COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

November 22, 2017

Wayland Zoning Board of Appeals
41 Cochituate Road
Wayland, MA 01778

RE: CASCADE WAYLAND, BOSTON POST ROAD, WAYLAND, MA
REVIEW OF COMPREHENSIVE PERMIT APPLICATION (40B)

Dear Members of the Wayland Zoning Board of Appeals:

At the request of ProtectWayland.org, Comprehensive Environmental Inc. (CEI) has conducted a technical review of the multi-family residential structure proposed for construction at 113, 115, 117, and 119 Boston Post Road. Our review focuses on stormwater management, wastewater management, and related water resources impacts of the project as currently designed.

CEI has based the review on the following information on file on the Town of Wayland's webpage dedicated to the Cascade Wayland Project:

1. A Comprehensive Permit Application entitled " Properties located at 113, 115, 117 & 119 Boston Post Road, Wayland, Massachusetts Assessor's Map 30 Parcel 71 and Map 30 Parcel 70" dated July 25, 2017.

2. Drawings entitled "Cascade Wayland" dated July 21, 2017 prepared by Finegold Alexander Architects. The drawings consist of 24 sheets.

3. Drawings C000, C101, C201, C301, C401, C501, and C502, dated 11/13/2017 prepared by Finegold Alexander Architects.

4. A stormwater management report entitled, "113 & 115 Boston Post Road", dated 11/10/2017, prepared by Beals and Thomas, Inc.

5. Cascade Wayland project feedback letters to/from various individuals and organizations contained in the August, September, October, and November files.

CEI offers the following comments from our review of the referenced materials:

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

• Engineering
• Design
• Construction
• Inspection

Responsive service, cost-effective solutions, technical excellence

• Drainage & Flooding
• Energy & Sustainability
• Hazardous Waste
• Permitting & NEPA
• Stormwater & LID
• Transportation
• Water & Wastewater
• Watershed Restoration

B. General

1. The Comprehensive Permit Application includes a list of requested waivers from provisions of local bylaws and regulations. In CEI's experience in the review of these types of projects, waiver requests need to be supported by an explanation of why the waiver is required, and how the lack of a waiver would place an unreasonable financial burden on the project.

    a. The list of waivers does not provide the rationale for each waiver requested.

    b. The Zoning Board of Appeals (ZBA) should not grant waivers of local provisions that are no stricter than state or federal regulations that apply to the site development. For example, those provisions of the local Stormwater and Land Disturbance Bylaw or Wetlands Protection Bylaw that are consistent with Massachusetts Wetlands Protection Act regulations should still apply to the site.

    c. Where local bylaws (such as the Board of Health regulations of wastewater systems) are protective of public health and safety, a waiver should not be granted unless the applicant demonstrates that the alternative design is equally protective of the public interest.

2. We recommend that the ZBA <u>not</u> grant a waiver of the application of the Stormwater and Land Disturbance Bylaw. This Bylaw enables the Town of Wayland to comply with its obligations under federal regulations. See further comments below under Stormwater Management Design

3. We recommend that the ZBA <u>not</u> grant a waiver of the application of Wayland's Board of Health Regulation requiring design based on a flow of 165gpd per bedroom, as the local requirement is based on protection of public health and safety, with consideration of local conditions and experience. See further discussion below under Wastewater Management Design.

4. The Applicant should confirm the correct test pit data has been submitted. The forms included in the Comprehensive Permit Application indicate the test pit data is from Brookfield, Massachusetts. Also, Figure 1 accompanying the test pit data shows more than one location for TP-8.

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

5. In Section 9.0 of the Application, the Applicant states there are 89 bedrooms; however, this is not consistent with Section 5.0 which states there are 6 studios, 24 one bedrooms, 24 two bedrooms, and 6 three bedrooms, or a total of 96 bedrooms. See further comments below under Wastewater Management Design.

6. There is no specific reference or calculation supplied supporting the water use estimate of 4450 gallons per day. The applicant should document the derivation of this figure relative to water use. (See separate comments below relative to the appropriate figures to use for the design of the wastewater system).

7. Based on our review of the file materials at the Town web-site for this project, the existing conditions drawings appear to be either incomplete, or incorrect:

    a. The drawings do not show the correct water main from which the project would obtain service.

    b. The drawings do not show drainage system piping serving the Boston Post Road, including outlet pipes that transect the project site in at least two locations. See additional comments below relative to stormwater system design.

8. The building has an underground garage:

    a. The finished floor elevation appears to be lower than the seasonal high groundwater table. The drawings do not show how the groundwater will be intercepted, conveyed, and discharged.

    b. Floor drainage facilities are not indicated. The drawings do not show how runoff from the garage floor will be intercepted, stored and disposed.

    c. The Applicant has requested a waiver from the town of Wayland's Board of Health Regulation relative to floor drains. Where the local requirement is based on protection of public health and safety, with consideration of local conditions and experience, the Zoning Board of Appeals (ZBA) should not grant a waiver unless the Applicant

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com

provides documentation to verify the system design will provide an equivalent level of protection to the local standard.

9. In section 6.0, the application states the project is not within a NHESP priority habitat; however, we note that Pine Brook accepts stormwater runoff from the proposed development and flows directly into an NHESP protected habitat (protected plants, amphibians, and birds) north and west of Sandy Burr County Country Club.

C. **Wastewater Management Design**

1. Based on the information discussed below, the on-site wastewater disposal system may require permitting under the Groundwater Discharge Permit Program. Further clarification of the number of bedrooms and ancillary facilities (e.g., conference and work rooms) is needed to confirm whether design flows exceed 10,000gpd, the threshold for this permit. See the regulations at 310 CMR 15.006 (Title 5) and 314 CMR 5.00 (Ground Water Discharge Permit Program).

2. The septic system is currently only sized for 9,900gpd as shown on drawing C301. The derivation of this design flow should be documented.

   a. The number of bedrooms proposed should be clarified. We understand that the applicant has indicated a reduction in project scale to 89 bedrooms are now proposed. This number is not consistent with the architectural drawings provided, nor with Section 5.0 of the Comprehensive Permit Application, Project Description, which states that there are 6 studio apartments, 24 one-bedroom units, 24 two-bedroom units, and 6 three-bedroom units, or a total of 96 bedrooms within 60 units. 310 CMR 15.203 requires the system to be designed for a minimum of 110 gallons per day (gpd) per bedroom. 96 bedrooms x 110gpd/bedroom = 10,560gpd.

   b. The design flow should also account for ancillary uses. The architectural drawings show a management office, conference rooms, work bar, multi-purpose room, and what appears to be a pet grooming facility. The application submittal contains no

information documenting the design flows corresponding to these uses.

3. The application narrative notes a flow of 4,450gpd, but does not provide an adequate citation to support this figure. The introductory paragraph of 310 CMR 15.203 explicitly requires the use of flows specified in the table provided in the regulation.

4. The Applicant has requested a waiver from the town of Wayland's Board of Health Regulation requiring design based on a flow of 165gpd per bedroom. Where the local requirement is based on protection of public health and safety, with consideration of local conditions and experience, the Zoning Board of Appeals (ZBA) should not grant a waiver unless the Applicant provides documentation to verify the system design will provide an equivalent level of protection to the local standard.

5. We concur with the Wayland Board of Health's comments in a letter to the Zoning Board of Appeals dated August 17, 2017 indicating that there are insufficient deep test pits to support the design of the system, as shown on the drawings. We understand from our client that Board of Health personnel noted additional tests holes were performed, some of which were observed to encounter ledge, that have not been depicted in the information provided in the application.

6. The wastewater system design as shown on the drawings would result in deep fills, with site disturbance within the Riverfront Area in proximity to a stream classified as a cold-water fishery. The applicant should address the following:

    a. Information should be provided to document impacts on the cold-water fishery resulting from changes in groundwater hydrology. There will be a substantial increase in flow into the groundwater from the septic system.

    b. Information should be provided to document the impacts of changes in groundwater temperature, as a result of the septic system.

    c. The presence of the septic system will interfere with the ability to re-establish a wooded buffer within the inner riparian zone (within

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

100 feet of the stream). If the septic system and embankments need to be kept free of woody vegetation, this will hamper the long-term development of canopy and understory vegetation that would provide riparian habitat buffer and shade along the stream.

d. The construction of the septic system results in an extensive, steeply sloped bank that can potentially serve as a source of increased sediment load to the sensitive stream, and warrants an aggressive permanent erosion and sediment control design to prevent sediment impacts on the stream.

In summary, the Applicant has presented insufficient information to document the amount of wastewater that the Project would generate, and has not accounted for additional facilities included in the building plan. Failure to properly account for these flows could result in an undersized system. The documentation that has been produced reflects insufficient deep test pits to support the design of the system and a failure to account for the system's proximity to Pine Brook. Even were these shortcomings addressed, the ZBA should not waive local Board of Health requirements, which protect public health and safety based upon local conditions and experience, unless the Applicant provides documentation to verify the system design will provide an equivalent level of protection to the local standard.

D. **Stormwater Management Design**

1. The stormwater management system design does not adequately account for flows originating off of the site and discharging onto or through the site:

   a. Wayland public works personnel have indicated that existing drainage piping from Boston Post Road transects the site. The existing piping must be shown. The design must show how the pipes will be integrated into the design. If the pipes must be relocated, the new locations should be indicated. If the outlets at Pine Brook are altered or relocated, the applicant should provide information regarding how impacts will be addressed. Pine Brook will be particularly sensitive to disturbances on and near its bank. In addition, the presence of spawning redds (see letter from EBT Environmental Consultants dated November 2017) along the brook adjacent to the project warrants special care in preventing erosion,

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com

sedimentation, surface flow alteration, and groundwater flow alteration that can significantly affect this habitat.

b. Topographic data indicates that property to the east of the project site drains onto the site. The site drainage system design calculations do not include a mapping of the contributing watershed area or the inclusion of this area in the sizing of the drainage system. The model analyzing impacts on peak rates does not include the magnitude of these flows in either pre- or post-development conditions

2. The Massachusetts Stormwater Management Standards require the runoff from all impervious surfaces to be treated (Standard 4) for at least 80% TSS removal. The drawings and calculations do not clearly indicate compliance with this requirement:

   a. The graded depression between the visitor parking area and the greenhouse drains to an area drain, without apparent treatment. The greenhouse roof and a paved walkway drain to this area.

   b. While the main building roof appears to drain to an infiltration basin, the TSS removal calculations do not tabulate the storage volume required to capture the necessary water quality volume for treatment.

   c. The design shows the use of Stormceptor® units and derives treatment efficiencies using manufacturer-prescribed methods. The removal rates should be supported by a third-party independent evaluation of the Proprietary Separator's performance, to document credit for these removal rates.

3. The selected stormwater treatment measures shown on the drawings do not comply with the requirements of the Massachusetts Stormwater Management Standard applicable to Critical Areas (Standard 6), which applies because Pine Brook supports a cold-water fishery:

   a. Compliance with 310 CMR 10 requires designs to be in accordance with the Massachusetts Stormwater Handbook. The Stormceptor® is classified as a Proprietary Separator in Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook. Therefore, the

Stormceptor® "Must be used for pretreatment and be placed first in the treatment train to receive TSS removal credit."

b. The Massachusetts Stormwater Handbook, Volume 1, Chapter 1 includes a table entitled "Best Management Practices for Cold-Water Fisheries" which stipulates that proprietary BMPs may be used for pretreatment only, unless verified for such other uses by STEP or TARP (technology verification protocols specified by MassDEP). No data has been included to indicate verification of the Stormceptor® for this purpose.

c. The Stormceptor® provides no treatment process to reduce the temperature of runoff from contributing paved areas. The cold-water fishery is particularly sensitive to temperature impacts. This proprietary device is therefore not suitable as the primary treatment in this setting.

d. The Stormceptor® provides no treatment process to remove road salt or other chemicals in solution that would impact the cold-water fishery.

e. As noted in Stormwater Management Design Comment 2, there is drainage area near the greenhouse that receives no treatment of runoff prior to discharge.

4. The design provides for an infiltration basin to treat roof runoff, located between the building and Pine Brook. The application materials fail to show that this facility fully complies with the standards presented in the Massachusetts Stormwater Handbook:

   a. The application contains no subsurface data on soils textures or groundwater elevations in the vicinity of this basin, sufficient to support the design.

   b. If groundwater depth is less than 2 feet from the bottom of the infiltration basin, the design is non-compliant. The calculation assumes a groundwater depth of exactly 2 feet without any evidence.

c. If groundwater is between 2 and 4 feet of the invert of the infiltration chamber the Applicant must include a mounding analysis, where the basin is used to control peak rates for storms equal to or exceeding the 10-year frequency event. No mounding analysis has been provided.

d. Table RR of the Massachusetts Stormwater Handbook requires a 50ft setback from an infiltration basin to other surface waters. The infiltration basin is shown to be approximately 30ft from the mean annual highwater line of Pine Brook.

e. Table IB.1 of the Massachusetts Stormwater Handbook requires infiltration basins to be a minimum of 50' of any slope greater than 15%. The designed infiltration basin is within 15' to 20' of the steep bank (slope of approximately 30%) abutting Pine Brook.

f. Both the primary overflow outlet and the emergency spillway for this basin are positioned where flows exiting the spillway will discharge onto steep slopes. This presents a risk of severe erosion and potential slope failure adjacent to Pine Brook.

5. The drawings show the outlet from the piped stormwater system at the southeast corner of the site.

a. As noted in the above comment, locating the outlet at mid-bank level risks erosion of the bank below the riprap apron.

b. The location creates a point discharge that did not previously exist. Under existing conditions, the topographic data shows flows being dispersed along the western and southern boundaries of the site, not concentrated in a single location. Such flow dispersion would maximize the potential for infiltration of stormwater, and minimize potential for erosion.

c. The location directs stormwater discharge onto an adjacent property where there currently is no direct discharge.

d. The outlet is located immediately adjacent to a spawning redd, as identified in information included with EBT Environmental Consultants' letter dated November 2017. This habitat feature would be highly sensitive to any changes in surface and groundwater flow, water quality, and sediment inputs. The design

does not adequately address any of these potential impacts to stream habitat, as a result of placing the outlet so close to the spawning redd.

6. The drawings show the use of bioretention areas in the stormwater system.

   a. The drawings do not show details for the bioretention area or vegetated filter strip. A full technical review cannot be completed until all details are supplied by the Applicant.

   b. Because they are shown with no underdrain, it appears the bioretention areas are intended to drain by infiltration. Additional information is required to document this function, including supporting calculations showing drawdown within 72 hours following any storm event.

   c. Soil test pits should be provided at each location of the bioretention areas.

7. The Applicant has not described how snow storage will be managed on the site to prevent impacts to the stormwater management facilities (especially the bioretention areas), as well as to the stream.

8. As noted above, we recommend that the ZBA deny the requested waiver of the application of the Stormwater and Land Disturbance Bylaw. This Bylaw enables the Town of Wayland to comply with its obligations to the US EPA under the NPDES Stormwater Program, General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). That permit requires Wayland to regulate stormwater discharges, and on-going maintenance of systems extends beyond the initial development and construction of a stormwater discharge. Waiver of this bylaw may hamper the Town's ability to manage stormwater discharges in compliance with its federal permit.

In summary, the information furnished by the Applicant fails to document that the stormwater management complies with a number of the state Stormwater Management Standards. The system design also underestimates the volume of stormwater to be handled by failing to account for flows that originate off-site, and by incorrectly modeling on-site flows. As a result of these deficiencies, the Applicant has failed to account for or properly mitigate the Project's stormwater

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

impacts on and off of the site, including impacts to Pine Brook and the wildlife that relies upon it for habitat.

E. Flood Plain Management

1. The development is currently shown within a flood zone, which is depicted by scale from FEMA Flood Hazard mapping. The flood zone does not relate to the topographic features shown on the drawings:

    a. The location of the flood plain boundary is critical to the analysis of impacts at this site. If any of the proposed fill constricts the existing flood plain, increases in flow or velocity would be likely, with the potential for adverse impacts to upstream and downstream properties, as well as impacts within the sensitive stream resource. The applicant should be required to delineate the 100-year flood plain by accepted engineering methods, complying with the methodology specified in the Wetlands Protection Act Regulations at 310 CMR 10.57.

    b. Existing flood plain "pockets" within the site appear particularly inconsistent with the topographic mapping. The applicant should document that prior floodplain within the site has not been filled (please refer to comments in the letter from the YMCA to the ZBA dated September 25, 2017).

    c. The design shows placement of fills within flood plain (Bordering Land Subject to Flooding). No compensatory flood storage is shown, as required under the Wetlands Protection Regulations. Furthermore, provision of compensatory storage could require additional land disturbance at or near the bank of the stream, with potential additional impacts to that important resource area.

In summary, accurate flood zone delineation is a crucial component in analyzing the Project's impacts both on-site and off-site. This information must be properly calculated and provided, along with information regarding the location and extent of compensatory flood storage, to enable complete review of the project's impacts on the floodplain and the stream.

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

• Engineering
• Design
• Construction
• Inspection

Responsive service, cost-effective solutions, technical excellence

• Drainage & Flooding
• Energy & Sustainability
• Hazardous Waste
• Permitting & NEPA
• Stormwater & LID
• Transportation
• Water & Wastewater
• Watershed Restoration

G. Stormwater Management Report and Calculations

The Stormwater Report calculations contain deficiencies which do not allow comparison of pre- and post-development discharge rates. The calculations need to be corrected to allow review of the conclusion whether the project design would adequately control peak rates and volumes of discharge from the site, in compliance with the Massachusetts Stormwater Management Standards.

1. The predevelopment analysis overestimates peak flows and volumes.

    a. The hydrologic model fails to use the longest time to concentration (T_c) path for existing conditions, artificially shortening the time to peak, which will underestimate peak rate of the stormwater flow of the predeveloped area.

    b. The predevelopment analysis also does not account for ponding within existing low areas on the site, such as found adjacent to the east side of the existing building, or any infiltration that occurs as the result of such ponding.

2. The peak flow analysis underestimates the flow rates and volumes in the post-development analysis. The post-development area PDA-1B needs to be broken down into smaller, homogenous sub-catchments, with each routed to outlets following the contours of the site, to accurately model the stormwater flow of the developed site.

    a. A significant portion of PDA-1B does not drain through the drainage system contained in the paved area, but should be routed directly to the stream in the model.

    b. Flow from the remaining landscaped area is piped directly to outlet. Combining this area with the pavement in developing curve numbers and times of concentration will artificially distort the estimate of runoff, underestimating the contribution from the paved surface. The parking lot/driveway area should be treated as a separate sub-catchment, and routed independently to the design point from the landscaped portions of the catchment.

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

In summary, the Stormwater Report calculations overestimate existing flows and underestimate post-development flows. These deficiencies preclude a meaningful comparison of pre- and post-development discharge rates and must be corrected.

H. CONCLUSION

In conclusion, the Project design and supporting materials present a number of critical shortcomings with respect to stormwater management, wastewater management, and related water resources impacts. The Applicant has inadequately documented the amount of wastewater that the Project would generate, and has failed to establish that site conditions support the design of the system. The stormwater management system fails to satisfy a number of the state Stormwater Management Standards, underestimates the volume of stormwater, and inadequately addresses the Project's stormwater impacts on and off of the site. The Stormwater Report calculations require correction to properly estimate existing flows and post-development flows. An accurate flood plain boundary delineation has not been produced, which is critical to analyze the Project's impacts both on-site and off-site. The project design inadequately addresses the system's proximity to Pine Brook, including impacts to the stream and the wildlife that relies upon it for habitat.

The ZBA should not waive the Wayland Stormwater and Land Disturbance Bylaw or Board of Health requirements, both of which protect public health and safety based upon local conditions and experience. The Stormwater and Land Disturbance Bylaw also enables the Town of Wayland to meet its obligations under federal regulation.

If you have any questions or comments regarding this report please contact either Matt Doyon or Dave Nyman at 508-281-5160.

Sincerely,
COMPREHENSIVE ENVIRONMENTAL INC

Matthew P. Doyon, P.E.
Project Engineer

David C. Nyman, P.E.
Senior Civil Engineer

225 Cedar Hill Street, Marlborough, Massachusetts 01752 508-281-5160 Fax: 508-281-5136
21 Depot Street, Merrimack, New Hampshire 03054 603-424-8444 Fax: 603-424-8441
Gateway Crossing, 1 Hartford Square-East, New Britain, Connecticut 06052 860-224-0442
www.ceiengineers.com