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PLANNING & ZONING
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January 25, 2021

Thaddeus Bysiewicz
Ameritage, LLC
15 Meriden Road
Middlefield, CT 06455

**RE: Founders Ridge – Phase 2 – Ridgewood Road – Middletown, CT
P&R Job No. 143038**

Dear Mr. Bysiewicz:

This letter summarizes my observations and recommendations regarding erosion and sediment control concerns related to the phase 2 construction at Founders Ridge. These observations and recommendations are based in part on my January 15, 2021 and January 22, 2021 inspections of the active construction area on your site and the downstream pond area at 97 Poplar Road. It is my understanding that the owner of 97 Poplar Road has expressed concerns over impacts to the existing pond on the property and potential stormwater concerns as they relate to your ongoing construction project.

OBSERVATIONS

The pond at 97 Poplar Road was constructed by excavating a hole in an existing stream channel and constructing an earthen embankment at the downgradient end. It extends partially into an adjacent parcel owned by Eversource which is also an active construction site with ongoing replacement of electric transmission line structures and associated excavation. During my January 15, 2021 inspection, the timber mat stream crossing providing access to the Eversource construction area was covered with fine sediment and I noted that there were no perimeter erosion or sediment controls in place. It was also apparent that construction of the temporary timber mat stream crossing included excavation within the stream channel and wetland corridor immediately upgradient of the pond. Given the lack of any perimeter erosion and sediment controls on the Eversource project, a portion of the recent sediment deposition in the pond is likely the result of the Eversource construction. It appears that the timber mat stream crossing also limits the cross sectional flow area in the channel which could produce erosive velocities under higher flow conditions in the vicinity of the crossing. This flow restriction is also located in a relatively steep section of the stream channel. It is likely that the channel slope combined with the flow restriction is creating isolated areas of super critical flow under and around the crossing with resulting significant channel erosion.

In general, it is poor practice to construct an excavated pond directly in a watercourse as the subject pond was. This is particularly true given the small size of the pond relative to its watershed. Sediment transport is a natural function of any watercourse and as a result ponds constructed in this manner will be subject to regular deposition of sediment through natural forces and will require frequent maintenance if they are to remain open water bodies. Given the generally steep slopes within the pond's watershed the sediment load in

the stream will be significantly higher than in a gently sloping watershed. Based on visual observation of the vegetation growing in the pond, it is apparent that the pond would have had very limited water depth immediately prior to any construction or land disturbance associated with the Founders Ridge project. Photographs presented during the January 6, 2021 Inland Wetlands and Watercourses Agency (IWWA) meeting included a picture of stormwater apparently overflowing the pond embankment and flowing in the direction of the house at 97 Poplar Road. Our design of the Founders Ridge project included a detailed hydrologic and hydraulic analysis under both pre-construction and post-construction conditions. Based on this detailed analysis, there is no question that the two 12" RCP culverts forming the pond outlet do not have adequate hydraulic capacity to safely pass even a 2 year storm under pre-construction conditions. These two pipes have a hydraulic capacity of approximately 5 cfs (cubic feet per second) whereas the pre-construction flow was approximately 6 cfs. The design of the detention basins in the Founders Ridge project will provide a slight reduction in peak flow after construction is completed. Good engineering practice for any pond with a constructed embankment such as this one would include the design and construction of an appropriate stabilized emergency spillway for high flow storm events. Based on these significant shortcomings in the overall design and construction of this pond, it is likely that there was no design or analysis by a qualified engineer when this pond was originally installed or the construction was not consistent with any engineered plans that were developed.

The above referenced photographs presented on January 6, 2021 show that stormwater with suspended sediment was discharging from the Founders Ridge project during that particular storm event based on the red color of the water. In general, the red coloration of the water which is apparent in those photographs would result from the suspension of fine particles in the silt and clay size range. This would be indicative of a breached silt fence or some portion of the disturbed site which may have bypassed an otherwise functional perimeter erosion control measure. Relative to the size of the contributing watershed and the associated flows, the available storage volume in the pond at 97 Poplar Road is inconsequential for providing stormwater retention and settling time for suspended solids in the silt or clay size range. The recent deposition of material in the pond area appears to consist primarily of particles in the much large sand and gravel size range. The increased velocity and scouring resulting from the Eversource stream crossing may be a significant contributor to these deposits.

EROSION AND SEDIMENTATION CONTROL RECOMMENDATIONS

Regardless of the significant shortcomings in the pond design at 97 Poplar Road and the contribution of the Eversource project to the sediment deposition in the pond, it is important to properly implement and maintain the erosion and sediment controls on the Founders Ridge project. In our conversation at the site, you detailed several improvements to the temporary erosion and sedimentation control measures since the offsite concerns were raised. These improvements are consistent with preventing any future bypass or breach of our onsite controls as well as providing multiple layers of protection for the receiving watercourse. These improvements included the following:

1. Modification of the detention basin outlet structure to allow the basin to function as a temporary sediment basin with an increased retention volume prior to any concentrated discharge. This will significantly increase the available settling time for finer suspended solid particles.
2. Installation of a temporary diversion system consisting of swales and berms to direct stormwater from active construction areas with exposed soil to the detention basin. This flow is directed to the end of the basin opposite the outlet to maximize travel time and facilitate plug flow for increased sediment removal efficiency.
3. Installation of a smaller pretreatment swale/basin prior to stormwater discharging to the detention basin. This pretreatment basin has been lined with stone and includes several mulch wattle check dams to facilitate sediment removal and maintenance.
4. The disturbed area of phase 2 that is not actually under construction with roads or infrastructure which drains to the detention basin has been temporarily stabilized with a layer of wood chip mulch.

5. Straw and mulch wattles have been added at several locations subject to higher flows to reinforce existing silt fence.

In addition to the improvements described above, I would recommend several additional measures which we briefly discussed at the site:

1. Limit flows into the northerly portion of the pretreatment basin with an earthen berm and a 4" inlet pipe. This will divert higher flows into the completed portion of the storm sewer system and into the hydrodynamic separator which then discharges to the detention basin. Please note that the hydrodynamic separator will need regular maintenance when used in this manner, however this will offer an effective sediment removal methodology prior to discharge into the detention basin. This will also limit the accumulation of sediment in the detention basin which will ultimately require removal.
2. There is a small area of bare earth between the last house in phase 1 and the start of phase 2. This area is currently protected with a downgradient silt fence. As an additional protective measure, this area should be covered with a layer of the wood chip mulch which is stockpiled on the site. An additional perimeter control such as a wattle or staked hay bales should also be added at the downgradient end of this area in case high flows breach the silt fence. A permanent vegetative cover should be established in this area during the spring planting season.
3. If you have not already done so, I would recommend that appropriate quantities of erosion control measures such as silt fence, hay bales, wattles, filter fabric and crushed stone be kept on site until final site stabilization. It is important to ensure that these materials are immediately available to implement repairs if a problem develops during a storm event.

Based on our conversation and my understanding of the temporary erosion and sedimentation controls that were in place prior to the IWWA cease and desist order, the measures described above will offer a significant improvement in sediment removal efficiency and stormwater quality leaving the project site. As these measures are implemented, the most important task will be regular inspections and maintenance of temporary controls in accordance with the approved erosion and sediment control plan. It will also be important to remember that as construction progresses and site conditions change, additional temporary controls may be required to maintain stormwater quality. The approximate locations of several of these measures are shown on the attached sketch.

POND REPAIR RECOMMENDATIONS

It is my understanding that you are willing to repair the pond at 97 Poplar Road by removing the accumulated sediment and restoring an open water habitat. Provided the property owner is amenable to this repair work I would recommend that it be completed during a low flow period in the summer months. Pond side slopes should be no steeper than 3:1 for stability and to allow anybody who may enter the pond to walk up the side slope to exit the pond. An aquatic bench can be incorporated into the pond repair if desired. This excavation work should be undertaken carefully to avoid unnecessary disturbance to side slopes above the outlet pipe elevation. Any areas above the outlet which are disturbed should be stabilized with an appropriate seed mix and a protective mulch layer. All sediment removed from the pond should be properly disposed of or utilized as fill material on the Founders Ridge project.

I would recommend that you either limit repair work to the boundaries of 97 Poplar Road or that the owner of 97 Poplar Road provide evidence of their rights to have a portion of the pond within the Eversource property. It is also imperative that the owner of 97 Poplar Road understand the significant shortcomings with the design of the pond since it is inevitable that sediment will accumulate and eventually fill the pond in again unless it is regularly maintained. They should also fully understand that the existing pond outlet is severely undersized to pass any reasonable design storm event and any removal of sediment will have little or no effect on the hydraulic capacity of the outlet.

If you have any questions or need additional information, please do not hesitate to contact me at your convenience.

Sincerely,

David J. Held, P.E., L.S.
Provost & Rovero, Inc.

