



TOWNSHIP of HOPEWELL MERCER COUNTY

**201 WASHINGTON CROSSING – PENNINGTON ROAD
TITUSVILLE, NEW JERSEY 08560-1410**

PROJECT / APPLICATION

BLOCK:

LOT:

ADDRESS:

PROJECT NAME:

REVIEW REPORTS

CONTENTS

Memorandum

TO: Hopewell Township Zoning Board of Adjustment

CC: Applicant

FROM: James Bash, PE
For Herbert Seeberger, PE, CME, CPWM
Interim Township Engineer

DATE: October 2, 2024

RE: **Stormwater Management Review # 1 – Venue at Hopewell**
Preliminary/Final Subdivision & Site Plan; SI Zone
Nursery Road; Block 93, Lots 19, 20, 45.01, 46, & 60
VCEA File No. 78072401

I. Application Submission Items

The following documents were received by the Township for review with this application on February 2, 2023:

- A. Planning Board Application Form with checklists, required fees, escrow and authorization forms.
- B. Plan entitled “Preliminary and Final Major Subdivision & Preliminary and Final Site Plan For, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 06/25/24 and revised through 09/10/24.
- C. Plan entitled “Preliminary and Final Major Subdivision, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 10/15/19 and revised through 05/17/24.
- D. Plan entitled “ALTA/NSPS Land Title Survey, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 10/15/19 and revised through 09/29/21.

OFFICE LOCATIONS

www.vancleefengineering.com

Hillsborough, NJ
908-359-8291

Mt. Arlington, NJ
862-284-1100

Phillipsburg, NJ
908-454-3080

Doylestown, PA
215-345-1876

Pottstown, PA
610-323-4040

Hamilton, NJ
609-689-1100

Toms River, NJ
732-573-0490

Freehold, NJ
732-303-8700

Bethlehem, PA
610-332-1772

- E. Report entitled "Stormwater Management Report, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey", Prepared by Bowman Consulting Group Ltd, dated 06/25/24.
- F. Report entitled "Environmental Impact Statement, Ordinance of the Township of Hopewell, Venue at Hopewell (aka the Deer Valley Property), Block 93, Lots 19, 20, 45.01, 46 & 60, Hopewell Township, Mercer County, New Jersey", Prepared by Envirotactics, dated 06/2024.
- G. Report entitled "Community Impact Statement, Venue at Hopewell, Proposed Age Restricted Residential Development in, Hopewell Township, Mercer County, New Jersey", Prepared by Richard B. Reading Associates, dated 04/15/24.
- H. Report entitled "Traffic Impact Study For, Venue at Hopewell (aka Deer Valley), Hopewell Township, Mercer County, New Jersey", Prepared by Langan Engineering & Environmental Services, Inc, dated 05/06/2024.

II. Description

The property in question is a 185.51-acre parcel located in IMF-C Inclusionary Multifamily and Commercial Zoning District. The property contains approximately 9,040 feet of frontage on Nursery Road (County Route 647). The property is mostly farmland and wooded areas. There are wetlands, stream corridor buffers, and flood hazard areas located on the property. The proposed construction will require NJDEP permitting. The property is located in the Delaware and Raritan Canal Commissions Zone B. Surrounding properties contain single-family residential structures, farmland and wooded areas.

The application proposes a 600-unit residential inclusionary development consisting of 272 detached single family dwellings, 118 residential duplex units, 90 condo units, 120 affordable housing units in twelve buildings, an amenity area consisting of a clubhouse with pool, dog run, tot lot, tennis courts, bocce ball courts, and multiple stormwater facilities.

The project will add more than $\frac{1}{4}$ acre of impervious coverage and will disturb more than 1 acre of land, therefore this will be considered a major development for stormwater management purposes. The project proposes to meet stormwater quality, quantity and groundwater recharge with the use of 58 bioretention basins.

III. Stormwater Management Comments

- 1. For the purposes of the stormwater management design the maximum lot coverage per zoning code should be used when performing impervious surface calculations to account for future additions to the lots.

2. Multiple drainage feature callouts overlap and are illegible. Plans shall provide clear labeling of all drainage features.
3. The plans are missing Invert information at multiple outfall locations. Plans shall provide all invert information.
4. The elevations of all stormwater basins shall be provided on the plans.
5. The plans show multiple utility and drainage structures are in conflict with other site features. Plans shall be revised to resolve all conflicts.
6. Proposed tree lines travel through site features and are inaccurate. Proposed land cover calculations should be checked and revised as necessary.
7. Symbols used to illustrate storm sewer network are inconsistent with the proposed structure. For example, the wingwall symbol is being used for headwalls. Plans shall be revised to depict proper symbol.
8. The proposed flood hazard areas need to be shown on the grading plan and utility plan sheets.
9. The plans show multiple incorrect storm structure grate/rim and invert elevations. Many inverts are shown as negative and would therefore mean the drainage structures are 200 plus feet below grade. The storm sewer design shall be revised as necessary.
10. Inlet A275 (113) and A275 (115) discharge to a point that has no structure or continuing pipe. Plans shall be revised to clearly depict all conveyance structures.
11. Outlet control structure callouts on the utility plan shall also provide the inverts of any device on the outlet structure.
12. Basin 52 has a bottom of basin elevation called out of “xxx”. The correct bottom basin elevation shall be provided.
13. Outlet conduit protection must be provided for all outlet locations. The plans shall depict the outlet protection, and the corresponding calculations shall be provided within the stormwater report.
14. Storm structure “??? A275 (160)” is located in the adjoining property of lot 54. A drainage easement will need to be obtained to construct the pipe and structure. A proposed drainage easement shall be shown on the utility plan.
15. Discharge pipes coming out of basins are exposed at the point discharge. Grading shall be revised to provide adequate cover to pipes.
16. The plans show that Basins 6, 26, 34, 35, 52, 53 and 54 have no outlet control structures whereas the stormwater report does. The plans and report shall be revised to be consistent.

17. A minimum of a tenth of a foot drop from invert in and invert out shall be provided for all drainage structures.
18. The Standards for Soil Erosion and Sediment Control In New Jersey require earth embankments to be a certain width depending in the height of the embankment. The width of embankments shall be revised in accordance with Appendix A10 of the Standards for Soil Erosion and Sediment Control In New Jersey.
19. It is unknown which basins infiltrate or have an underdrain system. The plans and report shall specify whether each basin has an underdrain or infiltrates.
20. Basin details shall be provided. Details shall include basin elevations, water surface elevations, seasonal high-water table, and groundwater mounding clearance (where applicable). Due to the large number of basins, this can be provided with a typical cross-section detail and a table with the data.
21. Outlet control structure details shall be provided. Details shall include elevations, inlet inverts and size, and discharge pipe information.
22. Soil log location and identifying number shall be provided on the drainage area maps, grading plan and utility plan.
23. The outer bounds of the existing and proposed drainage area maps are not consistent. Maps shall be revised so that the extent of analysis is consistent.
24. It appears that bypass areas have been excluded from the drainage area maps. Bypass areas shall be included in the drainage area maps and analyzed accordingly to ensure compliance.
25. Drainage area maps provide multiple north arrows with different directions. Only one north arrow shall be presented on the plans.
26. Drainage area maps show spot elevations making it difficult to see site features. The plans shall be revised to be legible.
27. A subdrainage area map shall be provided showing the drainage area to each BMP.
28. An inlet area map shall be provided showing the drainage area to each inlet.
29. The stormwater report provides direct entry time of concentrations with no back up calculations to support them. Time of concentration calculations shall be provided.
30. Impervious and pervious time of concentration paths shall be shown separately and labeled accordingly on the drainage area maps.
31. The proposed drainage area map has number designations in basins that are different from the basin number. Clarification shall be provided.
32. There are 6 drainage areas on site therefore compliance would have to be met at each

drainage area individually. The method of combining drainage areas to design points would not be acceptable as it would not accurately represent compliance in each drainage area.

33. Per engineering checklist item 14b “Poor” land cover condition shall be used under post development conditions. The curve numbers for post development calculations currently use good and shall be revised to use poor conditions.
34. Table no. 1 summary of existing runoff conditions values are not consistent with values shown in the hydrographs.
35. Table no. 2 provides 3 design points where 6 drainage areas exist. All 6 drainage areas shall be analyzed individually.
36. Table no 1 does not specify whether current or future peak flows are represented. A table for both current and future existing runoff conditions shall be provided.
37. Stormwater report Section III Methodology A1 provides the rainfall frequency utilized in the calculations. The provided frequencies are inconsistent with the frequencies used in the calculations. The report shall provide the correct rainfall frequencies for the current and future storm events.
38. Storm frequencies used in the stormwater calculations are not consistent with the adjusted values for Mercer County. The calculations shall be revised using the correct storm frequencies.
39. Provide a section in the stormwater report for compliance with off-site stability. A Stability analysis must be performed for each point discharge
40. Print outs of the HydroCAD Hydrograph tables and basin profiles shall be provided in the Stormwater Management Report.
41. Hydraflow storm sewer tabulations have been provided. Storm sewer profiles with hydraulic grade line shall also be provided.
42. The GTA report was prepared in December of 2023. As of March 2024 the standards for basin flood tests have changed. Test results shall be reevaluated under the most current standards for compliance.
43. Soil testing was performed above the proposed BMPs in multiple locations. Soil testing shall be performed below the bottom of the bmp in accordance with the chapter 13 of the BMP manual.
44. The stormwater report refers to the appendix for details on groundwater recharge. The appendix does not provide any additional information on groundwater recharge. A groundwater recharge analysis must be provided.
45. Groundwater recharge will be performed with the use of bioretention basins and

therefore require a groundwater mounding analysis to be performed. A groundwater mounding analysis shall be provided for all infiltration BMPs.

46. Emergency spillways shall be shown on the plans and sizing calculations shall be provided. If any basin is classified as a dam, the design standards set forth in NJAC 7:20 Dam Safety Standards shall be followed.
47. Once a revised Stormwater Management Report and Plans are resubmitted, additional review will be necessary to confirm compliance with all applicable design standards.

Memorandum

TO: Hopewell Township Planning Board

CC: Applicant

FROM: James Bash, PE
For Herbert Seeberger, PE, CME, CPWM
Interim Township Engineer

DATE: January 07, 2025

RE: **Stormwater Management Review # 2 – Venue at Hopewell**
Preliminary/Final Subdivision & Site Plan; SI Zone
Nursery Road; Block 93, Lots 19, 20, 45.01, 46, & 60
VCEA File No. 78072401

I. Application Submission Items

The following documents were received by the Township for review with this application on February 2, 2023:

- A. Plan entitled “Preliminary and Final Major Subdivision & Preliminary and Final Site Plan For, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 06/25/24 and revised through 12/18/24.
- B. Report entitled “Stormwater Management Report, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 12/17/24.

OFFICE LOCATIONS

www.vancleefengineering.com

Hillsborough, NJ 908-359-8291	Mt. Arlington, NJ 862-284-1100	Phillipsburg, NJ 908-454-3080	Doylestown, PA 215-345-1876	Pottstown, PA 610-323-4040
Hamilton, NJ 609-689-1100	Toms River, NJ 732-573-0490	Freehold, NJ 732-303-8700	Bethlehem, PA 610-332-1772	

II. Description

The property in question is a 185.51-acre parcel located in IMF-C Inclusionary Multifamily and Commercial Zoning District. The property contains approximately 9,040 feet of frontage on Nursery Road (County Route 647). The property is mostly farmland and wooded areas. There are wetlands, stream corridor buffers, and flood hazard areas located on the property. The proposed construction will require NJDEP permitting. The property is located in the Delaware and Raritan Canal Commissions Zone B. Surrounding properties contain single-family residential structures, farmland and wooded areas.

The application proposes a 600-unit residential inclusionary development consisting of 272 detached single family dwellings, 118 residential duplex units, 90 condo units, 120 affordable housing units in twelve buildings, an amenity area consisting of a clubhouse with pool, dog run, tot lot, tennis courts, bocce ball courts, and multiple stormwater facilities.

The project will add more than $\frac{1}{4}$ acre of impervious coverage and will disturb more than 1 acre of land, therefore this will be considered a major development for stormwater management purposes. The project proposes to meet stormwater quality, quantity and groundwater recharge with the use of 58 bioretention basins.

III. Stormwater Management Comments

1. For the purposes of the stormwater management design the maximum lot coverage per zoning code should be used when performing impervious surface calculations to account for future additions to the lots.
2. Multiple drainage feature callouts overlap and are illegible. Plans shall provide clear labeling of all drainage features.
3. Proposed tree lines travel through site features and are inaccurate. Proposed land cover calculations should be checked and revised as necessary.
4. Symbols used to illustrate storm sewer network are inconsistent with the proposed structure. For example, the wingwall symbol is being used for headwalls. Plans shall be revised to depict proper symbol.
5. The proposed flood hazard areas need to be shown on the grading plan and utility plan Sheets.
6. The plans show multiple incorrect storm structure grade/rim and invert elevations. Many inverts are shown as negative and would therefore mean the drainage structures are 200 plus feet below grade. The storm sewer design shall be revised as necessary.

7. Outlet control structure callouts on the utility plan shall also provide the inverts of any device on the outlet structure.
8. Outlet conduit protection must be provided for all outlet locations. The plans shall depict the outlet protection, and the corresponding calculations shall be provided within the stormwater report.
9. Discharge pipes coming out of basins are exposed at the point discharge. Grading shall be revised to provide adequate cover to pipes.
10. A minimum of a tenth of a foot drop from invert in and invert out shall be provided for all drainage structures.
11. The Standards for Soil Erosion and Sediment Control In New Jersey require earth embankments to be a certain width depending in the height of the embankment. The width of embankments shall be revised in accordance with Appendix A10 of the Standards for Soil Erosion and Sediment Control In New Jersey.
12. It is unknown which basins infiltrate or have an underdrain system. The plans and report shall specify whether each basin has an underdrain or infiltrates.
13. Soil log location and identifying number shall be provided on the drainage area maps, grading plan and utility plan.
14. The outer bounds of the existing and proposed drainage area maps are not consistent. Maps shall be revised so that the extent of analysis is consistent.
15. It appears that bypass areas have been excluded from the drainage area maps. Bypass areas shall be included in the drainage area maps and analyzed accordingly to ensure compliance.
16. Drainage area maps provide multiple north arrows with different directions. Only one north arrow shall be presented on the plans.
17. A subdrainage area map shall be provided showing the drainage area to each BMP.
18. An inlet area map shall be provided showing the drainage area to each inlet.
19. The stormwater report provides direct entry time of concentrations with no back up calculations to support them. Time of concentration calculations shall be provided.
20. Impervious and pervious time of concentration paths shall be shown separately and labeled accordingly on the drainage area maps.
21. Per engineering checklist item 14b "Poor" land cover condition shall be used under post development conditions. The curve numbers for post development calculations currently use good and shall be revised to use poor conditions.

22. Table No. 1 does not specify whether current or future peak flows are represented. A table for both current and future existing runoff conditions shall be provided.
23. Stormwater report Section III Methodology A1 provides the rainfall frequency utilized in the calculations. The provided frequencies are inconsistent with the frequencies used in the calculations. The report shall provide the correct rainfall frequencies for the current and future storm events.
24. Storm frequencies used in the stormwater calculations are not consistent with the adjusted values for Mercer County. The calculations shall be revised using the correct storm frequencies.
25. Provide a section in the stormwater report for compliance with off-site stability. A Stability analysis must be performed for each point discharge.
26. Print outs of the HydroCAD Hydrograph tables and basin profiles shall be provided in the Stormwater Management Report.
27. Hydraflow storm sewer tabulations have been provided. Storm sewer profiles with hydraulic grade line shall also be provided.
28. The GTA report was prepared in December of 2023. As of March 2024, the standards for basin flood tests have changed. Test results shall be reevaluated under the most current standards for compliance.
29. Soil testing was performed above the proposed BMPs in multiple locations. Soil testing shall be performed below the bottom of the bmp in accordance with the chapter 13 of the BMP manual.
30. The stormwater report refers to the appendix for details on groundwater recharge. The appendix does not provide any additional information on groundwater recharge. A groundwater recharge analysis must be provided.
31. Groundwater recharge will be performed with the use of bioretention basins and therefore require a groundwater mounding analysis to be performed. A groundwater mounding analysis shall be provided for all infiltration BMPs.
32. Emergency spillways shall be shown on the plans and sizing calculations shall be provided. If any basin is classified as a dam, the design standards set forth in NJAC 7:20 Dam Safety Standards shall be followed.
33. It is unclear what type of basins are being used. The tables in the report denote each basin as bioretention, while the basin detail on Sheet 18G is labeled as an extended detention infiltration basin. Clarification shall be provided.

34. Per ordinance section 17-82.9 "Safety Standards for Stormwater Management Basins" stormwater basins are required to comply with the requirements of N.J.A.C. 7:8-6.2 and N.J.A.C. 7:8-6, Appendix A. All stormwater Basins should be revised to comply with the safety standards as necessary.
35. The maximum depth of stormwater runoff in a small-scale infiltration basin is 2 feet and 1 foot for small-scale bioretention basins. Multiple basins propose to a depth over the maximum. The design shall be revised to comply.
36. The outlet control structure detail table is cut off at the edge of Sheet 18G. Plan shall be revised to show entire table.
37. The outlet control structure detail table on Sheet 18G provides "???" as the label or elevation for multiple structures. Elevations shall be provided.
38. The plans show that Basin 36A has no outlet control structure whereas the stormwater report does. The plans and report shall be revised to be consistent.
39. Multiple outfall locations in basins show incorrect invert elevations. Invert elevations of shall be revised.
40. OCS discharge pipes are above ground in basins. For example, Basin 58 has a bottom elevation of 199 while the invert out of the OCS is 199. OCS shall be repositioned or inverts lowered to provide adequate cover for the discharge pipe.
41. The pipe from STM MH 2 to Headwall 3 is above ground. Inverts shall be revised to provide adequate cover.
42. The pipe from OCS 203 to STM MH 204 conflicts with SMH S52 structure and pipe. The pipe conflicts shall be revised.
43. Rim elevations for structures STM A275 (443) to (355) have elevations of 0 or lower. Rim elevations shall be revised as necessary.
44. Drainage easements shall be provided for storm sewer structures and pipes traveling through lots.
45. Profiles of the storm sewer network shall be provided showing the structure and pipe elevations and slopes, existing and proposed grade, and utility pipe crossings.
46. Sheet 10A provide dashed contours that do not tie into existing grade. Clarification is required.
47. Sheet 10B has a 216 contour that does not tie into existing grade. All proposed contours must tie into existing grade.

48. It appears storm sewer will be partially placed in the 50-foot right-of-way easement to Sun Pipeline Company. The applicant will require permission and obtain any easement needed in order to construct within the ROW.
49. On Sheet 10C the stream corridor buffer stops prematurely. The plans shall show the full stream corridor buffer.
50. Sheet 10C grading presents the curbed island as flush with the pavement. Clarification shall be provided.
51. Multiple discharge locations are placed less than 10 feet from or inside of a wetland and will require DEP approval. Testimony shall be provided.
52. The proposed tree lines do not tie into existing tree lines and end in open space. Additionally, tree lines don't include the full limits of disturbance and run through discharge pipes. The tree line shall be revised and the existing tree line to remain shall be shown.
53. Some proposed lots mark the dwellings with a first floor and ground floor elevation of "xxx". Floor elevations shall be provided.
54. SWM 7 and 47 OCS have a grate elevation at the bottom of basin. The outlet control structures shall be revised.
55. All text conflicts between drainage labels and the floor elevations of structures shall be resolved.
56. SWM Basins 52, 53, 54, 55, and 56 appear to be graded basins but also have a wall around them. It shall be clarified as to whether they are graded or walled basins.
57. Existing contour labels shall be provided on the drainage plans.
58. The grading around basins 17A and 17B do not tie in to each other properly. Grading shall be revised.
59. Structures STM MH A275 (363) and (382) appear create low points. Grading shall be revised to create positive drainage.
60. If basins have an underdrain network the underdrains shall be shown on the plans.
61. Sheet 10L shows a contour traveling through a building. Grading shall be revised to remove the contour from the building.
62. The pipes at discharge points appear to have inadequate cover and will be exposed. Grading around wingwalls at discharge locations shall be revised to provide cover for the pipes.
63. When increasing pipe size the crown inverts should match. The pipe network shall be revised as necessary.

64. The pipe traveling underneath Basins 24, 25, and 26 shall be relocated to avoid traveling under any other stormwater features.
65. It appears that the grading around Basin 23 is completely flat. More information within the area shall be provided confirming that there will be positive drainage on site.

Further review of the stormwater management design is deferred until the above is addressed.

Memorandum

TO: Hopewell Township Planning Board

CC: Applicant

FROM: James Bash, PE
Township Engineer

DATE: April 15, 2025

RE: **Stormwater Management Review # 3 – Venue at Hopewell**
Preliminary/Final Subdivision & Site Plan; SI Zone
Nursery Road; Block 93, Lots 19, 20, 45.01, 46, & 60
VCEA File No. 78072401

I. Application Submission Items

The following documents were received by the Township for review with this application under a cover letter dated April 1, 2025:

- A. Plan entitled “Preliminary and Final Major Subdivision & Preliminary and Final Site Plan For, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 06/25/24 and revised through 03/31/25.
- B. Report entitled “Stormwater Management Report, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 03/31/25.

II. Description

The property in question is a 185.51-acre parcel located in IMF-C Inclusionary Multifamily and Commercial Zoning District. The property contains approximately 9,040 feet of frontage on Nursery Road (County Route 647). The property is mostly farmland and wooded areas. There are wetlands, stream corridor buffers, and flood hazard areas

OFFICE LOCATIONS

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Hillsborough, NJ 908-359-8291	Mt. Arlington, NJ 862-284-1100	Phillipsburg, NJ 908-454-3080	Doylestown, PA 215-345-1876	Pottstown, PA 610-323-4040
Hamilton, NJ 609-689-1100	Toms River, NJ 732-573-0490	Freehold, NJ 732-303-8700	Bethlehem, PA 610-332-1772	

located on the property. The proposed construction will require NJDEP permitting. The property is located in the Delaware and Raritan Canal Commissions Zone B. Surrounding properties contain single-family residential structures, farmland and wooded areas.

The application proposes a 600-unit residential inclusionary development consisting of 272 detached single family dwellings, 118 residential duplex units, 90 condo units, 120 affordable housing units in twelve buildings, an amenity area consisting of a clubhouse with pool, dog run, tot lot, tennis courts, bocce ball courts, and multiple stormwater facilities.

The project will add more than $\frac{1}{4}$ acre of impervious coverage and will disturb more than 1 acre of land, therefore this will be considered a major development for stormwater management purposes. The project proposes to meet stormwater quality, quantity and groundwater recharge with the use of 58 bioretention Basins.

III. Stormwater Management Comments

1. For the purposes of the stormwater management design the maximum lot coverage per zoning code should be used when performing impervious surface calculations to account for future additions to the lots. **Addressed**

Applicant has stated the design accounts for maximum impervious coverage of the lots.

2. Multiple drainage feature callouts overlap and are illegible. Plans shall provide clear labeling of all drainage features. **Addressed**
3. Proposed tree lines travel through site features and are inaccurate. Proposed land cover calculations should be checked and revised as necessary. **Addressed**
4. Symbols used to illustrate storm sewer network are inconsistent with the proposed structure. For example, the wingwall symbol is being used for headwalls. Plans shall be revised to depict proper symbol. **Outstanding**

The symbols used are still inconsistent.

5. The proposed flood hazard areas need to be shown on the grading plan and utility plan Sheets. **Addressed**
6. The plans show multiple incorrect storm structure grate/rim and invert elevations. Many inverts are shown as negative and would therefore mean the drainage structures are 200 plus feet below grade. The storm sewer design shall be revised as necessary. **Outstanding**

The cleanout inverts in Basins 1 and 2 are set at elevation 0 and shall be revised.

7. Outlet control structure callouts on the utility plan shall also provide the inverts of any device on the outlet structure. **Addressed**

A complete summary table of OCS inverts has been provided on sheet 18G

8. Outlet conduit protection must be provided for all outlet locations. The plans shall depict the outlet protection, and the corresponding calculations shall be provided within the stormwater report. **Partially addressed**

Conduit outlet protection has been depicted on the plans, but the corresponding calculations have not been provided.

9. Discharge pipes coming out of Basins are exposed at the point discharge. Grading shall be revised to provide adequate cover to pipes. **Outstanding**

Revised grading has not been provided

10. A minimum of a tenth of a foot drop from invert in and invert out shall be provided for all drainage structures. **Addressed**

11. The Standards for Soil Erosion and Sediment Control In New Jersey require earth embankments to be a certain width depending in the height of the embankment. The width of embankments shall be revised in accordance with Appendix A10 of the Standards for Soil Erosion and Sediment Control In New Jersey. **Outstanding**

Not all embankments meet the required width.

12. It is unknown which Basins infiltrate or have an underdrain system. The plans and report shall specify whether each Basin has an underdrain or infiltrates. **Outstanding**

Identification has not been provided on the plans or report.

13. Soil log location and identifying number shall be provided on the drainage area maps, grading plan and utility plan. **Outstanding**

Soil log locations are not shown.

14. The outer bounds of the existing and proposed drainage area maps are not consistent. Maps shall be revised so that the extent of analysis is consistent. **Outstanding**

15. It appears that bypass areas have been excluded from the drainage area maps. Bypass areas shall be included in the drainage area maps and analyzed accordingly to ensure compliance. **Outstanding**

Disturbed bypass areas must be incorporated into the drainage area maps and calculations.

16. Drainage area maps provide multiple north arrows with different directions. Only one north arrow shall be presented on the plans. **Addressed**

17. A subdrainage area map shall be provided showing the drainage area to each BMP. **Addressed**

18. An inlet area map shall be provided showing the drainage area to each inlet. **Addressed**

19. The stormwater report provides direct entry time of concentrations with no back up calculations to support them. Time of concentration calculations shall be provided. **Outstanding**

Time of concentration calculations have not been provided.

20. Impervious and pervious time of concentration paths shall be shown separately and labeled accordingly on the drainage area maps. **Outstanding**

Proposed Tc paths are not shown for the proposed conditions.

21. Per engineering checklist item 14b “Poor” land cover condition shall be used under post development conditions. The curve numbers for post development calculations currently use good and shall be revised to use poor conditions. **Outstanding**

Good land cover condition is still used in the post development calculations.

22. Table No. 1 does not specify whether current or future peak flows are represented. A table for both current and future existing runoff conditions shall be provided. **Outstanding**

Specification and additional tables have not been provided.

23. Stormwater report Section III Methodology A1 provides the rainfall frequency utilized in the calculations. The provided frequencies are inconsistent with the frequencies used in the calculations. The report shall provide the correct rainfall frequencies for the current and future storm events. **Outstanding**

Inconsistent 24-hour rainfall depths remain. The rainfall depths should be consistent with the rainfall depths utilized in the HydroCAD calculations.

24. Storm frequencies used in the stormwater calculations are not consistent with the adjusted values for Mercer County. The calculations shall be revised using the correct storm frequencies. **Outstanding**

Incorrect 24-hour rainfall frequency data for Mercer County is still being utilized. The correct rainfall depths and adjustment factors for Mercer County must be utilized.

25. Provide a section in the stormwater report for compliance with off-site stability. A Stability analysis must be performed for each point discharge. **Outstanding**

A section for off-site stability and its corresponding calculations have not been provided.

26. Print outs of the HydroCAD Hydrograph tables and Basin profiles shall be provided in the Stormwater Management Report. **Outstanding**

Stage-discharge and stage-area-storage tables have been provided but hydrograph

tables and Basin profiles have not been provided.

27. Hydraflow storm sewer tabulations have been provided. Storm sewer profiles with hydraulic grade line shall also be provided. ***Outstanding***

Storm sewer profiles have not been provided.

28. The GTA report was prepared in December of 2023. As of March 2024, the standards for Basin flood tests have changed. Test results shall be reevaluated under the most current standards for compliance. ***Outstanding***

Applicants engineer states the test results will be reevaluated.

29. Soil testing was performed above the proposed BMPs in multiple locations. Soil testing shall be performed below the bottom of the bmp in accordance with the chapter 13 of the BMP manual. ***Outstanding***

Additional soil testing has not been performed.

Note that soil testing was performed out of season in October through November and additional soil logs must be performed in season (January-April) to confirm groundwater elevation.

30. The stormwater report refers to the appendix for details on groundwater recharge. The appendix does not provide any additional information on groundwater recharge. A groundwater recharge analysis must be provided. ***Addressed***

31. Groundwater recharge will be performed with the use of bioretention Basins and therefore require a groundwater mounding analysis to be performed. A groundwater mounding analysis shall be provided for all infiltration BMPs. ***Outstanding***

Groundwater mounding analyses have not been provided

32. Emergency spillways shall be shown on the plans and sizing calculations shall be provided. If any Basin is classified as a dam, the design standards set forth in NJAC 7:20 Dam Safety Standards shall be followed. ***Outstanding***

Not all Basins show emergency spillways as required, and calculations have not been provided.

33. It is unclear what type of Basins are being used. The tables in the report denote each Basin as bioretention, while the Basin detail on Sheet 18G is labeled as an extended detention infiltration Basin. Clarification shall be provided. ***Outstanding***

The extended detention infiltration Basin remains. Clarification is required.

34. Per ordinance section 17-82.9 "Safety Standards for Stormwater Management Basins" stormwater Basins are required to comply with the requirements of N.J.A.C. 7:8-6.2 and N.J.A.C. 7:8-6, Appendix A. All stormwater Basins should be revised to comply with the

safety standards as necessary. **Outstanding**

Not all Basins comply with the safety standards.

35. The maximum depth of stormwater runoff in a small-scale infiltration Basin is 2 feet and 1 foot for small-scale bioretention Basins. Multiple Basins propose to a depth over the maximum. The design shall be revised to comply. **Outstanding**

Multiple Basins still propose depths over the maximum.

36. The outlet control structure detail table is cut off at the edge of Sheet 18G. Plan shall be revised to show entire table. **Addressed**

37. The outlet control structure detail table on Sheet 18G provides “???” as the label or elevation for multiple structures. Elevations shall be provided. **Addressed**

38. The plans show that Basin 36A has no outlet control structure whereas the stormwater report does. The plans and report shall be revised to be consistent. **Outstanding**

Inconsistency remains.

39. Multiple outfall locations in Basins show incorrect invert elevations. Invert elevations shall be revised. **Outstanding**

Incorrect invert elevations remain.

40. OCS discharge pipes are above ground in Basins. For example, Basin 58 has a bottom elevation of 199 while the invert out of the OCS is 199. OCS shall be repositioned or inverts lowered to provide adequate cover for the discharge pipe. **Outstanding**

Discharge pipes are still exposed in Basins.

41. The pipe from STM MH 2 to Headwall 3 is above ground. Inverts shall be revised to provide adequate cover. **Outstanding**

The pipe appears to still be exposed in road B.

42. The pipe from OCS 203 to STM MH 204 conflicts with SMH S52 structure and pipe. The pipe conflicts shall be revised. **Addressed**

43. Rim elevations for structures STM A275 (443) to (355) have elevations of 0 or lower. Rim elevations shall be revised as necessary. **Addressed**

44. Drainage easements shall be provided for storm sewer structures and pipes traveling through lots. **Continuing condition of approval**

45. Profiles of the storm sewer network shall be provided showing the structure and pipe elevations and slopes, existing and proposed grade, and utility pipe crossings. **Outstanding**

The storm sewer along roads have been provided in the road profiles but the remaining

storm sewer network outside the road has not been provided.

46. Sheet 10A provide dashed contours that do not tie into existing grade. Clarification is required. **Outstanding**

Clarification is still required.

47. Sheet 10B has a 216 contour that does not tie into existing grade. All proposed contours must tie into existing grade. **Partially Addressed**

The 216 contour ties into existing grade. The grading on sheet 8D east of Basin 10 does not tie into existing grade. All proposed contours in the plan set shall tie back into existing grade.

48. It appears storm sewer will be partially placed in the 50-foot right-of-way easement to Sun Pipeline Company. The applicant will require permission and obtain any easement needed in order to construct within the ROW. **Outstanding**

The storm sewer system is still shown to be partly in the ROW. Additionally, the pipe from STM MH 275A 443 to 436 crosses the ROW.

49. On Sheet 10C the stream corridor buffer stops prematurely. The plans shall show the full stream corridor buffer. **Outstanding**

Stream corridor buffer still ends prematurely.

50. Sheet 10C grading presents the curbed island as flush with the pavement. Clarification shall be provided. **Addressed**

51. Multiple discharge locations are placed less than 10 feet from or inside of a wetland and will require DEP approval. Testimony shall be provided. **Outstanding**

52. The proposed tree lines do not tie into existing tree lines and end in open space. Additionally, tree lines don't include the full limits of disturbance and run through discharge pipes. The tree line shall be revised and the existing tree line to remain shall be shown. **Partially addressed**

The proposed tree lines tie in to existing but still run through storm sewer pipes.

53. Some proposed lots mark the dwellings with a first floor and ground floor elevation of "xxx". Floor elevations shall be provided. **Outstanding**

Floor elevation xxx is still shown on sheet 8K.

54. SWM 7 and 47 OCS have a grate elevation at the bottom of Basin. The outlet control structures shall be revised. **Addressed**

55. All text conflicts between drainage labels and the floor elevations of structures shall be resolved. **Addressed**

56. SWM Basins 52, 53, 54, 55, and 56 appear to be graded Basins but also have a wall around them. It shall be clarified as to whether they are graded or walled Basins. **Addressed**

57. Existing contour labels shall be provided on the drainage plans. **Addressed**

58. The grading around Basins 17A and 17B do not tie in to each other properly. Grading shall be revised. **Outstanding**

The grading still does not tie in properly.

59. Structures STM MH A275 (363) and (382) appear create low points. Grading shall be revised to create positive drainage. **Outstanding**

The low spots are still present.

60. If Basins have an underdrain network the underdrains shall be shown on the plans. **Addressed**

61. Sheet 10L shows contours traveling through buildings. Grading shall be revised to remove the contour from the building. **Outstanding**

Sheet 8L still shows contours going through buildings.

62. The pipes at discharge points appear to have inadequate cover and will be exposed. Grading around wingwalls at discharge locations shall be revised to provide cover for the pipes. **Outstanding**

Grading has not been provided at discharge points.

63. When increasing pipe size the crown inverts should match. The pipe network shall be revised as necessary. **Outstanding**

The storm sewer system has not been revised to match crowns when increasing in pipe size.

64. The pipe traveling underneath Basins 24, 25, and 26 shall be relocated to avoid traveling under any other stormwater features. **Outstanding**

The pipe remains underneath the Basins.

65. It appears that the grading around Basin 23 is completely flat. More information within the area shall be provided confirming that there will be positive drainage on site. **Outstanding**

Additional spot grades should be provided. Additionally, it appears that a 148 contour is missing.

New Comments:

66. The STM MH A275 (344) incoming pipe has a diameter of 18 inches and the outgoing pipe has a diameter of 15 inches. The outgoing pipe shall be increased in size to be greater or

equal to 18 inches.

67. It appears that the maintenance access in the Basins are missing walls. The walls shall be depicted on the plans.
68. The storm sewer system coming into Basin 14 is inside the Basin area and shall be relocated.
69. A flood hazard area verification has been provided. The verification was performed prior to the inland flood protection rule making therefore a new FHA verification may need to be obtained. Confirmation from NJDEP should be obtained.
70. The Drainage plans are missing the contour labels. Contour labels shall be provided on the drainage plans.
71. A “typical section rain garden” detail has been provided. It is not clear where the rain gardens are proposed on site. Clarification shall be provided.
72. It appears that small-scale bioretention Basins are being proposed. A detail for small-scale bioretention Basins shall be provided. The detail shall include but not limited to, soil media, sand layer, underdrain (if applicable), thickness of each layer, elevations, etc.
73. The storm sewer tabulations show points where the hydraulic grade line is above the structure rim elevation. This indicates that the structure has flooded/overtopped. The storm sewer shall be revised to maintain the HGL below structure rim elevations.
74. The storm sewer tabulations show multiple points where the ground/rim elevation is zero or negative. The storm sewer shall be revised to maintain correct ground/rim elevations.
75. The storm sewer tabulations show pipes with velocities less than 2 ft/s. RSIS requires a minimum of 2 ft/s in the pipe network. Storm sewer shall be revised to maintain a velocity of no less than 2 ft/s.
76. Water Quality calculations have not been provided. HydroCAD calculations for the water quality storm shall be provided.
77. The HydroCAD model shows multiple basins with bottom elevations and areas different from what is shown on the plans. The plans and report shall be consistent.
78. Basin drain time calculations shall be provided to ensure all Basins drain within 72 hours.
79. There appears to be severe oscillations present in the future 100-year storm hydrographs for Basins 4A and 4B causing the primary outflow to be greater than the inflow. The design shall be revised to resolve any oscillations that occur.
80. An Operation and Maintenance Manual shall be provided.
81. The groundwater recharge spreadsheet (GWRS) total area for pre-developed conditions and post-developed conditions are not equal. The GWRS shall be revised so that the total

area for pre- and post- developed conditions are equal.

82. GWRSSs for all Basins including underdrained systems have been provided. Underdrained systems cannot be used to infiltrate and therefore cannot be used for ground water recharge. GWRSS for underdrained systems shall be removed from the report and compliance with groundwater recharge confirmed.
83. It appears that the values used for dBMPu in the GWRSSs are incorrect. The correct dBMPu values shall be used and compliance with groundwater recharge confirmed.
84. The GWRSS all use the same Aimp for all Basins. Aimp is the contributing impervious area to the Basin and therefore all Aimp values are different. Aimp values shall be corrected and compliance with groundwater recharge confirmed.
85. Section III.C. "Ground Water Recharge" of the narrative shall provide a groundwater recharge compliance summary table. The table shall include the recharge deficit, infiltration BMPs utilized, and the annual BMP recharge volume calculated for each BMP.
86. Basin labels shall be provided on the Proposed Drainage Area Map.
87. Basin 43 appears to have a contributory area greater than 2.5 acres. The design shall be revised to comply with contributory area restrictions.
88. The Proposed BMP Area Map drainage boundaries appear incorrect at and around Basins 3 and 33. The BMP areas shall be revised to show the proper drainage area boundary.

Further review of the stormwater management design is deferred until the above is addressed.

Memorandum

TO: Hopewell Township Planning Board

CC: Applicant

FROM: James Bash, PE
Township Engineer

DATE: June 24, 2025

RE: **Stormwater Management Review # 4 – Venue at Hopewell**
Preliminary/Final Subdivision & Site Plan; SI Zone
Nursery Road; Block 93, Lots 19, 20, 45.01, 46, & 60
VCEA File No. 78072401

I. Application Submission Items

The following documents were received by the Township for review with this application under a cover letter dated April 1, 2025:

- A. Plan entitled “Preliminary and Final Major Subdivision & Preliminary and Final Site Plan For, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 06/25/24 and revised through 03/31/25.
- B. Report entitled “Stormwater Management Report, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 03/31/25.

II. Description

The property in question is a 185.51-acre parcel located in IMF-C Inclusionary Multifamily and Commercial Zoning District. The property contains approximately 9,040 feet of frontage on Nursery Road (County Route 647). The property is mostly farmland and wooded areas. There are wetlands, stream corridor buffers, and flood hazard areas

OFFICE LOCATIONS

www.vancleefengineering.com

Hillsborough, NJ 908-359-8291	Mt. Arlington, NJ 862-284-1100	Phillipsburg, NJ 908-454-3080	Doylestown, PA 215-345-1876	Pottstown, PA 610-323-4040
Hamilton, NJ 609-689-1100	Toms River, NJ 732-573-0490	Freehold, NJ 732-303-8700	Bethlehem, PA 610-332-1772	

located on the property. The proposed construction will require NJDEP permitting. The property is located in the Delaware and Raritan Canal Commissions Zone B. Surrounding properties contain single-family residential structures, farmland and wooded areas.

The application proposes a 600-unit residential inclusionary development consisting of 272 detached single family dwellings, 118 residential duplex units, 90 condo units, 120 affordable housing units in twelve buildings, an amenity area consisting of a clubhouse with pool, dog run, tot lot, tennis courts, bocce ball courts, and multiple stormwater facilities.

The project will add more than $\frac{1}{4}$ acre of impervious coverage and will disturb more than 1 acre of land, therefore this will be considered a major development for stormwater management purposes. The project proposes to meet stormwater quality, quantity and groundwater recharge with the use of 58 bioretention Basins.

III. Stormwater Management Comments

1. For the purposes of the stormwater management design the maximum lot coverage per zoning code should be used when performing impervious surface calculations to account for future additions to the lots. **Addressed**

Applicant has stated the design accounts for maximum impervious coverage of the lots.

2. Multiple drainage feature callouts overlap and are illegible. Plans shall provide clear labeling of all drainage features. **Addressed**
3. Proposed tree lines travel through site features and are inaccurate. Proposed land cover calculations should be checked and revised as necessary. **Addressed**
4. Symbols used to illustrate storm sewer network are inconsistent with the proposed structure. For example, the wingwall symbol is being used for headwalls. Plans shall be revised to depict proper symbol. **Outstanding**

The symbols used are still inconsistent.

5. The proposed flood hazard areas need to be shown on the grading plan and utility plan Sheets. **Addressed**
6. The plans show multiple incorrect storm structure grate/rim and invert elevations. Many inverts are shown as negative and would therefore mean the drainage structures are 200 plus feet below grade. The storm sewer design shall be revised as necessary. **Outstanding**

The cleanout inverts in Basins 1 and 2 are set at elevation 0. STM MH 635 has a rim elevation of 0. Manhole rim elevations around SWM Basins 36A, 36B, 35, and 34 appear to have rim elevations above finished grade. All rim elevations shall be revised

accordingly.

7. Outlet control structure callouts on the utility plan shall also provide the inverts of any device on the outlet structure. **Addressed**
8. Outlet conduit protection must be provided for all outlet locations. The plans shall depict the outlet protection, and the corresponding calculations shall be provided within the stormwater report. **Outstanding**

Conduit outlet protection has been depicted on the plans, but the corresponding calculations have not been provided. Additionally, the riprap aprons and scour holes are oriented incorrectly and shall be revised to be consistent with the direction of flow.

9. Discharge pipes coming out of Basins are exposed at the point discharge. Grading shall be revised to provide adequate cover to pipes. **Outstanding**

Revised grading has not been provided

10. A minimum of a tenth of a foot drop from invert in and invert out shall be provided for all drainage structures. **Addressed**

11. The Standards for Soil Erosion and Sediment Control In New Jersey require earth embankments to be a certain width depending in the height of the embankment. The width of embankments shall be revised in accordance with Appendix A10 of the Standards for Soil Erosion and Sediment Control In New Jersey. **Outstanding**

Applicant states that all embankments are in compliance with RSIS standards. Not all embankments meet the required width per RSIS. All embankments shall meet the requirements set forth in N.J.A.C. 5:21-7.8.

12. It is unknown which Basins infiltrate or have an underdrain system. The plans and report shall specify whether each Basin has an underdrain or infiltrates. **Addressed**

13. Soil log location and identifying number shall be provided on the drainage area maps, grading plan and utility plan. **Outstanding**

Soil log locations are not shown.

14. The outer bounds of the existing and proposed drainage area maps are not consistent. Maps shall be revised so that the extent of analysis is consistent. **Outstanding**

15. It appears that bypass areas have been excluded from the drainage area maps. Bypass areas shall be included in the drainage area maps and analyzed accordingly to ensure compliance. **Outstanding**

Disturbed bypass areas must be incorporated into the drainage area maps and calculations.

16. Drainage area maps provide multiple north arrows with different directions. Only one

north arrow shall be presented on the plans. **Addressed**

17. A subdrainage area map shall be provided showing the drainage area to each BMP.

Addressed

18. An inlet area map shall be provided showing the drainage area to each inlet. **Addressed**

19. The stormwater report provides direct entry time of concentrations with no back up calculations to support them. Time of concentration calculations shall be provided. **Outstanding**

Time of concentration calculations have not been provided.

20. Impervious and pervious time of concentration paths shall be shown separately and labeled accordingly on the drainage area maps. **Outstanding**

Proposed Tc paths are not shown for the proposed conditions.

21. Per engineering checklist item 14b “Poor” land cover condition shall be used under post development conditions. The curve numbers for post development calculations currently use good and shall be revised to use poor conditions. **Outstanding**

Good land cover condition is still used in the post development calculations.

22. Table No. 1 does not specify whether current or future peak flows are represented. A table for both current and future existing runoff conditions shall be provided. **Outstanding**

Columns for the future 2-, 10-, and 100-year storms have been added to Table 1 but the columns are empty.

23. Stormwater report Section III Methodology A1 provides the rainfall frequency utilized in the calculations. The provided frequencies are inconsistent with the frequencies used in the calculations. The report shall provide the correct rainfall frequencies for the current and future storm events. **Addressed**

24. Storm frequencies used in the stormwater calculations are not consistent with the adjusted values for Mercer County. The calculations shall be revised using the correct storm frequencies. **Partially Addressed**

The applicant states that the “NOAA 14 Point Precipitation Frequency Estimates” is being utilized to obtain the rainfall depths. This is an acceptable method for determining rainfall depths but the Point Precipitation Frequency tables and maps must be provided for review.

25. Provide a section in the stormwater report for compliance with off-site stability. A Stability analysis must be performed for each point discharge. **Outstanding**

A section for off-site stability and its corresponding calculations have not been provided.

26. Print outs of the HydroCAD Hydrograph tables and Basin profiles shall be provided in the Stormwater Management Report.

Stage-discharge and stage-area-storage tables have been provided but hydrograph tables and Basin profiles have not been provided. **Addressed**

27. Hydraflow storm sewer tabulations have been provided. Storm sewer profiles with hydraulic grade line shall also be provided. **Outstanding**

Storm sewer profiles have not been provided.

28. The GTA report was prepared in December of 2023. As of March 2024, the standards for Basin flood tests have changed. Test results shall be reevaluated under the most current standards for compliance. **Outstanding**

Applicants engineer states the test results will be reevaluated.

29. Soil testing was performed above the proposed BMPs in multiple locations. Soil testing shall be performed below the bottom of the bmp in accordance with the chapter 13 of the BMP manual. **Outstanding**

Additional soil testing has not been performed.

Note that soil testing was performed out of season in October through November and additional soil logs must be performed in season (January-April) to confirm groundwater elevation.

30. The stormwater report refers to the appendix for details on groundwater recharge. The appendix does not provide any additional information on groundwater recharge. A groundwater recharge analysis must be provided. **Addressed**

31. Groundwater recharge will be performed with the use of bioretention Basins and therefore require a groundwater mounding analysis to be performed. A groundwater mounding analysis shall be provided for all infiltration BMPs. **Partially Addressed**

Groundwater mounding analyses have been provided but are not labeled, making it unclear which basin is being analyzed. Labels shall be provided to clarify which basin is being analyzed. Additionally, duration of infiltration calculations shall be provided.

32. Emergency spillways shall be shown on the plans and sizing calculations shall be provided. If any Basin is classified as a dam, the design standards set forth in NJAC 7:20 Dam Safety Standards shall be followed.

Not all Basins show emergency spillways as required, and calculations have not been provided. **Outstanding**

Some basins have been revised to have a spillway but SWM Basin 5, 3, 9, 16a, 21, 22, 24, 16b, 26, and 25 still do not have any spillway.

Additionally, SWM Basin 1, 5, 3, 7, 10, 51, 50, 16a, 16b, 17a, 17b, 11, 47, 19, 18, 46b, 46a, 45, 27, 26, 25, 21, and 22 are all classified as Class IV Dams and need to be designed to NJAC 7:20 Dam Safety Standards.

33. It is unclear what type of Basins are being used. The tables in the report denote each Basin as bioretention, while the Basin detail on Sheet 18G is labeled as an extended detention infiltration Basin. Clarification shall be provided.

The extended detention infiltration Basin remains. Clarification is required. ***Outstanding***
The detail is now labeled as a Bioretention Basin but still illustrates an infiltration basin.

34. Per ordinance section 17-82.9 “Safety Standards for Stormwater Management Basins” stormwater Basins are required to comply with the requirements of N.J.A.C. 7:8-6.2 and N.J.A.C. 7:8-6, Appendix A. All stormwater Basins should be revised to comply with the safety standards as necessary. ***Outstanding***

Not all Basins comply with the safety standards.

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Multiple Basins still propose depths over the maximum. ***Outstanding***

All bioretention basins shall be checked and revised to ensure that the WQDS runoff depth is no more than 1.00 foot.

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74. The storm sewer tabulations show multiple points where the ground/rim elevation is zero or negative. The storm sewer shall be revised to maintain correct ground/rim elevations. **Outstanding**

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of no less than 2 ft/s. **Outstanding**

76. Water Quality calculations have not been provided. HydroCAD calculations for the water quality storm shall be provided. **Addressed**

77. The HydroCAD model shows multiple basins with bottom elevations and areas different from what is shown on the plans. The plans and report shall be consistent. **Outstanding**

Bottom basin elevations for SWM basins 2, 4A, 4B, 7, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36A, 36B, 37A, 37B, 38, 39, 40, 41, 42, 43, 44, 45, 46A, 46B, 47, 53, 54, 55, 56, and 57 in the HydroCAD calculations are different from what is shown on the plans. Additionally, Multiple basins have a bottom surface area of 0 SF which would imply that the basins are slightly slopes. The design shall be revised to model the bioretention basins as flat bottomed.

78. Basin drain time calculations shall be provided to ensure all Basins drain within 72 hours. **Outstanding**

79. There appears to be severe oscillations present in the future 100-year storm hydrographs for Basins 4A and 4B causing the primary outflow to be greater than the inflow. The design shall be revised to resolve any oscillations that occur. **Outstanding**

Oscillations remain.

80. An Operation and Maintenance Manual shall be provided. **Outstanding**

81. The groundwater recharge spreadsheet (GWRSS) total area for pre-developed conditions and post-developed conditions are not equal. The GWRSS shall be revised so that the total area for pre- and post- developed conditions are equal. **Addressed**

82. GWRSSs for all Basins including underdrained systems have been provided. Underdrained systems cannot be used to infiltrate and therefore cannot be used for ground water recharge. GWRSS for underdrained systems shall be removed from the report and compliance with groundwater recharge confirmed. **Addressed**

83. It appears that the values used for dBMPu in the GWRSSs are incorrect. The correct dBMPu values shall be used and compliance with groundwater recharge confirmed. **Outstanding**

Values remain incorrect. Note that dBMPu is defined as the vertical distance from the vegetated ground surface to the maximum water surface level in the BMP and dBMP represents the maximum equivalent water depth that can be achieved in the BMP before overflow begins.

84. The GWRSS all use the same Aimp for all Basins. Aimp is the contributing impervious area to the Basin and therefore all Aimp values are different. Aimp values shall be corrected and compliance with groundwater recharge confirmed. **Addressed**

85. Section III.C. "Ground Water Recharge" of the narrative shall provide a groundwater

recharge compliance summary table. The table shall include the recharge deficit, infiltration BMPs utilized, and the annual BMP recharge volume calculated for each BMP.

Outstanding

A table has not been provided in the stormwater report narrative.

86. Basin labels shall be provided on the Proposed Drainage Area Map. **Addressed**
87. Basin 43 appears to have a contributory area greater than 2.5 acres. The design shall be revised to comply with contributory area restrictions. **Addressed**
88. The Proposed BMP Area Map drainage boundaries appear incorrect at and around Basins 3 and 33. The BMP areas shall be revised to show the proper drainage area boundary.

Outstanding

New Comments:

89. Pursuant to N.J.A.C. 7:8-5.2(l) the Applicant shall demonstrate compliance with the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards within each drainage area on-site (i.e. to each point of interest for hydrologic modeling). The Applicant's Engineer has demonstrated analysis of runoff quantity and quality within each drainage area. However, the groundwater recharge deficit shall be calculated for each drainage area and compliance demonstrated locally, instead of a site-wide deficit spreadsheet calculation as provided.
90. The outlet control structure detail shall illustrate an underdrain connection.
91. There appears to be a grading conflict at the berm and spillways between SWM basins 50 and 51 on sheet 8E.
92. Basin table provides incorrect values for water surface elevations and basin elevations. The table shall be reviewed and revised to be consistent with the plan set and HydroCAD calculations. Additionally, the table denotes SWM Basins 26, 31, and 48 as underdrained but the basins do not have underdrains shown on the plans.
93. The grading east of basin 36A and west of basin 37B end in space without tying in. Grading shall be revised
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96. The grading plan shows dashed lines around SWM Basins 5, 7, 53, 54, 12, 14, 13, 38, 26, and 27. Clarification on what the dashed line represent shall be provided.
97. There appears to be a missing 190 contour in the upper right corner of Sheet 8H.

98. Inlet 41 on sheet 10C has an out invert lower than the in invert of Inlet 42. Inverts shall be revised to provide positive drainage.

Further review of the stormwater management design is deferred until the above is addressed.

Memorandum

TO: Hopewell Township Planning Board

CC: Applicant

FROM: James Bash, PE
Township Engineer

DATE: October 22, 2025

RE: **Stormwater Management Review # 6 – Venue at Hopewell**
Preliminary/Final Subdivision & Site Plan; SI Zone
Nursery Road; Block 93, Lots 19, 20, 45.01, 46, & 60
VCEA File No. 78072401

I. Application Submission Items

The following documents were received by the Township for review with this application under a cover letter dated September 30, 2025:

- A. Plan entitled “Preliminary and Final Major Subdivision & Preliminary and Final Site Plan For, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 06/25/24 and revised through 09/30/25.
- B. Report entitled “Stormwater Management Report, Venue at Hopewell, Block 93, Lots 19, 20, 45.01, 46 & 60, Township of Hopewell, Mercer County, New Jersey”, Prepared by Bowman Consulting Group Ltd, dated 09/30/25.

II. Description

The property in question is a 185.51-acre parcel located in IMF-C Inclusionary Multifamily and Commercial Zoning District. The property contains approximately 9,040 feet of frontage on Nursery Road (County Route 647). The property is mostly farmland and wooded areas. There are wetlands, stream corridor buffers, and flood hazard areas located on the property. The proposed construction will require NJDEP permitting. The property is located in the Delaware

OFFICE LOCATIONS

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Hillsborough, NJ 908-359-8291	Mt. Arlington, NJ 862-284-1100	Phillipsburg, NJ 908-454-3080	Doylestown, PA 215-345-1876	Pottstown, PA 610-323-4040
Hamilton, NJ 609-689-1100	Toms River, NJ 732-573-0490	Freehold, NJ 732-303-8700	Bethlehem, PA 610-332-1772	

and Raritan Canal Commissions Zone B. Surrounding properties contain single-family residential structures, farmland and wooded areas.

The application proposes a 600-unit residential inclusionary development consisting of 272 detached single family dwellings, 118 residential duplex units, 90 condo units, 120 affordable housing units in twelve buildings, an amenity area consisting of a clubhouse with pool, dog run, tot lot, tennis courts, bocce ball courts, and multiple stormwater facilities.

The project will add more than $\frac{1}{4}$ acre of impervious coverage and will disturb more than 1 acre of land, therefore this will be considered a major development for stormwater management purposes. The project proposes to meet stormwater quality, quantity and groundwater recharge with the use of 58 bioretention Basins.

III. Stormwater Management Comments

1. For the purposes of the stormwater management design the maximum lot coverage per zoning code should be used when performing impervious surface calculations to account for future additions to the lots. **Addressed**

Applicant has stated the design accounts for maximum impervious coverage of the lots.

2. Multiple drainage feature callouts overlap and are illegible. Plans shall provide clear labeling of all drainage features. **Addressed**
3. Proposed tree lines travel through site features and are inaccurate. Proposed land cover calculations should be checked and revised as necessary. **Addressed**
4. Symbols used to illustrate storm sewer network are inconsistent with the proposed structure. For example, the wingwall symbol is being used for headwalls. Plans shall be revised to depict proper symbol. **Outstanding**

The symbols used are still inconsistent.

5. The proposed flood hazard areas need to be shown on the grading plan and utility plan Sheets. **Addressed**
6. The plans show multiple incorrect storm structure grade/rim and invert elevations. Many inverts are shown as negative and would therefore mean the drainage structures are 200 plus feet below grade. The storm sewer design shall be revised as necessary.

The cleanout inverts in Basins 1 and 2 are set at elevation 0. STM MH 635 has a rim elevation of 0. Manhole rim elevations around SWM Basins 36A, 36B, 35, and 34 appear to have rim elevations above finished grade. All rim elevations shall be revised accordingly. **Addressed**

7. Outlet control structure callouts on the utility plan shall also provide the inverts of any device on the outlet structure. **Addressed**
8. Outlet conduit protection must be provided for all outlet locations. The plans shall depict the

outlet protection, and the corresponding calculations shall be provided within the stormwater report.

Conduit outlet protection has been depicted on the plans, but the corresponding calculations have not been provided. Additionally, the riprap aprons and scour holes are oriented incorrectly and shall be revised to be consistent with the direction of flow. **Partially Addressed.**

Basins 55 and 56 wingwalls and outlet protection are not oriented in the direction of flow. I offer no objection to this being addressed as a condition of any approval the Board may grant.

9. Discharge pipes coming out of Basins are exposed at the point discharge. Grading shall be revised to provide adequate cover to pipes. **Outstanding**

Revised grading has not been provided. I offer no objection to this being addressed as a condition of any approval the Board may grant.

10. A minimum of a tenth of a foot drop from invert in and invert out shall be provided for all drainage structures. **Addressed**

11. The Standards for Soil Erosion and Sediment Control In New Jersey require earth embankments to be a certain width depending in the height of the embankment. The width of embankments shall be revised in accordance with Appendix A10 of the Standards for Soil Erosion and Sediment Control In New Jersey.

Applicant states that all embankments are in compliance with RSIS standards. Not all embankments meet the required width per RSIS. All embankments shall meet the requirements set forth in N.J.A.C. 5:21-7.8. **Outstanding**

Grading shows Basin 4B has a 3 foot wide berm. Grading shall be revised. I offer no objection to this being addressed as a condition of any approval the Board may grant.

12. It is unknown which Basins infiltrate or have an underdrain system. The plans and report shall specify whether each Basin has an underdrain or infiltrates. **Addressed**

13. Soil log location and identifying number shall be provided on the drainage area maps, grading plan and utility plan. **Addressed**

14. The outer bounds of the existing and proposed drainage area maps are not consistent. Maps shall be revised so that the extent of analysis is consistent. **Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.**

15. It appears that bypass areas have been excluded from the drainage area maps. Bypass areas shall be included in the drainage area maps and analyzed accordingly to ensure compliance.

Disturbed bypass areas must be incorporated into the drainage area maps and calculations. **Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.**

16. Drainage area maps provide multiple north arrows with different directions. Only one north arrow shall be presented on the plans. **Addressed**
17. A subdrainage area map shall be provided showing the drainage area to each BMP. **Addressed**
18. An inlet area map shall be provided showing the drainage area to each inlet. **Addressed**
19. The stormwater report provides direct entry time of concentrations with no back up calculations to support them. Time of concentration calculations shall be provided.
Time of concentration calculations have not been provided. **Addressed**
20. Impervious and pervious time of concentration paths shall be shown separately and labeled accordingly on the drainage area maps. **Addressed**
21. Per engineering checklist item 14b “Poor” land cover condition shall be used under post development conditions. The curve numbers for post development calculations currently use good and shall be revised to use poor conditions. **Addressed**
Applicant has requested a waiver stating that “The applicant will use sod to stabilize the soil in the post developed condition, corresponding to “good” land cover.”. Our office takes no exception to granting this waiver given the site is restored to good land cover conditions as a condition of approval.
22. Table No. 1 does not specify whether current or future peak flows are represented. A table for both current and future existing runoff conditions shall be provided.
Columns for the future 2-, 10-, and 100-year storms have been added to Table 1 but the columns are empty. **Addressed**
23. Stormwater report Section III Methodology A1 provides the rainfall frequency utilized in the calculations. The provided frequencies are inconsistent with the frequencies used in the calculations. The report shall provide the correct rainfall frequencies for the current and future storm events. **Addressed**
24. Storm frequencies used in the stormwater calculations are not consistent with the adjusted values for Mercer County. The calculations shall be revised using the correct storm frequencies.
The applicant states that the “NOAA 14 Point Precipitation Frequency Estimates” is being utilized to obtain the rainfall depths. This is an acceptable method for determining rainfall depths but the Point Precipitation Frequency tables and maps must be provided for review. **Addressed**
25. Provide a section in the stormwater report for compliance with off-site stability. A Stability analysis must be performed for each point discharge. **Addressed**
26. Print outs of the HydroCAD Hydrograph tables and Basin profiles shall be provided in the Stormwater Management Report.

Stage-discharge and stage-area-storage tables have been provided but hydrograph tables and Basin profiles have not been provided. **Addressed**

27. Hydraflow storm sewer tabulations have been provided. Storm sewer profiles with hydraulic grade line shall also be provided. **Addressed**

28. The GTA report was prepared in December of 2023. As of March 2024, the standards for Basin flood tests have changed. Test results shall be reevaluated under the most current standards for compliance. **Outstanding**

Applicants engineer states the test results will be reevaluated. I offer no objection to this being addressed as a condition of any approval the Board may grant.

29. Soil testing was performed above the proposed BMPs in multiple locations. Soil testing shall be performed below the bottom of the bmp in accordance with the chapter 13 of the BMP manual.

Additional soil testing has not been performed.

Note that soil testing was performed out of season in October through November and additional soil logs must be performed in season (January-April) to confirm groundwater elevation. **Outstanding**

Applicant states that additional soil testing will be performed in season. I offer no objection to this being addressed as a condition of any approval the Board may grant.

30. The stormwater report refers to the appendix for details on groundwater recharge. The appendix does not provide any additional information on groundwater recharge. A groundwater recharge analysis must be provided. **Addressed**

31. Groundwater recharge will be performed with the use of bioretention Basins and therefore require a groundwater mounding analysis to be performed. A groundwater mounding analysis shall be provided for all infiltration BMPs.

Groundwater mounding analyses have been provided but are not labeled, making it unclear which basin is being analyzed. Labels shall be provided to clarify which basin is being analyzed. Additionally, duration of infiltration calculations shall be provided. **Addressed**

32. Emergency spillways shall be shown on the plans and sizing calculations shall be provided. If any Basin is classified as a dam, the design standards set forth in NJAC 7:20 Dam Safety Standards shall be followed.

Not all Basins show emergency spillways as required, and calculations have not been provided. **Outstanding.** *Calculations are still not provided for spillways. I offer no objection to this being addressed as a condition of any approval the Board may grant..*

33. It is unclear what type of Basins are being used. The tables in the report denote each Basin as bioretention, while the Basin detail on Sheet 18G is labeled as an extended detention infiltration Basin. Clarification shall be provided.

The extended detention infiltration Basin remains. Clarification is required.

The detail is now labeled as a Bioretention Basin but still illustrates an infiltration basin.
Addressed

34. Per ordinance section 17-82.9 "Safety Standards for Stormwater Management Basins" stormwater Basins are required to comply with the requirements of N.J.A.C. 7:8-6.2 and N.J.A.C. 7:8-6, Appendix A. All stormwater Basins should be revised to comply with the safety standards as necessary. **Addressed**
35. The maximum depth of stormwater runoff in a small-scale infiltration Basin is 2 feet and 1 foot for small-scale bioretention Basins. Multiple Basins propose to a depth over the maximum. The design shall be revised to comply.

Multiple Basins still propose depths over the maximum. **Outstanding**

All bioretention basins shall be checked and revised to ensure that the WQDS runoff depth is no more than 1.00 foot. I offer no objection to this being addressed as a condition of any approval the Board may grant.

36. The outlet control structure detail table is cut off at the edge of Sheet 18G. Plan shall be revised to show entire table. **Addressed**
37. The outlet control structure detail table on Sheet 18G provides "????" as the label or elevation for multiple structures. Elevations shall be provided. **Addressed**
38. The plans show that Basin 36A has no outlet control structure whereas the stormwater report does. The plans and report shall be revised to be consistent. **Addressed**
39. Multiple outfall locations in Basins show incorrect invert elevations. Invert elevations shall be revised. *This appears to be an open item. I offer no objection to this being addressed as a condition of any approval the Board may grant.*
40. OCS discharge pipes are above ground in Basins. For example, Basin 58 has a bottom elevation of 199 while the invert out of the OCS is 199. OCS shall be repositioned or inverts lowered to provide adequate cover for the discharge pipe. **Outstanding**

Pipes discharging into Basins 58, 40, 39, and 20 are exposed. I offer no objection to this being addressed as a condition of any approval the Board may grant.
41. The pipe from STM MH 2 to Headwall 3 is above ground. Inverts shall be revised to provide adequate cover. **Outstanding**

The pipe appears to still be exposed in road B. I offer no objection to this being addressed as a condition of any approval the Board may grant.
42. The pipe from OCS 203 to STM MH 204 conflicts with SMH S52 structure and pipe. The pipe conflicts shall be revised. **Addressed**
43. Rim elevations for structures STM A275 (443) to (355) have elevations of 0 or lower. Rim

elevations shall be revised as necessary. **Addressed**

44. Drainage easements shall be provided for storm sewer structures and pipes traveling through lots. **Continuing condition of approval. I offer no objection to this being addressed as a condition of any approval the Board may grant.**

45. Profiles of the storm sewer network shall be provided showing the structure and pipe elevations and slopes, existing and proposed grade, and utility pipe crossings.

The storm sewer along roads have been provided in the road profiles but the remaining storm sewer network outside the road has not been provided. **Outstanding I offer no objection to this being addressed as a condition of any approval the Board may grant.**

46. Sheet 10A provide dashed contours that do not tie into existing grade. Clarification is required. **Outstanding**

Clarification is still required. I offer no objection to this being addressed as a condition of any approval the Board may grant.

47. Sheet 10B has a 216 contour that does not tie into existing grade. All proposed contours must tie into existing grade.

The 216 contour ties into existing grade. The grading on sheet 8D east of Basin 10 does not tie into existing grade. All proposed contours in the plan set shall tie back into existing grade. **Addressed**

48. It appears storm sewer will be partially placed in the 50-foot right-of-way easement to Sun Pipeline Company. The applicant will require permission and obtain any easement needed in order to construct within the ROW. **Outstanding**

The storm sewer system is still shown to be partly in the ROW. Additionally, the pipe from STM MH 275A 443 to 436 crosses the ROW. I offer no objection to this being addressed as a condition of any approval the Board may grant.

49. On Sheet 10C the stream corridor buffer stops prematurely. The plans shall show the full stream corridor buffer. **Addressed**

50. Sheet 10C grading presents the curbed island as flush with the pavement. Clarification shall be provided. **Addressed**

51. Multiple discharge locations are placed less than 10 feet from or inside of a wetland and will require DEP approval. Testimony shall be provided. **Outstanding.**

52. The proposed tree lines do not tie into existing tree lines and end in open space. Additionally, tree lines don't include the full limits of disturbance and run through discharge pipes. The tree line shall be revised and the existing tree line to remain shall be shown. **Outstanding**

The proposed tree lines tie in to existing but still run through storm sewer pipes. I offer no objection to this being addressed as a condition of any approval the Board may grant.

53. Some proposed lots mark the dwellings with a first floor and ground floor elevation of "xxx". Floor elevations shall be provided. **Outstanding**
Floor elevation xxx is still shown on sheet 8K. I offer no objection to this being addressed as a condition of any approval the Board may grant.

54. SWM 7 and 47 OCS have a grate elevation at the bottom of Basin. The outlet control structures shall be revised. **Addressed**

55. All text conflicts between drainage labels and the floor elevations of structures shall be resolved. **Addressed**

56. SWM Basins 52, 53, 54, 55, and 56 appear to be graded Basins but also have a wall around them. It shall be clarified as to whether they are graded or walled Basins. **Addressed**

57. Existing contour labels shall be provided on the drainage plans. **Addressed**

58. The grading around Basins 17A and 17B do not tie in to each other properly. Grading shall be revised. **Outstanding**
The grading still does not tie in properly. I offer no objection to this being addressed as a condition of any approval the Board may grant.

59. Structures STM MH A275 (363) and (382) appear create low points. Grading shall be revised to create positive drainage. **Addressed**

60. If Basins have an underdrain network the underdrains shall be shown on the plans. **Addressed**

61. Sheet 10L shows contours traveling through buildings. Grading shall be revised to remove the contour from the building. **Outstanding**
Sheet 8L still shows contours going through buildings. I offer no objection to this being addressed as a condition of any approval the Board may grant.

62. The pipes at discharge points appear to have inadequate cover and will be exposed. Grading around wingwalls at discharge locations shall be revised to provide cover for the pipes. **Outstanding**
Grading has not been provided at discharge points. I offer no objection to this being addressed as a condition of any approval the Board may grant.

63. When increasing pipe size the crown inverts should match. The pipe network shall be revised as necessary. **Outstanding**
The storm sewer system has not been revised to match crowns when increasing in pipe size. I offer no objection to this being addressed as a condition of any approval the Board may grant.

64. The pipe traveling underneath Basins 24, 25, and 26 shall be relocated to avoid traveling under any other stormwater features. **Outstanding**

The pipe remains underneath the Basins. I offer no objection to this being addressed as a condition of any approval the Board may grant.

65. It appears that the grading around Basin 23 is completely flat. More information within the area shall be provided confirming that there will be positive drainage on site. **Addressed**
66. The STM MH A275 (344) incoming pipe has a diameter of 18 inches and the outgoing pipe has a diameter of 15 inches. The outgoing pipe shall be increased in size to be greater or equal to 18 inches. **Addressed**
67. It appears that the maintenance access in the Basins are missing walls. The walls shall be depicted on the plans. **Addressed**
68. The storm sewer system coming into Basin 14 is inside the Basin area and shall be relocated. **Addressed**
69. A flood hazard area verification has been provided. The verification was performed prior to the inland flood protection rule making therefore a new FHA verification may need to be obtained. Confirmation from NJDEP should be obtained. **Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.**
70. The Drainage plans are missing the contour labels. Contour labels shall be provided on the drainage plans. **Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.**
71. A “typical section rain garden” detail has been provided. It is not clear where the rain gardens are proposed on site. Clarification shall be provided. **Addressed**
72. It appears that small-scale bioretention Basins are being proposed. A detail for small-scale bioretention Basins shall be provided. The detail shall include but not limited to, soil media, sand layer, underdrain (if applicable), thickness of each layer, elevations, etc. **Addressed**
73. The storm sewer tabulations show points where the hydraulic grade line is above the structure rim elevation. This indicates that the structure has flooded/overtopped. The storm sewer shall be revised to maintain the HGL below structure rim elevations. **Addressed**
74. The storm sewer tabulations show multiple points where the ground/rim elevation is zero or negative. The storm sewer shall be revised to maintain correct ground/rim elevations. **Addressed**
75. The storm sewer tabulations show pipes with velocities less than 2 ft/s. RSIS requires a minimum of 2 ft/s in the pipe network. Storm sewer shall be revised to maintain a velocity of no less than 2 ft/s. **This appears to remain as an open item. I offer no objection to this being address as a condition of any approval the Board may grant.**
76. Water Quality calculations have not been provided. HydroCAD calculations for the water quality storm shall be provided. **Addressed**
77. The HydroCAD model shows multiple basins with bottom elevations and areas different from

what is shown on the plans. The plans and report shall be consistent.

Partially addressed.

It appears the calculations have been revised, however there still needs to be drafting revisions to match the design calculations. I offer no objection to this being addressed as a condition of any approval the Board may grant.

78. Basin drain time calculations shall be provided to ensure all Basins drain within 72 hours.
Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.
79. There appears to be severe oscillations present in the future 100-year storm hydrographs for Basins 4A and 4B causing the primary outflow to be greater than the inflow. The design shall be revised to resolve any oscillations that occur. **Addressed**
80. An Operation and Maintenance Manual shall be provided. *Outstanding*
Applicant states an Operation and Maintenance manual shall be provided upon approval of the stormwater management design by all agencies. I offer no objection to this being addressed as a condition of any approval the Board may grant.
81. The groundwater recharge spreadsheet (GWRSS) total area for pre-developed conditions and post-developed conditions are not equal. The GWRSS shall be revised so that the total area for pre- and post- developed conditions are equal. **Addressed**
82. GWRSSs for all Basins including underdrained systems have been provided. Underdrained systems cannot be used to infiltrate and therefore cannot be used for ground water recharge. GWRSS for underdrained systems shall be removed from the report and compliance with groundwater recharge confirmed. **Addressed**
83. It appears that the values used for dBMPu in the GWRSSs are incorrect. The correct dBMPu values shall be used and compliance with groundwater recharge confirmed.
Values remain incorrect. Note that dBMPu is defined as the vertical distance from the vegetated ground surface to the maximum water surface level in the BMP and dBMP represents the maximum equivalent water depth that can be achieved in the BMP before overflow begins. **Addressed**
84. The GWRSS all use the same Aimp for all Basins. Aimp is the contributing impervious area to the Basin and therefore all Aimp values are different. Aimp values shall be corrected and compliance with groundwater recharge confirmed. **Addressed**
85. Section III.C. "Ground Water Recharge" of the narrative shall provide a groundwater recharge compliance summary table. The table shall include the recharge deficit, infiltration BMPs utilized, and the annual BMP recharge volume calculated for each BMP. **Addressed**
86. Basin labels shall be provided on the Proposed Drainage Area Map. **Addressed**
87. Basin 43 appears to have a contributory area greater than 2.5 acres. The design shall be

revised to comply with contributory area restrictions. **Addressed**

88. The Proposed BMP Area Map drainage boundaries appear incorrect at and around Basins 3 and 33. The BMP areas shall be revised to show the proper drainage area boundary. **Addressed**
89. Pursuant to N.J.A.C. 7:8-5.2(l) the Applicant shall demonstrate compliance with the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards within each drainage area on-site (i.e. to each point of interest for hydrologic modeling). The Applicant's Engineer has demonstrated analysis of runoff quantity and quality within each drainage area. However, the groundwater recharge deficit shall be calculated for each drainage area and compliance demonstrated locally, instead of a site-wide deficit spreadsheet calculation as provided. **Addressed**
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97. There appears to be a missing 190 contour in the upper right corner of Sheet 8H. **Addressed**.
98. Inlet 41 on sheet 10C has an out invert lower than the in invert of Inlet 42. Inverts shall be revised to provide positive drainage. **Outstanding. I offer no objection to this being addressed as a condition of any approval the Board may grant.**

New Comments:

99. The proposed impervious time of concentration calculations appear to assume 100 feet of sheet flow and shallow concentrated flow along the curb line in multiple drainage areas.

Flow along a curb line should be considered channel flow. The proposed impervious Tc calculations shall be revised. ***I offer no objection to this being addressed as a condition of any approval the Board may grant.***

100. Underground storage is proposed to Basins 40 and 39. This shall be addressed via testimony and clarified on the plan as a condition of any approval the Board may grant.
101. It appears porous pavement is proposed to Basin 36a. This shall be addressed via testimony and clarified on the plan as a condition of any approval the Board may grant.
102. STM MH A275 is in conflict with the wall of Basin 40. This shall be clarified on the plan as a condition of any approval the Board may grant.

In conclusion, it is my opinion that the remaining technical comments are minor in nature and I offer no objection to these being addressed as a condition of any approval that the Board may grant.