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MILLENNIUM ENGINEERING, INC.
Land Surveyors and Civil Engineers

March 1, 2022

Methuen Community Development Board
City Hall, Searles Building
41 Pleasant Street
Methuen, MA. 01844

Re: Definitive Subdivision at 23 Hampstead St, Methuen, MA
Response to Engineering Department provided by Stephen Gagnon dated February 9, 2022, and
Response to TEC peer review dated December 1, 2021

Members of the Board,

The following provides our response to peer review comments referenced above. We have included the peer review comments and our response to facilitate the Commission's review.

Comment / Response	
Engineering Department Review	
Comment 1:	*The intended final ownership of the subdivision should be identified,i.e., City or Homeowners Association.*
Response:	The intention is for the Road to become a public road.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 2:	*The cover sheet of the plan set requests the following waivers fromthe Subdivision Rules and Regulations:* a. *Section 4.2.2.8 - Dead end streets.* b. *Section 5.7.1 - Sidewalks.* c. *Section 5.6.1 - Looped water main.* d. *Section 5.6.1 - 8" diameter water main.* *I suggest in exchange for waivers a. and b. the Developer providean additional inch of pavement thickness to the roadway, to increase its longevity and ultimate reduce future costs to the residents.* *I do not recommend waiver c. be granted. This waiver is contrary tothe MassDEP Water Distribution regulations the city must follow.* *Annually, MassDEP completes a detailed audit of the City's water distribution system. Each year our score is adversely impacted dueto dead*

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	end water mains. The proposed water main could be easily looped to Applewood Ln. or Stoneybrook Rd., preventing the creation of a new dead-end water main and eliminating an existingdead end main. *Waived d. cannot be granted, as DEP requires every water mainwhich service a fire hydrant to be a minimum of 8" diameter.*
Response:	Waivers A and B: We agree to the additional inch of pavement based on the approval of the waivers for pavement width and bituminous curb. Waiver C: There is currently no means of looping the proposed water main as no easements are in place. Furthermore, the cost associated with potentially looping the water main is significantly more than the cost to install the water main to serve the project and is cost prohibitive to the project. Waiver D: This waiver has been removed and 8" water main is proposed. Additional waivers have been added to the list.
Comment:	*The pavement detail should be revised to depict 2½" binder and 1½"finish course.* *Waivers A and B - Comment satisfactorily addressed.* *Waiver C - I do not recommend granting this waiver. A looped water distribution system is critical for the proper operation of a domestic water system. Private wells should not be considered as adequate fire protection will not be provided. The nearest hydrant will be morethan 500' from the dwelling on Lot 3.* *I would like to take a moment to restate why a looped water system is important. As you may be aware the domestic water treatment process involves several steps, concluding with disinfection utilizing a form of chlorine. The finish water leaves the treatment plant with aspecific amount of residual chlorine sufficient to prevent bacteria growth in the distribution system. Chlorine decomposes over time; the rate of decomposition depends on environmental conditions such as water temperature. Consequently, a residual chlorine level of 1.4 PPM at the treatment plant will become 0.3 or less at the farthestreaches of the distribution network.* *In a dead-end water main, if water consumption is inadequate, the water may sit long enough for the chlorine to be completely depletedand allow bacteria to thrive. If the bacteria bloom is minor the situation*

	may be resolved by flushing to expel the contaminated water and introduce new water with higher residual chlorine levels. *Flushing wastes large amounts of water and labor and thereforeshould be avoided.* *In a looped water system, water with appropriate chlorine levels circulates through the system, maintaining sanitary conditions, preventing bacteria growth. Further, a looped water system is fed by two or more sources reducing the possibility of a service interruption or more importantly a loss of fire protection. This specific water loop will not only prevent a new dead end main, but itwill also eliminate an existing dead end serving Stoneybrook Rd and Applewood Ln. According to the Water Distribution Superintendent the residents of Stoneybrook Rd and Applewood Ln. have had several service interruptions recently that could have been minor events had this water loop been in place.* *In his response, the Project Engineer states in part that the water loop cannot be provided as there are no easements in place to access a water main. It is my expectation the Developer would negotiate an easement with an abutter. Typically, a utility easement would be located along a property line, within the Zoning setback, thereby having little impact on the value of the subject property. In years past the Community Development Board would not hesitate torequire a developer to secure the easements necessary to provide aproperly designed utility. In fact, a brief review of some prior developments in the Methuen reveals more than 30 examples where utility easements on abutting properties were required and ultimatelysecured by Developers. Clearly, an easement to provide a properly designed water system is not an unreasonable ask. One final thought, the decisions the Board makes regarding the technical aspects of a subdivision may seem trivial however they have the potential to adversely affect the DPW for years to come.*
Response:	The pavement detail has been revised. We understand the reason for wanting a looped water main, however the length of water main required to loop the systems is about 3 times longer than the proposed water main itself and is not economically feasible for a project of this size. We have reached out to the abutters along Stoneybrook Road regarding the granting of an easement and have not received any response at this point. The granting of this waiver would not further impact the water systems in the surrounding neighborhoods.
Comment:	***In my last memo I provided almost two pages of testimony as to why the***

	water loop is necessary. Let me reiterate, the water system as proposed does not conform to MassDEP standards. The Community Development Board should not follow its own regulations and not place the DPW at odds with DEP.
Response:	**The applicant has reached out to all three abutters off the rear property line that would allow access to Applewood Lane or Stonybrook Road to loop the water main. The applicant hasn't received a response from any of the abutters thus far, making it impossible to loop the watermain.**
Comment 3:	*Section 4.2.2.4 of the Subdivision Rules and Regulations requires roadway centerline offsets to be a minimum of 125'. The proposedroadway is offset only 11O' from the private way known as Old Hampstead Street.*
Response:	A waiver has been requested for this section.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 4:	*Section 4.2.4.3 of the Subdivision Rules and Regulations requires a minimum length of 75' to be substantially level approaching an intersection. Approximately 25' has been provided.*
Response:	The grading of the roadway has been revised to provide an average grade of less than 2% for 75'.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 5:	*An analysis of the sight distance, at the intersection of the proposedroad and Hampstead Street, should be provided.*
Response:	A Traffic Memo which includes a sight distance analysis has been provided.
Comment:	*Comment addressed. However, the vegetation maintenance recommendations outlined in the traffic memo should be incorporated into the plan set.*
Response:	The area within the right-of-way to be cut back for sight distance purposes has been added to the Grading and Drainage Plan.
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 6:	*The proposed roadway will bisect the existing sidewalk on Hampstead Street. ADA/ABB compliant wheelchair ramps must be provided at each side of the proposed roadway.*
Response:	ADA compliant ramps have been added to each side of the proposed roadway.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 7:	*Subdrains should be provided along the roadway where the cut profile exceeds one foot.*

Response:	A note has been added requiring the installation of a subdrain as required in the field.
Comment:	*The note regarding subdrains, on sheet 6 of the plan set, states inpart "where the site contractor deems necessary." The comment should be revised to state "subdrains shell be provided where cutexceeds one foot."*
Response:	At our meeting on November 22, we had discussed this item and we discussed that groundwater was at least 45" below grade based on test pits and had agreed that we would depict subdrains where it was necessary and would leave it up to the contractor at the time of construction to install subdrains as needed.
Comment:	***Section 5.3.3 (4) f) states "When required, subdrains shall be installed at location directed by the department of public works." Show the subdrain on the plan, if they prove to be unwarranted during construction DPW can recommend a field change.***
Response:	**A note has been added to the plan and profile (page 6) stating "subdrains are to be installed at a minimum starting at station 0+00 and where the department of public works deems necessary.**
Comment 8:	*It is not clear if the existing water mains in Hampstead Street are labeled correctly on the plan set. Regardless of the representation,the water connection for the subdivision must be made to the 12" diameter water main.*
Response:	The approximate location of the existing 12" main has been added to the plans. The connection of the proposed water main has been revised to connect to the existing 12" main.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 9:	*The plan should be revised to depict three gates at each connection to a water main.*
Response:	Three gate valves have been shown at the connection of the proposed water main.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 10:	*The proposed sewer service connections are depicted as 4" diameter on sheet 6 of the plan set. The plan should be revised todepict 6" diameter sewer service connections.*
Response:	The sewer service connections have been revised to 6" services.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 11:	*The plan set depicts approximately 125' of the roadway draining uncontrolled onto Hampstead Street. Catch basins should be provided to collect the stormwater before it reaches Hampstead Street.*
Response:	Catch basins have been added at the entrance of the proposed roadway.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 12:	*The proposed route maintenance vehicles are to access the infiltration basin should be identified on the plan set.*

Response:	The maintenance route has been added to the plan set.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 13:	*An underdrain should be provided in the infiltration basin so it canbe dewatered for maintenance.*
Response:	An underdrain has been provided in the infiltration basin.
Comment:	*Comment partly addressed - An underdrain is now depicted on the plan, but no information has been provided regarding pipe diameter,elevation, material etc. A complete construction detail should be provided.*
Response:	A subdrain detail has been added to sheet 9.
Comment:	***The detail is incomplete. It does not provide invert elevations, gate location, connection to outlet structure etc.***
Response:	**The Infiltration basin cross section detail has been revised to show the subdrain and call out the pipe size/material and invert.**
Comment 14:	*The plan depicts the infiltration chamber outlet pipe discharging directly to Hampstead St. This is not acceptable as it will causeicing of the roadway and sidewalk in cold weather.*
Response:	The outlet from the subsurface infiltration area has been removed from the design.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 15:	*In the profile view, the pipes entering DMH-1 from CB-1 & CB-2 are lower than the pipe exiting DMH-1. The plan should be revised accordingly.*
Response:	The profile has been revised to accurately depict the inverts of the drainage system.
Comment:	*Comment not addressed. Some drainage structures do not have invert elevations.*
Response:	The profile has been revised to show all drainage inverts.
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 16:	*The elevation of the flared end section on the infiltration pond outletpipe does not agree in the plan set and the Stormwater Management Report.*
Response:	The elevation of the flared end has been revised.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 17:	*The Stormwater Management Report indicates Subcatchment P1Bwill flow overland before discharging directly into the infiltration chambers. The plan should be revised to provide pretreatment for the overland flow.*
Response:	The drainage design has been revised and no overland flow enters into the subsurface infiltration area.
Comment:	*Comment addressed.*
Response:	No response required.

Comment 18:	*The plan depicts an existing 12" CMP entering the subject propertyfrom a catch basin on Hampstead Street. This pipe should be investigated, and its source determined.*
Response:	Additional detail was provided regarding the drainage system in Hampstead Street. No information was found regarding the pipe exiting the site.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 19:	*The soil logs provided in the Stormwater Management Report should be revised to provide an elevation for ESHGW and refusal.*
Response:	The soil logs have been added to the plan set and the elevation of the ESHGW have been added.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 20:	*The Operation and Maintenance Plan provided exceeds the abilityof the Methuen DPW, should the Applicant wish the subdivision tobe accepted by the city.*
Response:	No response required.
Comment:	*This issue will be further discussed during the ConservationCommission review.*
Response:	No response required.
Comment 21:	*Under the heading of Infiltration Chambers, the Operation and Maintenance Plan states the Condo Association is the responsibleparty. Is this correct or a typographical error?*
Response:	The O&M has been revised to require the homeowner to be responsible for the maintenance of the subsurface infiltration area.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 22:	*The Applicant should consider installing a landscaped island in thecul-de-sac to reduce pavement costs and reduce impervious area and stormwater runoff.*
Response:	A landscape island has been added to the cul-de-sac.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 23:	*The plan depicts proposed grading adjacent to the east propertyline of Lot 4. A detail of this grading should be provided.*
Response:	A detail of the grading has been provided.
Comment:	*Comment addressed.*
Response:	No response required.

New Comments:

Comment 1:	*Note 13 on page 4 of the plan set should be replaced with "6" thick concrete eencasement extending 1O' either side of the crossing."*

Response:	The note has been revised as requested.
Comment:	**Comment addressed.**
Response:	**No response required.**
Comment 2:	*Note 14 on page 4 of the plan set should be removed.*
Response:	The note has been removed.
Comment:	**Comment addressed.**
Response:	**No response required.**
Comment 3:	*Sheet 5 has a note that states "Prop reconstructed sidewalk along project frontage (see detail). I was unable to locate a corresponding detail. It should be noted the Construction Standard for curbing and sidewalk on aprimary roadway is vertical granite curbing and cement concrete sidewalk.*
Response:	A detail has been added to sheet 4 showing the construction detail. As discussed in our November 22 meeting, we are proposing to replace the existing curb and sidewalk with similar construction as is in place today which is bituminous curb and sidewalk.
Comment:	**The Hampstead Street sidewalk has been on the CIP list for several years and was under contract 2020. The specifications were for vertical granite curbing and cement concrete sidewalk. Either the developer can provide a benefit to the city by following the proposed construction specification otherwise his non-spec sidewalk will be removed and replaced when the city constructs the balance of the sidewalk.**
Response:	**The applicant proposes to contribute $10,000 in lieu of constructing the sidewalks as previously proposed.**
Comment 4:	*The hydrant detail should be revised to specify Mueller Centurion openleft.*
Response:	The hydrant detail has been revised to specify a Muller Centurion open left.
Comment:	***Comment addressed.***
Response:	**No response required.**
TEC Review Comments	
Site Plan & Application – Definitive Subdivision Regulations	
Comment 1:	*A discrepancy in the total lot area was noted in the Definitive Subdivision Application andPlans. The Application details a total lot area of 5.17 acres (as noted on the City of Methuen GIS), while the Definitive Subdivision Plans details a total site area of 4.87 acres.*
Response:	The correct area of the project is 4.87 acres.
Comment:	*Comment* Addressed
Response:	No response required.
Comment 2:	*As stated in Section 3.2.2.5 of the City of Methuen Subdivision Rules and Regulations (abbreviated further as MSRR), the proposed street name should be added to the plans.*
Response:	A road name of "Geramat Way" has been added to the plan set.
Comment:	*Comment Addressed*
Response:	No response required.
Comment 3:	*TEC acknowledges the waivers requests in the Application and on Sheet 1 of the Definitive Subdivision Plans. TEC concurs with the terms of agreement for the*

	twowaivers (Sections 4.2.2.8 & 5.7.1) stated in the letter by Stephen J. Gagnon datedOctober 19, 2021. TEC also concurs with the statements regarding denial of the remaining two waivers based around the proposed water main.
Response:	Waivers A and B: We agree to the additional inch of pavement based on the approval of the waivers for pavement width and bituminous curb. Waiver C: There is currently no means of looping the proposed water main as no easements are in place. Furthermore, the cost associated with potentially looping the water main is significantly more than the cost to install the water main to serve the project and is cost prohibitive to the project. Waiver D: This waiver has been removed and 8" water main is proposed. Additional waivers have been added to the list.
Comment:	*Regarding waiver D: comments addressed. Regarding waivers A-C & all additional waivers, TEC continues to defer to Stephon Gagnon and the City of Methuen on whether these waivers are acceptable.*
Response:	No response required.
Comment 4:	*The proposed outlet invert is drawn higher than the inlet pipes within DMH 1. The invertsfor this structure should be adjusted to be in accordance with Section 4.3.3.7 of the MSSR.*
Response:	The profile has been revised to correctly show the inverts of the drainage system.
Comment:	*TEC acknowledges the revisions on the profile, however inverts for the DMH 1, CB1, & CB 2are no longer provided on the Definitive plan set. The applicant should revise the plans to detail all inverts for these structures.*
Response:	The Profile has been revised to show all inverts for DMH 1, CB1, and CB 2
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 5:	*Per Sections 4.3.3.6 & 4.4.2.3 of the MSSR, drainage and sewer pipe designs respectfully have specific design velocity requirements. The applicant should provide pipe flow calculations for both systems to prove this design meets these requirements.*
Response:	Pipe flow calculations have been included in the Stormwater Report.
Comment:	*Regarding the drainage system & section 4.3.3.6 of the MSSR, comment address. Per section 4.4.2.3. of the MSSR, the applicant should provide sewer pipe design velocities for review.*
Response:	Sewer pipe sizing calculations have been included with this submittal.
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 6:	*TEC recommends that the sewer service connections be drawn in the profile view on the plan & profile. It appears that the sewer service from Lot 4 may be too low to tie into the sewer main at the proposed location.*
Response:	The sewer services have been added to the profile view. Lot 4?
Comment:	*Comment addressed*
Response:	No response required
Comment 7:	*The sewer service detail calls for a 6" service diameter, but the Plan & Profile call for a4" service diameter.*

Response:	The plans have been revised to depict 6" sewer services.
Comment:	*Regarding the Plan & Profile sheet and sewer service detail, comment addressed. However, the roadway cross-section detail shows a 6" PVC sewer under the roadway while the plan & profile detail an 8" PVC sewer. The applicant should revise this detail accordingly.*
Response:	The Roadway cross-section detail has been revised to show an 8" PVC sewer
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 8:	*Both CB 1 & 2 do not include the proposed use of gutter curb inlets. Per Section 5.3.8 ofthe MSSR, these catch basins should be revised to include gutter curb inlets.*
Response:	A waiver from this requirement has been requested.
Comment:	*See TEC response to Comment 3.*
Response:	No response required.
Comment:	***TEC will continue to defer to Stephen Gagnon and the CD Board regarding the acceptance of any & all waivers.***
Response:	**No response required.**
Comment 9:	*Per Section 5.4.2.2 of the MSSR, all drainage pipes must be constructed of reinforced concrete. On Sheet 6 of the Definitive Subdivision Plan, the connection between CB 1, CB 2, and DMH 1 are detailed as 12" PVC. This should be revised to follow this Section.*
Response:	The drainage pipes have been revised to specify RCP.
Comment:	*TEC notes the change to the RCP for the pipes between these structures. However, there is no information stating the pipe type, size, lengths, or inverts on the definitive site plans. The applicant should revise the plans accordingly.*
Response:	All drainage pipes are labels with size, material, length, and slope.
Comment:	**Comment addressed.**
Response:	**No response required.**
Comment 10:	*The proposed rim to invert elevation for CB 1 is just under 3'. This invert should be revised to have at least 3' of separation per Section 5.4.3.4 of the MSSR.*
Response:	The rim to invert separation has been revised to provide at least a 3' separation.
Comment:	Comment Addressed.
Response:	No response required.
Site Plan - General	
Comment 11:	*The typical section calls for sloped granite curbing on both sides of the roadway. The Applicant should confirm that curbing is proposed around the full extents of the roadway,and TEC recommends adding a leader to call out the proposed curbing on the Plan.*
Response:	A waiver has been requested to allow for bituminous curbs to be installed. Curbing is proposed along the full extents of the roadway. A label has been added to the Plan and Profile sheet calling out the curbing.
Comment:	*TEC recommends using sloped granite as originally shown on the typical section. Bituminous curbing will become a long-term maintenance issue for the city.*
Response:	The bituminous curb has been discussed with the Engineering Department and in lieu of sloped granite curbing, we are in agreement to proposed bituminous curb and increase the depth of pavement for the roadway.

Comment:	**Comment addressed.**
Response:	**No response required.**
Comment 12:	*The maximum building coverage and open area requirements should be added to the zoning table on Sheet 3 of the Definitive Subdivision Plans.*
Response:	The maximum building coverage and open space requirements have been added to the table.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 13:	*TEC recommends that a building square footage should be added on each proposed building.*
Response:	The square footage of each footprint has been added to the plan set.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 14:	*There appears to be some existing vegetation at the rear corner of abutting lot 75-3. Theplans should identify if this vegetation will be removed or a portion will remain. Location of individual trees may be required in this area in order to preserve the natural buffer.*
Response:	The existing vegetation will mostly be removed as the drainage line is proposed through the area of trees.
Comment:	*TEC recommends that the plan be revised to clearly identify that these tress will be removed.*
Response:	A note has been added to the plans stating "Exist. Trees within drain easement to be removed as needed"
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 15:	*It appears that the proposed tree line does not appropriately tie into the existing tree line at the south west property line of Lot 4.*
Response:	The tree line has been revised.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 16:	*TEC suggests the addition of proposed gas and electric connections to the proposed and existing dwelling(s) on Sheet 6 of the Definitive Subdivision Plans.*
Response:	Gas and underground electric have been added to the plan and profile sheet.
Comment:	*Regarding the proposed gas connections, comment addressed. The proposed underground electric only shows connections from the cul-de-sac center to the proposed buildings. The plans should be revised to indicate is the underground electric will be extended to the street.*
Response:	The underground electric has been extended to Hampstead Street. Note 3 has been added to the Plan and Profile Sheet.
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 17:	*On Sheet 6 of the Definitive Subdivision Plans a few issues were noted regarding theproposed utility profile:* a. *Pipe lengths of sewer pipes are labeled in inches, not feet.* b. *The inverts into DMH 1 should be specified for each CB they connect to.*

	c. *The invert out of CB 1 is labeled as an invert in.*
Response:	The sewer pipe labels have been revised. The Inverts into DMH 1 have been specified. The label for CB 1 has been revised to show the invert out.
Comment:	***Regarding the sewer pipe labels, comment addressed. Regarding the labels for DMH 1 & CB 1, inverts and pipe sizes/materials should be added to the plans.***
Response:	**The labels for DMH 1 & CB 1 have been revised to include inverts and pipe size/material.**
Comment:	***Comment addressed***
Response:	**No response required.**
Comment 18:	*On Sheet 7 of the Definitive Subdivision Plans a few issues were noted as listed below:* a. *Erosion Control barriers are proposed in front of the existing driveways for theexisting dwelling. A gap should be provided if this dwelling will be occupied during construction.* b. *Multiple areas of proposed grading cross the proposed silt sock line across the proposed lots. The silt sock positioning should be adjusted to provide a gap (3'recommended) between the work zone and the protected areas.* c. *The proposed silt sock crosses directly over the proposed rip rap for the outlet ofOutlet Structure 1.*
Response:	a. The existing dwelling is vacant and will ultimately access via the proposed roadway. b. We did not find any areas where the proposed grading crosses the erosion control barrier. The erosion control barrier has been revised to provide a 3' gap between the limit of work and the protected area. c. The erosion control barrier has been revised to avoid crossing the rip-rap.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 19:	*A detail should be provided for the inlet structure placed on top of the proposedsubsurface infiltration system.*
Response:	This structure is no longer part of the stormwater design.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 20:	*On Sheet 9 of the Definitive Subdivision Plans, multiple details reference HDPE pipes,but none are referenced on the other sheets.*
Response:	All references to HDPE pipe have been revised to specify RCP pipe.
Comment:	*Comment addressed.*
Response:	No response required.
Stormwater Report	
Comment 21:	*Upon adjustment of the proposed catch basin locations (as suggested in the letter by Stephen J. Gagnon dated October 19, 2021), the water quality calculations should be adjusted to include the additional impervious area leading to these catch basins.*
Response:	The water quality calculations that were provided accounted for all of the roadway areas.
Comment:	*Comment addressed.*

Response:	No response required
Comment 22:	*TEC suggests the Water quality calculations and TSS removal calculations include information for the proposed subsurface infiltration system.*
Response	The design has been revised and the proposed subsurface infiltration area only takes flow directly from the roof of the dwelling on Lot 4. No TSS or water quality calculations are required.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 23:	*The contribution to TSS Removal from deep sump hooded catch basins should be added to the TSS removal calculations.*
Response:	The TSS removal calculations have been revised to include the catch basins and sediment forebay as pretreatment prior to the infiltration basin.
Comment:	*Comment addressed.*
Response:	No response required.
Comment 24:	*The estimated seasonal high water table near the proposed infiltration basin within proposed Lot 2 is less than 2' below the bottom of the proposed basin based on the provided Test Pit 21-9. A revision in design of the basin is required to meet the 2' minimum separation between the estimated seasonal high water table and the bottom of basin per Volume 2 Chapter 2 of the Massachusetts Stormwater Handbook. The ESHWT value on the Infiltration Basin Cross-Section on Sheet 9 of the Definitive Subdivision Plans should also be revised accordingly.*
Response:	The infiltration basin has been revised to provide a 2' separation to ESHGW.
Comment:	*Based on the revised design on sheets 7 & , the proposed infiltration basin still does not provide the 2' minimum separation between the estimated seasonal high-water table and the bottom of the basin. The ESHWT value reported for TP 21-8 is 176.6 based on the information on sheet 10. However, the ESHWT shown on the infiltration basin cross-section is labeled at 175.5 which is not detailed on any test pits. The applicant should revise accordingly.*
Response:	We believe there is at least a 2' separation to groundwater from the bottom of the basin. TP21-7 has ESHGW of 178.5 and the bottom of basin is 181.6. TP21-8 has an ESHGW at 176.6 and the bottom of basin is at 178.6. TP21-9 has an ESHGW at 178.4 and the bottom of basin is at 181.2. The lowest elevation of the basin is 177.5 and the existing grade is 179.5. With ESHGW in TP21-8 of 49", the lowest point of the basin will have just over 2' separation to groundwater.
Comment:	***Based on the information stated above, 49" below TP21-8 is equal to elevation 176.6, not 175.5 as shown on the plans. TEC disagrees with the assumption of ESHGW. The applicant should either provide additional test pits at the proposed location to prove this assumption, or adjust their design to meet the document existing site conditions.***
Response:	**An additional test pit has been provided and the bottom of the basin has been slightly modified based on the results. to prove the assumption of ESHGW.**
Additional Comments	

Comment 25:	*a. Sheet 5 labels the chambers as a roof drywell. Sheet 10 shows a detail labeled subsurface infiltration area. These labels should be revised to be consistent for clarity.* *b. The subsurface area elevations are not consistent with the dimensions of the detail. (Bottom chambers = 183.00 + 30" chamber height = 185.5, not 186.50)* *c. The "Subsurface Infiltration Area Detail" shows what appears to be an outlet pipe and manifold system labeled with a dimension "0.5". This is not shown on the site plan sheet 5.*
Response:	a. The Detail on sheet 10 has been revised to read "Roof Drywell Detail" b. The subsurface elevations have been corrected. c. There is no outlet pipe coming from the roof drywell. The 0.5' dimension is the labeling the width of stone between chambers.
Comment:	***Comment addressed.***
Response:	**No response required.**
Comment 26:	***Traditionally, the sight distance calculations are based upon the design speed of the roadway which was not identified by the Applicant. It would generally be assumed that the design speed would be slightly above ethe posted speed, say 35 mph. The Applicant has provided sight distance calculations for 40 mph as well which depicts the conservative calculation for sight distance at the subdivision road.***
Response:	***The design speed of a roadway is typically 5 to 10 mph above the posted speed limit of a roadway. The sight distance requirements have been added to Table 1 for a 35 mph design speed.***
Comment 27:	***The Sight Distance Assessment memorandum denotes that the required minimum sight distance due to grade is 188-feet at 30 mph and 285-feet at 40 mph for both directions in terms of stopping sight distance. This would suggest that the downgrade is the same in both directions from the sub-division road. Based on field observation it appears that the grades are not the same and that the calculated SSD should be higher than 200-feet for the downgrades on each approach.***
Response:	**Bayside reviewed the grades used in the assessment. The grades were obtained from the subdivision plans for Hampstead Street. Based on the plans, Hampstead Street north of the proposed subdivision roadway is on an approximate downgrade of 4 percent (south to north). South of the proposed subdivision roadway, Hampstead Street is on an approximate downgrade of 3.7 percent (south to north). These grades were used in the sight distance assessment and are shown above in Table 1. The original assessment had the Hampstead Street grade as an upgrade in this area when it should be a downgrade (as reflected above). Attached are the sight distance calculations.**
Comment 28:	***TEC agrees that the sight distance measurements will exceed AASHTO minimum recommendations. It is anticipated that the changes based on the comment above will not alter this conclusion. Although the minimum sight distance is met, the desired sight distance at 30 mph is not for intersection sight distance (ISD) looking north and at 40 mph for ISD looking south. TEC agrees that the Applicant should maintain cut-back vegetation on the site frontage to provide the maximum sight lines possible.***

Response:	**Bayside concurs. On the ISD, in accordance with the AASHTO manual, "If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road." Accordingly, the ISD should be at least equal to the SSD, which would allow a driver approaching the minor road to safely stop. The Applicant will maintain cut-back vegetation along the site frontage to provide the maximum sight lines possible.**
New Comments – February 7, 2022	
Comment 29:	***On page 15 of the attached Stormwater Report, the applicant references the use of water main that is 6" in diameter instead of an 8" diameter pipe referenced on the plans. The applicant should revise accordingly.***
Response:	**Page 15 has been revised from "6 in" water main" to "12" water main".**
Comment 30:	***Multiple pipe lengths, slopes, and inverts detailed on the Pipe Sizing Calculation Spreadsheet (page 82 of the attached Stormwater Report) do not match the information stated on sheets 5 & 6 of the Definitive Subdivision Plan set. The applicant should revise accordingly.***
Response:	**The Pipe Sizing Calculation Spreadsheet has been revised.**
Comment 31:	***The infiltration basin design incorporates an underdrain and valve in Plan View. The underdrain and valve should be added to the Construction Detail and Cross Section of the infiltration basin.***
Response:	**The infiltration basin cross section has been revised to include an underdrain/valve.**
Comment 32:	***The infiltration basin cross section includes several errors and should be revised:*** ***a) Emergency spillway labeled at 181.00, but drawn at elevation 180.50*** ***b) 100-year Flood Elevation labeled at 180.82, but drawn at ~180.50*** ***c) ESHWT labeled at 175.5, but test pits show 176.6 (lowest elevation)*** ***d) Naturally occurring materials labeled as loamy sand, but test pits show sandy loam*** ***e) TEC recommends an anti-seep collar within the berm to prevent risk of breakout/erosion.***
Response:	**a) The emergency spillway has been revised to be depicted at elevation 181.00.** **b) The 100-year flood elevation has been revised to be depicted at 180.48.** **c) An additional test pit has been provided to support the design.** **d) This note has been revised to read "sandy loam".** **e) The infiltration berm detail on page 9 of the plan set depicts Clay-type Soil in which MEI believes to be adequate.**

Comment 33:	*The infiltration basin is designed with an emergency spillway at elevation 181.00. The berm around the basin should be designed to provide a minimum of 1-foot of free board above the highest water elevation. TEC recommends retaining the 10-foot berm width for access and maintenance purposes.*
Response:	**The Basin has been revised to provide a minimum of 1-foot of free board. The top of berm elevation is 181.50 and the peak elevation for the 100-year storm is 180.48.**
Comment 34:	*The sediment forebay construction detail shows information for four different sediment forebays. TEC believes this is a drafting error and should be revised to show accurate information for the one forebay proposed.*
Response:	**The sedimentation forebay construction detail has been revised.**
Comment 35:	*The construction detail for the outlet control structure calls for a top of structure elevation of 180.75, but the HydroCAD shows a top elevation of 180.00. Also, the "top view" of the detail shows only one orifice, but the side view calls for two.*
Response:	**The Outlet Structure detail has been revised to reflect the correct elevations.**
Comment 36:	*TEC recommends installation of a level spreader at the discharge point of the infiltration basin to better match existing drainage patterns.*
Response:	**A level spreader has been added to plan view as well as a construction detail to the detail sheet.**
Comment 37:	*DMH A is shown within the right-of-way of Hampstead Street but it does not show any connection to the existing drainage system. The Applicant should provide invert information and should provide confirmation that the system in Hampstead is in working condition and functioning properly. If DMH A is proposed as a dog house manhole, a construction detail should be provided to be reviewed by the City Engineering Department.*
Response:	**Invert information has been added to the grading and drainage page as well as the plan and profile sheet with the note "inv. to be confirmed by contractor prior to installation."**

We trust this response letter provides the necessary information for the Board's consideration of the request for completeness. If you have any questions or comments, please feel free to contact our office at your convenience.

Sincerely,

Millennium Engineering, Inc.

James Melvin, P.E.
Project Manager

w/ Attachments