



dan@legacy-ce.com
508-376-8883(o)
508-868-8353(c)
730 Main Street
Suite 2C
Millis, MA 02054

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Robert Alix, Chair
Lancaster Zoning Board of Appeals
Prescott Building
701 Main Street, Suite 4
Lancaster, MA 01523
ATTN: Brian Keating, Planning Director

Ref: 13 Neck Road
Comprehensive Permit Application

Dear Chair Alix and Members of the Board:

I write on behalf of Jan Pirozzolo-Mellowes and John Mellowes, the owners of 12 Neck Road in Lancaster. 12 Neck Road is an abutter to, being directly across the street from, the lot at 13 Neck Road on which Neck Farm Estates LLC, the Applicant for a Comprehensive Permit under Chapter 40B in this matter (the "Applicant"), intends to construct the Proposed Development. In its current configuration, the Proposed Development consists of 11 rental units, and the lot at 13 Neck Road is half an acre located at the junction of Neck Road and Center Bridge Road (the "Locus").

We have been engaged to review the application documents and provide technical comments to the Board for their consideration in deliberations relative to the proposed development. We offer the following comments and are available to answer any questions you may have.

1. **Stormwater Management:** We have several concerns about the proposed stormwater management system design and calculations. As a Comprehensive Permit application, while the Applicant may seek waivers from local regulations and bylaws, they are bound by federal and state requirements. Our review finds several instances of non-compliance with MassDEP Stormwater Management standards and its accompanying Handbook. Please note the following:
 - a. The Hydrocad calculations are inconsistent with the site plan and standard engineering practice in several ways:
 - i. The Applicant classified the entire site as Class C soils (presumably based on the NRCS soils mapping). However, test pit data for 2022-01, 2022-02 and 2022-03 (1-3) appears to be inconsistent with this classification because the parent soil material is medium sand, which is typically a Class A soil. As a result



of this condition, the applicant may be overstating the existing conditions peak rate of runoff, which is the benchmark by which the proposed design is measured to ensure that there is no increase in the peak rate of runoff from the proposed site condition. Additional test pits should be excavated to properly classify the soils throughout the site.

- ii. The Applicant should provide the source (UNH design study) for their decision to utilize a time of concentration for parking lot runoff of 460 minutes (7.7 hours). Typical time of concentration for paved surfaces is 2-5 minutes. Such a dramatic increase in the design time of concentration value significantly reduces the peak rate of runoff and likely models an unrealistically slow rainfall distribution flow to the porous pavement reservoir course. This would overstate the expected infiltration into the ground and understate the expected peak discharge from the system.
 - iii. The Hydrocad calculations model the porous pavement reservoir course as being flat at an elevation of 266.0. The site plan, however, specifies that a large portion of the porous pavement system will have a bottom elevation of 268.0 and that portions of the bottom of the reservoir course are sloped. The Hydrocad model is therefore materially flawed and not reflective of the design intent indicated on the site plan. The model should be revised to reflect the actual proposed elevations of the porous pavement reservoir course and how it interacts with the proposed weir overflow.
- b. Generally speaking, porous pavement systems are not optimal or appropriate for sites with characteristics present at the proposed development. This site contains high groundwater and lies within a "Critical Area" (MassDEP Stormwater Standard 6). Porous pavement systems require substantial depths to seasonal high groundwater to be effective. With the depth of the porous pavement system itself and the 3-foot separation to seasonal high groundwater specified in the Handbook below the bottom of the system, seasonal high groundwater generally needs to be at least 5-6 feet below grade for porous pavement to be effective. The soils testing on this site indicates seasonal high groundwater elevations that are generally 3-3.3 feet below grade. Additionally, the DEP Stormwater Handbook states "the long-term pollution prevention strategies for sites near critical areas must also incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event." (Volume 1, Chapter 1, page 16). This is not possible with a porous pavement system and any unexpected spill of hazardous materials will impact the underlying soils and groundwater table quickly. We note that the site is proximal to a perennial river to the east, the North Nashua River to the southwest and to Estimated and Priority Habitat for rare and endangered species to the southeast.



- c. The proposed porous pavement system does not comply with the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Handbook's various requirements in several ways:
 - i. The system does not appear to meet the minimum 10-foot setback to property lines.
 - ii. The system does not appear meet the minimum 10-foot setback to slab foundations (20 feet for cellar foundations, if applicable).
 - iii. The proposed system is only 2.4 feet deep and will not be below the frost line as the Handbook requires.
 - iv. The handbook requires that the filter course (which provides enhanced filtration treatment) be at least 12" thick. The proposed design provides for only 8-inches and will therefore not provide the necessary treatment of stormwater runoff.
 - v. The Handbook states "the bottom of the stone reservoir must be completely flat so that runoff can infiltrate through the entire surface." The design appears to provide for portions of the bottom surface of the reservoir course to be sloped. See below for further discussion.
 - vi. The Handbook states "provide a three-foot buffer between the bed bottom and the seasonal high groundwater elevation." As discussed below, the proposed system appears to be at or below seasonal high groundwater elevation in several locations.
- d. The southerly porous pavement system specifies a bottom elevation of 266.0-268.0. There is no clear indication of how this elevation transition is to occur. We infer that the bottom of the porous pavement cell is proposed to be sloped. This will not function as designed. Stormwater entering the reservoir course would flow along the sloping bottom of the system to the low end, which is not what is indicated in the Hydrocad report. The Hydrocad calculations assume that the entire reservoir course will be level (at elevation 266.0). In reality, the upper segments of a sloped reservoir course are of little value because stormwater will quickly build up to the point on the low end of the system where the weir will engage (at elevation 266.50). Thus, the storage capacity of the reservoir course is significantly overstated in the Hydrocad calculations.





- e. The westerly (rear) portion of the site (test pits 4-6) are consistent with the NRCS soil mapping, which indicates restrictive glacial till soils with high groundwater conditions. Although the plans do not provide specific elevations for each test pit, based on the existing conditions topography, we conclude that the seasonal high groundwater at test pits 5 and 6 are between elevations 267.5-268.0. The bottom of the proposed porous pavement reservoir course is specified to be at elevation 268.0, which is at the high groundwater elevation. The system will not function as intended as it is not at least three feet above seasonal high groundwater elevation. The design infiltration rate is therefore not valid and vastly overstated as infiltration rates slow dramatically at the high groundwater interface.
- f. Similarly, the southerly porous pavement cell reservoir course is specified with a bottom elevation ranging from 268.0-266.0. We presume the higher end will be at the west side (although the plan is not clear on this topic). As noted above, seasonal high groundwater elevation in this vicinity is not at least three feet below the bottom of the reservoir course. Test pit 2 and 3 indicate seasonal high groundwater elevations of ~266.1-266.8, again suggesting that portions of the proposed porous pavement system will be at or below seasonal high groundwater and certainly not at least three feet above it. It is our view that the proposed system will not function as designed, that it does not comply with by Mass DEP Stormwater Management Standards (or standard engineering practice), and that the proposed stormwater management system needs to be reconsidered.
- g. Given the numerous issues raised about the actual capacity of the porous pavement system to infiltrate runoff given the high groundwater conditions and the proposed sloped reservoir course, it is our expectation that the proposed stormwater discharge calculations are significantly understated. As the Lancaster DPW noted in their memorandum, the proposed stormwater management system discharge connects to what is undoubtedly a vastly undersized stormwater pipe in Center Bridge Road (only 12-inches). Any proposed increase in either the peak rate or total volume of discharge from this densely developed site into the Town's stormwater management system is likely to result in substantive adverse impacts. As has been noted in other commentary provided to the Board, we do not recommend a connection from the site's stormwater management system to a catch basin in Center Bridge Road. We defer to the recommendations of the Lancaster DPW on the best connection methodology, but connecting to a catch basin is not consistent with standard engineering practice. Any proposed connection should be to a manhole.





2. **Center Bridge Road Sidewalk:** The site plan depicts the municipal sidewalk for Center Bridge Road on the east side of the site. This is problematic for several reasons:
 - a. The Applicant should be required to provide a title search that demonstrates that there are no existing easements in that area relative to the sidewalk that may impede or preclude the construction of their proposed site features.
 - b. The presence of a municipal sidewalk on private property is obviously not an appropriate configuration. As part of any site development, the Applicant should be required to relocate the sidewalk into the Center Bridge Road layout, including all necessary modifications to the roadway shoulder. Given the location of the two utility poles in relation to the property line, either the utility poles would need to be relocated or the sidewalk would need to be positioned in close proximity to the paved roadway surface. With any lack of grass strip, appropriate construction techniques to provide safe passage for pedestrians in a condition of this nature would involve installing vertical curbing at the paved roadway edge with the relocated sidewalk installed at the back edge of the new curbing.
 - c. The existing sidewalk location on the property falls within ~2 feet of two of the proposed structures, including the large barn style building and the portion of the easterly two-unit building. It is not practical to construct either of these structures without destroying the adjacent sidewalk for foundation installation and then blocking the sidewalk for constructing the above-ground portions of these buildings. The Applicant should be required to either provide appropriate construction-stage safeguards for pedestrian traffic, including a temporary sidewalk and fencing, or they should be required to relocate the sidewalk into the Town's road layout prior to the construction of either building.
 - d. Any reconstructed sidewalk segments must comply in all respects with accessibility laws and regulations.
3. **Snow Collection & Vinyl Fence:** Vinyl fences are generally light-weight and modular, typically consisting of separate cross beams and vertical slats. These structures are not very stable and can be impacted by even strong wind. In our experience, designating an area along a vinyl fence as a snow storage area is likely to damage the fence and may result in adverse impacts to surrounding properties if the fencing fails (such as snow or fence segments being pushed into adjacent properties).
4. **Project Density:** It is our opinion that the proposed 11-unit development (22 units per acre) is too dense for this small site and that it is out of character with the surrounding land uses that generally have significant areas of open space. As noted above, the proposed site does not have enough room for adequate snow storage or stormwater management systems. We note further that there is little usable outside amenity space on the site. With two- and three-bedroom units included the need for outdoor amenity space should be considered.



5. **Wetlands Impacts:** We note that a perennial river exists to the north of the site. Depending on where mean-annual high water is flagged along the west side of that river, portions of the site and associated construction activities may fall within the Riverfront Area and may require approval from the Conservation Commission.

Do not hesitate to contact me should you have any questions or comments.

LEGACY ENGINEERING LLC

Daniel J. Merrikin, P.E.
President

cc: File

