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March 18, 2016

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

Dear Joe:

We received the following documents in our office March 4, 2016:

- Correspondence from Thompson-Liston Associates, Inc. to the Town of Grafton Planning Board dated February 12, 2016, re: preliminary subdivision filing.
- Full-size and reduced-size plans entitled "The Ridings", Conventional Plan Preliminary Subdivision in Grafton, Massachusetts dated January 13, 2016, prepared by Thompson-Liston Associates, Inc. for Casa Builders & Developers Corp. (26 sheets)
- Full-size and reduced-size plans entitled "The Ridings", Flexible Plan Preliminary Subdivision in Grafton, Massachusetts dated November 25, 2015, prepared by Thompson-Liston Associates, Inc. for Casa Builders & Developers Corp. (22 sheets)
- Bound document entitled Traffic Impact Study; Proposed Residential Development, Grafton, MA and Westborough, MA dated February 2016, prepared by Conley Associates.
- Supporting documents entitled: Application for Special Permit, Application for Approval of Preliminary Plan, Certificate of Good Standing, List of Abutters, FEMA Flood Insurance Rate Map, List of Project Waivers, Project Soil Limitations, Project Information Summary and Environmental and Community Impact Analysis.
- Correspondence from Grafton Conservation Commission to Thompson-Liston Associates, Inc. dated September 4, 2016 with attached Order of Resource Area Delineation - MassDEP File Number 164-886 and Determination of Applicability, Grafton Wetlands Protection Bylaw.

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 this review, GEI visited the site on March 4, 2016.

**Our comments follow:**

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## **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)
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)
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)
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)

11. The plans do not reference the zoning district. (§3.2.4.1.p)
12. The plans do not reference that Adams Road is a Scenic Road. (§3.2.4.1.q)
13. The plans do not reference the deed book and page nor the Assessor's Map and lot number. (§3.2.4.1.r)
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)
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)
16. A vertical curve is required at Road A station 11+00 due to the proposed 1% change in grade. (§4.1.5.3)
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)
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)

#### **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)
20. On Sheet L4, the Road C tangent length of 146.40 feet (the straight section of Road C that provides part of the frontage for Lots 17, 18, 21 and 22) has less than the required minimum length of 150 feet. (§4.1.3.3)
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)

### **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)

### **General Engineering Comments**

#### **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.
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.
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.

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.
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.

#### **Conventional Development Plans**

30. The Conventional Development Plans show proprietary stormwater treatment units and what appears to be underground infiltration systems. In order to minimize the cost of long-term operation and maintenance if/when this infrastructure is accepted by the Town, we recommend that the use of proprietary stormwater treatment units and underground infiltration or detention systems be avoided unless specific site conditions suggest otherwise. The use of open stormwater BMPs such as forebays, detention basins and infiltration basins will be less costly to own and maintain.
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).

#### **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.

#### **General Comments**

##### **Conventional Development Plans**

33. On Sheet L4, the northern property line of Lot 24 (part of the project perimeter) is not consistent with the Key Sheet nor with the Flexible Development Plans.

##### **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.

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.