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Jan. 2, 2021

Barrington Planning Board,
Marcia Gasses (Planner)
PO Box 660
Barrington NH 03825

Ref: Proposed site Plan – Map 238, Lot 36
PROJECT APPLICATION: 238-36-V-20-Design

Dear Ms. Gasses, Chairman & Members of the Board:

We are in receipt of a review letter from Dubois & King Inc. dated Dec. 18, 2020 and we offer the following responses to the noted comments. Each comment is followed by our response in **bold**.

1. The proposed drainage design consists of 12-inch diameter pipes in multiple locations. We recommend that diameters are increased to 15 inches to meet the requirements of Site Plan Review Regulations 4.7.7(1) or submit a waiver request.
   Response: All of the 12-inch Dia. Pipes have been revised to a min. of 15 inch as required.

2. The proposed drainage design consists of storm drain lines with less than 36 inches of cover. We recommend that the applicant revise the proposed system to meet the minimum depth of cover for storm drain lines of 36 inches from the top of pipe to finished grade as required by Site Plan Review Regulations 4.7.7(3).
   Response: All of the pipes have been lowered to the extent possible for additional cover keeping the road grades as low as possible for building construction. The proposed pipes are rated for much less cover then the required 36" and is standard practice of 2' in other municipalities. We would request a waiver to allow less.

3. Sheet 5 of 15. We recommend that the applicant indicate the waivers requested in accordance with Site Plan Review Regulations 3.2.10(14).
   Response: The requested waivers have been added as requested.

4. Sheet 6 of 15. The plans show an existing access path that leads to the proposed wells and pump house. We recommend that the applicant provide details to show that the existing access way is comprised of adequate base materials to provide the necessary service vehicles for operation and maintenance of the pump house. Additionally, we recommend that the applicant show how this path ties into the new driveway configuration on Sheet 5 of 15.
   Response: A proposed connection has been added and a detail of the access road supplied for the minimum standard.

5. Sheet 9 of 15. We recommend that the applicant show the proposed location of the stabilized construction entrance.
   Response: Added as requested.

6. Sheet 9 of 15. Plan View. The proposed sidewalk configuration does not include curb ramps (tip downs) at the Route 9 intersection. We recommend that the applicant provide curb ramps at these locations to provide means for handicapped access in accordance with Site Plan Review Regulations Section 4.15.2. Additionally, we recommend that all ends of the sidewalk have tip downs. Additionally, the proposed visitor parking areas and parking areas to individual units would block movements to the sidewalk when vehicles are parked. We recommend that the curb ramps are placed to allow an accessible path around parked vehicles for the entirety of the site. Lastly, we recommend that the applicant provide a sidewalk that extends to building 19 to further provide interconnectivity in the area and additional pedestrian safety measures.

   Response: Tip down requirements have been added to the plan. The visitor spaces have been revised to provide space behind parked vehicles. All of the sidewalk locations have been reviewed with the board and found appropriate. The end section is a dead-end road with extremely low traffic volume.

7. Sheets 9 – 11 of 15. We recommend that the applicant show proposed underdrain and outlet locations on the plans and profiles in all areas where the proposed private roads are in a cut section.
   Response: Under drain locations have been added in cut areas and a note added to daylight into the catch basins.

8. Sheets 9 – 11 of 15. We recommend that the applicant provide proposed finish floor elevations of the residential multi-family buildings to confirm that the proposed elevations can be accommodated with the proposed grading.
   Response: Slab elevations have been added.

9. Sheets 9 – 11 of 15. We recommend that the applicant provide spot-elevations along the proposed site at all corners of parking areas, along sidewalk and curb ramps, and at not more than 100-foot intervals in all directions in accordance with Site Plan Review Regulations Section 4.3.2.
   Response: Spot elevations have been added to the paved aprons and all parking areas. Any remaining areas can be derived from the roadway profiles and typical road section if needed.

10. Sheets 9 – 11 of 15. We recommend that the applicant provide grading on the plans and a corresponding detail to show a conveyance swale for the proposed drainage paths behind buildings 1, 3, 7 (drainage subcatchment CB3) and behind buildings 8, 9 (drainage subcatchment CB4) to provide adequate conveyance and reduce the possibility of future erosion through the use of stone check dams or other means, if necessary, to accommodate the approximate 2CFS flow estimated in the drainage analysis during the design storm event.
    Response: These are not formal drainage swales, and the diversion ditches will only realize a fraction of the actual peak flow for the subcatchment at the analysis point. Based on this and the fact that much of the flow path in subcat. CB4 will remain treed, we are confident the customary loam and seed will be sufficient to non-erosively convey stormwater to the analysis points (e.g. the referenced catch basins).

11. Sheets 9 – 11 of 15. We recommend that the applicant identify the snow storage areas in accordance with Article 4.15.1 of the Site Plan Regulations.
    Response: Snow storage areas have been added to sheet 5 for clarity.

12. Sheet 11 of 15. We recommend that the applicant provide a gravel access road on the plan to allow for maintenance of the proposed stormwater Wet Pond.
    Response: The gravel access has been added as suggested to sheet 11.

13. Sheet 11 of 15. The proposed grading contours for elevations 196 and 192 adjacent to the proposed septic fields do not tie into existing ground. We recommend the applicant revise the grading drafting in this area to reflect the proposed design intentions.
Response: The proposed grading has been corrected.

14. Sheet 12 of 15. Typical Drainage Trench Detail.
    a. We recommend that the detail is revised to indicate that the proposed stormwater pipe type is ADS N-12 in accordance with Site Plan Review Regulations 4.7.7(5). Similarly, we recommend that the pipe type "CPP" called out on the plan sheet is defined as ADS N-12 for clarity. **Revised as requested.**
    b. We recommend that the applicant revise the detail to indicate 36 inches of minimum cover from the top of pipe to finished grade as required by Site Plan Review Regulations 4.7.7(3). **Response: The detail has been revised per the requested waiver.**
    c. We recommend that the applicant revise the detail to indicate that the crushed stone bedding is ¾" in accordance with Site Plan Review Regulations 4.7.7(4)
    Response: The detail has been corrected.

15. Sheet 12 of 15. Wet Pond Basin Profile. We recommend that the applicant provide berm material gradation and compaction requirements so that a suitable berm can be constructed that does not allow seepage.
Response: The detail has been embellished to detail berm construction/compaction requirements as requested.

16. Sheet 12 of 15. Cape Cod Berm Detail. We recommend that granite curbing be used in place of bituminous curbing. Granite curbing will ensure that over time, there will not be drainage issues due to damaged or missing curbing.
Response: The client prefers bituminous curb as have used it on previous projects. This is private development and will be responsible to replace any curbing if necessary.

17. Sheet 12 of 15. Construction Details. Typical Cross Section. We recommend that the applicant add a note to the detail to indicate that "Compaction is required for both the subbase and base materials. It shall be performed by using vibrating rollers and water in lifts of no greater than twelve (12) inches. Compaction shall be performed until the required density is achieved. Density shall be determined by AASHTO T238 method and shall not be less than 95 percent of the maximum density determined in accordance with AASHTO T99." in accordance with Subdivision Regulations Section 12.8.1(4).
Response: The note has been added as requested.

18. Sheet 15 of 15. We recommend that the applicant add a detail for erosion control matting, and indicate that it is installed on all slopes greater than 3:1. Additionally, we recommend that the plans show the locations of the proposed matting.
Response: The grading has been revised with no areas with grading over 3:1.

19. Drainage Analysis. The modeling uses a value of 3.0 inches/hour for infiltration of stormwater in the proposed bioretention pond. We recommend that the applicant provide infiltration testing results for the test pit #7 associated with the proposed bioretention pond and that the applicant revise the drainage report to include a narrative that describes the infiltration rates.
Response: The value is taken directly from the SNEEE published ksat values with the factor of safety of 2 applied as is acceptable practice per Env-Wq 1500. The infiltration rate remains unchanged.

20. Drainage Analysis. We recommend that the applicant revise the HydroCAD model to use the Dynamic Storage-Indication Method so that the overall watershed be analyzed in a

dynamic manner so that ponds may respond to tailwater effects.
Response: The model has been revised to utilize the Dynamic Storage-Indication method as recommended.

21. Drainage Analysis. Pond DMH3. The Hydrocad modeling shows a length of the outlet pipe from DMH3 of 14 feet. The plans indicate 114 feet. We recommend that the applicant revise the modeling to reflect the plans.
Response: The errant input into the model of 14' has been corrected to 100' as is the current design.

22. Drainage Analysis. Wet Pond (1P) BMP and Bioretention Pond (2P) worksheets. The values for the area draining to the practice and the Impervious area drainage to the practice do not match the HydroCAD model. We recommend that the applicant revise the BMP worksheet calculations as this may affect the sizing of the ponds to handle the necessary WQV.
Response: The BMP worksheets have been edited to correct the input areas as requested.

23. Drainage Analysis. The Hydro CAD model shows one large 19.0" x 19.0" horizontal orifice for each catch basin. We recommend that the applicant revise the model to replace the one large opening with an array of small openings that represents the proposed catch basin grates.
Response: Having reviewed this with NHDES AoT in the past, it has been determined that a 2'x2' grate has effective openings that result in 19"x19" orifice capacity & therefore there would be no benefit of complicating the model to analyze individual openings within the grate.

24. Drainage Analysis. The Hydro CAD model suggests that in the 50-year storm event, CB3 will be overtopped by 0.2 feet. The design rainfall frequency for multi-family residential is 50 years according to Site Plan Review Regulations Section 4.7.5(4). We recommend that the revised the design of the proposed closed conduit system to accommodate the 50-year event without surcharge, in accordance with Site Plan Review Regulations Section 4.7.3(1).
Response: The CB in question is in a sump within a grassed area that has roughly 1.1' of depth to the grate elevation. The 2.4" surcharge under the 50-YR storm event will be contained within the earth sump and based on this we feel the model is compliant with the regulation cited.

25. Drainage Analysis. Rip Rap Calculations. The riprap was sized for the 10-year storm event. We recommend that the applicant revise the riprap sizing to accommodate the 50-year event in accordance with Site Plan Review Regulations Section 4.7.2(9).
Response: Riprap calculations have been revised to the 50-YR storm as requested.

26. Drainage Analysis. We recommend that the applicant provide the HydroCAD modeling node summary information for the design storm event (50 years) to confirm that the proposed stormwater pipes meet the minimum velocity of 2 feet per second in accordance with Site Plan Review Regulations Section 4.7.7(1) and the maximum velocity of 10 feet per second in accordance with Site Plan Review Regulations Section 4.7.7(2).
Response: The summary has been revised to the 50-YR storm as requested.

Traffic Impact Analysis Comments **(See Responses under separate cover)**

27. Due to the close proximity of the proposed site to this major intersection, we recommend that the applicant provide justification as to why the NH Route 125 / NH Route 9 intersection was not included in the evaluation.

28. Access Requirements. We recommend that the applicant evaluate a 2-lane approach of the Site driveway at the intersection with NH Route 9 to see if this improves the anticipated LOS from what is shown as LOS E.

29. Safety considerations. We recommend that the applicant verify if the State of NH has crash data available along NH Route 9 in the vicinity of the project area that can be reviewed.

30. Page 6, No-Build Traffic Volumes. We recommend that the applicant add a table showing what the traffic volumes from the "identified specific development projects by others" are that are incorporated into the No-Build volumes. The attachments do not include what these volumes from other projects are that are estimated to go through the project area.

31. Project-Generated Traffic, page 7, Table 2. We recommend that the applicant revise the footer to reference "LUC 220" instead of "LUC 221".

32. Trip Distribution Map, page 8, Figure 4 – We recommend that the applicant confirm distribution for Saturday midday peak hour. Based on traffic volumes, it appears that the distribution of eastbound/westbound traffic is roughly 450/50 during the Saturday midday peak hour.

33. Analysis Results, page 8 – Under the 2031 Build scenario, the driveway (NB) approach is anticipated to operate at LOS E. We recommend that the applicant clarify if a 2-lane approach was considered at this location to evaluate if a better LOS could be obtained.

34. Page 11, Left-Turn Lane. The left-turn lane warrant criteria is met for westbound NH Route 9 during the evening pm peak hour. The report indicates that a left-turn lane does not appear to be necessary due to sufficient gaps in through traffic along NH Route 9. LOS analysis does suggest LOS A with no expected queue. We recommend Defer to the City in regards to whether there are any potential safety concerns (e.g. any concerns with existing crashes in the vicinity, etc.) at this location with not providing a westbound left-turn lane here.

Thank you for your timely and professional review of the submitted plans. We hope the information provided address your concerns. Please feel free to contact our office if you have any additional question and/or comments.

Very Truly Yours,

BEALS ASSOCIATES, PLLC

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December 23, 2020

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

Re: Response to Review Comments
The Crossing at Village Center - NH Route 125 at NH Route 9
Barrington, New Hampshire

Dear Ms. Gasses:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the December 18, 2020 review letter prepared by DuBois & King, Inc. on behalf of the Planning Board in reference to their review of the November 30, 2020 *Traffic Impact Study* (the "November 2020 TIS") prepared by VAI in support of the proposed multifamily residential community to be known as The Crossing at Village Center and generally situated in the southeast quadrant of the intersection of Calef Highway (NH Route 125) at Franklin Pierce Highway (NH Route 9) in Barrington, New Hampshire (hereafter referred to as the "Project"). Listed below are each of the comments pertaining to the November 2020 TIS identified in the subject letter followed by our response on behalf of the Applicant. Responses to the remaining comments will be provided by others under separate cover.

Comment 27: *Due to the close proximity of the proposed site to this major intersection, we recommend that the applicant provide justification as to why the NH Route 125/ NH Route 9 intersection was not included in the evaluation.*

Response: The Project is expected to add fewer than 20 vehicle trips to the NH Route 125/ NH Route 9 intersection during the peak hours, or less than one (1) additional vehicle every 3-minutes during the peak-hour which, when dispersed to the multiple travel lanes and approaches at the intersection, would not produce a significant increase in motorist delays or vehicle queuing over anticipated future conditions without the Project.

Comment 28: *Access Requirements. We recommend that the applicant evaluate a 2-lane approach of the Site driveway at the intersection with NH Route 9 to see if this improves the anticipated LOS from what is shown as LOS E.*

Response: The Project is expected to produce 30 exiting trips during the weekday morning peak-hour, 18 exiting trips during the weekday evening peak-hour and 26 exiting trips during the Saturday midday peak-hour, the majority of which are expected to turn right and will experience limited delay except when a left turning vehicle is present (between 6 and 10 exiting left-turn vehicles are expected during the peak hours). The impact of

the resulting delay was identified as a residual vehicle queue of up to one (1) vehicle. Given the relatively low traffic volumes that are expected to be produced by the Project and the limited benefit that would be achieved by providing separate left and right-turn lanes exiting the Project site in relation to the increased intersection width and conflict area created by widening the driveway, providing (2) exiting travel lanes was not recommended for the Project.

Comment 29: *Safety considerations. We recommend that the applicant verify if the State of NH has crash data available along NH Route 9 in the vicinity of the project area that can be reviewed.*

Response: Motor vehicle crash data for NH Route 9 in the vicinity of the Project site was requested from NHDOT; however, NHDOT no longer releases crash records due to privacy concerns. A request for crash data was also sent to the Town of Barrington Police Department and will be provided in a supplemental submission once the information has been received.

Comment 30: *Page 6, No-Build Traffic Volumes. We recommend that the applicant add a table showing what the traffic volumes from the "identified specific development projects by others" are that are incorporated into the No-Build volumes. The attachments do not include what these volumes from other projects are that are estimated to go through the project area.*

Response: The table below summarizes the increase in traffic volumes within the study area that were attributable to the (2) identified specific development projects by others:

Project:	Peak-Hour		
	AM	PM	Sat. Mid
The Ridge at Green Hill	9	9	10
Mixed-Use Development	2	1	2

Comment 31: *Project-Generated Traffic, page 7, Table 2. We recommend that the applicant revise the footer to reference "LUC 220" instead of "LUC 221".*

Response: Corrected footnote added to Table 2 below.

Table 2
TRIP GENERATION SUMMARY

Time Period	Vehicle Trips		
	Entering	Exiting	Total
Average Weekday:	282	282	564
Weekday Morning Peak-Hour:	9	30	39
Weekday Evening Peak-Hour:	30	18	48
Saturday:	326	326	652
Saturday Midday Peak-Hour:	30	26	56

[a]Based on ITE LUC 220, *Multifamily Detached (Low-Rise)* (80 units).

Comment 32: *Trip Distribution Map, page 8, Figure 4 – We recommend that the applicant confirm distribution for Saturday midday peak hour. Based on traffic volumes, it appears that the distribution of eastbound/westbound traffic is roughly [45/55] during the Saturday midday peak hour.*

Response: The trip distribution pattern shown on Figure 4 of the November 2020 TIS is a composite average of the directional peak-hour traffic flow along NH Route 9 in the vicinity of the Project site. The suggested variation in the directional distribution during the Saturday midday peak-hour would result in a shift of (3) vehicles entering and exiting the Project site. Given that operating conditions for all movements at the Project site driveway during the Saturday midday peak-hour were reported at a level-of-service (LOS) B or better, a variation in the directional distribution of this magnitude would not be expected to result in a significant increase in motorist delays or vehicle queuing at the Project site driveway intersection.

Comment 33: *Analysis Results, page 8 – Under the 2031 Build scenario, the driveway (NB) approach is anticipated to operate at LOS E. We recommend that the applicant clarify if a 2-lane approach was considered at this location to evaluate if a better LOS could be obtained.*

Response: As stated in response to Comment 28, given the relatively low traffic volumes that are expected to be produced by the Project and the limited benefit that would be achieved by providing separate left and right-turn lanes exiting the Project site in relation to the increased intersection width and conflict area created by widening the driveway, providing (2) exiting travel lanes was not recommended for the Project.

Comment 34: *Page 11, Left-Turn Lane. The left-turn lane warrant criteria is met for westbound NH Route 9 during the evening pm peak hour. The report indicates that a left-turn lane does not appear to be necessary due to sufficient gaps in through traffic along NH Route 9. LOS analysis does suggest LOS A with no expected queue. We recommend Defer to the City in regards to whether there are any potential safety concerns (e.g. any concerns with existing crashes in the vicinity, etc.) at this location with not providing a westbound left-turn lane here.*

Response: No response required; however, as identified in the November 2020 TIS and acknowledged by DuBois & King, Inc.: i) the left-turn lane is warranted during the weekday evening peak hour only; and ii) the traffic operations analysis indicates that there are sufficient gaps in through traffic along NH Route 9 to allow left-turning vehicles to enter the Project site without unduly hindering through traffic (no residual vehicle queuing was reported on NH Route 9).

We trust that this information is responsive to the comments that were raised in the December 18, 2020 review letter prepared by DuBois & King, Inc. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey S. Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing partner

Professional Engineer in CT, MA, ME, NH, RI and VA

JSD/jsd

cc: J. Adler, P.E. - DuBois & King, Inc. (via email)
J. White – J&L Terra Holdings Inc. (via email)
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