

**BOROUGH OF HAWORTH
BERGEN COUNTY, NEW JERSEY**

**Municipal Stormwater
Management Plan**

January 2005

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Haworth 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 baseflow in receiving water bodies.

The plan describes long-term operation and maintenance measures for existing and future stormwater facilities. The plan addresses the review and update of existing ordinances, the Borough's Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the 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. 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 A-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.

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 waste, 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 providing shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Background

Haworth Borough is primarily a single-family community which occupies 2.4 square miles in northeastern Bergen County, New Jersey. The Borough lies approximately 14.5 miles north of Manhattan, and approximately five (5) miles north of Hackensack, the County seat. Main road access is provided by Knickerbocker Road (County Road 505) to the east and Sunset Avenue to the west. North-south access is provided by Schraalenburgh Road. Haworth is a nearly fully developed municipality. The middle and eastern portions of the Borough are developed for single family housing. The Borough's western area contains two golf courses totaling approximately 160 acres. Conservation lands around the golf courses, and near the reservoir, total approximately 80 acres. Lands owned by the water utility United Water, NJ, which includes the Oradell Reservoir, total approximately 365 acres. The reservoir by itself accounts for 245 acres. In all, the reservoir, golf courses, water utility and conservation lands total approximately 605 acres, or approximately 39% of Haworth's total land area, which is restricted from future development. With most of the middle and eastern portions of the borough already developed, there is far less than 640 acres of developable land remaining.

Public water is supplied by United Water, a water utility company, to all residents of the Borough. There are no public wellheads located within the Borough. Sanitary sewers are available to the entire Borough. Sewage flows are directed to the Bergen County Utility Authority.

The population of the Borough is 3,390 as of the 2000 census. The resultant change from the census of 1990, which was 3,384 persons, was negligible. A downward population trend occurred from 1970 to 1990, which saw a 10.0% drop in population. The Borough has yet to return to the 1970 population. It should be noted that during the time period from 1970 to 1990, dwelling units increased steadily even as the population dropped. The total number of dwelling units increased slightly from 1990 to 2000.

<u>Year</u>	<u>Population</u>	<u>Dwelling Units</u>
1970	3,760	1,037
1980	3,509	1,093
1990	3,384	1,142
2000	3,390	1,146

The recent population history of Haworth is provided by the data in Table 1, including age distribution and regional population trends.

Haworth is an older established community where land use is fairly stable. There are very few properties where development can take place. Therefore, there is a slight expectation of a large increase in stormwater runoff volumes and pollutant loads to the Borough's waterways.

The major waterway in the Borough is the **Oradell Reservoir**, an impoundment of the Hackensack River. There are also three main streams that flow to the reservoir, as follows:

Steinals Ditch – Traverses from the south at the corporate limits with Dumont to the north to Kips Brook and the Oradell Reservoir.

Kips Brook – Traverses from the south near Seneca Trace northerly to the Oradell Reservoir.

Charlies Creek – Traverses from the south of Madison Avenue northerly to the corporate limits with Closter. The creek flows into the Tenakill Brook in Closter, which flows north into the eastern portion of the Oradell Reservoir.

All waterways within the Borough lie within NJ State Watershed Area Number 5. Watershed areas within the state are additionally broken down into smaller sub-watersheds designated as HUC-14s. The HUC-14 watersheds are used to perform build-out analyses for municipalities with greater than one square mile of developable or agricultural land remaining. Haworth Borough has far less than one square mile of remaining developable land, therefore there is no HUC-14 delineation or build-out analysis included in this report.

All waterways within the Borough, including un-named tributaries, are classified as Category One waterways by the New Jersey Department of Environmental Protection. A Category One designation provides additional protection to water bodies that help prevent water quality degradation and discourage development where it would impair or destroy natural resources and environmental quality.

All waterways are subject to extensive flooding, and bank erosion. Figure A-2 illustrates the waterways in the Borough. These waterways are not listed on the New Jersey Department of Environmental Protection Ambient Biomonitoring Network (AMNET). The AMNET documents the health of the state's waterways. Streams are classified as non-impaired, moderately impaired, or severely impaired. Figure A-3 depicts the Borough boundary on USGS quadrangle maps.

Design and Performance Standards

The Borough will adopt the design and performance standards for stormwater management measures by Ordinance 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 county for review and approval within (24 months of the effective date of the Stormwater Management Rules).

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

Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area and no Total Maximum Daily Loads (TMDLs) have been developed for waters within the Borough; 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. The municipality will utilize the most current updates 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 Borough'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, Borough 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

The Borough will be reviewing the master plan (last re-examined 2003) and ordinances, and will provide a list of the sections in the Borough land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within (24 months of the effective date of the Stormwater Management Rules). A copy will be sent to the Department of Environmental Protection at the time of submission.

Chapter 26 of the Borough Code, entitled Land Use Regulations, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes will be made to this Chapter, to incorporate these strategies.

Section 26-903.5: Buffer areas shall be maintained between any parking or loading areas which abut a residential zone or abut an existing residential use and the residential zone or use. The landscape requirements for these buffer areas in the existing section do not recommend the use of native vegetation. The language of this section will be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language will be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

Section 26-908.3: Curbs and gutters require that curbing and gutters shall be required along all streets adjacent to or within a development. This section will be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

Section 26-903.4 (e): Driveways, parking areas and off-street truck loading spaces shall be suitably paved, drained, and lighted. This section will be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, language will be added to allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers.

Section 26-901: Drainage requires that all streets shall be provided with a storm drainage system including manholes, catch basins and pipes as may be necessary for proper collection of storm runoff. This section will be amended to encourage the uses of natural vegetated swales in lieu of inlets and pipes.

Section 26-904.2(a): Natural Features requires that natural features, such as trees, views, natural terrain and water bodies shall be preserved whenever possible in any development. This section will be amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

Section 3-2.9: Performance Standards will be added to provide pollution source control. It prohibits materials or wastes to be deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. It also requires that all materials and wastes that might create a pollutant or a hazard be enclosed in appropriate containers.

Section 26-1004.4 (c) 15: Soil Erosion and Sediment Control addresses soil erosion and sediment control by requiring developers to comply with the Bergen County Soil Conservation District's requirements. This section will be amended to outline some general design principals, including: whenever possible, retain and protect natural vegetation; minimize and retain water runoff to facilitate groundwater recharge; and, install diversions, sediment basins, and similar required structures prior to any on site grading or disturbance.

Section 26-908.1: Streets describes the requirements for streets in the Borough. The Borough has several street classifications, ranging from "Arterial", which has a minimum right-of-way of 80 feet, to "Minor", which has a minimum right-of-way of 50 feet. The paved width for "Minor" local streets is 30 feet.

This section will be amended to encourage developers to limit on-street parking to allow for narrower paved widths. This section also required that cul-de-sacs have a minimum radius of 50 feet. Language will be added to this section to reduce the minimum radius of cul-de-sac designs. Cul-de-sacs with landscaped islands will have a minimum paved radius of 40 feet to accommodate larger equipment and emergency vehicles.

Section 26-901: General Provisions and Design Requirements for drainage is discussed. This section will be amended to include all requirements outlined in N.J.A.C. 7:8-5. These changes were presented earlier in this document.

Several changes will be made to Section 26-504 "Application of Regulations" and the "Limiting Schedule". The Borough has 2 types of residential districts. Each district has no restrictions on total impervious coverage, but does have a minimum "Green Area" of 60%. The Borough has one (1) business district, which has no restriction on total impervious coverage nor green area.

The Borough Code will be amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures contained in Section 26-901. The Borough is evaluating the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. The Borough is also evaluating a maximum percent of disturbance for each zone. Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer

must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding and groundwater recharge. A detailed description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

Mitigation Plans

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

Mitigation Project Criteria

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

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects can be obtained from the Borough Engineer. Listed below are the types of projects that can be used to address the mitigation requirement.

A. Groundwater Recharge

- Retrofit existing detention basins to provide additional cubic feet of average annual groundwater recharge.
- Replace existing deteriorated overflow impervious parking lots with permeable paving to provide additional cubic feet of average annual groundwater recharge.

B. Water Quality

- Retrofit existing stormwater management facilities to provide the removal of 80 percent of total suspended solids (TSS) from parking lot.

C. Water Quantity

- Install stormwater management measures in open spaces in various developments to reduce the peak flow from the upstream development on the receiving stream for the 2, 10 and 100-year storms.

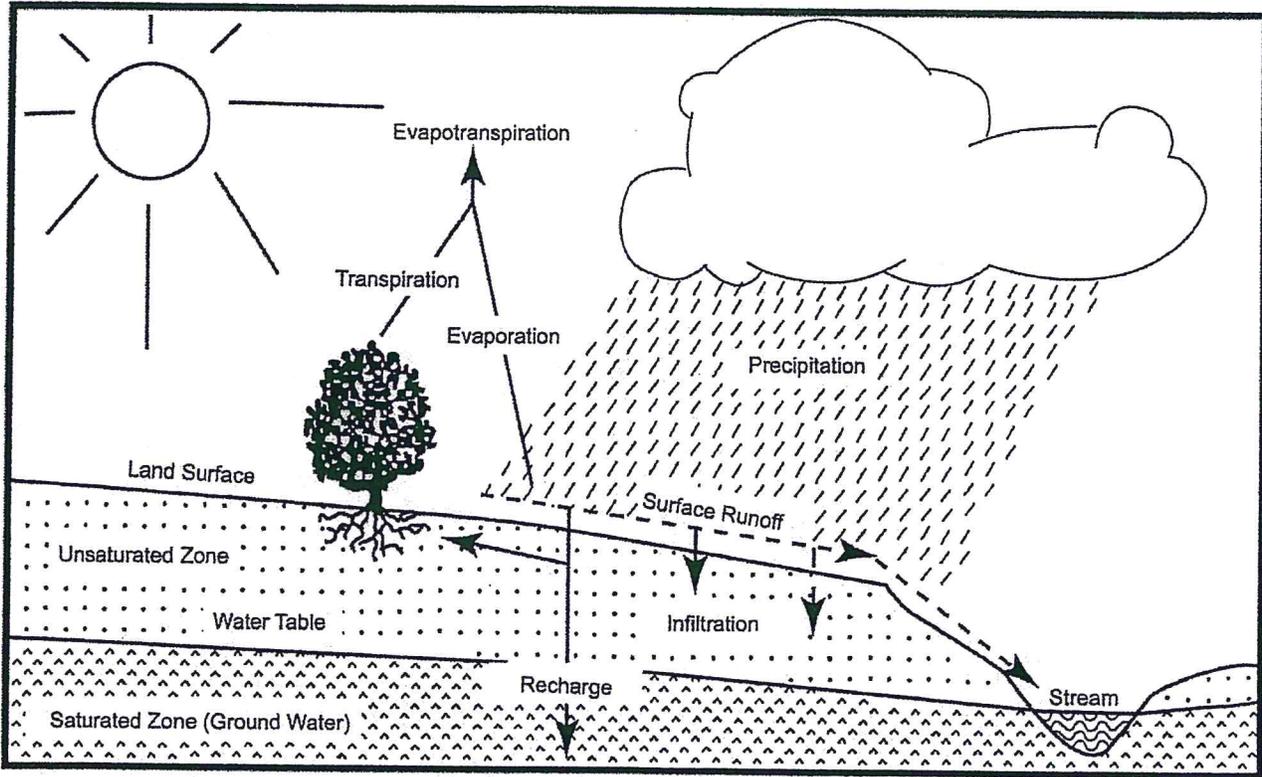
2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if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

Water Quality

- Re-establish a vegetative buffer (minimum 50 foot wide) along the shoreline at Haworth pond as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- Provide goose management measures, including public education at the Municipal Building.

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

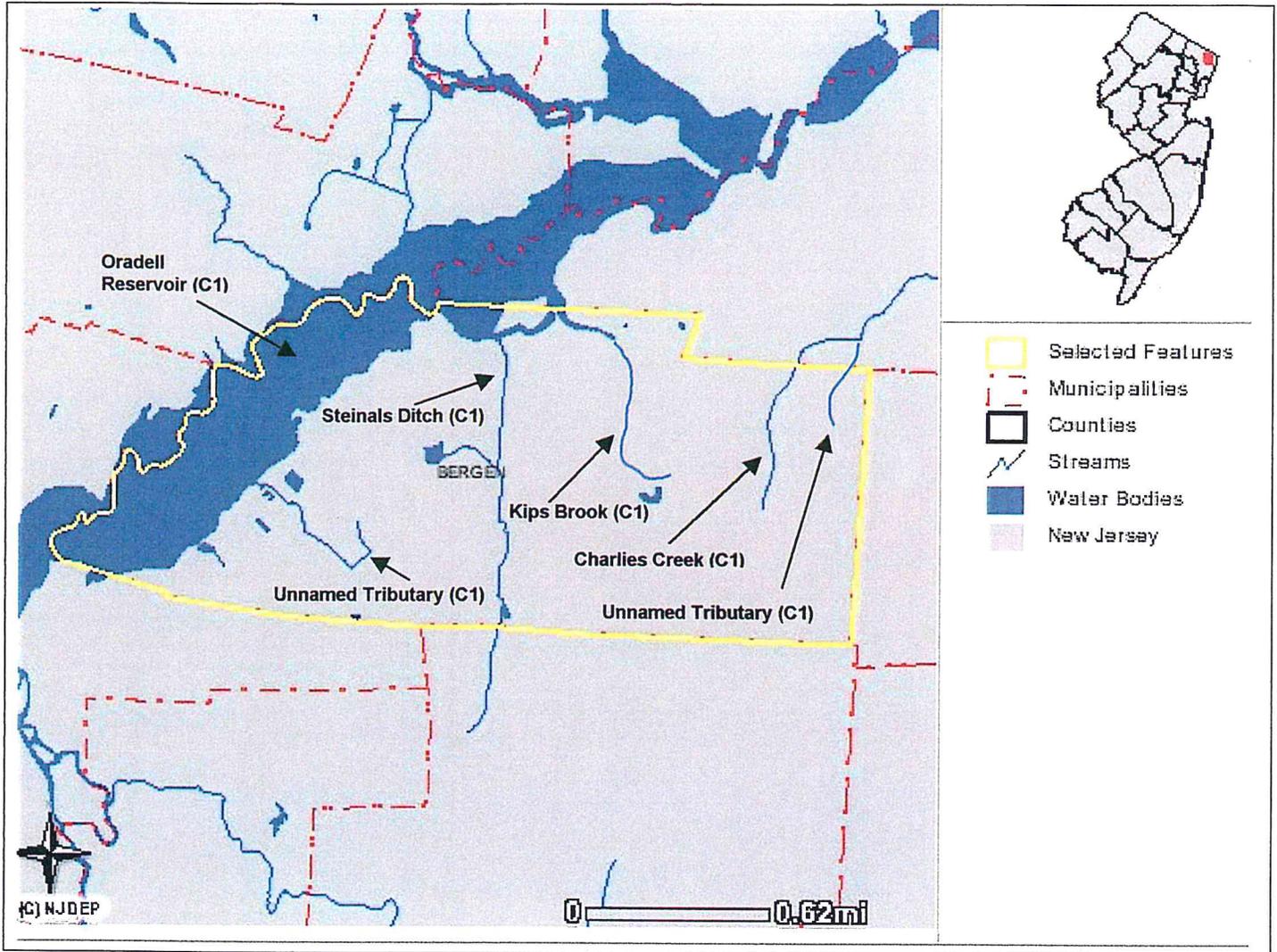
FIGURE A-1 GROUNDWATER RECHARGE IN THE HYDROLOGIC CYCLE



Source: New Jersey Geological Survey Report GSR-32.

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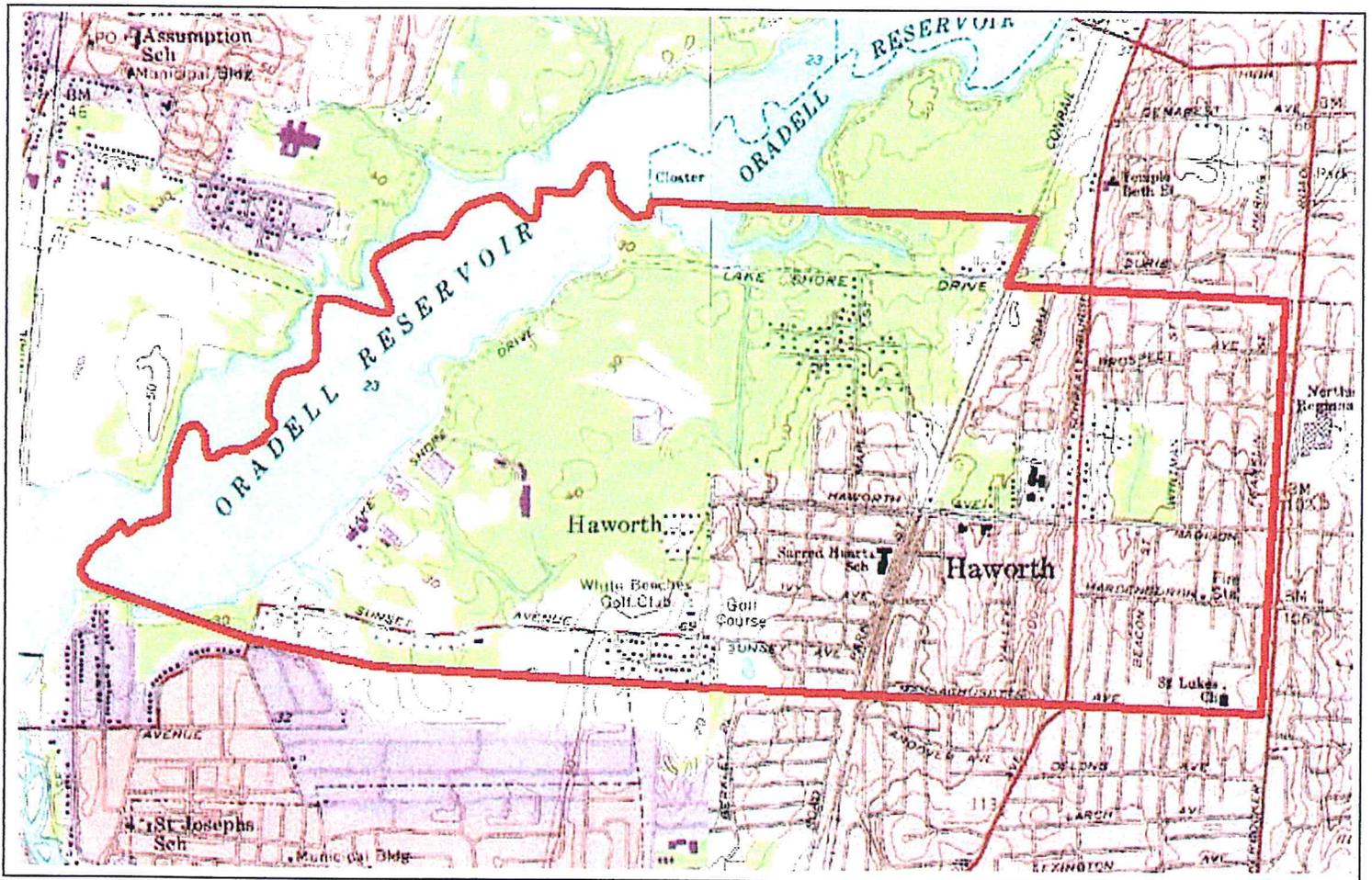
FIGURE A-2 HAWORTH BOROUGH WATERWAYS



Source: NJDEP i-Map

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FIGURE A-3 HAWORTH BOROUGH ON USGS QUADRANGLE MAPS

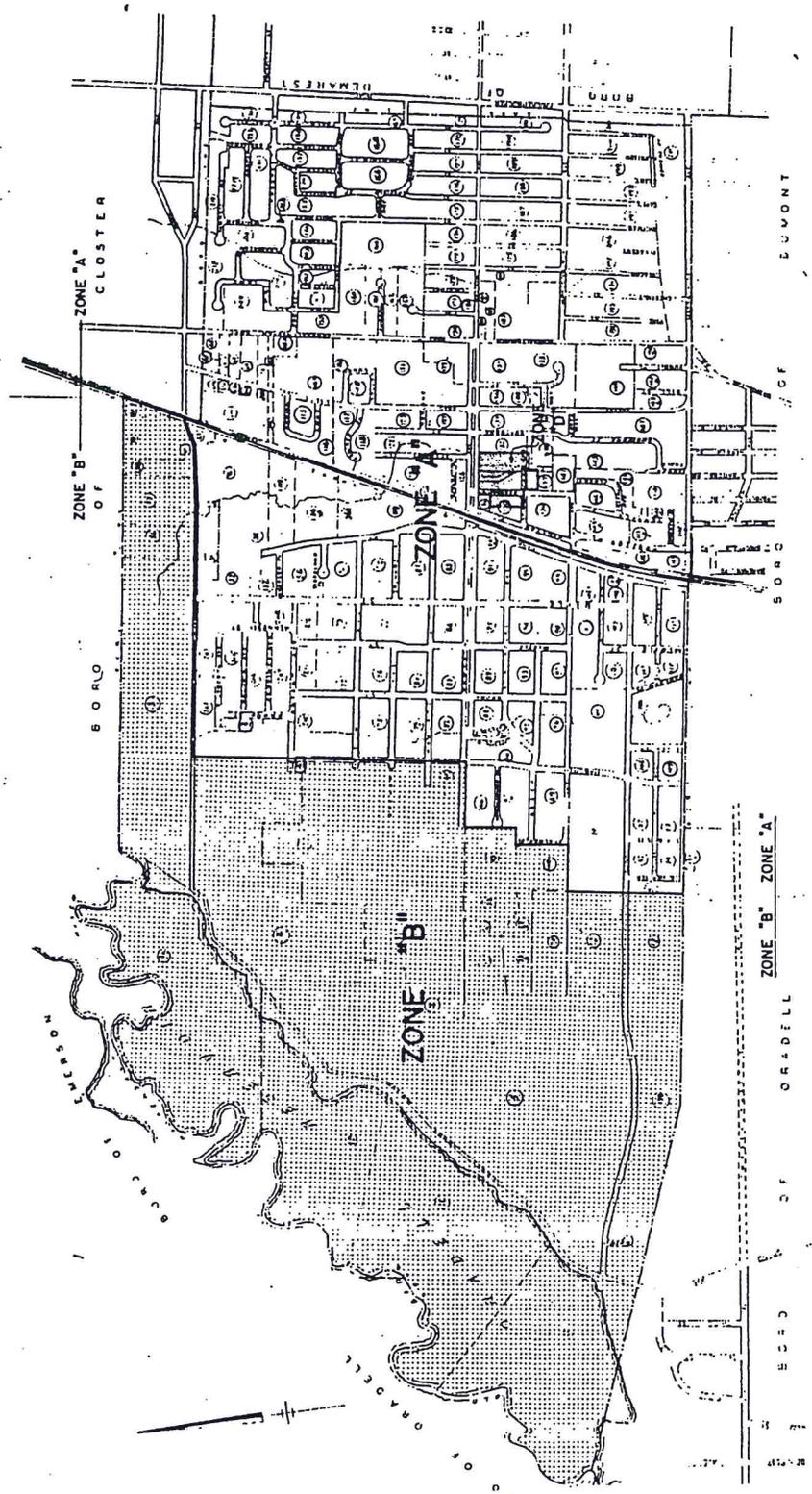


Source: US Geological Survey Quadrangles
Hackensack, NJ(1981) Yonkers, NY(1979)

 Borough Boundary

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ZONING MAP
BOROUGH OF HAWORTH
 BERGEN COUNTY
 NEW JERSEY
 SCALE: 1"=600'
 JANUARY, 1962
 HOWARD L. BOSWELL, P.E. & L.S. LICENSE NO 7613
 BOROUGH ENGINEER
 78 80 MT VERNON STREET
 RIDGEFIELD PARK, NEW JERSEY



1"=600'
 0 100 200 300
 GRAPHIC SCALE

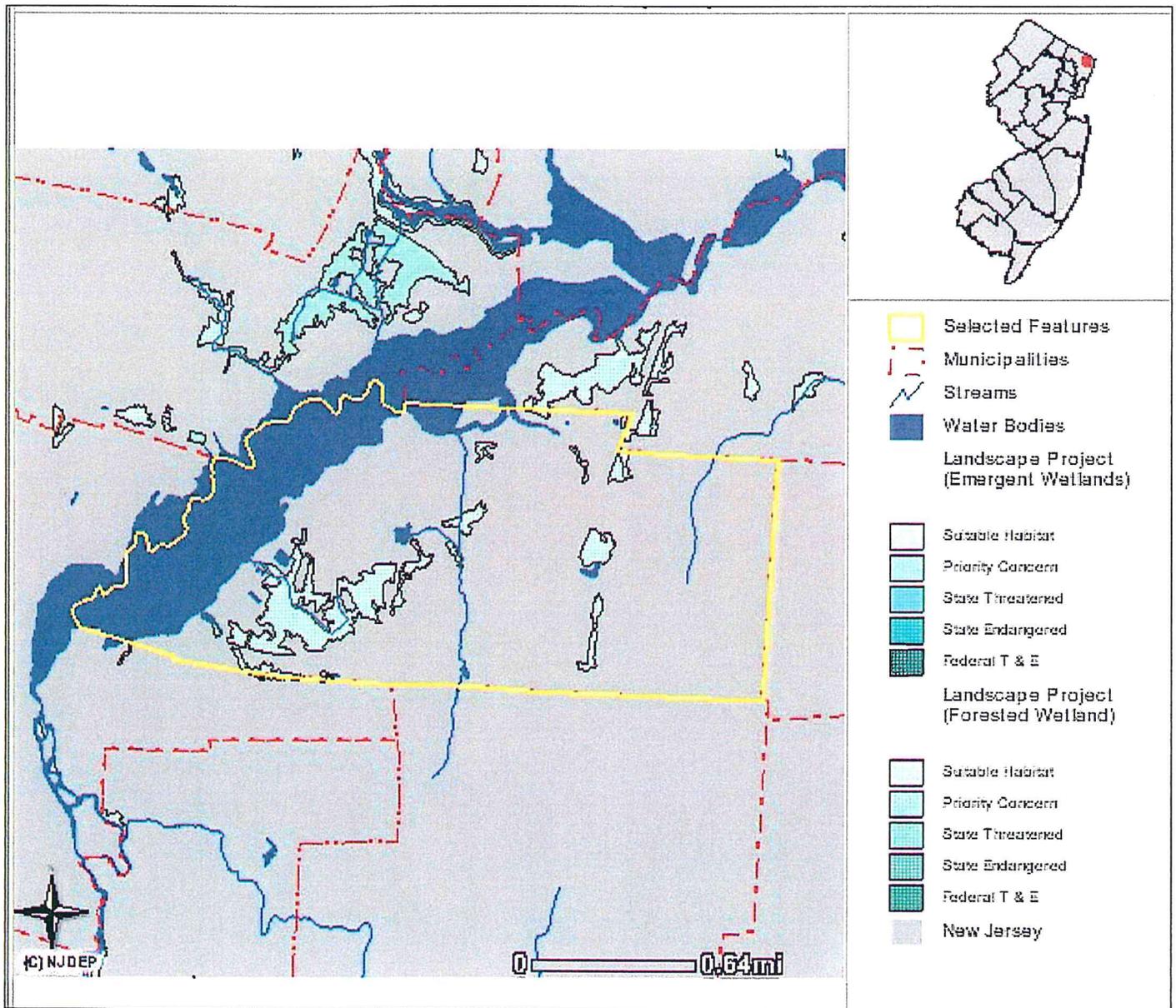
2- INDICATES BLOCK NUMBERS

NOTE: ZONE A RESIDENTIAL INCLUDES TRACTS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

LEGEND
 ZONE "A" RESIDENTIAL
 ZONE "B" RESIDENTIAL
 ZONE "D" BUSINESS

FIGURE A-4 HAWORTH BOROUGH ZONING

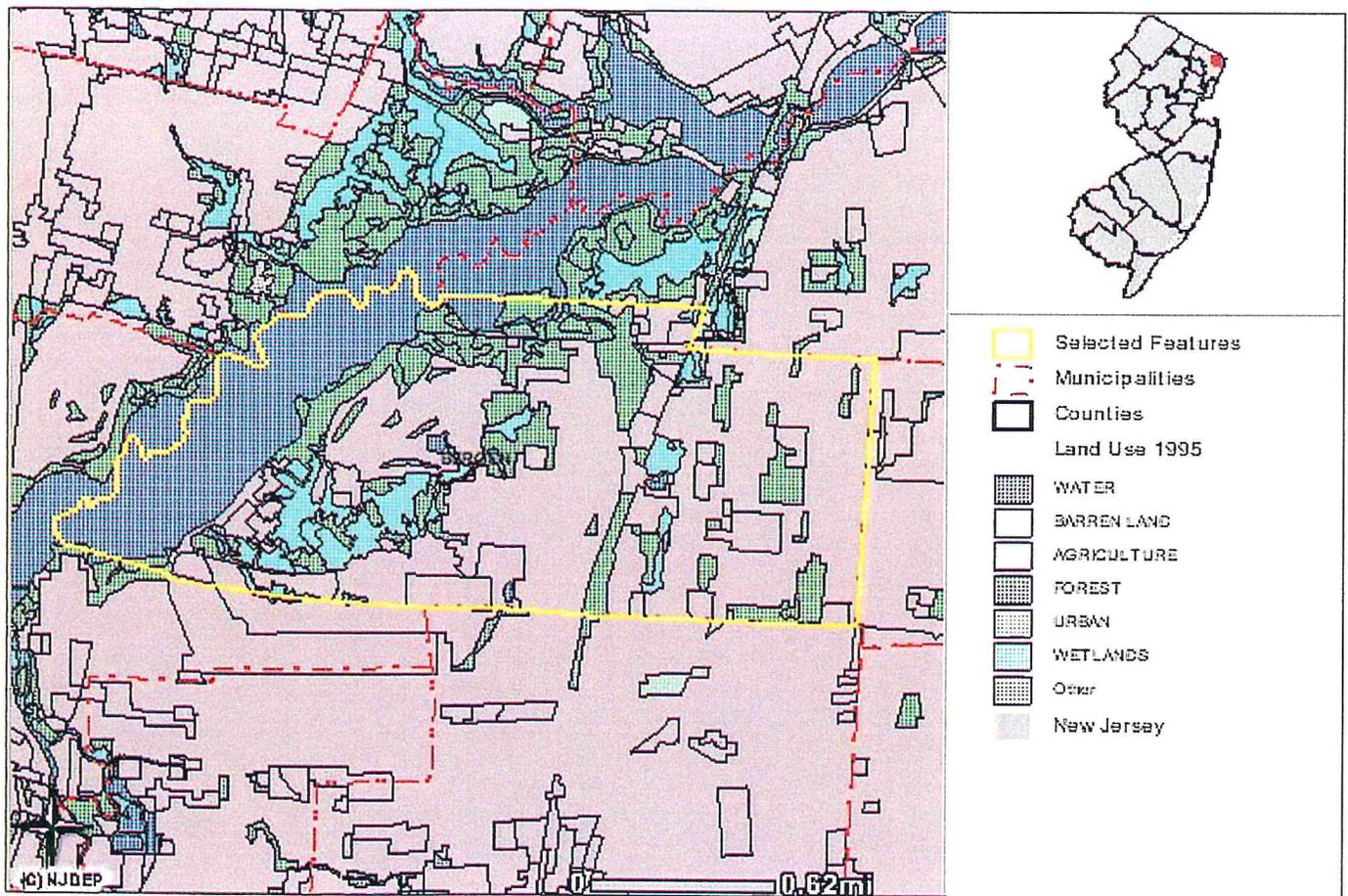
FIGURE A-5 HAWORTH BOROUGH WETLANDS



Source: NJDEP I-Map

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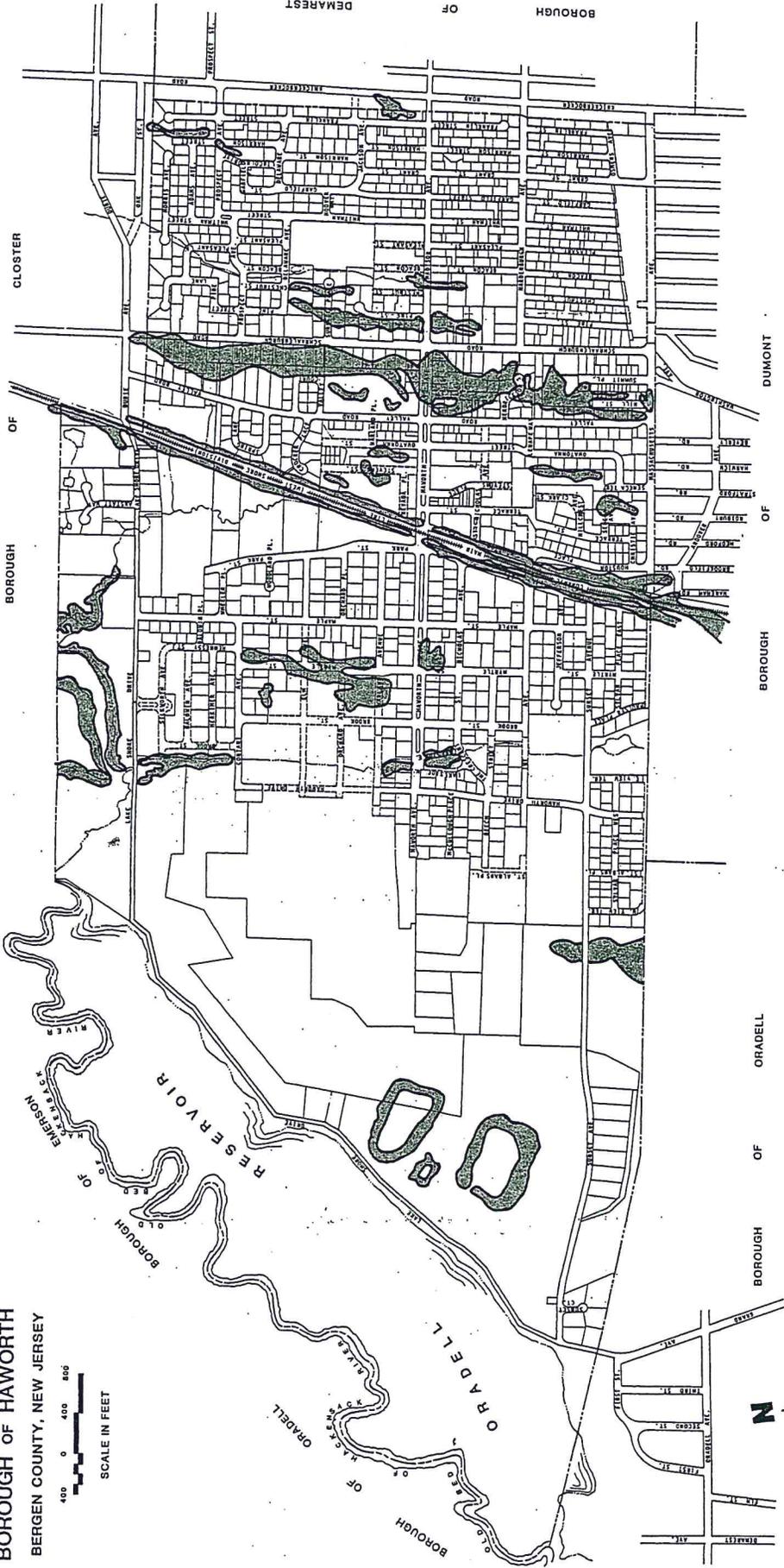
FIGURE A-6 HAWORTH BOROUGH EXISTING LAND USE



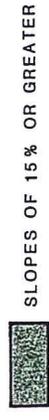
Source: NJDEP I-Map

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BOROUGH OF HAWORTH
BERGEN COUNTY, NEW JERSEY



CRITICAL SLOPE



SOURCE: ALL APPROXIMATE LOCATIONS OF CRITICAL SLOPES
 15% OR GREATER WERE TRANSFERRED FROM THE
 "TOPOGRAPHICAL MAPPING IN THE NORTHERN VALLEY"

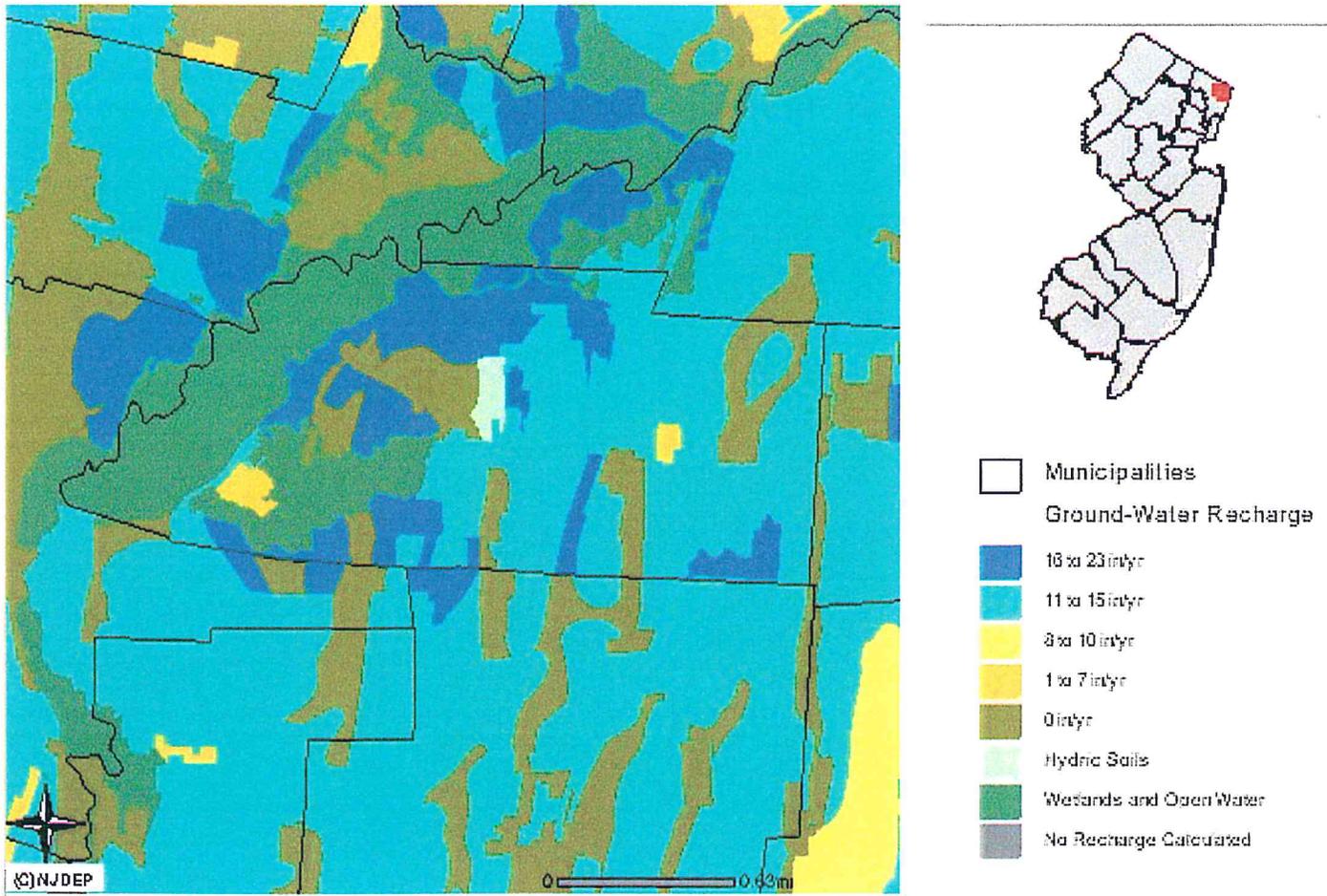
PROVIDED BY
 THE ENGINEERING DIVISION, D.P.W. BERGEN COUNTY, NEW JERSEY
 EDWARD R. RANUSKA P.E. N.J. LIC. NO. 14215.



SOURCE: BOROUGH TAX MAPS 1985
 BASE MAP PREPARED BY
 P. DAVID ZIMMERMAN, PROFESSIONAL PLANNER - 1989

FIGURE A-8 CRITICAL SLOPES

FIGURE A-9 HAWORTH BOROUGH GROUNDWATER RECHARGE



Source: NJDEP I-Map

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FIGURE A-10 HAWORTH BOROUGH AERIAL PHOTO 2002



Source: NJDEP I-Map

————— Borough Boundary

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TABLE 1

RECENT POPULATION HISTORY 1940 Through 2000 Haworth Borough

<u>Year</u>	<u>Population</u>	<u>Percent of Bergen County</u>
1940	1,419	0.3
1950	1,612	0.3
1960	3,215	0.4
1970	3,760	0.4
1980	3,509	0.4
1990	3,384	0.4
2000	3,390	0.4

AGE DISTRIBUTION 1980 Through 2000 Haworth Borough

<u>Age Group</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>
Under 5	180 (5.1%)	187 (5.5%)	232 (6.8%)
5 to 9	215 (6.1%)	220 (6.5%)	290 (8.6%)
10 to 14	323 (9.2%)	249 (7.4%)	300 (8.8%)
15 to 19	362 (10.3%)	209 (6.2%)	203 (6.0%)
20 to 24	199 (5.7%)	200 (5.9%)	101 (3.0%)
25 to 34	383 (11.1%)	308 (9.0%)	240 (7.1%)
35 to 44	520 (14.8%)	600 (17.8%)	560 (16.5%)
45 to 54	511 (14.6%)	510 (15.1%)	613 (18.1%)
55 to 59	262 (7.5%)	207 (6.1%)	219 (6.5%)
60 to 64	165 (4.7%)	216 (6.4%)	158 (4.7%)
65 & Over	389 (11.1%)	478 (14.1%)	474 (14.0%)

REGIONAL POPULATION TRENDS 1980 Through 2000 Haworth Borough and Surrounding Municipalities

<u>Municipality</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>Percentage Change</u>	
				<u>1980-90</u>	<u>1990-00</u>
Closter	8,164	8,094	8,383	-0.9	+3.6
Cresskill	7,609	7,558	7,746	-0.7	+2.5
Demarest	4,963	4,800	4,845	-3.3	+0.9
Dumont	18,334	17,187	17,503	-6.3	+1.8
Emerson	7,793	6,930	7,197	-11.1	+3.9
Oradell	8,658	8,024	8,047	-7.3	+0.3
HAWORTH	<u>3,509</u>	<u>3,384</u>	<u>3,390</u>	<u>-3.6</u>	<u>+0.2</u>
	59,030	55,977	57,111	-5.2	+2.0

Source: 2000 Census of Housing and Population