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December 30, 2019

Mr. Paul Foley, Director
Planning & Economic Development
Town of Fairhaven
40 Center Street
Fairhaven, MA 02719

RE: Sconticut Neck Woods, Fairhaven, MA.
Off Hiller Avenue and Timothy Street
Definitive Subdivision Plan
Subdivision and Stormwater Management Plan (SMP) Review.

Dear Mr. Foley:

GCG Associates, Inc. has reviewed the following information for the Sconticut Neck Woods Definitive Subdivision Plan, in Fairhaven, MA with respect to the Subdivision Regulation Chapters 322, stormwater and Stromwater related requirements under Chapters 192, 194, 198-31.1.

Plan References: "Sconticut Neck Woods", Definitive Subdivision Plan, Fairhaven, MA prepared by Schneider, Davignon & Leone, Inc. (SDL) dated November 08, 2018, Last revised December 18, 2019 consists of:
Sheet 1 - Cover Sheet
Sheet 2 – Lotting Plan – North & South
Sheet 3 – Existing Topographical Plan
Sheet 4 – Proposed Topographical Plan - North
Sheet 5 – Proposed Topographical Plan - South
Sheet 6 – Proposed Utility Plan – North
Sheet 7 – Proposed Utility Plan – South
Sheet 8 – Proposed Road Profile Plan – North
Sheet 9 – Proposed Road Profile Plan – South
Sheet 10 – Construction Details
Sheet 11 – Construction Details

Documents: Peer Review #2 - reply letter prepared by SDL dated December 05, 2019.

Stormwater Report Residential Subdivision Sconticut Neck Woods, Fairhaven, Massachusetts prepared by Keri William, P.E. dated May 16, 2019. Last revised December 02, 2019

Based upon our review of the above information, we offer the following general comments and comments with respect to compliance with Town Bylaws: Chapters 192 – Wetlands; 194 - Stormwater Management, Illicit Discharge, Soil Erosion, Sediment Control By-Law; 198-31.1 – Zoning - Stormwater Management; Chapter 322, Subdivision of Land and Chapter 322.26 – Stormwater Management. The numerical section of the regulations is referenced at the beginning of each comment unless it is a general comment. Applicant response is shown in ***bold Italic***, GCG 10/03/19 comments in *Blue Italic*. SDL 12/05/19 response in *Red Time New Roman.* GCG latest comments in **Blue Calibri.**

GENERAL PLAN AND DEVELOPMENT COMMENTS

The following are general comments with respect to the plans and development of the project.

1. This is a single-family residential definitive subdivision new development project on a vacant parcel Assessors Map 28C, Lot 71 consists of 15.08 acres (Tax record). The project is required to meet the Town of Fairhaven Subdivision Regulations, Stormwater Management standards. ***The Assessors records are not correct The property survey has been determined by a Registered Land Surveyor to have total lot area of 10.85 Acres+. Said figure has been added to sheets no. 1 and no. 2.*** *Resolved.*
2. 194-4(A)(1)(b) - this development requires a Land Disturbance Permit with the Fairhaven Board of Public Works. ***The BPW was required to submit a by-law for approval by Town Meeting by June 30, 2019. After speaking with Vincent Furtado, BPW Director, no such application currently exists. Mr. Furtado informed that we simply have to obtain Planning Board and Conservation Commission permits to proceed and that since the by-law was predicted on the Planning Board Erosion Control Criteria, no further action would be required.*** *Per BPW requirements, no response required.*
3. This project requires an US-EPA National Pollutant Discharge Elimination System (NPDES) permit and associated Stormwater Pollutant Prevention Plan (SWPPP) filing. ***Said permit has been submitted to the EPA.*** *Per EPA requirements, no response required.*
4. 322-14(C)(6 & 11) – Mete and bound, lot closures calculations for the proposed Right-of-Ways, Easements, and Lots should be submitted to show meeting Zoning requirements. ***The Zoning information was already shown on the cover sheet (upper right comer), specifically the Zoning District and its applicable requirements. Sheets no. 2 and no. 3 depict all of the calculated lot & street areas with metes and bounds as determined by a Registered Land Surveyor.*** *GCG will rely on Surveyor's certification, no response required.*
5. 322-14(C)(7) - The Plan should show or reference all WRP, NHESP boundary and location of the FIRM boundary or stated that the subject parcel is outside of the regulated zone or district***. All wetland resource areas are depicted on the plans and the site does not fall within a Flood Zone. The F.I.R.M. information has been added to the Cover Sheet (below zoning information).*** *Resolved.*
6. 322-14(C)(12) – Street numbers should be shown enclosed in squares, when available. ***House numbers will not he assigned by the Town of Fairhaven***

Assessors/Building Dept until such time as Building Permit Applications are submitted to the Building Dept. *As stated, when available.*

7. 322-14(C)(15) – At least two permanent concrete or granite monuments must be placed on site and shown in the plans prior to construction. Vertical Benchmarks (TBM) may be provided. ***A note has been added to sheet no. 2 relative to the installation of two permanent markers to be installed prior to construction. Benchmarks have been added to the plans.*** *Resolved.*
8. 322-14(C)(18) – proposed street trees and existing trees to be retained should be shown on the plan. The typical roadway cross-section details call for street trees 40 feet over center. Tree locations should be shown on the plan. ***The proposed street tree locations have been added to sheets no. 5 and no. 6 together with the limits of***
clearing. The Town Planner has not directed this office as to which trees should be retained as required by Section 322-14 (c)(18). *Trees to be retained should be marked on plan for protection, as directed.*
9. 322-14(C)(19) – Existing utility pole and overhead wire should be shown on the plan, Existing water and sewer main size and material should be shown upstream and downstream manholes and invert(s) should be provided to determine flow direction and capacity. ***The existing utility poles closest to the two proposed roadways and their respective overhead wires have been added to the plans. The existing water main types and sizes and the sewer main sizes, slopes and directions have been shown. However please note that the type of the sewer pipe located in Hiller Avenue is unknown to the Sewer Dept.*** *The applicant should provide all necessary data to assist the Board to determine the existing surrounding municipal infrastructure is sufficient and/or capable of handling the additional volume. (322-18 C.) All available information has been provided.* **The applicant should identify the existing sewer pipe material and conditions in Hiller Avenue. The pipe is approximately 165' in length and services no more than two dwellings. This is a multimillion-dollar development connecting to an unknown pipe. The applicant should investigate the conditions and capacity of the existing sewer main.**
10. 322-14(D)(1) – An environmental impact analysis is required for all subdivision over 10 acres. ***See attached Report by LEC Environmental Consultants, Inc.*** *See Stormwater review comments.*
11. 322-14(D)(7) – Construction cost estimate is required. ***See attached Construction cost estimate provided by the Developer who will be installing the roadway and infrastructure. Robert Rodriques is the owner of Fairhaven Excavation a local excavation company with decades of experience performing said type of construction and is more qualified to provide said estimate than this engineering firm. It is my opinion that the Fairhaven BPW would/could confirm his qualifications.*** *322-14(D)(7) requires detailed estimate be certified by the project's registered professional engineer, estimate shall be based on the MassDOT Standard Specifications, quantity, item number, unit price and total amount for each construction item, adjusted to prevailing wages rates and 20% inflation/safety factor, and engineering inspection, materials testing, legal and other soft costs. This information is utilized to establish surety. The developer will be fulfilling a covenant Form D in lieu of filing a bond or depositing money.* **Planning Board decision required.**
12. 322-14(D)(8) – Street- lighting should be shown on the plan. ***This office agrees that the regulations require a lighting plan. However, it is the Applicant's position that the Planning Board historically has never required that a street lighting plan he implemented other than that provided by Eversource on utility poles***

installed. The Applicant has proposed underground electric as required by the regulations but is open to also installing utility poles with street lights and therefore defers to the Planning Board for this decision. *Planning Board decision is required. The plans have been revised to incorporate a lighting plan.* **Lighting has been added to the plan set. Two light poles have been proposed on Colin's Drive, two poles on Hiller Avenue Extension and three poles on Nolan's Way. This is a residential subdivision and there are no specific luminaire requirements. The regulation stated, "Said system shall be in conformance with existing systems in the Town, as well as with the local electric company street-lighting specifications…..The applicant shall include a complete street-lighting system for the proposed street in the definitive plans prior to endorsement of those plans." GCG considered this plan has met the intend of this regulation. Lighting fixture and details should be incorporated with Eversource and submit to the Board prior to endorsement of the Definitive Subdivision plan.**

13. 322-14(D)(9) – Additional erosion control should be installed along the east property line of 21 Timothy Street; in front of wet-flags #7 to #15; #17 to easterly property line, along easterly property to wet-flag #24; in front of wet-flags #29 to #39 and along the easterly property line and along the south side of lots 4 and 5. ***The plans have been revised per the above suggestion.*** *Resolved.*
14. 322-16(A)(11) – the proposed Lot 14 and Parcel B appear to consist reserve strip along the proposed hammerhead roadway off Timothy Street. Planning Board approval is required, GCG recommends widening the proposed right-of-way to meet the abutting properties. ***With all due respect to the recommendation, the proposed Roadway Layout complies with the Subdivision Rules and Regulations. The Applicant respectfully declines to provide a layout that is not required.*** *The proposed layout has two narrow strips of land separating the abutting properties (Map 28C, Lots 70 & 77) to have direct access to the proposed roadway. Hence, Board approval is required. The regulation was intended to allow abutting properties to utilize/share the right-of-way for future development. GCG does not foresee any further development of Lots 70 and 77. Therefore, approval of the layout should not have any effect to the abutters. However, please see additional comments for the drainage design.*
15. 322-16(B) – a 75 feet leveling area not to exceed 3% slope is required at the new intersection. ***The plans have been revised to provide said leveling area less than 3%.*** *Resolved.*
16. 322-16(B) – The proposed hammerhead at the end of Hiller Avenue is intended to service Lots 11, 12 and 13. However, the overall dead-end street from Paul Street intersection to the hammerhead services two additional existing lots plus the 10 new lots created within this subdivision. In the situation of traffic blocking the proposed 10 lots roadway, emergency would have to utilizes the hammerhead to turn around. The Board may consider requiring a full cul-de-sac at the end of Hiller Avenue. ***The proposed hammerhead servicing the 3-lots complies with the Subdivision Rules and Regulations. The existing portion of Hiller Avenue which would now service five homes also complies with the width of pavement required for five lots and the additional ten lots.*** *Fire and Police Departments should review the proposed layout.*
17. Massachusetts Stormwater Handbook (MSH) Vol. 2, Ch. 2 Pg. 88. – requires infiltration basin to provide a minimum of 50 feet setback from any surface water of the commonwealth. (Applies for Ponds A & B). Existing buildings for #21 and #23 Timothy Street should be located on the plan to proof the proposed infiltration basin meets the 100 feet upslope setback requirements. ***The location of the existing***

homes located on Timothy Street have been provided together with contours which depict that they are located upgradient of the detention pond. Please refer to Stormwater Management Comment no. 2 on page 9 regarding the 50 foot setback requirement. *See Stormwater review comments.*

18. MSH Vol. 2, Ch. 2 Pg. 91. – requires 15 feet wide access around the entire basin perimeter, (applies to Pond A & B). GCG recommends a minimum of 10 feet wide top bench. ***The design of the detention ponds complies with the Fairhaven Subdivision Rules and Regulations. Additionally, the requirement of slopes to be at 4:1 allow for easy access for machinery to enter the ponds along the significant frontage of their respective roadways. Therefore, it is the position of the Applicant that adequate access into the pond's for future maintenance has been provided.*** *The 15 feet wide access path was required by the DEP MSH. And a ten-foot wide bench at a slope of 0% shall surround any permanent pool in addition to the required 4H:1V side slope, which is required under 322-Appendix A (C)(2)(g)(2). The proposed top of berm is only 4' wide and is not suitable for DPW maintenance crew, who requires hauling equipment to site. The plans have been revised to provide a 10 ' wide access path around the perimeter of the outside of the ponds to provide access for maintenance of the outside of the berms. The inside has adequate access from the roadways.* **MSH requires the area at the top of the basin must provide unimpeded vehicle access around the entire basin perimeter. And 322-Appendix A (C)(2)(g)(2) also requires "A ten-foot wide bench at a slope of 0% shall surround any permanent pool". Both State and Local regulations require the wide access/bench on top of earth berm to avoid breach of the embankment and assure any trees and woody vegetation will be removed on the access path. Roots are considered safety hazard associated with earthen berms for water impoundment. The basins as shown do not have room to provide the required ten feet wide bench around the pond perimeter. As proposed, it provided reasonable maintenance access. GCG recommends to re-grade the steep 4H:1V section to 15% to 18%. However, Fairhaven DPW will be the future operator for public drainage facility after street acceptance and should review and approve the system. GCG recommends the applicant to request a waive for 322-Appendix A (C)(2)(g)(2). However, MassDEP could reject the design by Supersede Order of Conditions for their 15' wide access path requirements.**

19. Hammerhead radius should be called out on the plan. ***All radii have been added to the plans.*** *Resolved.*

20. 322-16(A)(7) – requires roadway center line coincide with Right-of-Way, the proposed hammerhead at the end of Hiller Avenue has approximately 5 feet center line offset at the 10 lots roadway intersection. The Hiller Avenue east bound travel lane is placed head on with the new hammerhead opposite traffic, which creates a dangerous conflict and shall be revised. Taper should be provided for reducing pavement width per AASHTO. ***The plans have been revised to address this comment.*** *Resolved.*

21. The plan proposed fill along the north, east and south sides of Map 28C Lot 79 (20 Hiller Avenue). The proposed grading appears to trap surface runoff along the east portion of Lot 79, there is a proposed 12-inch culvert at the easterly lot corner. Additional contours should be provided within Lot 79 to assure existing surface drains toward the easterly lot corner. The proposed contour along Lot 79 southerly property line needs to be set lower than elevation 36 to release surface runoff. Detail drainage study should be performed to assure water does not backup onto Lot 79. Based on the site photos provided by the Town, which showing the existing open channel carries much higher volume and flow than the 10-inch diameter discharge

pipe capacity. The drainage study should analysis the upstream watershed area and size the drainage system to handle the less frequency storm and assure the water does not backup to Lot 79. The Board may consider requiring a drainage and/or slope easement from the abutter. ***Additional contours have been added and a drainage study has been performed. The study has resulted in no change to the proposed 15" drain but a change in the invert of the outfall pipe. The driveway and associated fill have been revised to eliminate the need for a retaining wall. Additional changes in grades have been provided to address the concerns of the ponding of water. Finally, the existing 10" RCP located in the Hiller Avenue will now he replaced with a 12" RCP.*** *The revised stormwater management report shown that there are 5.4 acres of offsite watershed drains to the existing single drop inlet at the Hiller Avenue and Paul Street intersection. The peak flows are 6.70 cfs, 11.18 cfs, 14.33 cfs, 19.30 cfs for the 2-year, 10-year, 25-year and 100-year storm events, respectively. The existing drop inlet does not have the capacity to handle a 2-year storm event. Currently excessive/by-pass runoff flows toward the end of Hiller Avenue and overland flows to wetland area. The proposed Hiller Avenue extension pitches toward to the low point at new streets' intersection. This layout is blocking existing drainage runoff overflow path and potentially spill over onto Lots 78 and 79. This would become a liability issue. The applicant needs to design the drainage system to handle the existing flow and new flows generated by this development without flooding the abutters. Due to this new finding, please provide catch basin inlet capacity calculations per 198-31.1(C)(2)(n)[3], including the existing drop inlet at the Hiller Avenue and Paul Street intersection. The offsite flow would require a minimum of 21" RCP to handle the 19.30 cfs and appropriate inlet(s) to collect the flow. This is an existing issue and not causing by this development. However, the Board has the authority to require off-site improvements under Section 322-18 C. The offsite area has been further analyzed and determined to be 4. 94 acres. Said area drains into six (6) existing catch basins (not a single basin) located along Hiller Avenue. Refer to Existing Conditions Basin Map for existing catch basin locations (ECB 1 - ECB 6). The analysis proves that this concern has been addressed with the further plan revisions which include incorporating double grates at catch basins #1 and #lA and increasing the pipe sizes of the proposed by-pass system.* **The latest calculations shown peak runoff at the Hiller Avenue 10" RCP for the 25-year and 100-year storm events were calculated as 14.11 cfs and 17.40 cfs, respectively. The proposed 15" replacement RCP has a full capacity of 6.79 cfs. Therefore, a large amount of runoff will be left behind and flows toward to the proposed double catch basin #1. Please provide inlet capacity calculations for the drainage system. Some ponding is expected and allowed during the less frequent storm events per 322-26.F.(3). Runoff shall be controlled and retained within the right-of-right for up to 100-year storm event. The three proposed 24" pipes from DMH-1 to DMH-2 to DMH-3 to outfall do not have the capacity to carry the 100-year storm flow. Calculations should be provided to show surcharge would stay within the right-the -way during 100-year storm event.**

22. The proposed Lot 13 driveway culvert outlet is located 2 feet away from Lot 12 westerly lot line, an easement should be provided. GCG recommends rotating the culvert and place the outlet toward wet-flags #10 & #11. ***The plans have been revised per the recommendation. Due to the relocation no easement is needed.*** *Resolved.*
23. The proposed grading along Map 28C Lot 78 easterly property line needs clarification. The plan calls for a Redi-Rock drainage headwall, top wall elevation 42.7, bottom elevation 38.2. This drainage headwall appears to be a 140-feet

retaining wall, there is also a (18" wide) drainage trench proposed between the Redi-Rock wall and Lot 78 property line with 6" ADS perforated pipe, laid level with invert at 38.8, (which is above the bottom of wall at 28.2). Please provide 18" wide drainage trench cross-section detail to clarify the intend), there is no discharge connection for the 6" ADS pipe, if it is used as infiltration trench, a minimum of 10 feet setback from the property line is required. All these works are located within a foot along Lot 78 property line. Encroachment is expected and GCG recommends a drainage or slope easement should be provided. Furthermore, two culverts were proposed within the 140 feet wall, the southerly culvert invert at the northeast lot #1 corner is proposed at 39.4, and the northerly culvert near the Hiller Avenue and proposed roadways intersection invert is at 38.70. There is no proposed grading shown along Lot 78 property line. Additional grading or berm is needed to ensure the runoff flows into the southerly culvert and not onto Lot 78. The plan as shown will pond water along the lot line. ***A x-sectional detail has been provided on sheet no.11 to clarify the proposed layout Additionally, the Redi-Rock wall has been relocated further away from the lot line to eliminate the need for an easement. Finally, additional contours have been added to further illustrate the existing conditions, specifically that no ponding will occur.*** *The proposed retaining wall and stone/pipe trench is located approximately 3' from the property line. And there appears to be existing trees along lot 78property line. The proposed peastone covered stone trench would require frequent maintenance. It is impractical to expect the DPW crew to access the narrow strip between the Redi-Rock wall and property line to maintain the trench to prevent flooding the private property. The proposed retaining wall is located within the right-of-way and become the Town's responsibility after street acceptance. 322-16 B. - Street design standards table calls for maximum Shoulder Slope 3:1, and the face of the proposed retaining wall would have a slope of close to 0:1, a waiver should be required for the retaining wall. The stone leaching trench has been replaced with a precast concrete trench drain to minimize and simplify maintenance. The proposed retaining wall has been incorporated into the drainage system to function as a headwall to collect offsite stormwater from lot #79. Typically, headwalls incorporated for stormwater collection and transport do not require waivers because structurally they are considered equivalent to side slopes.* **The proposed retaining wall with 130 feet long trench grate drainage system is located within the 5 feet wide shoulder area, where would not be accessible by vehicle due to the retaining wall with railing. Maintenance would require manual removal of the grate and cleaning. This 130 foot wall is a retaining wall and will be a future liability for the Town. It is the intent of 322-16 B. to require a 3:1 maximum shoulder slope to preclude walls within the right-of-way. The proposed wall and drainage system would become the DPW's responsibility after street acceptance and should be reviewed and approved by the Board of Public Works. An alternative would be widening the Nolan's Way and entrance and relocate the roadway westward away from Lot 78. (Similar to the proposed Colin's Drive and Timothy Street intersection.)**

24. There are two retaining walls located within the proposed right-of-way, both walls are partially in the private property, one (Lot 13) without a benefit of an easement. Once approved and through street acceptance, the walls will become the Town's responsibility. GCG recommends the applicant to provide additional easement to cover the wall in Lot 13. However, the Board does have the authority to require retaining wall to be installed in private property and become the property owner's responsibility. Guardrail should be installed along the 4.5 feet tall retaining wall next to Lot 78. Guardrail may also be required in front of Lot 79 depends on grading and

relocating roadway to meet ROW center line. ***The driveway for lot #13 has been relocated easterly to eliminate the need for the retaining wall and all concerns outlined The retaining wall along lot #78 is only 3 feet high (see attached x-sectional detail) and has a sidewalk between said structure and the paved roadway, therefore no guardrail is warranted. A safety fence has been added along the top of the will.*** *A waiver for the proposed wall within the shoulder area is required, see comment #23 above. Lots 78 and 79 have potential flooding risks due to the insufficient and incapable existing drainage system and the proposed grading. The Town and/or developer needs to address the issues and protect the abutters. The design revisions performed on 8-30-19 addressed any potential flooding risk to lot #79. The changes described in item no. 23 above addresses all concerns relative to lot #78. Jn addition to the concrete trench drain, which will have its grate set significantly lower than the lowest grade of lot 78, a 12" diameter emergency overflow pipe has been provided.* **The location and capacity of the double catch basin #1 should be analysis to assure no overspill over onto lot 79. The proposed wall and drain system require extensive manual maintenance and should be reviewed and approved by the Board of Public Works. (See comments 21 and 23 above.)**

25. 322-26(F)(7) - Storm drains shall have at least 24 inches of cover. The catch basins and drain manhole at the Hiller Avenue/New roadways intersection have less than 2 feet cover. Reinforced concrete Class IV pipe should be specified if having less than forty-eight-inch cover within a street right-of-way. ***The "Typical Storm Drain Trench X-Section" on Sheet no. 10 now specifies Class IV pipe.*** *The required 24 inches of cover at the intersection needs to be addressed. The typical "storm drain trench x-sectional detail provides a note for pipes with less than 2 ft. of cover to be encased in 6" of concrete.* **The proposed concrete encasement would work on the roadway shoulder or cross-country area. The drainpipes at the Nolan's Way/Hiller Avenue intersection have approximately 13'' of cover over the top of concrete pipe, with the proposed 6" concrete encasement, top of the concrete would be 3" below the binder pavement and is not suitable for frost heaves actions in New England's winter conditions. GCG recommends to two feet pipe cover (pavement over gravel) within the roadway area; the proposed drainpipe D4 interferes drainpipe D7 at their crossing, top of 24" (D4) RCP elevation is 37.17 and bottom of 12" (D7) RCP crossing elevation is 36.99; There are discrepancy with the pipe schedules shown on sheets 8 & 9. (e.g. D11, D12 and D16; D3 should be 12" RCP.) Pipe schedule tables should match with the Storm Drain Design Worksheet.**

26. The existing water main size on Paul Street, Timothy Street and Hiller Avenue should be called out on the plan. The section of water main on Hiller Avenue services only Lot 79, the main may not meet the minimum requirements. The applicant should be responsible to upgrade this section of main to 8" CLDI as necessary. All new water main should have a minimum size of 8" diameter. ***All water main types and sizes have been shown. The BPW Water Dept has reviewed the plans and are not requiring any offsite upgrades.*** *Approximately 800 linear feet of proposed 8" Class 52 Ductile Iron water main are extended from the existing 200' section of 6" AC water on Hiller Avenue, there is no indication of the water main size and material. BPW-water also requested main piping all class 52 Ductile Iron. GCG recommends replacing the existing 6" AC water main on Hiller Avenue with 8" DI new main. All new water mains have been specified to be 8" ductile iron pipe. The Fairhaven water department is not requesting any upgrades to offsite pipes.* **GCG**

recommends to replace the existing 6" diameter AC water main with 8" ductile iron pipe to the Paul Street extension.

27. Existing Hydrant(s) near the new development should be shown on the plan. Additional hydrant may be required to improve the existing system to meet the maximum 500 feet spacing requirements. Water pressure tests on Paul Street and Timothy Street should be performed to ensure enough pressure to support the development. ***The approximate locations of the nearest hydrants located on Timothy Street and Hiller Avenue and their respective distances to the proposed roadways are now shown. The distances between the existing and proposed hydrants are less than 500 feet Therefore, no additional hydrants are required The BPW Water Dept is not requiring the Applicant to provide water pressure tests.*** *The applicant is responsible to prove that the proposed water main extensions have sufficient hydrant flow to meet current Fire Code. Therefore, flow tests should be performed at the connection locations and analysis the hydrant flow with the development. The BPW Water Dept. is not requiring the Applicant to provide water pressure tests.* **The Town would be liable for approving a water main without knowing it can meet the water demand and fire flow requirements. GCG does not recommend approval without proving the proposed water main will meet all codes.**

28. The proposed water main on Hiller Avenue and the new roads will create an approximately 1000 feet of dead-end water system. GCG recommends looping the system back to Paul Street or Timothy Street. ***The Applicant respectfully declines to provide said loop because it is not a requirement by the Planning Board Subdivision Rules and Regulations or any BPW - Water Department Regulation. Per the Fairhaven BPW - Water Dept the existing water mains in Hiller Ave and Timothy Street are 6"AC installed circa 1945 (date of subdivision plans). It is our opinion that to improve water pressure and quality the Town should upgrade all water mains in the abutting neighborhood with 8" Class 52 Ductile Iron including looping Timothy Street to Arsene Street.*** *The BPW – Water also requested to loop Timothy to Hiller instead of Dead Ends. GCG recommends that the new water system be looped back to Timothy Street. Existing utilities improvements are regulated under Section 322-18 C. which stated that "…The Planning Board shall disapprove of a subdivision plan where, in the opinion of the Planning Board, the existing surrounding municipal infrastructure (e.g. street width and construction, sanitary sewer, public water, etc.) is insufficient and/or incapable of handling the volume (e.g. traffic, sewage, stormwater, etc.) anticipated, by the Planning Board, to be generated by the project. Planning Board may accept or require off-site improvements to mitigate any of these impacts." This regulation is current and allows the Board to accept or require offsite improvements. The previous rebuttal provided by the Applicant and this office above stands.* **On the September 10, 2019 reply letter to Board of Public Works Comments prepared by SDL stated BPW-Water-Comments dated 6-19-19, Item 2. "Loop Timothy to Hiller instead of Dead Ends." Responded: "The Applicant respectfully declines to provide said loop because it is not a requirement by the Planning Board Subdivision Rules and Regulations or any BPW - Water Department Regulation. Per the Fairhaven BPW - Water Dept. the existing water mains in Hiller Ave and Timothy Street are 6" AC installed circa 1945 (date of subdivision plans). It is our opinion that to improve water pressure and quality the Town should upgrade all water mains in the abutting neighborhood with 8" Class 52 Ductile Iron including looping Timothy Street to Arsene Street." Section 322-18C. stated that the Town is not responsible for off-site improvements to support a new project. GCG recommends the new water**

main be looped from Paul Street to Timothy Street. The existing AC water mains are old but functional. GCG recommends the applicant to test and prove that the existing water main on Paul Street and Timothy Street have the capacity to support this project.

29. Additional contours and spot grades should be provided at the Pond A outlet trap rock swale. The top of trap rock next to the east property line should be at elevation 35.9, see detention pond details sheet 11 of 11. However, the existing contour at the property line is at elevation 34.2. Similar situation is at the Pond B outfall location, proposed contours and spot grade should be added. ***Additional contours and detail information have been added as suggested.*** *Resolved.*
30. Lot #79 driveway location should be field located, due to the proximity of the proposed catch basin and steep grading in front of the lot. ***The driveway has been field located by this office and added to the plan.*** *Resolved.*
31. The two drain lines crossing at the easterly Hiller Avenue Hammerhead does not have sufficient separation, (approximately 0.15' separation as shown, 18" recommended.) ***The proposed by-pass pipe has been lowered and the outfall pipe from the catch basin has been raised to create 7.3" of clearance. The existing drainage outfall at the existing end of pavement limits what can be achieved.*** *GCG recommends encasing the pipes with concrete. A note has been added to the Typical Storm Drain X -sectional detail requiring said pipes to be encased in concrete.* **The two pipes shown in this iteration collide at the crossing. The 12" pipe (D7) bottom of pipe at crossing is 36.99 and the 24" pipe (D4) top of pipe elevation at 37.20. Please revise.**
32. Drainage manhole with various size pipes should match crown elevation. ***The proposed by-pass pipe has been lowered and the outfall pipe from the catch has been raised to create 7.3" of clearance. The existing drainage outfall at the existing end of pavement limits what can he achieved.*** *322-26(F)(7) - the updated 24" pipe does not meet the minimum 2' cover. Please verify DMH #6 (4' diameter) is adequate for the pipe sizes with multiple inlets. Existing drop inlet catch basin combined with proposed catch basins #1 and #1A do not have the capacity to collect the offsite flows (14.33 cfs & 19.30 cfs for 25-year and 100-year storm event, respectively.) Bypassed runoff would overspill onto Lots #78 & #79. Drainage system at the intersection needs to be re-sized to handle the offsite flow. DMH #6 has been upgraded to a 5 ft. diameter structure. All pipes with less than 2 ft. of cover will be encased in concrete. Further analysis has been completed to address the intersection concern as outlined in item no. 21.* **The proposed 6" concrete encasement would work in the roadway shoulder and cross-country situations. The pipes at the intersection have 13+/- inches of cover, the 6" concrete encasement would be within the roadway gravel base and 3" below the binder course. And is not suitable for the frost heaves conditions in this region. GCG recommends a minimum of 2 feet cover within the proposed roadway pavement area.**
33. All sewer line within the street Right-of-Way should be 8" diameter minimum per MDEP. ***The plans have been updated to provide a minimum 8" diameter.*** *Resolved.*
34. The proposed sewer connection manhole at the end of Hiller Avenue has less than 4' of cover. The existing sewer pipe size should be called out on the plan, and upgraded to 8" diameter as necessary, sewer pipe with less than 4' of cover should be insulated. ***The existing pavement in the area (before and after) the existing sewer manhole is proposed to be regraded at a higher elevation. The existing sewer manhole rim will be changed from elevation 38.89 to elevation 40.35 resulting in a 4.15 Foot dimension from invert to finish grade. The BPW Sewer Dept has reviewed the plans and are not requiring an insulation of the pipes.*** *The applicant should investigate the existing sewer pipe's material and conditions to*

assure adequate to handle the proposed development. The existing SMH at the end of Hiller Avenue has less than 3.5' pipe cover with the proposed road grade, and the proposed SMH #1 also has less than 3.5 ' pipe cover. MassDEP's "Guideline for the Design, Construction, Operation, and Maintenance of Small Wastewater Treatment Facilities with Land Disposal", Section IX. Design Criteria page 51 stated that Depth of Cover – "Sewers should be designed to be deep enough to drain basement fixtures (where feasible) and to prevent freezing. Insulation may be required for sewers that cannot be placed at depths greater than 4 feet. The existing sewer pipe with less than 4' of cover services a single-family dwelling and the proposed development will add additional 13 houses sewage flow to the system. GCG recommends all sewer pipe with less than 4' cover be insulated. The BPW Sewer Dept. has reviewed the plans and is not requiring an insulation of the pipes. **GCG recommends insulate the section of sewer main on Hiller Avenue with less than 4' cover. The existing 8" sewer main pipe type on Hiller Avenue is unknown. The applicant should investigate the existing sewer type and prove that it has the capacity and suitable to handle the proposed flow.**

35. Proposed drainpipe near Lot 79 driveway not labeled, (10' at 1.0% slope). ***The information has been added.*** *Resolved.*
36. Sewer manhole interior channel should have minimum of 0.1 feet drop. ***The notation has been added to the SMH detail on sheet no. 10.*** *Resolved.*
37. Drop Sewer Manhole details should be included, internal or external drop should be specified per Fairhaven DPW's approval. If internal drop is required, SMH diameter should be upgraded to accommodate the hard wares. ***A detail has been provided for an external drop on sheet no. 10.*** *Subject to Sewer/Wastewater Department approval.*
38. Subdivision Regulations - Appendix A (C)(2)(K) – forebay minimum depth should be 4 feet and sized to accommodate 0.25 inches/impervious area. Access path should be provided per 322-26 (D). ***The forebays have been revised to be 4 feet deep and sized to acco.1I1II1odate 0.25 inches/ imperious area. The plans comply with section 322-26 (D) which requires that the drainage parcels have a minimum 20-foot right- of- way to the roadway. Parcel A and Parcel B contain 172.21 and 315.90 feet of frontage respectively (> 20 ft.) along the actual roadway.*** *SMH Vol. 2, Ch. 2 Pg. 15 requires the bottom of sediment forebay be set at a minimum of 2 feet above seasonal high groundwater (SHGW), unless part of a wet basin. The proposed forebay bottoms are at SHGW. The design has been revised to incorporate 2 ft. deep precast concrete sumps in the forebays which provides the additional 2 ft. the Planning Board regulations require while still maintaining the 2 ft. groundwater separation with that portion of the fore bay bottom which is an earth (loam) bottom.* **GCG does not recommend the solid concrete sump at the forebay bottom. Water would pond at bottom of the sump and create a mosquito breeding ground. A sediment forebay is intended to exfiltrate and flow through the earth berm/spillway to the basin and is expected to draw down within 72 hours. (Hence, the 2 feet seasonal high ground water separation is required by MSH.)**
39. There is a proposed drainpipe at the corner of Lots 1 & 2 labeled "D21", please clarify. Intention of the existing stone wall should be called out on the plan. proposed contour 40 should be removed from this location. ***Please refer to "Drainage Pipe Lengths & Slopes" list on sheet no. 8 for "D-21". Notations have been added depicting stone walls which shall remain along the property lines of lots #1- #4 and contour 40 has been removed.*** *Resolved.*

40. Grading at the southerly lot #3 corner and rear of lot #4 needs clarification. Proposed contour 43 tied to existing contour 42. ***The grading has been clarified.*** *SMH Vol. 2 Ch.2 Pg.72. recommends conveyance drainage channel to use side slope of 3:1 or flatter to prevent side slope erosion. The proposed drainage channel between lots # and #4 has a side slope of 2:1. The side slopes of said swale located at the property line of lots #3 and #4 has been modified to provide a 3:1 slope.* **The applicant has proposed recharge trench between Lots 1 & 2 and Lots 3 & 4. These two infiltration trenches have outlet pipe invert at the bottom of the stone and do not retain any storage volume for recharge. GCG recommends to re-model these two swales as conveyance swale and remove any exfiltration and storage credit. The infiltration trench as modeled would require additional soil test pits and meet the ESHGW separation requirements.**
41. Proposed cul-de-sac landscape island is different from the Appendix C – Street Design Drawing, C-13. The proposed pavement width is uniform at 24 feet wide. The applicant should request a waiver. ***It is the opinion of this office that the ellipse-type design as shown in Appendix C would be difficult to construct as shown. The proposed design exceeds the minimum roadway width requirement therefore a waiver is not required. The Fairhaven Highway Dept. has requested that the landscape island be omitted and paved for plowing purposes. If the Planning Board decides that said request would be more appropriate the Applicant would agree to said change.*** *The shape of the landscape island should not cause any negative impacts to the development. If the Board is decided to eliminate the landscape island, the grading should be adjusted accordingly. Subject to Planning Board approval.*
42. Sewer pipe connection to the SMH on Timothy Street should be labeled. Sewer main within the street ROW should be 8" dimeter minimum, verify existing SMH condition is suitable for the proposed drop inlet installation. ***The sewer main in Timothy Street is 24" diameter per plans of record from the Sewer Dept A detail has been provided for an exterior drop inlet The Sewer Dept has reviewed the plans and has not outlined any concerns relative to this connection.*** *Subject to Sewer/Wastewater Department approval.*
43. Sewer and water services per each lot should be shown on the plan, with minimum of 10 feet horizontal separation. Sewer cleanout should be specified at the property line. A 2" sewer force main is proposed to service Lot #11. ***All sewer and water services together with water shutoffs and sewer cleanouts have been added to the plans including a typical 10 ft separation dimension.*** *Resolved.*
44. 322-16(B) – Profile should show the 75 feet leveling area. Sewer within street ROW should be 8" diameter minimum. Sewer manhole inverts channel should have a minimum of 0.1' drop. ***All profile views have been updated to show the 75-foot leveling areas. AU sewer pipe is specified to be 8" diameter and a notation has been added to the sewer manhole detail to provide 0.1-foot drop on sheet no. 10. Additionally, the sewer pipes shown in the roadway profile views have been updated to properly depict the 0.1-foot drop.*** *Resolved.*
45. The proposed drop inlet in front of Lot 79 is located on the grass shoulder and abuts proposed asphalt berm. This structure should be substituted with a standard deep sump catch basin. Is there a reason for the drop inlet at the corner of Lot 10, it seems like that a standard catch basin would fit in front of the berm. ***This was looked at again and a standard catch basin does not work for this location.*** *322-26(F)(4) requires catch basin grates shall be in the gutter to facilitate snow removal. GCG recommends applicant to request for a waiver. GCG is concerning the reported large existing offsite runoff entering this Hiller Avenue intersection. The*

existing drop inlet catch basin and proposed catch basins inlet capacity calculations should be provided per Ch. 322-26 (F)(3). Which requires Water velocities in catch basins shall not exceed 0.5 feet per second. Catch basins shall be designed (inlet capacity and spacing) such that the flow in the gutter during a twenty-five-year design storm is not more than three feet in width as calculated utilizing methodologies described in "Drainage of Highway Pavements, Hydraulic Engineering Circular No. 12" as published by the United States Department of Transportation, Federal Highway Administration. Inlet capacity shall be sized to eliminate any spillover onto abutter's property during the 25-year and 100-year storm events. Per item no. 21 above the concern relative to offsite runoff flooding at the intersection has been addressed. The drop inlet catch basin does not have a grate, therefore does not require a waiver. The regulations are silent on the use of drop inlet basins. It should be noted that all catch basins located on Hiller Avenue, Paul Street and John Street have "drop inlets". **GCG believes that the proposed double catch basin #1 does not have the capacity to collect the excessive offsite stormwater runoff and runoff will spill over onto the abutting private property. (See Comments #21 above.)**

46. All proposed sidewalk should meet ADA requirements, wheelchair ramps should be required. ***Wheelchair ramps have been provided including a detail on sheet no. 9.*** *ADA requires wheelchair ramps (WCR) be installed at the intersection. The ramps should be located after the stop sign. The proposed single WCR is located over 100 feet from the Timothy Street intersection on Colin's Drive and the proposed paved runoff chute is preventing sidewalk to connect to Timothy Street. Two WCRs are proposed on Nolan's Way approximately 30 to 40 feet from the Hiller Avenue intersection. No WCR proposed on Hiller Avenue Extension.*

47. Catch basin and drop inlet trap should have a sealed cover top. ***The specification on the catch basin detail sheet no. 10 has been updated.*** *Resolved.*

48. Show 18" wide drainage trench with 6" perforated pipe detail. ***A x- sectional detail has been added to sheet no. 11.*** *The proposed drainage trench would be impractical for the Town to maintain. There is tree line along the property line with four feet width between proposed retaining wall (which requires a waiver) and private property. Furthermore, 322 Appendix A (C)(3)(b) underground infiltration practices is not allow. (The HydroCAD calculations modelled this trench with infiltration). All wheelchair ramps have been relocated in compliance with the statement above including the placement of an additional ramp for the Hiller Avenue extension.* **A metal grate over runoff chute has been called out at the northeast Colin's Drive & Timothy Street intersection. Details should be provided to prove ADA compliance.**

49. Add wheelchair ramp detail. ***A detail has been added to sheet no. 9.*** *Resolved.*

50. Add sewer drop manhole detail. ***A sewer drop manhole detail has been added to sheet no. 10.*** *Subject to Sewer/Wastewater Department approval.*

51. Add drainage swale detail. ***A x-sectional detail of the proposed grass drainage swales has been added to sheet no. 11.*** *Conveyance drainage swale/channel side slope should be 3:1 maximum. This comment has been addressed as stated in item no. 40 above.* **(See Comments #40 above)**

52. The proposed roof drain Cultec Chamber units is classified as Underground Injection Control (UIC) Class V Well. There are 10 feet setback requirements to the property line and building foundation, 50 feet setback from BVW, and other requirements. Chambers should be equipped with cleanout/inspection port. Location of the chamber should be shown on the plan. ***A cleanout/inspection port has been added to the profile detail on sheet no. 10 and the locations of all chamber systems have been added to the plans. All chamber systems meet the 10-foot***

property line and foundation setbacks together with the 50-foot wetland setbacks. *Resolved.*

53. Operation and Maintenance Plan – Sediment Forebay requires monthly inspection and cleaned four times per year; Grass swale should be mowed to keep grass height not shorten then 3" to 4", Grass height should not excess 6"; Catch basin should be inspected and cleaned four times per year or depth of deposit is greater or equal to ½ of the sump; Plunge Pool and Level Spreader should be included in the O&M plan. All sediment deposit should be disposed in accordance to the Federal, State and Local regulations. The party responsible for the O&M should be identified on the plan with a signature block. ***The O & M Plan on sheet no. 10 has been updated per the above. Said updated O & M Plan has also been incorporated into the Stormnwater Report. The developer will provide a signature on a separate O& M document as required by the Planning Board.*** *Further update of the O&M Plan may be required to match drainage design changes.*
54. O&M sample log and estimated annual operation budget should be included. ***The 0 & M sample log has been included in the revised stonnwater management report and the Developer will provide the Fairhaven BPW-Highway Superintendent with an estimated annual operation budget for his review and approval.*** *Further update of the O&M Log may be required to match drainage design changes.*
55. Anti-seep collar should be installed around the basin outlet pipe. Forebay should be 4' deep. ***Said collar detail has been added to sheet no. 11 and the forebay has been revised as required.*** *See forebay comments above. This comment has been addressed in item no. 38 above.* **(See Comments #38 above)**
56. Is there any reason to replace the detention basin bottom material with sand below the seasonal high ground water? ***The design proposes to excavate to the Sand and Gravel Strata to maximize groundwater recharge during the dry months (June-October).*** *This practice would affect the exfiltration function during the wet season and is not recommended. The proposed infiltration basin does not meet MassDEP setback requirements. See additional stormwater management comments below. The detention pond detail has been revised to limit the proposed excavation and replacement with C-33 sand to the maximum seasonal high groundwater or 2 ft. below the bottom of the ponds.* **The proposed sand layer is used to provide the required 2' separation to seasonal high ground water and should not count any storage credit. (bottom of the storage should be 2' above the ESHGW). The proposed rubber liner should be replaced with a 12" thick clay barrier to prevent loam material sliding off rubber liner surface.**
57. The 10' separation between water and sewer mains should also be called out on the Northerly and Easterly Roadways cross-section. ***Said dimension has been added to sheet no. 11.*** *Resolved.*
58. *The proposed drainage swale along Map 28C Lot #77 should have a berm along the abutter's property line to prevent spillover onto private property, channel should be sized with freeboard per Vol. 2, Ch.2, Pg. 71. The roadway surface runoff flows through the paved runoff chute to the level spreader does not meet the treatment requirements.* **Not addressed.**

STORMWATER MANAGEMENT REPORT COMMENTS

1. There is approximately 65 feet of the new roadway and sidewalk 23' wide post-development impervious area (0.034+/- acres, please verify sub-catchment Pond B area?) drains directly to Timothy Street, where does not have any drainage system, and

most likely flows onto abutter's property. A pre-development and post-development analysis point should be added at the Timothy Street intersection. ***Paved runoff chutes and grass swales have been added to capture the first 65 feet of new roadway and sidewalk onsite. The drainage report has been updated accordingly.*** *The HydroCAD report shows Pond C1:Culvert 1 with a 20' long x 20' breadth Broad-Created Rectangular Weir at elevation 39.70. There is no Weir shown on the plan set. Culvert 1 and Culvert 2 have peak elevation at 40.92 during the 100-year storm event the peak water elevation is higher than the Timothy Street intersection grade and onto the abutter's lot (Map 28c Lot 70).* *This area has been re-evaluated and corrected to address the concern.* **Culvert 2 – the two 18" RCP pipe slopes do not match with HydroCAD calculations. Culvert 1 peak elevation during 25-year and 100-year storm event are above the Timothy Street intersection grade. i.e. Flooding occurs.**

2. The two proposed detention basins are located within the 50 feet setback to any water of commonwealth. Existing houses within the required setback of the basin should be shown to verify setback requirements. (100' downslope and 10' upslope.) ***The design of both detention ponds, including setbacks to wetlands, complies with the Fairhaven Planning Board Subdivision Rules and Regulations. The ponds have been sized to meet items numbered 38 and 53 together with stormwater items numbered 3, 4, 6, 7, 8 and 10 - in compliance with the Subdivision Rules and Regulations. In order to comply with number 7 above, specifically providing adequate volume to infiltrate the first flush (=1.25 inches), infiltration is required within the detention pond.***

It is important to note that the Stormwater Design complies with the DEP stormwater Management Standards aimed at encouraging recharge and preventing Stormwater discharges from causing or contribution to the pollution of the surface waters and Groundwaters of the Commonwealth. In 1997, MassDEP published the Mass Stormwater Handbook as Guidance to Stormwater Policy. The 50-foot setback is suggested in the handbook for an infiltration basin to a wetland However, if said setback is not required for a detention basin with no infiltration component, then the bottom and sidewalls of the ponds would be presumed to be impervious. This is supported by Appendix A (C)(2)(J)(4) as outlined in No. 3 and No. 4 below. They require that said surfaces be modelled as impervious. Therefore, it is our position the detention pond modification which now provides a 50-foot setback between the infiltration component within the pond to the wetland complies with the suggested setback requirement outlines in the DEP Storm water Handbook. *The 1996 Massachusetts Stormwater Management Handbook (SMH) was updated in January 2, 2008 and incorporated into the State's Wetland Regulations 310 CMR 10.05 (6)(K) & 314 CMR 9.06(6)(a) under Massachusetts General Law Chapter 131 Section 40 and becomes law. These SMH regulations are enforced by the Conservation Commission and MassDEP. Any exfiltration system with less than 4' vertical separation to the SHGW would require Mounding Analysis, (Vol. 3, Ch.1 Pa. 28).* *The plans have been revised to incorporate a rubber membrane along the inner side slopes of the detention ponds within 50 ft. of the edge of the wetland. It is the opinion of this office that this satisfies the SMH setback requirement.* **The rubber liner lacks friction to prevent topsoil sliding off the surface during high intensity rainfall. Use clay layer to seal the basin.**

3. Appendix A (C)(2)(J)(2) – requires infiltration area be located in areas with a NRCS HSG (Hydrologic Soil Group) 'A', 'B', or 'C'. The easterly half of detention pond A is in "D" soil. ***The basin bottom has been modelled as impervious and no credit has been taken in the drainage analysis for the infiltration area located in mapped D soil.*** *Per USDA - Group 'D' soil consists chiefly of clays that have a high shrink-swell potential,*

soils that have a high water table, soils that have a clay layer at or near the surface, and soils that are shallow over nearly impervious material. The soil test logs indicated no clays and impervious material in all five logs, with mottling (SHGW) at 12" to 27" below surface. The high SHGW situation is normally be found near wetland resource area and not suitable for infiltration system, and hence DEP is requiring a 50' setback. No infiltration will occur within 50 ft. of the wetland (see dimension on plan). Furthermore, a rubber liner has been provided consistent with similar techniques permitted in Title 5 of the State Environmental Code. **GCG recommends replace the rubber liner with clay barrier.**

4. Appendix A (C)(2)(J)(4) – the basin structure surface should be modelled as impervious. The report used the basin bottom area as impervious only. ***The side slopes have now been modelled as impervious.*** *Resolved.*
5. The site consists majority of HSG "C" and "D" soil groups per soil report. The drainage studies were based on HSG 'C' soil. However, the exfiltration rate used on the calculations was based on 2.41 inches per hour, (HSG 'A') soil. GCG recommends using group 'C' soil exfiltration rate for modeling, the soil group used to determine the CN number should be consistent with the exfiltration rate for the same soil group. ***The analysis has been revised using 1.02 inches per hour which is reflective of the soil evaluations which depict sand and gravel and loamy sand material.*** *The 1.02 inches per hour is based on Sandy Loam material, which is identified in the USDA soil report, However, the USDA soil report also rated the sandy loam as HSG 'C' soil due to the proximity of SHGW. GCG recommends using 0.27 inches per hour minimum exfiltration rate for this project as listed on the Rawls 1982 rate for HSG 'C' soil. As discussed with GCG Associates, the design has been revised to use 1. 02 inches per the actual soil evaluations for sandy loam.* **Design engineer has agreed to re-calculate the required recharge volume based on Sandy Loam - HSG 'B' soil. (See additional volume calculations comments below).**
6. Appendix A (C)(2)(K) - Forebay sizing and volume (0.25 inches per impervious acre of contributing drainage required) calculations should be included. Forebay should be 4' deep minimum. ***The forebays have been revised to meet the 4-foot depth. Forebay sizing and volume calculations have been provided to show compliance with the 0.25 inches per impervious acre requirement.*** *Bottom of the forebays are proposed at the SHGW elevation. SMH requires minimum of 2' separation, unless part of a wet basin. (SMH Vo. 2 Ch.2, Pg. 15) This has been addressed as stated in item no. 38 above.* **See comments #38 above.**
7. Appendix A(C)(4)(c)[3] – requires Adequate volume to infiltration the first flush of runoff. 322-4 (First Flush = 1.25"). ***The calculations show that this has been met.*** *First Flush volume calculations should be based on 322-4(B) "First Flush" definition. (see comment #8 below). The Recharge HydroCAD report was missing pages 4 to 7. The exfiltration rate used in Ponds 'A' and 'B' were at the SHGW with HSG 'B' soil group. There were no mounding calculations, (not possible as exfiltration is at SHGW). Infiltration basin (IB) should comply with 322 Appendix A (C)(4)(c) and MDEP requirements. Mounding calculations have been provided.* **See additional volume calculation comments below.**
8. Appendix A (C)(4)(C) - 198-33 – Definition - First Flush – "In residential areas, the % impervious area is obtained from the TR-55 table Runoff Curve Number for Urban Areas, Residential District by Average Lot Size." ***The calculations have been updated per the above recommendation.*** *Calculations should be based on Vt = (1.25/12 In)(Rv)(Site Area in square feet).* ***Contributing Drainage Area in Square Feet was used in the calculation instead of Site Area in square feet.*** *As discussed with GCG Associates, contributing drainage area to each pond was used in first flush calculations. We also determined the water quality volume as required by MADEP stormwater requirements. The first flush*

volume provided within Pond A and Pond B meet both the Town of Fairhaven and MADEP standards. **See additional volume calculation comments below.**

9. Basin draw down calculation exfiltration rate should be based on HSG 'C'. Draw down time shall not excess 72 hours. ***The calculations show that the draw down will not exceed 72 hours.*** *GCG recommends using HSG 'C' soil exfiltration rate and relocate infiltration basin to comply with the SMH required setback. Refer to previous responses in item no. 5 above.* **See additional volume calculation comments below.**
10. Water quality volume calculations to treat 1.25" of the impervious area. 198-31.1(A)(1)(b). ***The calculations have been provided as requested.*** *Pond volume should be calculated from pond bottom to orifice (not spillway), see comment #8 above for required First Flush volume calculations. Said analysis has been provided.* **See additional volume calculation comments below.**
11. Emergency spill way and sizing calculations should be provided. ***Said calculations have been provided.*** *Spillway calculations should be based on "brimful" conditions per SMH Vol.2, Ch.2, Pg.91. (i.e. pond volume filled to specified storm event.) The spillway calculations have been provided to the 100- yr storm event.* **The spillway calculations for the two ponds were based on 5' long x 11' breadth (Pond A) and 5' long x 12' breadth (Pond B) broad-crested rectangular weir with pond storage. The calculations should be based on the 100-year storm event inflow pass through the weir, (without any other outlet and no storage, assuming outlets malfunctioned, and pond filled with water) per MDEP. Furthermore, the spillways cross-section on sheet 11 of 11 shown 4' long only. Please recalculate spillway length and revise details accordingly.**
12. Operation and Maintenance Plan shall be included in the Stormwater Management report for responsible party's signature. ***The O & M Plan has been revised and included in the Storm water Management Report with a signature page.*** *O&M may require further update to match design changes per review comments.*
13. An illicit Discharge Compliance Statement should be provided by the applicant in the report. ***Said statement has been provided in the Storm water Management Report.*** **Signature needed.**
14. Portion of the impervious (roofs, driveway, and section of roadway) area runoff does not drain to the two detention basins, Therefore, calculations are required to show basin inflow meets the 65% rule (MSH Vol. 3, Ch.1, Pg. 27) and basin storage volume sized per requirements. ***Said calculations have been provided to show compliance with this requirement Under proposed conditions, the impervious cover is 1.80 acres. 1.44 acres (80% of the site's impervious cover) is directed to proposed BMPs. This exceeds the minimum 65% of the site's impervious cover be directed to the BMPs intended to infiltrate the Required Recharge Volume.*** *SMH required the recharge volume be adjusted (Vol. 3, Ch.1, Pg.28). However, the subdivision regulations' First Flush treatment requirements is more stringent than SMH requirements. The proposed system needs to meet 322 Appendix A requirements. As discussed with GCG Associates, the project is in compliance.* **See additional volume calculation comments below.**
15. Detention basin outlet should be placed furthest away from inlet/forebay to avoid short circuit. Emergency spill way should be sized without basin outlet(s) without overtopping the earth berm. Top of berm should have a minimum of 10' wide bench with maintenance access path. ***The outlet control structure for Pond B has been relocated to the opposite side of the pond. The emergency spillway has been analyzed without the basin outlet as requested. The access to both ponds is provided directly from the shoulders of the roadways down the slope at 4:1. Therefore an access road around the ponds is not needed, nor required by the Subdivision Rules and Regulations nor requested by the Fairhaven Highway Dept.***

The access path is required by SMH Vol. 2, Ch.2, Pg.91. to provide unimpeded vehicular access around the entire basin perimeter. The access area shall be no less than 15 feet. This item has been addressed - see item no. 18. **Applicant needs to request for a waive for 322-Appendix A (C)(2)(g)(2) for 10' wide bench local requirement. The 15' wide access path MDEP requirements are subject to MDEP review.**

16. Culverts should be sized incorporated with tail water (Dynamic) routing to make sure runoff does not back up to the private property. ***Said calculations have been provided.*** *The revised calculations shown that a large offsite runoff entering the Hiller Avenue intersection. Calculations to show the proposed system can handle the existing offsite flow should be provided. Said analysis has been completed to address this concern. – see response item no. 21.* **See comment 11 above.**
17. The Town had provided site photos of the existing 10" RCP outfall and open channel flow during heavy rainstorm. Upstream watershed should be analysis to size the appropriate drainage system. ***The upstream watershed has been analyzed and the proposed increase from a 10" diameter pipe to a 15" diameter pipe for the by-pass system has been found to be adequate. Additionally, the plan now proposes to remove and replace 135 feet of 10" RCP with 12" RCP located in Hiller Avenue.*** *The revised calculations shown that the offsite peak flow entering the Hiller Avenue & Paul Street intersection is 14.33 cfs and 19.30 cfs for the 25-year and 100-year storm events, respectively. Please clarify how to collect these runoffs through a single curb opening to the proposed 12" pipe. Majority of the existing flow bypassed the single inlet and overland flow to the down stream wetland. The proposed Hiller Ave. extension would block the flow path and creating a low point at the Nolan's way intersection. Any overflow will cause flooding onto Lots 78 and 79. The offsite analysis has been completed to address this concern. – see response item no. 21.* **Applicant needs to address the excessive off-site runoff at the Hiller Avenue and Nolan's Way intersection. Catch Basin inlet capacity calculations should be provided. The proposed 15" RCP upgrade and 24" RCP does not have the capacity to handle the 25-year and 100-year storm events and should be addressed.**
18. The proposed detention basins do not meet the MDEP setback requirements and should be relocated. The relocated basin design needs to meet 198-31.1. A.1.a.1 and 2 with the with no increase of peak flow and volume. ***The Detention Ponds comply with the Fairhaven Planning Board Subdivision Rules and Regulations and comply with Section 198-31.1 A. I.a. 1 and 2.*** *The detention basin consist of exfiltration function and should meet MDEP setback requirements. See First Flush volume calculations comment #8 above. See response in item no. 2 and no. 7 above.* **See additional volume calculation comments below.**
19. The proposed roof drain chamber system shown on the detail plan is not shown on the site plan and calculations were not included. ***The roof runoff system which is shown in the details has been added to the plan view and the calculations have been included in the Stormwater Report.*** *GCG recommends using HSC 'C' exfiltration rate for roof drain chamber sizing calculations. The proposed roof runoff recharge systems will all be placed within sand/gravel fill significantly above the maximum seasonal high groundwater with a majority of the systems setback greater than 100 ft. from the edge of the wetland. Therefore, it is our position that a Class B infiltration rate of 1.02 inches per hour more accurately reflects the soil infiltration which will occur vs. 0.27 inches per hour (Class C).* **See additional volume calculation comments below.**
20. The Storm Drain Design Worksheet shown DMH numbered. GCG recommends proposed CBs, DMHs and SMHs be numbers on the plan. The worksheet should include the off-site runoff flows to the existing 10" RCP at the end of Hiller Avenue. The worksheet is based on Rational Method design and not accounting tail water and pipe

entrance restriction. All critical culvert should be checked with dynastic routing to assure no negative impact to the abutters. ***All DMH's, CB's, & SMH's have been numbered on the plan as suggested. All critical culverts have been analyzed as requested***

Additional Comments:

21. **Plan sheet 10 of 11 – Precast concrete catch basins #1 & #1A should be equipped with sealed cover on trap for oil/hydrocarbon separation.**
22. **The roof chamber calculations should be based on 7.5 effective length with 1.87 c.f. per ft storage volume (per Cultec)**

Storage Volume Calculations:

The pre-development HydroCAD report shown 1.178 ac impervious area (Existing – Page 2)
And the post-development report shown 3.350 ac impervious area. (Propose – Page 3).

Net increase impervious area due to new development = 2.172 ac.

MDEP - MSH requirements:

Recharge Volume = 2.172 ac x 43,560 s.f. x 0.35 in/12 in/ft (agreed HSG 'B' soil) = 2,760 c.f.

WQV = 2.172 ac x 43,560 s.f. x 0.5 in/12 in/ft (0.5" rule) = 3,942 c.f.

Provided.

Recharge volume: 14 roof drain systems = 256 c.f. x 14 =		**3,584 c.f**
Lot 9		**119 c.f**
Lot 12		**243 c.f.**
	Sub-total =	**3,946 c.f.**

65% Rule – total impervious area= 2.172 ac (MSH Vol.3 Ch.1 Pg. 27)

Impervious area to Pond A = 0.5 ac (Basin A) + 0.18 ac (Pond A) = 0.68 ac	
Impervious area to Pond B	**= 0.19 ac**
Roof (14 units)	**= 0.5 ac**
Lot 12	**=0.03 ac**
Lot 9	**=0.03 ac**
	1.43 ac (68.5% > 65%) OK

65% Adjustment Ratio = 2.172/1.43=1.52 (MSH Vol.3 Ch.1 Pg. 28)

Require Recharge Volume =2,760 c.f. x 1.52 = 4,195 c.f

Pond A (El. 36.50-37.50)	**3,024 c.f.**
Pond B (El. 37.50-38.50)	**621 c.f.**
	Total = 11,537 c.f > 4,195 c.f. OK

WQV:	**Pond A and Pond B**	**3,645 c.f. < 3,942 c.f. Not comply**

Local Regulations: water Quality - First Flush (1.25")

Parcel area = 10.85 ac

First Flush Volume: 10.85 ac x 43,560 s.f. x 0.3 (30% impervious for 1/3 AC lot, TR55) x 1.25 in/12 in/ft = 14,770 c.f. (Infiltration volume within infiltration basin, Appendix-A - C.4.c[2])

Water Quality (First Flush) volume: Residential roof runoff are considered clean water per MSH and no treatments required. The chamber systems are located within the private property and maintained by the property owners. Pond A & Pond B storage volume below the outlet invert has been pre-treated by deep sump hooded catch basin and sediment forebay. The combined volume = 11,537 c.f. which is below the required 14,770 c.f. Not comply.

(This is a rough calculation check based on the report data. There may be some discrepancy with the computer modeling with minor exfiltration function.)

Summary:

The proposed infiltration basin does not meet the MDEP setback (50' from any surface water of commonwealth) requirements. Forebay and Infiltration basin sizing should be based on 322-26 requirements. The two existing lots #78 and #79 are being filled along their property line and relied on a culvert at each lot to release the surface runoff, pipe entrance conditions should be accounted for and the head water should be retained within the street ROW or within an drainage easement. *The offsite drainage analysis discovered a major deficiency at the Hiller Avenue existing drainage system. The proposed development will create a low point at the proposed Nolan's Way intersection. Drainage design should be sized to handle the existing off-site flow and new development flow to eliminate potentially flooding/overflow onto to abutting properties. The proposed detention basin does not meet SMH and Subdivision Regulation requirements. Additional BMP facilities/volume is needed to provide the First Flush treatment requirements.* **Based on GCG's rough volume calculations check. The proposed WQV BMPs are substantially under sized for the Fairhaven Stormwater Management requirements for Water Quality - First Flush (1.25") treatment. And minor deficiency for the State WQV requirements, which could be easily fix. However, the First Flush treatment volume would require additional area to satisfy the requirements. This is a local Subdivision Regulations - Appendix A. Stormwater Management Systems and is outside the MDEP jurisdiction.**

If you have any questions regarding this matter, please contact our office.

Respectfully Submitted,
GCG Associates

Michael J. Carter

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