Municipal Stormwater Management Plan

For the

City of Ocean City

Prepared by

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the City of Ocean City to address stormwater-related impacts. N.J.A.C. 7:14A-25 Municipal Stormwater Regulations require the creation of this plan. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A "build-out" analysis is not included in this plan because Ocean City has less than one-square mile of vacant land or agricultural land. Additionally, in accordance with NJDEP's Stormwater Regulations at N.J.A.C. 7:8-4.2(c)10, since the City of Ocean City is not required to perform a build out analysis it is also not required to perform a review of its master plan and ordinances, and therefore, a list of the sections in Ocean City's land use and zoning ordinances is not included in the Stormwater Management Plan.
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 stormwater plan, stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

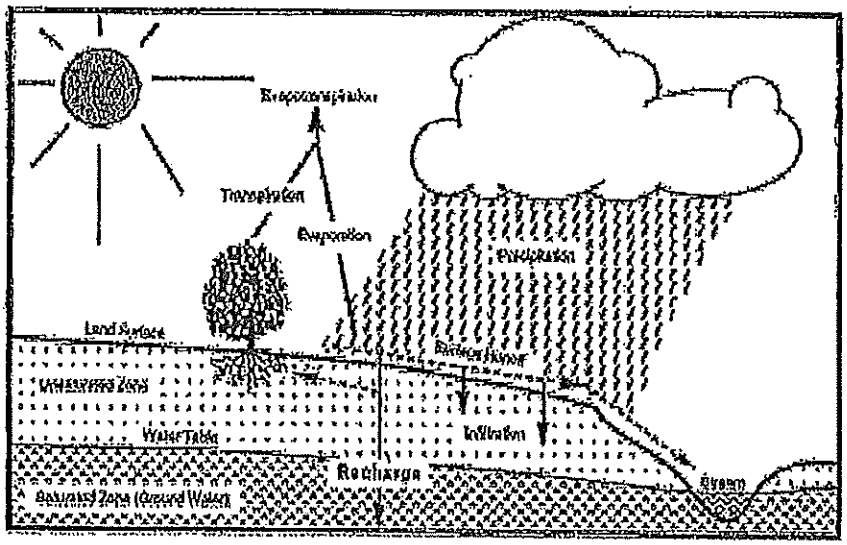
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other 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. 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.

Stormwater 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 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 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, 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.

Background

The City of Ocean City encompasses a 7 square mile area in Cape May County, New Jersey. Although Cape May County has had a 7.6% population growth from the 1990 census to the 2000 census, Ocean City has observed an opposite trend. In fact the population of the City has gradually decreased from 15,512 in 1990, to 15,378 in 2000. This population decrease, in conjunction with the already developed status of land in

Ocean City has resulted in relativity stable stormwater runoff volumes and pollutant loads to the waterways of the City. Figure C-2 illustrates the waterways located near Ocean City. Figure C-3 depicts the City 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. There are no impaired fresh water waterbodies within the boundaries of Ocean City. However, the Department also conducts monitoring of coastal and estuarine environments. NJDEP Coastal Monitoring, Shellfish Monitoring program has indicated that both the Atlantic Ocean and Great Egg Harbor have been moderately impaired for Total Coliform and Dissolved Oxygen, respectively.

total maximum daily load

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 stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater 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 stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

A map of the groundwater recharge areas is shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-5.

Design and Performance Standards

The City of Ocean City will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards in N.J.A.C. 7:8 Stormwater Management Rules are applicable to all major development. Major development is defined as any development that provides for ultimately disturbing one or

more acres of land or increasing impervious surface by one-quarter acre or more. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The stormwater control ordinance will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

Non-structural measures to be considered first shall include site design and preventive source controls. To confirm the effectiveness of such measures, applicants must verify that control of stormwater quantity impacts as detailed in the Stormwater Management rules have been achieved. The tests of assuring control of the quantity impacts as detailed in these rules will be incorporated into the City's Stormwater Ordinance

The general standards for structural measures are specified in the Stormwater Management rules and will be incorporated into the City of Ocean City's Ordinance. These measures shall be incorporated as needed to meet the soil erosion, infiltration and runoff quantity standards included in the City's Stormwater Ordinance. The design standards for the specific structural stormwater management measures are those included in the New Jersey Stormwater Best Management Practices Manual. Other designs or practices may be used if they are approved by the Soil Conservation District. The design and construction of such facilities must comply with the Soil Erosion and Sediment Control Standards as well as any other applicable state regulation including the Freshwater Wetland Protection Act rules, the Flood Hazard Control rules, the Surface Water Quality Standards and the Dam Safety rules. The requirement to be consistent with all other applicable rules will be included in the City's Stormwater Ordinance. Stormwater runoff quality controls for total suspended solids and nutrient load shall meet the design and performance standards as specified in the Stormwater Management rules. The minimum design and performance standards for infiltration and groundwater recharge specified in the Stormwater Management Rules will be incorporated into the City's Stormwater Ordinance and must be met for all applicable development. Consistent with the Stormwater Management Rules, the Ordinance allows for an exemption from this requirement where the applicant can demonstrate that it is not practicable to meet the standards but has taken all possible steps to meet all stormwater management measures.

During construction, City inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Adequate long term operation as well as preventative and corrective maintenance of the selected stormwater management measures will be ensured by requiring the design engineer to prepare a maintenance plan for its stormwater management facilities incorporated into the design of the major development. The maintenance plan shall have specific preventative maintenance tasks, schedules and cost estimates as well as the responsible party for corrective and preventative maintenance.

Where the City assumes maintenance responsibility, preventative maintenance shall be performed on a regular basis and will be appropriate for the particular structural

management measure being implemented. These maintenance measures shall be in accordance with N.J.A.C. 7:8-5 and may include: periodic inspections, vegetation management, sediment, debris and trash removal and mosquito control. Corrective maintenance shall be performed on an as needed basis for structure repairs or replacements, removal of outlet and pipe blockages, erosion restoration, snow and ice removal, etc. The person or persons responsible for maintenance shall keep a detailed log of all preventative and corrective maintenance for the structural management measures incorporated into the design of the development, including a record of all inspections and work orders.

Plan Consistency

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

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

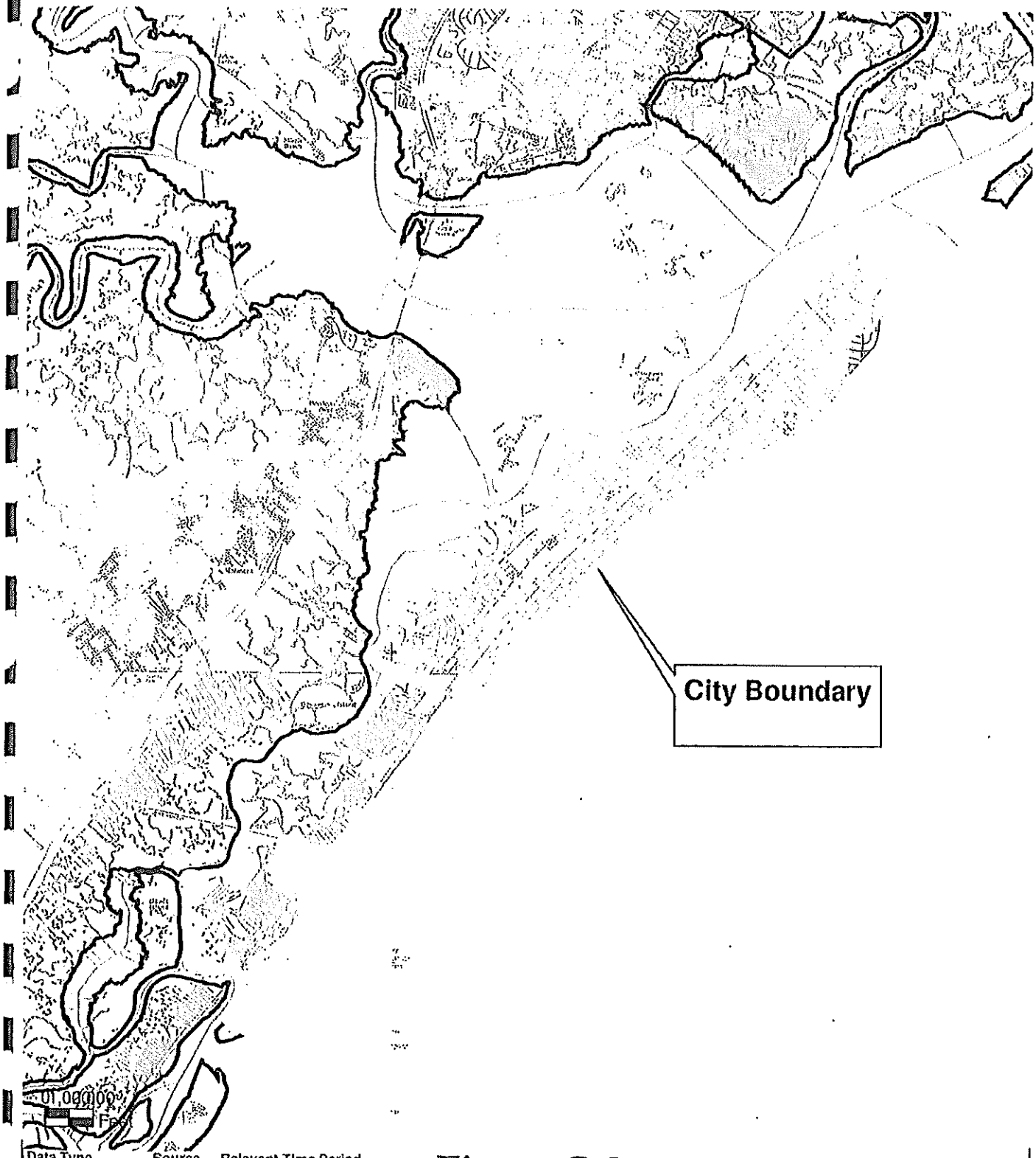
Ocean City's Stormwater Management Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies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

Nonstructural Stormwater Management Strategies

In accordance with NJDEP's Stormwater Regulations at N.J.A.C. 7:8-4.2(c)10, since the City of Ocean City is not required to perform a build out analysis, it is also not required to perform a review of its master plan and ordinances, and therefore, a list of the sections in Ocean City's land use and zoning ordinances is not included in the Stormwater Management Plan.

Land Use/Build-Out Analysis

The City of Ocean City does not have a combined total of greater than one square mile of vacant or agricultural land; therefore, it is not required to complete a build-out analysis.



Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
C1 Waters	NJDEP	2003

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

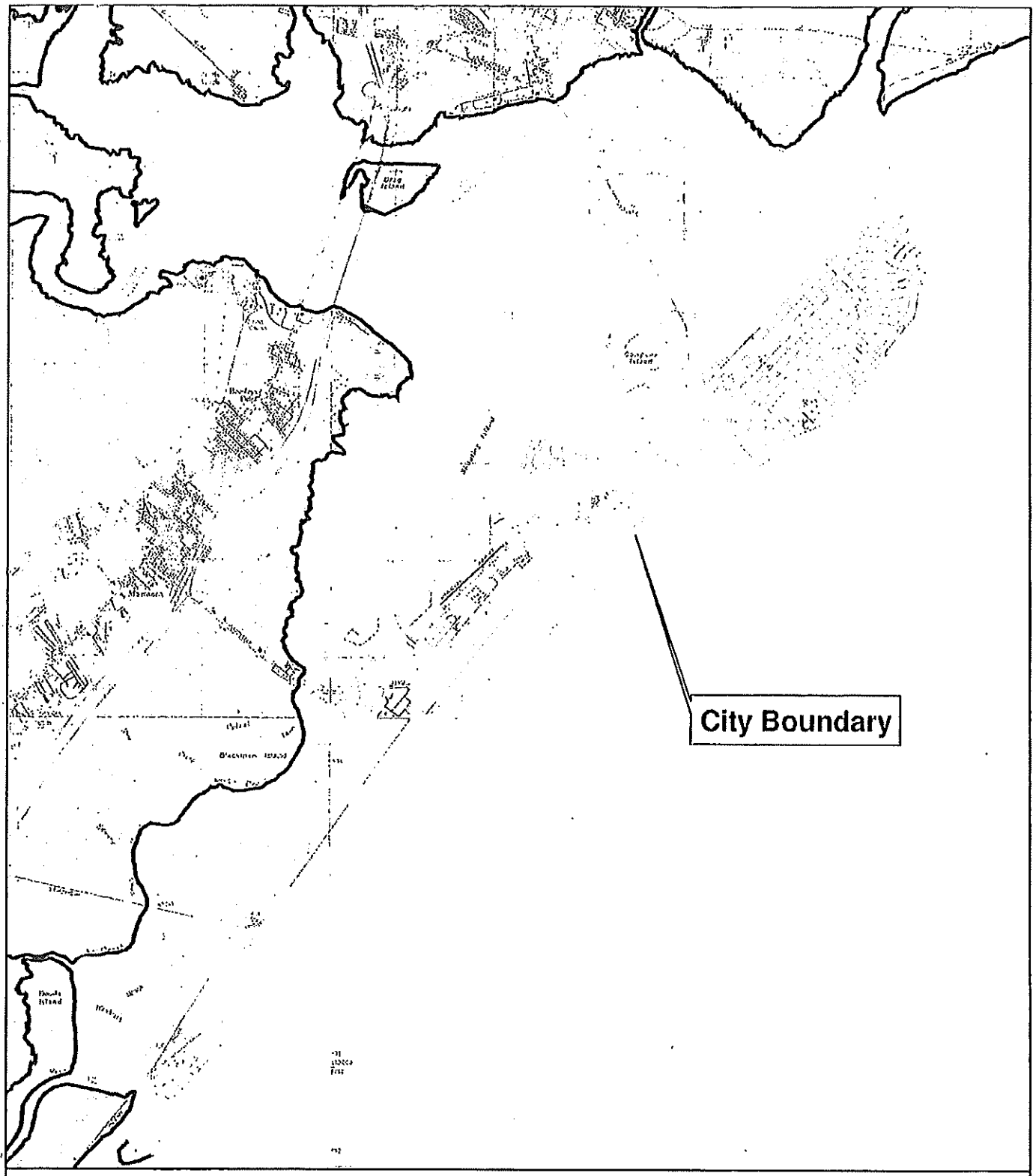
Figure C-2

City and its Waterways

Ocean City
Cape May County, New Jersey

Symbol Legend
- Municipal Boundary

C1 Waters
- FW2-NT
- FW2-TM
- FW2-TMC1
- FW2-TP
- FW2-TPC1



Data Type	Source	Relevant Time Period
USGS Quadrangles		Feb-Apr 2002
Municipal Boundary	NJDEP	1989

0 1,0002,000 Feet

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection. Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure C-3

City Boundary on USGS Quadrangles

Ocean City
Cape May County, New Jersey

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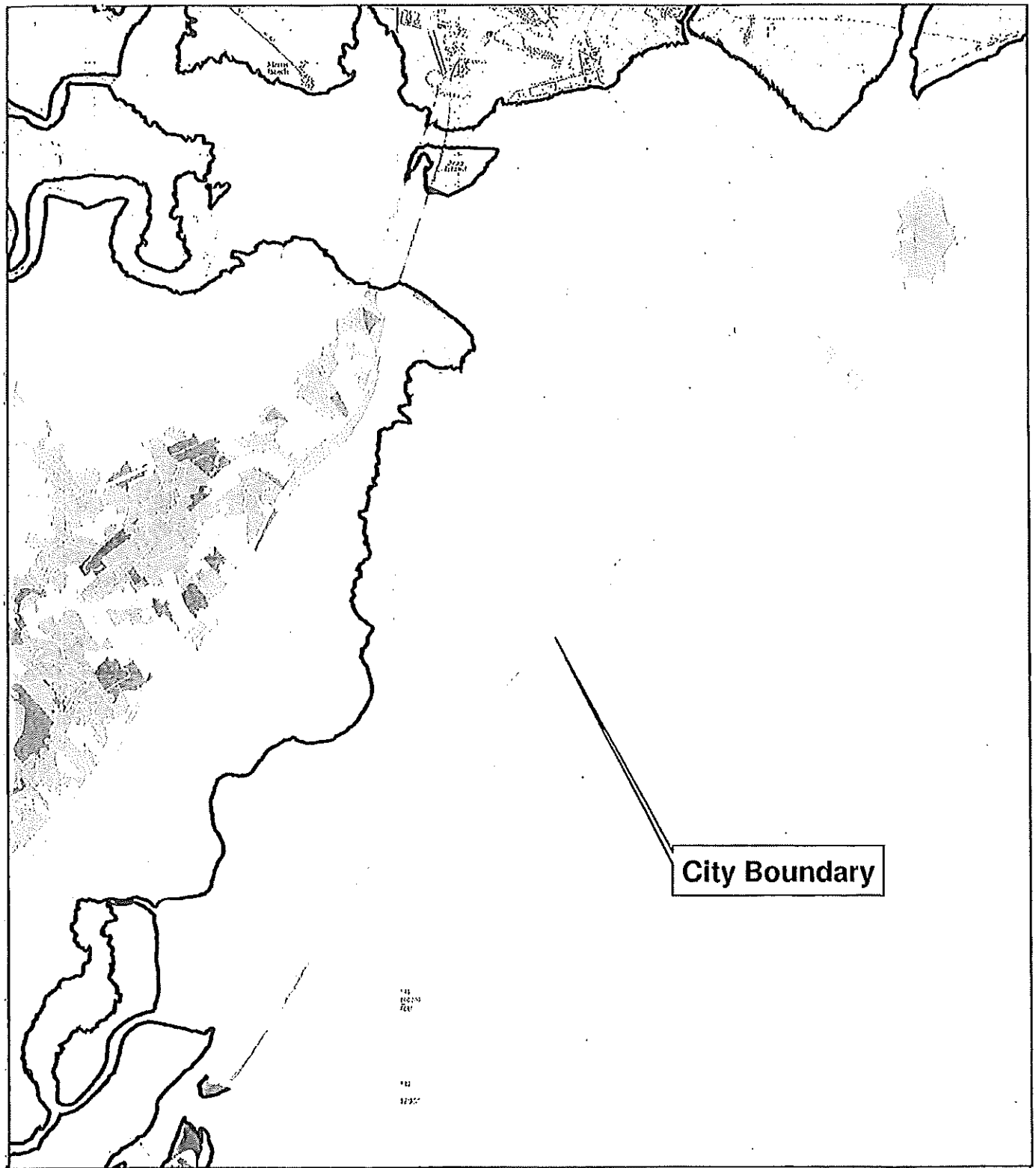
SCHOOLS OF PLANNING



Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1999
Groundwater Recharge Areas	NJDEP	Various

0 1,000 2,000
Feet

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Figure C-4

Groundwater Recharge Areas in the City

Ocean City
Cape May County, New Jersey

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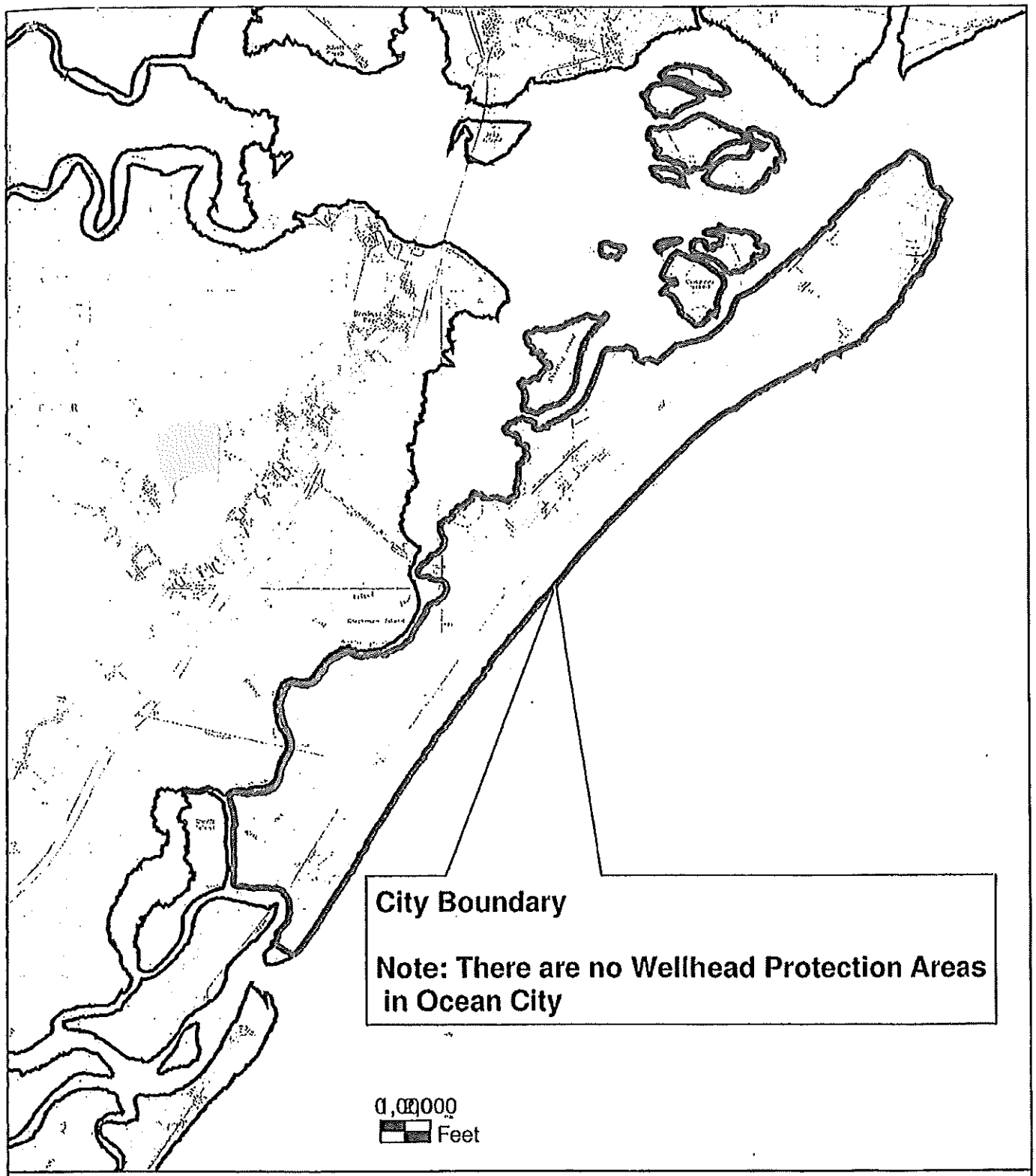
Symbol Legend
- Municipal Boundary

Ground Water Recharge Areas
- 0.00 in/yr
- 0.01 - 9.00 in/yr
- 9.01 - 12.00 in/yr
- 12.01 - 16.00 in/yr
- 16.01 - 22.74 in/yr

SCHOOR DEPALMA



Data Type	Source	Relevant Time Period
USGS Quadrangles	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1999
Wellhead Protection Areas	NJDEP	2004 (Updated)

Figure C-5

Wellhead Protection Areas in the City

Ocean City
Cape May County, New Jersey

Symbol Legend
- Municipal Boundary
- Wellhead Protection Areas
  - 2 Year
  - 5 Year
  - 12 Year

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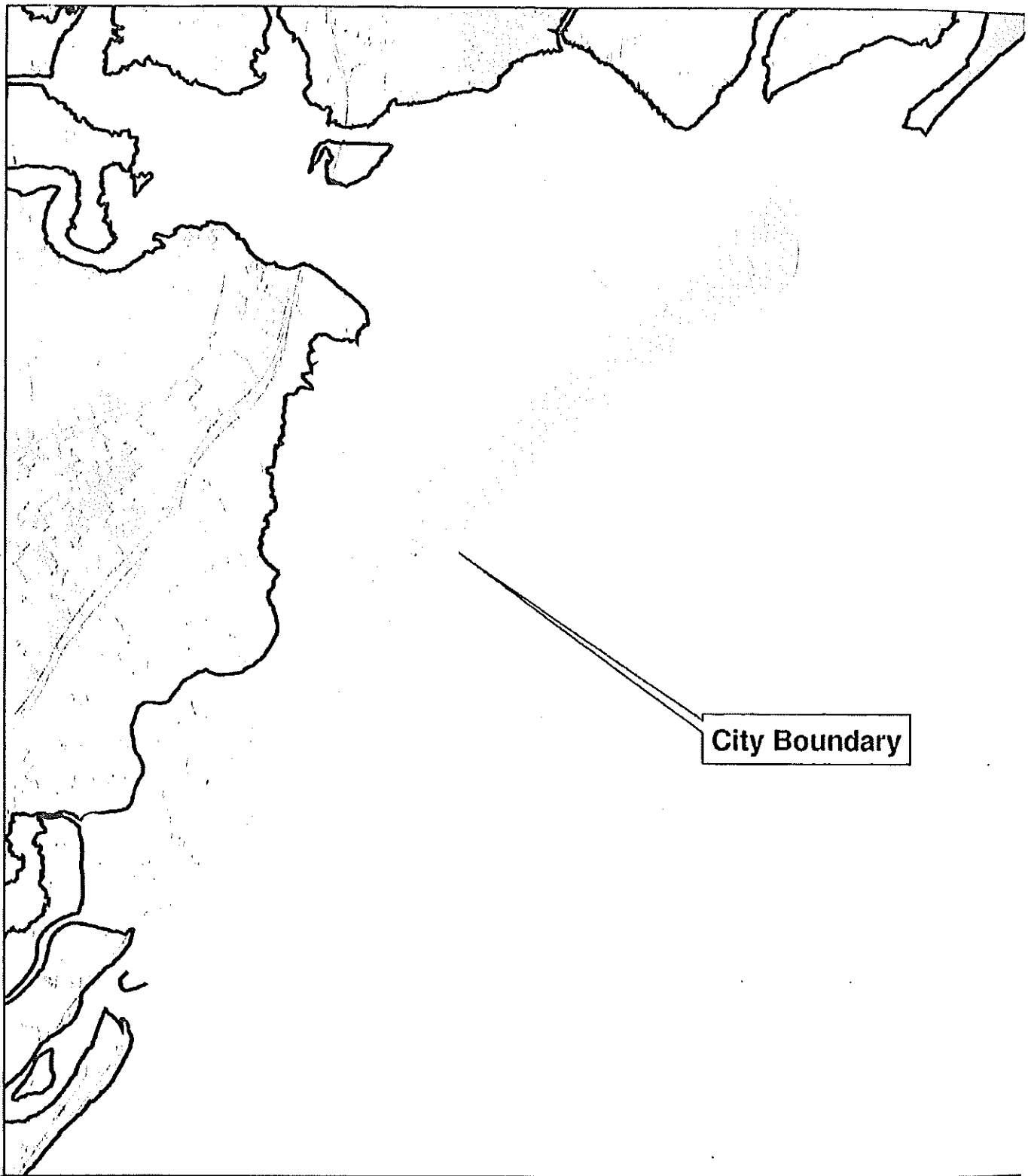

Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Land Use/ Land Cover	NJDEP	1995/1997

0 1,000 2,000
Feet

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Figure C-6

City's Existing Land Use

Ocean City
Cape May County, New Jersey

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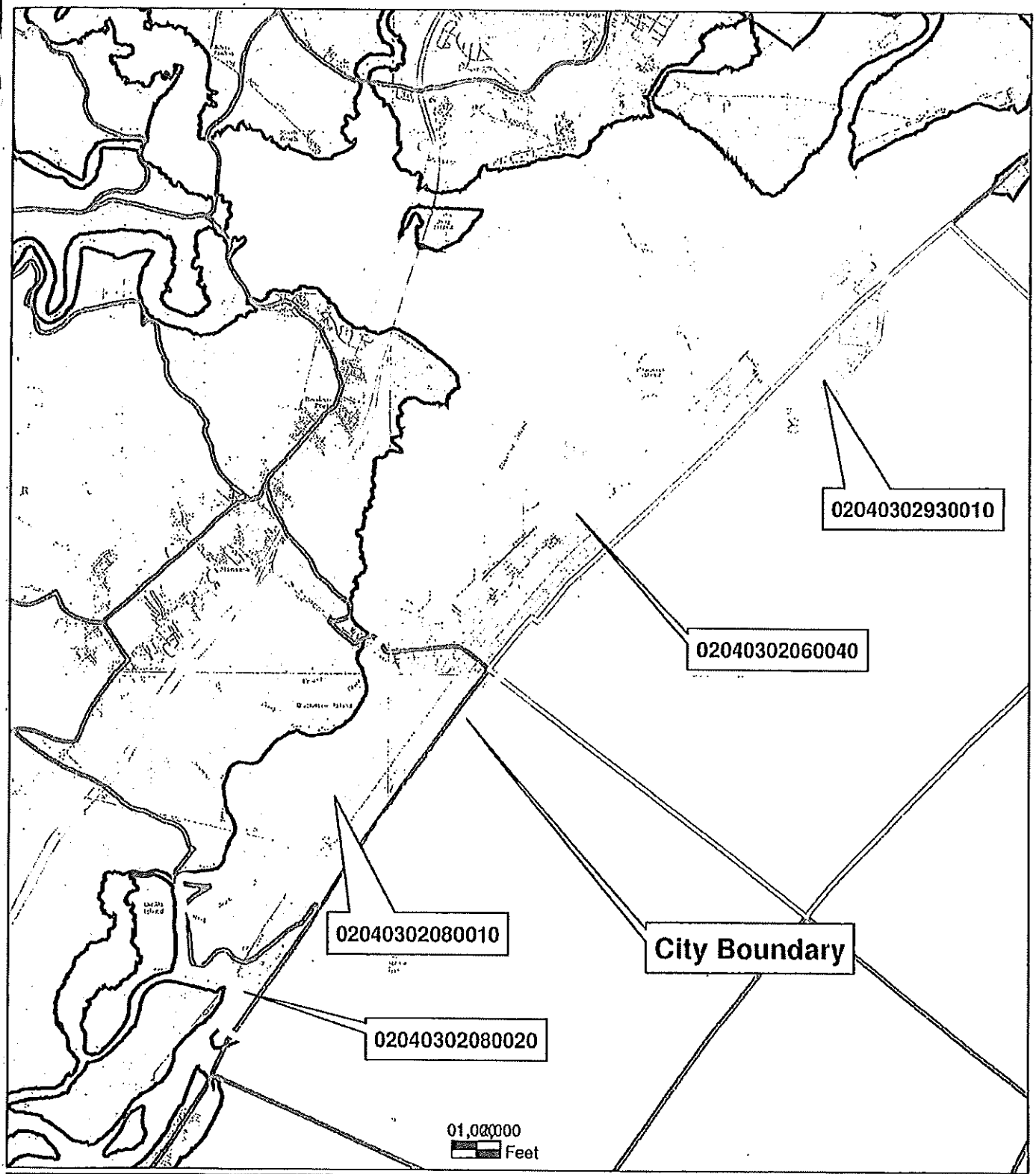
SCHOOLS DEVELOPMENT AUTHORITY

Symbol Legend
- Municipal Boundar
- Land Use
- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS



Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1999
HUC14	NJDEP	2000

Figure C-7

Hydrologic Units (HUC14) Within the City

Ocean City

Cape May County, New Jersey

Symbol Legend

- NJDEP Huc 14
- Municipal Boundary

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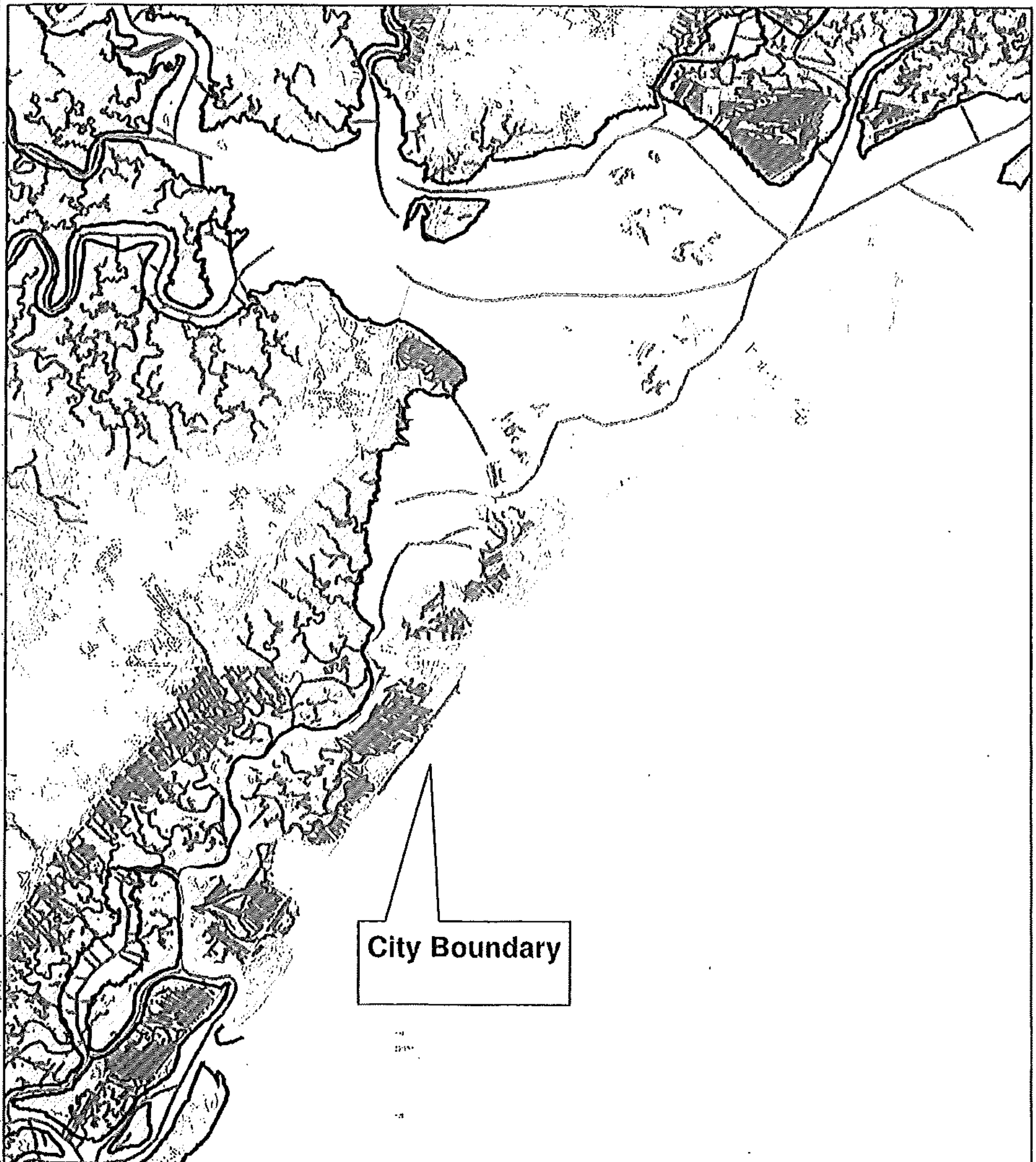

Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wetlands	NJDEP	1986
Lakes	NJDEP	1986
Streams	NJDEP	1998

1,000 2,000 Feet

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Figure C-9

Wetlands and Water Land Uses within the City

Ocean City
Cape May County, New Jersey

Symbol Legend
- Streams
- Lakes
- Wetlands
- Municipal Boundary