GRAVES
ENGINEERING, Inc.
100 GROVE ST. | WORCESTER, MA 01605
T 508-856-0321
F 508-856-0357
gravesengineering.com

September 21, 2016

RECEIVED
SEP 23 2016
PLANNING BOARD
GRAFTON, MA

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

Subject: The Ridings, 88 Adams Road
Preliminary Plan and MRDSP Review

Dear Joe:

We received the following documents in our office on August 22, 2016:

- Correspondence from Thompson-Liston Associates, Inc. to Grafton Planning Board dated August 22, 2016, re: Preliminary Subdivision filing.

- Plans entitled "The Ridings", Conventional Plan Preliminary Subdivision in Grafton, Massachusetts dated January 13, 2016 and last revised August 15, 2016, prepared by Thompson-Liston Associates, Inc. for Casa Builders & Developers Corp. (25 sheets)

We also received the following documents in our office on September 12, 2016:

- Plans entitled "The Ridings", Conventional Plan Preliminary Subdivision in Grafton, Massachusetts dated January 13, 2016 and last revised September 2, 2016, prepared by Thompson-Liston Associates, Inc. for Casa Builders & Developers Corp. (25 sheets)

Graves Engineering, Inc. (GEI) has been requested to review and comment on the plans' conformance with applicable "Rules and Regulations Governing the Subdivision of Land; Grafton, Massachusetts" revised through April 27, 2009; "Grafton Zoning By-Law" amended through October 19, 2015 and standard engineering practices. As part of our initial review, GEI visited the site on March 4, 2016.

This letter is a follow-up to our previous review letters dated March 18, 2016, June 24, 2016, and July 25, 2016. For clarity, comments from our previous letters are *italicized* and our latest comments to the design engineer's responses are depicted in **bold**. For brevity, comments previously addressed by the design engineer and acknowledged by GEI have been omitted. Previous comment numbering has been maintained.

Our comments follow:

As also with our June 24, 2016 and July 25, 2016 follow-up review letters, we did not receive a revised copy of the Open Space development plan as we understand that no changes were made to it. Our follow-up comments below refer to the Conventional Development Plan last revised September 2, 2016.

Zoning By-Law

Flexible Development Plans

1. *Proposed dwellings on Lots 1 and 12 were shown within the 50-foot buffer area as measured from adjacent tracts of land. (§5.3.6.h)*

2. *The Common Land appears to contain well in excess of the minimum required amount of upland. At least 40% of the project land must be Common Land, of which at least 50% must be upland for a minimum upland area of 14.38 acres. We estimated that the Common Land consists of approximately 42.3 acres of upland. (§5.3.7)*

3. *It is our understanding that grading associated with lot development must occur on the lots and not within the adjacent Common Land. We ask for the Planning Board's input about whether our understanding is correct. Grading for lot development was proposed in certain areas of Common Land, e.g. the development of Lots 2, 3, 4, 5, 10, 15, 16, 17, 21, 22, 23, 27 and 30. Some of the grading noted herein is associated with dwelling construction whereas the remainder of the grading is associated with septic system construction. (§5.3.11.b)*

4. *On Sheets L3 and G3, the open space located west of Lot 1 closes to a point at the Road A sideline, thus prohibiting access to the western portion of Open Space Parcel B. Also, the wetland and retaining wall located east of Lot 2 will inhibit access to Open Space Parcel B. Consideration should be given to creating access to the western-most portion of Open Space B at a width of 40 feet. (§5.3.11.c)*

5. *On Sheets L3 and G3, the open space located south of Lot 3 narrows to approximately 37 feet. A minimum width of 40 feet is required. (§5.3.11.c)*

6. *On Sheets L6 and G6, the open space areas east of Lots 12 and 13 narrow to about 15 to 17 feet in width within the Town of Grafton. We defer to the Planning Board whether what appears to be contiguous open space in Westborough can be utilized along with the Grafton open space to provide the required 40-foot wide access to the open spaces located in Grafton south of Lot 12 and north of Lot 13. (§5.3.11.c)*

Subdivision Rules & Regulations

Both Conventional and Flexible Development Plans

7. *The locus needs to have a north arrow. (§3.2.3.1)*
   Acknowledged. The locus was revised to include a north arrow.

8. *On the Key Sheets, it would be helpful to include the lot numbers and open space parcel letters. Also, the scale bars are incorrect (1"=40' was provided instead of 1"=150'). (§3.2.3.1)*
   Acknowledged. On the Conventional Development Plans lot numbers have been added to the Key Sheet and the scale bar was revised.

9. *The approximate location of easement lines (e.g. drainage easements or retaining wall easements) were not shown on the plans. (§3.2.3.4 & §3.2.4.1.n)*
   Acknowledged. The plans were revised to include labels for drainage easements and retaining wall easements.

10. *The project is to be served by public water located in Adams Road. As such, the plans need to include a general description of the connection to be made to the existing water system. (§3.2.4.1.f)*
    We understand that the developer desires to proceed with development following the Flexible Development plans. As such, any revisions to the Flexible Development plans need to also address this comment.

11. *The plans do not reference the zoning district. (§3.2.4.1.p)*
    A "Notes" section has been added to Sheets L1-L7 which includes the zoning district. However, it is indicated that the site is in an R4 zoning District, which should actually read "R40". This typographic error could be addressed during definitive plan review.

12. *The plans do not reference that Adams Road is a Scenic Road. (§3.2.4.1.q)*
    Acknowledged. An additional label has been added to Sheet L3 to identify Adams Road as a Scenic Road.

13. *The plans do not reference the deed book and page nor the Assessor's Map and lot number. (§3.2.4.1.r)*
    Acknowledged. A "Notes" section has been added to Sheets L1-L7 which includes the deed book and page as well as the Assessor's Map and lot number.

14. *We defer to the Planning Board whether a projection of streets (layout on plans, not road construction) needs to be made to abutting property to the north owned by n/f LaFlamme. This area of the project and the abutting land is located within Estimated Habitat of Rare Wildlife and Priority Habitat of Rare Species as mapped by the Massachusetts Division of Fisheries & Wildlife's Natural Heritage & Endangered Species Program. This street projection could potentially connect the project's road system to the abutting parcel and also would roughly align with a street projection located on Robin Drive (in an area of a deep earth cut). The project's street projection and the Robin Drive street projection would be separated by two parcels of land with a total distance of approximately 1,200 feet. The projection of project streets would consist of: extending Road D on the Conventional Development Plans approximately 80 feet or extending Road C on the Flexible Development Plans approximately 750 feet. (§4.1.4.1.d & GZBL §5.3.8)*
    No further comment necessary.

15. *The plans propose roadway pavement widths of 24 feet throughout the project. A waiver request was submitted to allow this pavement width in lieu of a 30-foot wide pavement width on Road A. We don't have an issue with the proposal to reduce the pavement width to less than 30 feet in an effort to promote traffic calming. At this time we don't have a concern with the proposed width of 24 feet. If additional information comes to light that suggests a wider pavement width may be in order, then an alternative to the 24-foot width could perhaps be a pavement width of 26 feet. (§4.1.4.2)*
    No further comment necessary.

16. *A vertical curve is required at Road A station 11+00 due to the proposed 1% change in grade. (§4.1.5.3)*

June 24, 2016:
Acknowledged. A 50-foot crest vertical curve was added at Road A station 11+00.
Acknowledged. The plans were revised and there is no longer a vertical curve at Road A station 11+00.

17. *The proposed project relies on the connection of Road A to a yet-to-be-constructed extension of Harvest Way located in Westborough in order to avoid the creation of a dead end street in Grafton. The concept of this connection does not seem unreasonable. However, coordination between the Grafton project and the Westborough project needs to occur. This coordination issue is beyond the scope of an engineering peer review, and as such we defer coordination to the Planning Board. (§4.1.6.3)*
No further comment.

18. *Retaining walls are proposed within the Road A right-of-way at station 5+25+/-. We understand that the Town requires any retaining walls to be located outside of the rights-of-way. (§5.8)*
Acknowledged. The retaining walls have been revised to be located outside of the Road A right-of-way at station 5+25+/-.

Conventional Development Plans

19. *There are several areas within the rights-of-way where the proposed cut or fill is greater than six feet (as measured from the existing centerline elevation to the proposed centerline elevation). These areas consist of:*
    - *Road A station 2+70± to 5+70± and station 6+80+/- to 12+70+/- (fill),*
    - *Road A station 18+00+/- to 21+40+/- [town line] (cut),*
    - *Road C station 0+80+/- to 3+00+/-, station 15+70+/- to 17+20+/- and station 21+00 to 22+70+/- [town line] (cut),*
    - *Road C station 11+20+/- to 13+90+/- (fill),*
    - *Road D station 0+90+/- to 4+08+/- (cut),*
    - *Road E station 0+00 to station 2+80+/- (cut). (§4.1.2.1.b)*

    June 24, 2016:
    None of the cuts or fill in the lists above were revised to account for a six-foot maximum cut or fill from existing grade with the exception of Road C stations 0+80+/- to 3+00+/-.
    Acknowledged. All of the proposed cuts and fills were revised to account for a six-foot maximum cut or fill from existing grade.

21. *If a Major Residential Development Special Permit (MRDSP) is issued for the Conventional Development, then during the preparation of definitive plans all slopes adjacent to the rights-of-way must be no steeper than 2H:1V. For example, slopes steeper than 2H:1V are proposed at Road A station 5+50+/- right, at Road A station 8+50+/- right, at Road C station 16+50+/- right and along the right side of Road D except at driveways. (§5.1.1 & Minor Street Standard Cross Sections)*

    June 24, 2016:
    The proposed slopes adjacent to rights-of-way have been revised to be 2H:1V at Road A station 5+50+/- right, Road C station 16+50+/- right, and the right side of Road D. However, the slope adjacent to the right-of-way of Road A station 8+50+/- right has not been revised and is still 1.5H:1V.

The road layout was revised, and there are now several areas where proposed slopes adjacent to rights-of-way are greater than 2H:1V. These areas consist of:

- **Road C station 2+50+/- to 5+25+/-**
- **Road C cul-de-sac**
- **Road D station 2+00+/-**

If the project is to be developed as a conventional development, then these slopes will have to be re-evaluated during definitive plan design.

Flexible Development Plans

22. *There are several areas within the rights-of-way where the proposed cut or fill is greater than six feet (as measured from the existing centerline elevation to the proposed centerline elevation). These areas consist of:*
    - *Road A station 2+70± to 5+70± and station 9+15+/- to 13+50+/- (fill),*
    - *Road A station 16+15+/- to 18+20+/- and station 20+00+/- to 22+05+/- [town line] (cut). (§4.1.2.1.b)*

23. *The applicant has requested a waiver to allow a dead end street (Road C) in excess of 500 feet in length. A narrative was provided along with this waiver request. We don't take exception to the points made in the narrative. Nevertheless we understand that the Planning Board will address waiver requests and may vote to deny or approve said waiver request. (§4.1.6.3)*

24. *If a MRDSP is issued for the Flexible Development, then during the preparation of definitive plans the 1H:1V slope proposed at the right side of Road A at station 5+50+/- must be revised to a slope no steeper than 2H:1V slope. (§5.1.1 & Minor Street Standard Cross Sections)*

<u>General Engineering Comments</u>

Both Conventional and Flexible Development Plans

25. *The intersection curb radii within the project should be no greater than 30 feet. Curb radii of approximately 45 feet were proposed.*
    The intersection radii were not revised. This level of detail could be addressed during definitive plan review.

26. *We reviewed the Traffic Impact Study (The Study) in a general manner (not as a detailed peer review). The methodology appeared to be in order. The Study concluded that the level of service at the intersection of Adams Road and the project street will operate at level of service (LOS) A. Based upon the information presented in The Study, we have no reason to dispute this conclusion.*
    No further comment necessary.

27. *The Study discusses improvements (i.e. vegetation clearing) to improve sight distance along Adams Road and/or the use of advance warning signs. These measures should be implemented as appropriate.*
    This level of detail should be addressed during definitive plan review.

28. *We noted that in the "Existing Roadway Geometry" section of The Study (on Page 2), reference was made that Adams Road is posted at 25 miles per hour (mph). This*

appears to be a typographic error. The "Sight Distance" section on Page 7 correctly references a posted speed of 30 mph. We observed at the site that there is a sign for southbound travel located south of Old Westboro Road and a sign for northbound travel located north of High Point Drive.
No further comment necessary.

29. *With a through-connection being proposed between Adams Road in Grafton and Adams Street in Westborough, we were concerned about the potential for cut-through traffic. I spoke with Jennifer Conley of Conley Associates concerning this issue. To summarize the discussion, we concurred that it is unlikely that the project street would serve as a major cut-through. The Adams Street area contains narrow, winding streets (except for the newer subdivision streets) with no nearby major thoroughfare. We also concurred that some localized traffic may use the new connection and that localized traffic should not significantly affect roadway operations proximate to the project.*
No further comment necessary.

Conventional Development Plans

31. *The plans propose 1H:1V slopes at many locations on the building lots. To the extent possible, we recommend the use of 2H:1V slopes. Any slopes proposed at 1H:1V will need to be appropriately stabilized and protected (e.g. pedestrian guards).*
This comment was not addressed. We understand, however, that this is a preliminary plan and if the conventional development plan is chosen, this issue will have to be addressed in the definitive plan.

Flexible Development Plans

32. *The owners of Lots 18, 19 and 20 will have difficulty gaining access to their septic system leaching areas after lot development – a slope of 1.5H:1V will have to be traversed with a total elevation change of sixteen to twenty feet.*

<u>General Comments</u>

Flexible Development Plans

34. *There is a minor typographic error on Sheets L5 and G5. The area for Lot 20 reads "50.589 S.F." but should be corrected to 50,589 S.F.*

<u>Additional Comments, July 25, 2016</u>

35. *We don't have an issue with the findings of the "Sight Distance Confirmation Plan and Profile."*
No further comment necessary.

36. *We don't have an issue with the revision to Road C near its intersection with a proposed road in Westborough. We noted that the road in Westborough was moved approximately twenty feet farther away from the town line into Westborough and that the vertical alignment of Road C was revised accordingly.*
Acknowledged. The road layout was revised and Road C no longer intersects with a proposed road in Westborough.

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.
Vice President

cc: James Tetreault, P.E., Thompson-Liston Associates, Inc.