SMITHCO. ENGINEERING GROUP, INC.

Engineering • Environmental • Development • Construction Services

BOROUGH OF LAWNSIDE

MUNICIPAL STORMWATER MANAGEMENT PLAN

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TABLE OF CONTENTS

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I. INTRODUCTION

The following Municipal separate Stormwater System (MS4) Stormwater Plan was prepared by SmithCo Engineering Group for the Borough of Lawnside. The NJDEP "Sample Municipal Stormwater Management Plan" was used as a basis for preparation of the plan, as modified to provide specific information germane to Lawnside.

This **Municipal Stormwater Management Plan (MSWMP)** documents the strategy for the Borough of Lawnside to address Stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 (Municipal Stormwater Regulations). As required, this plan contains all of the required elements described in N.J.A.C. 7:8 (Stormwater Management Regulations).

The plan contained herein addresses groundwater recharge, Stormwater quantity and Stormwater quality impacts by incorporating Stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of Stormwater runoff on water quality / quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

In addition, this plan describes long-term operation and maintenance measures for existing and future Stormwater facilities. In accordance with N.J.A.C. 7:8, a waiver performing a build-out analysis will be obtained upon Borough adoption and filing of this plan, on the basis that there is less than one (1) square mile of buildable, undeveloped land within the Borough **(see Development Constraints Map, Appendix A).**

II. GOALS

The goals of this MSWMP are as follows:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in Stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts; bridges and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution.
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in Stormwater runoff from new and existing development to:
- Restore, enhance and maintain the chemical, physical and biological integrity of the waters of the state, protect public health, safeguard fish and aquatic life and scenic and ecological values, enhance the domestic, municipal recreational, industrial and other uses of water ; and
- Protect public safety through the proper design and operation of Stormwater basins;

To achieve these goals, this plan outlines specific Stormwater design and performance standards for new development. Additionally, the plan proposes Stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included to ensure long-term effectiveness of Stormwater management facilities. The plan also outlines safety standards for Stormwater infrastructure to be implemented to protect public safety.

III. STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle of a site and (ultimately) an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of Stormwater runoff from the site.

In addition, impervious areas that are connected to each other through gutters, channels and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel.

Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows.

Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt. In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, Stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

IV. BACKGROUND

The Borough of Lawnside encompasses approximately 1.4 square miles of land within Camden County. It is bordered by Tavistock Borough to the north, Cherry Hill Township to the east, Magnolia Borough to the south, and Barrington Borough to the west. The Borough of Lawnside is located approximately 10 miles southeast of Philadelphia. The Cooper River traverses the eastern border of the Borough.

The Borough is developed to near maximum build-out per available land use and environmental regulations **(refer to Appendix A, Existing conditions and Development Constraints Maps).** As indicated on the enclosed mapping, virtually all land within the Borough is either previously-developed or environmentally-constrained.

The Borough has a population of 2,945 based on 2010 census data as cited from the U.S. Census Bureau. Population has increased moderately since 1960, with resident populations of 2,155, 2,757, 3,042, 2,841 and 2692 for census years 1960, 1970, 1980, 1990 and 2000 respectively. Between the census years 1960 and 2010, population increased by 790 residents (approximately 37%). It should be noted that population peaked during the census year 1980 with approximately 3,042 residents. Although the overall population increased by approximately 37% between the census years 1960 and 2010, population decreased approximately 3% between the census years 1980 and 2010.

The Borough of Lawnside is predominantly developed with almost all remaining undeveloped land consisting of wetlands and threatened species habitat. It should be noted that a significant amount of "wooded" land and wetlands, as shown on the enclosed "Existing Conditions", "Freshwater Wetlands", and "Development Constraints" maps **(Appendix a of Report),** is along the Cooper River which traverses the eastern border of the Borough and within the eastern half of the Borough, and constrained by freshwater wetlands and threatened species habitat. As such, there is limited remaining developable land within the Borough.

Per review of the United States Geological Survey (USGS) topographic mapping and available NJDEP-GIS data, the Cooper River and two of its tributaries are the only surface water bodies within the Borough. The Cooper River traverses the eastern border of the borough. One tributary of the Cooper River traverses a portion of the Borough's northern border and the other tributary traverses a portion of the Borough's southeastern border.

The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the State of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Up to 2008 streams were classified as non-impaired, moderately impaired or severely impaired, or severely impaired based on AMNET data. In 2008 streams were classifies as either excellent, good, fair, or poor. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to the benthic macroinvertebrate community.

In addition to the AMNET data, NJDEP and other agencies collect water quality chemical data for streams in the state. This data is incorporated into the biennial **New Jersey Integrated Water Quality Monitoring and Assessment Report.** The 2008 Report **305(b)** and **Integrated List of Water Quality Limited Waters (303(d))** indicates that the following parameters exceed the state's criteria (in the Cooper River between Wallworth Gage to Evesham Road):

Parameter

Total dissolved solids	Chlordane
Turbidity	PCB
Sulfate	DDT
Arsenic	DDE
Lead	Mercury
PCE	TCE

This means that the cooper River bordering Lawnside is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for the pollutants present.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved Stormwater treatment plants, adoption of ordinances, retrofitting Stormwater systems, and other BMPs. The **New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List)** is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. The combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired.

It should be noted that as part of the Borough's Municipal Separate Storm Sewer (MS4) regulations, existing inlets and outfalls will be inspected and repairs / maintenance will be made. At that time, existing water quantity and erosion problems (if any) will be assessed and abated to the maximum extent practicable.

Since there is limited remaining developable land within the Borough, the potential for additional surface and groundwater degradation in the long-term will be via redevelopment and limited development. Any future major development will comply with the new NJDEP Stormwater design standards (NJAC 7:8), including the average annual recharge. As such, future development / redevelopment will be controlled to the maximum extent practicable with respect to Stormwater management, Total Suspended Solids (TSS) minimization and Stormwater recharge to the maximum extent practicable.

V. DESIGN AND PERFORMANCE STANDARDS

The Borough has adopted the design and performance standards for Stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of Stormwater runoff on water quality / quantity and loss of groundwater recharge in receiving water bodies. The NJDEP Model Stormwater Ordinance **(Appendix B)**, as amended for use and enforcement within the Borough of Lawnside, has been adopted (Ordinance No. 09-FY2007).

The design and performance standards include the language for maintenance of Stormwater management measures consistent with the Stormwater management rules at N.J.A.C. 7:8-6 (Safety Standards for Stormwater Management Basins). The following ordinances are also required as specified the **Tier A Municipal General Permit**

Ordinance	**Status**
Pet Waste Ordinance (Ord. No. 07-FY2006)	Adopted 10-5-05
Litter Ordinance (Ord. No. 06-FY2006)	Adopted 10-5-06
Wildlife Feeding Ordinance (Ord. No. 09-FY2006)	Adopted 10-5-05
Yard Waste Ordinance (Ord. No 08-FY2006)	Adopted 10-5-05
Refuse Container / Dumpster Ordinance	Being developed/awaiting adoption
Private Storm Drain Inlet Retrofitting Ordinance	Being developed/awaiting adoption
Illicit Connection Ordinance (Ord. No. 05-FY2006)	Adopted 10-5-05

During construction, Borough inspectors will observe the construction of the project to ensure that the Stormwater management measures are constructed and function as designed.

VI. PLAN CONSISTENCY

The Borough is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Borough; therefore this plan does not need to be consistent with any regional Stormwater management plans (RSWMPs) nor any TMDLs at this time. It should be noted that Camden County is working on a Regional Plan for the Cooper River Watershed.

If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the Stormwater management review of residential areas. The Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Borough's Stormwater Control Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Camden County Soil Conservation District.

VII. NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

Non-structural Stormwater strategies for the design of **new** developments, or redevelopment, as defined by NJDEP Stormwater Design Regulations (NJAC 5.3(b)), include the following

A. Protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.

B. Minimizing impervious surfaces and breakup or disconnecting the flow of runoff over impervious surfaces.

C. Maximum protection of natural drainage features and vegetation.

D. Minimizing the decrease in "time of concentration" from pre-construction conditions to post-construction conditions.

E. Minimizing land disturbance during clearing and grading.

F. Minimizing soil compaction.

G. Providing low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides.

H. Providing vegetated open channel conveyance systems discharging into and through stable vegetative areas.

I. Providing other source controls to prevent or minimize.

It should be noted that due to less than one (1) square mile of vacant or developable lands, outside of environmentally-constrained areas remaining in the Borough, that Lawnside Borough is exempt from the requirement to evaluate the extent to which the Borough's Master Plan implements the non-structural strategies referenced above.

However, as indicated previously, Lawnside Borough has adopted the NJDEP model Stormwater control ordinance, as modified for use and enforcement within the Borough of Lawnside. This ordinance includes methodologies for incorporating non-structural Stormwater strategies identified above, in design, "to the maximum extent practicable".

If an applicant (or his / her Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any of the applicable nonstructural Stormwater management strategies into the design of a particular project, the applicant will identify the strategy and provide a basis for the contention. It is understood that any project requiring NJDEP Land Use Regulation program permitting or approvals will also be subject to similar Stormwater review by the appropriate agency.

The Borough has adopted a Stormwater control ordinance (Ord. No. 09-FY2007) based on the NJDEP model ordinance on 3-7-07.

VIII. LAND USE / BUILD-OUT ANALYSIS

As stated previously, there is less than one (1) square mile of vacant or developable lands, outside of environmentally-constrained areas remaining in the Borough, that Lawnside is exempt from the requirement to evaluate the extent to which the Borough's Master Plan implements the non-structural strategies referenced above **(refer to Appendix A, Existing Development and Development Constraints Map for verification).**

APPENDIX A
MAPPING

FIGURE 1
U.S.G.S. QUADRANGLE / HYDROLOGIC UNITS (HUC 14S)

FIGURE 2
WELLHEAD PROTECTION AREAS / GROUNDWATER RECHARGE AREAS

FIGURE 3
ZONING DISTRICTS

FIGURE 4
WETLANDS

FIGURE 5
SOILS

FIGURE 6
FLOODPRONE AREAS

FIGURE 7
AERIAL PHOTO OF EXISTING CONDITIONS

FIGURE 8
DEVELOPMENT CONSTRAINTS MAP

APPENDIX B
STORMWATER CONTROL ORDINANCE