Professional Services Corporation, PC

Memorandum

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Date	August 11, 2021
To	Bourne Zoning Board of Appeals
From	Thomas C. Houston, PE, AICP
Project	Cape View Way Comprehensive Permit Project
Subject	Peer Review of Civil Engineering/Site Design

Professional Services Corporation, PC (PSC) reviewed the First Submittal of the Site Plans, Stormwater, and related design for the Cape View Way Comprehensive Permit Project (Proposed Project) on behalf of the Bourne Zoning Board of Appeals.

The Preservation of Affordable Housing, Inc.(POAH) and the Housing Assistance Corporation (HAC) (collectively the "Applicants") propose to construct a 51-unit mid-rise multifamily residential building with a footprint of 27,000 sq.-ft. The 51 dwelling units have a total of 90 bedrooms comprised of 17 one-bedroom units, 29 two-bedroom units, and 5 three-bedroom units. The Proposed Project will provide rental units under the low-income housing tax credit program and all units will be affordable.

The Proposed Project is located on Cape View Way which is situated on the north side of Meetinghouse Lane between the Post Office and Bourne Fire Station 3. The 2.94-acre Project Site which is currently owned by the Bourne Housing Authority is comprised of 7 parcels, Assessing Map 6 parcel 0 and Assessing Map 7 Parcels 0, 6, 8, 10, 11, and 12 and lies within the R-40 Zoning District.

Cape View Way was a previously approved subdivision road which was never completed. The subdivision roadway layout will be modified and the former subdivision lots will be combined, and the project will be developed as a single lot. Currently, Cape View Way includes a paved roadway stub with the remainder unpaved. To serve the Proposed Project, construction of Cape View Way will be redesigned and completed providing a 24-ft. wide paved traveled with a

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5± ft. wide sidewalk on one side. A total of 85 parking spaces (69 standard parking spaces/12 compact parking spaces/4 accessible parking spaces) are provided to serve the 51 dwelling units.

Site improvements include utilities, a stormwater management system to collect, treat, and infiltrate stormwater, an on-site wastewater treatment system for 9,900 gallons per day, water distribution system, cable utilities, site lighting, and landscaping.

Overall, we find that the site plans prepared by the Horsley Witten Group, Inc. (Horsley Witten Group) are properly designed and generally comply with standard engineering practice. We offer the comments provided herein for consideration.

FIRST SUBMITTAL

A. Cape View Way Permitting Plans, Bourne Massachusetts, prepared by the Horsley Witten Group, Inc, containing 21 sheets, dated March 5, 2021.

B. Stormwater Analysis and Drainage Report, Cape View Way, Bourne, Massachusetts, prepared by the Horsley Witten Group, Inc., dated March 5, 2021.

C. Cape View Way Permitting Plans, Bourne Massachusetts, Landscape Rendering, prepared by the Horsley Witten Group, Inc. containing 21 sheets, dated March 5, 2021.

D. Cape View Way, Bourne, Massachusetts, Existing Conditions, prepared by the Horsley Witten Group, Inc., dated June 2019.

E. Photometric Study – Run 2 – King Luminare & Heper, prepared by speclines and manufacturer's literature.

F. Town of Bourne Board of Appeals, Comprehensive Permit Application, Pursuant to MGL Ch. 40B § 20-23 and 760 CMR 56.00.

G. Development Agreement by and between Preservation of Affordable Housing, Inc. ("POAH") and Housing Assistance Corporation ("HAC," and jointly with POAH, the "Developer") and the Bourne Housing Authority

REFERENCE

A. Town of Bourne Zoning Bylaw, as most recently the special town meeting, October 2019, printed February 13, 2020.

B. 2021 Approved Zoning Bylaws, Approved ATM 2021 zoning article for Lowland Regulations.

C. Town of Bourne General Bylaws, Section 3.7 Wetland and Natural Resources Protection.

SUBDIVISION

The Applicants intend to modify the layout of Cape View Way created by the 1987 subdivision entitled "Meetinghouse Place" while combining the original subdivision lots into a single parcel.

The status of the "Meetinghouse Place" subdivision should be researched to determine if the approved subdivision is valid and was recorded in the registry of deeds. The 1987 Planning Board Decision should be reviewed to determine if there are sunset provisions. If the subdivision has expired there may be the requirement to upgrade the subdivision to comply with the current Planning Board Rules and Regulations. It should be noted that the northwesterly segment of the subdivision roadway has a new alignment, and the cul-de-sac has a revised layout and is in a different location.

1. Determine if the "Meetinghouse Place" subdivision was recorded in the registry of deeds.
2. Determine if the 1987 Planning Board "Decision" contains sunset provisions which after a specified period either voids an unconstructed subdivision or requires upgrades to comply with the current Planning Board Rules and Regulations as a condition of extending the unconstructed subdivision.
3. Either apply to the Zoning Board of Appeals (acting as Planning Board) for a new definitive subdivision approval or for modifications to an approved subdivision if the subdivision remains valid. In either case the subdivision road is eligible to apply for approval, the issue is to identify the appropriate procedure.
4. In the drop off area at the main building entrance, revise the cul-de-sac island to accommodate fire apparatus and any large vehicles expected to use the site requires a new subdivision approval or modification.
5. As the subdivision roadway is unconstructed it cannot currently provide vital access. Therefore, procedurally the Applicants must petition to merge the subdivision lots under the subdivision process (with the ZBA acting as Planning Board). Given the incomplete construction of the subdivision road (no vital access), lots cannot be combined through the ANR or 81P process.
6. Provide a subdivision plan complying with all requirements for recording in the registry of deeds.

a. Provide a signature block for the ZBA (serving as Planning Board) to endorse the plan.
b. Show metes and bounds for the Cape View Way layout. The general requirement of the registry of deeds is that sufficient geometric data must be provided to allow all points on the layout to be field located.
c. Show bounds to define the layout.
d. Record the approved plan in the Registry of Deeds.

ZONING

The Applicants request waiver of certain provisions of the Town of Bourne Zoning Bylaws as follows: "Inspector of Buildings, Zoning Enforcement" (ZBL §1210), "Certification" (ZBL §1220), "Site Plan Special Permit Approval" (ZBL §1230), "Maximum Lot Coverage" (ZBL §2454), "Maximum Building Height" (ZBL §2455), "Enforcement.(ZBL §2460), "Subdivision Control Law Compliance" (ZBL §2498), "Rate of Development Scheduling" (ZBL §2640), "Exemptions.(ZBL §2650), "Table of" (*Parking)* Requirements" (ZBL §3320), "Number of Plants" (ZBL §3512(II)), "Parking Area Plantings" (ZBL §3513(IV)), "Natural Cover Removal" (ZBL §3570), "Earth Removal" (ZBL §4400)

In addition to requested waivers, additional waivers of strict compliance may be required.

7. Determine compliance or request waiver of strict compliance with the provisions of "Lot Shape" (ZBL §2480).

The Project Site is located in the R-40 Zoning District. The Town of Bourne Zoning Bylaw (ZBL) provides for single family residential and two-family use in the R-40 District (ZBL §2200). As a mid-rise multifamily residential use, the Proposed Project does not comply with the use and certain dimensional requirements of the R-40 District. The Applicants have requested waiver of certain provisions of the R-40 District. These waivers are necessary in order to allow the Proposed Project to be constructed as submitted. The Applicants zoning analysis and the waiver requests presume Cape View Way has the status of a way. See Comments 1 through 5.

The proposed project complies with the requirements of the R-40 District with respect to minimum lot area of 40,000 square feet (100,000+ square feet provided), the minimum frontage of 125 feet (125+ feet provided), the minimum side yard of 15 feet (15+ feet provided), and minimum usable open space of 20 percent (64% provided) (ZBL §2500).

8. The submittal states the usable open space provided is 64% of the lot area. Explain the apparent inconsistency of 47% total impervious materials coverage versus 68% total open space per the "Tabulation of Ground Area Coverages" in the Application.

The applicants request waiver of strict compliance with the certain dimensional requirements of the R-40 District with respect to minimum front yard setback of 30 feet (10 feet provided), minimum rear yard of 15 feet (7.8 feet provided), maximum lot coverage of 20% (32% provided), and maximum building height of 35 feet (38.9 feet provided) (ZBL §2500).

STORMWATER

The site is provided with a stormwater management system that collects, treats, and infiltrates stormwater on site. Based upon on site wetlands, the Proposed Project is subject to the Massachusetts Wetlands Protection Act (MGL c. 131, § 40) and the stormwater management system must comply with the DEP Stormwater Standards and with the guidance of the Massachusetts Stormwater Handbook. The stormwater management system must also comply with Town of Bourne stormwater management requirements (unless waived) as set forth in the zoning bylaw and the Subdivision Rules and Regulations of the Planning Board.

Compliance with the Massachusetts Stormwater Standards

We evaluated the discussion of compliance the Massachusetts Stormwater Standards provided in the Stormwater Analysis and Drainage Report, and we conclude as follows:

Standard 1: No New Untreated Discharges or Erosion to Wetlands. There is no proposed discharge to wetlands.

Standard 2: Peak Rate Attenuation. Stormwater management system shall be designed so that post development peak discharge rates do not exceed pre-development peak discharge rates. The submitted Stormwater Analysis and Drainage Report tentatively demonstrates compliance. However, supplemental soils testing is requried for final confirmation of compliance. See Comment 11.

Standard 3: Stormwater Recharge. Loss of the annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, stormwater management best practices, and good operation and maintenance. As a minimum, the annual recharge from the post development site shall approximate the annual recharge from the pre-development site based on soil type. The standard is met when the stormwater management system is designed

to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook. The stormwater management system. The submitted Stormwater Analysis and Drainage Report tentatively demonstrates compliance. However, supplemental soils testing is requried for final confirmation of compliance. See Comment 11.

Standard 4: Water Quality. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when: 1) suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained; 2) structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and 3) pretreatment is provided in accordance with the Massachusetts Stormwater Handbook. The submitted Stormwater Analysis and Drainage Report tentatively demonstrates compliance; however, additional pretreatment must be provided for the CB 100 infiltration system.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs). This standard is not applicable for the Project Site.

Standard 6: Critical Areas. The Project Site does not fall within a Critical Area as defined by the SWH and compliance with this standard is not required.

Standard 7: Redevelopment Project. This standard is not applicable for the Project Site.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls: The Applicant has provided sufficient information to demonstrate compliance.

Standard 9: Operation and Maintenance Plan. The Applicant has provided sufficient information to demonstrate compliance.

Standard 10: Prohibition of Illicit Discharges. An Illicit Discharge Compliance Statement has not been submitted.

9. Submit or state the timing for submittal of an Illicit Discharge Prohibition Statement.

Soils

The natural Resource Conservation Service mapping provided in the Stormwater Report classifies most of the on-site soils as "Carver Loamy Sand, 3 to 8 percent slopes (259B)" and a portion in the south portion of the site as Hinkley Loamy Sand, 3 to 8 percent slopes (245B).

Both of these soil groups are well drained and are classified as Hydrologic Soils Group A (HSG A).

Numerous test pits have been excavated on the site and show a reasonably consistent soil profile. With some exceptions, the test pits show surface layers of Sandy Loam underlain by Sand. Test Pits E and F located in the northwest portion of the site are an exception. They show upper layers of Sandy Loam underlain by Gley Silt Loam, which is underlain by Fine Sandy Loam and sand or sand.

The Stormwater Handbook specifically requires soil testing at the location of the infiltration Best Management Practice (BMP). The on-site stormwater management system includes 6 subsurface structures including 4 URC systems with "Stormtech MC-3500" units and 2 precast concrete Recharge Basin (RB) systems. For the Storm Tech MC 3500 units, the Stormwater Handbook bases test pit requirements on the requirements for infiltration trenches. For URC-1 five test spits are required and for URC-2, URC-3 and URC-4, two test pits are required for each. There are no test pits located at any of the six on site infiltration BMP's which is not in compliance with the Stormwater Handbook. Due uniformity of the sites soil profile, it may be possible to defer additional testing until the construction phase. We recommend that the Sandy Loam layers be removed down to the sand layers and the excavation backfilled with Title 5 sand in order to ensure long term operation of the infiltration BMP's. We recommend that removal of the Sandy Loam be verified on-site by the engineer of record. The requirement for on-site observation of removal of the Sandy Loam layers can be combined with on-site verification of the textural classification of sand layers at lower levels. The Applicants assume some risk that the subsurface structures may have to be redesigned; however, there is room on-site for expansion of these BMPs if requried.

10. Revise the drawings to require on-site observation of removal of the sandy loam layers and backfilling with Title 5 sand at each of the 6 subsurface structures during construction.
11. Revise the drawings to require on-site soil texture classification by a Massachusetts Soil Evaluator at each of the 6 subsurface structures during Construction and to require design revisions if location specific soil data is not consistent with the submitted design.

Calculations.

Revise the HydroCAD calculations as follows:

12. Limit sheet flow length to 50 feet in determining the time of concentration.

13. Revise the first flush calculations using 1.7 inches per the subdivision regulations.

14. Add flow path to the watershed maps.

Infiltration structures.

Subsurface structure peak water elevations are shown on sheet 15. However, the data is not labeled to show the URC system for which the peak elevations are determined. The top row of the chart which appears to show elevations for URC-1 the elevations do not match the HydroCAD Reports. The "Underground Chambers, Design Storm Elevations" table on sheet 15 should be deleted and replaced with a new table on sheet C-8 or C-9.

15. Revise the "Underground Chambers, Design Storm Elevations" table on sheet 15 to include labels for the rows as URC-1, URC-2, URC-3, URC-4. Revise the WQv (for 1.7 inch) peak elevation and add the 2-yr. peak elevation. The elevations in the top row do not appear to match the HydroCAD calculations.

16. Supplement the URC "Specifications" table on Sheet 17 providing the elevations for the bottom of stone elevation, bottom of structure elevation, top of structure elevation, top of stone elevation. Alternatively, this information could be labeled for each structure on Sheets C-8 and C-9.

17. Due to the maintenance burden, revise structure URC-1 to provide a single isolator row.

18. A double-ring infiltrometer test was performed at TP-F which resulted in an infiltration rate of 7.0 inches/hour. This infiltration rate was used to design RRC-3. Although contiguous to RRC-3, subsurface structure RRC-2 is designed with an infiltration rate of 8.27 inches per hour. Revise the design of RRC-3 using an infiltration rate of 7.00 inches per hour or provide two test pits substantiating the design infiltration rate of 8.27 inches per hour.

19. Provide time to drain calculations for URC-1, URC-2, URC-3, URC-4.

20. Revise the design of Bioretention Area 2 in order to accommodate the revised island geometry at the building entrance. See Comment 4

21. Provide requirements for bulkheading subsurface structures until the site is fully stabilized.

Treatment BMPs

22. The Water Quality Volume used in the sizing of the Bioretention Areas and the Tree Trenches is based on the 1-inch rainfall, not the 1.7-inch rainfall required by the Planning Board Rules and Regulations (PBRR §352 D 1).

23. Label the Sidewalk Inlet Grate on sheets C-8 and C*9 and reference the detail on Sheet 16.

Collection System

24. Label pipe diameters, materials, and slopes.

25. Relocate DMH 200 and eliminate the acute reverse flow angle.

26. The CB 100 – RB 101 – RB 102 system provides 25% TSS removal prior to discharge to the infiltration BMP whereas 44% TSS removal is required.

Stormwater Waivers

The proposed stormwater management system does not comply with the planning board rules and regulations. Revise the submittal to comply or request waiver of strict compliance with the following.

27. Water Quality Depth shall be 1.7 inches.

28. Request waiver of requirements for RCP pipe (PBRR §352 A 7).

29. Request waiver of prohibition for subsurface structures (PBRR §352 D 3.b).

SITE PLAN

30. The building domestic water service and the building water protection line, and the proposed fire hydrant are located in proximity (hereinafter the "three connections"). To improve reliability and safety, add two 8-inch diameter gate valves, one of each site of the "three connections" to enable the domestic water service, the building water protection line, and the hydrant to be fed from either direction. Adjust the waterline location slightly in order to enable locating the valve boxes for both recommended gate valves within the pavement.

31. Coordinate with the Fire Department and determine the following:
    a. Is a second on-site fire hydrant required.

b. Is a PIV valve required where the fire service enters the building?

32. Research availability of record data or provide a fire flow test.

33. Specify bituminous coated cement lined ductile iron pipe.

34. Show the limits of the waterline to be abandoned and identify the point of connection for the watermain extension.

35. Coordinate with the Water District and determine if a three-valve connection is required or if a tapping sleeve and valve is permitted on Homestead Road.

36. Show a supply line if natural gas service is available.

37. If natural gas service is not available show the location and spill protection provisions for the heating oil storage tank. The oil storage tank must comply with Fire Department requirements.

38. Show an emergency generator if proposed and provide visual and acoustical screening. The generator should be gas fired if natural gas service is available. The generator should be located to minimize noise impacts on residents and abutters. If not desired to power the entire building, an emergency generator may be required in order to operate the elevator and maintain handicapped accessibility to the second and third floors of the building.

39. Specify the material for vertical faced curbing. Although more expensive than precast concrete curb, vertical faced granite curb is recommended in the turnaround are due to restricted vehicle maneuvering and tight geometry for snow plowing.

40. Specify a 4" thick superpave pavement section with a 1½-inch thick surface course and a 2½-inch thick intermediate course. Increasing the surface course from 1¼-inch thick specified in the subdivision regulations allows for increased aggregate size and increased strength.

41. The Zoning Bylaw which proscribes requirements for site lighting, limits the max./min. ratio to 4.0 whereas the max./min. ratio provided on the "speclines" photometric plan for Driveway is 14.0, for Parking A is 25.5, and for Parking B is 24.5 (ZBL §3453 c)) . However, illumination levels provided are similar to illumination levels provided in comparable developments .

SEPTIC SYSTEM

The septic system information provided is a preliminary design and will require additional design prior to final septic system approval.

42. The conventional Title 5 system location is shown as an outline of dashed lines overlapping the Presby beds. The Presby's state approval letter requires that the site to support a conventional system (primary and reserve). It's not clear that the area must be in a different location on the property, but the rectangular space provided is not supported with design calculations to prove that the space shown represents the conventional system's primary and reserve.
43. The site evaluation data excludes percolation tests. Granted sandy soil percolation rates are predictable but this test data will be required for final approval.
44. Redoximorphic features (mottles) was recorded in the soil profiles but in a different area not representing the soils underneath the soil absorption system.
45. The plan does not provide a 100% reserve area.
46. The plan does not provide deep observation holes and percolation tests verifying a suitable location for the reserve area.
47. The mound height is stated but calculations are not provided for groundwater mounding as required for systems over 2,000 gpd.
48. No information provided for the high groundwater elevations provided.
49. Bed #1 and Bed #2 will receive an unequal volume of effluent. The beds are two different sizes, one will receive more effluent than the other not providing equal distribution for the entire soil absorption system when dosed.
50. Details are missing for the vent manifolds exiting the double offset adapters.
51. Bed #1 vent manifold has no details.
52. Bed #2 vent manifold is not clear or presented.
53. The site plan offers a location for vent pipes north of the beds. No details provided how to get the pipes to the specified location. The manifold vent pipes for Bed #2 are located on the southern end of the bed and Bed #1 is located on the northern end.

54. No calculations provided for the pump chamber daily dose (6 doses daily minimum), emergency storage volume, and pressure line backflow volume.

55. No pump specifications, inside dimensions for the pump chamber, actual dynamic head, pump performance curve (total dynamic head versus flow rate), and manufactured stated flow rate for the actual dynamic head calculated.

56. Sheet 14 of 21. Sheet provides specifications for sewer manhole and wye connector that are unrelated to the current design. Should be omitted. Space used for current design details which would benefit the design.

57. Final grade cover over Bed #1 and #2 exceed state's maximum 3 feet of cover.

58. Pump chamber outlet elevation is the same for the inlet elevation for the main distribution box. Using the same elevation (no negative grade) will prevent the fluids in the pressure line to return to the pump chamber after each dose by gravity.

59. No weep hole provided in the pressure line for backflow return to pump chamber.

60. Final grade provided above the pressure line length does not provide proper cover to provide protection from freezing. If buried deep the line will have a bow preventing backflow to pump chamber due to both ends of the pressure line are at the same elevation.

61. Distribution box specifications lack 6" stone base or equivalent to provide a stable base, and the outlet distribution lines to be level for a minimum of the first 2' of the pipe lengths.

62. The Presby's state approval letter states the system shall be installed with differential venting for aeration and inspection access at end of each serial bed whenever the system is installed under impervious surfaces.

COMMENTS FROM THE TIA PEER REVIEW

Our review of the TIA for Cape View Way, gave rise to recommended site plan modifications. We restate these issues to ensure they are addressed in revised site plans. Revised site plans should address the following:

- Any sidewalk obstructions (signs, hydrants, etc.) to be placed to reserve a 48-inch-wide accessible path.

- For walkways at the head of perpendicular parking space, widen the sidewalk to 7½ ft., provide parking bumper blocks, or providing a loam strip to maintain a minimum accessible route.
- Provide an outdoor bicycle rack be provided for visitors.
- For the 4 compact perpendicular parking spaces that are accessed from the pavement within the turnaround at the building entrance, provide an overall width of this parking bay (aisle plus parking space) of 42 ft. to ensure proper vehicle maneuvering.
- The turnaround with center island at the end of Cape View Way that has been adapted to serve as a drop-off at the building entrance. Modify the inner radius of the turnaround to accommodate a fire truck or the largest vehicle expected to regularly access the site.
- Provide signs prohibiting parking along Cape View Way.