

Phosphorus Identification Report

Town of Wilmington, MA

June 2023, Rev. September 2023



Phosphorus Identification Report

This Phosphorus Identification Report has been developed by the Town of Wilmington to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Further, the permittee must comply with Appendix H of the MS4 Permit, "Requirements Related to Discharges to Certain Water Quality Limited Waterbodies". For Discharges to water quality waterbodies and their tributaries where phosphorus is the cause of impairment, the permittee is required to prepare this Phosphorus Identification Report. The report shall include the following elements:

1. Calculation of total MS4 area draining to the water quality limited receiving water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations.
2. All screening and monitoring results pursuant to part 2.3.4.7, targeting the receiving water body segment.
3. Impervious Area (IA) and Directly Connected Impervious Area (DCIA) for the target catchment.
4. Identification, delineation, and prioritization of potential catchments with high phosphorus loading.
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area.

Phosphorus Impairment

Part 2.2.2.b.i. of the MS4 identifies the permittees subject to additional requirements to address phosphorus in their stormwater discharges because they discharge to waterbodies that are water quality limited due to phosphorus, or their tributaries, without an EPA approved TMDL. Permittees must identify and implement BMPs designed to reduce phosphorus discharges in the impaired catchment. To Address phosphorus discharges each permittee shall comply with the following requirements:

1. Enhanced Public Outreach
2. Stormwater Management in New Development and Redevelopment:
3. Good House Keeping and Pollution Prevention, and,
4. Phosphorus Identification Report.

According to the EPA, *“Too much nitrogen and phosphorus in the water can have diverse and far-reaching impacts on public health, the environment and the economy.*

Nutrient pollution is one of America's most widespread, costly and challenging environmental problems, and is caused by excess nitrogen and phosphorus in the air and water.

Nitrogen and phosphorus are nutrients that are natural parts of aquatic ecosystems. Nitrogen and phosphorus support the growth of algae and aquatic plants, which provide food and habitat for fish, shellfish and smaller organisms that live in water.

But when too much nitrogen and phosphorus enter the environment - usually from a wide range of human activities - the air and water can become polluted. Nutrient pollution has impacted many streams, rivers, lakes, bays and coastal waters for the past several decades, resulting in serious environmental and human health issues, and impacting the economy.

Too much nitrogen and phosphorus in the water causes algae to grow faster than ecosystems can handle. Significant increases in algae harm water quality, food resources and habitats, and decrease the oxygen that fish and other aquatic life need to survive. Large growths of algae are called algal blooms and they can severely reduce or eliminate oxygen in the water, leading to illnesses in fish and the death of large numbers of fish. Some algal blooms are harmful to humans because they produce elevated toxins and bacterial growth that can make people sick if they come into contact with polluted water, consume tainted fish or shellfish, or drink contaminated water.”

The information in quotations and italics (above) was taken from www.epa.gov/nutrientpollution/issue

Receiving Waters and Impairments

Table 1-1 lists the “impaired waters” within the boundaries of the Town of Wilmington’s regulated area based on the 2018/2020 Massachusetts Integrated List of Waters produced by MassDEP every two years. Note, at the time of preparing this document the 2022 List of Waters was still in draft form however a cursory review of the document was performed. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters
Town of Wilmington, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Shawsheen River	MA83-18	Tributary to 4a, 5	E.Coli, Fecal Coliform	Yes; bacteria
Fosters Pond	MA83005	5	D.O., Mercury in Fish Tissue	
Maple Meadow Brook	MA92-04	5	Dewatering, D.O.	
Lubbers Brook	MA92-05	5	Dewatering, D.O., E.Coli	
Silver Lake	MA92059	5	DDT, Mercury in Fish Tissue	
Ipswich River	MA92-06	5	Dewatering, D.O., Mercury in Fish Tissue	
Martins Brook	MA92-08	5	Bentic Macroinvertebrates, D.O., E.Coli, Fecal Colif.	
Aberjona River	MA71-01	5	Ammonia, Arsenic, Benthic Macroinvertebrates, Chloride, D.O., E.Coli, Fish Bioassessments Phosphorus , Sediment Bioassay	

Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).

Category 5 Waters – impaired water bodies that require a TMDL.

“Approved TMDLs” are those that have been approved by EPA as of the date of issuance of the 2018/2020 MS4 Permit.

As noted in Table 1-1, all impaired waterbody segments within the Town of Wilmington require a TMDL, however the TMDL has not been prepared. Five (5) of the eight (8) impaired waterbody segments listed above are impaired due to pollutants associated with a high potential for illicit discharges within the watershed. As such, outfalls that fall within these segments watersheds boundaries have been classified as “high priority outfalls”.

Only one waterbody segment (or tributary thereto) exists within the Town of Wilmington where phosphorus is listed as an impairment. That waterbody is the Aberjona River, which is located in the southern-most section of Town along the Woburn/Wilmington Town line.

The Aberjona River Watershed in Wilmington is relatively small in area (300± acres) constituting approximately 3% of the total land area in Town. The Aberjona Watershed encompasses Industrial Way, Eames Street, and Jewell Drive. The Town is unaware of any municipally owned parcels or structural BMPs within this watershed. The majority of land uses within this area is zoned as Industrial Uses. Other land uses include commercial and residential.

Additional Requirements for Phosphorus Impaired Waterbodies

In accordance with Appendix H of the MS4 Permit, the Town of Wilmington has implemented enhanced BMPs designed to reduce phosphorus discharges in the catchment to the impaired waterbody, which is the Aberjona River Watershed. The following measures have been undertaken by the Town:

1. **Public Education and Outreach:** The permittee has supplemented its Residential and Commercial/Business property owner educational message to include targeted annual messages in the Spring, Summer, and Fall for fertilizer use, pet waste pickup, and leaf litter, respectively.
2. **Stormwater Management in Redevelopment and New Development Projects:** the Town has been very active in educating developers and property owners/applicants within the Aberjona River and throughout Town. Any new or redevelopment must meet the recently promulgated phosphorus removal regulations, and emphasis is placed on infiltration and filtration practices. Within the last few years, Analog Devices (Town's largest taxpayer that owns a compound in the Aberjona River Watershed) installed a green roof, constructed gravel wetland, bioretention systems, and infiltration systems throughout their campus as part of a new and redevelopment project. Also, 12 Industrial Way, 15 Industrial Way, and 885-887 Woburn Street have all implemented water quality BMPs as part of their permitted plan sets. This was through extensive and sometimes exhausting meetings between Town Staff and developers to have these enhanced measures included within their development program.
3. **Good Housekeeping and Pollution Prevention:** The permittee is not aware of any facilities owned by the Municipality within the Aberjona River Watershed. However, the Permittee has and will continue to perform SWPPP inspections at the Town's yard waste center and the DPW Storage facility which both appear to be located within the Ipswich River Watershed. Further, the streets within the Aberjona River Watershed (Industrial Way, Eames Street, and Jewell Drive) are all on a two-time per year street

sweeping schedule using a Town owned vacuum type street sweeper, as is the case with the majority of municipally owned streets regardless of which watershed they are in.

4. Source Identification for Catchments within the Aberjona River Watershed: Using GIS, record data, and recently permitted projects, the permittee refined the catchment delineation for the Aberjona River Watershed all available on the GIS map located on the Town's website or by visiting:

<https://www.mapsonline.net/wilmingtonma/ms4.html>

The spreadsheet on the following page lists the breakdown of impervious area, land use, DCIA estimate (based on Sutherland equation), and the resulting Phosphorus load estimates for the entire catchment.

Land Use	EPA Code	Total Acres	IA (ac)	IC %	DCIA %	PC (ac)	P Rate (lb/acre/year)	P Load (lbs/yr)	P Load DCIA (lbs/yr)
Industrial	2	257.16	137.16	67.55	55.52		1.78	244.14	254.13
Industrial	2					120.00	0.21	25.20	
Residential	5	4.37	1.07	24.49	4.64		2.32	2.48	0.47
Residential	5					3.30	0.21	0.69	
Open Space	9	17.79	1.12	6.30	1.58		1.52	1.70	0.43
Open Space	9					16.67	0.21	3.50	
Totals for Aberjona Watershed in Wilmington		279.32	139.35			139.97		277.72	255.03
References									
DCIA									
Industrial	DCIA% = $0.1(IA\%)^{1.5}$								
High Density Residential	DCIA% = $0.4(IA\%)^{1.2}$								
Open Land	DCIA% = $0.1(IA\%)^{1.5}$								
P Load Rates									
Industrial	Impervious	1.78 lbs/acre/year							
	Pervious	0.21 lbs/acre/year							
High Density Residential	Impervious	2.32 lbs/acre/year							
	Pervious	0.21 lbs/acre/year							
Open Space	Impervious	1.52 lbs/acre/year							
	Pervious	0.21 lbs/acre/year							
Phosphorus Load	P Load Rate * Acres								