PARE CORPORATION

October 17, 2024

Mr. Raymond Lavey
Executive Director
Waterfront District Commission
145 Taunton Avenue, Town Hall 2nd Floor
East Providence, RI 02914

Re: **Waterfront District Commission – Stormwater Peer Review Services**
Metacomet Redevelopment
On-Call Professional Engineering Review Services
East Providence, Rhode Island
(Pare Project No. 24039.00)

Dear Mr. Lavey:

Pare Corporation (Pare) has completed our review of the stormwater management design for the Metacomet Redevelopment Project. Pare reviewed the following documents provided by the Waterfront District Commission:

- Drainage Report for Marshall Properties proposed Metacomet Redevelopment dated December 21, 2023, and Revised August 16, 2024, prepared by Bohler Engineering
- Proposed Site Plan Documents for Marshall Properties proposed Metacomet Redevelopment dated December 21, 2023, and revised August 16, 2014, prepared by Bohler Engineering
- Comment Letter Response dated August 29, 2024, prepared by Bohler Engineering

Pare Offers the following comments pertaining to these submissions:

Proposed Site Plan Documents:

1. Bioretention Basin Detail on Detail Sheet (C-906) does not show the proposed 30-inch perforated pipe illustrated on Drainage Plan D (Sheet C-455) and shown in HydroCAD model. Detail currently shows 4-inch perforated PVC underdrain. Review and revise accordingly.
   Response: No Bioretention Basin proposed.

   Pare Response: Response Accepted.

2. Drainage Plan C (Sheet C-454) Subcatchment PD2.1 appears to surcharge through a proposed catch basin grate to the Proposed Above Ground Stormwater Basin P2.1. The proposed catch basin rim elevation is above the top of Stormwater Basin P2.1 berm. Review and confirm intent.
   Response: The plan is revised to discharge the pipe to a flared end section with rip rap apron.

   Pare Response: Response Accepted.

3. Infiltration Basin Detail on Detail Sheet (Sheet C-906) shows a sediment forebay for the Infiltration Basins. Sediment forebays are not illustrated on the grading or drainage plan sheets. Show limits of pretreatment as required including sediment forebay check dam locations and heights
   a. Update infiltrating areas within calculations.

   Response: The detail is revised to remove the forebay. Pretreatment to the surface basins with infiltration are achieved by offline deep sump CBs, NA for contributing roofs with direct discharge to infiltration, and/or proprietary water quality units when CBs are inline.

Pare Response: Confirm Infiltration Basins are in conformance with (250-RICR) Section 8.21 Stormwater Infiltration Practices Part D Subpart 1. To protect the long-term integrity of the infiltration rate, and when proposing Deep Sump Catch Basins for pretreatment, one of the following practices must also be implemented:

- **Upper sand layer (6" minimum w/ filter fabric at the sand/gravel interface); or**
- **Washed pea gravel (1/8" to 3/8")**
- **Proprietary devise"**

Review and revise detail accordingly.

Above Ground Stormwater Basin P3.4 has C-101 CB contributing directly to the system without pretreatment.

Above Ground Stormwater Basin P3.10 has M-20 CB contributing directly to the system without pretreatment.

Above Ground Stormwater Basin P7.2 has K-100 CB contributing directly to the system without pretreatment.

4. Pretreatment is not shown for the underground infiltration and detention systems. Confirm pretreatment requirements are met.

   Response: Pretreatment is not required for contributing roofs if they discharge directly to the infiltration system. For other areas, Pretreatment is met by offline deep sump catch basins or, where pipe networks utilize catch basins inline, a proprietary water quality unit is proposed prior to discharge.

   Pare Response: See Response #3 regarding deep sump catch basins being used for pretreatment.

   Underground Stormwater Basin P3.7 has E-100 CB and E-200 CB contributing directly to the system without pretreatment.

   Underground Stormwater Basin P3.9 has H-200 CB and H-100 CB contributing directly to the system without pretreatment.

   Underground Stormwater Basin P3.3 has B-300 CB and B-100 CB contributing directly to the system without pretreatment.

5. Maintenance access ports are not shown for the underground infiltration and detention systems. Add system specific details illustrating how the systems will be accessed and maintained.

   Response: These are added to the respective detail for each system.

   Pare Response: Response Accepted.

6. Proposed Underground Stormwater Basin P3.1.1 on Drainage Plan D (Sheet C-455) is annotated as P3.1.2 within the hydrologic model. Review and revise accordingly.

   Response: The plan is revised to annotate as P3.1.2.

   Pare Response: Response Accepted.

7. Review Proposed Diversion-MH 7 and proposed HDS-MH 249 on Drainage Plan D (Sheet C-455). Confirm flow direction and inverts.

   Response: The plans are revised to reflect positively draining pipes.

Pare Response: Response Accepted.

8. Confirm how runoff from the proposed parking lot west of Infiltration Basin P4.3 is being directed to the basin on Drainage Plan A (Sheet C-452).
   Response: A closed pipe drainage system is added to direct the parking area to P7.3

   Pare Response: Response Accepted. Recommend adding pipe ends (Flared End Section, Headwall, etc.) to the Drainage Plans.

9. Confirm how runoff from the proposed roadway and front of houses south of Bioretention-Infiltration Basin P3.10 is being directed to the basin on Drainage Plan D (Sheet C-455). For Prop. Bunker-CB 267, provide invert of primary outlet and the location.
   Response: Runoff from the roadway is collected in CBs at the cul-de-sac, while downspouts from the duplexes discharge into a collector pipe route to P3.10. A bunker is no longer proposed.

   Pare Response: Response Accepted.

10. Provide details on how the Wet Extended Detention Basin will be accessed and maintained. Revise grading for access to the sediment forebay as required.
    Response: The basin (including outlet control structure) can be accessed from the adjacent roadway, parking lot, and/or sidewalk. As there is no longer a proposed sediment forebay, maintenance to the Wet ED Basin is periodic mowing so a designated 12-foot wide, 15% maintenance access drive is not provided.

    Pare Response: Provide details on how the Wet Extended Detention Basin will be accessed and maintained. Recommend showing the anticipated gate locations and widths to confirm access to the outlet control and proprietary system.

11. The Wet Extended Detention Basin will have approximately 7 feet of ponding during a 100-year storm event. Confirm if fencing, safety benches, or other means of protection should be included.
    Response: The revised plans include a fence around the perimeter of the Wet Extended Detention Basin.

    Pare Response: Response Accepted.

12. The Prop. AG-OCS 11 for the Wet Extended Detention Basin is located at approximately elevation 47±. The detail and hydrologic calculations call for an orifice at elevation 43.5. Please review and provide additional detail.
    Response: The location of the OCS is set in the embankment. The orifice at 43.5 is for a reverse slope pond drain so the OCS does not need to have an exposed face at 43.5.

    Pare Response: Response Accepted.

13. Confirm Bioretention systems are in conformance with Stormwater Management, Design, and Installation Rules (250-RICR) Section 8.23- Filtering Systems Part D Treatment Subpart 4. Bioretention systems shall consist of the following treatment components… a 6-inch to 9-inch-deep surface ponding area." Confirm ponding depths within Bioretention systems.
    a. Update provided WQv within calculations.
    Response: No Bioretention Basin proposed.

    Pare Response: Response Accepted.

14. Confirm Bioretention systems are proposed with the required pretreatment. Show sediment forebays, if applicable, and update the filter areas.
    Response: No Bioretention Basin proposed.

    Pare Response: Response Accepted.

15. Bioretention Basin Detail on Detail Sheet C-906 soil mix should conform with 250-RICR-150-10 Section 8.23-Filtering Systems Part D Treatment Subpart 4. Review and revise accordingly.
    Response: No Bioretention Basin proposed.

    Pare Response: Response Accepted.

16. Landscape plans should show plantings proposed within the infiltration, bioretention, and wet extended detention basin.
    Response: Acknowledged. Landscape plans will be revised accordingly.

    Pare Response: Revised Landscape Plans have not been provided.

Drainage Report:

1. Appendix A Checklist – review Minimum Standards 4 & 5. DP 4 does not directly discharge to a 4th Order Stream or Pond of 50 acres or Greater. DP 4 discharges to a forested wetland and Fort Street prior to entering Providence River. Additionally, not all subcatchments in DP 3 discharge directly to Providence River.
    Response: The checklist is revised accordingly to match the updated analysis that considered DP3 as only what is realized at the cove pipe discharge. DP4 (now DP7) meets Minimum Standards 4 and 5.

    Pare Response: Response Accepted.

2. Provide calculations for sediment forebay pretreatment sizing for surface infiltration and filtering practices. Confirm pretreatment sizing in accordance with the applicable sections of the 250-RICR-150-10 Section 8.23-Filtering Systems.
    Response: Calculations will be provided for the pretreatment practices to the infiltration and filtering practices.

    Pare Response: Calculations for pretreatment practices to the infiltration and filtering practices have not been provided. Confirm pretreatment sizing in accordance with the applicable sections of the 250-RICR-150-10.

3. The drainage report references deep sump hooded catch basins. The plans show the RIDOT Standard Detail 4.3.0 with a 3-foot sump. Review and revise the details accordingly in conformance with 250-RICR-150-10 Section 8.30 – Pretreatment – Deep Sump Catch Basins.
    Response: The detail will be revised to 4-foot sump depth to comply with the cited section.

    Pare Response: Response Accepted.

4. Provide calculations to confirm compliance with 250-RICR-150-10 Section 8.23- Filtering Systems Part D Treatment Subpart 6 for minimum filter bed area and other applicable standards for Bioretention Areas.
    Response: No Bioretention Basin proposed.

    Pare Response: Response Accepted.

5. Provide calculations to confirm compliance with 250-RICR-150-10 Section 8.21 Stormwater Infiltration Practices Part C- Conveyance Subpart 3. All infiltration systems shall be designed to fully de-water the entire WQv within 48 hours after the storm event.

   Response: Drawdown calculations are included in the revised drainage report to demonstrate de-watering in less than 48 hours.

   Pare Response: Confirm that "K" values from field permeability tests were completed in accordance with Appendix H Section H.1.3 Field Infiltration Testing.

6. Appendix A Checklist Table 5.2 – Summary of BMPs identifies that infiltration systems do not meet the Horizontal Setback Criteria. Provide Technical Justification and the distance provided.

   Response: The checklist is updated accordingly, and Technical Justifications provided on page 5 of the revised drainage report.

   Pare Response: Response Accepted.

7. Provide calculations to confirm compliance with 250-RICR-150-10 Section 8.33 Quantity Control – Stormwater Basins Part E and Part F for Using Basins for Additional Pollutant Loading Reduction. Confirm minimum detention times, pretreatment, length to width ratios, drainage area surface area ratios, and permanent pool ratios.

   Response: A Jellyfish is added prior to discharge into the Wet ED Basin to meet the pollutant loading reduction rather than utilizing the Wet extended basin for enhanced removal credit. Other inflows to the Wet ED Basin are from the treated outflow from Basin P3.9.

   Pare Response: Response Accepted.

8. Wet Extended Detention Basins shall have a minimum contributing drainage area of 25 acres, unless groundwater is intercepted. Basins that do intercept groundwater shall not include the volume of the permanent pool in storage calculations. Confirm ESHGT.

   Response: Test pit #1, P6, and #3 from the preliminary geotechnical investigation indicates ESHGT at elevation 39, 40.5, and 44 respectively. The basin bottom (elevation 41) intercepts the average groundwater elevation (41.5) and should maintain a permanent pool.

   Pare Response: Based on the logs provided, Test Pit #1 indicated mottling at approximate elevation 39.5. The 2-inch probe P6 would not be used to identify estimated seasonal high groundwater, however the observed groundwater elevation within the log is 44.0. And Test Pit #3 identifies groundwater encountered at approximate elevation 30. Review and revise response and design accordingly.

9. Review Time of Concentration for Subcatchment ED 2 and ED 4. The Time of Concentration currently delineated is not the hydraulically most distant point within the subwatershed. Review and revise existing flows accordingly.

   Response: In subcatchment ED2 the slowest path was selected that was not intercepted by an existing catch basin into a closed pipe system. A more distant path in the subwatershed results in a faster time and less conservative design due to less shallow concentrated flow and more channelized flow.

   The drainage analysis of DP4 (now DP7) was revised and better reflects the sub watersheds within.

   Pare Response: ED-2 includes a long flat portion of the existing fairway without any identified

presence of closed drainage near the northern boundary. Review and confirm.

For DP7 and Pond EP7.1, there are several other isolated depressions throughout the site. Confirm consistent approach for hydrologic modelling throughout the existing conditions. Provide modeling of Pond EP7.1: Depression-Discarded to demonstrate assumptions for infiltration rates, volume, and peak elevations.

10. Confirm that test holes were observed by an RI Registered Professional Engineer or DEM- licensed Class IV Soil Evaluator.
    Response: Northeast Geotechnical, Inc. has confirmed.

    Pare Response: Response Accepted. Recommend listing all the observers who logged soils in Appendix A Checklist – Part 4.

11. Appendix A Checklist Table 5.3 does not include the soils analysis or separation to groundwater for each BMP and states "awaiting final geotechnical data". For infiltration practices, provide information in accordance with 250-RICR-150-10 Section 8.21- Stormwater Infiltration Practices providing a minimum of 1 test hole per 5,000 square feet. For filtering systems, provide information to confirm compliance with the requirements of 250-RICR-150-10 Section 8.23- Filtering Systems.
    a. The Test Boring Logs, Test Probe Logs, and Test Pit Logs provided include soil descriptions using Burmister Identification System for the stratums observed. For stormwater management design, USDA textural classifications are required for selecting infiltration rates. One sample per hole was taken and grain size distribution tests were completed to determine the USDA textural classifications. Approximate depths of samples are included within a summary table.
    Response: The checklist is revised accordingly. The additional testing demonstrates minimum number of test holes for each infiltration practice.

    Pare Response: Response Accepted.

    b. The ESHGT should be observed and logged based on the identification of redoximorphic features. The Test Pit and Boring Logs do not review ESHGT. Review and confirm ESHGT elevations.
    Response: ESHGT was indicated in the logs in the Preliminary Geotechnical report from 9/6/2022 and these are indicated on the plans. No ESHGT was found by the geotechnical engineer in the report from 1/22/2024.

    Pare Response: Response Accepted. Confirm if observed groundwater elevations are used, they are utilized only in accordance with Section H.1.2 Test Pit/Boring Requirements of the RISDISM and RIDEM Guidance for utilizing Adjustment Factors for observed groundwater elevations.

    c. The preliminary Geotechnical Engineering Report does not include soil data for the following proposed infiltration practices:

    - Infiltration Basin P2.1
    - Underground Stormwater Basin P3.9
    - Infiltration Trench P3.13
    - Infiltration Basin P4.3

    Response: The new geotechnical data is included in the revised drainage report.

    Pare Response: Response Accepted.

d. Underground Stormwater Basin P2.2 shows a bottom of stone elevation of 40.2 and an Estimated Seasonal High Groundwater Elevation (ESHGT) of 38.0 within TP-23 and elevation 39.0 within B-42.

   i. Within 250-RICR-150-10 Section 8.21- Stormwater Infiltration Practices, the bottom of infiltration practices shall be separated by at least 3 feet vertically from the ESHGT. Review and revise accordingly.

Response: Basin P2.2 is removed due to the findings within the latest geotechnical investigation.

Pare Response: Response Accepted.

Provide a section view of each BMP, showing the soil data collected and the associated elevations of the stratums observed, USDA soil textural class, and the ESHGT determined based on redoximorphic features. The bottoms of systems should be located with the required ESHGT separation, and outside of fill materials and A and B soil horizons.

Response: The necessary information to review the design intent for each BMP can be found in Appendix C and Table 5.3 of Appendix A Checklist. The system bottoms have been located with the required ESHGT separation and the fill materials along with A and B soil horizons will be removed.

Pare Response: Confirm that if observed groundwater elevations are used within the design, they are utilized only in accordance with Section H.1.2 Test Pit/Boring Requirements of the RISDISM and are adjusted based on RIDEM Guidance for utilizing Adjustment Factors for observed groundwater elevations.

Observations and determination of the seasonal high groundwater table during the wet season shall be made by a licensed Soil Evaluator January 1 through April 1. Wet season determinations are intended to measure the groundwater table at its annual highest level. Yearly fluctuations in the groundwater table may necessitate that the Department add adjustment factors to compensate for periods of low groundwater recharge that results in the seasonal high groundwater table to be lower than normal.

TP-K6 Test Pit Log indicates mottling approximately 2.5 feet below grade (Elevation 13.4). The existing ground surface elevation is identified as approximately 15.90. Table 5.3 indicates SHWT elevation of 11.9. Table 5.3 indicates a bottom elevation for P2.1 of 43.5, the plans indicate a bottom elevation of approximately 15.0. Review and confirm separation.

For P3.3 UG Infiltration Basin, B-33 Boring Log indicates groundwater observed approximately 15.5 feet below grade (Elevation 39.5). No mottling was identified within the log. If observed groundwater within a boring is to be used for SHWT, the groundwater table should be observed at the time of the drilling and again 24-hours later in accordance with the procedures outlined within Appendix H of the RISDISM. RIDEM Adjustment Factors should be applied for observed groundwater elevations in accordance with the procedures for Wet Season Determinations.

Recommend providing section view of each BMP with estimated SHWT. This will likely be a requirement for RIDEM permitting.

12. Hydrologic Calculations for Infiltration Basin P2.1 show a peak elevation of 15.30 in the 100-year storm. Confirm sufficient freeboard is available from the top of berm elevation (15.50 in HydroCAD and 15.00 on Proposed Site Documents).

    Response: The plans and report are revised to provide 1-foot of freeboard in the infiltration basin and resolved discrepancies between them.

    Pare Response: Response Accepted.

13. Hydrologic Calculations for Infiltration Basin P2.1 show an outflow of 22.29 cfs through the spillway during the 100-year storm event discharging directly to golf course. Confirm safe passage of the 100- year flows and detail any necessary downstream stabilization).

    Response: This 100-yr outflow is less than the existing conditions peak flow to DP2 and the proposed overland flow condition is the same as existing conditions, so no downstream stabilization is planned.

    Pare Response: Response Accepted.

14. Hydrologic Calculations for Infiltration Basin P3.4 show a peak elevation of 49.80 in the 100-year storm. Confirm sufficient freeboard is available from the top of berm elevation (50.50 in HydroCAD and 50.00 on the Proposed Site Documents).

    Response: See response to #12.

    Pare Response: Response Accepted.

15. Hydrologic Calculations for Bioretention-Infiltration Basin P3.10 show a peak elevation of 47.32 in the 100-year storm. Confirm sufficient freeboard is available from the top of berm of elevation (47.50 in HydroCAD and 47.00 on Proposed site Plan Documents).

    Response: The plans and report are revised to provide 1-foot of freeboard in the infiltration basin and resolved discrepancies between them.

    Pare Response: Response Accepted.

16. Hydrologic Calculations for Infiltration Basin P4.2 show a peak elevation of 63.98 in the 100-year storm. Confirm sufficient freeboard is available from the top of berm elevation (64.50 in HydroCAD and 64.00 on Proposed Site Documents).

    Response: See response to #12.

    Pare Response: Hydrologic Calculations for Infiltration Basin P4.2 (now P7.2) shows a peak elevation of 63.94 in the 100-year storm. Confirm sufficient freeboard is available from the top of berm elevation (64.50 in HydroCAD and 64.00 on Proposed Site Documents). The note indicates a top of berm of 65.0 but the grading indicated a top of berm of approximately 64.0.

17. Confirm Recharge Volume provided, and Water Quality Volume provided for Infiltration Chambers P3.9. The Stage-Area Storage for weir elevation 58.60 is 20,720 cf. A volume of 22,733 cf is listed. Review and revise accordingly.

    Response: The plans and report are revised to provide 1-foot of freeboard in the infiltration basin and resolved discrepancies between them.

    Pare Response: Response Accepted.

18. HydroCAD analysis should be updated using appropriate grate dimensions of the Nyloplast Dome Grate for applicable BMPs.
    Response: No Nyloplast Dome Grates are proposed on the revised plans.

    Pare Response: Response Accepted.

19. Provide product flow rates for the Jellyfish Filter Systems and model sizing calculations.
    Response: The backup from Contech Engineered Solutions LLC is included in the revised drainage report.

    Pare Response: Response Accepted.

20. Provide HydroCAD 1.2" storm summary to confirm WQf values listed in Exhibit 4-III (Page 434 in Appendix F).
    Response: The revised drainage report includes the 1.2" storm summary in the HydroCAD outputs found in Appendix D and E.

    Pare Response: Response Accepted.

21. Appendix A – Part 1, MS4 should be checked for initial discharge location for DP 5 and DP 1.
    Response: The checklist will include these boxes checked.

    Pare Response: Response Accepted.

22. **RIDEM Minimum Standard 3: Water Quality Volume: In accordance with Section 8.21 Stormwater Infiltration Practices "If the in-situ infiltration rate for the underlying soils is greater than 8.3 inches per hour, 100% of the WQv shall be treated by an acceptable water quality practice prior to entry into an infiltration facility." PD7.3 should not be credited for Water Quality, and an upstream Water Quality system is required prior to infiltration. Review and revise accordingly.**

23. **Confirm status of RIDEM and USACE permitting.**

24. **Review and confirm safe passage of the 100-year design storm. Confirm that surcharged conditions within the conveyance system do not negatively impact proposed structures, and all flows contribute to the anticipated downstream design points.**

The applicant should provide a formal response to address each comment.

If you have any questions or require any additional information, please do not hesitate to contact me at 401-334-4100 or bsykes@parecorp.com.

Sincerely,

Robert J. Sykes P.E.
Managing Engineer

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