

November 22, 2016

Mr. Joseph Laydon  
Town Planner  
Grafton Municipal Center  
30 Providence Road  
Grafton, MA 01519

**RE: Estates at Bull Meadow  
Response to Peer Review Comments  
Dated November 01, 2016**

Dear Joe:

McCarty Engineering Inc. (MEI) is in receipt of a review letter dated November 1, 2016 prepared by Graves Engineering, Inc. relative to the Bull Meadow Estates proposed subdivision off Appaloosa Drive. This letter is in response to the revised definitive subdivision application package submitted to the Town of Grafton on October 11, 2016. They have offered 43 comments (36 original and 7 new) to the Board on conformance with the Subdivision Rules & Regulations, Zoning By-Law, Stormwater Management & Hydrology Review and General Engineering Comments.

For ease of review, the Graves Comment is shown below with MEI's response provided below it in italic font.

The comments received are as follows:

**Subdivision Rules & Regulations**

1. Although the boundary of the development was drawn on the plans, it is difficult to distinguish the boundary from other interior and exterior lot lines. The boundary should be a heavier line type. (§3.3.3.1)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

2. A north point needs to be shown on Sheet 6 and for the three viewports on Sheet 18. (§3.3.3.6)

**Comment Partially Satisfied: 11/1/2016. North Arrow is still needed on Sheet 6.**

*Response: A north arrow has been added to Sheet 6.*

3. Notice of any and all decisions, special permits (e.g.: Major Residential Special Permit), etc. must be identified on the plans, including Worcester District Registry of Deeds book and page numbers. (§3.3.3.13)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

4. The species of proposed street trees were not identified in the plans. (§3.3.3.20)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

5. The profile for Paddock Ridge Drive shows fill greater than 6 feet between stations 12+75 and 14+60. We understand a waiver request was submitted and will be reviewed by the Planning Board. (§4.1.2.1.b)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

6. The minimum K requirement for vertical curves was not met at station 12+24 (proposed sag curve with K=27) and at station 13+81 (proposed crest curve with K=6). (§4.1.5.3)

**Comment Partially Satisfied: 11/1/2016.** The minimum K requirement for a crest vertical curve is 28, however, a crest curve with K=7 is proposed at station 13+81. The Engineer responded that the curve meets the AASHTO requirement regarding sight distance for a design speed of 20 MPH. Nevertheless, the grades of the approach tangents are shallow and the height of the crest curve is low, such that a driver located in the low point of the road on one side of the vertical curve will be able to see an object in the road at the low point on the opposite side of the vertical curve. In short, based upon the information submitted with the revised plans and upon further evaluation of sight lines, we do not take issue with the sight distance provided at the crest curve and we find the K value of 7 to not be unreasonable in this particular situation.

As for the sag vertical curve at station 12+24, the plans were revised to propose a K of 28. The issue at hand is the ability to observe objects in the road if illuminated by a vehicle's headlights. In our opinion, the plans should be revised to provide a minimum K of 35 as required. Such a revision will require the length of the vertical curve to be extended from 164 feet to 208 feet and will result in the low point of the vertical curve being moved approximately sixteen feet and raised approximately 0.9 feet, thereby not impacting the efforts already made to address stormwater management.

*Response: The sag vertical curve at STA 12+24 has been revised to propose a K of 35 as required by the Rules and Regulations Governing the Subdivision of Land in Grafton, Massachusetts.*

7. Street lights were not shown on the plans. (§4.7.6)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

8. The three hydrants proposed along Paddock Ridge Drive between Carriage House Lane and Bridle Ridge Drive are proposed at spacing greater than the required maximum of 500 running feet. If not already done, the Planning Board may wish to solicit comments from the Fire Department and Grafton Water District relative to hydrant locations. (§4.7.7.1)

**Comment Satisfied: 11/1/2016. Applicant will solicit a response from the Grafton Fire Department and Water District.**

*Response: Acknowledged*

9. Granite curb inlets are required for the catch basins. (§4.7.8.3)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

10. Sheet 22 proposes a reinforced concrete bound; however, granite bounds are required. The bound material and dimensions need to be revised. Additionally, on Sheet 5 two bounds are missing at the eastern drain easement. (§4.8.1)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

11. Concrete sidewalk needs to be shown across driveways. (§4.9.1)

**Comment Satisfied: 11/1/2016. Waiver Request will be submitted directly to the Planning Board for review.**

*Response: Acknowledged*

12. The proposed 10-foot wide trail access easement shown between Lots 11 and 12 does not meet the minimum required width of 20 feet. Also, the easement was labeled as a drain easement on Sheet 5. (§4.11.4)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*



13. A waiver was requested to allow less than the required four feet of cover over the drain line at two locations. The proposed cover is at least 2.5 feet. We don't have an issue with the waiver request as long as Class V reinforced concrete pipe is used along Carriage House Lane between DMH 6 and Infiltration Basin 1. The other location is a cross-country drain line; Class III pipe (which is commonly used) would not be unreasonable at this location. (§5.4.2.2)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

14. Retaining walls are proposed within the Paddock Ridge Drive right-of-way between stations 12+50± and 14+45± and a waiver was requested. We understand that the Town of Grafton requires retaining walls to be outside the rights-of-way. (Schedule E, Standard Cross Section Minor Street B)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

15. The "Bituminous Concrete Pavement Detail" on Sheet 22 needs to be revised to be consistent with the "Minor Street B Standard Cross-Section" construction detail on Sheet 23 and with Grafton Subdivision Rules and Regulations. The total pavement thickness is incorrect and the gravel base needs to consist of one 12" lift of gravel.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

### **Zoning By-Law**

16. Lot 6 has a frontage of 139.98 feet which does not meet the minimum 140-foot requirement. (§3.2.3.2)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

### **Stormwater Management & Hydrology**

17. Access to Infiltration Basins 1 and 2 needs to be revised. The minimum top-of-berm berm width needs to be ten feet and the access grade can't exceed 20%. The tops of the berms are proposed to be approximately seven feet wide and the grade at Infiltration Basin 2 is approximately 33% (3H:1V).

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

18. Calculations must be provided to demonstrate the infiltration forebay size in Infiltration Basins 1 and 2 comply with DEP Stormwater Management Guidelines.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

19. The two infiltration basins will only have approximately 0.8 feet of freeboard as measured between the 100-year peak water surface elevation and the top of the berms; at least one foot of freeboard needs to be provided.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

20. The plans should clearly show that the sides of the riprap spillways and down-gradient aprons are to also be lined with riprap in order to avoid erosion along the spillways' edges.

**Comment Not Satisfied: 11/1/2016. The plans show the width of the riprap spillways extending to the top-of-berm of the infiltration basins, however, there appears to be an issue with the revised grading of the basins at the spillways (see comment 21).**

*Response: The Emergency Spillway Detail shows the limit of riprap required in the infiltration basins.*

21. The riprap spillway elevations need to be labeled at Infiltration Basins 1 and 2.

**Comment Not Satisfied: 11/1/2016.**

*Response: The grading has been revised to reflect the spillway elevations.*

22. Soil testing has not yet been performed at Infiltration Basin 2 to demonstrate compliance with MassDEP's required two-foot offset to seasonal high groundwater. Based upon the soil testing data that was submitted (for fifteen building lots and Infiltration Basin 1), the proposed elevation for Infiltration Basin 2 does not appear to be unreasonable. Nevertheless, soil testing will have to be performed at infiltration Basin 2.

**Comment Satisfied: 11/1/2016. Testing to be performed after Conservation Approval.**

*Response: Acknowledged*

23. The Area 2A label on the Existing Conditions Watershed Plan should be removed. This label applies to the proposed conditions.

**Comment Satisfied: 11/1/2016**



*Response: Acknowledged*

24. There is an unlabeled area shown on the Proposed Conditions Watershed Plan in front of Subcatchment Lot 13.

**Comment Not Satisfied: 11/1/2016. The area remains unlabeled.**

*Response: The Proposed Conditions Watershed Plan was revised, however the previous version was included in the revised drainage report. The correct plan is included in this submission.*

25. It is necessary to provide appropriately-sized riprap aprons at drainage system discharge points. Additionally, supporting calculations relative to the apron dimensions and riprap stone size must be submitted.

**Comment Not Satisfied: 11/1/2016. Calculations have been provided for sizing the riprap aprons, however, the calculations are not consistent with the plans. The calculations require a riprap apron length of twelve feet for FES 1 and sixteen feet for FES 4 and 5, however, based on the "Flared End w/ Riprap Detail" on Sheet 23 the lengths of these aprons would be ten feet.**

*Response: The riprap aprons are shown accurately on the grading and drainage plans. The Flared End with Riprap Detail on sheet 23 has been deleted. A new detail with FES sizing dimensions is shown on sheet 25.*

26. Sheet 10 refers to an infiltration basin while Sheet 12 refers to the same structure as a detention basin. The labels on the plans should be consistent and should follow MassDEP nomenclature.

**Comment Not Satisfied: 11/1/2016. The label for the basin has been removed from Sheet 12, however, while Sheet 10 refers to an infiltration basin, Sheet 7 refers to the structure as a stormwater management system, and Sheet 8 refers to the structure as a stormwater mitigation area. The labels on the plans should be consistent and should follow MassDEP nomenclature. Also, Infiltration Basin 4 should be labeled on the plans and should follow MassDEP nomenclature.**

*Response: The plans reflect Infiltration basins.*

### **General Engineering Comments**

27. On Sheet 21, the floor fill in the precast drain manhole construction detail needs to have a channel as opposed to being a planar surface.

**Comment Not Satisfied: 11/1/2016. The precast drain manhole construction detail has not been revised (now on Sheet 23).**

*Response: The drain manhole detail has been revised accordingly.*

28. Guardrails and pedestrian barriers (e.g. chain link fences) need to be provided at the tops of the retaining walls.

**Comment Not Satisfied: 11/1/2016.** A four-foot chain link fence has been added to the Precast Concrete Retaining Wall Detail, however, no guardrail is proposed between the roadway and the retaining wall. We believe a cross section of the right-of-way at the wetland crossing should be provided to show the proposed roadway, retaining walls, chain link fences, guardrails, sidewalk, and utilities.

*Response: See Sheet 8, Layout and Materials Plan. A guardrail is incorporated into the design between the roadway and retaining wall. A cross section has been added to the detail sheets.*

### **General Comments**

29. We understand that the Planning Board or its staff will review any impact reports.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

30. We understand that the Grafton Water District will review the proposed water utility infrastructure.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

31. We are not aware if a meeting has occurred with Town staff/departments to address the configuration of the existing Appaloosa Drive cul-de-sac. At issue is whether the cul-de-sac should remain as is, be configured with an island or reconfigured as a through road. (MRSP 2014-8, Condition C3)

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

32. The cover sheet specifies the site as being in zoning district R4. This should be corrected to R40.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

33. It is recommended for clarity that the existing conditions plans (Sheets 1 and 2) be revised so the underlying gray existing conditions lines are black.

**Comment Satisfied: 11/1/2016**



*Response: Acknowledged*

34. The layout plan identifies roads by road name while the profile plans identify roads with a letter. Road identification should be consistent.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

35. Prior to plan endorsement, all sheets of the plan set, including the cover sheet, must include the statement "See Sheet \_\_\_ for Planning Board Conditions of Approval", and the conditions must be inscribed on said sheet.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

36. The design engineer should be aware that the town has local wetland regulations and stormwater regulations that are administered by the Conservation Commission. GEI has not reviewed the submittal for compliance with those regulations.

**Comment Satisfied: 11/1/2016**

*Response: Acknowledged*

### **Additional Comments**

37. The Proposed Conditions watershed Plan was not revised to address the changes to the drainage and stormwater management system, grading or the hydrology computations.

*Response: The Proposed Conditions Watershed Plan was revised, however the previous version was included in the revised drainage report. The correct plan is included in this submission.*

38. GEI noted that Infiltration Basin 2 was converted to a subsurface infiltration system. Sheet 27 includes details for the system, however, no elevations were provided. Elevations for the cross section of the system must be provided, as well as a detail for the upstream manhole with weir.

*Response: Elevations of the proposed subsurface infiltration system were provided on Sheet 27 of the plan set. Additionally, the detail for the upstream manhole with weir is also detailed on sheet 27 of the plan set. Please see Detail #8, "STORMTECH ELEVATIONS" on sheet 27.*

39. Sheet 25 includes an SC-740 Dry Well detail for the recharge of roof runoff at individual lots. The dry wells should be clearly labeled as dry wells on the plans in order to differentiate the dry wells from the subsurface infiltration system.



*Response: The dry wells are clearly labeled on the plans and detailed on sheet 25.*

40. On Sheets 14 and 15, the elevations at the bottom of the profiles need to be revised to include the proposed elevations. Two sets of existing elevations were provided on these profiles.

*Response: The elevations on the bottom of the profiles have been revised accordingly.*

41. On Sheet 11, the drainage pipe located on Lot 8 between DMH 8 and DMH 9 is located outside of the drainage easement. The pipe location or easement will need to be revised.

*Response: The drainage easement has been revised.*

42. On Sheet 11, the proprietary stormwater treatment device (STC 450 at DMH 8) should be located within or adjacent to the right-of-way for ease of maintenance (e.g. cleaning with a vacuum-truck) if the Town of Grafton becomes responsible for its maintenance.

*Response: DMH 8 has been relocated to within the ROW.*

43. On Sheet 22, in the table Sequence of Work, installation of the stabilized construction entrance(s) to be used for land clearing needs to occur before the start of tree cutting and chipping.

*Response: The sequence of work has been revised to include the installation of the stabilized construction entrance before the start of tree cutting and chipping.*

We trust that the responses provided above satisfactorily address the comments raised by Graves Engineering, Inc. We will prepare a revised set of Plans and forward them to the Town for review.

Please feel free to contact me with any questions.

Sincerely,



Brian Marchetti, PE  
Vice President

CC: Project File  
Applicant  
Jeff Walsh, PE - Graves Engineering, Inc.