

Engineering has reviewed the plans for the Woodlands at Echo Farms Tract 2 project submitted December 6, 2018 and have the following comments:

Stormwater-Erosion Control Design Narrative

Design Narrative (pg. 3)

1. The Hydrologic Soil Groups listed for the soil types found on-site in the WSS are in conflict with the listed HSG for the same soil types in the TR-55 document. Table H-1 of the TSSM (pg. 5-52) references TR-55 as a source for HSGs. Please revise calculations.

Calculations

2. Minor revision: The header for Basin #3 is mislabeled as Basin: DA #2 [PRE] on the time of concentration page.
3. Minor revision: The HSG % of Basin for DA#2 and DA #3 [Post] are the same. Please verify percentages for each DA.

Woodlands Tract 2 Wet Detention Basin #1

4. *Average Depth Calculation: The area of the bottom of the shelf must include both the main pool and the forebays. Correct the average depth and check the SA/DA ratio and required surface area. Again, this is an old rule. By definition in the old rules, the area of the bottom of the shelf is the surface area at the bottom of shelf (includes main pond & forebay(s)) even though the vegetated shelf does not encompass the forebay. The area of the bottom of the shelf at elevation 4.00' is 25,117sf. The calculated average depth is 3.61' and the average depth used is 3.50' (rounding down to nearest 0.5'). Using 46% impervious at 3.50' yields an SA/DA ratio of 4.60. Required PP surface area is approximately 19,050sf. It doesn't change your pond design, but the calculations need to be consistent with the old rules.*
5. Minor revision: Revisit the drawdown time for the temporary pool (7.60'). I calculate around 5 days, which is still acceptable.

Woodlands Tract 2 Wet Detention Basin #2

6. Same idea for #2 as outlined in review comment #9.

Woodlands Tract 2 Wet Detention Basin #3

7. Same idea for #3 as outlined in review comment #9. The depth used in the average depth equation should be 5' instead of 6'.
8. Minor revision: Drawdown Time for Temporary Pool (6.75') of 4.72 days seems high.

Echo Farms Boulevard Driveway Culvert

9. What design storm is used to size the culvert? Should be the 25-year storm event. Provide the calculations for the 14.00 cfs.

Pond Routing

10. Minor revision: Subcatchment 4S: The Tc appears to be for Basin #3, not Basin #2.
11. Minor revision: Two subcatchments are labeled as RA #2 on pages 9 and 10. Please revise.
12. Summary for Pond 2P: Wet Pond #1:
 - a. Downstream outlet pipe invert should match invert on sheet C-5.2.
 - b. Emergency spillway elevation does not match detail on C-5.2.

10YR HGL Calculations

13. Note only: The 10-YR HGL is above a few of the rim elevations of the structures in the 10-year storm event. It is considered good engineering practice to keep the 10-year HGL elevation below the rim elevation. At a minimum, emergency services cannot be impeded by flooding within the right-of-way.
14. Note only: The pipe system that enters forebay #2 of pond #1 appears to come in deeper than the bottom elevation of the forebay will allow. The 18-inch pipe at FES 14 has a downstream

invert of -1.00'. The Pond #1 detail on C-5.2 has a forebay bottom elevation of 0.00'. Please address.

50YR HGL Calculations

15. Note only: While I can agree that CI-5 and CI-6 have a wetland area to drain to during the larger storms, CI-12 and CI-13 do not have that relief. Public roads must be passable by emergency vehicles during large storm events. Please review to alleviate potential hazards as much as possible.

Supplements

16. Basin #1:
 - a. Temporary pool elevation is 7.60', not 5.71'.
 - b. Update SA/DA Ratio if different based on earlier comments.
 - c. Update Average depth calculated.
 - d. Coefficient of discharge should be 0.87 for the drawdown of the temporary pool and not the 1.5".
 - e. Storage volume discharge rate: 0.22 cfs.
 - f. Storage volume drawdown time: approx. 5 days.
17. Basin #2:
 - a. Temporary pool elevation is 6.75', not 6.03'.
 - b. Update SA/DA Ratio if different based on earlier comments.
 - c. Update Average depth calculated.
 - d. Coefficient of discharge should be 1.75' for the drawdown of the temporary pool and not the 1.5".
 - e. Storage volume discharge rate: 0.08 cfs.
 - f. Storage volume drawdown time: 3.36 days.
18. Basin #3:
 - a. Temporary pool elevation is 6.75', not 6.00'.
 - b. Update SA/DA ratio: 4.83.
 - c. Update Average depth calculated (3.31') and Average depth used (3.00').
 - d. Coefficient of discharge should be 1.75' for the drawdown of the temporary pool and not the 1.5".
 - e. Storage volume discharge rate: 0.06 cfs.
 - f. Update Storage volume drawdown time based on earlier comment.

Operation & Maintenance Agreements

19. The O&M for Pond #1 needs to address the sediment removal elevations in the two forebays: "When the permanent pool depth reads 6(#1)/4(#2) feet in the forebay, the sediment shall be removed.'

Plans

20. C-2.0:
 - a. Placeholder: Provide the permit for the wetland impact at the intersection of Road R and Echo Farms Blvd.
 - b. The proposed sidewalk design along the portion of the property that fronts Echo Farms Boulevard and Appleton Way will need to be included in the plan set. Spot grades, contours, grading, utility relocation, tree removal, etc., needs to be submitted, reviewed and approved by the City before release for construction is granted.
 - c. *A non-municipal utility easement of 10' in width shall be provided on both sides of all public streets for installation of electric, gas, telephone and cable TV lines.* I see the linework was added, but please add a callout, unless it is there and I missed it.
 - d. The Local Street detail is difficult to read.

- e. Note only: Please make every effort to collect and treat runoff from proposed impervious cart paths. Provide a detail for the new walks.
21. C-2.2:
- a. The Minor Street detail is difficult to read.
 - b. The sidewalk along Appleton Way at the intersection needs to be in a public pedestrian access easement since it appears to be outside of the right-of-way.
22. C-3.0: General Note #7 needs to specify the use of ADS HP Storm pipe. ADS N-12 HP Pipe is different and not allowed. Also, the pipe material requirement is only for pipes that will be dedicated as public.
23. C-3.2:
- a. *Piped systems to be dedicated public shall be located within the public right-of-way. Where this is not possible, a dedicated drainage easement will be required with a width determined by the equation found on page 5-3 in the technical standards. The easement shall be labeled as a 'public drainage easement'. Extend the P.D.E. to include the pipe MH-15 to FES-14 and label it. Pipes from CI-3 to FES-1 must be in a P.D.E. Public drainage easements must extend to end of inlet pipes in the forebays. Pipes from DI-43 to FES-36 need to be in a private drainage easement as it does not convey public water. You may also want to put the swales on lots 52-54 (sheet C-3.3) in private drainage easements, too. Add labels to differentiate public easements from private easements.*
 - b. Thank you for relocating MH-8 out of the driveway entrance. Please relocate it from the tire path in the asphalt. Center of the travel lane would be fine. Also, could consider changing it to a CI to get it out of the asphalt altogether.
 - c. Twin driveway culverts do not appear to have a headwall or flared end section.
 - d. Will runoff from the rear of lots 35, 36 and 37 flow into the proposed swale #7? Swale #7 should be placed in a private drainage easement.
 - e. *Add the 10' maintenance access and 5' landscape zone per the technical standards around the perimeter of the pond. Please add labels for each on each pond. Landscape plans were not submitted.*
 - f. *Show emergency spillway appropriately designed stabilization material from the top of the spillway down to natural grade. The rip rap to be used as stabilization material needs to be shown from the top of the spillway down to natural grade for all ponds. C-4.0, 4.1 and 4.3 show it, but other sheets do not.*
24. C-3.3:
- a. Please ensure that any runoff from lots 42 thru 51 will not negatively impact the properties to the rear. Would a swale work here as it does on sheet C3.2?
 - b. Does Old Titanium Court extend further than 150 feet past the turnaround? Provide dimension to show length.
 - c. Public drainage easements are needed on the two pipes leading into the pond #3 forebay.
25. C-3.6: Individual drainage areas are not shown for the inlets and swales.
26. C-4.0:
- a. Proposed valves need to be relocated outside of the asphalt (Fairforest and Independence). Check all sheets.
 - b. Fire Hydrant needs to be shown outside of the sidewalk. Check all sheets.
27. C-4.1:

- a. Fairforest Way profile should extend into Echo Farms Blvd to show the road connection. Same for Old Titanium Court profile. Awendaw Court profile needs to tie back into existing grade.
28. C-5.0:
- a. Add City standard detail SD 3-05.
 - b. Add City standard details SD 3-03.3 and 3-03.4.
29. C-5.2: Some of the 'Sediment Storage El', 'Pond Bottom El.' and 'Bottom El. Forebay' elevations need to be switched for Pond #1 and #2.
30. Provide landscape plan. Was not included with this submittal.

Please submit one complete set of plans, stormwater narrative, calculations and any other supporting documentation to Engineering for additional review. Please call or email if there are any questions.
Thank you.