STORMWATER MANAGEMENT PLAN
CITY OF ENGLEWOOD
BERGEN COUNTY, NEW JERSEY

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GLOSSARY

The following definitions and acronyms shall apply to and are used in this document:

“BMP” – Best Management Practice

"CITY" - refers to the City of Englewood.

“GREEN INFRASTRUCTURE” – A set of stormwater management practices that use or mimic the natural water cycle to capture, filter, absorb, and/or re-use stormwater.

"MAJOR DEVELOPMENT" - refers to page 3 for revised definition

“MINOR DEVELOPMENT” – Any public or private development that results in the increase of more than 150 SF of impervious area, but less than that required by a Major Development.

"MSWMP" - refers to Municipal Stormwater Management Plan.

“MTD” – Manufactured Treatment Device

"NJDEP" - refers to New Jersey Department of Environmental Protection.

“PPS” – Potential Pollutant Source

“REDEVELOPMENT” – Any site improvements that results in the replacement or addition of impervious surface on an already developed site that is not part of a routine maintenance activity.

“SIC” – Standard Industrial Classification

"TSS" - refers to Total Suspended Solids.

INTRODUCTION

In 2003, the State of New Jersey required all municipalities to obtain a Stormwater General Permit to regulate the discharge of stormwater into the State's waterways. The City of Englewood received a Tier A Stormwater General Permit and the permit requirements include the development of a municipal stormwater management plan and the generation of municipal ordinances that implement the plan. This **MSWMP** has been developed for the City of Englewood, located in Bergen County New Jersey, in accordance with the requirements of N.J.A.C. 7:14A-25, Municipal Stormwater Regulations and N.J.A.C. 7:8, Stormwater Management Rules. The City of Englewood has adopted ordinances and revised existing ordinances to comply with this plan.

The primary focus of the plan is to address and limit the impact of existing (where new site plan approval is required), new and major developments on water quality and runoff. The plan also addresses groundwater recharge. All new developments must incorporate some form of groundwater recharge into their plans. The stormwater management plan describes strategies and performance standards that must be included in the design of all new developments and existing developments requiring site plan approval. In 2020, the definition of **Major Development** was revised to mean an individual development as well as multiple developments that individually or collectively result in the following:

- The disturbance of one or more acres of land;
- The creation of one-quarter acre or more of "regulated impervious surface";
- The creation of one-quarter acre or more of "regulated motor vehicle surface"; or
- A combination of regulated impervious and regulated motor vehicle surfaces that totals an area of one-quarter acre or more.

Englewood's stormwater management plan includes provisions for runoff control and groundwater recharge for all new development, regardless of size although the requirements for Major Developments are different from those of modifications of existing developments and developments that are not classified as Major.

The intent of the standards is to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides stormwater baseflow in receiving water bodies.

The City of Englewood has had ordinances in place for the control of runoff for several decades and as a result, as development increased, flooding in the City did not. This plan expands upon runoff control and incorporates water quality and runoff reduction measures consistent with State of New Jersey requirements. In 2014, the City revised its Mater Plan and the Master Plan and the City's revitalization efforts are considered in this stormwater management plan. The plan also addresses the review and update of existing ordinances, to insure that project designs include low impact development techniques. The final component of this plan is a mitigation strategy, to provide alternative approaches for reducing impacts in situations when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

GOALS

The goals of this **MSWMP** are to:

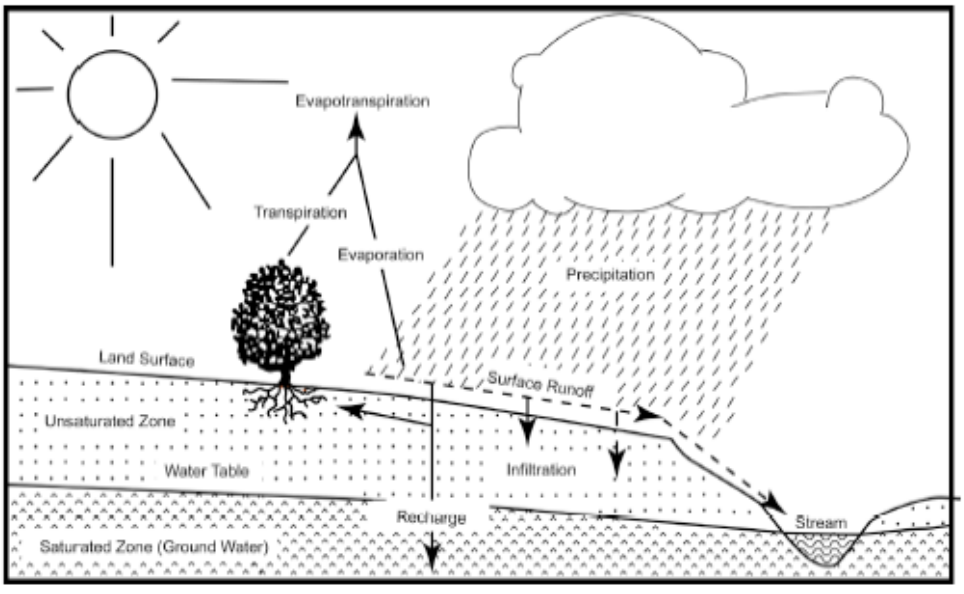
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other 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 stormwater 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 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 when those developments require new site plans because of proposed modifications to the original site plan. Preventative and corrective maintenance strategies are included in the plan 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.

OVERVIEW

Land development can have a direct impact on runoff and flooding, water quality, groundwater recharge, erosion and the overall condition of fresh water bodies in the community. 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 stormwater 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, or "time of concentration", 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.



Source: New Jersey Geological Survey Report GSR-32.

Figure 1: Groundwater Recharge in the Hydrologic Cycle

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.

According to **NJDEP**, most waterways in New Jersey no longer meet the current guidelines of the Federal Clean Water Act and New Jersey's Water Pollution Control Act. As municipalities continue to develop and increase their impervious footprint, the flooding due to climate change will become increasingly problematic. One of the major contributors of poor water quality and flooding is inadequate management of polluted stormwater runoff. It is estimated that over 90% of New Jersey's waterways are polluted. In an attempt to offset the impact that stormwater runoff is having in our communities, NJDEP made some modifications to its Stormwater rules and regulations in 2021 to include the use of **Green Infrastructure**. These **BMP**s include constructed wetlands, vegetated swales, infiltration basins, bioretention wet ponds, green roofs, and cisterns.
More specifically, the following differences have been adopted:

- Replaces a subjective performance standard with an objective, math-based standard that requires the use of green infrastructure to meet water quality, quantity, and recharge standards. The rule includes tables showing which green infrastructure BMPs may be used to meet certain standards, and which BMPs may be used only with a variance.
- The water quality standard will apply to "motor vehicle surface" — meaning, paved or unpaved roads, driveways, parking lots, etc. — instead of impervious surface. Consistent with current NJDEP practice, the water quality standard will not apply to impervious surfaces that are not used by vehicles.
- The "major development" definition now includes "creation of one-quarter acre or more of 'regulated motor vehicle surface'."
- Water quantity, quality, and groundwater recharge standards must be met in each drainage area on-site (unless they converge before leaving the property).
- A groundwater mounding analysis is required for all infiltration BMPs, not just for recharge.
- A deed notice for stormwater management measures, including green infrastructure, must be recorded and submitted to NJDEP before construction.
- For cities with combined sewer systems (so-called CSS or CSO communities):
    - Water quality treatment is required for discharges into combined sewer systems
    - Water quantity control is required in tidal areas (except discharges directly into lower reach of major tidal water bodies)
    - Community basins, which will allow several properties in a CSS community to use a single large basin for quantity control, are allowed

NJDEP believes the amendments to the SWMR will more effectively reduce stormwater volume, reduce erosion, encourage stormwater infiltration and groundwater recharge, and minimize the discharge of stormwater-related pollutants into the environment. Provisions are made for local municipalities to adopt

a stricter requirements and municipal ordinances my include optional measures to further prevent or reduce pollution and to address local water quality issues, environmental concerns, community needs, and flooding issues.

CITY OF ENGLEWOOD

The City of Englewood encompasses 3,168 acres or 4.95 square miles. The City is located in the eastern section of Bergen County, New Jersey. It is approximately one mile west of the Hudson River and two miles east of Hackensack, the center of Bergen County government. Having two major highway systems transverse across the City, State Route 4 and Interstate Highway 80/95, and located just minutes from New York City, Englewood is in a central location that has attracted interest in redevelopment for the past twenty years.

Figure 2: Aerial Photograph – City of Englewood

Englewood is an older suburban community. Almost 80% of its residential housing stock was constructed prior to 1980, a period when runoff control and water quality impacts did not receive the same focus of attention as they do now.

CITY OF ENGLEWOOD RESIDENTIAL HOUSING DATA		
Year Built	**Number**	**Percentage**
Before 1940	3212	33.50%
1940 - 1959	3453	35.90%
1960 - 1969	966	10.00%
1970 - 1979	821	8.50%
1980 - 1989	813	8.50%
1990 - 2000	349	3.60%
Total	9614	100%

Source: United States Census

Figure 3: Year of Construction –Number of Residential Housing

Historically, Englewood experienced double digit growth rates in population in the decades of the 1950's and 1960's when it reached its peak of 26,057 in 1960. Since that time, the population stabilized and then decreased slightly from 1960 to 1990 to 24,850. From 1990, the population has seen an increase and reached a new high in the year 2020. In the year 2020, population in Englewood was 28,278.

Bergen County has the largest annual population increase of 0.6% between 2010 and 2011. The county's largest decline was between 2019 and 2020 when the population dropped 0.2%. Between 2010 and 2020, the county grew by approximately 3%, while the City changed by 4.19%

CITY OF ENGLEWOOD POPULATION DATA (1920-2020)			
Year	**Population**	**Change**	**% Change**
1920	11,627		
1930	17,805	6,178	53.13%
1940	18,966	1,161	6.52%
1950	23,145	4,179	22.03%
1960	26,057	2,912	12.58%
1970	24,985	-1,072	-4.11%
1980	23,701	-1,284	-5.14%
1990	24,850	1,149	4.85%
2000	26,203	1,353	5.44%
2010	27,140	937	3.58%
2020	28,278	1,138	4.19%

Source: United States Census

Figure 4: Population Growth– 1920 to 2020

Englewood is largely built up with a minimal amount of vacant land. Approved redevelopment projects of recent years are expected to result in an increase in population of from 850 to 1000 additional residents. The redevelopment will be accomplished through the construction of moderate density housing and stormwater management will be an important component of each project. Redevelopment is not expected to increase impervious areas in the City.

Englewood is situated on the western slope of the New Jersey Palisades and at the northern end of the Hackensack Meadows. The sloping characteristic of the Palisades dominates the eastern half of the City. A vertical rise of over 300 feet occurs along the ridges on the east side of the City. The highest elevation in Englewood, 410 ft., is in the northeastern corner of the City.

The low-lying areas in the south central section of the City, formally wetlands and marshlands, are now entirely developed with either industrial properties or soon to be redeveloped with mixed-use developments. The flow of flood waters is from the North to the South, with waters eventually reaching Overpeck Lake, south of the City and emptying into the Hackensack water basin and ultimately Newark Bay. Bergen County Department of Public Works operates the flood gates in Ridgefield Park that are typically closed during flood events that coincide with high tide. The closed tide gates prevent tidal backflow into Englewood, but the high tide also limits flow south out of Englewood during the periods when the gates are closed. The result during high intensity storms can be flooding in southern central Englewood along Overpeck Creek.

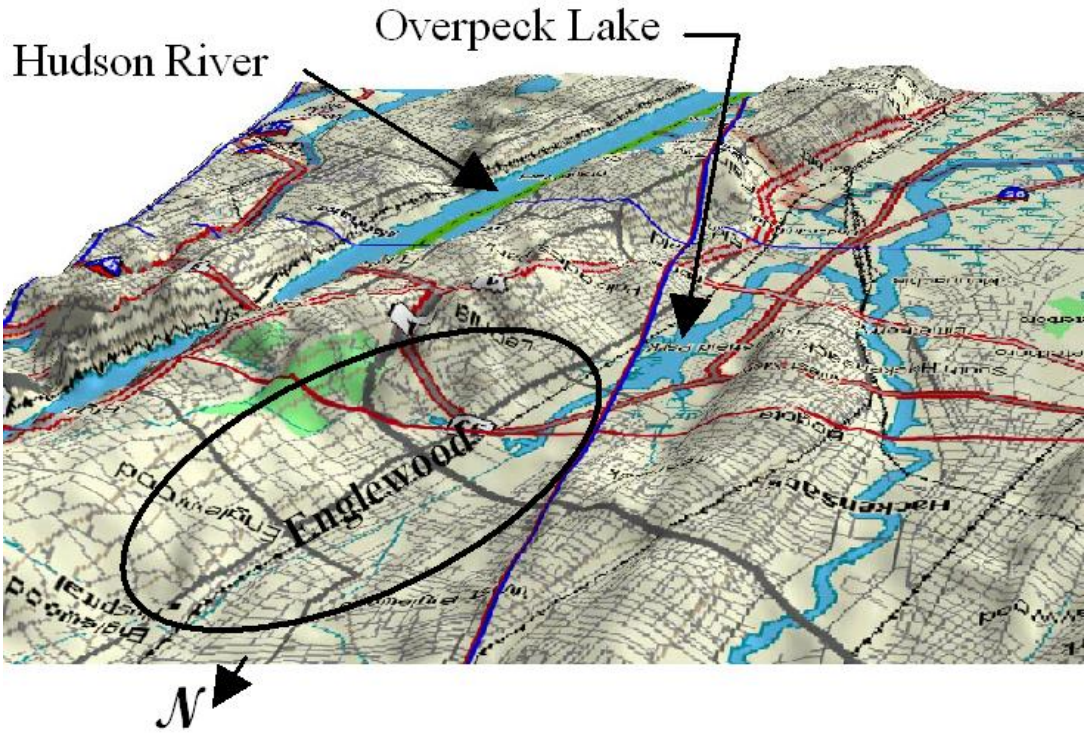


Figure 5: Englewood Watershed

Englewood is a fully developed community with virtually no vacant land. Development in Englewood is largely confined to the redevelopment of existing developed sites therefore it is anticipated that there will be no increase in impervious area in Englewood for at least the next decade or two. In fact, as a result

of the new stormwater management regulations, a decrease in impervious area is anticipated over the next ten years.

Englewood is traversed by three major waterways that carry stormwater from the north to the south: Overpeck Creek, Metzlers Brook, and Flat Rock Brook. These streams are shown on the Bergen County Soil Survey and are identified in Figure 6 below. Minor streams and culverts flow into these three waterways throughout the City. For the most part, the three channels follow their natural path although most of Overpeck and Metzlers Brook have been directed through concrete walled channels. The capability of these channels to convey flood waters is limited by bridge and culvert openings, the flood gates south of Englewood, and the tidal conditions in the Hackensack River Basin.

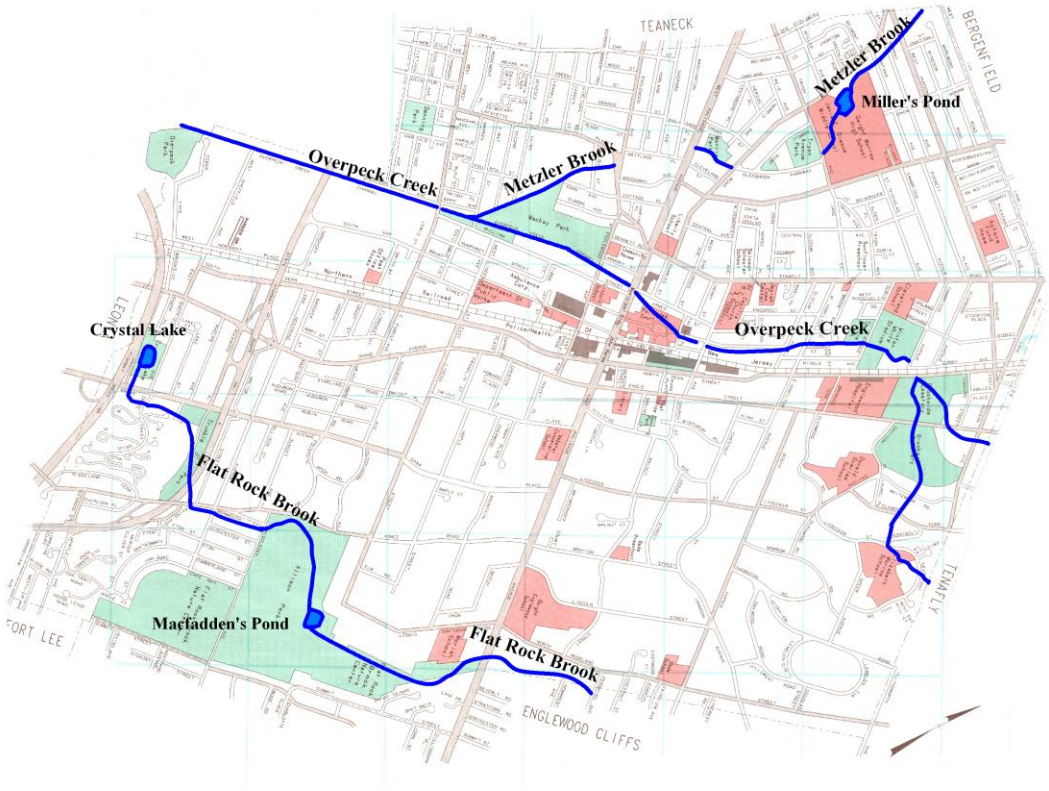


Figure 6: Primary Waterways - City of Englewood

The entire City is within HUC14, 02030103180040, in the Sub-watershed 05BB04, Overpeck Creek, with the exception of a small area at the northern end which is within HUC14, 02030103170040, in the Sub-Watershed 05BA04, Tenakill Brook. The HUC14 boundary can be viewed on NJ-GeoWeb.

<u>Overpeck Creek:</u>
The watershed of Overpeck Creek begins in Tenafly and flows into the northern border of Englewood. The watershed encompasses much of Englewood, taking flow from the all four wards in the City including the majority of acreage from the east side of Englewood. During intensive rain events such as Hurricane Floyd in 1999, Hurricane Sandy in 2012 and most recently Tropical Storm IDA in 2021, flooding was observed throughout the Western half of the City. Two locations along Overpeck Creek are of major concern during

substantial rain events: the Pindle/White Neighborhood, and along Epps and Forest Avenues. Flood storage in the channel is insufficient to carry the 100-year storm. Lesser intensity storms are typically confined to the Channel, but it is noted that with the closing of the flood gates, south of Englewood, a storm of very long duration, coinciding with high tide, will most likely flood these neighborhoods.

The watershed delivering flow into Overpeck Creek through its many tributaries is over 3 square miles in the vicinity of First Street and exceeds well over 10 square miles at the junction of Flat Rock Brook with Overpeck. The watershed of Overpeck Creek exceeds twice the area of Englewood.

Metzlers Brook flows into Overpeck Creek immediately south of First Street. Flat Rock Brook flows into Overpeck Creek just south of the border between Englewood and Leonia. Tributary No. 4, the largest of Overpeck's tributaries, flows from Teaneck into Overpeck Creek south of Forest Avenue. Overpeck Creek is lined with channel walls for its entire length with the exception of the northernmost reach east of Engle Street and a box culvert at Palisade Avenue extending north to Tallman Place.

Metzlers Brook:

Metzlers Brook begins in Bergenfield and traverses Englewood in a southeast direction, flowing into Overpeck Creek immediately south of First Street. Its watershed at the junction with Overpeck Creek is approximately 2.5 square miles. Metzlers Brook flows into a two-acre detention pond, Miller's Brook, about 1400 feet south of the Bergenfield border.

Metzlers Brook contains the flow during significant storm events until it reaches First Street and enters Overpeck Creek. The potential for flooding along Metzlers Brook does exist in the area immediately upstream of Overpeck Creek. Most of Metzlers Brook is lined with concrete channel walls with a box culvert extending from Tryon Avenue south to Liberty Road.

Flat Rock Brook:

The Flat Rock Brook drainage area includes 2.5 square miles in Englewood, Englewood Cliffs, Leonia and Fort Lee. The main channel length is 3.3 miles from its headwater in the Palisades to Overpeck Creek. The total vertical drop of 370 feet occurs primarily upstream of Jones Road where the channel slopes are as great as 13%. Flat Rock Brook flows into a detention pond, Macfaddens Pond, located in Allison Park, a nature preserve. This pond has silted up over the past 25 years and the trustees of Allison Park, the Flat Rock Brook Nature Center, make provisions to desilt the one-acre Macfaddens Pond periodically.

Erosion downstream of the most severe vertical drop at Jones Road is constantly moving the stream banks. Flat Rock Brook east of Jones Road is a natural open channel. Concrete walls have been constructed south of Middlesex Road. Flooding along Flat Rock Brook occurs at a number of locations particularly along Jones Road and the reach between Middlesex Road and Van Nostrand Avenue.

Delineated flood hazard areas can be found on the Flood Insurance Rate Map (FIRM), Panels 211 (Map No. 34003C0211 F), 212 (Map No. 34003C0212 F), 213 (Map No. 34003C0213 F), and 277 (Map No. 34003C0277 F). It should be noted that the "Flood Hazard Area" for the City of Englewood coincides with the 500-year flood delineation.

Other Tributaries:

Significant tributaries include Tributary No. 4, flowing from Teaneck across Green Street and eventually flowing into Overpeck Creek south of Forest Avenue. Occasional flooding has been observed along its banks.

Other tributaries cross the east hill and flow westerly into Overpeck Creek. Most of these tributaries have steep slopes and therefore are able to accommodate large flows without local flooding. Their impact is mostly downstream in the area entering Overpeck Creek.

Drainage Areas:

There are three primary drainage areas within the City of Englewood. Drainage Area 1, the largest drainage area, receives waters from Tenafly and Englewood Cliffs (not shown in Figure 7) and flows to the south into Overpeck Lake and eventually flows into the Hackensack River onto the Newark Bay. Drainage Area 2, receives flow from Teaneck (not shown in Figure 7), transports water to the confluence of Metzler's Brook and Overpeck Creek and flows into Overpeck Creek. Drainage Area 3, receives flow from Englewood Cliffs and eventually flows into the southernmost point of Overpeck Creek within the City of Englewood and then flows south to Leonia. All of Englewood is within the three drainage areas and all of the flow eventually ends up in Overpeck Lake and onto the Hackensack River and Newark Bay.

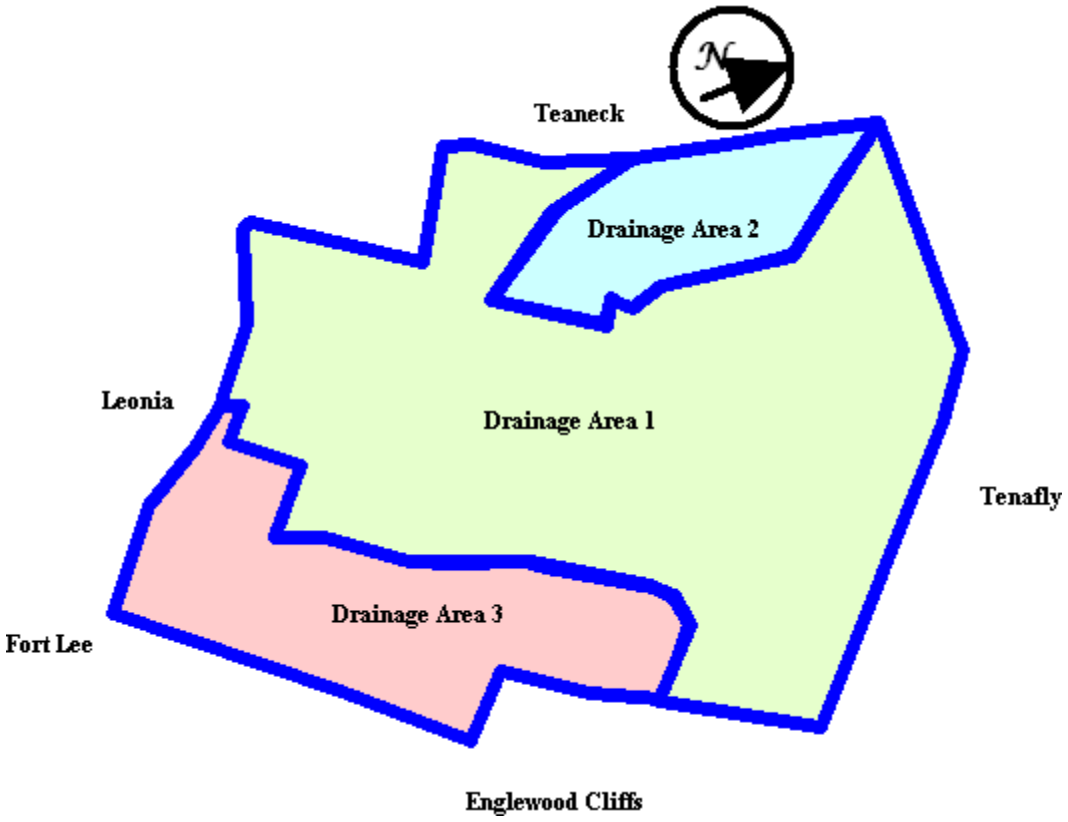


Figure 7: Drainage Areas - City of Englewood

Flood Hazard Areas:

Flood prone areas in the City are delineated in Figure 8 below. The light blue area represents the Flood Hazard Area, which in Englewood is the 500-year storm event.

Large areas, particularly along Overpeck Creek in the south central section of Englewood, fall into the New Jersey Department of Environmental Protection Flood Hazard Area designation.

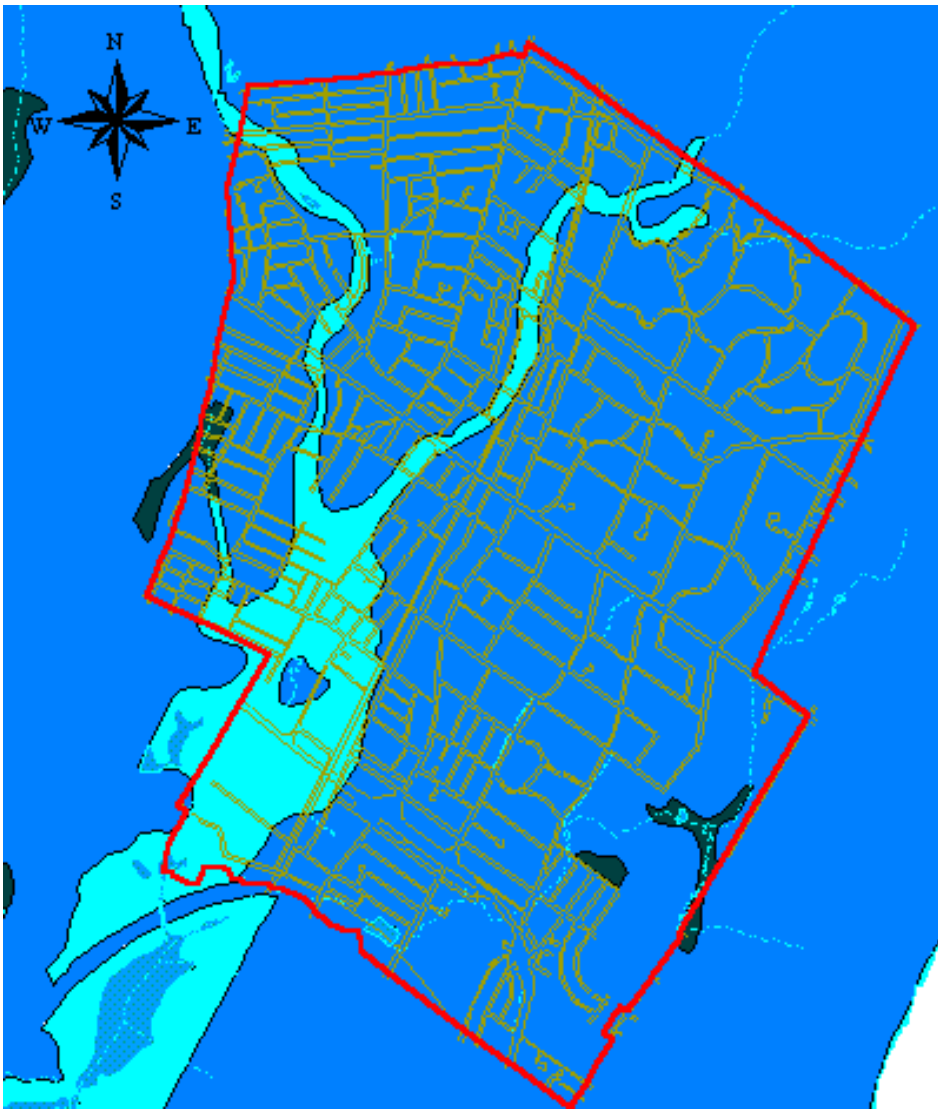


Figure 8: Flood Hazard Areas
Source: Firm Panels from the Federal Emergency Management Agency and New Jersey Department of Environmental Protection mapping

The waterways within the City are not on the New Jersey Integrated Water Quality Monitoring Assessment Report or on the Integrated List. The Total Maximum Daily Loads (TMDLs) for Englewood's waterways have

not been prepared. There are no Category 1 (C-1) waterways in the City of Englewood and the C-1 waters north and west of the City do not flow into the Englewood watershed areas.

Englewood's waterways typically have low flows that are hugely magnified during large storm events. It is assumed that large organisms are periodically washed out during these events. The Flat Rock Brook Nature Association formed a stream study team to evaluate the health of the Flat Rock Brook by sampling its macro invertebrate life. The following is taken from the report issued by the Land Stewardship Committee of the Nature Association:

> "The team compiled a base of data, which will serve as reference in the future to determine change over time and to monitor any natural or management alteration of the stream environment. The water quality of the brook appeared to be poor as measured by an index of the variety and number of sampled invertebrates, using the Save Our Streams protocol. Results have been reported to the New Jersey Department of Environmental Protection (which calls the program Biological Assessment Teams, or BATs).
>
> In the graph below, you see the average index ratings on the 4 stations we have monitored. An index under 11 is considered poor quality. A rating of 25 is considered excellent, but rare to find in a developed suburban area. Station 1 is at the south border of the Nature Center at Middlesex Avenue; Station 2 is above the picnic area; Station 3 is on the brook's south fork and Station 4 is on the north fork before the confluence above the pond. Of interest is that the samples taken at the bottom of the gorge through which the brook flows after leaving Macfadden's Pond are slightly higher than those taken at the top of the hill. That is, the stream condition seems to improve somewhat after flowing through the pond and tumbling down the slope. One cause might be related to the dropping of harmful sediment in the pond before the water flows downstream. Another cause might be due to increased aeration of the water as it tumbles downstream. While this is an interesting finding the fact remains that there is much improvement needed to provide a healthy environment for organisms that live in the stream."

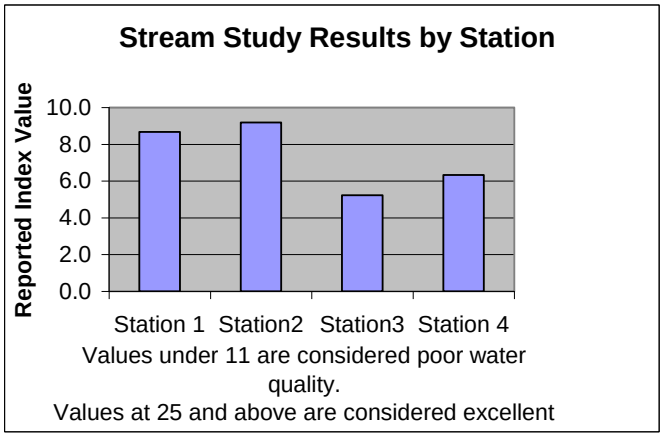


Figure 9: Index Ratings

In addition to the issues connected with the biological life of the City's waterways, periodic testing for chemicals indicates that the levels of phosphorus and other chemicals related to lawn treatments are damaging the biota of the streams.

Through an educational and public outreach program, it is anticipated that chemical lawn treatments, particularly immediately surrounding the City's waterways, can be reduced.

The New Jersey Geologic Survey prepared a map entitled "Gound-Wter Recharge for Bergen County, New Jersey". Groundwater recharge areas within the City limits can also be viewed on NJ-GeoWeb. Areas of "No recharge calculated", 1-7 inches/year", "8-10 inches/year", and "11-15 inches/year" are located within the City of Englewood and shown below in Figure 10 below.

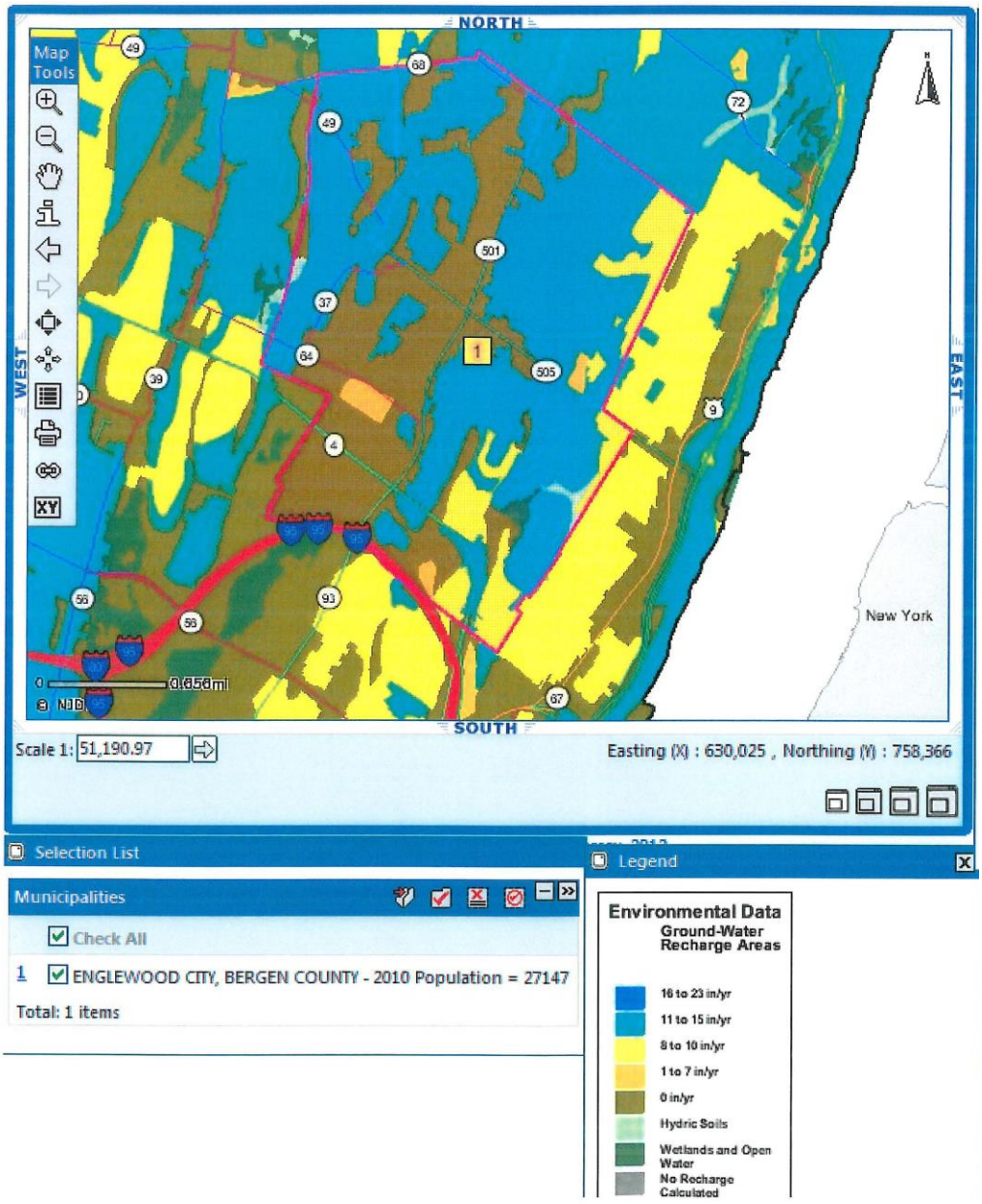


Figure 10: Ground Water Recharge Areas - City of Englewood (from the NJ Geo-Web)

The City of Englewood is within Watershed Management Area No. 5. There are no wells providing potable domestic water within the City boundaries. There is one well-head protection area shown on the NJ-Geo Web mapping in the southwest of Englewood in the industrial area. The only other known wells within the City service Englewood Hospital and provide replacement water to the Hospitals HVAC System. All domestic water is provided by Veolia formerly known as SUEZ.

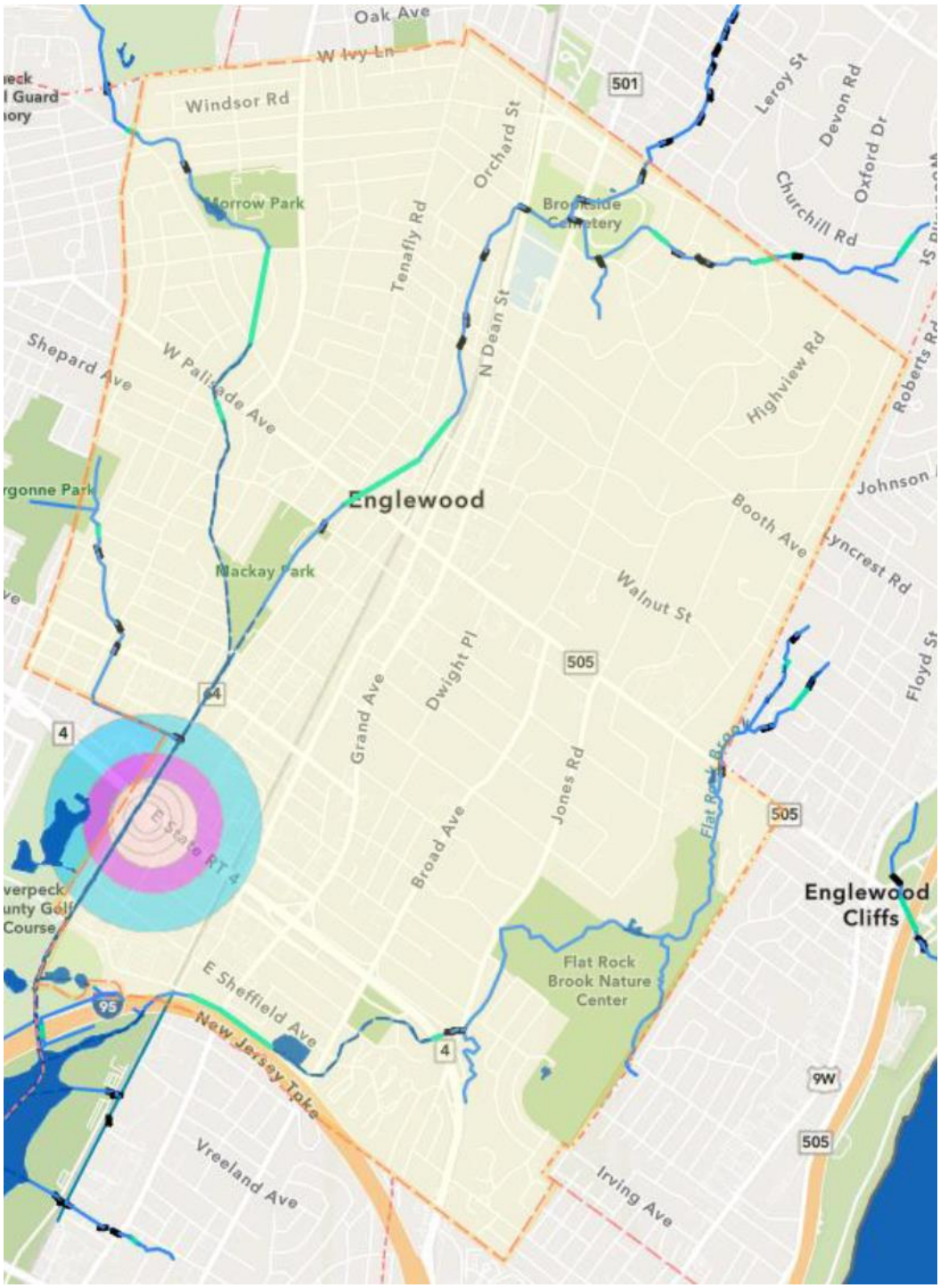


Figure 11: Well-Head Protection Areas - City of Englewood (from the NJ Geo-Web)

Englewood' sanitary sewer system is operated by the Englewood Department of Public Works, transports all sewerage to the Bergen County Utilities Authority (BCUA) treatment plant in Little Ferry, New Jersey.

Englewood's soil characteristics are shown in Figure 12 below.

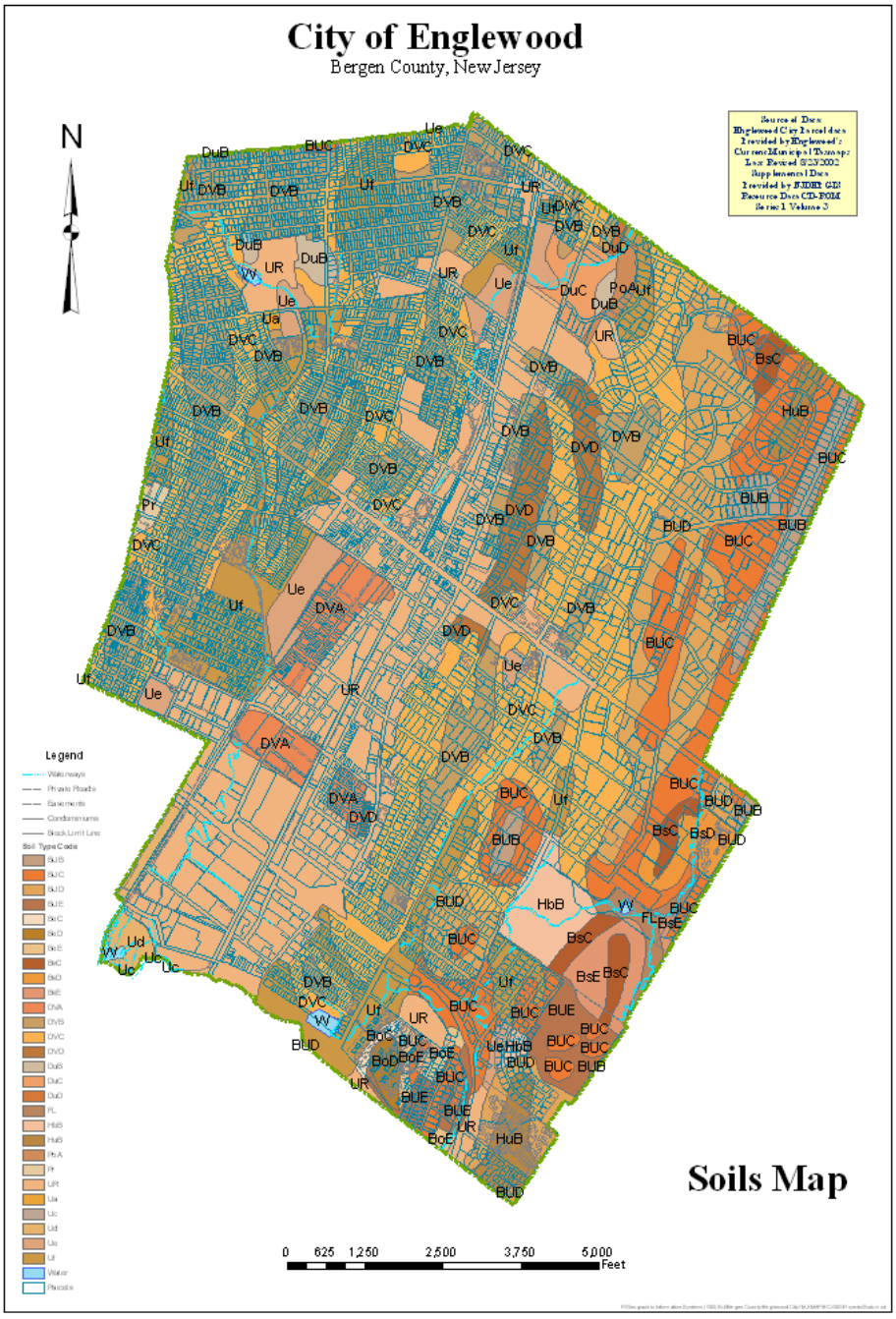


Figure 12: Soil Characteristics – Englewood

Englewood's delineated wetlands are shown in Figure 13 below.

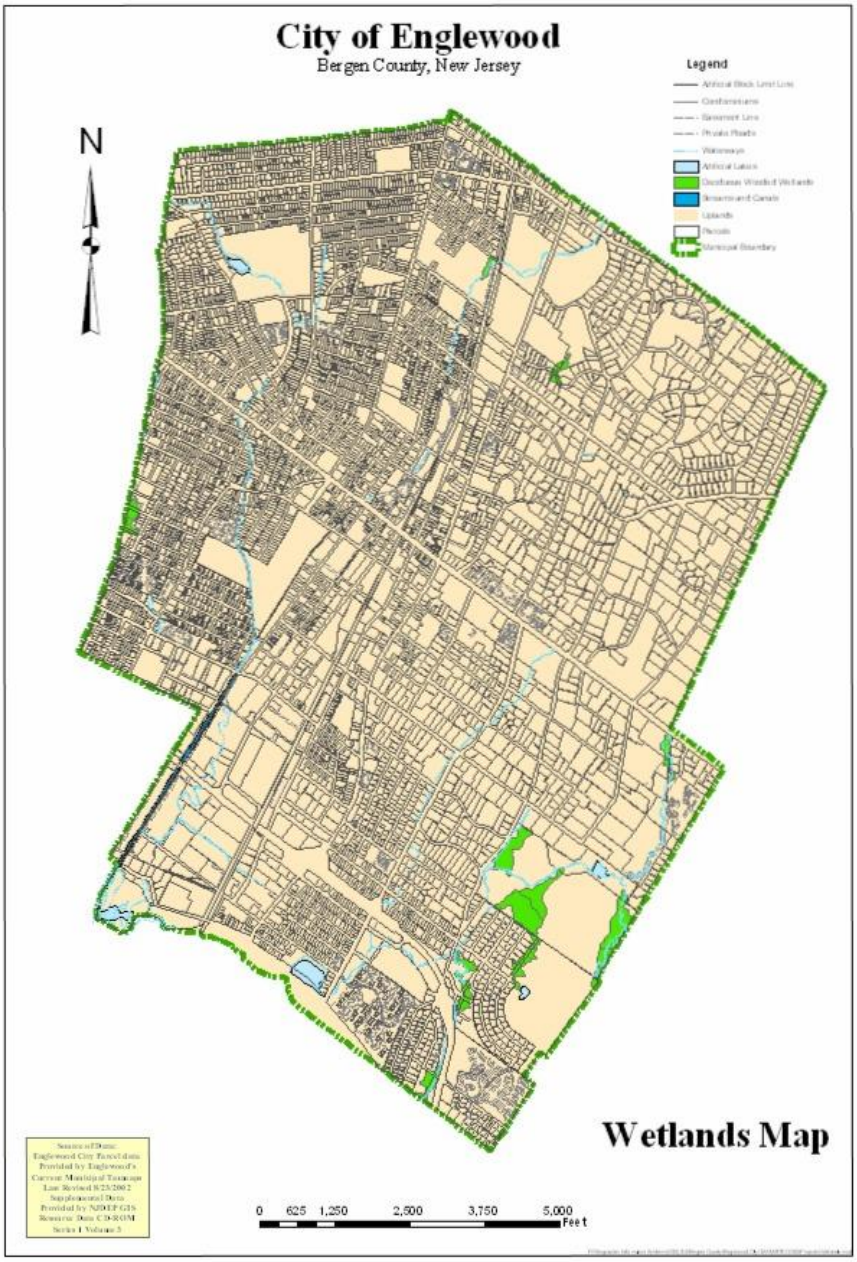


Figure 13: Delineated Wetlands - Englewood

Englewood's topographic features are shown in Figure 14 below.

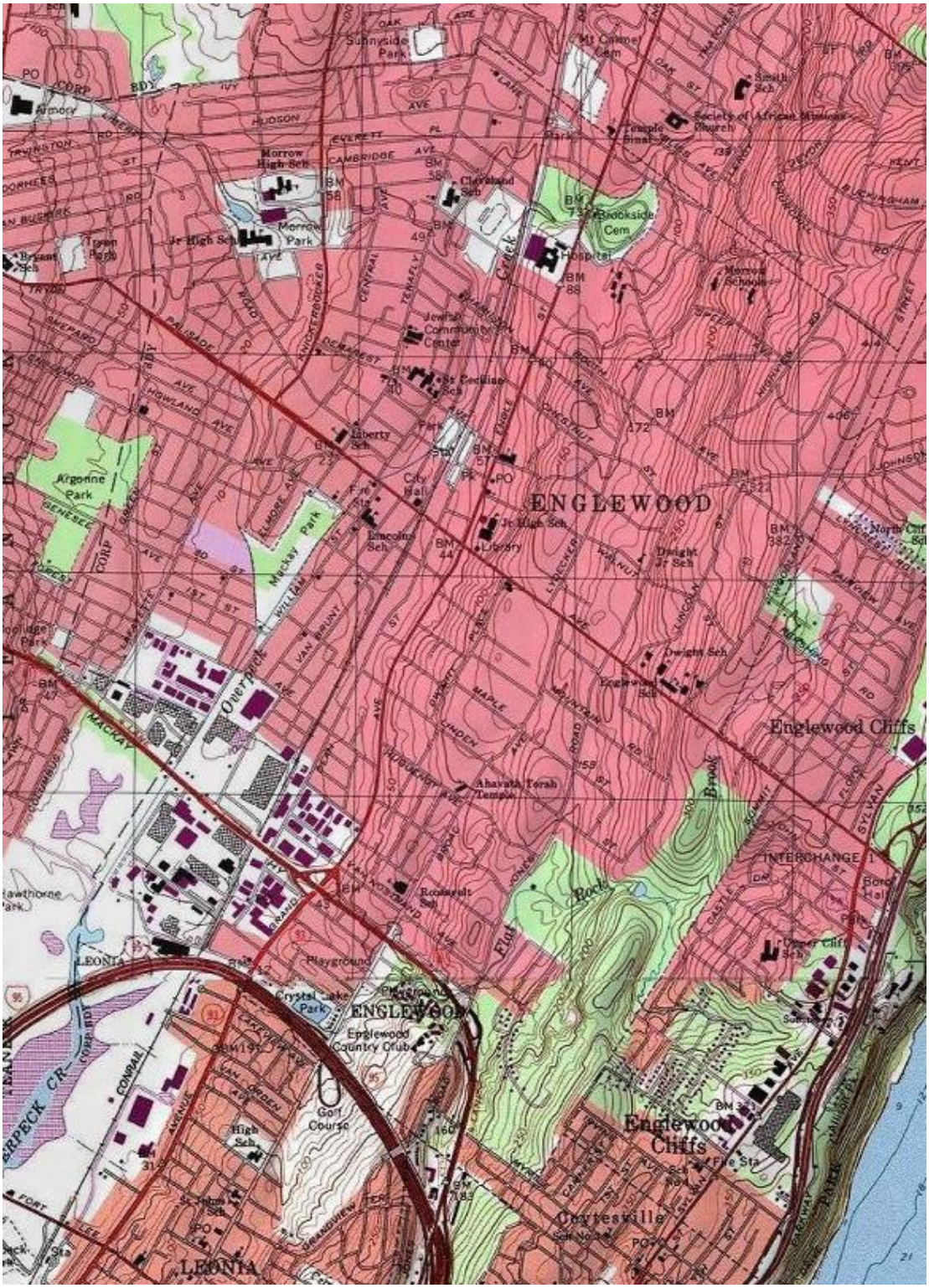


Figure 14: USGS Topographic Map - Englewood

DESIGN AND PERFORMANCE STANDARDS

The City of Englewood currently requires stormwater management plans to be submitted and approved by the City Engineer for all projects that involve the creation or addition of impervious surfaces of 100 square feet or more. The plans must mitigate against additional runoff from any regulated project and the City ordinances require the containment of any additional runoff into a subsurface system that also supports groundwater recharge. The City's ordinances require adherence to the New Jersey Residential Site Improvement Standards for applicable projects. Chapter 374, Stormwater Management, of the City's Code applies to Major Developments. All other projects are governed by Chapter 370, Stormwater and Surface Drainage. Although comprehensive in nature, the City's stormwater management ordinances must be updated to be consistent with the State's regulations and coordinated and updated with the County's stormwater plan.

Englewood's ordinances adhere to the following goals that are part of the New Jersey stormwater management regulations:

1. Reduce flood damage, including damage to life and property;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
3. Reduce soil erosion from any development or construction project;
4. Assure the adequacy of existing and proposed culverts and bridges, and other instream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
7. Maintain the integrity of stream channels for their biological functions, as well as for drainage;
8. Minimize pollutants in stormwater runoff from new and existing development in order 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
9. Protect public safety through the proper design and operation of stormwater management basins.

These goals are implemented through several procedures and in accordance with the ordinance requirements of Chapters 370 and 374 of the Code of the City of Englewood. The City of Englewood has adopted design and performance standards for stormwater management measures that are fully consistent with the goals identified above and also consistent with N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies.

The City considers and determines how nonstructural stormwater management measures shall be addressed and has adopted ordinances consistent with the New Jersey Stormwater Best Management Practices Manual (March 2021).

The City Engineer reviews all site plans submitted to both the Englewood Planning Board and the Board of Adjustment for compliance with the City's Ordinance requirements for stormwater management. Written reviews are submitted to the respective Board's and stormwater related requirements are incorporated into Board approvals. In addition all building permits involving any new construction or modifications to existing properties are submitted to the City Engineer for review. The City Engineer maintains searchable digital files for all building permits and developments that facilitates analysis of the stormwater impact of any modifications to existing sites.

The City Engineer for Englewood also serves as the agent for the Soil Conservation District within the City of Englewood. Englewood is one of only two towns in Bergen County that provides its own inspections and issues permits for Soil Erosion and Sediment Control. As such, coordination between the Bergen County Conservation District and the City is done through an annual review of the City's activities by the Bergen County Conservation District.

Englewood's ordinance revisions provides for short and long-term maintenance of the stormwater management measures that are implemented. Ordinance requirements related to maintenance plans includes the following:

(a) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

(b) The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

(c) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

(d) If the person responsible for maintenance identified under (b) above is not a public agency, the maintenance plan and any future revisions based on (h) below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

(e) Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

(f) The person responsible for maintenance identified under (b) above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

(g) The person responsible for maintenance identified under (b) above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

(h) The person responsible for maintenance identified under (b) above shall retain and make available, upon request by any public entity with administrative, health, environmental or safety authority over the site, the maintenance plan and the documentation required by (f) and (g) above.

(i) The municipality in which the major development is located may require the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

Safety standards for Stormwater Management Basins in accordance with N.J.A.C. 7:8-6, will be incorporated into the City's ordinances. The City will develop and adopt ordinances consistent with the stormwater management plan within the next 12 months and all ordinances will be submitted to the county for review and approval.

During construction, the City Engineer's office is responsible for inspections and will be observing construction projects to ensure that the stormwater management measures are constructed and function as designed.

After construction, a continued inspection program by the Zoning Officer and the City Engineer will ensure compliance with maintenance and operation requirements.

PLAN CONSISTENCY

Currently Bergen County is developing a stormwater management plan. Upon completion, the City of Englewood will review the County's plan for consistency and modify its own plan if necessary.

There are no other regional stormwater management plans that include the City of Englewood. The waterways within the City are not on the New Jersey Integrated Water Quality Monitoring Assessment Report or on the Integrated List. The Total Maximum Daily Loads (TMDLs) have not been developed for waters within the City, therefore this stormwater management plan does not need to be consistent with regional plans or TMDLs. If, in the future, regional plans are developed or TMDLs are prepared, the municipality will review the City's plan and update it accordingly for consistency.

The municipal ordinances currently are consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The Municipal Stormwater Management Plan is consistent with RSIS and the municipality will utilize the most current update of the RSIS in reviews of residential developments. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The City's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control (SESC) Standards. The City Engineer in Englewood acts as an agent of the Soil Conservation District by reviewing SESC plans, issuing SESC permits, and monitoring the compliance of construction sites with approved plans. During construction, the office of the City Engineer will observe on-site soil erosion and sediment control measures and take appropriate action to correct deficiencies in those measures. The Bergen County Soil Conservation District periodically reviews the City's permits.

NONSTRUCTURAL MANAGEMENT STRATEGIES

Stormwater management measures that minimize development impacts can be structural or nonstructural in nature. Structural measures that are associated with low impact development (LID) are typically basins, filters, roof drains, surfaces to direct runoff, and seepage pits to both store runoff and produce groundwater recharge. Structural measures are needed to accomplish the performance standards discussed in the earlier section of this plan.

Nonstructural measures are those practices utilized in low impact development that seek to reduce stormwater runoff impacts through sound site planning and design. Nonstructural measures are particularly important because they minimize the source of many problems associated with development.

The NJDEP Stormwater Management Rules, N.J.A.C. 7:8, Section 5.2(a) require that for major developments, "to the maximum extent practicable, the minimum design and performance standards for groundwater recharge, stormwater runoff quality, and stormwater runoff quantity at N.J.A.C. 7:8-5.4, 5.5, and 5.6 shall be met by incorporating green infrastructure in accordance with N.J.A.C. 7:8- 5.3

Nonstructural stormwater management strategies for incorporation into site design shall:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
3. Maximize the protection of natural drainage features and vegetation;
4. Minimize the decrease in the "time of concentration" from pre-construction to postconstruction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
5. Minimize land disturbance including clearing and grading;
6. Minimize soil compaction;
7. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
8. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and
9. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:
   i. Site design features that help to prevent accumulation of trash and debris in drainage systems;
   ii. Site design features that help to prevent discharge of trash and debris from drainage systems;
   iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
   iv. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

The above referenced measures can be grouped into four general categories:

1. Vegetation and Landscaping
2. Minimizing Site Disturbance
3. Impervious Area Management;
4. Time of Concentration Modifications

The City of Englewood will be reviewing all of the relevant municipal ordinances periodically to determine methods of encouraging the implementation of nonstructural stormwater management measures. The City of Englewood has implemented the following ordinances in recent years that impact on the above four categories and is also reviewing each of the following ordinances to determine appropriate revisions that are consistent with the use of nonstructural measures to reduce development impacts:

Vegetation and Landscaping

Municipal Land Use Ordinance Section 250-59, subsection I4: Yard Requirements requires a planting area of a minimum size in each of the residential zone districts which consists entirely of grass or other living plants. The City will be considering the following modifications:

a) increasing the minimum size of the planting strips; and
b) requiring native plants in the planting strips to provide a low-maintenance alternative to grass, resulting in lower fertilizer and water need.
c) No pervious or impervious surface shall encroach within the minimum planting setback area

Municipal Land Use Ordinance Section 250-61, subsection B2g: Yard Requirements requires a planting area of a minimum size in each of the multi-family zone districts which consists entirely of grass or other living plants. The City will be considering the following modifications:

a) increasing the minimum size of the planting strips; and
b) requiring native plants in the planting strips to provide a low-maintenance alternative to grass, resulting in lower fertilizer and water need.

Municipal Land Use Ordinance Section 250-68, subsection E3: Yard Requirements requires a front yard planting area of a minimum size in the industrial zone. The City will be considering the following modifications:

a) increasing the minimum size of the planting strips; and
b) adding rear and/or side yard planting strips: and
c) requiring native plants in the planting strips to provide a low-maintenance alternative to grass, resulting in lower fertilizer and water need.

Municipal Land Use Ordinance Section 425: Tree Removal regulates tree removals in the City of Englewood and requires bonds and fees for any property owner removing more than two trees within a five year period, on a property. This ordinance also requires a replanting schedule to replace any lost trees. The City will be considering the following modifications:

a) requiring native plants in the re-planting schedule or providing an incentive to re-planting with native species.

Minimizing Land Disturbance

Municipal Land Use Ordinance Section 250-75: Open Space preserves open space within the City of Englewood for outdoor recreation, park land, or passive space, and restricts all development within the zone. The City of Englewood has been adding property to this zone on a continual basis thus restricting any land disturbance within the open space zone.

Municipal Land Use Ordinance Section 250-59, subsection D: Accessory Buildings and Structures establishes setbacks from property lines that restrict the construction of swimming pools, tennis courts, basketball courts and all other paved surfaces within specific distances from the property line for all residential zone districts. The result of this ordinance is to:

a) restrict the construction of impervious surfaces close to the property lines; and
b) minimize land disturbances within specific distances of the property line.

The City of Englewood will be considering an ordinance provision that protects undisturbed areas on a site plan to prevent excessive land disturbance.

Impervious Land Management

Municipal Land Use Ordinance Section 250-59, subsection M: Maximum Coverage limits the maximum impervious coverage in each of the residential zone districts which consists entirely of grass or other living plants. The City will be considering the following modification:

- decreasing the maximum size of impervious coverage.

Municipal Land Use Ordinance Section 374-6-8: Stormwater Management Ordinance establishes requirements for all construction projects in the City and establishes runoff mitigation and minimum groundwater recharge methods. The result of this ordinance is to:

a) provide groundwater recharge for all projects that increase impervious surfaces; and
b) prevent any increase in runoff

The City will be reviewing and modifying this ordinance for consistency with the State's stormwater management regulations and the City of Englewood stormwater management plan and to integrate nonstructural measures where appropriate.

Municipal Land Use Ordinance Section 220-1: Establishes Undisturbed Buffer Areas around all streams in Englewood *and* restricts the construction of any buildings, fences, or other structures within the buffer areas. The buffer area for the City's three major waterways is 50 ft. from the centerline and for other waterways, 30 ft. from the centerline. The ordinance shall be reviewed to determine the necessity of additional restrictions within the buffer areas such as tree removals and supporting the planting of native vegetation.

Time of Concentration Modifications

Municipal Land Use Ordinance Section 250-39: Steep Sloped Areas examines the impacts resulting from construction on steep slopes, limits the disturbance on steep slopes, and provides performance standards to mitigate impacts of construction on steep slopes. This ordinance, by providing limits and conditions on steep slope construction, also limits the reduction of time of concentration resulting from construction on steep slopes.

Municipal Land Use Ordinance Section 342-16: Discharge of Stormwater restricts the direct discharge of stormwater to a public storm sewer system without approval by the City Engineer. This ordinance results in on-site detention/retention prior to any underflow or overflow connection into the City's storm system. The ordinance shall be reviewed to determine the necessity of additional restrictions.

Gravel drives

For single-family residential properties are and will continue to be permitted.

Upon the completion of the review period, all ordinances that are modified shall be submitted to the Bergen County Planning Board for review and approval. Copies shall be sent to the Department of Environmental Protection at the time of County submission.

Master Plan Review

In 2014, the Planning Board revised the Master Plan for the City of Englewood. The following four objectives of the Master Plan were developed and these objectives support the goals of stormwater management:

- Preserve the character of the residential neighborhoods.
  (discourages overbuilding on residential lots)

- Encourage residential development in the Central Business District.
  (intensifies development in already developed areas)

- Encourage mixed-use development in targeted areas, in particular the Office-Industrial Zone where land is underutilized.
  (intensifies development in already developed areas)

- Take full advantage of open space resources, in particular by redesigning Depot Square as a site of community activities, with a landscaped park, outdoor amphitheater for concerts and movies, and facilities for an open-air market.
  (preserves open space)

Throughout the Master Plan there are references to maintaining the character of residential neighborhoods, preserving planting buffers between residential and nonresidential uses and strictly enforcing setback requirements.

A review of the Master Plan indicates that it is consistent with Englewood's Stormwater Management Plan. The Master Plan will be further reviewed and modifications shall be submitted to the Englewood Planning Board to encourage the incorporation of nonstructural management strategies and new green infrastructure guidelines.

LAND USE

Englewood also has a variety of land uses. It has an attractive and vibrant central business district, other commercial and industrial uses, a number of parks, and various institutional uses, such as Englewood Hospital. Englewood also provides a wide array of housing types, particularly for a suburban community. The City's housing mix includes residential uses such as one- and two-family homes to apartments above stores, recently constructed townhouses, and affordable housing developments. Currently, the City of Englewood has fewer than 120 vacant parcels out of a total of 7,825 parcels. The vacant parcels account for less than 1% of the total assessment value and less than 2% of parcel lots.

CITY OF ENGLEWOOD PROPERTY TAX BASE			
2021			
Property Classification	**Assessment**	**% of Total Ratable**	**Number of Parcels**
Vacant Land	41,969,100	0.93%	114
Residential	3,164,440,500	69.86%	6,765
Commercial	685,652,300	15.14%	500
Industrial	252,680,800	5.58%	126
Apartments	384,875,100	8.50%	60
Total Ratables	4,529,617,800	100.00%	7,565
Tax Exempt	628,406,000		260
Totals	5,158,023,800		7,825

Source: Englewood Tax Records

Figure 15: Real Property Tax Base - 2021

Englewood, therefore, is not required to conduct a build-out analysis.

It is however, important to provide a zoning map and a land use map as part of the Stormwater Management Plan and the maps are provided on the following two pages. The Land Use Map shows all vacant parcels and the zoning map shows the respective zone districts in Englewood. Note that the vast majority of land in Englewood is zoned residential.

As a fully developed City, the preservation of open space and the enforcement of setback requirements, preventing overbuilding, are paramount to the City's efforts to maintain the existing ratio of pervious to impervious land use.

Figure 16: Englewood Land Use Map

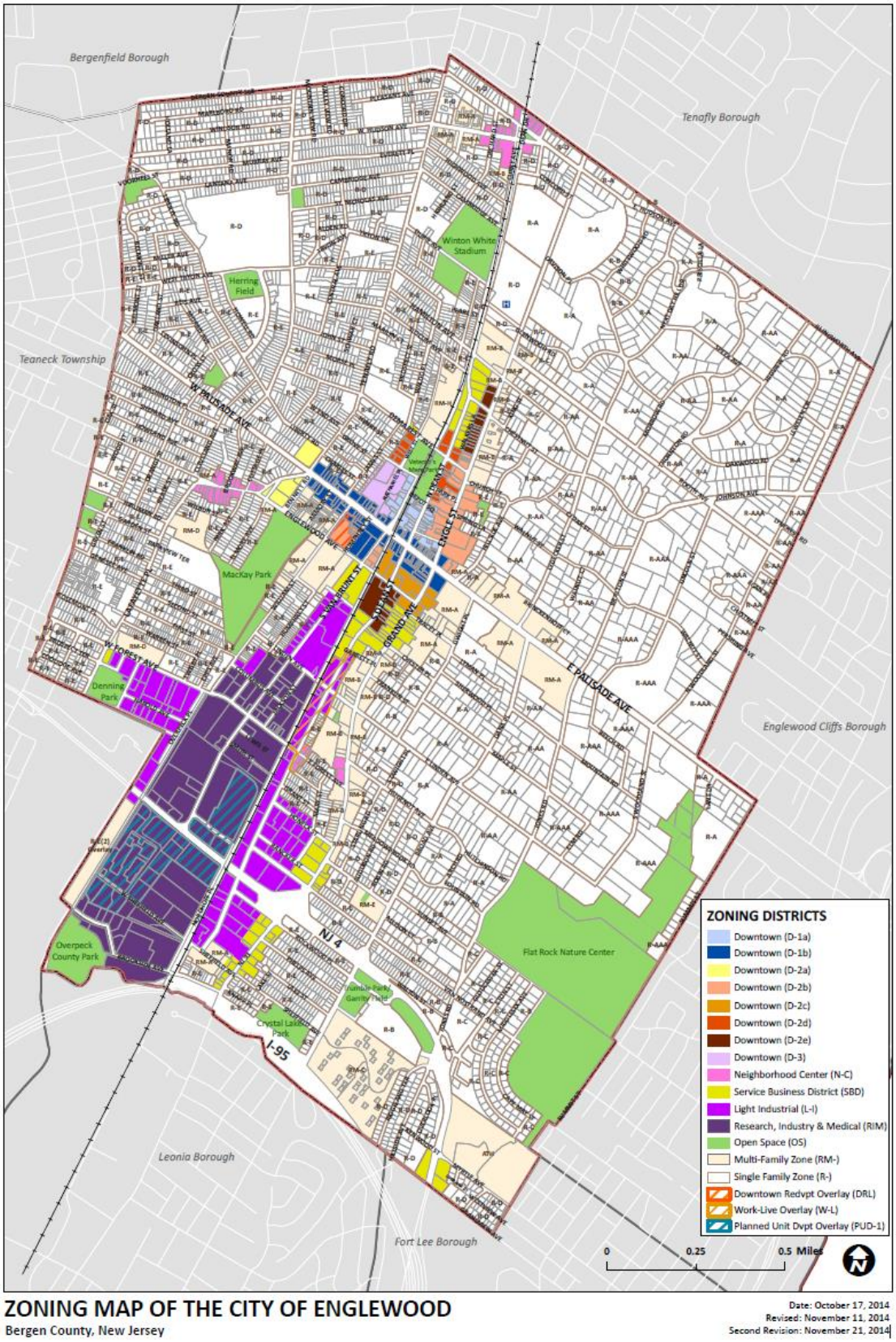


Figure 17: Englewood Zoning Map

MIDIGATION PLAN

The Stormwater Management rules establish design and performance standards for the management of stormwater with regard to water quantity, water quality and groundwater recharge. These standards must be met on the site of a proposed development and, to the maximum extent practical using nonstructural stormwater management strategies. The City of Englewood recognizes that in rare cases, developments may be unable to provide designs meeting the performance standards of the City's Stormwater Management Plan because of site specific conditions. In those cases, when reviewed and approved by the City Engineer, a project may be granted a variance or exemption for reasons that will be outlined in the City's ordinances.

In such cases, the proposed development must provide a mitigation plan for offsetting the effects of the development. The mitigation plan must provide for groundwater recharge and stormwater quality and quantity control in such measures that offset the impact of the proposed development.

A listing of Stormwater Management Mitigation Projects shall be maintained by the City Engineer and updated on an ongoing basis. Mitigation projects generally will be performed in the same drainage area as the proposed development unless the City's immediate priorities dictate otherwise.

If the value of the stormwater management measures for which a variance is granted is not sufficient to complete a discrete project, the developer can provide funding equivalent to the measures as calculated by the City Engineer and such funding shall be placed in an escrow account. Upon reaching a sufficient level, the City of Englewood shall utilize the escrow account to complete a stormwater management project.

Mitigation Projects

A developer must submit an assessment of the impact that will result from the requested deviation from full compliance and this will be utilized to determine whether an alternative project will offset the deviations.

The developer can select from one or more of the projects described below to compensate for the deficit from the performance standards resulting from a proposed project.

1. Projects along Overpeck Creek, Metzlers Brook, or Flat Rock Brook that involve one or more of the following measures:
    a. water quality improvements for water that flows directly into one of the waterways; or
    b. water quantity reduction and groundwater recharge to reduce flow through retention/detention methods prior to flows entering one of the waterways; or
    c. flood control measures including the restoration of channel walls that have failed or are failing.
2. Stream bank stabilization at strategic locations as determined by the City Engineer.
3. Retrofitting of Inlets within the City right of way.
4. Funding studies throughout the City to identify flooding and/or water quality and/or erosion issues.

In the case of projects involving flood control measures, such projects will be combined with measures to improve water quality, reduce flows, and/or increase groundwater recharge. The City will permit a developer to provide funding or partial funding for an environmental enhancement project that has been identified in the Municipal Stormwater Management Plan or the City's Master Plan or towards the development of a mitigation project. 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.

Prior to granting a waiver or exemption from the standards, the following shall be submitted to the City Engineer:

1. Impact from noncompliance: in addition to describing the impact, the applicant shall provide a table quantifying what would be required for the project to achieve the standards, the extent to which this value will be achieved on site and the extent of which the value must be mitigated off-site. If proposing to fund a project off-site, the applicant must provide a cost estimate of the improvements required by the Stormwater Management Plan that will not be implemented.
2. Narrative and other supporting information substantiating the need for the waiver:
    a. the waiver cannot be due to a condition created by the applicant as opposed to a site condition that prevents the implementation of measures that meet the standards. For example, a less extensive development that the site can support together with required measures for stormwater management may result in the denial of a waiver.
    b. The applicant shall demonstrate that the need for a waiver was not created by the applicant. The applicant shall provide a discussion together with a quantitative assessment of the site conditions peculiar to the subject property that prevent the proposed development from including measures that fully comply with the performance standards of the Stormwater Management Plan.
    c. Site conditions may include soil type, the underlying geological strata, acid soils, a high groundwater table, unique conditions that would create an unsafe design, as well as conditions that my provide a detrimental impact to the public health, welfare and safety.
    d. The applicant shall demonstrate that by granting the requested waiver/exemption it would not result in an adverse impact that would not be compensated for by off-site mitigation.

3. Design of the Mitigation Project: provide details of the mitigation project in sufficient detail to construct the measures. This includes but is not limited to, drawings, calculations and other information needed to evaluate the mitigation project.

4. Permits; obtain any and all necessary local, State or other applicable permits for the mitigation measure or project. Permits must be obtained prior to the municipal approval of the project for which mitigation is being provided.

5. Construct the project or at the sole discretion of the City, the City may construct the project. A certificate of occupancy for any project requiring mitigation shall not be issued unless the mitigation project is fully permitted and is either constructed or funds have been posted with the City in sufficient amount to insure that the mitigation project will be completed.

ADDENDUM

Chapter 370 of the General Ordinances of Englewood – "Stormwater and Surface Drainage"

Chapter 374 of the General Ordinances of Englewood – "Stormwater Management"

Ordinances can be obtained on the website of the City of Englewood, www.cityofenglewood.org