

Chessia Consulting Services LLC



August 14, 2019

Ms. Mary Savage-Dunham
Community Planning Director
Town of Hingham
210 Central Street
Hingham, MA 02043

RE: Engineering Review
156 Chief Justice Cushing Highway
Residential Development

Dear Ms. Savage-Dunham:

In response to your request, Chessia Consulting Services, LLC has reviewed the site plan submittal for the above referenced project for compliance with the requirements of the Zoning Bylaw (ZBL) for projects submitted under an Application for Site Plan Approval. I also reviewed the submittal relative to general engineering design standards, DEP Stormwater Management Regulations/drainage design and parking and circulation as applicable. I visited the site previously as part of my review of the septic system design. The data reviewed included the following information:

- Plan entitled “Site Plan 156 Justice Cushing Way Hingham, MA 02043” dated 7-23-19 prepared by Cavanaro Consulting. (Plan)
- Report entitled “Site Plan Review Application Submitted to Town of Hingham Planning Board Proposed Residential Development 156 Justice Cushing Way Hingham, MA 02043” undated stamped received by Hingham Planning Board July 24, 2019, prepared by Cavanaro Consulting, Inc. (Report)

The site is located on the north side of Chief Justice Cushing Highway. Topographically the lot slopes to the north at a moderate slope near the roadway and at a fairly steep slope within the wetland buffer zone as indicated to the limit of provided topography. There is a wetland area identified on the southern part of the lot. Based on an email from Loni Fournier on August 5, 2019, the wetland line has not been confirmed at this time. The overall lot area is listed as 1.31 acres inclusive of wetlands. The area closest to Chief Justice Cushing Highway has been cleared and stripped. There are fill piles, etc. in the front of the site and along the steep slope above the wetlands. The slope is wooded. Based on available orthophotographs the upper excavated/altered area was vegetated but not forested prior to the recent excavation work.

Based on MassGIS mapping the locus is not in a FEMA flood hazard area, NHESP habitat, Zone II for public water supply wells or ACEC. No certified or potential vernal pools are mapped within 100 feet of proposed work. It is unclear where runoff from the wetland ultimately discharges as there are no mapped streams in the area on MassGIS and there are developed lots along East Street.

Based on the Report and published data, soils appear to be silt loam in the proposed work area with potentially more permeable soils to the north near the wetlands. Seasonal groundwater elevations are reportedly 30-36" below grade, based on testing performed for the septic leaching area. The Natural Resource Conservation Service (NRCS) data indicates that an even higher seasonal high water table is likely in these soils. I note that the excavation for testing in the proposed septic leaching area has been holding water over the past four to six weeks at roughly the same elevation. Logs for four on site tests at the location of the proposed septic leaching area were included on the Plan.

It is proposed to construct a new dwelling with a 4,240 square foot (sf) footprint. The house would have a 2,450 sf footprint and the garage a 1,700 sf footprint. It is unclear if this is a one or two story building. The rear of the house would be a walk out to the rear yard.

GENERAL PLAN REVIEW:

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

Summary of Main Concerns:

- Existing contours should extend further to the east as the grading slopes to the neighboring property. As drawn, it appears that there would be a swale between the lots.
- The Board may require existing contours sufficient to determine if there is an outlet from the wetlands.
- There is work proposed in the State Highway Layout, including fill and closing of an existing drainage scupper that may not be approved by MassDOT.
- Drainage design, there are some issues to be addressed in relative to compliance with the Standards.
- Notes appear to be relative to the proposed septic system not the site plan and should be corrected.
- Landscape Design, no data on removal of existing trees or any proposed plantings has been provided. Some existing trees will need to be removed to implement the work.

I have described my comments with reference to the specific section of the submittal requirements. My comments are as identified below:

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. I note that an Application for a Special Permit A3 for a parking determination is included in the submittal.
3. Pre-Application Submittal.
It is unknown if a pre-application submittal has been submitted or commented on by the Board.
4. Submittal Requirements:
 - a. The submittal includes a “Locus Plan” within the Report. The Locus plan is a USGS Map. The Applicant is Mr. Fred Butts. The property limits are indicated on the plans with descriptive data (metes and bounds). Topography has been indicated for part of the locus. There is a sheet sourced from MassGIS in the Report that indicates structures within 100 feet of the locus. The Board may want some structures indicated on the Plan, in particular the easterly abutter. Some additional topography should also be required to the east and potentially to the north to identify where runoff discharges to the east and from the wetlands to the north.
 - b. The plans are drawn to scale. Building plans have not been provided, the Board should determine if they will be required for a single family dwelling.
 - c. A single family house typically does not require a traffic analysis. There is likely sufficient sight distance but I recommend it be confirmed as this is a highly traveled roadway with higher speed traffic compared to a typical residential street. The Board may require a detail of the driveway construction.
 - d. The Application does not request any relief from zoning requirements. The site is in the Residence C zoning district. Typically, a table of Zoning requirements is listed on the Plan.
 - e. The plans include a water service location although the location of the existing water main is not indicated on the plans. I recommend that the location of the existing water main be indicated. The water main location will ultimately be required to obtain a Permit from MassDOT. A proposed on-site septic system is indicated. The plan requires variances from the local regulations that have not yet been approved. It appears that cable utilities would be brought to the house from a pole in the front of the site via underground conduits.
No data on landscaping has been provided. The Board may request data on existing trees and any proposed landscaping.
As a single family house refuse storage and removal is generally not an issue with site plan review.

- f. The submittal includes a grading plan and stormwater runoff analysis. As noted, traffic is generally not an issue with single family projects on existing ANR lots. Refer to comments under Stormwater Management Regulations below for drainage design. The grading proposes substantial fill in the front of the house and lesser fill in the rear. The septic system leaching area would require excavation of 20-30 feet of unsuitable material and imported Title 5 sand backfill. There are sandy soils below the silt loam. I recommend that more data on existing contours on the east side be indicated. The land has a slope to the abutting property and the proposed design appears to direct more runoff to the neighbor post development. Runoff ultimately all flows to the north but the design should not increase direct flow to the abutter.
- g. This item requires information to assess the impact of the development on soil, water supply, ways and services. The plans appear to require substantial fill to implement the project. The submittal discusses the volume of import required to implement the project. The project proposes a new water connection; it is unclear where the existing water main is located in Chief Justice Cushing Highway. Test pit data for four test locations has been provided; published data and soil logs indicate very slowly permeable soils at most locations proposed for the development. It is questionable whether water will infiltrate into the soil given my observations over the past several weeks. Groundwater is reported as shallow where soils were tested.
- h. The regulations require compliance with DEP Stormwater Management Regulations as discussed below:

STORMWATER MANAGEMENT POLICY/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 be considered a redevelopment only for the portion of the site currently covered with impervious surfaces and for other parts full compliance is required. It is my understanding that the existing gravel parking lots would not be considered impervious by DEP.

Standard 1 – Untreated Stormwater

This standard requires that the project not result in point sources of untreated runoff and that runoff not result in erosion or sedimentation.

There are two new outlets indicated. The project proposes to infiltrate and detain runoff from the roof of the new building and driveway in a subsurface infiltration system. All runoff would be treated through the infiltration

systems. Outlet sizing calculations should be provided. The outlet from the rear system discharges to a steep slope and may cause erosion.

More data on the proposed outlet protection should be submitted to the Board.

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. System designs should comply with the DEP Handbook for stormwater management systems.

General:

There is a wetland at the bottom of the slope that appears to extend into adjacent properties. The wetland outlet(s), if present, should be identified. If it is an isolated wetland the limits and contour data may need to be determined to demonstrate flooding elevations pre and post. If the wetland has a restrictive outlet more modeling may be required to demonstrate abutting properties are not impacted.

It is proposed to install two subsurface infiltration systems to control both peak rates of runoff and total runoff volume. This may not be feasible given soil conditions and site observations.

Subarea plans were not provided. Data cannot be completely checked without suitable to scale subarea plans.

Existing Conditions:

Runoff on the site generally flows north to the wetlands at the bottom of the slope. A portion of the site pitches to the east to the abutting property, although the contours indicate a swale, one was not observed in the field. The survey should be expanded and corrected in this area.

Soils, based on the NRCS mapping are Hydrologic Soil Group (HSG) D in the south where development is proposed and HSG B nearer to the wetlands in the north. On-site testing indicates silt loam with sand approximately 20-30 feet below the silt loam layer. Based on testing and observations I recommend that the site be considered HSG D soils in the development area unless testing indicates differing soil conditions in other parts of the site. HSG D soils are generally not suitable for infiltration. The water table is relatively shallow based on both soil testing and site observations.

As the area in the vicinity of the work has been altered it is unclear if the vegetation prior to the alteration was fair condition grass cover. As noted,

historic aerial photos indicate that the area was cleared as a pasture or some other open use. It is unlikely it was a maintained lawn area as it is not close to the former house that was associated with the property that is accessed off of East Street and is now a Day Care facility.

The time of concentration is estimated as 5 minutes. This is likely faster than pre-altered conditions.

If the total runoff volume is met or reduced it would not be required to map the tributary to the existing low area. If there is an increase in runoff proposed the lower wetland area should be modeled as a pond to assess flood height and associated impacts. Since soils do not appear to be suitable for infiltration purposes it is likely that the volume of runoff will increase.

Proposed Conditions:

Overall drainage area issues as noted under Existing Conditions would also apply for the proposed conditions. In particular, the area tributary to the easterly abutter appears to be increased and should be modeled to assess the impact.

A pipe is indicated on the easterly side of the driveway connected to the infiltration system in the front. But the model does not include that connection. There are no roof drain collection pipes indicated discharging to the front system included on the plan, the model assumes that half of the roof discharges to the front subsurface system. Two pipes of unspecified size and slope are indicated at the rear of the house. A subarea plan including roof ridge lines, gutter sizing, as this is a substantial roof, piping, etc. should be provided.

Subsurface infiltration systems should route outflow through the final culvert. The outlet is modeled as an orifice not a culvert. The outlet inverts should be listed on the plans.

On-site testing was only performed at the septic system leaching area. Testing at the location of proposed infiltration systems is required to demonstrate that they will function as proposed. As noted, soils are likely not suitable for infiltration based on NRCS and on-site test data. The design assumes an infiltration rate of 0.27 in./hr. Typically, glacial drumlins have a denser composition that further restricts infiltration compared to silt loam soils in other parts of the country.

Testing should be performed at the proposed system locations. I recommend that testing be witnessed by an agent of the Town. It is proposed to utilize infiltration in all storms modeled. I note that four feet of separation or a groundwater mounding analysis is required for systems that utilize infiltration

for peak rate control where less than four feet of separation is proposed. Soils also need to be suitable for infiltration purposes.

Subsurface systems should use bottom area for rate control not wetted area, based on email data provided by Tom Maguire of DEP. This factor overestimates the infiltration in the systems.

The rear system is located at the edge of a steep fill slope and could result in break out and instability on the proposed fill slope. Although subsurface systems are all different and may not have a specific setback from a slope, the closest similar system in the DEP Handbook is an infiltration trench which requires a setback of 100 feet from a steep slope.

It does not appear that this Standard would be met by the design. Additional information is required to demonstrate compliance with this standard.

Standard 3 – Recharge to Groundwater

The design would result in an increase in impervious area. The difference in impervious area over the existing conditions should be infiltrated in accordance with the standard.

It is proposed to infiltrate in excess of that required under this standard such that there would be less total runoff volume than currently exists. As noted, it does not appear that suitable soils exist on the site and insufficient testing to demonstrate that soils will drain adequately has been provided. As noted under Standard 2 more site specific soil testing should be performed. There may not be adequate groundwater separation based on published data. On site specific testing to document compliance with groundwater separation should be performed.

It is unclear that this Standard could be met based on soils conditions reported and observed. For sites with HSG C and D soils that are not suitable for recharge it is required to recharge to the maximum extent practicable. The Applicant could request that recharge be to the extent practicable if further testing confirms unsuitable soils are present.

Standard 4 – 80% TSS Removal

This standard requires that runoff be treated to remove 80% of total suspended solids (TSS) prior to discharge.

It is proposed to discharge runoff from the driveway to a crushed stone trench with a 4 inch PVC pipe. As noted under Standard 2, it is unclear where this pipe is proposed to discharge. More data on this proposal is required. An

infiltration trench provides treatment if runoff is properly pre-treated. In this case there is no pretreatment and it is questionable that the trench will infiltrate as soils are not reported as suitable. A crushed stone trench is not listed as a treatment BMP in the DEP Handbook.

Refer also to comments on the design of these systems under Standards 2 & 3.

It does not appear that this standard would be met.

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

The site is not located in a critical area based on MassGIS.

Standard 7 – Redevelopment Projects

The site is not a redevelopment project.

Standard 8 – Erosion/Sediment Control

This Standard requires development of plans and narrative data to control erosion and sedimentation resulting from the removal of vegetation, etc. as a result of construction. In this case the work area may be less than the one acre of disturbance threshold and an EPA NPDES Permit and SWPPP may not be required.

This Standard requires the following data. I reference the Stormwater Report Checklist. Some of this information could be provided prior to construction:

- Narrative – There should be a Construction Sequencing section on the Plan that describes general construction phases, procedures, etc.
- Construction Period Operation and Maintenance Plan – A Construction Period O&M has been provided. The only proposed sediment control is a mulch sock. The plans should also include a tracking pad, stockpile and staging areas, etc. and discussion of maintenance of these areas.
- Names of Persons or Entity Responsible for Plan Compliance – The Owner is listed as the responsible party. The Board could require documentation that the Owner is experienced in erosion and sediment controls. I note that there were no sediment controls on site with several areas of disturbed soils and stockpiles at the time of my site visit.
- Construction Period Pollution Prevention Measures – Some data is provided on the plans, primarily a mulch sock to be installed at the

sides and rear of the property. The write up also requires protection of subsurface infiltration structures. The Conservation Commission may have additional requirements as the work is proposed to the edge of the 50 foot buffer on a steep slope.

- Erosion and Sediment Control Drawings – No specific drawing has been provided; the Site Plan indicates the mulch sock location. A complete Erosion and Sediment Control Plan responsive to the requirements should be provided. Also refer to other comments.
- Detail Drawings and specifications for erosion control BMPs, including sizing calculations. – The only detail is for a mulch sock. I recommend that the mulch sock be staked as the slopes are steep. Other details will also be required.
- Vegetation Planning – Typically planting periods for successful growth should be included. There is no discussion of planting or landscaping.
- Site Development Plan – This requirement would be satisfied with the Plans.
- Construction Sequencing Plan – Not provided.
- Sequencing of Erosion and Sediment Controls – The Plan should specify the timing of sediment and erosion controls as required. It is required to install the mulch sock prior to any site disturbance. I note that there was no mulch sock on site at the time of my site visit and there has been site disturbance over most of the front of the site.
- Operation and Maintenance of Erosion and Sediment Controls – The submittal includes requirements for maintenance and repair of the mulch sock only. Any other erosion and sediment controls should have maintenance listed in the Construction O&M.
- Inspection Schedule – A schedule for inspection of various erosion and sediment controls should be included.
- Maintenance Schedule - The submittal includes a schedule for maintenance and repair of the mulch sock only A schedule for maintenance of other erosion and sediment controls should be included.
- Inspection and Maintenance Log Form – A construction phase log form was not included with the submittal.

As noted above minimal data has been provided. Data as required in the DEP Handbook should be provided with the Application.

Additional data is required under this Standard.

Standard 9 – Operation and Maintenance Plan

An Operation and Maintenance Plan (O&M) was provided in the Report. For all projects a comprehensive O&M is required for the entire site.

I recommend that the O&M be revised to be consistent with DEP requirements for the BMP's proposed. A plan identifying the location of all on-site BMP's should be provided.

The Board could require that the plans identify snow storage areas.

The proposed crushed stone trench should be added to the O&M.

I recommend that the subsurface system if proposed to collect runoff from the pavement have an isolator row. It is unclear if pavement is proposed to connect to the front system.

I recommend roof drain gutters be cleaned twice a year once in the fall after leaf drop and again in the spring after snow melt.

Additional data is required to comply with this Standard.

Standard 10 Illicit Discharge

There is a general statement regarding illicit discharge connections and a form to be signed. A signed statement from the Owner is required.

- i. The plans do not indicate any existing or proposed lighting. Lighting is generally not an issue with a single family dwelling.
- 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 6. 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

