MAMARONECK UNION FREE SCHOOL DISTRICT
1000 WEST BOSTON POST ROAD
MAMARONECK, NY 10543

MS4PY11 STORMWATER PROGRAM

FACT SHEET #5
SEPTEMBER 2020

PERMEABLE PAVING FOR STORMWATER MANAGEMENT

FOR MORE INFORMATION, CONTACT YOUR STORMWATER COORDINATOR:

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1. STORMWATER IMPACTS FROM IMPERMEABLE SURFACES

Stormwater runoff impacts from impermeable surfaces include:

- **Nearby Surface Water Pollution:** Runoff collects the pollutants deposited on impermeable surfaces and then discharges these pollutants into nearby streams, rivers and lakes
- **Flooding**: Impermeable surfaces increase runoff, causing street and home flooding
- **Groundwater Reductions**: Impervious surfaces reduce infiltration of the rainfall into groundwater
- **Increased Peak Flows:** Increased peak flows may cause stream bank erosion, increase water temperatures and reduce water quality

Minimizing the negative impacts of impermeable surfaces can be accomplished through the use of permeable paving, which allows the stormwater to percolate to the underlying soils, thereby reducing runoff.

2. PERMEABLE PAVING, A BEST MANAGEMENT PRACTICE (BMP)

When properly designed, installed and maintained, permeable paving is an effective stormwater Best Management Practice (BMP) that can last for decades. Permeable paving, as described in NYS Stormwater Design Manual, includes all types of pavements used for roads, parking, sidewalks and plaza surfaces. Permeable paving provides an alternative to

conventional asphalt and concrete surfaces and is designed to infiltrate rainfall and snowmelt into groundwater, thereby reducing the impacts of stormwater runoff from the site. Permeable paving basically consists of:

- **Porous Pavements:** Porous pavement is a permeable asphalt or pervious concrete, that allows stormwater runoff to quickly infiltrate directly into the underlying soils, which recharges the groundwater. Porous pavements include:
  - **Porous Asphalt Pavement** consists of an open-graded course aggregate asphalt, bonded together by asphalt cement with sufficient interconnected voids that makes it highly permeable to water
  - **Pervious Concrete** consists of specially formulated mixtures of Portland cement, uniform, open-graded course aggregate, and water. Pervious concrete has void spaces in the mixture to permit the rapid percolation of rainfall and snowmelt through the pavement
- **Permeable Pavers:** Permeable pavers include:
  - **Interlocking Concrete Pavers**, with the spaces between pavers filled with gravel or with grass
  - **Plastic Network of Cells,** with grass infill or gravel, and virtually no impervious surfaces

3. FEASIBILTY/LIMITATIONS

The proper site selection is critical to reducing the failure rate of permeable paving. Permeable paving may be used in areas with small rainfall events and areas with light traffic, provided the grades, subsoils, drainage characteristics and groundwater conditions are suitable:

- **Location:** Permeable paving should be located at least 100 feet from drinking water wells and at least 25 feet downgradient from building structures and septic systems
- **Contributing Drainage Areas:** The contributing drainage area should be less than 5 acres and should be flat to permit sheet flow to the permeable paving area
- **Rainfall Events:** Permeable paving does not work well for storms greater than 1-inch or with higher rainfall intensities
- **Underlying Soils:** Sandy soils and low clay soils are suitable for permeable paving. The soil permeability should be at least between 0.5 and 3.0 inches per hour, to permit groundwater infiltration
- **Cold Climate Considerations:** Permeable paving may be used effectively in cold climate regions, but should not be used where sand or de-icing materials are applied for winter protection. These materials will clog the pavement and contaminate the groundwater
- **Seasonal High Groundwater:** Permeable paving should not be located in areas that have less than 3 feet of seasonally high groundwater table

4. POROUS PAVING DESIGN DETAILS

Design components for a typical porous paving consists of the following three (3) components:

- **Washed Uniformly Graded Coarse Aggregate:** The washed uniformly graded broken stone (1" minimum thickness) bed is placed on an uncompacted earthen subgrade. The uniformly graded broken stone is used to temporarily store the runoff that moves vertically through the porous asphalt or concrete into the bed. The thickness of this bed depends on the required storage volume. The high rate of infiltration through the bed is achieved through the elimination of the finer aggregates that are typically used in conventional paving
- **Non-Woven Geotextile:** Non-Woven geotextile fabric is placed underneath the washed, uniformly graded coarse aggregate bed to prevent any stormwater run-off sediment from infiltrating into the uncompacted subgrade
- **Uncompacted Earthen Subgrade:** Stored runoff then infiltrates over time into the uncompacted subgrade soils similar to an infiltration basin

5. PERMEABLE PAVERS W/ STORAGE

A permeable paver with a storage bed system functions in a similar manner to the porous paving system. The system's surface consists of impervious concrete blocks known as pavers that can either have void spaces cast into their surfaces or interlock in such a way to create such void spaces. These void spaces allow runoff from the impervious paver surface to collect and move vertically past the individual pavers into the broken stone storage bed below. Similar to a porous paving system, the runoff stored in the storage bed infiltrates over time into the uncompacted subgrade soils.

6. GRASS PAVERS

Grass pavers, made of interlocking plastic or concrete with grass grown in the interconnected cells, allow you to park, drive, walk or lounge on a beautiful grass surface. The interlocking plastic or concrete cells allow roots to develop with minimal compaction. Key features and benefits of grass pavers include:

- **Functional Durability:** Grass pavers are ideal for spaces such as trails, overflow parking, home driveways and golf buggy paths
- **Environmental Benefits:** Grass pavers minimize impervious areas, avoid downstream flooding, encourage infiltration and trap pollutants that would contaminate groundwater

7. MAINTENANCE REQUIREMENTS

Openings in the surface of permeable pavements are susceptible to clogging by sediment. To prevent clogging, the permeable pavement should be vacuum swept followed by high-pressure jet hosing. Inspections should be conducted quarterly to spot clogging. Pretreatment systems, such as a perimeter stone filter inlet or a vegetative filter strip, will help reduce clogging by sediment.