

# Township of Hopewell (1106)

## Introduction

This municipal chapter is an element of the Mercer County Wastewater Management Plan prepared by the Mercer County Planning Division in accordance with N.J.A.C. 7:15.

Hopewell Township is located in the northeastern portion of Mercer County and encompasses approximately 59 square miles. Although the Township contains pockets of suburban growth, it retains a rural-like atmosphere, with rolling, rural landscapes primarily in the north. Amidst the Township's suburban and rural landscapes are located the two self-governing, established Boroughs of Pennington and Hopewell. Both suburban and rural lands are intersected by a network of streams that make their way to a larger system of rivers and streams that define two sides of the Township boundary. A little less than half of the stream corridors flow through preserved open space. Approximately 35 percent of the Township's land is located in the agriculture development area and is eligible for farmland preservation programs. In addition, approximately 30 percent of the Township is comprised of public parks and preserved open space. These areas primarily include large regional parks, natural, and cultural areas. The remaining land within the Township consists mainly of residential housing, commercial uses, and corporate campuses. Residential housing is found throughout the Township with the densest housing found in the southern portion. Commercial and commercially-zoned land uses are primarily located along the Route 31 corridor. The Township zoning designations are shown on Map 4M.

Aside from the Federal and state highways I-95, Route 29, and Route 31, the township roadways are primarily comprised of county and local roads. Route 31 is identified in the Mercer County Master Plan as a growth corridor.

The 2005 DVRPC (Delaware Valley Regional Planning Commission) population projection estimates Hopewell's population in 2010 to be 18,168 up from the 2005 population of 17,454. The 2007 DVRPC population projection estimates a slight increase in Hopewell's 2010 population to be 18,272.

Following are some important considerations for this municipality with respect to wastewater management planning:

- Township of Hopewell is considered a non-urban municipality.

In this document the following terms may be used:

*EDUs* - Equivalent Dwelling Units - a measure where one unit is equivalent to wastewater effluent from one dwelling unit. NJDEP defines a dwelling unit to mean any building or portion of a building, permanent or temporary, used or proposed to be used as a residence either seasonally or throughout the year. Most often, EDU is used in reference to a single family home.

*gpd* – gallons per day, a unit of flow measurement.

*GW* – groundwater

*HUC11* - Hydrologic Unit Code consisting of 11 digits – a United States Geological Survey (USGS) standard designation for subwatersheds delineated based on topography.

Individual Subsurface Disposal System (ISSDS) – means a system for the disposal of sanitary sewage into the ground, which is designed and constructed to treat sanitary

sewage in a manner that will retain most of the settleable solids in a septic tank and discharge the liquid effluent to a disposal field.

*mgd* – million gallons per day, a unit of flow measurement.

*Nitrate Dilution Model (NDM)* –The NDM is required by NJDEP and follows the calculations methodology developed by the New Jersey Geological Service (NJGS). The NDM uses the soils type (SSURGO (NRCS) digital soils GIS layer revised by DEP) to estimate the minimum lot size needed to provide enough recharge to dilute nitrate to a specified target. This method is intended to be a guide for estimating the impact of nitrate from septic tanks on groundwater quality. The NDM uses the minimum lot size to calculate the number of EDUs possible for a given area.

*Non-discharge areas* - areas where additional wastewater generation and/or discharge are prohibited.

*Non-urban municipality* – any municipality not officially designated as an urban municipality

*Septic Area* – means an area to be served by systems for the disposal of sanitary sewage into the ground, which is designed and constructed to treat sanitary sewage in a manner that will retain most of the settleable solids in a septic tank and discharge the liquid effluent to a disposal field. Planning flows for septic areas are 2,000 gpd or less.

*Service Areas* – areas designated as wastewater discharge to permitted surface water facilities, groundwater facilities, ISSDS, or septic

*Sewer Service Area (SSA)* – represents the area to be served by a centralized treatment facility.

*STP* – Sewage Treatment Plant

*SW* – surface water

*Undeveloped/under developed* – areas within the existing or future sewer service area that could be developed

*WMP* – Wastewater Management Plan

*WPCF* – Water Pollution Control Facility

*WPCP* – Water Pollution Control Plant

*WTF* – Water Treatment Facility

*WWTP* – Wastewater Treatment Plant

## Existing Infrastructure

The existing wastewater collection and conveyance infrastructure within this municipality consists of the following:

- **Collection System** – The Township of Hopewell is largely undeveloped with the exception of several areas in the southern portion of the Township and a few isolated, sewerded, residential developments in the northeast portion of the Township. The collection system and associated trunk sewers convey flow from the developed

populated areas to the Ewing Lawrence SA, SBRSA Pennington STP, and SBRSA Hopewell STP.

- Pumping Stations – There are currently has 5 existing pumping stations serving dedicated areas within the municipality.

The existing major wastewater treatment facilities located within the municipality include:

- SBRSA Pennington STP
- SBRSA Hopewell STP

In addition to the existing major wastewater treatment facilities, Tables 1a and 1b include additional minor facilities in the Township of Hopewell regulated through NJDEP that have individual New Jersey Pollutant Discharge Elimination System (NJPDES) discharge permits. Table 1a shows facilities which are indicated as discharge to groundwater (DGW). Table 1b shows facilities which are indicated as discharge to surface water.

The NJDEP, Division of Land Use Management, provided the data for Tables 1a and 1b.

The existing treatment facilities, if any, are illustrated on Map 2M.

**Table 1a: NJPDES (DGW) Permitted Facilities within Township of Hopewell**

| NJPDES Permit Number | Facility Name                                 | Permit Program Code | Receiving Stream or Aquifer | Classification | Permittee                      | Contact Organization Name    | Block   | Lot     | Permitted Flow (MGD) | Existing Flow (MGD) | Future Flow (MGD) | Discharge Category     |
|----------------------|---|---------------------|-----------------------------|----------------|--------------------------------|------------------------------|---------|---------|----------------------|---------------------|-------------------|------------------------|
| NJ0101028            | Pennytown Shopping Village                    | GW                  | Brunswick                   | II-A           | Kav Center Inc                 | Ramu Veerappan               | No Data | No Data | 0.01421              | No Data             | No Data           | Sanitary               |
| NJ0101575            | Bristol Myers Squibb Co                       | GW                  | Brunswick                   | II-A           | BRISTOL MYERS SQUIBB CO        | Louis Fedele                 | No Data | No Data | No Data              | No Data             | No Data           | Sanitary Process Water |
| NJ0102024            | Pennington Quarry                             | GW                  | Diabase                     | II-A           | Trap Rock Industries           | Harry Hicks<br>George Conway | No Data | No Data | No Data              | No Data             | No Data           | Process Water          |
| NJ0141232            | Pennington Point West Commercial              | GW                  | Brunswick                   | II-A           | Pennington Point West Property | Edward Bucci                 | No Data | No Data | 0.00495              | No Data             | No Data           | Sanitary               |
| NJG0105643           | Kooltronic Inc                                | GW                  | No Data                     | II-A           | Pennwell Holdings Inc          | Barry Freeman                | No Data | No Data | No Data              | No Data             | No Data           | Sanitary               |
| NJ0202126 (proposed) | Stony Brook Millstone Watershed Assoc (SBMWA) | GW                  | No Data                     | No Data        | No Data                        | No Data                      | No Data | No Data | 0.002925             | No data             | No Data           | No Data                |

**Table 1b: NJPDES (DSW) Permitted Facilities within Township of Hopewell**

| NJPDES Permit Number | Facility Name                    | Permit Program Code | Receiving Stream or Aquifer       | Classification | Permittee                               | Contact Organization Name | Block   | Lot     | Permitted Flow (MGD)         | Existing Flow (MGD) | Future Flow (MGD) | Discharge Category                  |
|----------------------|----------------------------------|---------------------|-----------------------------------|----------------|---|---------------------------|---------|---------|------------------------------|---------------------|-------------------|-------------------------------------|
| NJ0000795            | Bristol-Myers Squibb Co          | SW                  | No Data                           | No Data        | Bristol-Myers Squibb Co                 | Bristol-Myers Squibb Co   | No Data | No Data | 0.172                        | No Data             | No Data           | Industrial Wastewater               |
| NJ0035301            | STONY BROOK RSA - Hopewell Plant | SW                  | Bedens Brook                      | FW2-NT(C2)     | Stony Brook Regional Sewerage Authority | No Data                   | No Data | No Data | 0.3                          | 0.324               | 0.366             | Sanitary                            |
| NJ0035319            | STONY BROOK RSA-Pennington Plant | SW                  | Stony Brook (Princeton)           | FW2-NT(C2)     | Stony Brook Regional Sewerage Authority | No Data                   | No Data | No Data | 0.445                        | 0.300               | 0.445             | Sanitary                            |
| NJ0027715            | Mercer Co. Correction Ctr STP    | SW                  | Unnamed tributary to Moores Creek | FW2-TM(C2)     | County of Mercer                        | County of Mercer          | No Data | No Data | 0.09                         | No Data             | No Data           | Sanitary                            |
| NJ0000809            | Hopewell Business Center         | SW                  | Cleveland Brook                   | FW2-NT         | Carter Road CE, LLC                     | Paul Faris                | No Data | No data | 0.08 (003A)<br>0.048 (004A)* | No data             | No data           | Cooling tower blowdown and sanitary |

\* Outfall 004A is presently inactive. The flow value currently recognized in the NJPDES permit is listed. However, the discharge value is contingent upon the permittee requesting that this outfall be reactivated as required in item G.a of Part IV of the NJPDES permit.

## Environmental Features

Hopewell Township is bordered by the Delaware River and the Route 29 scenic by-way on the west, and by the Sourland Mountain range on the north. The Township shares the large county regional park, Mercer Meadows (formerly Mercer County Park Northwest) with Lawrence Township on the east. I-95 is located on the Township's southern border. The Township shares municipal borders with Ewing, Lawrence, and Princeton Townships. The Township contains protected open space and recreational areas including but not limited to the following:

- Independence Park
- Alliger Tract
- Else Tract
- Municipal Athletic Complex
- Mercer Meadows
- Washington Crossing Park
- Baldpate Mountain
- Howell Living History Farm
- Delaware and Raritan Canal Towpath

There are approximately 12,565 acres in the Hopewell Township Agriculture Development Area (ADA). Farmland within the ADA is generally privately owned with publicly-held easements. A specific listing of these farms can be found in the Mercer County Farmland Preservation Plan.

Many streams and tributaries run throughout the Township eventually flowing through adjacent municipalities south and east of the township or west to the Delaware River and the Delaware and Raritan Canal.

Major streams in Hopewell Township include Baldwins Creek, Beden Brook, Fiddlers Creek, Honey Branch, Jacobs Creek, Ewing Creek, Moore Creek, Shabakunk Creek, Steele Run, Stony Brook, Woodsville Brook, and Woolsey Brook. A segment of the Stony Brook is categorized as C-1.

## Delineation of Service Areas and Planning Integration

### *Sewer Service Areas*

Following are the sewer service areas within Township of Hopewell. Existing areas served and future SSAs are shown on Maps 2M and 3M, respectively. The facilities providing treatment to these service areas have an associated facilities table in the Appendix.

- Ewing Lawrence SA (NJPDES NJ0024759) – This SSA encompasses a portion the Township.
- SBRSA Pennington STP (NJPDES NJ0035319) – This SSA encompasses a portion the Township.
- SBRSA Hopewell STP (NJPDES NJ0035301) – This SSA encompasses a portion the Township.

An explanation of the mapping method used to delineate the SSA is included in Appendix A to this chapter.

### ***Septic Areas (ISSDS)***

Individual subsurface sewage disposal systems (ISSDSs) consist of those areas with planning flows 2,000 gallons per day or less (i.e. residential septic systems) that are neither designated for sewer service nor as non-discharge areas. These areas can be seen in Maps 2M and 3M.

## **Future Wastewater Demand and Facilities**

For the purposes of evaluating capacity and future sanitary flow rates, the full build-out of undeveloped or underdeveloped land in the Township was derived from existing zoning and the development potential of land parcels within the Township. The results of the build-out were compared to the permitted treatment capacity of major wastewater treatment facilities. This analysis is not required for the minor facilities.

The County used CommunityViz, a land use planning software package offered through Placeways, LLC. CommunityViz is an extension for ESRI's ArcGIS platform that uses existing zoning information to estimate future development. CommunityViz uses zoning data such as minimum lot size and set back requirements to evaluate potential number of future residential units or square feet of commercial space on individual parcels or within the municipality.

The County has identified a category of service indicated as "open with facilities". This category was created in response to a number of comments received from municipalities to include recreational lands, many purchased through public funding, in the Future SSA. The requests pertain to open space properties that currently have support facilities or may have them in the future. The intent of this service type category is to account for up to 2,000 gpd of wastewater generation from these parcels, while recognizing they will continue to function as municipal open space and recreational facilities. The estimated flow has been included in the capacity analysis for the facility serving the closest sewer service area. This category gives municipalities flexibility in planning for essential facilities that support existing and future recreational programming at the local level.

### ***Sewer Service Area Wastewater Capacity Analysis***

Table 2a presents the results of the Build-out Analysis within the SSA indicated above.



**Table 2a: Hopewell Township Build-out Table (SSAs)**

| NJPDES Permit Number | Major Public Wastewater Treatment Facility | Capacity Allocation/ Permitted Capacity (mgd) | Total Existing Flow (mgd)** | Total Flow Attributed to TWAs Approved But Unconnected (mgd) | Residential Build-out Flow (mgd) | Non-Residential Build-out Flow (mgd) | Existing Septic Systems Flow (mgd) | Total Projected Build-out Flow (mgd) | Remaining Capacity (mgd) |
|----------------------|--|---|-----------------------------|--|----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|--------------------------|
|                      |  |   |                             | Committed Flow (mgd)   |                                  |                                      |                                    |                                      |                          |
| NJ0024759            | ELSA                                       | 16.0*   | 0.402                       | 0.057  | 0.374                            | 0.646                                | 0.114                              | 1.191                                | See Facility Table       |
|                      |  |   |                             | 0.459  |                                  |                                      |                                    |                                      |                          |
| NJ0035319            | SBRSA – Pennington STP                     | 0.445/FCFS Mbr*                               | 0.056                       | 0.000  | 0.018                            | 0.074                                | -                                  | 0.092                                | See Facility Table       |
| NJ0035301            | SBRSA – Hopewell STP                       | 0.300/FCFS Mbr*                               | 0.109                       | 0.000  | 0.113                            | 0.000                                | -                                  | 0.113                                | See Facility Table       |

\*See ELSA facility table, SBRSA Pennington STP, and SBRSA Hopewell STP for current and build-out flows by municipality. FCFS=First Come First Served; Mbr=SBRSA Member.

\*\*Total Existing Flow from DMR data February 2011 through January 2012.

Treatment Works Approvals (TWAs) approved by NJDEP for unconnected projects within Hopewell Township consist of the following:

**Table 2b – Treatment Works Approvals**

| TWA                       | Facility | Unconnected Flow (mgd) |
|---------------------------|----------|------------------------|
| Merrill Lynch Bldgs 16-19 | ELSA     | 0.0400                 |
| Freedom Village           | ELSA     | 0.0167                 |
| <b>Total</b>              |          | <b>0.0567</b>          |

The capacity of Ewing Lawrence SA, SBRSA Pennington STP and SBRSA Hopewell STP is shown in the Facility Table. The facilities have no formal agreements with regard to allocation of treatment capacity.

With regard to the SBRSA facilities, flows are accepted on a first-come-first-served basis from the participant member communities. Hopewell Township is a member of SBRSA, but is not a participant. As such, they must contract with SBRSA or a participant for service from SBRSA facilities. With respect to ELSA, all flows are permitted through existing contracts between ELSA and Hopewell Township.

Undeveloped and underdeveloped parcels are shown on Map 3M.

### ***Septic Area Wastewater Capacity Analysis***

Table 3 presents the results of the Build-out Analysis within the ISSDS. The ISSDS is shown on Map 3M.

The breakdown by HUC11 subwatershed is shown below.

**Table 3 –Township of Hopewell Build-out by HUC11**

| HUC11       | Build-out Potential (Equivalent Dwelling Units) |                        | Surplus/Deficit |
|-------------|---|------------------------|-----------------|
|             | Using Nitrate Dilution Model                    | Under Municipal Zoning |                 |
| 02030105090 | 1,679.1   | 285.5                  | 1,393.6         |
| 02030105110 | 543.3   | 56.0                   | 487.3           |
| 02040105210 | 1,618.8   | 675.0                  | 943.8           |
| 02040105230 | 7.3   | 0.0                    | 7.3             |
| 02040105240 | 53.9  | 46.0                   | 7.9             |

Table 3 shows the variation in build-out results based on existing zoning as compared to the potential EDUs predicted by the Nitrate Dilution Model (NDM). The zoning based build-out and the NDM should be run on a HUC11 basis to determine if the entire HUC11 has sufficient nitrate dilution capacity to accommodate full zoning build-out.

For Table 3, equivalent dwelling units were calculated using the following formula: [potential residential flow (gpd) + potential non-residential flow (gpd)]/500 gpd/EDU. Potential non-residential flow in septic areas was estimated using existing zoning criteria (e.g. FAR) and a flow factor of 0.125 gpd/square foot.

The Septic Area build-out capacity analysis for the Township of Hopewell was based on the 2.0 mg/L statewide standard for the target concentration of nitrate in groundwater.

Following are the results of this analysis shown in table 3 for the Township of Hopewell’s portion of the HUC11:

- For all HUC11s, the build-out results based on existing zoning are less than the number of potential EDUs generated by the Nitrate Dilution Model (NDM) for septic capacity, and therefore, no further analysis of these HUC11s will be required nor will any change in zoning be required.

A list of zoning codes and descriptions are included on Map 4M.

## **Appendix A – Basis for Service Area Delineations**

### **SSA (Sewer Service Area)**

The SSA designation is for areas from which wastewater is designated to flow to a permitted wastewater treatment facility.

In assigning the SSA designations shown, several data sources were considered:

- Cross-Acceptance proceedings (2004)
- NJDEP’s adopted SSA map for Mercer County (2006)
- NJDEP’s draft SSA map for Mercer County (2008) including revised editions based on public comments received from 12/2008 through March 2011; two editions of the original 2008 map were reviewed periodically during this period once in June 2009, once in February 2010, and once in November 2010 prior to the NJDEP Public Meeting in December 2010.
- Data (such as collection system extent) obtained from municipalities or private entities.
- Existing TWA permits
- Sewer service areas provided by existing sewerage authorities and wastewater treatment facilities

Parcels that were within previous draft or adopted sewer service areas, or existing sewer service areas provided by sewerage authorities or wastewater facilities, were given the SSA designation, unless specific guidance was provided to remove them.

Proximity to existing collection system was considered if service for a given parcel was indeterminate based on other criteria.

Parcels with valid NJDEP Treatment Works Approvals (TWA) were automatically given an SSA designation.

### **Septic Areas (ISSDS)**

The ISSDS designation represents those areas served by septic systems. For the purpose of mapping, the ISSDS designation also represents those areas that are not designated as any of the other categories (SSA or Open/Utility as described below).

### **Open & Utility (Open Space, Utility)**

The Open & Utility designation identifies the following:

- Open Space – Mercer County Planning Division maintains an open space layer. The county boundary is the layer’s geographic extent. The open space layers is developed from several sources including a county-owned land inventory, Green Acres ROSI, preserved farmland inventory, municipal open space inventories, and state and non-profit open space inventories. The open space layer served as the basis for identifying undevelopable land designated through the Plan as Municipal, County, or State Land, Deed Restricted properties, Conservation Easements, and certain lands overseen by non-profit entities.
- Utility - tax assessment data was used to identify lands owned by public utilities.

This designation indicates that these parcels are undevelopable, except for instances where public programs require the construction of public facilities. Such instances will require that the public facilities be designated as SSA or septic areas, but that the remainder of the parcel be undeveloped.

## Environmentally Sensitive Areas

The Environmentally Sensitive Areas (ESAs) designation applies to those areas that have been mapped as such by NJDEP. They consist of the following:

- Wetlands – areas based on NJDEP’s Land Use/Land Cover feature class (2002)
- Stream corridors – areas which incorporate the appropriate buffer along surface waters based on NJDEP’s stream classification (2008)
- Natural Heritage Priority Sites – areas of critical importance due to the presence of rare plant species and ecological communities (2007)
- Landscape Project Areas (Rank 3, 4, and 5) – areas representing wildlife habitat mapping for community planning and endangered species conservation. Rank 3 is associated with NJ State threatened species. Rank 4 is associated with NJ State endangered species. Rank 5 is associated with Federal threatened or endangered species (2007)

## Methodology

The following methodology was employed to designate all parcels within Mercer County as either SSA or ISSDS, except for parcels designated as Open/Utility as described above. The following is the general methodology used for preparing the Draft SSA Map.

1. Parcels were evaluated to determine if:
  - a. It was designated under the Mercer County’s open space inventory.
  - b. It was owned by a public utility.Any parcels falling within the above categories were designated as Open/Utility.
2. The remaining parcels were evaluated to determine if they were part of previous SSA. If so, these parcels were designated SSA, unless directed otherwise by NJDEP, Mercer County, or the Municipality.
3. The remaining parcels not designated as previously part of an SSA were also evaluated to determine if any existing wastewater generating structures were present onsite using Mercer County’s building footprint (January 2009) layer and aerial photography (2007). County staff further reviewed these parcels with more current aerial photography (2009). COAH and local approvals were also considered in this evaluation. If sewage generating potential was identified, the parcel was further evaluated to determine if it was readily sewerable by an existing collection system without extending it. If this was the case, the parcel was designated as SSA unless:
  - a. A significant portion of the parcel is undeveloped and falls within the constrained boundary AND
  - b. Comments were received from NJDEP indicating the constrained portion of the parcel was to be excluded from the SSA.

In cases where a) and b) above apply, the parcel was split along the Constrained boundary. In this case, the portion of the parcel within the Constrained boundary was designated ISSDS and the remaining unconstrained portion was designated SSA.

4. For parcels not addressed under 1, 2, or 3 above, any vacant lands were evaluated to determine if it was readily sewerable by an existing collection system without extending it. If this was the case, the parcel was designated as SSA unless:
  - a. Comments were received from NJDEP, Mercer County, or the Municipality indicating the subject parcel should be excluded from SSA category. If such was the case, the parcel was designated ISSDS.
  - b. The parcel was constrained in whole or in part by Environmentally Sensitive Areas (ESA). If this was the case, the portion of the parcel within the Constrained boundary was designated as ISSDS and the remaining unconstrained portion was designated as SSA.
5. Parcels that were not designated under 1, 2, 3, or 4 above were designated as ISSDS.