

March 20, 2014

Groton Planning Board and  
Earth Removal Stormwater Advisory Committee  
c/o Michelle Collete, AICP  
Town Planner  
173 Main Street  
Groton, MA 01450

RE: Nitsch Project #10178  
New England Shirdi Sai  
Parivaar Temple  
Stormwater Site Plan Review  
Groton, MA

Dear Planning Board Members:

Nitsch Engineering received and reviewed the Site Plan (the Plan) entitled, "Site Plan Review, New England Shirdi Sai Parivaar Temple", dated February 21, 2014, Sheets 1-17 of 17 prepared by Markey & Rubin, Inc.

Nitsch Engineering understands this is a Level I Site Plan Review pursuant to Chapter 218 of the Code of the The Town of Groton. The Plan has been reviewed to determine compliance with the following sections of the Code of the Town of Groton:

1. "Stormwater Design Criteria, Article II of Chapter 352, from the Code of the Town of Groton".

In addition to the above sections of the Code of the Town of Groton, the Plan and additional documents were reviewed to determine compliance with the Massachusetts Stormwater Standards.

As part of our review, Nitsch Engineering has also received and reviewed the following documents in addition to the Plan:

1. Drainage Report for Shirdi Sai Parivaar Temple, dated February 19, 2014, prepared by Markey & Rubin, Inc.; and
2. Project Report for Shirdi Sai Parivaar Temple, dated February 21, 2014, prepared by Markey & Rubin, Inc.

### **Stormwater Design Criteria**

1. Section 352-8.B.(3) states that the site planning process shall include creating a decentralized stormwater system: manage runoff at the source to the extent practical through the use of small decentralized structures such as swales, bioretention areas, infiltration structures, filter strips, rain barrels, cisterns, dry wells, and vegetated areas. Increase the time of concentration (average time for rainfall to reach a point) by using open, vegetated drainage systems and maximizing overland or sheet flow.

The Plan indicates multiple, decentralized infiltration structures; however, the loop road uses conventional structures such as catch basins, water quality structures, and retention ponds for stormwater management. The Applicant should consider using swales and bioretention areas to provide water quality treatment for the loop roadway runoff.

2. Section 352-10.C.(3) states that compaction of soils in designated recharge areas must be minimized during and after construction.

The Plan does not indicate that these areas must be protected from compaction during construction. The Plan should be revised to indicate that these areas will be protected from compaction during construction.

3. Section 352-10.C.(5) states that to qualify as a treatment Best Management Practice (BMP), a recharge system must discharge to soils with infiltration rates less than or equal to 2.4 inches per hour when used as a treatment BMP.

The Drainage Report indicates that Retention Pond #2 is used as a treatment BMP. The Drainage Report also indicates that the infiltration rate of the underlying soil is 8.27 inches per hour. The Drainage Report should be revised to exclude Retention Pond 2 from the water quality calculations, or the underlying soil should be amended to reduce the infiltration to less than or equal to 2.4 inches per hour.

4. Section 352-10.C.(6)(a) states at least 44% of the total suspended solids (TSS) must be removed prior to discharge to an infiltration structure used for treatment if the discharge is within a Zone II or Interim Wellhead Protection Area.

The Plan indicates a potable water supply well. This well appears to be a public water supply because it will serve more than 25 people. The Applicant should confirm the limits of the wellhead protection area (also called the Zone II) and indicate the Zone II limits on the Plan. Stormwater discharge to infiltration structures located in this Zone II should have at least 44% TSS removal prior to discharge to the structure.

The Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook indicates that porous pavement is not suitable within Zone II of public water supplies. Oil and other potential contaminants have a greater risk of entering the public water supply if the porous pavement is located within a Zone II. The Applicant should reevaluate the use of porous asphalt on the project site once the limit of the Zone II is established.

5. Section 352-10.C.(7) states that at least 80% of the TSS must be removed prior to discharge to an infiltration structure used for recharge if the discharge is within an area with a rapid infiltration rate greater than 2.4 inches per hour.

The Drainage Report indicates that 66% of TSS is removed prior to discharge to Retention Pond 2 which has an infiltration rate of 8.27 inches per hour. The Plan and calculations should be revised to include 80% of TSS removal prior to discharge to Retention Pond 2, or the Applicant should ask the Planning Board and Earth Removal Stormwater Advisory Committee for a waiver.

6. Section 352-11.B.(2) states that pretreatment devices shall be designed to accommodate a minimum of one (1) year's worth of sediment.

The Drainage Report does not include calculations to demonstrate that the pretreatment devices are designed to accommodate a minimum of one (1) year's worth of sediment. The Applicant should demonstrate that the pretreatment devices, including the Stormceptor units, and sediment forebay, are sized to accommodate one (1) year's worth of sediment as determined pursuant to Section 352-11.B.(6).

7. Section 352-11.B.(5) states that the Revised Universal Soil Loss equation (RULSE) shall be used to calculate sediment deposits that would occur from pervious areas adjacent to the BMP.

The Drainage Report did not include RULSE calculations. The Drainage Report should be revised to include RULSE calculations or the Applicant should ask the Planning Board and Earth Removal Stormwater Advisory Committee for a waiver.

8. Section 352-11.B.(6) states that pretreatment structures shall be sized to hold an annual sediment loading. An annual sediment load shall be calculated using a sand application rate of 500 pounds per acre for sanding of roadways, parking areas, and access drives within the subcatchment area, a sand density of 90 pounds per cubic foot and assuming a minimum frequency of 10 sandings per year. To obtain an annual sediment volume, perform the following calculation: [see Section 352-11.B.(6) for equation].

The Drainage Report does not include sizing calculations for the pretreatment structures pursuant to Section 352-11.B.(6). The Drainage Report should be revised to include sizing calculations for the pretreatment structures pursuant to Section 352-11.B.(6).

9. Section 352-12.E. states that emergency spillways shall be designed for the full range of design storms assuming the primary outlet structure is not functioning.

The Drainage Report does not include sizing calculations for the spillways associated with the three (3) retention ponds. The Drainage Report should be revised to include sizing calculations for the spillways associated with the three (3) retention ponds. The spillways should be sized to pass a 100-year storm assuming the outlet control device does not function. The spillways should have at least 12 inches of freeboard.

10. Section 352-12.G states that the Applicant should use Curve Number values as provided in Table 2 to calculate stormwater runoff rates for pre-/post-construction ground surface conditions. [See Section 352-12.G for Table 2.]

The Drainage Report indicates that a Curve Number of 39 is used for grass over a hydrologic soil group (HSG) A soil. The Drainage Report should be revised using 68 for grass over a HSG A soil

11. Section 352-18.A through BB lists requirements for Erosion Control.

The Plan includes an Erosion Control detail sheet; however, it does not include an Erosion Control Plan. The Plan should be revised to include an Erosion Control Plan pursuant to Section 352-18.A through BB. The Plan should include at a minimum: the limit of work, appropriate erosion and sediment control measures, inlet protection, locations of sediment basins, a Construction Phasing Plan, stock pile locations, tracking pad locations, and areas of steep slope protection. The Applicant should also submit an Operation and Maintenance Plan (O&M Plan) for the temporary erosion control measures.

12. Section 352-19 states that prior to the start of construction, the Applicant must submit a Narrative addressing pollution prevention measures to be taken at the site during the construction period. If the proponent is required to have a National Pollutant Discharge Elimination System (NPDES) permit, a copy of the Stormwater Pollution Prevention Plan (SWPPP) can be filed in lieu of the Narrative. The Narrative must include emergency contact information during construction activities.

Nitsch Engineering did not receive a SWPPP. The Applicant should submit a SWPPP to Nitsch Engineering, the Planning Board and Earth Removal Stormwater Advisory Committee for review.

13. Section 352-21.A.(4) states that the O&M Plan should include provisions to notify the appropriate reviewing entity of a change in responsible party.

The Project Report includes an O&M Plan; however, provisions to notify the appropriate reviewing entity of a change in responsible party is not included. The O&M Plan should be revised to include this information.

14. Section 352-21.A.(10) states that the O&M Plan should include a plan that is drawn to scale and shows the location of all stormwater BMP's in each treatment train along with the discharge point.

The O&M Plan does not include a stormwater BMP location sketch pursuant to Section 352-21.A.(10). The O&M Plan should be revised to include this sketch.

15. Section 352-21.A.(13) states that the O&M Plan should include the signature of the Owner(s).

The O&M Plan does not include the signature of the Owner(s). The O&M Plan should be signed by the Owner and submitted to the Planning Board and Earth Removal Stormwater Advisory Committee.

### **Massachusetts Stormwater Management Standards**

16. The Stormwater Checklist provided in the Drainage Report indicates that the proposed project is not within a Critical Area (Standard 6). However, due to the proposed stormwater discharge to the vernal pool (an Outstanding Resource Water) and the proposed potable water well, the project is subject to the requirements of Standard 6. The Drainage Report should be revised to document compliance with Standard 6.
17. The HydroCAD calculations in the Drainage Report indicate that the volume of runoff discharged at Design Point #1 is reduced in the proposed condition. This discharge point is the wetland that contains a Certified Vernal Pool. Vernal pools are sensitive habitats that may be adversely affected from changes in the surrounding hydrology. The Planning Board and Earth Removal Stormwater Advisory Committee should determine if additional information is required to adequately protect the vernal pool.
18. The Drainage Maps should be provided at full-scale for clarity. Additionally, the proposed subcatchment boundary linetype should be indicated on the legend. Nitsch Engineering recommends a heavier or dashed linetype so that it is easier to distinguish between other features shown on the plan.
19. The subsurface soils testing indicates that the on-site soils are consistently either a sandy loam or loamy sand at the soil surface (typically HSG B), rather than the more restrictive soils indicated on the Natural Resources Conservation Service (NRCS) soil map (HSG D). The Applicant should revise the HydroCAD calculations to reflect the observed soil conditions onsite.
20. The time of concentration (T<sub>c</sub>) path for Existing Subcatchment Area 1 and Proposed Subcatchment Area 15 extends past the property boundary. The Applicant should revise the Drainage Maps and calculations to terminate the T<sub>c</sub> path at the property boundary, or include the additional subcatchment area outside the property boundary.
21. The Drainage Maps indicate two (2) proposed subcatchment areas that discharge to Design Point 2, Subcatchments 1 and 15. The HydroCAD calculations model this as one (1) subcatchment. The HydroCAD calculations should be revised to model the subcatchments separately to reflect their unique curve numbers and time of concentration paths. These two (2) areas do not share a boundary, and therefore should not be considered as one (1) drainage area, although they will both continue to discharge to Design Point 2.
22. The Plan indicates five (5) porous pavement parking lots, including the two (2) large parking lots along the north and south sides of the looped driveway. Nitsch Engineering agrees that the intended use of the parking lots and apparent subsurface conditions make this a favorable application for porous asphalt. To ensure that the subsurface reservoir of the porous asphalt parking lots are adequately sized, the HydroCAD calculations should be revised to include the subsurface layers as a pond and demonstrate the ponding depth for all storm events. Nitsch Engineering recommends using the HydroCAD Porous Pavement Help Section and the referenced University of New Hampshire Stormwater Center research for more information on modelling porous asphalt.
23. The proposed HydroCAD model indicates that Subcatchments 5 and 6 (Porous Asphalt Areas) includes woods. Based on the adjacent grading and Drainage Area Map, it is unclear why wooded area would

be included. The Applicant should revise the HydroCAD calculations to eliminate woods in these Subcatchments, or provide an explanation as to why these Subcatchments include woods.

24. The Porous Pavement Section detail provided on Sheet D1 of the Plan indicates an underdrain in the reservoir course. The Plan should be revised to indicate the underdrains on the Utility Plan.
25. Sizing calculations for the proposed Stormceptor units are not included in the Drainage Report. The Drainage Report should be revised to include sizing calculations for the Stormceptor units based on the current MassDEP methodology using water quality flow rate. The sizing calculations should also demonstrate compliance with Chapter 352 of the Code of the Town of Groton.
26. The HydroCAD calculations in the Drainage Report indicate that there is less than 1 foot of freeboard provided in the 100-year storm event for Retention Pond 2. The MassDEP Stormwater Handbook requires 1 foot of freeboard for infiltration basins in the 100-year storm. The Plan and Drainage Report should be revised to include at least 1 foot of freeboard in the 100-year storm.
27. The Plan indicates that the overflow weir for Retention Pond 1 is at elevation 238.5, but the HydroCAD calculations indicate that this elevation is 238.0. The Plan should be revised to indicate the top of berm for Retention Pond 1 consistent with the HydroCAD calculations.
28. The Plan does not indicate the top of berm elevation for Retention Pond 3. The Plan should be revised to indicate the top of berm elevation for Retention Pond 3.
29. The O&M Plan does not include snow management for the porous asphalt areas. The O&M Plan should be revised to include snow management for the porous asphalt areas. Nitsch Engineering recommends using the Winter Maintenance Guidelines, prepared by the University of New Hampshire Stormwater Center.
30. The O&M Plan does not include specific measures for inspecting and maintaining the infiltrative capacity of the proposed retention ponds and subsurface infiltration system. The O&M Plan should be revised to include specific measures for inspecting and maintaining the infiltrative capacity of the proposed retention ponds and subsurface infiltration system. These measures are outlined in Volume 2, Chapter 2 of the MassDEP Stormwater Handbook.

### **General Comments**

31. The site is located in a Priority and Estimated Habitat according to the Natural Heritage and Endangered Species Program (NHESP). The Plan should be reviewed by the NHESP to determine if state-listed species or their habitats will be impacted by the project.
32. The direction of flow after the discharge from Retention Pond #1 is unclear. The plan indicates a contour around the Tierney property dwelling; however, it is not labeled. The Applicant should confirm that the direction of flow will be towards the wetlands and revise the plan to indicate the elevation of the unlabeled contour.

### **RECOMMENDATIONS**

The Plan appears to conform to the Town of Groton's Stormwater Design Criteria, and the Massachusetts Stormwater Standards, except as noted. The Applicant should revise and resubmit the documents.

Groton Planning Board and Earth Removal Stormwater Advisory Committee: Nitsch Project #10178  
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Page 6 of 6

If the Planning Board has any questions, please call.

Very truly yours,

**Nitsch Engineering, Inc.**



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TJM/jms/fmk

Approved By:



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