

Project Location: Address: 18 Boyd Drive and 5 Brown Avenue

DCI Proj.#: 2015-63

Date: August 8, /2017

The following are the DCI written responses to the comments. Comments made by Christiansen & Sergi, Inc. (CSI), review date: June 26, 2017. The numbered responses correspond to the numbering on the comment letter.

1. The proposed project layout and roadway widths were approved based upon the Open Space Residential Design approval special permit. As detailed in the traffic report the roadway network will only experience local traffic for the new neighborhood and not experience thru traffic from Brown Avenue to Boyd Drive.
2. The catch basin detail has been changed to a flat top slab and 2 feet cover is now provided over all drainage pipes.
3. Pipe material preference will be confirmed with the Newburyport Department of Public Services.
4. Two foot minimum cover is now provided over all drainage pipes.
5. Catch basins have been added to provide less than 300 feet of roadway between basins.
6. The vertical curves have been shortened to 50' in all locations where vertical grade PVI's are 1%. This will minimize any potential grading issues along the curb line.
7. Additional grading information is now provided along with area drains to drain the low area behind lots 28-30 and 36-38.
8. The ILSF calculation now uses elevation 52 for the bottom elevation of the calculation. This is based upon soil evaluation from the test pits versus the observed seasonal high groundwater in the observation wells. No stormwater storage below this elevation is included in the ILSF storage volume. The city completed a well pump test on the property pumping 200 gpm for 72 hours. This operation pumped a total of 864,000 gallons or 115,508 cubic feet water that was discharged into the Isolated Vegetated Wetland. During this pump test the water never accumulated more than 12" of depth within an area of 28,430 square feet. The concentration of water pumped here was 4.06cf of water per square foot of flooded area. With this inundation of water, there was 0.7' of groundwater mounding recorded in the observation wells located 20 feet from the flooded area. The ILSF event holds 444,713cf of water over an area of 245,396 square feet with an inundation of only 1.84cf of water per square foot of flooded area. This level of inundation is less than half of the amount water pumped that was pumped to the IVW area. The

grading plan had been revised to raise the meadow area to elevation 54 to insure all areas outside of the construction stormwater wetland, water feature and IVW are above groundwater even with any potential mounding. The ILSF volume calculation has been updated based on the revised grading.

With the porous gravel subgrade material we would not expect excessive mounding as confirmed with the pump test discharge to the IVW. The DEP stormwater regulations require 2' offset to stormwater infiltration systems. There is not a requirement to maintain 2' offset for isolated land subject to flooding. We have attached the information from the groundwater wells during the pump test. The calculation for ILSF draw down time has been updated in the drainage calculations.

9. DEP stormwater regulations allow recharge for infiltration bio-retention areas. All five bio-retention areas provide about 3 feet separation to seasonal high groundwater and designed to provide infiltration. Drip edge infiltration areas are now provided to infiltrate road runoff along with additional drywell adding recharge volume. 100% of the stormwater is eventually recharged other than what is lost to evaporation given the topography of the site.
10. The catch basins and drain manholes are now modeled. Some pipes have been upsized to prevent potential ponding during the 100 year storm event.
11. Time of Concentrations are now calculated for all drainage areas contributing to pipe networks to establish peak flows through the pipe networks. It is not necessary for ILSF volume calculations where stormwater volume is the only design criteria needed to be considered.
12. TSS removal is now detailed in the drainage report. The required 44% pretreatment is provided for stormwater flow to the bio-retention areas.
13. The 4' Depth only occurs during extreme storm events with would be a rare occurrences. Any safety concerns will be discussed with the Planning Board.
14. Water mains are now shown on the profiles.
15. Adequate cover has been confirmed over the cross country drainage. Added profiles have not been added at this time. The cross country profiles can be added if the Planning Board concurs with this request.

.Please see the revised drawings and stormwater calculations for your review. Please contact us with any added comments or questions on the provided material.

Sincerely,
Design Consultants Inc.

Stephen B Sawyer

Stephen Sawyer, P.E.
Director of Engineering

72 Hour Pumping Test at 200 gpm on Evergreen Golf TW-1

