrology Pond 6P: Subsurface Infiltration System 4, the primary outlet is shown to be a twelve-inch round culvert whereas on Sheet C-106 the outlet manhole (DMH-17) shows an outlet as a fifteen-inch round culvert. The plans and the modelling need to coordinate with each other.
15. In the post-development hydrology Pond 12P: Infiltration/Detention Basin, the emergency spillway was modeled as a ten foot long by six-foot breadth broad-crested weir whereas on

Sheet C-106, the spillway scales to be fifteen feet long by eight feet in breadth. The plans and the modelling need to coordinate with each other.

16. In the post-development hydrology Pond 12P: Infiltration/Detention Basin, the emergency spillway was modeled as elevation 410.75 feet whereas on Sheet C-106 the emergency spillway is shown to be as elevation 410.50 feet. Furthermore, there needs to be one foot of freeboard between spillway elevation and the top of the berm elevation.
17. For Ponds 3P, 5P, 6P and 14P (subsurface infiltration systems) there are sharp-crested rectangular weirs modelled with a length of 0.5 feet whereas on Sheet C-506 the construction detail for the infiltration system outlet structure has the effective length of the weir across the entire diameter of the manhole structure. The plans and the modelling need to coordinate with each other.
18. For ponds 3P, 5P, 6P and 14P (subsurface infiltration systems) the size of the systems are shown incorrectly on the plans. For example, on Sheet C-105 Infiltration System 1 is scaled to be twenty-four feet wide by one hundred twenty-six feet long (24'x126') whereas in the hydrology calculations the proper sizing for the MC-4500 system is thirty-seven and fifty-eight feet wide and forty-three and thirty-four feet long (37.58'x43.34'). The plans and the modelling need to coordinate with each other.
19. Compliance with MassDEP Stormwater Handbook appears to be reasonable except as noted in the following five comments.
20. Soil testing needs to be performed at the proposed locations of the stormwater infiltration facilities to demonstrate that the required groundwater offset will be achieved and that the subsurface conditions are suitable for infiltration.
21. The Stormceptor sizing report for the water quality units shows sizing calculations for three water quality units but four units are shown on the plans. The water quality units need to be labeled to coordinate with the sizing report (e.g. WQU 1, WQU 2, etc.) and a sizing calculation for the fourth water quality unit needs to be provided.
22. In the total suspended solids (TSS) removal calculation worksheet, the pre-treatment shows a proprietary treatment device that has a remove rate of 52%. It appears that this proprietary treatment device is intended to be the oil/grit separator. According to the MassDEP Stormwater Handbook a removal rate of 25% is more appropriate.
23. In the TSS removal calculations worksheets, Treatment Train 1 and Treatment Train 2 both credit 10% TSS removal for monthly street sweeping, however the operation and maintenance plan does not support the 10% removal credit (only quarterly street sweeping).
24. In the TSS removal calculations worksheet for Treatment Train 2, it appears that this worksheet refers to the southern parking area to wetland. There needs to be a minimum of 80% TSS removed prior to discharging towards the wetland.

General Engineering Comments

25. There needs to be additional spot elevations at the handicap accessible parking spaces to demonstrate compliance with the Massachusetts Architectural Access Board (MAAB) requirements.

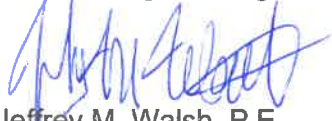
26. On Sheet C-107, the sewer pipe has no slope between the building face and sewer manhole (SMH) 1.
27. On Sheet C-107, the label for SMH 2 shows one of the inlet inverts to be lower than the outlet invert. The outlet needs to be the lowest invert.
28. On Sheet C-108, the reconfigured sewer system layout originating in Pine Street shows a change in flow direction of greater than ninety degrees. This is a problematic configuration that can result in excessive clogging. The change in direction needs to be limited to ninety degrees.
29. On Sheet C-108, the elevations of the reconfigured sewer layout between Pine Street and SMH 9 need to be revised. The proposed invert elevations of SMH 6 are too low.
30. Sheet C-106 has erosion control barriers only proximate to the wetlands. Erosion control barriers need to be provided at all down-gradient sides of the work on Sheet C-105 and C-106.
31. On Sheet C-106, DMH-14 needs to include the rim elevation for the structure.
32. On Sheet C-504, there is a construction detail for "typical drain line and sewer trench section" that show the pipes to be bedded on sand or gravel borrow. The construction detail should specify that the storm drain line is to be bedded in gravel or stone. GEI understands that the sewer pipe should be bedded in stone, but defers to the Grafton Sewer Department.
33. On Sheet C-507, the construction detail for Stormwater Infiltration System 4 needs to include information (e.g. elevations) associated with the outlet manhole (DMH-17).

General Comments

34. The plans need to address how snow storage associated with the upper decks of the parking garages will be addressed.
35. GEI did not review for compliance with Grafton Stormwater Regulations or Wetland Regulations. Per my discussion with the Grafton Conservation Agent, GEI will proceed with such a review once we received revised plans and a revised stormwater management report.
36. GEI understands that the Grafton Sewer Department and the Grafton Water District will review the plans relative to their respective utilities.
37. GEI did not review the architectural plans.

We trust this letter addresses your review requirements. Feel free to contact this office if you have any questions or comments.

Very truly yours,
Graves Engineering, Inc.



Jeffrey M. Walsh, P.E.
Principal

cc: Grafton Conservation Commission
Jean E. Christy, P.E.; Tighe & Bond