

Chessia Consulting Services LLC



May 20, 2021

Planning Board
Town of Hingham
210 Central Street
Hingham, MA 02043

RE: Engineering Review
220 Summer Street
Site Plan Review

Dear Members of the Board:

In response to your request, Chessia Consulting Services, LLC has reviewed the above referenced project under the Site Plan review procedures in the Zoning By-Law. The submittal was also reviewed for general engineering design standards, and DEP Stormwater Management Policy/drainage design. The data reviewed included the following information:

- Plans entitled:
“Site Plan Proposed Dwelling 220 Summer Street Hingham, MA 02043”
dated 3-15-21, revised 4-21-21 prepared by James Engineering, Inc.
consisting of 5 sheets. (Plans)
- Package Including:
“Drainage Calculations for 220 Summer Street” dated April 21, 2021
prepared by James Engineering, Inc. (Report)

The site is located on the North Side of Summer Street and the east side of Kilby Street. The property initially included an antique house and barn that has been divided to create a new lot at the corner of Summer and Kilby Streets. The property is mostly cleared with recent earthwork in the southerly part of the site. Based on prior reviews of this project, the site area was previously mostly meadow and brush with a developed lawn around the existing antique house and barn. There was an existing cart path from Kilby Street to the existing house and barn that crosses the newly created lot. I visited the site several times over the past two years, most recently on May 12, 2021 to observe existing conditions.

Topographically the new lot is lower than the surrounding area with a gentle slope to the north. There was a channel that was flowing in sections at the time of my first site visit in January of 2019. The channel originated near Summer Street and flowed to a 6” culvert under the cart path. Based on observations and the presence of algae in the water the water source was assumed to be from groundwater. There is a stone retaining wall in the area that appears to be located within the Summer Street layout where water was observed and this section of Summer Street has a berm along the roadway to channel

surface runoff in the street gutter. Below the cart path the channel was more defined and had more significant flow. Ultimately this flow discharges next to an existing catch basin in Kilby Street, but most of the flow bypasses the catch basin and flows to the north across the abutting driveway to a catch basin in Chief Justice Cushing Highway. In addition to the groundwater flow there is a section of roadway at the corner of Summer and Kilby Streets where surface runoff flows into the lot from the roadway. At this location there is no berm or a minimal berm along the edge of pavement. There was evidence of scour between the pavement and the lower lot area noted in my 2019 site visit. Along Kilby Street north of Summer Street there is a very small berm that does not appear to be that effective as there was evidence of flow from the roadway across the shoulder, which is covered in wood chips, to the property along this area as well.

Since the prior submissions, the channel through the lot has been mostly filled and a 4” corrugated plastic pipe in crushed stone has been installed in the channel area. This appears to have limited effectiveness as the area near Summer Street has ponded water. I have attached photographs taken at my recent site visit. There has also been fill and other site disturbance over most of the southern part of the lot. Some work was performed on the abutting lot to the north based on property line stakes placed in the field and part of the tracking pad at the access appears to be over the lot line. There is no or minimal vegetation in the disturbed part of the lot. The area of the previous channel is defined by a gray shaded area on the plans, but the pipe and stone have not been identified. There is also a French drain indicated on the plans that was previously installed along the west side of the lot parallel to Kilby Street. This drain previously discharged to the existing channel at the northerly end of the site. This drain is no longer visible and may have been disturbed by recent fill and other work on the site. It is unclear that this drain still functions due to the recent site disturbance.

It is my understanding that the Conservation Commission determined that the site was not considered a wetland. The Drainage Calculations identify the area as a wet meadow based on soil conditions and model the runoff accordingly in the existing case with a higher runoff curve number typical of wetlands conditions used in the calculations.

Based on a review of MassGIS data, the property is not in an ACEC, Zone II or Zone A of public water supplies, nor are there any identified rare wildlife habitat or vernal pools in the vicinity of the parcel. The property is not located in the Accord Pond Watershed and Hingham Aquifer Protection District.

Some soil testing data is included on the plans. Tests were previously performed and two were witnessed by Chessia Consulting Services one was at the southerly end of the previously proposed infiltration basin. I have also reviewed Natural Resource Conservation Service (NRCS) published data available on line. The site primarily consists of Chatfield Rock Outcrop complex soils with Newfield soils to the north. Both Chatfield and Newfield soils are classified as Hydrologic Soil Group (HSG) B, which are of moderate permeability. Soils in the vicinity of the existing channel have been considered HSG D, typical of wetland soils, due to high groundwater conditions. Testing that has been performed indicates more permeable sands generally to the south east side

of the site and in the area of the antique house and barn. These soils would be HSG A and have been assumed to be HSG A in the calculations.

GENERAL PLAN REVIEW:

The proposed project would develop a new residential house on an ANR lot. The former cart path that accessed off of Kilby Street would be modified to a paved driveway to access the lot. The driveway opening is in the same general area of the cart path. The proposed garage has been changed to the rear of the house (north side).

This lot would be served by an on-site septic system. Runoff would be collected from the roof of the new house, part of the new driveway and part of the existing barn, existing house and associated yard area for discharge to a new surface infiltration basin on the lot. Runoff from the front yard associated with Summer Street frontage would be collected in a new flared end inlet connecting to the existing French drain for discharge at the north end of the lot into the existing channel. The outlet for the French drain would be extended to the north approximately 30 feet into the channel, which would be filled. The area of the drain has been disturbed by recent work and it is unclear if the drain has been damaged. I recommend that the status of this drain be determined to confirm it is suitable for the proposed use. Part of the westerly side of the lot would be sloped into Kilby Street. This is a change from the previously approved plan as more area is directed to the right of way than before. This aspect should be coordinated with the DPW as the agreement for the prior plan did not include adding this extent of area to the Town right of way. More of the proposed driveway than on the previously approved plan is also directed to Kilby Street. A new inlet and swale along Kilby Street are proposed as previously indicated on the approved plans to collect this runoff. The catch basin is proposed to connect to the existing catch basin further to the north on Kilby Street as previously approved.

The overall study area for runoff analysis has expanded to include more of the existing house, barn and associated area. More of this area would flow to the infiltration basin than in the previously approved plans. The total flow to the channel and catch basin in Kilby Street has not been assessed in any of the filings.

The water service is proposed to come off of Summer Street; there is no data on gas, electric or cable utilities. The project is subject to site plan review since there would be alteration of 20,000 square feet of land.

The following issues are considered the most significant for the Board to consider in review of the project:

- Confirmation from the DPW of the proposed work in Kilby Street based on the new design.
- Soil testing for the proposed stormwater basin and general basin design given that the basin has been relocated further into the wet area with what appear to be less suitable soils.

- Compliance with stormwater standards.
- Condition and function of existing the French Drain and new 4" drain in the channel.

Section I-I Site Plan Review:

1. Purpose:
No comment required.

2. Procedures:
It is assumed that the appropriate information has been submitted to initiate the review process. The Board should review the project relative to the specific subsections of this section.

3. Pre-Application Submittal.
It is unknown if a pre-application submittal has been submitted or commented on by the Board. I note that this site has been previously approved with a follow up modification plan. There has not been a plan that complied with all of the approval conditions to the best of my knowledge as my files indicate some outstanding issues based on my review of the plans submitted after the Decision on the approved plans. This plan is a significant change as the lot design, basin design and location, etc. have all been modified from the prior plans.

4. Submittal Requirements:
Plans are stamped by a Professional Engineer.
 - a. The submittal includes a locus plan. The Owner/Applicant is listed as Ryan P. Sillery on the Plan. The lot area and boundary dimensions are indicated on the plans. The plans include setbacks from Summer Street, Kilby Street and the easterly lot line. The plans include the Zoning District (Residence C) where the lot is located, together with required zoning setbacks, area, etc. The plan also includes the zoning square. It appears that the proposed building would meet setbacks as shown on the plan. The plans indicate existing and proposed contour elevations in the vicinity of the proposed work. Structures within 100 feet of the property line are indicated on the plans as required.
 - b. The plans are drawn to scale (1" = 40' and 1" = 20') and indicate the proposed building footprint. The building dimensions are not listed on the plans as required. Building elevations and floor plans were not provided but may not be required for a residential dwelling.
 - c. No data on traffic circulation has been provided. As a single family lot, it is not typically required to perform a traffic analysis. The Board may require a detail of the driveway cross section.
 - d. The Application does not request any relief from zoning requirements. Since the site includes over 20,000 square feet of land disturbance a site plan review is required under Section IV-B 6 b.
 - e. The plans indicate a proposed on-site septic system near the existing barn is proposed. It is my understanding that the Board of Health has approved the

septic system but will be discussing the need for a variance for the foundation due to groundwater concerns. Water would be brought to the site from Summer Street. Electric/cable services are not indicated, it is unclear if these would be brought to the house via overhead wires or in underground conduits. No gas mains or a service connection is indicated on the plans. Utility purveyors should comment on the plans. A stormwater system consisting extension of the existing French drain, a new catch basin in the driveway, roof leaders and an open infiltration basin system is proposed. Refer to comments on the stormwater systems under h. below. There are no proposed trees or plantings indicated. There are some trees both along the Summer Street and Kilby Street frontage within the lot that could be impacted by grading, one is listed as to be removed. There are other large trees on the lot that would be impacted by grading or excavation, including a 48 inch maple that will likely need to be removed due to excavation for the septic system sewer pipe. The plans should identify trees to be removed or retained. A landscape plan has not been provided.

- f. The submittal includes a grading plan and stormwater runoff analysis. Traffic volume is unlikely to be a concern. Refer to comments under Stormwater Management Regulations below for drainage design. The grading plan proposes to fill the front and around the proposed house by 4-6 feet to create a pad for the house, driveway and yard. As noted the area has a very high water table, essentially at grade during high groundwater periods. The house would be constructed over the existing channel that passes through the lot. This channel has been filled and a stone trench with 4 inch corrugated pipe installed. I note that this drain was not on the prior approved plans. Based on my observations this pipe has limited function. I have included some photos of this area to help describe conditions. Plans should identify elevations at the top and base of the retaining wall along Summer Street. There are some elevations listed but more should be added. Much of this wall is indicated in the Public Way.
- g. This item requires information to assess the impact of the development on soil, water supply, ways and services. There are several test pit logs included in the Application for this lot but none at the actual location of the proposed stormwater basin, which has been moved north and east of the previously approved location. Most of the testing appears to be for septic system design. Tests performed indicate refusal at ledge 6 feet or deeper in many of the tests. Soils below the top layers are reported as sand or loamy sand with percolation rates of all less than 2 min/in primarily on the easterly side of the site. The westerly side has less permeable soils. Groundwater is generally shallow and estimated either by redox features or weeping in the lower elevation areas. The results are consistent with site observations with EL 37 being approximately the seasonal high water table near Summer Street. This site has significant water issues as noted and control of groundwater and surface water flow through the site is a major issue. Recent work does not appear to have improved conditions as there is still ponding near Summer Street despite

- the new drain and water was observed on the surface of the recent fill material and in the channel where the 4 inch pipe and stone trench has been installed.
- h. The regulations require compliance with DEP Stormwater Management Policy as discussed below:

STORMWATER MANAGEMENT REGULATIONS - EROSION AND SEDIMENT CONTROL:

The DEP Stormwater Management Regulations consist of ten standards. The standards were reviewed using the Massachusetts Stormwater Handbook Documenting Compliance (MSHDC) together with other sections of the Handbook as appropriate. This section of the correspondence lists the standards and identifies whether the submittal complies, does not comply or if additional information is required to demonstrate compliance.

This project would not be considered a redevelopment as the lot is currently vacant.

Standard 1 – Untreated Stormwater

This standard requires that no new untreated point source discharges are created and that point source or sheet flow discharges do not result in erosion into or scour of wetlands. This standard is required to be met for redevelopment projects.

The design includes three new surface discharge points although one is for the proposed foundation drain. There is an outlet from the basin on the northeast side of the lot and two outlets, including the foundation drain and the extension of the French drain proximate to the remainder of the channel on the lot. The plans do not indicate the existing 4” drain outlet which is also in the same general location. These outlets are approximately 30 feet from the property line. The basin low level drain also discharges at this point but would not have flow except to maintain the basin in the event soils become clogged. There is also a proposed new drop inlet with a connection to an existing catch basin in Kilby Street that would discharge through the existing outlet of the street system. Most of the discharge from impervious areas on the lot would be treated in the infiltration basin. Some would only be treated in the drop inlet proposed in Kilby Street.

The submittal should include details, a plan and sizing calculations for scour protection as required.

To demonstrate compliance outlet protection data should be provided. Also refer to comments under other Standards.

Standard 2 – Post Development Peak Discharge Rates

This standard requires that the peak rate of discharge does not exceed pre-development conditions and that the design would not result in off-site flooding during the 100 year storm. I note that it is not permitted to increase runoff or flooding to abutting properties without appropriate easements, etc.

I recommend that the subareas use the channel/trench drain as the divide not an arbitrary area on the slope. It is standard practice to use identifiable control points as a channel in this type of analysis. The time of concentration flow paths should extend to the control point at the property line at the end of the channel/trench or the catch basin in Kilby Street as applicable.

The condition of the existing French drain near Kilby Street should be assessed as if it has been damaged by recent construction it may need to be replaced.

The model erroneously adds post watershed directly to the catch basin in Kilby Street in the post development condition, but the flow would have to cross the abutter to reach this point. This area should be added to the control point at the property line consistent with the existing conditions.

The proposed basin would be an infiltration basin by design, although the calculations do not credit exfiltration during a storm it is assumed to infiltrate between storms to have all of the volume available for the next storm. The Board should require additional soil testing to confirm conditions are suitable for infiltration. The basin has been moved to the north and recent field observations question the suitability of the soils on this side of the site. There were suitable soils under fill at the south end of the previous basin but the test is 50 feet away from the closest point in the bottom of the basin.

Additional data is required under this Standard to demonstrate compliance.

Standard 3 – Recharge to Groundwater

This standard requires that designs provide on-site recharge to mimic pre-development conditions. Calculations to demonstrate compliance are based on soil conditions, and certain methodology as outlined in the MSHDC.

No site specific testing has been performed at the location of the proposed basin to determine if any suitable soils exist at the proposed location of the basin. It is proposed to raise the bottom of the basin approximately 2 feet above existing grades at the low end. I note that based on a discussion with DEP staff on a different project, removal of less permeable soils in the C layer to expose more permeable soils is not consistent with DEP requirements. This issue was not known at the time of the initial review of the project.

The submittal should include time to drain calculations and an adjustment for the portion of the driveway that is not tributary. Calculations use 0.5 inches of runoff as the recharge volume. This is conservative as some of the soil is HSG D (.1 inch recharge required) and the west side is primarily HSG B (.35 inch recharge required). HSG A soils require 0.6 inches of recharge but there does not appear to be any new impervious area in the HSG A soils.

Additional data is required under this Standard to demonstrate compliance.

Standard 4 – 80% TSS Removal

This standard requires runoff be treated to remove suspended solids (TSS) to at least 80% removal. For areas with rapidly draining soil pretreatment of 44% prior to an infiltration system is required. In this case soils are mixed with more permeable soils on the east side of the site.

It is proposed to direct runoff from the driveway into a catch basin prior to discharge to the infiltration basin. A portion of the driveway would flow to the new inlet in Kilby Street. Roof and patio flow would be collected in a pipe system and discharge directly to the basin. Roof runoff does not require pretreatment.

Details of proposed catch basins, manholes, trenches, etc. should be included on the plans.

A small area of the new driveway (694 square feet) is proposed to discharge to a new catch basin. This catch basin could meet requirements for 25% TSS removal if it is designed appropriately in accordance with DEP requirements as it would receive less than ¼ acre of impervious surface flow. This is the only treatment for a portion of the new driveway. This would not comply with requirement for 80% TSS removal. It may be “de minimus” based on DEP Regulations but the submittal should demonstrate that is the case.

The majority of the driveway would be collected in a new catch basin in the driveway. As noted no details have been provided so it cannot be determined if the catch basin would receive treatment credit. The tributary impervious area is less than ¼ acre so a standard deep sump catch basin with hood could meet requirement for 25% TSS removal.

The final BMP in the treatment train is an infiltration basin. Depending upon soil conditions this system could meet requirements. If soils are highly permeable a higher level of pretreatment is required. The recharge volume calculations use the runoff criteria for water quality volume and indicate that the system is sized adequately. As noted under other Standards additional testing should be performed to confirm soil conditions.

Additional data is required to demonstrate compliance with this Standard.

Standard 5 – Higher Potential Pollutant Loads

The project is not considered a source of higher pollutant loads, this standard is not applicable.

Standard 6 – Protection of Critical Areas

Based on a review of Mass GIS mapping the site is not located in a critical area.

Standard 7 – Redevelopment Projects

The project would not be considered a redevelopment

Standard 8 – Erosion/Sediment Control

This standard requires construction phase erosion controls. Although the work area is less than one acre and a SWPPP under EPA requirements would not be required, the data should include all of the information required in the DEP Handbook. As noted work has commenced without final approvals. I recommend that the Board require a separate Erosion and Sedimentation Control plan with all of the data required in the DEP Checklist. The site is subject to a high water table and depending on the season of construction this could be an issue.

Additional data is required to demonstrate compliance with this Standard.

Standard 9 – Operation and Maintenance Plan

This standard requires long term maintenance of non-structural and structural BMP's and requires a specific inspection schedule, etc.

The Report states that the O&M manual is attached but it was not included in the data provided.

Additional data is required to demonstrate compliance with this Standard.

Standard 10 – Illicit Discharge

An unsigned Certification Statement has been provided. Providing a signed Certification should be a condition if the project is approved.

- i. It does not appear that any lighting is proposed.

- j. It is unclear if the Board requires or requests and other materials not identified above regarding the project.

The Board should review the comments and determine if all of the information required under Section 7. Review Standards and Approval have been addressed by the Applicant prior to arriving at a decision.

I appreciate the opportunity to assist the Planning Board on this project and hope that this information is sufficient for your needs. This report is for the Hingham Planning Board and associated Hingham land use agencies only and provides no engineering, planning or other advice that may be relied upon by any party or agency other than the Town of Hingham. I would be pleased to meet with the Board or the design engineer to discuss this project at your convenience. If you have any questions please do not hesitate to contact me.

Very truly yours,
Chessia Consulting Services, LLC

John C. Chessia, P.E.
JCC/jcc