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MEMORANDUM

Project: Marshall Simonds Middle School Athletic Fields Renovation Project (114 Winn Street), Burlington, MA
Subject: Crumb Rubber Solids Retention and Protection of Downgradient Resource Areas (Including ORW)
Prepared for: Town of Burlington Conservation Department / Conservation Commission
Prepared by: NESRA Engineering, LLC
Date: 1/2/25

1. Purpose

This memorandum is provided in response to Conservation Commission requests to document how crumb rubber and other solids remain contained within the proposed stormwater management system, including during large rainfall events and extreme storm surges, and to describe the redundant design and maintenance controls that prevent migration of infill toward the wetlands/stream/ORW receiving areas.

2. Stormwater Management Context (Design Summary)

The stormwater system is designed so that runoff from the ADA walkway and site hardscape is directed to the synthetic turf field, where it infiltrates into the turf drainage section. The overall approach is a fully contained treatment train with no intentional bypass of untreated runoff under design conditions.

In general, runoff:

1. enters the turf system (walkway runoff directed onto turf),
2. infiltrates through the turf/infill and underlying drainage section,
3. is collected in the subsurface drainage network only after filtration/settling within the section, and
4. any excess conveyed flow is routed to a bioretention rain garden for final polishing/treatment prior to discharge to the closed drainage system.

This design provides multiple opportunities for physical filtration, sedimentation, and capture, while also preventing off-site transport of infill.

3. Primary Solids Retention Within the Turf System

The synthetic turf system is installed and configured so that crumb rubber is mechanically interlocked within the turf fiber matrix and not present as a loose, mobile surface layer under normal rainfall and use conditions.

3.1 Installation Sequence and Stabilization

The installation sequence and turf geometry provide multiple stabilizing mechanisms:

- Sand is installed first and brushed/groomed into the turf. This acts as a stabilizing ballast layer, helps lock the turf backing into place, and provides an additional filtration layer within the fiber matrix.
- Crumb rubber is installed above the sand layer and groomed in. Grooming causes the crumb rubber to settle down into the turf fibers and stabilize below the upper fiber canopy.
- Turf fibers extend above the infill (typical exposure on the order of approximately ½ to ¾ inch), which helps retain infill within the fiber canopy and promotes mechanical interlock and resistance to transport from rainfall or incidental splash.

3.2 Material Behavior (Handling vs. Installed Condition)

During handling and installation, lightweight particles can occasionally appear to behave as “floaters” due to static charge, surface tension effects, and trapped air. However, tire rubber has a specific gravity generally greater than water, and once wetted and stabilized within the turf matrix, it is not expected to behave as floating debris during rainfall events. In the installed condition, the crumb rubber is embedded within the fibers, overlain by the fiber canopy, and further protected by the site grading and perimeter capture features described below.

4. Site Design Features That Limit Off-Field Migration

The project includes multiple secondary controls that limit any potential migration of infill away from the turf system, including:

4.1 Perimeter Hardscape Grading

The perimeter walkway is graded at approximately 1.5% back toward the turf field, so any surface runoff on the hardscape is directed inward rather than outward toward resource areas. This inward cross-slope also reduces the likelihood that any incidental infill on the walkway could migrate away from the field.

4.2 Secondary Capture Areas

Even in the unlikely event that small quantities of infill migrate beyond the turf edge, the project provides secondary capture measures, including:

- Perimeter grass/vegetated strip(s) adjacent to the field edge, which act as an immediate trapping zone.
- A downgradient bioretention rain garden, which provides additional filtration and settling capacity and serves as a further capture measure.

These redundant features provide a "belt and suspenders" approach to ensure infill remains on-site and out of the riverfront/wetland/ORW resource areas.

5. Subsurface Retention and Filtration (No Direct Migration Path to Native Soils)

Below the turf system, the drainage section is configured to provide filtration and prevent direct transport of solids into native soils or groundwater. Based on the project details, the subsurface section includes:

- turf backing layer (physical separation),
- engineered drainage layers (stone and/or drainage composites),
- geotextile separation layers (including specified geotextile such as Mirafi 140N where shown on the plans), and
- a 3-inch sand filter layer as indicated on the project details.

Additionally:

- Flat panel drains are wrapped in filter fabric (as applicable), and
- collector piping within stone trenches is wrapped in fabric, providing additional prevention of sediment/infill transport into the conveyance network.

These layers function to keep solids within the engineered section while maintaining drainage performance and providing an additional filtration barrier before any collected flow reaches downstream structures.

6. Conveyance and Structural Controls (Catch Basins / Pretreatment)

Where subsurface flow is ultimately conveyed, the system includes structural measures intended to capture and retain any sediment that reaches the collection network:

- Deep sump, hooded catch basins are used at the appropriate collection and outlet locations (including the outlet structure and/or rain garden pretreatment/inlet structures, where applicable).
- These structures provide additional settling volume and floatables control and are maintained in accordance with the project's Long-Term O&M Plan.

7. Operations & Maintenance Measures

To provide enforceable, long-term assurance that the system continues to function as designed, the project includes O&M measures that align with the Long-Term Stormwater Operations and Maintenance Plan (Revised 12-28-25) and the project SWPPP. Key measures supporting solids/infill retention include:

1. Turf surface inspections and periodic grooming to maintain fiber stand-up and keep infill properly seated within the turf canopy.
2. Perimeter walkway housekeeping: during the active season, the turf surface and adjacent paved edges/walkways will be inspected monthly (typ. Apr–Nov) and swept/sanitized as needed to remove any incidental displaced infill and debris. Recovered infill will be returned to the field where appropriate or disposed of properly if mixed with debris.
3. Deep sump / hooded catch basin inspections and cleanout: consistent with the O&M Plan, these structures will be inspected/cleaned at least quarterly, and additionally whenever sediment deposits reach the O&M threshold (e.g., when deposits are at or above one-half the depth to the lowest outlet/invert) and/or following significant storm events as needed.
4. Vegetated perimeter and rain garden inspections to confirm stable vegetation, no erosion at edges, and continued functionality of capture areas.

These O&M actions are intended to be implemented by the Town/Owner or a qualified maintenance contractor and documented as part of routine facility maintenance.

8. Conclusion

The proposed design provides multiple redundant layers of protection against crumb rubber migration, including:

- mechanical interlock within the turf fiber matrix,
- inward-sloped perimeter hardscape directing runoff back to the field,

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- vegetated perimeter capture areas and a downgradient rain garden,
- subsurface filtration and geotextile separation layers (including Mirafi 140N where specified),
- deep sump/hooded structural controls, and
- an O&M program that includes monthly active-season inspections/housekeeping and quarterly structural maintenance.

Collectively, these measures provide a robust, practical approach to ensure crumb rubber and other solids remain contained on-site and are not transported to the wetland/stream/ORW resource areas.