DuBois & King inc.

322211P
August 28, 2013

Ms. Marcia Gasses
Town Planner and Land Use Administrator
Town of Barrington, Land Use Department
PO Box 660
Barrington, NH 03825

SUBJECT: Homestead Subdivision
Engineering Review

Dear Ms. Gasses:

As requested, we have completed our review of materials submitted by MJS Engineering, PC for the above referenced project with respect to drainage and roadway design. The following materials were provided for our review:

- 11"x17" and full size plan sets consisting of 23 sheets entitled "The Homestead Subdivision – Phase II, for Gerrior Lane Trust, 1550 Falmouth Road, Suite 15, Centerville, MA 02632," dated May 15, 2013 and last revised July 1, 2013.
- Project application package received May 15, 2013 by your office.
- Section 9.6 Application for Special Permit for Construction in Wetland Buffer received May 15, 2013 by your office.
- Stormwater Systems Inspection and Maintenance Manual, dated June 26, 2013.
- Drainage Analysis, dated May 15, 2013.

The following were noted during our review:

DRAINAGE COMMENTS

1. Discrepancies were noted in the HydroCAD soil listings between pre- and post-development. We recommend that the soil area calculations be reviewed and adjusted as necessary, or that an explanation be provided to justify why the soil areas are different between pre- and post-development conditions.

2. The watershed maps indicate that Pond 1 corresponds to the drainage pond at the corner of Gerrior Drive & St. Matthews Drive, however the HydroCAD input does not match the conditions depicted on Sheet 5 of 6 prepared by Doucet Survey. We recommend that the discrepancies between the survey and engineering work be resolved.

3. Several reaches that represent open channel flow in both the pre- and post-development drainage models do not include the upstream land areas that contribute flow. We recommend that these upstream areas be modeled as subcatchments, and routed to the appropriate nodes.

4. The Post Watershed Map appears to contain a typographical error, with Subcatchment 1C labeled as 1D.

5. The existing index contours appear to be frozen on plan sheets C1-C5. We recommend that these be restored to the appropriate viewports. We further recommend that the text size of the contour labels on the 100-scale sheets be enlarged to improve legibility.

6. We recommend that the engineer review the design of the 48" culvert (Reach 7) and the associated plunge pool, based on the following:
    a. Since the culvert is modeled as a reach, the engineer should verify that normal open-channel flow will exist under the proposed design. If a headwater or tailwater condition is determined to exist, the culvert should instead be modeled as a pond with a 48" culvert outlet.
    b. The riprap sizing calculations indicate a downstream channel bottom width of 25', 10:1 sideslopes, a 48' long apron, and a top width of 59.80'. Though shown accurately in the detail, this geometry is not reflected by the contours shown on the plan and should be added to facilitate proper construction.
    c. To assure adequate detail is provided to the contractor, we recommend that design elevations be added to the downstream end of the plunge pool. If the engineer intends to maintain normal open-channel flow in the culvert, the elevations will need to be set accordingly.

7. A number of proposed pipes are shown on the plans that are not included in the HydroCAD analysis. We recommend that these be added to the model with appropriate subcatchment areas to verify that grates and culverts are sized to accommodate the 50-year storm. Note also that the minimum diameter and length for driveway culverts required by the Town are 15" and 30', respectively.

8. We recommend that the engineer review the Standard Drainage Pipe Trench detail, as it appears that some drafting errors may have occurred.

9. It is noted that the 12" pipe leaving drop inlet #1 is designed with less than 2' of cover. Where the NHDOT standard drop inlet requires a minimum of 26" cover (assuming a 4" frame mounted directly to the structure), we recommend that the engineer provide the

appropriate detail to facilitate proper construction. Likewise, at catch basin #1, only about a foot of cover is provided, where a minimum of 19" is needed according to the NHDOT standard slab top catch basin detail (assuming a 4" frame mounted directly to the structure).

10. A typo of the word "spillway" was found in the note under the Rip Rap Spillway Typical Cross Section Detail.

11. Pursuant to the Stone Check Dam detail, we recommend that the locations and dimensions of stone check dams be added to the plan sheets. We further recommend that stone check dams be employed in the swales proposed along St. Matthews Drive in addition to the swales already called out on the plans.

12. Less than 12" of cover was noted at some of the HDPE driveway culverts – we recommend that the engineer check the culvert designs and make the appropriate revisions to ensure the integrity of both the pipe and pavement.

13. Reach #8 is modeled as a 0.4' deep channel, however the 0.87' average depth of flow exceeds the specified storage range in the 50-year storm. We recommend that the engineer modify the input of the reach to accurately represent the flow characteristics during the 50-year storm.

14. We recommend that the Stabilized Construction Entrance Detail be expanded to specify the Mirafi filter fabric product selected by the engineer for this application. This will help to assure that the contractor provides the appropriate product for the intended use.

15. Discrepancies were noted when comparing the gravel wetland outlet shown in the plan set to the HydroCAD input. We recommend that the engineer review the design and make the appropriate revisions.

16. The gravel wetland outlet control structure calls for a 36" dia. Nyoplast body, with a 24" grate assembly. The engineer should clarify how the grate assembly is to be mounted to the larger-diameter drain basin body. Simply upsizing the grate to 30" does not appear to address the matter, as the outside diameter of the assembly is 36" and the inside diameter of the drain basin body is 36".

17. The engineer should clarify the rim elevation of the gravel wetland outlet structure by adjusting the leader to point to the top of grate.

18. We recommend that the location of Section B-B' Gravel Wetland Pipe Outlet Detail be clarified on the plans. It appears that Section B-B' is labeled as A-A'.

19. We recommend that the drainage easement be expanded to include the existing drainage system on the southerly quadrant of the Gerrior Drive/Heritage Lane intersection, on proposed lot #1.

20. We recommend that test pit logs and soil data be provided for review of the gravel wetland design and to justify the omission of underdrain along the roadway cut sections.

ROADWAY COMMENTS

1. Sheet C2 shows a proposed well within the Heritage Lane R.O.W. (near the end of the cul-de-sac). We recommend that the well location be shifted such that the well radius is on the lot that the well serves.

2. We recommend that grading information be added to the northeast end of Wallner Lane (between Sta. 4+50 and the end of the proposed shared driveway).

3. We recommend that tack coat be applied to the binder course prior to placing the bituminous curb.

4. We recommend that the curb conform to NHDOT standards for ease of construction.

5. It was noted that there is a drafting error on the sign detail – the sign post appears to have been deleted.

6. The sign detail calls for a MUTCD R7-6 "NO PARKING LOADING ZONE", whereas the plans call for STOP signs. We recommend that the engineer make the appropriate revisions to clarify this discrepancy.

7. The road design calls for a 3' shoulder width in cut sections, where a 6' shoulder width is required. Further, the Subdivision Regulations require NHDOT Item 304.33 – Modified Crushed Gravel for shoulder construction. We recommend that the drawings be revised accordingly.

8. In accordance with the Town's intersection design standards we recommend that the curb radius at the easterly quadrant of the Gerrior Drive/Heritage Lane be revised to comply with the requirements of Article 15.7 of the Subdivision Regulations. We further recommend that all driveway flares and intersection radii be labeled to facilitate proper construction.

9. The plans call for the center of the cul-de-sac to be graded at 1% from the center toward the proposed street pavement, which is inconsistent with the profile which calls for the center of the cul-de-sac to be graded at 1% from Sta. 9+75 toward the southwest, and the cross-sections which call for the center of the cul-de-sac to be left undisturbed. We recommend that the engineer clarify the proposed grading of the center of the cul-de-sac for review and for proper construction. Furthermore, we recommend that the appropriate drainage systems be incorporated into the cul-de-sac design to prevent stormwater from the center of the cul-de-sac from draining onto the pavement, and the dashed 35' radius circle in the center of the cul-de-sac be labeled for clarity.

If you should have any questions or comments, please call me.

Very truly yours,

DuBOIS & KING Inc.

Jeffrey A. Adler, P.E.
Senior Project Manager

JAA/mto

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