

Engineering has reviewed the plans for the Airlie at Wrightsville Sound project submitted December 12<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup>, 2017 and January 2, 2018 and have the following comments:

**Stormwater Management Permit Application Form**

1. II. Permit Information; 2: This project is covered under by an existing City Stormwater Permit. Check 'yes' and write in 2017038 for the City Stormwater Permit.
2. II. Permit Information; 3: Provide information on permits already acquired.
3. IV. Project Information; 14:
  - a. Revise the drainage areas for trenches A & C. These DAs do not need to include the upstream systems draining through them.
  - b. Check the Total Impervious Area for 'D' with the supplement. There appears to be a discrepancy.

**Stormwater Management Design Narrative**

4. I. Project Description: The first sentence of the second paragraph needs to be cleaned up.
5. Table 1 – Proposed Built-Upon –Area:
  - a. This table should match the table from the application (IV.9).
  - b. Proposed Built-Upon –Area: Remove the Pervious Sidewalk line item since there is none.
6. Pre-Development Drainage Area: The city requires the use of woods in good condition for the purposes of determining runoff coefficients. The land use must be woods in good condition with curve numbers of 39, 55, 70 and 77 for the soils groups. The weighted curve number will not change but the CN calculation needs to be correct.
7. Land use percentages for the post-development curve numbers for the trenches need to be verified based on the impervious numbers in the application submitted on January 2, 2018.
8. Basin A (CoW Retention Requirements):
  - a. Site Data: Update the impervious breakdown based on the 1/2/18 application.
  - b. Treatment Volume: When compared to the Hydraflow model, the infiltration trench A doesn't provide adequate storage for the first 1.5" at the temporary pool. At the TP (weir elevation 16.25'), the provided storage volume is approximately 6,553cf. The required volume is over 9,000cf.
  - c. How was the Infiltration Rate determined? Based on ECS Report, dated May 4, 2017, location B-3, which is located in the closest proximity to Trench A, yielded an infiltration rate of 2.97 in/hr. Yet the calculations show a rate of 6.89 in/hr. Please explain.
  - d. The Area of Bottom Contour needs to match the ADS design plans.
9. Basin B (CoW Retention Requirements):
  - a. Site Data: Update the impervious breakdown based on the 1/2/18 application.
  - b. The provided treatment volume (7,912 cf) does not agree with the corresponding temporary pool elevation (18.34') based on the Hydraflow model.
  - c. The Area of Bottom Contour needs to match the ADS design plans.
10. Basin C (CoW Retention Requirements):
  - a. Update the Total DA to reflect the DA in the application for Trench C.
  - b. Site Data: Update the impervious breakdown based on the 1/2/18 application.
  - c. The provided treatment volume (28,248 cf) does not agree with the corresponding temporary pool elevation (13.74') based on the Hydraflow model.
  - d. The Area of Bottom Contour needs to match the ADS design plans.
11. Basin E (CoW Retention Requirements):
  - a. Update the DA to reflect the DA in the application for Trench E.
  - b. Site Data: Update the impervious breakdown based on the 1/2/18 application.

- c. Treatment Volume: When compared to the Hydraflow model, the infiltration trench E doesn't provide adequate storage for the first 1.5" at the temporary pool. At the TP (weir elevation 26.85'), the provided storage volume is approximately 4,000 cf. The required volume is over 4,400cf.
  - d. How was the Infiltration Rate determined? Based on ECS Report, dated October 11, 2017, locations I-1 and I-2, which are located in close proximity to Trench E, yielded infiltration rates of 5.39 in/hr and 19.20 in/hr, respectively. Yet the calculations show a rate of 12.30 in/hr. I would prefer the lowest infiltration rate be used to determine the drawdown instead of an average.
  - e. The Area of Bottom Contour needs to match the ADS design plans.
12. Pond Report Trench B: Verify the invert elevation of Culvert A (12.30').
13. Hydraflow Report:
- a. Pond No. 3-Trench B: The invert elevation, length and slope do not appear to agree with the storm drainage design on CG-100.
  - b. Pond No. 1-Stormfilter: The stage/storage table, culvert and weir information does not appear to reflect the elevations provided on sheet CG-505 for the Contech Stormfilter.
  - c. Pond No. 5-Trench E: The length and slope of culvert A do not match the pipe information on CG-100.
  - d. Pond No. 2-Trench A: Verify the infiltration rate of 6.89 in/hr. This does not appear to be supported by the ECS Report.

#### **Supplements**

- 14. Trench A:
  - a. Verify Volume Provided. Volume above the temporary pool elevation cannot be counted.
  - b. Verify the infiltration rate and drawdown time.
- 15. Trench B:
  - a. Verify Volume Provided. Volume above the temporary pool elevation cannot be counted.
  - b. Verify the drawdown time.
- 16. Trench C: The drainage area changed based on the 1/2/18 application. Recheck the entire supplement for needed revisions.
- 17. Trench D (Stormfilter): Recheck II. Design Information, specifically Site characteristics and Storage volume inputs for accuracy with Contech determination of cartridge numbers worksheet.
- 18. Trench E:
  - a. Verify Volume Provided. Volume above the temporary pool elevation cannot be counted.
  - b. Verify the infiltration rate and drawdown time.

#### **Operation & Maintenance Agreements**

- 19. Although credit is not being taken for the pervious concrete, O&M'S are required for the PC in order to keep it functioning properly.

#### **Plans**

- 20. SC-1 (Soil Boring Map Exhibit): Revise the Trench E boring location labels to provide the SHWT elevation, not the depth to the SHWT.
- 21. SC-2 (Drainage Area Map Exhibit): Update this sheet to account for the increase in the total drainage area (12.74 acres from 12.70 acres).
- 22. CX-101: The Total Area within the Project Boundary needs to be updated to match the application.
- 23. CS-100: The Site Data Table and Impervious Table appear to need updating.
- 24. CL-101: The infiltration trenches appear to be outdated.

25. CG-101: Roof drain leaders along lot line 33/34 and lot 34 northern property line need to extend and connect to the storm pipe and not the PC.

**ADS Plans**

26. Please have ADS add the storage volume of each system to the plans to verify that the system configuration does indeed provide the necessary storage volume in order to validate the Hydraflow models.

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