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February 9, 2017

Ms. Maren Toohill
Planning Administrator/Permit Coordinator
Town of Littleton Planning Board
Shattuck Street Municipal Building
37 Shattuck Street, Room 303
Littleton, MA 01460

Subject: **Engineering Review Services of Definitive Subdivision Plan Application for "Couper Farm Estates" Littleton Planning Board**

Dear Ms. Toohill:

Pursuant to our agreement with the Town of Littleton, Green International Affiliates, Inc. (Green) is submitting this letter report of the findings from our peer review of the Definitive Subdivision Plan Application Package for "Couper Farm Estates Definitive Subdivision".

This peer review investigates the application package for compliance with the Code of the Town of Littleton, Massachusetts, Chapter 173, Zoning Bylaw and Chapter 249, Subdivision of Land Regulations. This review included an examination of the following documents:

- Plans titled "Open Space Development Definitive Subdivision and Over 55 Housing Development Special Permit Couper Farm Estates" prepared by Markey & Rubin, Inc., dated December 15, 2016 and containing twenty-one (21) sheets;
- Letter titled "Permit Applications - Couper Farm Estates", prepared by Markey & Rubin, Inc., dated December 15, 2016;
- Letter titled "Couper Farm Estates – Definitive Subdivision, Request for Waivers from the Littleton Subdivision of Land Regulations", prepared by Markey & Rubin, Inc., dated December 15, 2016;
- Report titled "Stormwater Drainage Report" prepared by Markey & Rubin, Inc., dated December 15, 2016;
- Report titled "Development Impact Statements" prepared by Markey & Rubin, Inc., dated December 15, 2016;
- Form C: Application for Approval of Definitive Plan;
- Special Permit Application – Open Space Development, Shared Residential Driveways, Over 55 Housing Developments.

Green offers the following comments resulting from our review of the above documents as they pertain to the Code of the Town of Littleton, Massachusetts, Chapter 173, Zoning Bylaw and Chapter 249, Subdivision of Land Regulations. Please note that this peer review is not a complete review of the project design and does not relieve the Applicant and Engineer of meeting all requirements of local, state and federal regulations.

## Plan Comments:

1. Per § 249-32.B, the Definitive Plans shall be at 1"=20' scale. The plans are at 1"=40' scale. Green finds the drawing scale to be adequate for the site; however, we respectfully defer to the Planning Board for a determination on this item. Per § 249-32.C.1, a North arrow is required on the plans. The Applicant should revise the plans to include this information on the relevant sheets.
2. Per § 249-32.D.5, all drainage facilities, including stormwater mitigation practices, shall be shown on plan and on profiles showing sizes, invert elevations and slopes. The Applicant should revise the plans and profiles to include all structures and inverts, including those which are outside of the roadway. Several pipe sizes and inverts are not included in either the plan or profiles.
3. Per § 249-32.D.6, water line locations shall be shown on profile sheets where they cross drainage facilities. The Applicant should revise the profile sheets to show water line locations at CB 1, CB 10, CB 12, CB 21, CB 31, CB 34, CB 38, CB 42, DMH 43, DMH 57, CB 55, DMH 53, CB 50, and CB 61.
4. Per § 249-32.D.7, the location of all subsurface utilities shall be shown on the plans. No gas utility is shown on the plans. If gas is proposed, the Applicant should revise the plans to show the location of the proposed gas utility.
5. Per § 249-32.E.1.b.iii, the narrative statement shall document the effects upon priority and estimated habitat for rare and endangered species. Seventeen houses are currently proposed within NHESP-listed Priority Habitat (PH 1159). The Applicant should provide their correspondence with NHESP to document that impacts to rare and endangered species are limited.
6. Per § 249-32.E.3, the Applicant shall submit calculations showing that any proposed sanitary sewer system has been designed according to Town standards, and that sewage estimates shall be based on the Massachusetts Department of Environmental Protection's Title V. While the review of this information is outside of the scope of this review, the Applicant should provide documentation that the calculations for the two proposed septic treatment areas have been reviewed and approved by the Littleton Board of Health.
7. Per § 249-32.E.4, the Applicant shall submit a water study certified by a Professional Engineer with demonstrated qualifications as a water consultant. The Applicant should submit their correspondence with the Town of Littleton Water Department to document that the proposed water system will provide the development with adequate fire and water flows.
8. Per § 249-32.E.5, the Applicant shall provide additional costs for future plowing, sanding, and sweeping per lane mile, including maintenance of the stormwater system. The Applicant reported this value based on the 2014 Annual Town Report. As the 2015 Annual Town Report is now available, the Applicant should provide the additional costs for Public Works based on this more recent data.
9. Per § 249-32.E.6, the Applicant shall provide estimates of municipal service costs. The Applicant Reported the value based on the 2012-2013 Pupil Expenditure Report. As the 2014-2015 Pupil Expenditure Report is now available, the Applicant should provide estimates of municipal service costs based upon this more recent data.
10. Per § 249-43.A.2, dead-end streets shall be no longer than 750 feet, measured from the end of the turnaround to the sideline of the first intersecting street not part of the dead end system. Field Lane is 750-feet long and the addition of Dean Lane off Field Lane creates a dead end that is longer than 750-feet. The Applicant should revise the roadway layout so that no dead end street is longer than 750-feet.

11. Per § 249-43.A.3, dead-end streets shall be provided at the closed end with a turnaround having dimensions confirming to AASHTO Exhibit 5-8D. The cul-de-sac appears to meet the requirements of AASHTO Exhibit 5-8C, which is a circular type rather than a circular offset type. We take no exception to the substitution; however, the Applicant should verify the Fire Department and Highway Department approve of the cul-de-sac configuration and revise the plans to provide dimensions of the cul-de-sac. Additionally, the Applicant should provide turning movements demonstrating that a fire truck of dimensions specified by the Fire Department can be accommodated.

12. Per § 249-43.A.6, the minimum width of right-of-way for off-street paths or easements shall be ten (10) feet. The Applicant should revise plans to include a minimum of ten (10) feet of right-of-way for all proposed paths.

13. Per § 249-43.B.1, Horizontal alignment shall be designed in accordance with Section 4.2 of the MassDOT PD&DG. Minimum centerline alignment radii for Minor Roads should be based on a design speed of 30 MPH using MassDOT PD&DG for non-superelevated roadways in Exhibit 4-9. The Applicant should revise all horizontal curves to meet Section 4.2 of the MassDOT PD&DG.

14. Per § 249-43.B.3, Vertical curves shall be designed in accordance with Section 4.3.3 Vertical Curves and 4.4 Combination of Horizontal and Vertical Alignments of the MassDOT PD&DG and with the AASHTO Green Book. The Applicant should revise the vertical curves at station 2+06.66 on Couper Farm Lane and station 1+50.00 on Dean Lane to meet the required k-values for Minor Streets. The Applicant should verify that all vertical curves are designed in accordance to the sections stated above. Also, the Applicant should revise Couper Farm Lane Profile to include proper grade break through the intersection of Couper Farm lane and Field Lane.

15. Per § 249-43.C.1, street cross sections shall be designed in accordance with the minimum design requirements of the Typical Sections provided in the appendices for the respective street classification. The Applicant should revise the Roadway Sections to include additional dimensions and labels to better reflect Figures 1, 2 & 3 in the Subdivision Rules and Regulations. For example, include a dimensions and label denoting both the sidewalk and the grass strip within the sections.

16. Per § 249-43.C.2, all subdivisions with ten (10) or more lots located in an area where school busing is provided or is likely to be provided in the future must provide at least one bituminous or cement concrete paved bus waiting area. The Applicant should provide a bus waiting area.

17. Per § 249-43.D.8, any group of twenty (20) or more lots shall be provided with two (2) means of egress. It is our understanding that the spirit of this regulation is to have no more than 20 dwellings without two (2) means of egress. There is a total of 37 dwellings on Field Lane and Dean Lane with only one (1) means of egress. Should access be blocked near the corner of Field Lane and Couper Farm Lane by a fallen tree or other obstruction, emergency vehicles will not have emergency access to these lots. The Applicant should revise the plans to included two (2) means of egress for Dean Lane and Field Lane.

18. Per § 249-43.D.12, the nearest line of any driveway shall not be closer than fifty (50) feet from the intersection of any two (2) streets. The Applicant should revise the plans so that no driveways are within fifty (50) feet of an intersection.

19. Per § 249-43.E.1, cul-de-sac center island shall be landscaped. If, based on the turning movements to be provided by the Applicant, the Fire Department determines that the cul-de-sac can adequately accommodate fire apparatus while maintaining landscaped center islands, the Applicant should revise the plans to call out and detail the landscaped center islands.

20. Per § 249-43.E.3, trees shall be planted on both sides of the street. The Applicant should revise the Landscape and Signage Plan to include trees on both sides of the roadway for all streets throughout the project. If the Applicant proposes to retain existing trees in lieu of new trees, the Applicant should add that information to the plans.

21. Per § 249-43.E.5, street tree locations shall be coordinated with all existing and proposed below grade and above grade utilities. The Landscape Plan does not show all proposed utilities. The Applicant should revise the Landscape Plan to show all utilities to determine if there are any conflicts between street tree locations and proposed utilities.

22. Per § 249-43.E.9, street tree locations shall be 3" caliper minimum. The Landscape Plan proposes 2.5" minimum. The Applicant should revise the Landscape Plan to require 3" minimum caliper street trees.

23. Per § 249-47.A, easements are required for all utilities within lots lines. Easements of at least 20 feet in width shall be provided where necessary within the lot lines. The Applicant should revise the sewer easement bordering Lot 20 and 55+ Age Restricted Development House 16 to be at least 20 feet in width and provide easements for all closed drainage within open space lots.

24. Per § 249-52.D, water resources shall be protected, including but not limited to floodplains, wetlands, aquifer recharge areas, and Town well fields. The Applicant should avoid all work within a wetland. This includes, but not limited to, widening an existing walking path to 6-feet.

25. Per § 249-59.A, all wiring, appurtenances of electric power, telephone, cable and fire alarm systems, and other utilities shall be placed underground within the limits of the street right-of-way. The plans indicate that electric power and communications will be placed underground. The Applicant should confirm all other wired utilities will be placed underground, along the same route as the underground electric or spare conduits will be provided, per § 249-59.B.

26. Per § 249-66.J, the Applicant should indicate on the plans that all proposed work shall conform to MassDOT Standard Specifications.

27. Per § 249-73.A, MassDOT Granite Curb Type VA-4 is required. The Applicant has requested a waiver to provide bituminous berm in lieu of granite curb. Wheelchair ramps should be constructed with granite transition curbs. Should the Planning Board approve the waiver request, the Applicant should also provide a detail to transition from the bituminous berm to the granite curb required at the wheelchair ramps.

28. Per § 249-77.A, footpaths shall meet ADA and MAAB requirements. The Applicant should provide cross slopes and longitudinal slopes for the proposed footpaths, and should provide the relocated route of the existing walking path near Infiltration Basin 4.

29. Per § 249-81.A, there shall be sidewalks five (5) feet in width on both sides of all collector streets and on one (1) side of all minor streets. As indicated in Figures 1, 2 & 3, cement concrete is required for all sidewalks unless a written waiver is obtained by the Applicant. The Applicant should revise the plans to show a five (5) foot cement concrete sidewalk throughout the project, including between Vint Lane and Great Road. If a waiver is obtained by the Applicant for the install asphalt sidewalks, cement concrete shall still be used for all wheelchair ramps.

30. Per § 249-81.D, sidewalks shall be five (5) feet in width exclusive of the curb clear width requirements and shall have a maximum cross slope of 1.5% and a longitudinal slope of 4.5% to reflect construction tolerances. In addition, ramps shall have a maximum cross slope of 1.5% and a longitudinal slope of 7.5% to reflect construction tolerances. The Applicant should revise the profiles on Couper Farm Lane and Vint Lane so that the longitudinal slope does not exceed 4.5%.

The Wheelchair Ramp Detail shall be revised to match the maximum slopes listed above and to show detectable warning panels.

31. Per § 249-85.A.1, fire hydrants shall be spaced no further than 500 feet apart. The Fire Department should comment on the acceptability of the proposed hydrant spacing within the proposed development, as the proposed spacing exceeds 500 feet.

32. Per § 249-85.C, underground installation. All utilities shall be installed underground. Depth of cover shall be as indicated in Figure 4. The Applicant should revise the Typical Section for Utilities to show 36" minimum cover for the storm drain.

33. Per § 249-85.D, streetlights are not required; however, the Board reserves the right to require developers install street lights. The Applicant has not proposed street lighting. We recommend street lights be installed at any pedestrian crossings and at all intersections, including both intersections of Great Road and Couper Farm Lane. We respectfully defer to the Planning Board for determination on this item.

34. The Water Department should confirm the acceptability of the proposed 8"x8" tapping sleeve and valve at the intersection of Great Road and Couper Farm Lane. Water Departments often will not allow tapping sleeves in situations where the trunk line is the same size as the proposed spur.

35. The proposed water mains are depicted on the plans with arcs. The maximum deflection angles for 8" ductile iron pipe will require bends be used on these lines. In order to identify locations where the storm drain pipe is with 5 feet of the proposed water line, the water main should be depicted with bends and straight sections with only minor deflection, as this is how the system will be constructed.

36. Per § 249-85.E.3, if a storm drain is within 5 feet of water line, the storm drain pipe shall be encased in concrete per Figure 5 of the Subdivision of Land Regulations. The Applicant should identify locations where this is the case and revise the plans to require concrete encasement, referring to the detail.

37. The proposed connection of the relocated catch basin at the intersection of Couper Farm Lane and Great Road is not shown. The Applicant should indicate where this structure will be connected.

38. Gate valves shall be as required by the Town of Littleton Water Department. We recommend that a note stating this requirement be added to the Water Main, Hydrant and Gate Valve Detail on Sheet D2.

39. The hydrant detail on Sheet D2 indicates that the proposed hydrants will connect to a 6-inch diameter water main, while the plan indicates that the water main on all proposed streets except for Vint Lane are 8-inch diameter pipes. The Applicant should revise the plans to indicate the locations of the presumed 8"x6" reducers.

40. Proposed grading within the infiltration basins is limited and poorly labeled. The Applicant should revise the plans to better depict the proposed information to clarify the design intent.

41. As currently proposed, stormwater will be redirected away from a portion of the wetland system on the eastern side of the site, approximately between Wetland Flag 23 and Wetland Flag 51. The resultant reduction in flow would negatively impact this portion of the wetland, as insufficient flow would likely be provided to maintain habitat and vegetation. The Applicant should revise the outlet of Infiltration Basin 2 to discharge near the upgradient end of the wetland system, near Wetland Flag 32 and Wetland Flag 35, in order to maintain regular flow.

## Record Plan of Land Comments

42. Per § 249-32.C.(10), the subdivision shall be tied to the Massachusetts State Plane Coordinate System and NAVD 88. The Applicant should add the north arrow to Sheets R1 through R4 and revise the north arrow on the Existing Conditions plan to reflect Massachusetts State Plane Coordinate System. Additionally, coordinates tied to Massachusetts State Plane should be shown.
43. Per § 249-32.A.(1)(a).ii, the existing conditions plan should show the entire site to be subdivided, with existing lot lines, rights-of-way, easements, stone walls, major trees, etc. The Applicant should revise and add stone walls and trees.
44. Per § 249-32.C.(4), the location, names and present widths of ways bounding within 200 feet of the subdivision should be shown. The Applicant should revise and add names and present widths of ways bounding within 200 feet of the subdivision.
45. Per § 249-32.A.(1)(a).iv, easement plans may be required for clarity. The Applicant should comment on whether or not a separate easement plan being submitted.
46. Per § 249-32.C.(10), sufficient data should be included to determine readily the location, direction and length of every street or way, easement, lot line and boundary line and to establish those lines on the ground. If separate easement plan is not being submitted, the Applicant should revise the plans and add bearings and distances to all proposed easements.
47. The rear lot line of Lot 24 shows two distances. In addition, there are several redundant bearings and overwrites throughout the recordable plans. The Applicant should revise the plans and minimize redundant bearings and eliminate overwrites.

## Stormwater Drainage Report Comments:

48. Per MassDOT PD&DG, pipe network calculations should be performed using the Rational Method. The Applicant performed these calculations using the NRCS Method, which is less conservative. The Applicant should revise the proposed catch basin calculations to utilize the Rational Method.
49. The total volumes reported in Section 1.5 of the Stormwater Drainage Report are invalid, as the tie span used starts at 5 hours and ends at 20 hours. The Applicant should revise the time span used in existing and proposed HydroCAD models to begin at 0 hours and end after the flow rate at the design point drops to zero. This will ensure that the reported existing and proposed total volumes include the entire storm event.
50. Per § 249-51.D, catch basins are required on both sides of the roadway at all low points, sags, and near the upstream corners of the roadway at intersecting streets. The Applicant should revise the plans to include am additional catch basin at the upstream corner of the intersection of Couper Farm Lane and Great Road.
51. Several discrepancies exist between those listed in the HydroCAD calculations and the table provided in Section 2 of the Stormwater Drainage Report. These flows are used to calculate gutterline spread. The Applicant should reconcile these values.
52. The gutterline spread calculation appears to incorrectly categorize CB11 as on grade, rather than at a low point. The Applicant should revise the gutterline spread calculation accordingly.
53. Per § 249-51.D, an inlet analysis shall be provided demonstrating that gutterline spreads at all inlets meet the requirements of MassDOT PD&DG. For local roads, the Design Guide requires a gutterline spread of not more than half of a through traffic lane, or 6 feet (whichever is larger). As a result, the allowable gutterline spread is 6 feet on all streets within the project area. As currently shown, ten catch basins exceed the maximum allowable spread. While the Applicant appears to have used the

10-year design storm event for this calculation, we believe that a 5-year design storm event is more appropriate for the local roads within the project area.

In addition, the gutterline spread calculations also do not take into account bypass flow to downgradient inlet structures. As indicated in the grate efficiency table provided by the Applicant, it is anticipated that a substantial portion of the flow to each catch basin will bypass the inlet structure and be directed to the next downgradient inlet structure. The calculations do not appear to take this additional flow into account at the downgradient structure.

The Applicant should revise the calculations and design, if necessary, to demonstrate that gutterline spreads do not exceed 6 feet for the 5-year storm event, using flows calculated using the Rational Method. The Applicant should provide revised calculations to include bypass flow and reduce the proposed spread below the allowable value.

54. While the Applicant has provided flow depths for catch basins at the low points, gutterline spreads should also be provided at these locations.

55. Per Vol. 2, Ch. 2 of the Massachusetts Stormwater Handbook, infiltration basins require sediment forebays for pretreatment of stormwater to achieve the claimed 80% TSS removal rate. As the Applicant is proposing water quality structures (Stormceptors) in lieu of sediment forebays prior to discharge into infiltration basins, sizing calculations should be provided demonstrating that the appropriate structure has been selected to accommodate the anticipated flow rates.

56. Per Vol. 2, Ch. 2 of the Massachusetts Stormwater Handbook, infiltration basins require a minimum of two feet of separation to seasonal high groundwater elevation. Test pits are required where the infiltration basins are proposed to demonstrate the minimum separation is provided. The nearest existing test pits indicate depth to groundwater of only 20 and 36 inches, which is likely insufficient for the proposed infiltration basins. The Applicant should provide test pit information in the proposed locations of infiltration basins demonstrating that the required separation to seasonal high groundwater is provided at these proposed BMP locations.

57. Per Vol. 3, Ch. 1, pp. 27-28 of the Massachusetts Stormwater Handbook, sufficient runoff must be directed to the infiltration BMPs to ensure infiltration of the required recharge volume. The Applicant provided the equation for required recharge volume, but only calculated the values for the areas flowing directly into infiltration basins, not the value for the entire site. The Applicant should include the area which does not flow into one of the infiltration basins in this calculation. Following this change to the calculation, the Applicant should revise the required recharge volume based on the ratio of total site area to site area draining to recharge facilities (per Vol. 3, Ch. 1, pp. 27-28 of the Massachusetts Stormwater Handbook).

58. Per the Massachusetts Stormwater Handbook, Standard 3, infiltration basins shall draw down within 72 hours. The Applicant should provide calculations demonstrating that the proposed infiltration basins will completely empty within 72 hours.

59. As indicated in the Massachusetts Stormwater Handbook, since the basins are being used for peak rate attenuation during the 100-year storm event, one foot of freeboard should be provided above the 100-year ponding elevation. This required freeboard is not provided at any of the four proposed infiltration basins. The Applicant should revise the plans to provide the required.

60. The infiltration basins appear to have been modeled in HydroCAD with a flow-rate base exfiltration component. The Applicant should revise the models to assume a constant velocity (in/hr) infiltration rate based on the Rawls Rates shown in Table 2.3.3 in Vol. 3, Ch. 1 of the Massachusetts Stormwater Handbook. The Applicant should perform test pits to confirm the soil texture used from the Rawls Rates Table to establish an infiltration rate.

61. Per Vol. 2, Ch. 2 of the Massachusetts Stormwater Handbook, an access area at the top of the basin must provide unimpeded vehicular access to the entire basin perimeter and that this access area shall be no less than 15 feet wide. The Applicant should revise the basin design to incorporate this required access.

62. Per Vol. 2, Ch. 2 of the Massachusetts Stormwater Handbook, infiltration basins must include an overflow outlet in addition to an emergency spillway. The current designs of the Infiltration Basins 1 and 2 utilize the emergency spillways as the primary outlets. The emergency spillway should be designed at the 100-year flood elevation, not as the primary outlet. Infiltration Basin 3 has not been designed with an emergency spillway. The Applicant should revise the basin designs to incorporate an overflow outlet, as well as an emergency spillway set the at the 100-year flood elevation.

63. The proposed grading for Infiltration Basin 2 does not match the stage storage or spillway data provided in the HydroCAD model.

64. Per the Massachusetts Stormwater Handbook, Standard 4, stormwater management systems shall be designed to remove 80% of the average annual post-construction load of TSS. The Applicant should include the area which does not flow into one of the infiltration basins in the TSS calculations. While the TSS removal value for this area will be less than the required 80% TSS removal, it may be sufficient for the overall site composite TSS removal to achieve the required 80% TSS removal.

65. Per the Massachusetts Stormwater Handbook, Standard 8, projects that disturb one or more acres of land are required to obtain coverage under the NPDES Construction General Permit issued by the EPA and prepare a Stormwater Pollution Plan (SWPPP). This document must be submitted prior to construction. We recommend that the Planning Board include this requirement as a condition to any approval.

66. Per the Massachusetts Stormwater Handbook, Standard 10, illicit discharges to the stormwater management systems are prohibited. This is addressed in the Operations & Management Plan, but we recommend that a signed Illicit Discharge Compliance Statement be submitted to the Planning Board prior to the discharge of any stormwater to post-construction BMPs. We recommend that the Planning Board include this requirement as a condition to any approval.

## Chapter 173, Zoning Bylaws:

67. Per § 173-151.A and § 173-98.A, development statements describing the development programs for Over 55 Housing Developments and Open Space Developments, respectively, are required. The Applicant should include development statements with the required information.

68. Per § 173-98.C.4, perspective drawings illustrating views from existing public roads abutting the site after the completion of the Open Space Development are required. The Applicant should provide these drawings.

69. Per § 173-98.C.5-6, typical elevations and typical floor plans of proposed structures within the Open Space Development should be provided. The Applicant should include these items in the submission.

70. Per § 173-151.F and § 173-98.E, marketing programs, including anticipated price schedule of units, target market sectors, and anticipating timing of development and sales, are required for Over 55 Housing Development and Open Space Development submissions, respectively. The Applicant should provide these items.

71. Per § 173-151.G and § 173-98.F, construction schedules, including staging program if applicable, with estimated start and finish dates of each stage, anticipated completion dates of community facilities serving the development, and planned completion dates of the entire developments shall

be included in the Over 55 Housing Development and Open Space Development submissions, respectively. The Applicant should provide these schedules.

72. Per § 173-151.I and § 173-98.H, the Over 55 Housing Development and Open Space Development submissions, respectively, should include development team qualifications, including names, addresses and resumes of the development company, development managers, architects, engineers, landscape architects, land planners, other consultants and participants, and all general partners. Resumes must include lists of all developments in progress or completed within five years by each participant. The Applicant should supply this information.

73. Per § 173-116, Limitations on Further Division, Land shown on a plan for which a permit is granted under this article may not be further divided and a notation to this effect shall be shown on the plan and shall be a condition of any approvals granted. There does not appear to be a notation to this effect; therefore, the Applicant should revise the plans to include this content satisfactory to the Planning Board.

74. Per § 173-151.C.11, the landscape plan for Over 55 Housing Developments shall indicate the number and type of vegetation being utilized to buffer the disturbed portion of the development. The Applicant has provided a landscape plan and list, but the proposed vegetation is screened to the same degree as the existing conditions. The Applicant should revise the Landscape Plan to show the trees as proposed vegetation.

75. Per § 173-153.B, the maximum height of principal and accessory structures within the Over 55 Housing Development area is 32 feet. The Applicant should indicate the maximum height of the proposed structures on the Elevation Plans.

## Requested Waivers

76. *§249-32 D(2), cross section cuts at 50-foot stations is required with the Site Plans. The plans submitted have only three sections – one a typical section through the 40-foot right-of-way, one typical section through the 45 foot right of way, and the other through the center of the 120-foot turnaround. The purpose of providing sections is essentially to calculate volumes of cut and fill. With computer software today, there are alternative ways of calculating cuts and fills which are simpler and as accurate as using sections of the road, and therefore we request a waiver on providing every section as required in the regulations. If the Board sees a necessity for us to provide the cut and fill volumes, we shall certainly do so.*

    Roadway cross-sections are required to determine if all roadside elements have been considered, such as guardrail due to steep side slopes, the need for retaining walls and underdrains in large cut sections. The cross-sections are to provide a level of detail that cannot be obtained from proposed contouring on a 1"=40' Scale plan.

77. *§249-32 F(6) and §249-59 G, Construction Management Plans are required with the Definitive Subdivision. Since the only routes to I-495 from the site of this subdivision is via Great Road, then either straight to I-495 or left continuing on King Street to I-495, this covers all truck routes to I-495. Also, further information on Construction Management will be provided in the SWPPP and this is submitted prior to construction. Considering the limited options for maneuvering construction vehicles and that further construction control is to be provided, we request a waiver on providing additional information at this time.*

    We respectfully defer to the Planning Board for a determination on the requirement of Construction Management Plans for this submission. The Applicant will be required to show construction signing when applying for their MassDOT Access Permit.

78. *§249-32 F(7), a Cost Estimate is provided for all construction costs within the proposed right-of-way and associated easements. However, these estimates are based on actual quotes from local contractors and not on Massachusetts Highway Department's "Standard Specifications for Highway and Bridges". Nevertheless, the costs are adjusted by 25% increase for safety and inflation. If the Board requests for the full scale MassDOT Weighted Average Unit Bid Prices and all other required factors, this can be provided.*

    We take no exception to the Applicant's request for a waiver. However, we respectfully defer to the Planning Board for a determination on this item. As the Town would be required to complete the remaining work using prevailing wage rates should the Applicant be unable to complete construction, this information will be required to set a bond amount.

79. *§249-51 G, a hydraulic grade line analysis is required for storm drains. We do provide full drainage calculations for all pipes proposed in this subdivision and hence providing adequate pipe-sizing calculations. The hydraulic gradient analysis would provide no further benefit and there we request this waiver.*

    We take no exception to the Applicant's request for a waiver of the hydraulic grade analysis, as the Pipe Flow Calculations indicate that the proposed pipes have sufficient capacity to convey the design flows without surcharging. We respectfully defer to the Board for a determination on the requirement of such an analysis for this submission.

80. *§249-51 H, a minimum thirty-foot setback to all property lines is required for the retention basins. However, in this subdivision, the layout of the lots and generation of open space limits the options for the location of the retention ponds. The location of the wetlands, the access to the site, the open space, and the control of the runoff, all limit the options for the precise location of these ponds, and on this basis, we request a waiver to this regulation.*

    While we believe the lots could have been configured to provide the required setback, we respectfully defer to the Board for a determination on this requirement.

81. *§249-73, all curbing shall be MassDOT Granite Curb Type V A-4 as approved by the board an shall be installed on both sides of the street and for the total length of the street and on other streets for the full radius plus at least (3) feet on each end of all street intersections. MassDOT Sloped Granite Edging Type SA shall be used for the inner and outer circle of cul-de-sacs and for median islands when median islands have been approved by the board. A waiver is requested to allow bituminous berm in lieu of vertical and sloped granite curbing.*

    We take no exception to the proposed berm and sloped granite edging proposed by the Applicant. We respectfully defer to the Planning Board for a determination on the acceptability of the bituminous berm and sloped granite edging.

82. *§249-81, requires 5' cement concrete sidewalks with a 3' grass strip. A waiver is requested to allow 4' bituminous sidewalks with a 1.5' grass strip.*

    We respectfully defer to the Planning Board for a determination on this waiver. The 5-foot minimum is to provide room for the Town's sidewalk plow. Additionally, ADA regulations require a 5-foot x 5-foot turning area every 200-feet if a sidewalk of less than 5-feet is constructed. A 3-foot wide grass strip is required to ensure grass seed establishment. A grass strip less than 3-foot wide will not be wide enough to promote grass growth. Cement concrete is preferred over bituminous concrete due to long term durability.

83. *§249-85, requires all storm drainage pipes be reinforced concrete pipe. A waiver is requested to allow all storm drainage pipes to be constructed of High Density Polyethylene (HDPE).*

We respectfully defer to the Planning Board for a determination on the use of HDPE within the proposed private way. It should be noted that improper backfilling of HDPE pipe can result in "out-of-round" pipe and reduced load-bearing capacity due to insufficient structural support below the pipe springline. If this waiver is granted, we recommend that the Applicant include notes requiring that pipe backfilling be performed in accordance with the HDPE pipe manufacturer's requirements to address this potential concern.

84. *Open Space Developemnt §173-104, requires density yield plans show all lots can support the placement of an on-lot septic system for a 4 bedroom dwelling as evidenced by soils and percolation tests. While a significant number of test holes have been performed on site, the requirement to test every lot on the yield plan is excessive. We have performed over 50 test holes on site and can confidently say that all lots shown on the yield plan will support a 4 bedroom dwelling.*

    Per the Comment #2 from the Board of Health Agent James Garreffi in his January 10, 2017 email, "There have been many deep holes and perc tests done on the site in three distinct areas. Given the variability of soils, perc rates and the water table in the area I could not make the statement by the engineer in support of this request." Based on the available testing information, we recommend that additional test pits be conducted at Lots 14 through 17 on the density yield plan (Sheet YP) to confirm suitability for on-site septic systems for these lots. The existing elevations of these lots are similar to those of the wetlands located at the rear of the lots. We respectfully defer to the Planning Board for a determination on the acceptability of this waiver request.

**Comments from Town Departments:**

85. Per an email from James Garreffi to Maren Toohill, dated January 10, 2017, the Littleton Board of Health has the following comments. The Applicant should provide a response to each comment.
    a. "This office has not seen any materials on the proposed sewage disposal systems for the site."
    b. "With regards to the waiver request #9 I would have the following response. There have been many deep holes and perc tests done on the site in three distinct areas. Given the variability of soils, perc rates and the water table in the area I could not make the statement by the engineer in support of this request."
    c. "What percentage of the proposed open space are wetlands?"
    d. "The ultimate ownership arrangement of the proposed development (home owner's association, condominium) will require additional reviews and adherence to other portions of Title 5 which apply additional requirements for the proposed sewage disposal system."
    e. "This development, with the creation of the over 55 development lot, allows for the installation of two Title 5 systems rather than one sewage system for the development. The one system would require permitting under the groundwater discharge permit process which would provide enhanced wastewater treatment and be permitted by DEP."
    f. "Woodwaste generated from the development of these lots must be handled in accordance with the Department of Environmental Protection's Woodwaste Policy and Site Assignment regulations."
    g. "Any blasting done on site will be with non-perchlorate based blasting materials."

87. Per an email from David Ketchen to Maren Toohill, dated January 4, 2017, the Littleton Electric Light Department has the following comments. The Applicant should provide a response to each comment.
    a. "…we do not want the electrical conduit to be installed under the sidewalk unless absolutely necessary. Also, whatever electrical conduit that is installed under sidewalk, or roadway we require to be either concrete encased or schedule 80 conduit."
    b. "…we want the electrical conduit and infrastructure to be installed on the field side of the sidewalk as opposed to the street side."
88. Per an email from Kevin Hunt to Maren Toohill, dated January 4, 2017, the Littleton Water Department has the following comment. The Applicant should provide a response to the comment.
    a. "LWD will require that a FLOW test be performed at the location of the proposed development as part of the permitting process for this project."

**Exclusions:**

As indicated in the Scope of Services, this peer review does not include the following:

- Review of the Definitive Subdivision Application Package for compliance with other Local, State or Federal codes, ordinances or laws not mandated by the Code of the Town of Littleton, Massachusetts, Chapter 173, Zoning Bylaw and Chapter 249, Subdivision of Land Regulations;
- Review of any previously approved plans, reports or applications for compliance with Local, State or Federal codes, ordinances or laws;
- Confirmation of any delineated resource areas;
- Review of septic system design;
- Review of the project during construction;
- A waiver has been requested for the Traffic Impact Study. If a Traffic Impact Study is provided, we can review this document as an additional service.

Several of the above comments include recommendations for the provision of additional drawing and document information. The updated information may result in the generation of additional comments once received and reviewed. Should you have any questions regarding this Peer Review please do not hesitate to contact us.

Sincerely,
***Green International Affiliates, Inc.***

Thomas Bigelow

Thomas Bigelow, P.E. (NH)
Project Engineer

Luke Boucher, P.E.
Project Manager

LB/TB

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