New Jersey Storm water
Best Management Practices Manual

April 2018

A P P E N D I X C

Municipal Storm Water Management Plan

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Introduction

This Municipal Storm water Management Plan (MSWMP) documents the strategy for South Orange Village ("the Village") to address storm water-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Storm water Regulations. This plan contains all of the required elements described in N.J.A.C.7:8 Storm water Management Rules. The plan addresses groundwater recharge, storm water quantity, and storm water quality impacts by incorporating storm water 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 storm water runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future storm water facilities.

A "build-out" analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Village Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the storm water plan, specific storm water management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

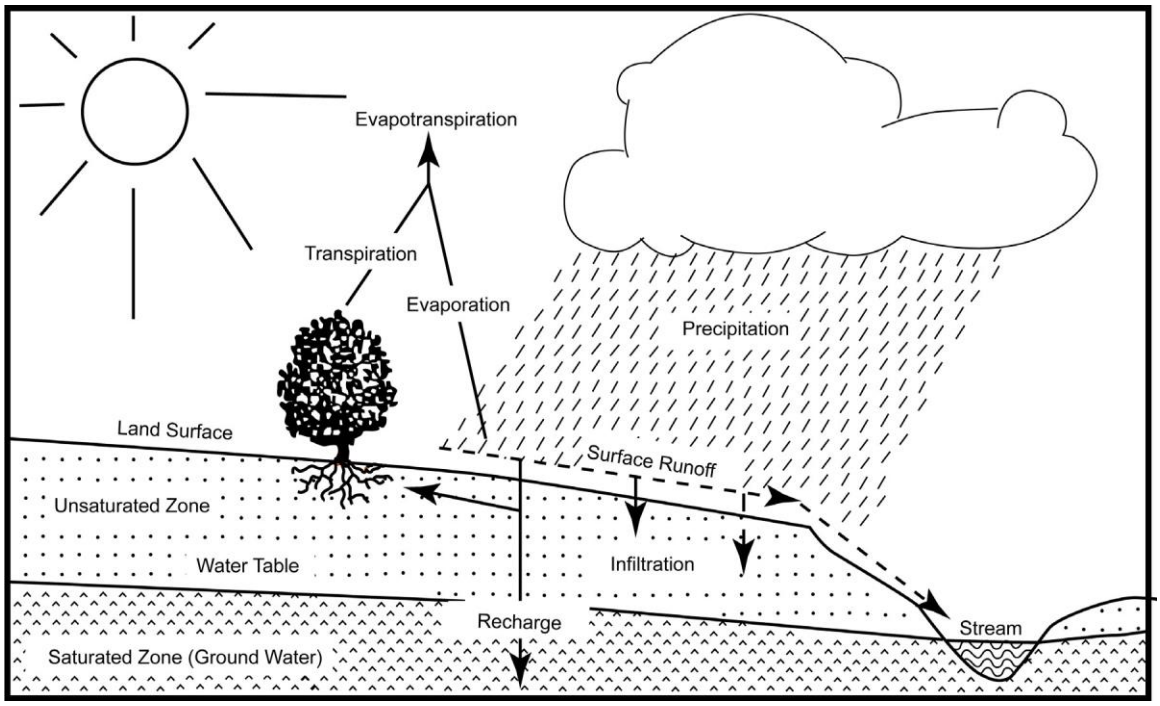
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in storm water runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and 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 storm water runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of storm water basins.

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

Storm Water Discussion

Land development can dramatically alter the hydrologic cycle (See Figure C-1) 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 through 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 storm water runoff from the site. 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 or 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, in turn, 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.

Figure C-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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, storm water 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.

Background

The Village encompasses 2.83 square mile area in Essex County, New Jersey. In recent years, the Village has been under significant development pressure. The population of the Village has increased from 15,864 in 1980, to 16,390 in 1990, to 16,964 in 2000. This population increase has resulted in considerable demand for new development; changes in the landscape have most likely increased storm water runoff volumes and pollutant loads to the waterways of the municipality. Figure C-2 illustrates the waterways in the Village. Figure C-3 depicts the Village boundary on the USGS quadrangle maps.

The New Jersey Department of Environmental Protection (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. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics. The main river that runs through the Village is the east branch of the Rahway River.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. If these data show that the instream total phosphorus concentrations and fecal coliform concentrations exceed the state's criteria, then the river is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for the waterway.

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. The allowable load is allocated to the various sources of the pollutant, such as storm water and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes storm water runoff from agricultural areas and residential areas, along with a margin of safety. 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 storm water treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting storm water 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. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sub list 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

In addition to water quality problems, the Village has exhibited severe water quantity problems including flooding and stream bank erosion.

As the imperviousness increased in the Village, the peak and volumes of stream flows also increased. The increased amount of water resulted in stream bank erosion. The high imperviousness of the Village has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months.

Figure C-2: Village and Its Waterways

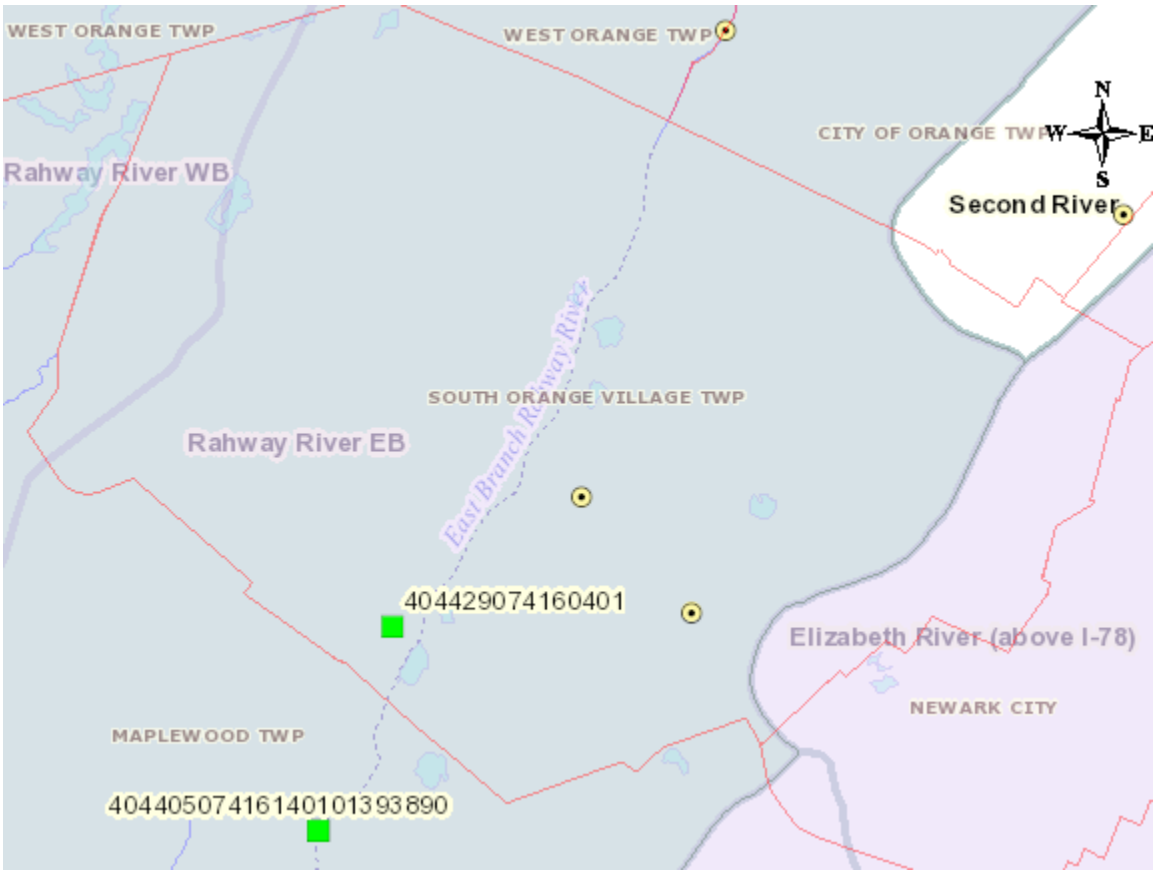


Figure C-3: Village Boundary on USGS Quadrangles

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Design and Performance Standards

The Village will adopt the design and performance standards for storm water management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of storm water runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of storm water management measures consistent with the storm water management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Storm water Management Basins. The ordinances will be submitted to the county for review and approval within [24 months of the effective date of the Storm water Management Rules.]

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

Plan Consistency

The Village is not within a Regional Storm water Management Planning Area and no TMDLs have been developed for waters within the Village; therefore this plan does not need to be consistent with any regional storm water management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Storm water Management Plan will be updated to be consistent.

The Municipal Storm water 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 Storm water management review of residential areas. This Municipal Storm water Management Plan will be updated to be consistent with any future updates to the RSIS.

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

Figure C-4: Village's Existing Land Use

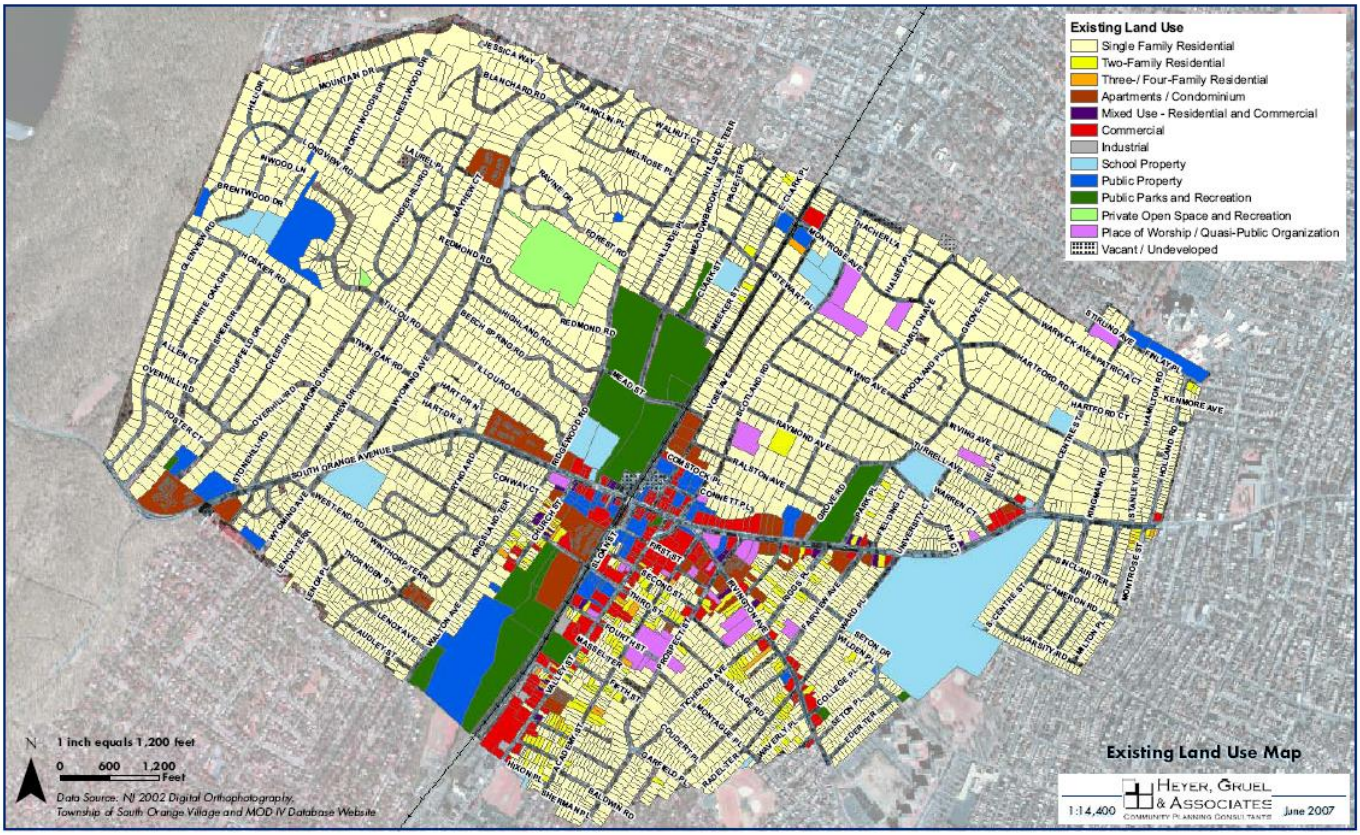
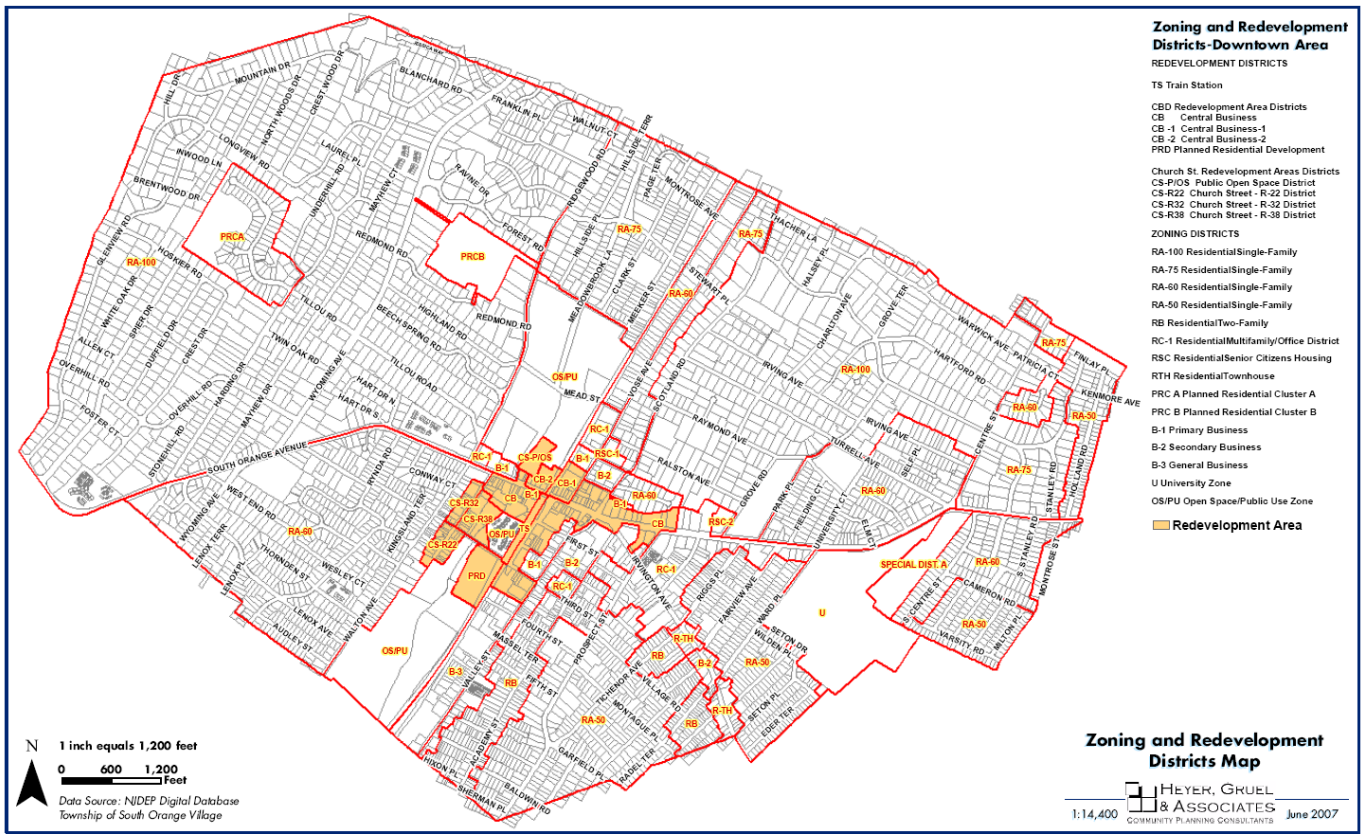


Figure C-5: Hydrologic Map of the Village

Figure C-6: Zoning Districts within the Village



Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the storm water management design and performance standards. Presented is a hierarchy of options.

Mitigation Project Criteria

The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from storm water runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Storm water Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Storm water BMP Manual.

If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment.

The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Storm water Management Plan, or towards the development of a Regional Storm water Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.