Municipal Stormwater Management Plan

Township of Lawrence
County of Mercer, State of New Jersey

April 7, 2005

Prepared by Lawrence Township Engineering Department

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Lawrence Township, Mercer County New Jersey ("Township") to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. 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 base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

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

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 1 in Appendix B) 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.

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 Township of Lawrence is comprised of approximately 22.1 square miles in Mercer County, New Jersey. Development within the Township has reached a constant rate and consists primarily of redevelopment. New projects comprise a very small percentage of overall development. The population of the Township has increased from 19,724 in 1980 to 25,787 in 1990 to 29,159 in 2000. The population increase from 1980 to 1990 resulted in significant demand for new development. Projected population growth trends within the township indicate that the inventory of vacant land that is zoned residential is negligible. Also, the inventory of vacant land which is zoned residential is negligible. Both of these two factors have steadied stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure 2 illustrates the waterways in the Township: Assunpink Creek, Five Mile Run (Little Shabakunk Creek), Sand Run, Shabakunk Creek, Shipetaukin Creek and Stony Brook. Figure 3 depicts the Township 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 are used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics. The only major stream within the township is the Stony Brook, site ID 01401000. In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. 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. Sub list 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed. A map of the groundwater recharge areas are shown in Figure 4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure 5.

The township has identified one particular watershed of severe flooding, that being the Shabakunk Creek. The Shabakunk originates in Ewing Township and flows to Colonial Lake, located in Lawrence and eventually discharges into the Assunpink Creek. As a result of continuous upstream bank erosion, Colonial Lake has experienced moderate to severe siltation problems. The lake was completely dredged in 1998 and a maintenance dredge recently completed in 2004. Maintenance dredges are anticipated and budgeted every five years. Both Ewing and Lawrence continue to identify and remediate upstream erosion areas.

Design and Performance Standards

The Township 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 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 ordinances will be submitted to the Mercer County for review and approval within 12 months from the adoption of this Stormwater Management Plan by the Lawrence Township Planning Board.

Stormwater management measures are required to be owned and operated by private entities, such as owners associations, for both residential and commercial construction. The township currently requires and approves association documents as part of the site plan or subdivision approval process and ensures appropriate language is included regarding maintenance and safety requirements. During construction, Township inspectors will observe the construction of all projects to ensure that the stormwater management measures are constructed and function as designed.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area, therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs). The Stony Brook has been identified as a TMDL. If any reduction requirements in non point sources are developed or if any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

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

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures. Lawrence Township is an exempt municipality and regulates all Soil Conservation standards.

Nonstructural Stormwater Management Strategies

The Township has reviewed the Master Plan and Land Use Ordinance and has identified no additional sections that are to be modified. The current content incorporates many nonstructural stormwater management strategies, such as landscape and stream buffers, cluster development standards, natural feature preservation, mitigation of additional impervious coverage, performance standards for pollution control and an extensive tree preservation section. As future non structural management strategies are developed, the ordinances will be amended and submitted to the county review agency for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

Land Use/Build-Out Analysis

A detailed land use analysis for the Township was conducted. Figure 6 illustrates the existing land use in the Township based upon the on 1995/97 GIS information from NJDEP. Figure 2 illustrates the HUC14s within the Township. The Township zoning map is shown in Figure 7. Figure 8 illustrates the constrained lands within the Township. The build-out calculations for impervious cover are shown in Table 1. Based upon the analysis, the total projected impervious coverage of developable land is approximately 28% of the gross land area of the township.

Mitigation Plans

A mitigation plan will be required if a proposed development is granted a variance or exception from stormwater management design and performance standards. The township does not anticipate granting any relief from these requirements. Potential mitigation sites have not been identified on any township property.

APPENDIX A

Tables

ble 1
Build Out and Non . Source Load Calculations

HUC14	HUC14 Area	ZONE_CODE	ZONE ACRES	CONSTRAIN LAND	DEVLOP AREA	ALLOW IMP.	BUILD OUT IMP AREA	TP (lbs/ac/yr)	TP (lbs/yr)	TN (lbs/ac/yr)	TN (lbs/yr)	TSS (lbs/ac/yr)	TSS (lbs/yr)
02030105090050	1155.69	EGI	3.61	0.00	3.61	60%	2.17	0.60	2	5	18	100	361
Stony Bk(Province Line Rd to 74d46m dam)		EP-1	32.48	0.22	32.26	12%	3.87	0.60	19	5	161	100	3226
		EP-2	647.87	128.06	519.81	12%	62.38	0.60	312	5	2599	100	51981
		OS	147.15	49.80	97.35	10%	9.74	1.30	127	10	974	300	29205
		RD-1	324.58	27.53	297.05	30%	89.11	2.10	624	22	6535	200	59410
02030105090060	782.25	EP-1	473.34	79.59	393.75	12%	47.25	0.60	236	5	1969	100	39375
Stony Bk (Rt 206 to Province Line Rd)		EP-2	58.86	3.63	55.23	13%	7.18	0.60	33	5	276	100	5523
		OS	182.74	45.24	137.50	10%	13.75	1.30	179	10	1375	300	41251
		RD-1	67.30	1.54	65.76	30%	19.73	2.10	138	22	1447	200	13153
02030105090070	436.21	EGI	11.72	0.37	11.35	60%	6.81	0.60	7	5	57	100	1135
Stony Bk (Harrison St to Rt 206)		EP-1	43.61	0.00	43.61	12%	5.23	0.60	26	5	218	100	4361
		EP-2	362.41	25.06	337.35	13%	43.86	0.60	202	5	1687	100	[illegible]735
		OS	18.47	14.63	3.84	10%	0.38	1.30	5	10	38	300	[illegible]52
02030105090080	3.31	HC	1.21	0.00	1.21	70%	0.85	2.10	3	22	27	200	242
Sand Run		PVD-2	0.30	0.00	0.30	65%	0.19	1.40	0	15	4	140	42
		RC	1.80	0.00	1.80	70%	1.26	2.10	4	22	40	200	360
02040105230050	714.05	EGI	31.98	15.42	16.56	60%	9.94	0.60	10	5	83	100	1656
Assunpink Ck (Shipetaukin to Trenton Rd)		HC	0.21	0.00	0.21	70%	0.15	2.10	0	22	5	200	42
		I-1	272.90	162.32	110.58	30%	33.17	1.50	166	16	1769	200	22115
		I-2	73.00	22.18	50.82	75%	38.12	1.50	76	16	813	200	10165
		MX	116.30	68.79	47.51	60%	28.51	1.00	48	10	475	120	5701
		NC-2	24.72	6.66	18.06	80%	14.45	1.00	18	10	181	120	2167
		OS	110.26	83.34	26.92	10%	2.69	1.30	35	10	269	300	8076
		PO	14.63	4.13	10.50	70%	7.35	2.10	22	22	231	200	2100
		PVD-2	70.05	8.81	61.24	65%	39.81	1.40	86	15	919	140	8574
02040105230060	6018.51	AT	65.76	8.88	56.88	35%	19.91	1.40	80	15	853	140	7964
Shipetaukin Creek		EGI	462.91	60.43	402.48	60%	241.49	0.60	241	5	2012	100	40248
		EP-1	1205.74	254.48	951.26	12%	114.15	0.60	571	5	4756	100	95126
		EP-2	884.47	190.72	673.75	13%	87.59	0.60	404	5	3369	100	67375
		HC	200.67	20.68	179.99	70%	125.99	2.10	378	22	3960	200	35998
		I-1	412.55	305.09	107.46	30%	32.24	1.50	161	16	1719	200	21492
		I-2	138.96	51.93	87.03	75%	65.27	1.50	131	16	1392	200	17405
		MX	136.66	105.54	31.12	60%	18.67	1.00	31	10	311	120	3735
		NC-1	16.27	0.00	16.27	80%	13.01	1.00	16	10	163	120	1952
		O	25.15	1.91	23.24	75%	17.43	2.10	49	22	511	200	4648
		OS	1045.98	529.50	516.46	10%	51.65	1.30	671	10	5165	300	154937
		PVD-1	97.61	16.79	80.82	65%	52.53	1.40	113	15	1212	140	[illegible]314
		PVD-2	172.15	64.34	107.81	65%	70.07	1.40	151	15	1617	140	[illegible]03
		R2-A	9.81	0.00	9.81	35%	3.43	0.60	6	5	49	100	[illegible]31
		R2-B/PO	4.10	0.00	4.10	70%	2.87	2.10	9	22	90	200	820
		R2-B	450.32	6.51	443.81	40%	177.52	0.60	266	5	2219	100	44381
		RC	117.89	3.48	114.43	70%	80.10	2.10	240	22	2517	200	22886
		RD-1	245.71	34.57	211.14	30%	63.34	2.10	443	22	4845	200	42227
		RD-2	292.39	41.22	251.17	70%	175.82	2.10	527	22	5526	200	50233
		RD-2 / SCR	52.05	35.34	16.71	50%	8.36	1.40	23	15	251	140	2340
		SCR	1.36	0.00	1.36	50%	0.68	1.40	2	15	20	140	190

Pollutant load factors from NJDEP Stormwater BMP Manual 2004

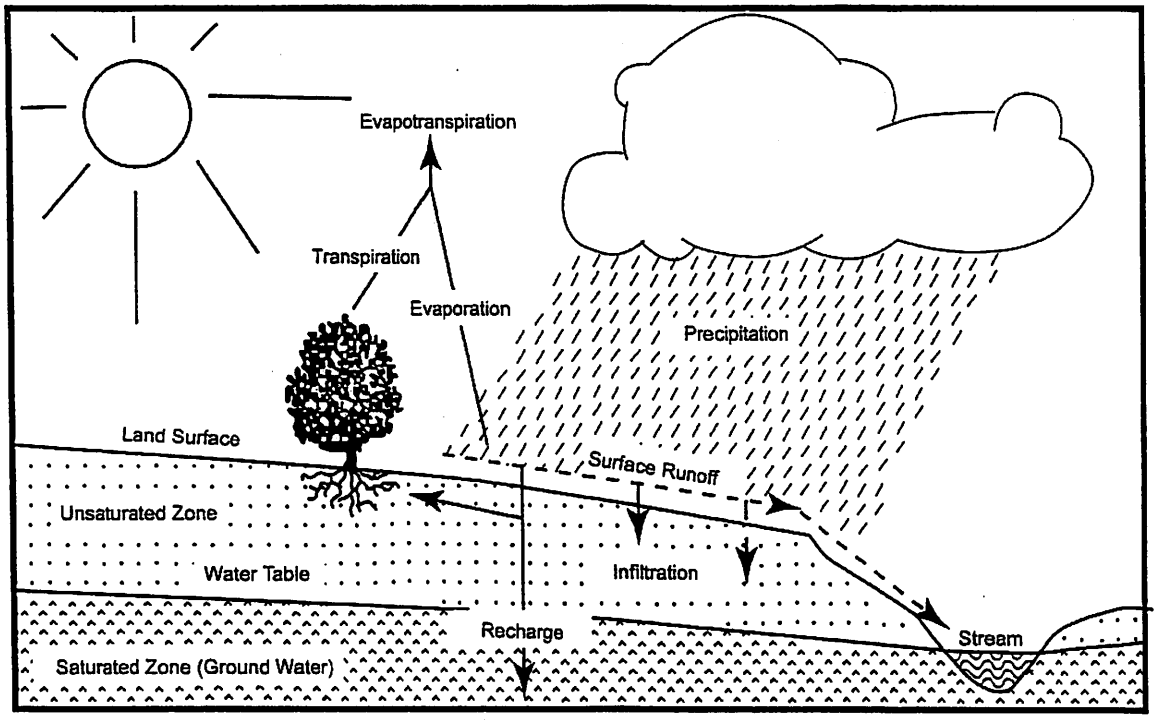
ble 1
Build Out and Nonpo... Source Load Calculations

HUC14	HUC14 Area	ZONE_CODE	ZONE ACRES	CONSTRAIN LAND	DEVLOP AREA	ALLOW IMP.	BUILD OUT IMP AREA	TP (lbs/ac/yr)	TP (lbs/yr)	TN (lbs/ac/yr)	TN (lbs/yr)	TSS (lbs/ac/yr)	TSS (lbs/yr)
02040105240010	1987.77	AT	75.06	14.98	60.08	35%	21.03	1.40	84	15	901	140	8411
Shabakunk Creek		EGI	266.41	81.09	185.32	60%	111.19	0.60	111	5	927	100	18532
		EP-1	2.33	0.00	2.32	12%	0.28	0.60	1	5	12	100	232
		HC	189.89	20.53	169.36	70%	118.55	2.10	356	22	3726	200	33871
		I-2	1.65	1.28	0.57	75%	0.43	1.50	1	16	9	200	114
		NC-1	48.17	0.40	47.77	80%	38.22	1.00	48	10	478	120	5733
		NC-2	18.90	0.75	18.15	80%	14.52	1.00	18	10	181	120	2178
		O	18.90	0.00	18.90	75%	14.18	2.10	40	22	416	200	3781
		OS	183.63	118.92	64.71	10%	6.47	1.30	84	10	647	300	19414
		PO	4.87	0.06	4.81	70%	3.36	2.10	10	22	106	200	961
		R-1	174.54	16.03	158.51	25%	39.63	0.60	95	5	793	100	15851
		R2-A	87.04	0.00	87.04	35%	30.46	0.60	52	5	435	100	)704
		R2-B	38.00	1.34	36.66	40%	14.66	0.60	22	5	183	100	)66
		R2-B	4.52	0.00	4.52	40%	1.81	0.60	3	5	23	100	452
		R-3	168.59	37.57	131.02	50%	65.51	1.40	183	15	1965	140	18342
		R-4	665.06	42.25	622.81	60%	373.69	1.40	872	15	9342	140	87194
		R-5	24.72	0.00	24.72	75%	18.54	1.40	35	15	371	140	3460
		SCR	17.25	0.30	16.95	50%	8.48	1.40	24	15	254	140	2373
02040105240020	36.34	EGI	0.73	0.55	0.18	60%	0.11	0.60	0	5	1	100	18
Shabakunk Creek WB		HC	26.08	3.54	22.54	70%	15.78	2.10	47	22	496	200	4509
		OS	9.53	5.41	4.12	10%	0.41	1.30	5	10	41	300	1235
		R-4	0.22	0.00	0.22	60%	0.13	1.40	0	15	3	140	31
02040105240050	2928.49	AT	111.50	10.48	101.02	35%	35.36	1.40	141	15	1515	140	14143
Assunpink Creek (below Shipetaukin Ck)		EGI	399.89	77.64	322.25	60%	193.35	0.60	193	5	1611	100	32225
		EP-1	13.21	0.00	13.21	12%	1.59	0.60	8	5	66	100	1321
		HC	153.56	25.53	128.03	70%	89.62	2.10	269	22	2817	200	25607
		I-1	0.09	0.09	0.00	30%	0.00	1.50	0	16	0	200	0
		I-2	74.54	19.02	55.52	75%	41.64	1.50	83	16	888	200	11103
		NC-1	14.05	0.00	14.05	80%	11.24	1.00	14	10	141	120	1686
		NC-2	13.21	1.61	11.60	80%	9.28	1.00	12	10	116	120	1392
		O	104.74	7.52	97.22	75%	72.92	2.10	204	22	2139	200	19445
		OS	356.73	169.89	186.84	10%	18.68	1.30	243	10	1868	300	56051
		PVD-1	65.46	7.03	58.43	65%	37.98	1.40	82	15	876	140	8180
		R-1	429.27	94.20	335.07	25%	83.77	0.60	201	5	1675	100	33507
		R2-A	200.46	11.46	189.00	35%	66.15	0.60	113	5	945	100	18900
		R2-B	51.26	2.47	48.79	40%	19.51	0.60	29	5	244	100	4879
		R2-B	301.56	73.72	227.84	40%	91.14	0.60	137	5	1139	100	22784
		R-3	390.50	16.19	374.31	50%	187.16	1.40	524	15	5615	140	)03
		R-4	127.66	1.83	125.83	60%	75.50	1.40	176	15	1887	140	.16
		R-5	0.26	0.00	0.26	75%	0.19	1.40	0	15	4	140	36
		RD-2	42.66	3.92	38.74	70%	27.12	2.10	81	22	852	200	7748
		SCR	77.89	14.52	63.37	50%	31.69	1.40	89	15	951	140	8872
			14084.74	3360.84	10703.90		3901.35		11585		111187		1563410

Pollutant load factors from NJDEP Stormwater BMP Manual 2004

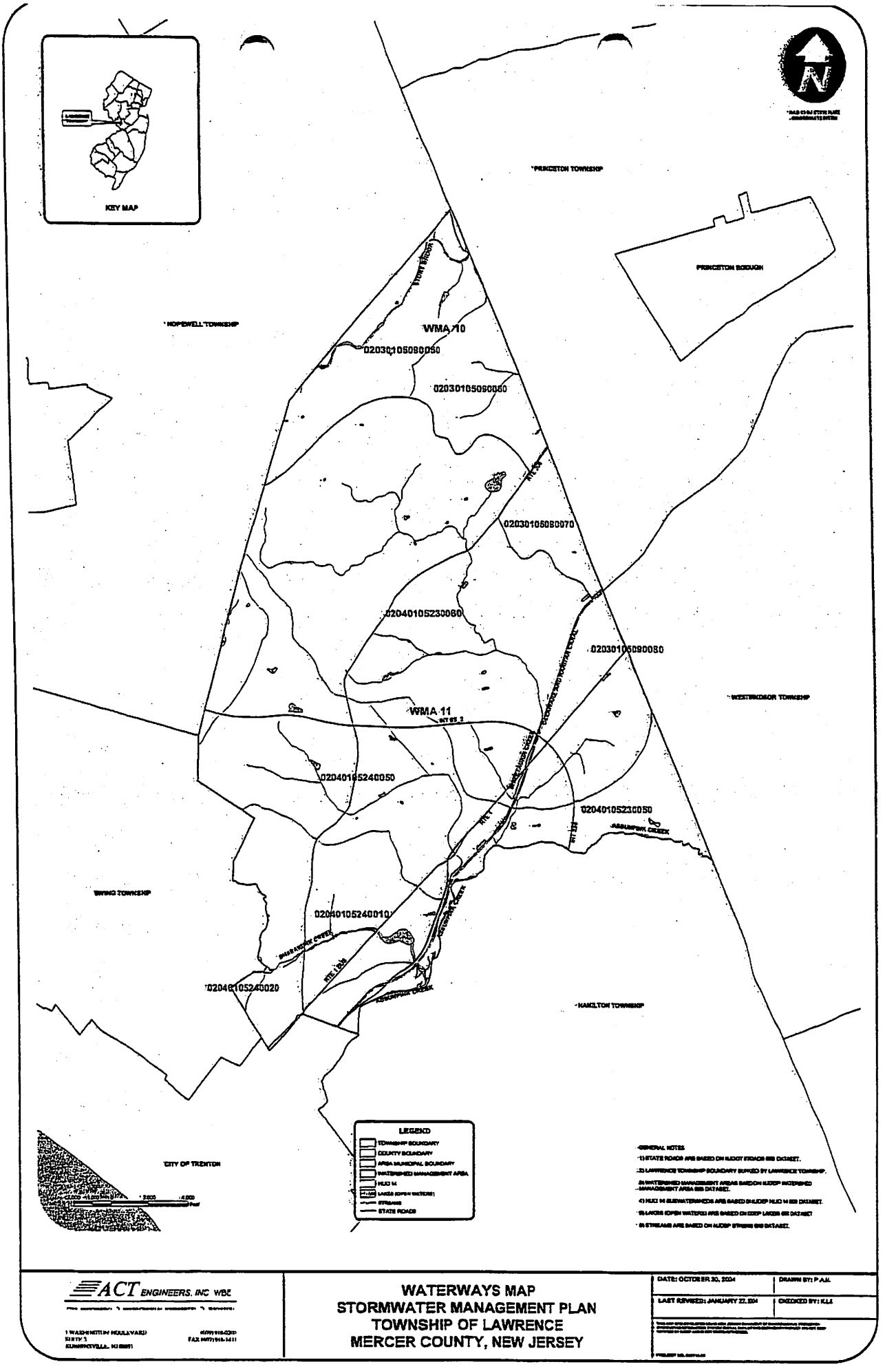
APPENDIX B

Figures



Source: New Jersey Geological Survey Report GSR-32

Figure 1: Groundwater Recharge in the Hydrologic Cycle


KEY MAP
PRINCETON TOWNSHIP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WMA 10
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02030105090060
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02040105230060
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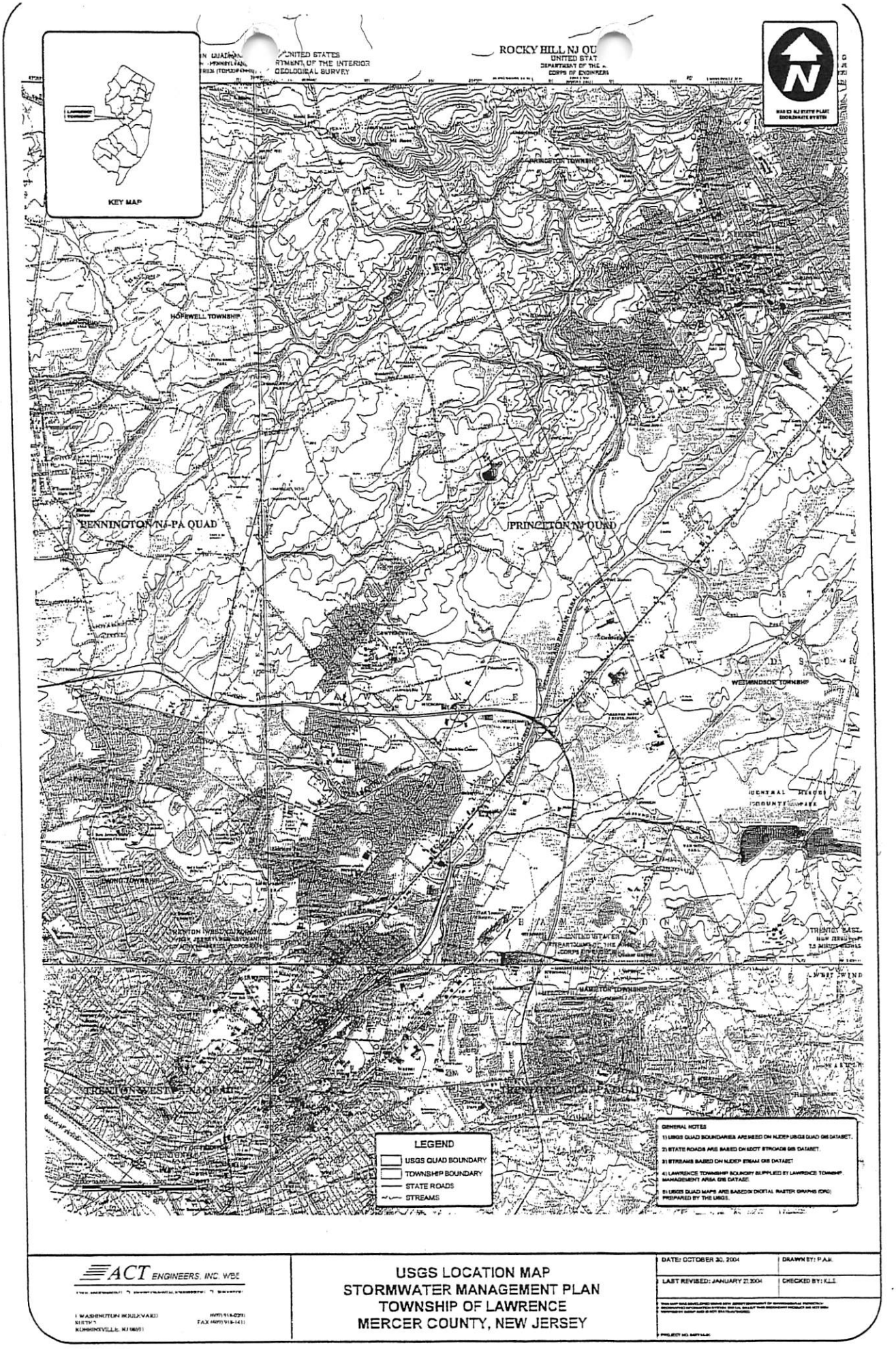
WMA 11
02040105240050
02040105230050
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
02040105240010
02040105240020
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
LAKES (OPEN WATERS)
STREAMS
STATE ROADS
GENERAL NOTES
ACT ENGINEERS, INC WBE
WATERWAYS MAP
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: OCTOBER 30, 2024
DRAWN BY: P.A.M.
LAST REVISED: JANUARY 22, 2025
CHECKED BY: K.L.I

Figure 2



ACT ENGINEERS, INC. WBE

1 WASHINGTON BOULEVARD
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(609) 918-0291
FAX (609) 918-1411

USGS LOCATION MAP
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY

DATE: OCTOBER 30, 2004 | DRAWN BY: P.A.K.
LAST REVISED: JANUARY 27, 2005 | CHECKED BY: K.L.S.

PROJECT NO. 04P1146

Figure 3

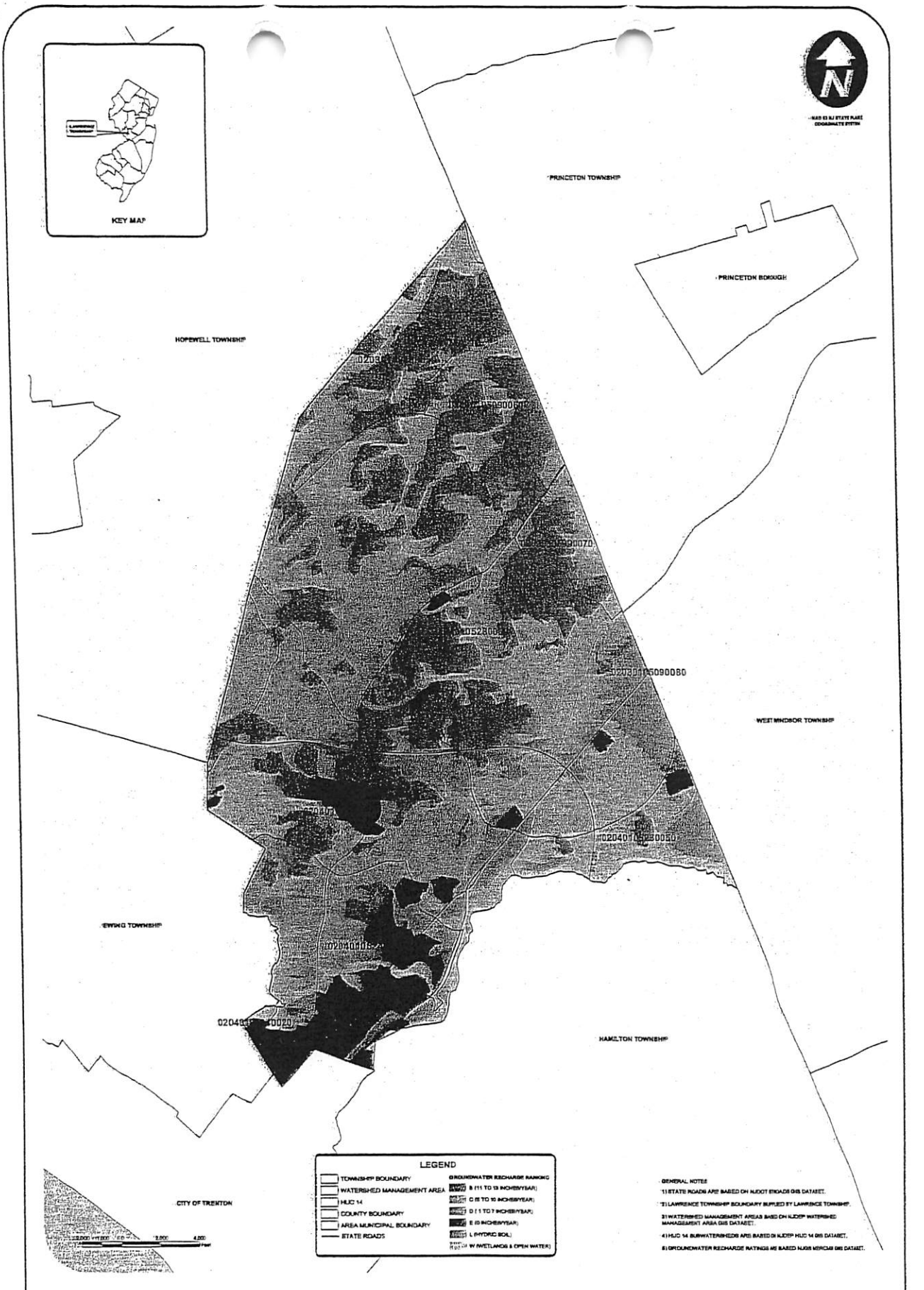
KEY MAP
PRINCETON TOWNSHIP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
STATE ROADS
GROUNDWATER RECHARGE RANKING
B (11 TO 13 INCHES/YEAR)
C (8 TO 10 INCHES/YEAR)
D (1 TO 7 INCHES/YEAR)
E (0 INCHES/YEAR)
L (HYDRIC SOIL)
W (WETLANDS & OPEN WATER)
GENERAL NOTES
1) STATE ROADS ARE BASED ON NJDOT STADAS GIS DATASET.
2) LAWRENCE TOWNSHIP BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
3) WATERSHED MANAGEMENT AREAS BASED ON NJDEP WATERSHED MANAGEMENT AREA GIS DATASET.
4) HUC 14 SUBWATERSHEDS ARE BASED ON NJDEP HUC 14 GIS DATASET.
5) GROUNDWATER RECHARGE RATINGS ARE BASED NJGS MERCER GIS DATASET.
ACT ENGINEERS, INC.
SOIL GROUNDWATER RECHARGE RANKING
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: DECEMBER 12, 2004
DRAWN BY: P.A.K
LAST REVISED:
CHECKED BY: K.L.I

Figure 4

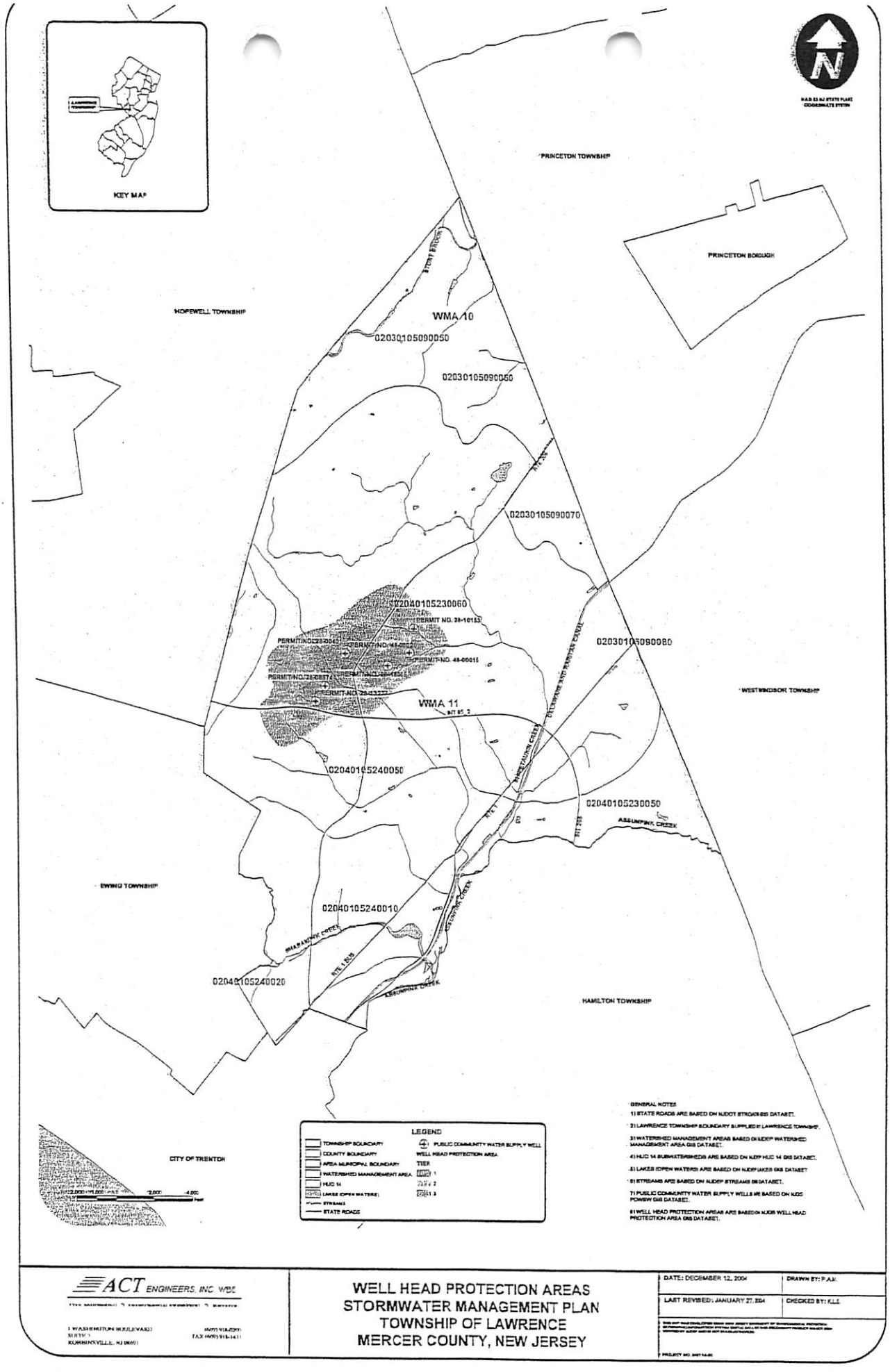
KEY MAP
PRINCETON TOWNSHIP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WMA 10
02030105090050
02030105090060
02030105090070
02040105230060
02030105090080
WMA 11
02040105240050
02040105230050
ASSUNPINK CREEK
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
02040105240010
02040105240020
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
LAKES (OPEN WATERS)
STREAMS
STATE ROADS
PUBLIC COMMUNITY WATER SUPPLY WELL
WELL HEAD PROTECTION AREA
TIER
GENERAL NOTES
1) STATE ROADS ARE BASED ON NJDOT STROAD GIS DATASET.
2) LAWRENCE TOWNSHIP BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
3) WATERSHED MANAGEMENT AREAS BASED ON NJDEP WATERSHED MANAGEMENT AREA GIS DATASET.
4) HUC 14 SUBWATERSHEDS ARE BASED ON NJDEP HUC 14 GIS DATASET.
5) LAKES (OPEN WATERS) ARE BASED ON NJDEPLAKES GIS DATASET
6) STREAMS ARE BASED ON NJDEP STREAMS GIS DATASET.
7) PUBLIC COMMUNITY WATER SUPPLY WELLS ARE BASED ON NJDS POWSW GIS DATASET.
8) WELL HEAD PROTECTION AREAS ARE BASED ON NJDS WELL HEAD PROTECTION AREA GIS DATASET.
ACT ENGINEERS, INC.
WELL HEAD PROTECTION AREAS
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: DECEMBER 12, 2004
DRAWN BY: P.A.M.
LAST REVISED: JANUARY 27, 2004
CHECKED BY: K.L.S

Figure 5


KEY MAP
PRINCETON TOWNSHIP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
STATE ROADS
LEVEL 1 CLASSIFICATION
AGRICULTURE
BARREN LAND
FOREST
URBAN
WATER
WETLANDS
GENERAL NOTES
1) STATE ROADS ARE BASED ON NJDOT ROADS GIS DATASET.
2) LAWRENCE TOWNSHIP BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
3) WATERSHED MANAGEMENT AREAS BASED ON NJDEP WATERSHED MANAGEMENT AREA GIS DATASET.
4) HUC 14 SUBWATERSHEDS ARE BASED ON NJDEP HUC 14 GIS DATASET.
5) 1995 LAND USE/LAND COVER AREAS BASED ON NJDEP 1995 LAND USE/LAND COVER GIS DATASET.
ACT ENGINEERS, INC WBE
EXISTING LAND USE MAP
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: OCTOBER 30, 2004
DRAWN BY: PAK
LAST REVISED: DECEMBER 6, 2004
CHECKED BY: KJJ

Figure 6

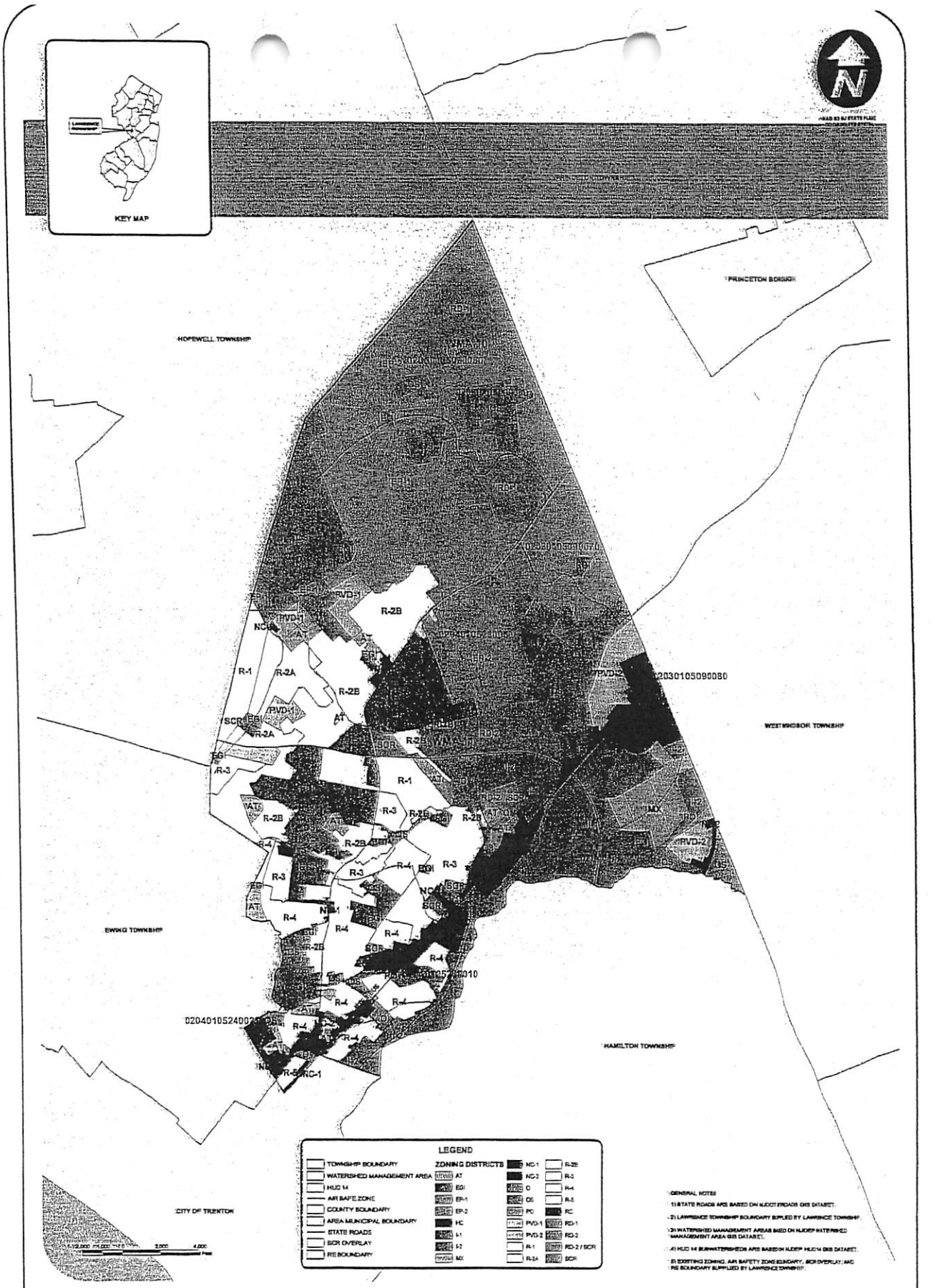
KEY MAP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
AIR SAFE ZONE
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
STATE ROADS
SCR OVERLAY
RE BOUNDARY
ZONING DISTRICTS
AT
EGI
EP-1
EP-2
HC
I-1
I-2
MX
NC-1
NC-2
O
OS
PC
PVD-1
PVD-2
R-1
R-2A
R-2B
R-3
R-4
R-5
RC
RD-1
RD-2
RD-2 / SCR
SCR
GENERAL NOTES
1) STATE ROADS ARE BASED ON NJDOT ROADS GIS DATASET.
2) LAWRENCE TOWNSHIP BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
3) WATERSHED MANAGEMENT AREAS BASED ON NJDEP WATERSHED MANAGEMENT AREA GIS DATASET.
4) HUC 14 SUBWATERSHEDS ARE BASED ON NJDEP HUC14 GIS DATASET.
5) EXISTING ZONING, AIR SAFETY ZONE BOUNDARY, SCR OVERLAY, AND RE BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
ACT ENGINEERS, INC.
EXISTING ZONING
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: OCTOBER 30, 2004
DRAWN BY: P.A.P.
LAST REVISED: DECEMBER 14, 2004
CHECKED BY: K.L.S.

Figure 7

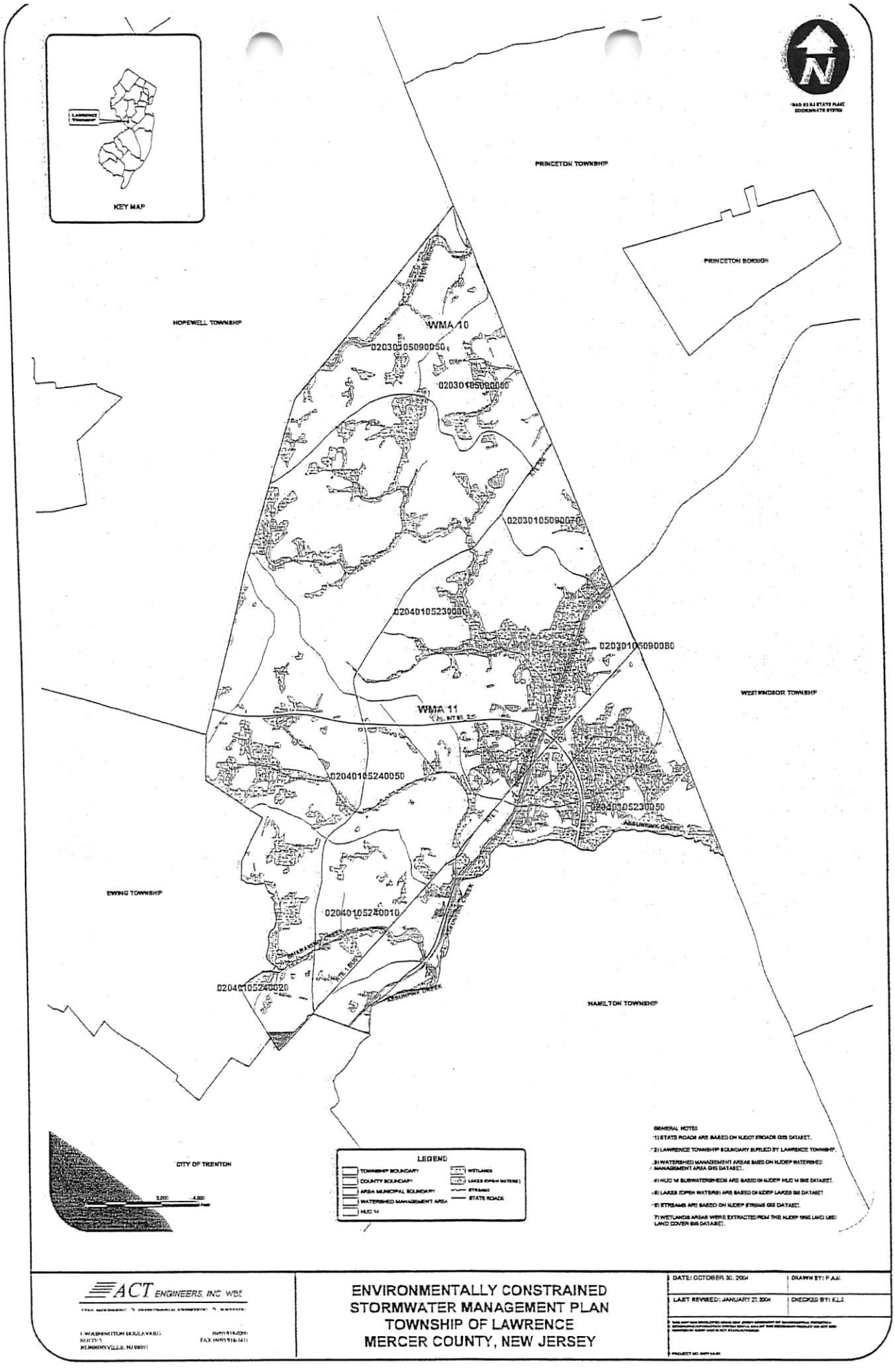
KEY MAP
PRINCETON TOWNSHIP
PRINCETON BOROUGH
HOPEWELL TOWNSHIP
WMA 10
02030105090050
02030105090060
02030105090070
02040105230060
02030105090080
WMA 11
02040105240050
02040105230050
WEST WINDSOR TOWNSHIP
EWING TOWNSHIP
02040105240010
02040105240020
HAMILTON TOWNSHIP
CITY OF TRENTON
LEGEND
TOWNSHIP BOUNDARY
COUNTY BOUNDARY
AREA MUNICIPAL BOUNDARY
WATERSHED MANAGEMENT AREA
HUC 14
WETLANDS
LAKES (OPEN WATERS)
STREAMS
STATE ROADS
GENERAL NOTES
1) STATE ROADS ARE BASED ON NJDOT STROADE GIS DATASET.
2) LAWRENCE TOWNSHIP BOUNDARY SUPPLIED BY LAWRENCE TOWNSHIP.
3) WATERSHED MANAGEMENT AREAS BASED ON NJDEP WATERSHED MANAGEMENT AREA GIS DATASET.
4) HUC 14 SUBWATERSHEDS ARE BASED ON NJDEP HUC 14 GIS DATASET.
5) LAKES (OPEN WATERS) ARE BASED ON NJDEP LAKES GIS DATASET
6) STREAMS ARE BASED ON NJDEP STREAMS GIS DATASET.
7) WETLANDS AREAS WERE EXTRACTED FROM THE NJDEP 1995 LAND USE/ LAND COVER GIS DATASET.
ACT ENGINEERS, INC WBE
ENVIRONMENTALLY CONSTRAINED
STORMWATER MANAGEMENT PLAN
TOWNSHIP OF LAWRENCE
MERCER COUNTY, NEW JERSEY
DATE: OCTOBER 30, 2004
DRAWN BY: P.A.H.
LAST REVISED: JANUARY 27, 2004
CHECKED BY: K.L.S.

Figure 8