United States
Environmental Protection
Agency

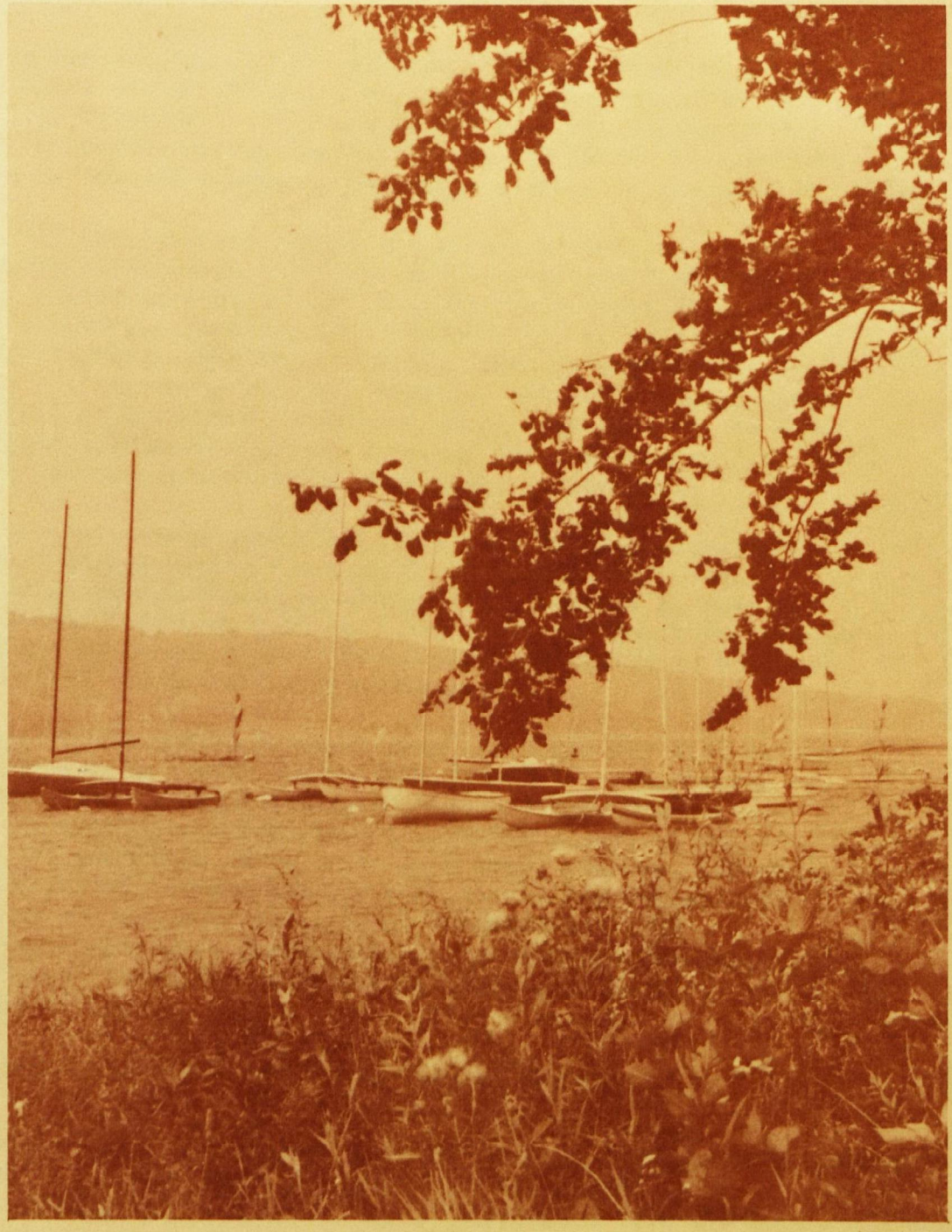
Region 3
Sixth and Walnut Streets
Philadelphia, Pa. 19106

September 1981

EPA

Draft Environmental Impact Statement

Wastewater Management Facilities Chalfont—New Britain Area, Pennsylvania



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

SEP 2 1 1981

TO ALL INTERESTED AGENCIES, PUBLIC GROUPS, AND CITIZENS:

Enclosed is a copy of the Draft Environmental Impact Statement (EIS) prepared by the U.S. Environmental Protection Agency (EPA) in relation to a request submitted by the Chalfont-New Britain Township Joint Sewage Authority for Federal funding to plan for wastewater management facilities for the Chalfont-New Britain and Doylestown areas of Bucks County, Pennsylvania.

This Draft EIS is issued pursuant to the National Environmental Policy Act of 1969, the Clean Water Act of 1977, and regulations promulgated by the Agency (40 CFR Part 6, November 6, 1979 and 40 CFR Part 35, September 27, 1978). Comments or questions concerning this Draft EIS should be submitted to the attention of Ms. Evelyn Schulz at the above address by November 30, 1981.

The purpose of the EIS is to inform you of the potential impacts of this project and to discuss alternative solutions which were developed through the EIS process. A number of significant environmental issues along with public controversy within the planning area prompted EPA to initiate an Environmental Impact Statement for this project. This issue-oriented Draft EIS concentrates on the following topics: Regional and local alternatives to upgrade the quality of wastewater treatment plant effluents in the area; malfunctioning on-lot wastewater disposal systems; and the primary and secondary impacts of providing wastewater conveyance facilities.

I want to thank everyone who has participated in this process, especially members of the Public Participation Advisory Group (PPAG), who have monitored the EIS progress and helped determine its direction by meeting periodically and raising important questions and answers. Their involvement is reflective of a desire on the part of local citizens and other interest groups to become part of the decisionmaking process.

A public hearing to solicit testimony concerning the Draft EIS will be held on November 19, 1981 at the Lenape Junior High School beginning at 7:30 p.m. Individuals and representatives of organizations wishing to testify at the public hearing are requested to furnish a copy of their proposed testimony (if possible) along with their name, address, telephone number and the organization represented, if any, to the EIS Preparation Section no later than the close of business on November 17, 1981 . Witnesses should limit their oral presentation to a five-minute summary of their written testimony. Everyone wishing to testify will be given an opportunity to do so at the hearing.

I welcome your interest and participation in the EIS process.

Sincerely yours,

Peter N. Bibko

Peter N. Bibko
Regional Administrator

DRAFT ENVIRONMENTAL IMPACT STATEMENT

on

WASTEWATER MANAGEMENT FACILITIES
CHALFONT-NEW BRITAIN AREA, PENNSYLVANIA

Prepared By:

US ENVIRONMENTAL PROTECTION AGENCY
REGION III
PHILADELPHIA, PENNSYLVANIA

Evelyn B. Schulz, Project Monitor

Prepared with the assistance of:

WAPORA, Inc.
BERWYN, PENNSYLVANIA

Valdis Jurka, Project Manager

Type of Action:

Legislative ( )
Administrative (X)

Executive Summary

EXECUTIVE SUMMARY

Background

The National Environmental Policy Act (NEPA) of 1969 requires each Federal government agency to prepare an Environmental Impact Statement (EIS) on every major Federal action significantly affecting the quality of the environment. The major purpose of an EIS is to explain the environmental consequences of pending Federal actions, such as funding for large construction projects, so that government officials and the public can make responsible decisions. The EIS process identifies all possible environmental and economic impacts and recommends a plan which minimizes adverse impacts and provides mitigative measures for those which are unavoidable. Federal funding through EPA's Construction Grants Program is one of the Federal actions subject to the requirements of NEPA.

In 1978 the US Environmental Protection Agency (EPA) evaluated the Chalfont-New Britain Township Joint Sewage Authority's (CNBTJSA) grant application for preparing a wastewater management Facilities Plan (Step I of a three-step process) and determined that an EIS was necessary. The PA Department of Environmental Resources (PA-DER) delineated the planning area to include the Boroughs of Chalfont, Doylestown, and New Britain; Doylestown and New Britain Townships; and portions of Plumstead and Warrington Townships.

Issues which this Draft EIS focuses upon include: the background and history of wastewater management planning; potential changes in the rate, density, and type of development; water quality concerns; wastewater treatment needs; and the systematic development and evaluation of wastewater treatment alternatives.

The Facilities Plan/EIS

This Draft EIS contains an analysis of wastewater management alternatives proposed in CNBTJSA's Draft Facilities Plan. Gilbert Associates, Inc., the engineering consultants to CNBTJSA, evaluated the alternatives in terms of engineering feasibility and cost-effectiveness. EPA has examined the alternatives from an environmental standpoint. The Facilities Plan and EIS have been prepared through a coordinated, concurrent approach which is sometimes called "piggybacking". At the conclusion of the EIS process, EPA will decide upon which alternatives are cost-effective, environmentally sound, implementable, and therefore eligible for Federal funding in the Step II (design) and Step III (construction) phases of the project. Through the Construction Grants Program, EPA may provide 75-85% of the cost of planning, design, and construction of publicly-owned wastewater treatment facilities.

Public Participation/ Coordination

Participation by the general public and involved government agencies has been continuously encouraged throughout the EIS process. Methods used to involve the public have included newsletters, pamphlets, public information meetings, and media contacts. In addition, EIS progress has been monitored and influenced by a local Public Participation Advisory Group which consists of individual citizens, representatives of public interest groups, organizations with economic interest, and public officials.

Environmental Setting

Population. The estimated 1980 population of the planning area was 37,580. The area's population is expected to increase by 37% to 50,080 by the year 2000. Approximately 25,238 persons presently reside within areas served by public sewers. Approximately 36,675 persons are projected to reside within the Facilities Plan proposed sewer service area by the year 2000.

Soils. Much of the area's soils are unsuitable for conventional on-lot systems. This factor, coupled with a ban on connection to public sewers, has constrained development in the planning area and contributed to a high percentage of malfunctioning septic systems.

Surface Water Quality. Waste discharges have depressed water quality throughout the Neshaminy Basin. As a result, PA-DER established water quality standards for the Upper and Lower Neshaminy Basins in order to protect stocked trout and warmwater fishes. In 1967 wastewater treatment plants in the Basin were ordered to upgrade the level of treatment they provide to meet these standards.

Wastewater Treatment Needs

Wastewater Treatment Plants. All facilities in the planning area must be upgraded from their present secondary treatment capability to advanced or tertiary treatment which removes residual biological oxygen demand (BOD), suspended solids, nitrogen and phosphorus. The Doylestown Borough plants at Green Street and Harvey Avenue have a combined capacity of 1.3 million gallons per day (mgd) which should be adequate through the year 2000. The Chalfont-New Britain plant is subject to hydraulic overloading at its present capacity of 2.0 mgd; it is expected that the year 2000 population within its service area will require a capacity of 3.8 mgd.

On-Lot Systems. Failing on-lot wastewater disposal systems can cause health hazards and groundwater contamination. An integral part of the Facilities Plan/EIS process is the assessment of the need to alleviate on-lot failures. To accomplish this, EPA's Environmental Photointerpretation Center (EPIC) took aerial photographs of the entire area with infrared film in July 1980. When the photos were analyzed, about 1,100 on-lot systems (principally septic tank-soil absorption systems) in the area showed signs of failure or having failed in the past. The EPIC process is intended to be used as a planning tool, i.e. to identify areas of concentrated failures rather than individual problems. Keeping this in mind, the Facilities Planners outlined five areas where problems were widespread: Timber Lane, Pebble Ridge - Pebble Hill, Sugar Bottom, Edison Furlong, and Sandy Pine. Failures were concentrated in these areas as well as scattered throughout the planning area.

Wastewater Treatment Alternatives

CNBTJSA's Facilities Plan contains nine feasible alternatives for upgrade and expansion of the planning area sewage treatment plants (STP). These alternatives incorporate various combinations of the three existing STPs and/or new regional facilities. Methods to handle areas with malfunctioning septic systems that are presently outside of the sewer service area include providing sewers (conventional and innovative types) and establishing a program to rehabilitate and maintain the area's on-lot systems.

STP Alternatives and Their Impacts

The following sections contain summaries of the alternatives, their impacts and their costs as developed during the Facilities Planning/EIS processes. A No Action alternative is included for comparison purposes. Before going on to the detailed descriptions, please consider the relative rankings of the alternatives. The length of new sewers which would have to be constructed ranges from 0 to 63,000 feet. Project costs range from $10.08 million to $35.66 million. Both economic costs and adverse environmental impacts increase with the amount of new construction. All of the alternatives, excluding No Action, will have a beneficial impact on the water quality of Neshaminy Creek.

Composite Environmental Ranking

Most Environmentally Sound	1,2
↓	3B
	3A,6
	4A,4B
Least Environmentally Sound	5A,5B

Capital/Construction Costs Ranking

Least Costly	1
↓	6
	2
	3A
	3B
	4B
	4A
	5B
Most Costly	5A

No Action Alternative

The Chalfont, Harvey Avenue, and Green Street plants would continue to provide only secondary treatment. None of the plants would be expanded.

New Construction: None required.

Impacts:

- The three plants would be in direct violation of an order by PA-DER to upgrade the level of treatment they currently provide. This would have a severe adverse impact on the quality of Neshaminy Creek. The Chalfont plant would remain in a state of hydraulic overloading and would still be subject to a connection ban.

Project Costs: $0

lternative 1

The Chalfont, Harvey Avenue, and Green Street plants would continue to operate at their present locations. All three plants would be upgraded to provide tertiary treatment. The Chalfont plant would be expanded to 3.8 mgd.

New Construction: No new interceptors required.

Impacts:

- Short term disturbance during treatment plant modifications.

Capital/Construction costs: $10.08 million
Operation/Maintenance costs: $860,000

lternative 2

The Chalfont plant would be expanded to 3.8 mgd and upgraded as required. Both the Green Street and Harvey Avenue plants would continue to provide secondary treatment. Green Street secondary effluent would be conveyed to a regional Borough of Doylestown facility at the Harvey Avenue plant for tertiary treatment.

New Construction: A pump station, force main and gravity sewer would be required to convey the Green Street effluent to Harvey Avenue.

Impacts:

- Dust, noise, and other disturbance due to construction and excavation through Doylestown Borough streets
- Possible disruption of known or previously unidentified historic/archaeological sites

Capital/Construction costs: $11.50 million
Operation/Maintenance costs: $790,000

Alternative 3A

All tertiary treatment would be performed at the Chalfont plant location. The Harvey Avenue and Green Street plants would continue to provide secondary treatment for flow from the Borough of Doylestown. The Chalfont plant would be expanded to 3.8 mgd.

New Construction: A pump station, force main, and gravity sewer (same as Alternative 2) would convey the Green Street flow to the Cooks Run interceptor adjacent to the Harvey Avenue plant. Additional gravity sewer would be constructed parallel to the existing gravity interceptor to convey Doylestown Borough flows to the Chalfont plant.

Impacts:

- Dust, noise, and possible disturbance to historic sites during sewer construction through Doylestown Borough
- Construction-related disturbances in the Cooks Run floodplain
- Possible long-term loss of forested areas, wildlife habitat, and small wetland areas
- Five stream crossings which would have short-term adverse effects on water quality and aquatic biota
- Possible disturbances of known historic and archaeological sites located near the Cooks Run interceptor
- Slight potential for increased development due to sewer availability

Project construction costs: $15.32 million
Annual operation and maintenance costs: $700,000

Alternative 3B

All treatment, tertiary and secondary, would be carried out at the Chalfont plant (5.1 mgd). The Harvey Avenue and Green Street plants would be abandoned.

New Construction: A pump station, force main and gravity sewer would be required to convey the Green Street flow to the Cooks Run interceptor as in Alternative 2. Gravity sewer would be placed parallel to the Cooks Run interceptor along the portion of its length from the New Britain Borough border to the Chalfont plant site.

Impacts:

- Similar to those of Alternative 3A
- The need to construct a parallel sewer along only a portion of the Cooks Run interceptor (as opposed to its entire length in Alternative 3A) would somewhat reduce the amount of disturbance to wetlands, forested areas, and wildlife habitats

- Short-term adverse effects on water quality and aquatic biota due to four stream crossings
- Slight potential for induced growth due to sewer availability

Capital/Construction costs: $16.98 million
Operation/Maintenance costs: $770,000

lternative 4A

All treatment, tertiary and secondary, would be carried out at a new regional plant (5.1 mgd) in the vicinity of Neshaminy Manor Center. The Chalfont, Harvey Avenue, and Green Street plants would be abandoned.

New Construction: The Harvey Avenue flow would be conveyed to the Chalfont Plant site through the existing Cooks Run interceptor. A new gravity interceptor would carry the combined Chalfont and Harvey Avenue flows to a point of connection with an interceptor from the Green Street Plant. The combined flows from the three plants would then flow by gravity interceptor to the new regional plant.

Impacts:

- New construction in the Neshaminy Creek and Country Club Run floodplains
- Significant loss of forest and disturbance of wildlife habitat and wetlands
- Possible disturbance to at least twelve historic sites on the Bucks County Register or Bucks County Inventory
- Short-term adverse effects on water quality and aquatic biota due to at least ten stream crossings
- High potential for induced development due to sewer service

Capital/Construction costs: 29.42 million
Operation/Maintenance costs: $740,000

lternative 4B

All tertiary treatment would be carried out at a new regional plant in the vicinity of Neshaminy Manor Center. The three existing plants would continue to provide secondary treatment. The Chalfont plant would be expanded to 3.8 mgd.

New Construction: New interceptors to convey the Chalfont flow to Neshaminy Manor Center would be the same as Alternative 4A. Because of the limited capacity of the Cooks Run Interceptor, a pump station, force main and gravity interceptor would convey the Harvey Avenue flow to the Green Street plant. A new gravity interceptor would convey the Doylestown flows to a point of connection with the Chalfont secondary effluent. A new gravity interceptor along Neshaminy Creek would convey the secondary effluents from all three sites to the new regional tertiary treatment plant.

Impacts:

- Similar to 4A
- Significant loss of forest and disturbance of wildlife habitat and wetlands
- Possible disturbance to at least 12 historic sites on the Bucks County Register or Bucks County Inventory

- Short-term adverse effects on water quality and aquatic biota due to at least nine stream crossings
- High potential for induced development due to sewer service
- Additional dust, noise and possible disturbance to historic sites during sewer construction through Doylestown Borough

Capital/Construction costs: 26.14 million
Operation/Maintenance costs: $760,000

Alternative 5B

All tertiary treatment would be carried out at a new regional plant (5.1 mgd) below Dark Hollow Dam in Buckingham Township. The Chalfont, Harvey Avenue, and Green Street plants would continue to provide secondary treatment. The Chalfont plant would be expanded to 3.8 mgd. Extending the discharge point below the dam eliminates phosphorus removal as a treatment requirement.

New Construction: A new gravity interceptor would carry the Chalfont secondary effluent to a point of connection with a gravity interceptor from the Green Street plant site. Because of the limited capacity of the Cooks Run interceptor, a pump station, force main, and gravity interceptor would convey the Harvey Avenue effluent to the Green Street Plant site. Doylestown secondary effluents would then flow by gravity interceptor to a point of connection with the Chalfont secondary effluent. The combined effluents would then flow by gravity interceptor to the Dark Hollow dam site.

Impacts:

- Similar to 5A
- Significant construction in the Neshaminy Creek and Country Club Run floodplains
- Significant loss of forest and disturbance to wildlife habitat and wetlands
- Possible disturbance to at least 12 historic sites on the Bucks County Register or Bucks County Inventory
- Short-term adverse effects on water quality and aquatic biota due to at least 18 stream crossings
- Additional noise, dust and possible disturbance to historic sites during sewer construction through Doylestown Borough
- High potential for induced development due to sewer service

Alternative 6

The Green Street plant would be maintained at its present location and upgraded. The Harvey Avenue plant would continue to provide secondary treatment with its secondary effluent being conveyed to the Chalfont plant for tertiary treatment. Tertiary treatment facilities at the Chalfont plant would have a capacity of 4.3 mgd.

New Construction: A new gravity interceptor would be placed parallel to the Cooks Run interceptor to transport Harvey Avenue's secondary effluent to the Chalfont plant.

Impacts:

- Loss of forest cover and disturbances to wildlife habitat

- New construction in the Neshaminy Creek and Cooks Run floodplains
- Possible disruption of several known historic/archaeological sites
- Short-term degradation of water quality and aquatic biota due to four stream crossings.

Capital/Construction costs: $11.32 million
Operation/Maintenance costs: $740,000

On-Lot System Alternatives

The feasibility and cost of providing sewers (gravity, vacuum, and pressure types), alternative on-lot systems (septic tank/sand mound and cluster types), and on-lot system management were compared for the five areas with high concentrations of malfunctioning systems. On-lot system management proved to be the most cost-effective option and had an additional advantage due to its feasibility for all on-lot systems in the planning area. Under the management program, no sewer service would be provided to the five areas with excessive malfunctioning septic systems.

The Facilities Plan outlines a program in which the Bucks County Water and Sewer Authority, Doylestown Township Municipal Authority, and CNBTJSA can be the jurisdictional agencies. During the detailed design (Step II) of the selected alternatives, all on-site systems would be inspected and all residents would have the option of joining the program. EPA would provide up to 85% of the cost of repairing or replacing septic systems of all program members whose systems were in place by December 27, 1977. Residents who did not join the program would rehabilitate their systems at their own expense.

As the program continues, each system would be inspected every three years. The management agencies would perform necessary repairs and pumpouts for program members with costs being covered by annual user fees. Non-members would be issued orders to repair their systems as necessary at their own expense. Any resident who did not join the program at its outset would have to obtain certification that his system was functioning properly before being allowed to join the established program. As a new member, the homeowner could be assured that future problems with his system would be corrected by the management agency.

User Charges

Individual user charges are those costs levied on homeowners to cover the local shares of capital costs and total operation and maintenance costs. They depend partly on the amount of Federal funding available for capital or construction costs. The Federal share is based on: (1) the number of features which are cost-eligible under Construction Grant Program regulations, (2) the percentage of Federal funding applied to these features, and (3) the availability of EPA funds from the Pennsylvania allocation. EPA may provide up to 85% of the cost of innovative and alternative wastewater treatment and up to 75% of the cost of conventional methods. The exact amount will be based on the final design of the project and also on the future budgets of EPA's Construction Grants Program and PA-DER's allocation for wastewater treatment projects. In addition to funding considerations, the exact charges for the wastewater treatment plant alternatives will be influenced by the effluent standards to be set by PA-DER and EPA's decision on funding of advanced treatment for the Chalfont-New Britain area; these decisions will be made prior to EPA's issuance of a Final EIS. Effluent standards are the allowable concentrations of pollutants in wastewater treatment plant discharges. User charges in

the Facilities Plan were based on the existing effluent standards. If these standards are relaxed slightly based on PA-DER's Stream Analysis, the annual costs presented below may also decrease. User charges also were developed in the Facilities Plan based on 0% and 75% Federal funding for Alternative 1 and 0% and 85% Federal funding for on-lot system management. For Alternative 1, annual user costs range from $191 to $313 with a 75% Federal grant and from $286 to $408 with no Federal grant. Annual charges for on-lot wastewater disposal system management were estimated at $169 with a Federal grant and $684 with no Federal grant.

Preliminary Recommendations

The Facilities Plan and the Draft EIS endorse Alternative 1 as the most cost-effective and environmentally sound means of meeting the need to upgrade and expand the area's wastewater treatment plants.

The Facilities Plan recommends on-lot wastewater disposal system management for the portion of the planning area which will not be served by sewers. EPA endorses the concept of on-lot system management by providing an incentive through 85% Federal funding. The success of such a program, however, is contingent upon the commitment by the jurisdictional agencies who would run the program and by residents who would participate. As part of the EIS process, EPA seeks the comments and opinions of government agencies and citizens on the Draft EIS. EPA will review all comments and publish a final recommendation on on-lot system management in the Final EIS.

Alternatives Selection Process

The wastewater management plans described in CNBTJSA's draft Facilities Plan and in EPA's draft EIS are based on two components:

- Wastewater treatment plant configurations which address the need to upgrade the quality of effluent discharged to Neshaminy Creek; and

- On-lot wastewater disposal system repair or replacement where malfunctioning systems have been identified.

Through the concurrent Facilities Planning and EIS processes, alternatives for improved wastewater management have been developed and evaluated. Details about alternatives which the Facilities Plan proposes as feasible from an engineering standpoint are presented for public consideration in the Draft EIS.

Both the costs and environmental impact information should be reviewed carefully by area residents and other interested parties to determine which of the alternatives, if any, is preferable. Ample time will be made available to study the material contained in the Draft EIS and raise questions. Following public distribution of the Draft EIS, there will be a 45 day review and comment period during which time a public hearing will be held as described in the front of this document.

The Draft EIS will be distributed to government agencies, citizens, and other interested groups on the mailing list which appeared in Chapter III. Opinions about material contained in the Draft EIS should be formulated and comments provided to EPA. EPA will carefully evaluate any comments received and make any necessary changes to the alternatives analysis based on these comments. A response to substantive comments will be provided in the Final EIS, which will be completed following the end of the Draft EIS review period.

Also in the Final EIS, EPA will identify a recommended alternative for implementation, with consideration given to public comments, local government positions, and the cost and impact evaluations described in the Draft EIS. EPA will also indicate whether other alternatives may also be acceptable and can be considered for Federal funding.

Following publication of the Final EIS, each local jurisdiction or municipal authority must decide which course of action they wish to pursue. If local decisions are consistent with the results of the EIS, applications for Federal funding to design (Step II) and construction (Step III) wastewater treatment facilities can then be processed.

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Chapter I

The Project's Background

CHAPTER I. THE PROJECT'S BACKGROUND

Statutory Authority

The proposed action involves federal financial assistance under the statutory authority of Title II, Section 201(g)(1) of the Clean Water Act. This authority enables the US Environmental Protection Agency's (EPA) Administrator to make grants to any State, municipality, or intermunicipal or interstate agency for the planning, design, and construction of publicly-owned water pollution control facilities. EPA regulations for administering the program appear in 40 CFR 35, Subpart E, Grants for Construction of Treatment Works.

Under the Construction Grants Program, EPA may provide up to 75% of the cost of conventional wastewater treatment systems (sewage treatment plants and gravity sewers, for example) and up to 85% of the cost of innovative/alternative systems (land application, septic system rehabilitation, and pressure sewers, for example). Grants are awarded from State allocations according to a Federally-approved State priority system based on the severity of pollution problems, the need to preserve water quality, and other factors. In Pennsylvania, the lead State agency is the Pennsylvania Department of Environmental Resources (PA-DER).

These grants are generally awarded in three phases: Step I (Planning), Step II (Detailed Design), and Step III (Construction). Applications for each Step in the grant process must be reviewed and approved by PA-DER and EPA. In September 1979, EPA offered the Chalfont-New Britain Township Joint Sewage Authority (CNBTJSA) a Step I (Planning) grant of $88,450 or 75% of the cost to prepare a wastewater Facilities Plan for the Boroughs of Chalfont, New Britain, and Doylestown; and for Doylestown, New Britain, Plumstead, and Warrington Townships. The remaining 25% will be funded by the State, CNBTJSA, and the Bucks County Water and Sewer Authority. When CNBTJSA has successfully completed its Facilities plan and the Plan's recommendations have been approved by EPA and PA-DER, application(s) for a Step II grant can be made.

NEPA

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies evaluate the potential environmental impacts of any Federally-funded or permitted project. When the potential for adverse impacts on natural, human, and/or economic environment is significant, an Environmental Impact Statement (EIS) is prepared. The intent of the EIS process is to identify all possible impacts and to recommend a plan which minimizes adverse impacts and provides mitigative measures for those which are unavoidable. In 1978 EPA evaluated CNBTJSA's Step I Grant application and determined that an EIS was necessary.

EIS Issues

The decision by EPA to prepare an Environmental Impact Statement was made because of significant social and environmental concerns. These issues, upon which the EIS will focus, are enumerated below:

(1) Background and history of wastewater management planning;

(2) Changes in land use with respect to rate, density, and type;

(3) Air and water quality effects (both primary and secondary effects);

(4) Wastewater treatment needs; and

(5) Evaluation of wastewater service alternatives based on a logical, systematic investigation.

Coordination Between EIS and Facility Planning

This Draft EIS contains an analysis and evaluation of wastewater management alternatives proposed in the Facilities Plan prepared by CNBTJSA, with the aid of Gilbert Associates, Inc. At the conclusion of the EIS process, EPA will decide upon which alternatives will be eligible for funding in the Step II (Design) and Step III (Construction) phases of the project. The Facility Plan and Draft EIS have been prepared through a coordinated, concurrent approach which is sometimes called "piggybacking". By coordinating the two processes, major issues can be identified and resolved. The intent of this approach is to provide a wastewater management plan which is cost-effective, environmentally sound, and eligible for Federal funding.

History of Wastewater Management Planning

Wastewater management planning has been a continuing activity for the various communities of central Bucks County. It has also been a complex and difficult process as described in the chronology below:

1960 The Bucks County Master Sewerage Plan recommended that one wastewater treatment facility be constructed to serve the north-central Neshaminy Creek drainage area. This area, designated as Sewerage Region SR-2, encompassed about 60 square miles including Chalfont, Doylestown and New Britain population centers.

1966 The Chalfont Borough-New Britain Joint Sewer Authority was formed. A 700,000 gpd (gallons per day) wastewater treatment facility was constructed at the approved regional site identified in the Bucks County Master Sewerage Plan.

Under provisions of the Pennsylvania Sewage Facilities Act (Act 537, 1966), the Bucks County Master Sewerage Plan was accepted as the "Official Plan" to direct the planning and provision of sewerage facilities in the County.

1967 The first major water quality evaluation of the Neshaminy Creek Basin was conducted in 1967 by the Pennsylvania Department of Health. The 1967 report evaluated waste discharges into Neshaminy Creek and their effect on water quality. The report concluded that water quality was depressed throughout the basin and identified the West Branch of the Neshaminy, Cooks Run, and Country Club Creek as areas where the problem was especially acute. This study further defined "B" and "C" water quality standards, respectively for the upper and lower Neshaminy Basin.

The Sanitary Water Board of the Pennsylvania Department of Health ordered upgrading of the Chalfont-New Britain wastewater treatment facility.

1969 Roy F. Weston, Inc. (1969) concluded that a single regional advanced wastewater treatment plant be constructed near the Chalfont-New Britain site. This regional facility was recommended to serve both the Hatfield (SR-I) as well as the Chalfont-New Britain Area (SR-II).

1970 The Chalfont-New Britain plant capacity was doubled to 1.4 mgd (million gallons per day) in an expansion where the Bucks County Water and Sewer Authority owned one-half of the treatment capacity in the newly expanded facility.

The 1960 Bucks County Master Sewerage Plan was updated (Albright and Friel, Inc. 1970). This Master Plan considered

the 1969 Roy F. Weston report as an integral part of the update that details the Neshaminy Basin sewerage plans.

A feasibility study (Gilbert Associates, Inc. 1970) was prepared for the Chalfont-New Britain plant. Recommendations were made to expand and upgrade the Chalfont-New Britain wastewater treatment facilities with phase-out of the two Doylestown Borough facilities. Because of the issuance of permit to construct an expanded and upgraded facility by the Hatfield Township Municipal Authority, joint treatment of wastes from both the Chalfont-New Britain and Hatfield areas was eliminated from consideration.

1972 A report was prepared (Camp, Dresser, and McKee, Inc. 1972) for the PA-DER. This study concluded that the most economical program for wastewater treatment would be achieved by building a regional facility near the junction of Neshaminy and Mill Creeks, in Wrightstown serving both the Chalfont-New Britain, Hatfield and other tributary areas. However, the study also pointed out that the retention of the Chalfont-New Britain facility may be preferable in order to maintain flow in the middle reaches of Neshaminy Creek during dry weather.

The Camp, Dresser and McKee report concluded that within the Chalfont-New Britain and Hatfield areas the most economical waste treatment approach would centralize treatment at the Chalfont-New Britain site with future phase-out of the Hatfield Township facilities and possible phase-out of the Lansdale facilities to the Chalfont-New Britain plant.

A second study (Gilbert Associates, Inc. 1972) prepared for the Bucks County Water and Sewer Authority and Chalfont-New Britain Joint Sewer Authority recommended a physical-chemical treatment process and an expansion of the Chalfont-New Britain plant to a 7.0 mgd capacity.

The PA-DER issued an order prohibiting any additional connections to the Chalfont-New Britain plant because of overloaded conditions. This order subsequently was modified during the year to allow acceptance and treatment of up to 2.0 mgd of influent wastewater.

1973 The PA-DER issued a permit for construction of the 7.0 mgd Chalfont-New Britain facility and placed the construction grant application for this facility on the State Priority List.

The Sub-Region II Wastewater Management Commission was established. The Commission was composed of representatives of Bucks County, Bucks County Water and Sewer Authority, Chalfont-New Britain Joint Sewer Authority, and of the ten municipalities that are located entirely or partially within Sub-Region II.

1974 The Chalfont-New Britain Joint Sewer Authority was notified by PA-DER that the funds for the expansion and upgrading of wastewater treatment facilities at the Chalfont-New Britain site would be available.

1975 An environmental assessment of the proposed project (Gilbert Associates 1975) was prepared.

EPA determined that the proposed plant expansion to 7.0 mgd was not cost-effective (expansion to 5.0 mgd was indicated as a more reasonable capacity) and therefore the Federal government could not participate in funding of the expansion. Consequently, PA-DER withdrew the Chalfont-New Britain construction permit for the 7.0 mgd facility. Subsequently, PA-DER issued an order to the two Sewer Authorities (Bucks and Chalfont-New Britain) and the Sub-Region II municipalities requiring the upgrading of treatment at the Chalfont-New Britain plant with construction to begin by the first day of 1976 and completion within 18 months.

1976 The Bucks County Water and Sewer Authority and the Chalfont-New Britain Joint Sewer Authority in coordination with the Sub-Region II Wastewater Commission decided to commence Step I Facilities Planning.

1977 The various members of the Sub-Region II achieved a consensus on the limits of the planning area. PA-DER formally delineated the facilities planning area.

1978 An engineering consultant (Gilbert Associates) was selected to prepare the 201 Facilities Plan.

EPA publishes Notice of Intent to file an EIS. EPA began preparation of a joint EIS for the Chalfont-New Britain planning area and the adjacent Buckingham Tonwhsip 201 Study.

1979 EPA offered a Step I (Planning) grant of $88,450 or 75% of the cost to prepare a Facilities Plan for the Chalfont-New Britain area. The grant was accepted by the Chalfont-New Britain Township Joint Sewage Authority (CNBTJSA) as the lead agency.

The joint EIS process was segregated into separate EIS's for the Chalfont-New Britain area and Buckingham Township due to significant differences in the Facilities Planning.

Alternatives Selection Process

The wastewater management plans described in CNBTJSA's draft Facilities Plan and in EPA's draft EIS are based on two components:

- Wastewater treatment plant configurations which address the need to upgrade the quality of effluent discharged to Neshaminy Creek; and
- On-lot wastewater disposal system repair or replacement where malfunctioning systems have been identified.

Through the concurrent Facilities Planning and EIS processes, alternatives for improved wastewater management have been developed and evaluated. Details about alternatives which the Facilities Plan proposes as feasible from an engineering standpoint are presented for public consideration in the Draft EIS.

Both the costs and environmental impact information should be reviewed carefully by area residents and other interested parties to determine which of the alternatives, if any, is preferable. Ample time will be made available to study the material contained in the Draft EIS and raise questions. Following public distribution of the Draft EIS, there will be a 45 day review and comment period during which time a public hearing will be held as described in the front of this document.

The Draft EIS will be distributed to government agencies, citizens, and other interested groups on the mailing list which appeared in Chapter III. Opinions about material contained in the Draft EIS should be formulated and comments provided to EPA. EPA will carefully evaluate any comments received and make any necessary changes to the alternatives analysis based on these comments. A response to substantive comments will be provided in the Final EIS, which will be completed following the end of the Draft EIS review period.

Also in the Final EIS, EPA will identify a recommended alternative for implementation, with consideration given to public comments, local government positions, and the cost and impact evaluations described in the Draft EIS. EPA will also indicate whether other alternatives may also be acceptable and can be considered for Federal funding.

Following publication of the Final EIS, each local jurisdiction or municipal authority must decide which course of action they wish to pursue. If local decisions are consistent with the results of the EIS, applications for Federal funding to design (Step II) and construction (Step III) wastewater treatment facilities can then be processed.

Chapter II

Environmental Inventory

CHAPTER II. ENVIRONMENTAL INVENTORY

Introduction

The existing environment and the projected future environment are described in this chapter. These environmental conditions were subsequently used in the development (Chapter IV) and evaluation (Chapter V) of alternative wastewater management plans.

As part of the concurrent Facilities Plan/EIS, EPA prepared a detailed inventory of the existing environmental, social, and economic conditions in the planning area (WAPORA 1978). The inventory was forwarded to CNBTJSA to aid in the development of alternative wastewater management plans.

The purpose of the Draft EIS is to familiarize and orient the reader with those environmental concerns and issues that will be significantly affected by wastewater management in the Chalfont-New Britain area. This has been done to make the Draft EIS concise and issue oriented.

General Setting

The Chalfont-New Britain planning area is located in southeastern Pennsylvania and encompasses 90 square miles. The planning area includes all of Chalfont, Doylestown, and New Britain Boroughs; all of Doylestown and New Britain Townships; and portions of Plumstead and Warrington Townships (Figure 1). These central Bucks County municipalities are located approximately 22 miles north of Philadelphia and 20 miles west of Trenton, New Jersey.

The Chalfont-New Britain planning area lies almost exclusively in the headwaters of Neshaminy Creek. A small portion of the planning area, consisting of 3 square miles, drains to Tohickon Creek. Both Neshaminy and Tohickon Creeks drain into the Delaware River.

The population of the Chalfont-New Britain planning area, has increased from approximately 12,000 people in 1950 to approximately 39,000 people by the year 1980. Marked changes in land use have accompanied the threefold increase in population. It is the changing patterns of population and land use that have brought about the need to plan wastewater treatment facilities.

Air Quality

Air quality in the planning area is generally good. The major pollutant of concern in the area is ozone (a photochemical oxidant). This problem is regional in nature as all of Pennsylvania has been classified as not in compliance with the photochemical oxidant standard. Air quality control programs have been developed to attain compliance.

Climate

The Chalfont-New Britain planning area has a modified, humid, continental climate. The average annual precipitation of the planning area is approximately 43 inches. This precipitation is distributed fairly evenly throughout the months of the year. The lowest monthly average occurs during February (2.6 inches) and the highest monthly average occurs during July and August (4.2 inches).

The average annual temperature of the planning area is approximately 51°F based upon data from Quakertown. Summers are warm and humid with mean maximum and minimum temperatures for July of 87°F and 65°F, respectively. Winters are moderately cold with mean January maximum and minimum temperatures 39°F and 22°F, respectively. The average data of the last spring frost is May 8th and the average date of the first fall frost is October 4th.

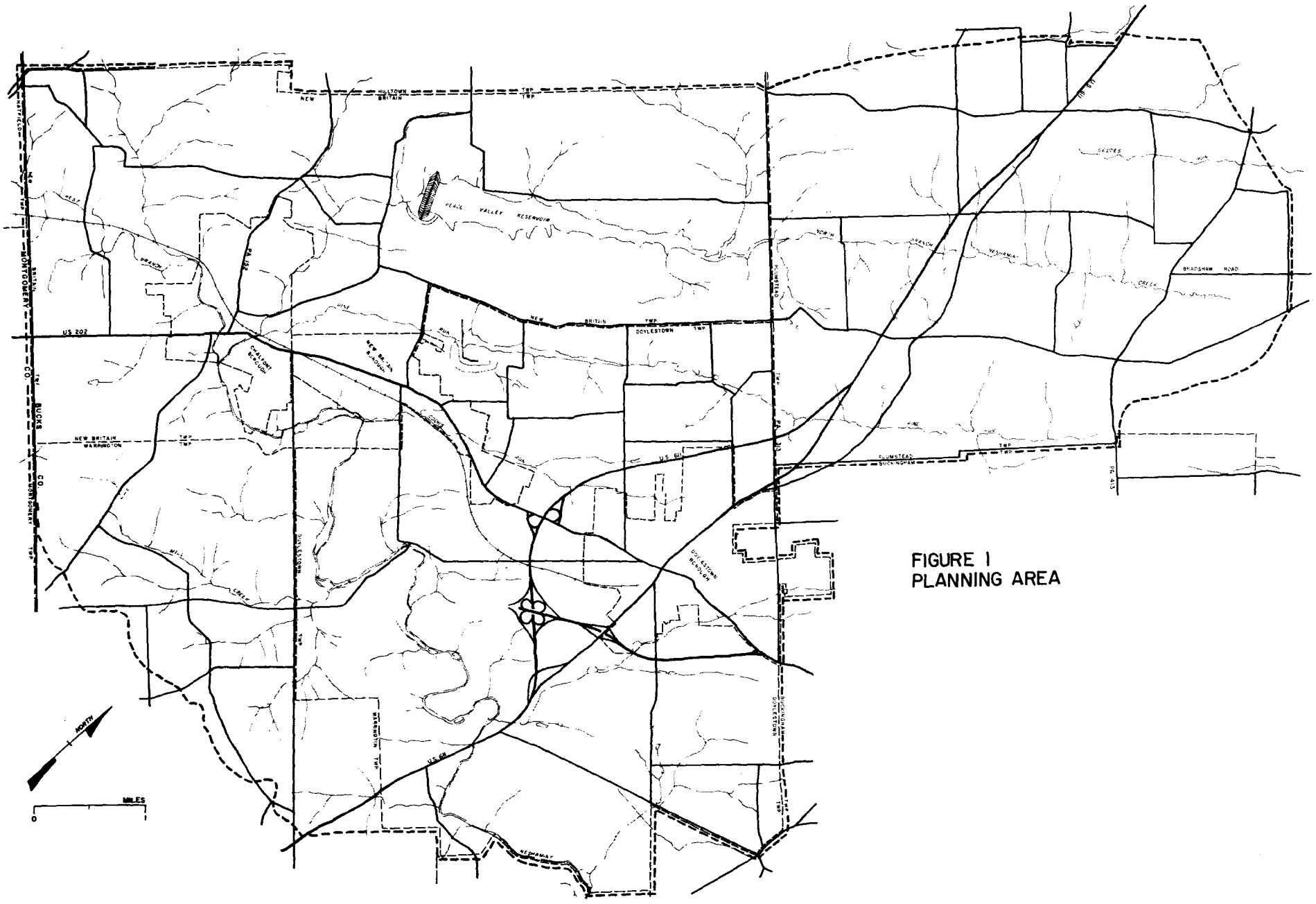


FIGURE 1
PLANNING AREA

Physiography

The Chalfont-New Britain planning area is located within the Triassic Lowlands section of the Piedmont physiographic province of eastern Pennsylvania. The Lowlands are characterized by low, northeast-southwest trending ridges which are underlain by bedrock composed of sedimentary sandstone, sedimentary conglomerate and igneous diabase. Broad valleys typically occur in areas underlain by easily eroded sandstones and shale.

Geology

The bedrock of the planning area includes igneous, sedimentary, and metamorphic rock types. The metamorphic Cocalico Phyllite is Ordivician in age (430-500 million years old) and is the oldest formation within the Chalfont-New Britain planning area. The Stockton and Lockatong Formations, which underlie the majority of the planning area, and the Brunswick Formations are three sedimentary formations within the Newark Group of Triassic Formations (190-225 million years old). These geologic units have different physical and chemical characteristics that can affect the siting of a facility, construction techniques used, and other activities.

Topography

Elevations range from a high of 640 feet above mean sea level (A.M.S.L.) near Naces Corner in the northwestern part of the planning area to a low of 180 feet A.M.S.L. near Neshaminy Creek in the southeastern corner of the planning area. Areas having slopes greater than 15% are found in the planning area. These steep slopes generally occur on the down dip (i.e., dip of the rock strata) side of stream valleys.

Watersheds

Watersheds in the planning area and their respective coverage areas are listed in Table 1. Neshaminy Creek, whose watershed comprises most of the planning area, flows from west to east across the southern end of the planning area into the Delaware River near Bristol. Tributaries of the Neshaminy which are located within the planning area include the North Branch, Pine Run, West Branch, Mill Creek and Cooks Run (see Figure 2). The northern corner of the planning area is located in the Tohickon Creek watershed. Tohickon Creek flows northeast into the Delaware River.

Table 1. Coverage areas within the boundaries of the Chalfont-New Britain planning area of major watersheds and sub-watersheds.

Stream	Coverage (Acres)
Tohickon Creek (total)	2,100
Tohickon Creek Mainstem	1,532
Geddes Run	568
Neshaminy Creek (total)	34,014
North Branch of Neshaminy Creek	11,006
West Branch of Neshaminy Creek	3,758
Pine Run	4,828
Mill Creek	3,109
Cooks Run	1,995
Neshaminy and Mainstem	9,318
TOTAL	36,114

Streamflows

There are no continuous USGS gaging stations within the planning area. However, the USGS does maintain a gaging station on Neshaminy Creek near Langhorne, downstream of the planning area.

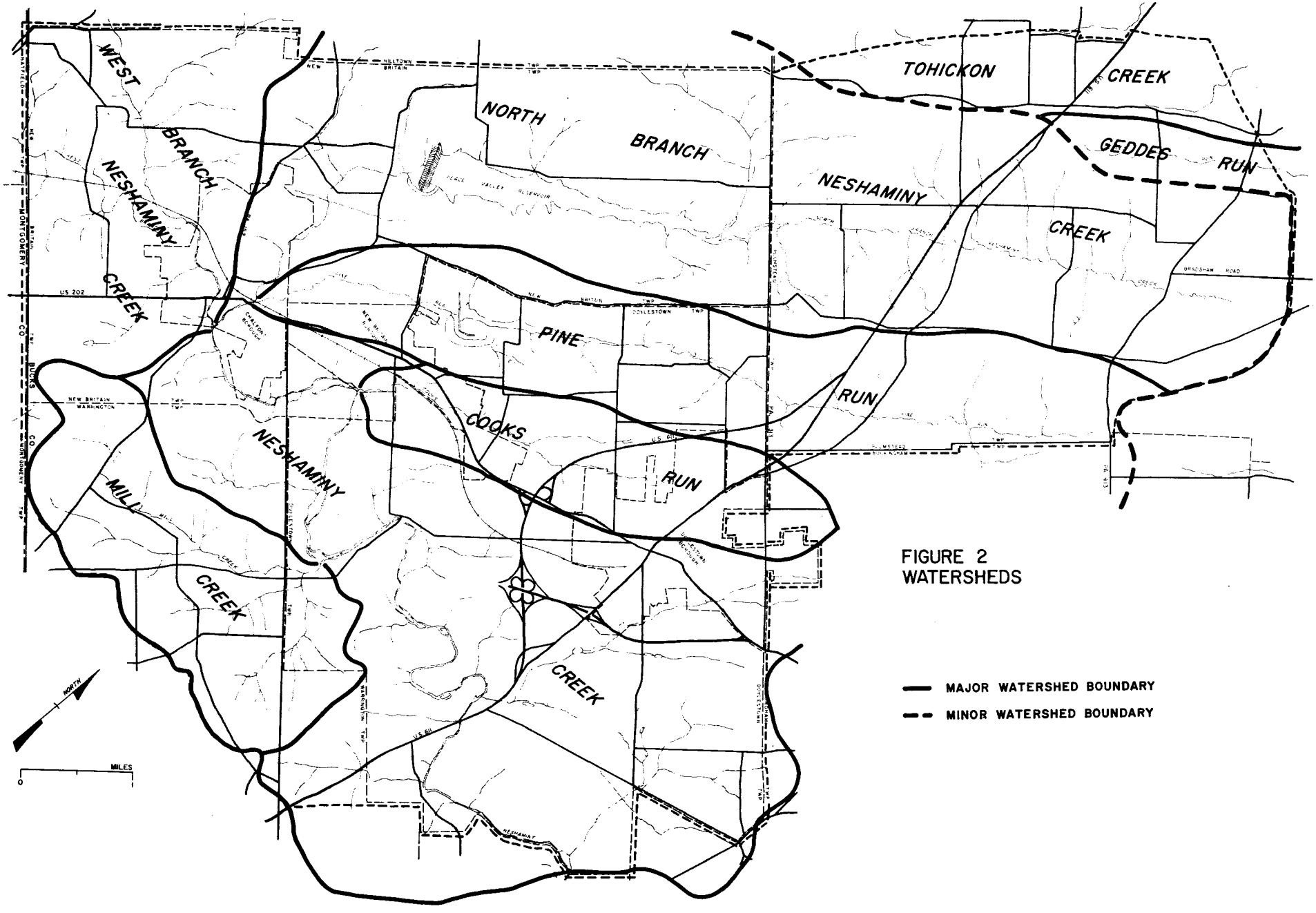


FIGURE 2
WATERSHEDS

Published data (Pennsylvania Department of Forests and Waters 1966) for the Langhorne station list the average discharge as 278 cfs (cubic feet per second) for a 28 year period of record, and the minimum and maximum discharges reported respectively as 1.9 cfs and 49,300 cfs. The minimum annual seven consecutive day flow with a ten year recurrence interval (MA7CD10) for Langhorne is 9.2 cfs. The MA7CD10 drought flow is frequently used for water quality planning purposes. One of the hydrographic modifications that would occur upon implementation of the Neshaminy Water Supply System are the minimum flow releases of 8.2 cfs from March 1 to June 15 and 4.2 cfs during the remainder of the year (NWRA 1979). This modification would occur at the point of the proposed North Branch Water Treatment Plant in Chalfont Borough and would then affect the downstream flow on the main stem of Neshaminy Creek.

Groundwater Supply

Because the public water supply in the planning area is derived totally from wells, the availability and potential depletion of the groundwater resource has become a prominent issue.

Future population growth and associated development will increase the demand placed upon water supplies. At the same time the coverage by impervious surfaces--roads, parking lots, etc.--serves to decrease the area available for recharge to the groundwater system. Therefore, a groundwater budget was prepared for each municipality in the planning area in order to assess current and projected demands (see Table 2). This budget is based upon total population, population density, water demand, and impervious area. Lost infiltration, recharge reduction, net recharge, total safe yield, and the total excess or deficit in the groundwater resource are estimated. As a result, the groundwater budget presented in this EIS is a simplified analysis that serves as an indicator of the adequacy of groundwater resources to meet future water supply needs in years of average precipitation.

Because of much lower population densities in the townships than in the boroughs, the townships appear to have adequate groundwater resources to satisfy expected demand. The net recharge in excess of safe yield for Doylestown and New Britain Townships for 2020 are calculated at 3.9 million gallons per day (mgd) and 3.8 mgd respectively, whereas demand is estimated to be 1.2 mgd for Doylestown Township and 1.2 mgd for New Britain Township. The difference between the net recharge in excess of safe yield and the demand is 2.7 mgd and 2.6 mgd for the respective townships. The sections of Plumstead and Warrington Townships in the planning area are not expected to experience any serious groundwater deficits since estimates for the year 2020 indicate demand to be 0.38 mgd (0.027 mgd/sq mi) and 0.27 mgd (0.048 mgd/sq mi), with net recharge in excess of safe yields of 4.0 mgd and 1.5 mgd for the respective townships.

Unlike the townships, the boroughs are densely populated and all are projected to have deficits before the year 2020. Doylestown Borough is expected to experience a groundwater deficit by 2020 of 0.35 mgd. New Britain Borough also will be unable to meet its 2020 demand, and will face a deficit of 0.009 mgd. Chalfont Borough is expected to have a net groundwater excess of 0.04 mgd by year 2000, but a deficit of 0.03 mgd by year 2020.

Water Supply Plans

The adequacy of water supplies to meet future needs has been under considerable study by the Neshaminy Water Resources Authority (NWRA). The NWRA (1979) has evaluated and analyzed previous studies (Justin and Courtney 1972, Pennoni Associates, Inc. 1977, Albright and Friel 1962, Betz Environmental Engineers 1977) and has

Table 2. Estimated groundwater budgets in the planning area for the years 1978, 2000, and 2020. Budget is determined for normal precipitation.

FACTOR	Chalfont Borough	Doylestown Borough	Doylestown Township	New Britain Borough	New Britain Township	Plumstead Township	Warrington Township
Extent of planning area (sq mi)	1.60	2.31	15.63	1.17	15.27	14.13	5.66
Estimated population							
1978	2,947	9,211	8,360	2,765	6,514	3,550	2,223
2000	4,100	9,940	12,700	3,550	12,000	4,710	3,080
2020	4,820	10,420	16,760	4,250	16,700	5,510	3,920
Density (persons/sq mi)							
1978	1,840	3,990	530	2,360	430	250	390
2000	2,560	4,300	810	3,030	790	330	540
2020	3,010	4,510	1,070	3,632	1,090	390	690
Impervious cover (%)[a]							
1978	17.3	26.0	8.7	19.8	7.6	5.6	7.2
2000	20.6	27.0	11.0	22.5	10.8	6.6	8.8
2020	22.5	27.6	12.9	24.7	12.0	7.2	10.1
Lost infiltraton (inches)							
1978	2.1	3.1	1.0	2.4	0.9	0.7	0.9
2000	2.5	3.2	1.3	2.7	1.3	0.8	1.1
2020	2.7	3.3	1.5	3.0	1.6	0.9	1.2
Recharge reduction (000 gpd/sq mi)[b]							
1978	99	148	50	113	43	32	41
2000	118	154	63	129	62	38	50
2020	128	158	74	141	74	41	58
Net recharge (000 gpd/sq mi)							
1978	472	423	521	458	528	539	530
2000	453	417	508	442	509	533	521
2020	443	413	497	430	497	530	513
Net recharge in excess of safe yield[c] (000 gpd/sq mi)							
1978	222	173	271	208	278	289	280
2000	203	167	258	192	259	283	271
2020	193	163	247	180	247	280	263
Demand (000 gpd/sq mi)[d]							
1978	129	279	37.4	165	29.9	17.6	27.5
2000	179	301	56.9	212	55.0	23.3	38.1
2020	211	316	75.1	254	76.6	27.3	48.5

Table 2. Estimated groundwater budgets (concluded).

FACTOR	Chalfont Borough	Doylestown Borough	Doylestown Township	New Britain Borough	New Britain Township	Plumstead Township	Warrington Township
Excess (deficit) (000 gpd/sq mi)							
1978	99.2	(106)	234	43.6	248	272	252
2000	23.7	(134)	201	(20.1)	204	260	233
2020	(18.1)	(153)	172	(74.6)	170	252	215
Excess (deficit) mgd							
1978	0.15	(0.25)	3.06	0.05	3.78	3.84	1.43
2000	0.04	(0.31)	3.14	(0.02)	3.12	3.68	1.32
2020	(0.03)	(0.35)	2.69	(0.09)	2.60	3.57	1.22

[a]The percent of impervious cover is estimated by an exponential equation which varies as a function of population density (Stankowski 1974).

[b]Assumes 30.48 cm (12 inches) recharge on undeveloped land. This is equivalent to 571,000 pgd/sq mi. Figure given is reduction in recharge due to impervious surfaces subtracted from gross recharge of 571,000 gpd/sq mi.

[c]Safe yield equals net recharge of 250,000 gpd/sq mi, which is minimum necessary to maintain streamflow (0.39 cfs/sq mi of watershed).

[d]Assumes a 70 pgcd consumption rate.

found that the water systems can supply sufficient amounts of water to satisfy present and immediate future water needs during years of average precipitation. However, water shortages during drought years will become increasingly severe in the future. On the basis of their groundwater resource evaluations using water budgets and streamflow hydrographs, the NWRA presented firm groundwater yields (i.e., groundwater available at drought year---1966 water year conditions) that are significantly less than the groundwater budget presented above which was based on average precipitation. Thus, the deficiencies of the groundwater system in meeting water demands are significantly greater. The NWRA (1979) concludes that a water system to supplement available groundwater supplies would be necessary to avoid adverse economic and environmental conditions. The recommended action is construction of pumping facilities, transmission mains and a water treatment plant which would divert water from the Delaware River into the planning area. The PA-DER (1977) supports this recommendation, recognizing that although continued groundwater development is a viable shortrange (1990) alternative, a regional surface water supply is needed to protect against drought conditions. Furthermore, PA-DER (1977) indicates that the best apparent solution is a Bucks County regional water system that utilizes the Point Pleasant diversion. Bucks County and the Philadelphia Electric Company have recently entered into agreement (Daily Intelligencer 14 February 1980) for such a project.

Neshaminy Water Supply System

The Neshaminy Water Supply System has been proposed by the NWRA to meet the water supply needs of Central Bucks and Montgomery Counties and to provide cooling water to the Philadelphia Electric Company's Limerick Nuclear Power Plant. The proposed system consists of the following major components:

(1) North Branch Water Treatment Plant will be constructed with an initial capacity of 20 mgd (million gallons per day) with a provision for an expanded capacity to 40 mgd. The North Branch Water Treatment Plant is to be located on 29 acres in Chalfont Borough at the confluence of Pine Run and North Branch Neshaminy Creek. Water to be treated will come from natural flows from Pine Run and North Branch Neshaminy Creek and from water withdrawn from the Delaware River at Point Pleasant.

(2) Four water transmission mains will radiate from the proposed water treatment plant. These water mains range from 18 to 36 inches in diameter and from 13,850 to 30,300 feet in length. The Chalfont-New Britain wastewater facility planning area lies entirely within the areas to be served by the four proposed water transmission mains.

(3) The Point Pleasant pumping facilities and associated transmission mains are proposed to withdraw and deliver water from the Delaware River.

The Neshaminy Water Supply System has different service areas which would cover the majority of the Chalfont-New Britain planning area. The existing and proposed water conveyance systems will in combination provide public water supplies to all of the planning area except a portion of Plumstead Township.

Groundwater Quality

Contamination of the groundwater resource also affects the quantity of high quality water available for water supply purposes. A number of wells in the planning area have been tested for both trichloroethylene (TCE) and perchloroethylene (PCE) after these chemicals were found in wells in Montgomery County. In the planning area, only one well, in Chalfont Borough, has been taken

off-line since early September 1979 due to PCE contamination. The Chalfont Water Company and the Bucks County Health Department stated (personal communications, Ms. Warren, Mr. Noll, 4 March 1980) that there have been no problems in supplying water with one less well in operation but, in the event of a serious drought, it may be necessary to put this well back on-line (dependent upon the PCE level at that time). Also, if further contamination results, a burden will be placed on the fresh groundwater supply and a re-evaluation of estimated safe yields and the availability of the water supply alternate situation will be necessary.

Surface Water Quality

The first major water quality evaluation of the Neshaminy Creek Basin was conducted in 1967 by the Pennsylvania Department of Health. The 1967 report evaluated waste discharges into Neshaminy Creek and their effect on water quality. The report concluded that water quality was depressed throughout the Basin and identified the West Branch of the Neshaminy, Cooks Run, and Country Club Creek as areas where the problem was especially severe.

Ten years later the COWAMP/208 Water Quality Plan (DVRPC 1977) reached essentially the same conclusion. As a result of the 1967 study the upper portion of the Neshaminy Basin, including the streams in the planning area, was designated as "B" quality water. The Upper Neshaminy Basin extends from the headwaters downstream from the proposed PA-614 dam on the mainstem of Neshaminy Creek. The "B" quality criteria have since been altered by Chapter 93 of the rules and regulations of the PA-DER. Current water quality criteria for the Upper Neshaminy Basin are presented in Table 3. The protected uses in the Upper Neshaminy Basin are the maintenance of stocked trout from February 15 to July 21 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat. Downstream of the dam site to its confluence with the Delaware River, Neshaminy Creek is subject to "C" quality criteria. Neshaming "C" are less stringent than "B" criteria and the protected water use is warmwater fishes.

The quality of wastewater that sewage treatment plants in the Basin can discharge to the Neshaminy Creek is defined by PA-DER. PA-DER is currently analyzing results of a stream survey conducted above and below the treatment plants in the Chalfont-New Britain area. Based on the results, PA-DER will determine whether to revise the effluent limitations (maximum allowable concentrations of specific pollutants in wastewater) for the Chalfont-New Britain and Doylestown Borough sewage treatment plants.

Non Point Sources

In addition to the significant point source pollution problems in the planning area, there are pollutant loads imposed on the streams from a number of diffuse sources. The DVRPC (1977) indicated that the most serious non-point source problems are erosion and sedimentation. The high erodibility of soils coupled with agriculture, urban and suburban runoff; construction; and roadside drainage were identified as the probable causes of accelerated erosion (DVRPC 1977). DVRPC (1977) also indicated that malfunctioning on-lot sewage disposal systems are considered a major problem in the Basin.

Aquatic Biota

Studies conducted in the planning area have shown that the macroinvertebrate fauna of West Branch, Cooks Run, Country Club Creek, and Neshaminy Creek are affected by moderate to severe water pollution (Strekal 1976a,b; BCPC 1977; Broadfoot et al. 1969 and 1970). The Bucks County Planning Commission (1977) reported that the reduction in species diversity was most severe below the various wastewater treatment plants in the planning area. Cooks Run appears to be the

Table 3. Specific water quality criteria for Upper Neshaminy Basin, source to PA-614 Dam on the mainstem of Neshaminy Creek (PA Bulletin 1979).

PARAMETER	CRITERIA
Aluminum	Not to exceed 0.1 of the 96-hour LC50 for representative important species as determined through substantial available literature data or bioassay tests tailored to the ambient quality of the receiving waters.
Alkalinity	Equal to or greater than 20 mg/l as $CaCO_3$, except where natural conditions are less. Where discharges are to waters with 20 mg/l or less alkalinity, the discharge should not further reduce the alkalinity of the receiving waters.
Arsenic	Not to exceed 0.05 mg/l.
Bacteria	During the swimming season (May 1 through September 30), the fecal coliform level shall not exceed a geometric mean of 200 per 100 milliliters (ml) based on five consecutive samples each sample collected on different days; for the remainder of the year, the fecal coliform level shall not exceed a geometric mean of 2,000 per 100 milliliters (ml) based on five consecutive samples collected on different days.
Chromium	Not to exceed 0.05 mg/l as hexavalent chromium.
Color	Not more than 50 units on the platinum-cobalt scale; no other colors perceptible to the human eye.
Copper	Not to exceed 0.1 of the 96-hour LC50 for representative important species as determined through substantial available literature data or bioassay tests tailored to the ambient quality of the receiving waters.
Cyanide	Not to exceed 0.005 mg/l as free cyanide (HCN + CN-).
Dissolved Oxygen	For ther period 2/15 to 7/31 of any year, minimum daily average of 6.0 mg/l, no value less than 5.0 mg/l. For the remainder of the year, minimum daily average of 5.0 mg/l no value less than 4.0 mg/l.
Fluoride	Not to exceed 2.0 mg/l.
Iron	Not to exceed 1.5 mg/l as total iron; not to exceed 0.3 mg/l as dissolved iron.
Lead	Not to exceed the lesser of 0.05 mg/l or 0.01 of the 96-hour LC50 for representative important species as determined through substantial available literature data or bioassay tests tailored to the ambient quality of the receiving waters.
Manganese	Not to exceed 1.0 mg/l.
Nickel	Not to exceed 0.01 of the 96-hour LC50 for representative important species as determined through substantial available literature data or bioassay tests tailored to the ambient quality of the receiving waters.
Nitrite plus Nitrate	Not to exceed 10 mg/l as nitrogen.
pH	Not less than 6.0 and not more than 9.0.

Table 3. Specific water quality criteria for Upper Neshaminy Basin (concluded).

Phenolics	Not to exceed 0.005 mg/l.
Phosphorus (Total Soluble as P)	Not more than 0.03 mg/l.
Temperature	For the period 2/15 to 7/31, no rise when ambient temperature is 74°F, or above; not more than 5°F rise above ambient temperature until stream temperature reaches 74°F, not to be changed by more than 2°F during any one-hour period; for the remainder of the year, no rise when ambient temperature is 87°F or above; not more than 5°F rise above ambient temperature until stream temperature reaches 87°F, not to be changed by more than 2°F during any one-hour period.
Total Dissolved Solids	Not more than 500 mg/l as a monthly average value; not more than 750 mg/l at any time.
Turbidity	For the period 5/15 - 9/15 of any year, not more than 40 NTU; for ther period 9/16 - 5/14 of any year, not more than 100 NTU.
Zinc	Not to exceed 0.01 of the 96-hour LC50 for representative important species as determined through substantial available literature data or bioassay tests tailored to the ambient quality of the receiving waters.

most severely affected (Strekal 1976b). During a 1978 site visit by WAPORA, Inc. personnel to Cooks Run, no fish or macroinvertebrate fauna were observed immediately above or below the outfall.

Only limited work has been conducted on fish populations in the planning area. Electroshocking surveys conducted from 1968-70 indicated that in the streams of the planning area with no significant discharges 10-20 species of fish could usually be collected (Broadfoot et al 1969, 1970, 1971). They reported high (18-19 species) diversity below the Chalfont-New Britain plant, low to medium (7-8 species) diversity below the Doylestown-Green Street plant and an almost complete absence (0-1 species) of fish below the Doylestown-Harvey Avenue plant. Personnel from the Bucks County Planning Commission believe that chlorine toxicity is the most likely explanation for the observed reduction in diversity below the treatment plants.

Flooding

The Chalfont-New Britain planning area is prone to flooding during all months of the year. The worst floods occur as a result of spring rains combined with snowmelt or summer rains during tropical storms. Large magnitude floods occurred during 1933, 1955, and 1971. The most severe flood occurred in August 1955 as a result of Hurricane Diane. The Federal Emergency Management Agency (FEMA) has designated the 1955 flood episode as one of 100 year probable recurrence. The floodplains are mapped in Figure 3.

Flood Control Structures

Three dams have been constructed in the planning area for flood control purposes -- PA 617 (North Branch Neshaminy Creek), PA 616 (Pine Run), and PA 615 (unnamed tributary, Neshaminy Creek, New Britain Township). These dams have drainage areas of 10,112, 6,010, and 2,170 acres, respectively. PA 617 forms a reservoir named Lake Galena which may also be utilized for water supply purposes and recreation. In addition, another dam, PA 614, is proposed for construction on the Neshaminy Creek downstream of the planning area. At this time, PA 614 is planned for design with a permanent pool. The requirement that nitrogen and phosphorus be removed from wastewater discharged in the planning area is based upon the need to prevent eutrophication in the stream above this dam. Construction of the dam may begin as early as 1983 (conversation with Robert Flowers, NWRA, on July 13, 1981).

Soil Suitability for On-Site Sewage Disposal

The PA-DER has classified all soil series that occur in Pennsylvania into 15 groups, based on their suitability for subsurface disposal of wastewater effluent (Chapter 73 of Title 25, PA Rules and Regulations). Soil series may be judged to be unsuitable for subsurface disposal systems due to flooding, seasonal high water table, shallow soils, or other pollution hazards. The PA-DER regulations further define these groups by general categories. Within the planning area, Category A soils generally are suitable for subsurface disposal of wastes. Areas that contain Groups 1, 7, or 9 soils within Category A require site-specific testing to ensure suitability for subsurface disposal. Generally, however, these soils do not have seasonal high water tables, severe flooding hazards, extreme shallowness, or limestone bedrock. Categories B, C, and E soils may be unsuitable for wastewater disposal, and intensive on-site investigation is required to ascertain adequacy. Categories D and F are unsuitable for subsurface disposal systems. Most of the planning area is unsuitable for on-site systems. Of the remaining portions of the planning area, more areas are adaptable to elevated sand mounds than are suitable for conventional septic tank-soil absorption systems (Figure 4). Almost all of the land which is suitable for on-lot systems in the planning area has been developed. Most of the remaining vacant areas are unsuitable

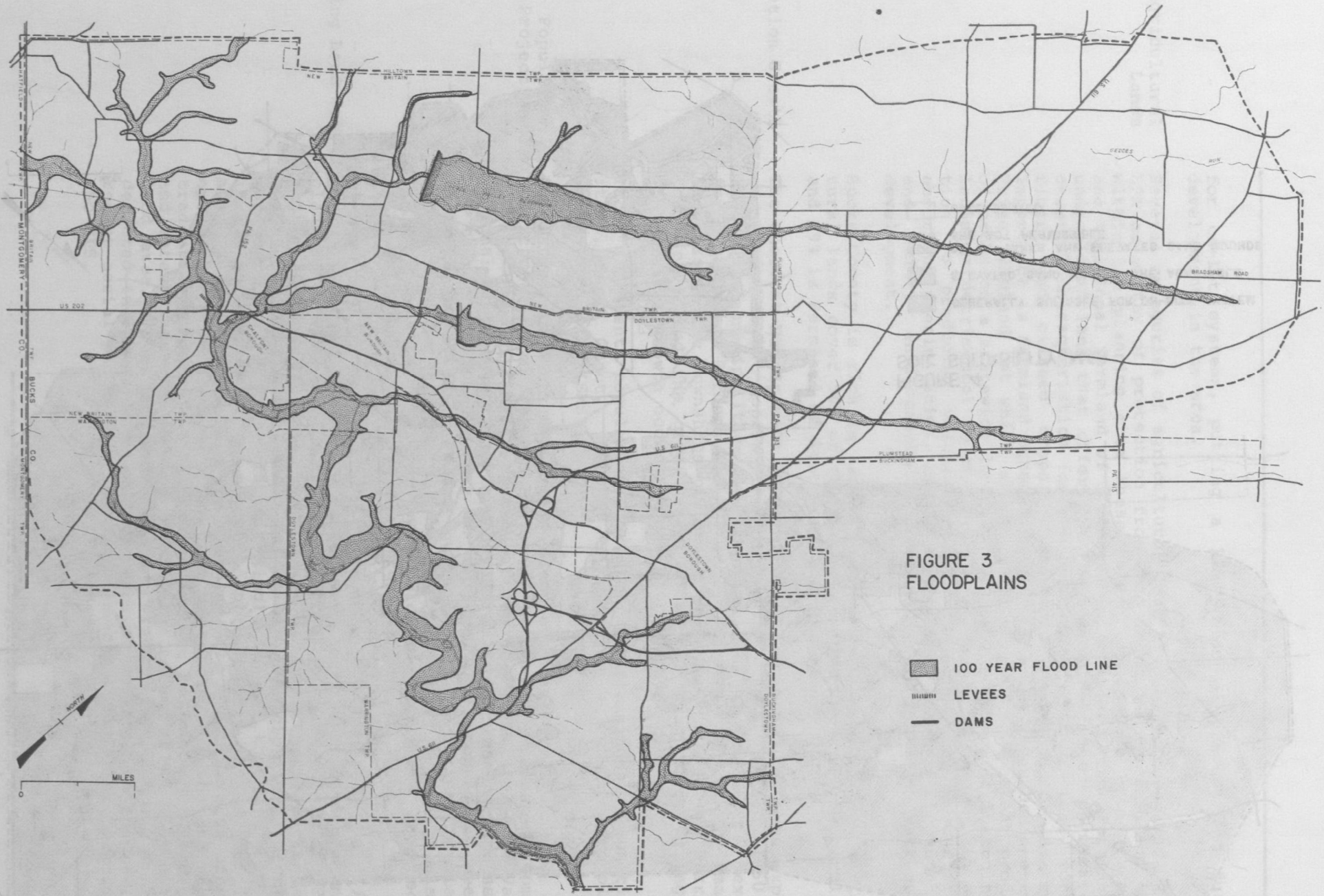


FIGURE 3
FLOODPLAINS

100 YEAR FLOOD LINE
LEVEES
DAMS

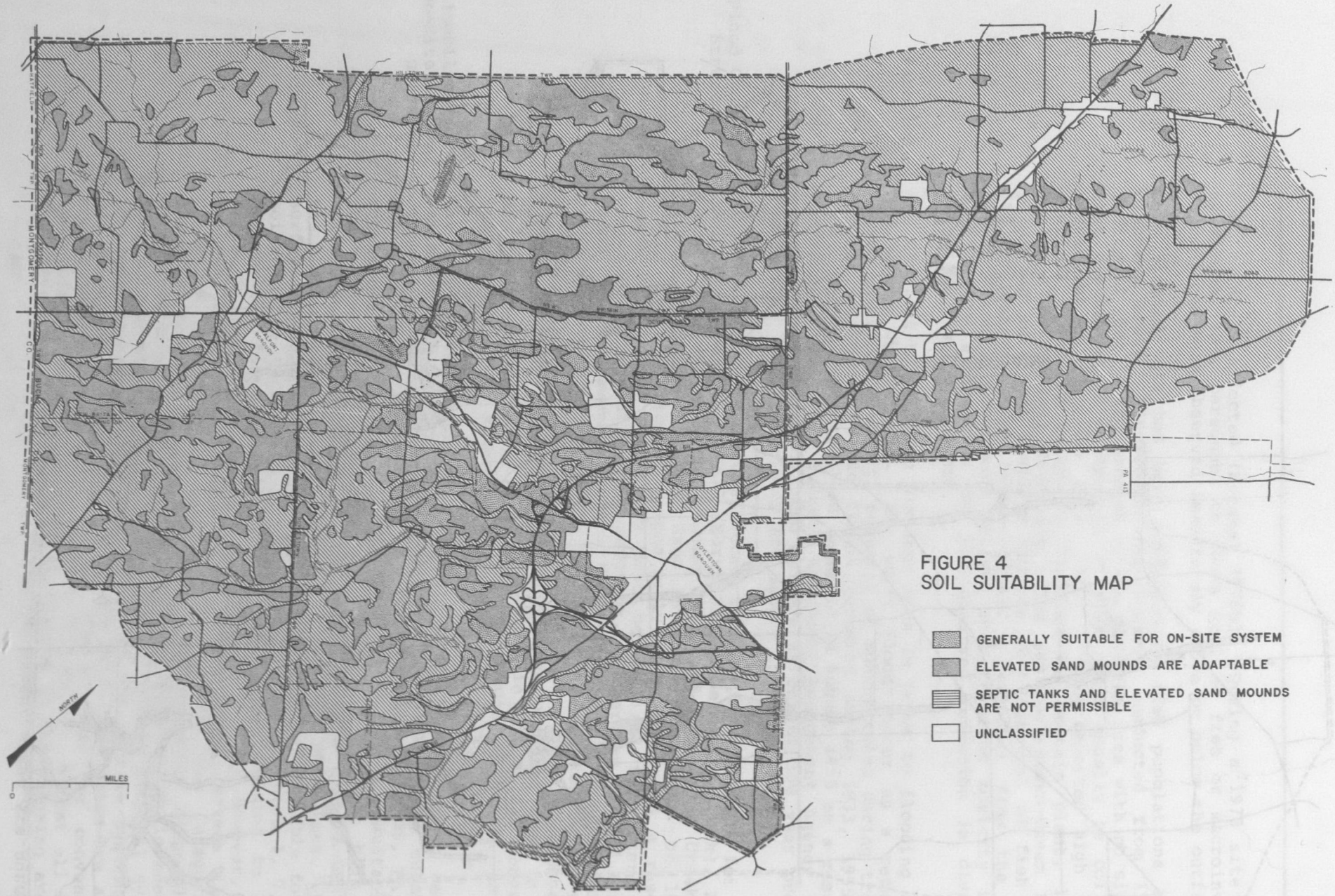


FIGURE 4
SOIL SUITABILITY MAP

- GENERALLY SUITABLE FOR ON-SITE SYSTEM
- ELEVATED SAND MOUNDS ARE ADAPTABLE
- SEPTIC TANKS AND ELEVATED SAND MOUNDS ARE NOT PERMISSIBLE
- UNCLASSIFIED

for on-lot systems, putting a limitation on present and future development in the area.

'rime Agricultural Lands

Several categories of agricultural land have been recognized by the EPA as worthy of protection from conversion to non-farmland uses. Within the planning area these categories include Prime Farmland and Additional Farmland of Statewide Importance. Prime Farmland is undeveloped land that offers the best combination of physical and chemical characteristics for the production of food, feed, forage, fiber, and oilseed crops. Additional Farmland of Statewide Importance is farmland other than that which has been designated as Prime Farmland but which also is felt to be an important producer of crops on a statewide level. The loss of important agricultural lands is detrimental to the quality of the environment. In addition to producing valuable crops, farmlands reduce runoff by absorbing precipitation, aid in replenishing groundwater supplies, and buffer environmentally sensitive areas from encroaching development.

Bucks County is rich in productive farmland. Significant agricultural lands cover 56% of the planning area; 17% is Prime Farmland, and 39% is Farmland of Statewide Importance (see Figure 5).

Population Growth

The Chalfont-New Britain planning area municipalities have experienced significant population growth since 1950. Between 1950 and 1980, all municipalities more than tripled in population, except for Doylestown Borough and Plumstead Township which had smaller increases. The Townships of Doylestown, New Britain, and Warrington experienced the greatest increases, although for Warrington, most of that growth occurred outside the study area.

Table 4 presents population growth for the planning area municipalities, Bucks County, and the Philadelphia Standard Metropolitan Statistical Area (SMSA).

Population Projections

Population projections for the planning area were discussed at a public meeting of the Sub Region II Wastewater Management Commission on 8 March 1979. Representatives of PA-DER, Delaware Valley Regional Planning Commission, the Bucks County Planning Commission, and the general public were in attendance. A subsequent meeting among these parties resulted in acceptance of revised population projections for the planning area (Table 5). These population projections were developed by considering estimates prepared by municipal, county, and regional organizations in light of the most current growth trends in the planning area.

xisting Land Use

Table 6 lists the number of acres devoted to each land use in the planning area municipalities for the year 1975 (BCPC 1977). Similar information is also presented for the Central Bucks region and Bucks County. For the planning area municipalities, agriculture accounted for the largest single use of the land (37%) in 1975. Residential uses occupied approximately 30% of the land. About 20% of the land in the planning area was vacant or undeveloped. The other categories of land use (manufacturing and mining, trades and commerce, utilities, government and education, and parks and entertainment) each accounted for 2 to 3 percent of the total land area. The land use patterns within the planning area are depicted in Figure 6. These patterns were mapped on the basis of recent aerial photography and field checking during preparation of the EIS.

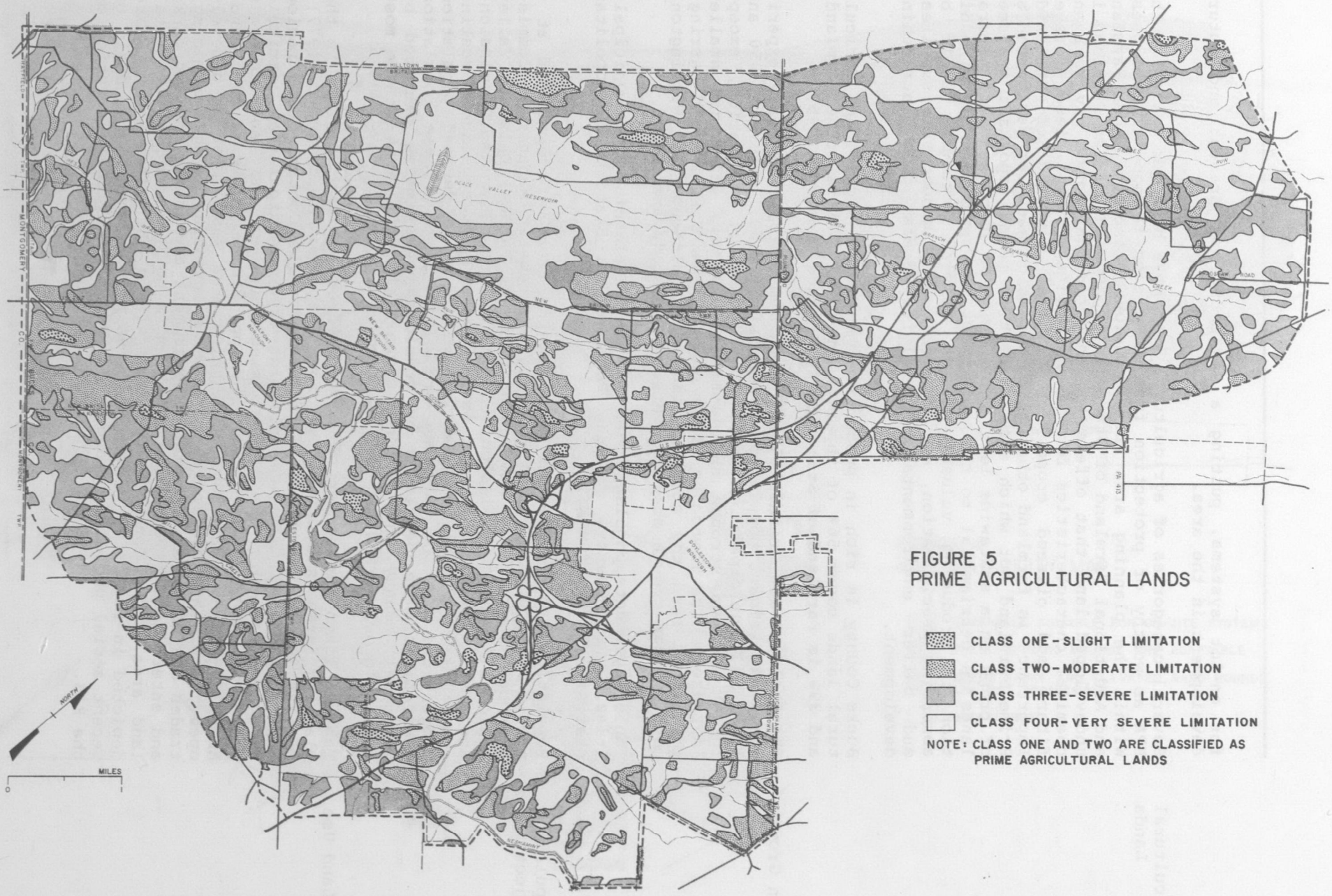


FIGURE 5
PRIME AGRICULTURAL LANDS

- CLASS ONE - SLIGHT LIMITATION
- CLASS TWO - MODERATE LIMITATION
- CLASS THREE - SEVERE LIMITATION
- CLASS FOUR - VERY SEVERE LIMITATION

NOTE: CLASS ONE AND TWO ARE CLASSIFIED AS PRIME AGRICULTURAL LANDS

Table 4. Population increase and growth rates for the Chalfont-New Britain planning area, 1950-1980. (Data from BCPC 1971, 1977; BCPC 1972; Plumstead Township Planning Commission 1962; US-DOC 1971, 1980). N/A indicates data unavailable.

	POPULATION			
MUNICIPALITY	1950	1960	1970	1980
Chalfont Borough	828	1,410	2,366	2,785
Doylestown Borough	5,262	5,917	8,270	8,718
Doylestown Township	2,364	3,795	6,613	11,790
New Britain Borough	581	1,109	2,428	2,506
New Britain Township	1,367	3,090	5,207	7,342
Plumstead Township	2,353	3,355	4,682	5,088
Warrington Township	2,336	4,148	7,550	10,659
Bucks County	144,620	308,567	416,728	474,713
Philadelphia SMSA	N/A	4,342,897	4,817,914	N/A

	PERCENT CHANGE		
MUNICIPALITY	1950-1960	1960-1970	1970-1980
Chalfont Borough	70.3	67.8	17.7
Doylestown Borough	12.4	39.8	5.4
Doylestown Township	60.5	74.3	78.3
New Britain Borough	90.9	118.9	3.2
New Britain Township	126.0	68.5	41.0
Plumstead Township	42.6	39.6	8.7
Warrington Township	77.6	82.0	41.2
Bucks County	113.4	35.1	13.9
Philadelphia SMSA	N/A	10.9	N/A

Table 5. Population projections for wastewater facility planning in the Chalfont-New Britain planning area, 1980 to 2000.

	POPULATION				
MUNICIPALITY	1980	1985	1990	1995	2000
Chalfont Borough	3,120	3,430	3,740	3,920	4,100
Doylestown Borough	9,460	9,580	9,700	9,820	9,940
Doylestown Township	8,650	9,660	10,670	11,680	12,700
New Britain Borough	2,860	3,030	3,200	3,370	3,550
New Britain Township	7,320	8,480	9,650	10,810	12,000
Plumstead Township[a]	3,920	4,110	4,310	4,510	4,210
Warrington Township[a]	2,250	3,460	2,660	2,870	3,080
Total	37,580	40,760	43,930	46,980	50,080

[a]Part of Township within Facility Planning Area.

Table 6. Land use of the Chalfont-New Britain PA planning area municipalities in 1975 in acres (BCPC 1977).

MUNICIPALITY	RESIDENTIAL	AGRICULTURE	MANUFACTURE & MINING	TRADE & COMMERCE	UTILITIES	GOVERNMENT & EDUCATION	PARKS & ENTERTAINMENT	VACANT & UNDEVELOPED	TOTAL
Chalfont Borough	564.4	78.3	25.0	74.5	12.1	4.5	31.3	233.7	1,023.8
Doylestown Borough	976.8	0	35.8	146.9	65.1	93.8	105.5	53.9	1,477.8
Doylestown Township	3,660.7	2,041.8	168.0	575.3	274.2	545.2	186.5	2,551.4	10,003.1
New Britain Borough	344.1	11.8	37.8	139.3	15.7	5.3	14.1	179.7	747.8
New Britain Township	2,534.0	3,697.9	78.6	113.1	38.4	156.9	562.3	2,591.6	9,772.8
Plumstead Township	2,791.8	8,740.4	207.7	208.6	123.1	11.6	282.1	2,149.5	14,514.8
Warrington Township	3,116.1	2,708.5	327.3	259.7	96.2	104.4	210.8	1,887.4	8,710.4
Planning Area Municipalities	13,987.9	17,278.7	880.2	1,517.4	624.8	921.7	1,392.6	9,647.2	46,250.5
Central Bucks County	42,053.5	63,354.2	2,485.8	4,444.4	2,425.7	3,097.5	4,958.0	26,047.3	148,866.4
Bucks County	106,466	147,595	12,683	11,707	6,894	5,776	20,495	79,772	391,388

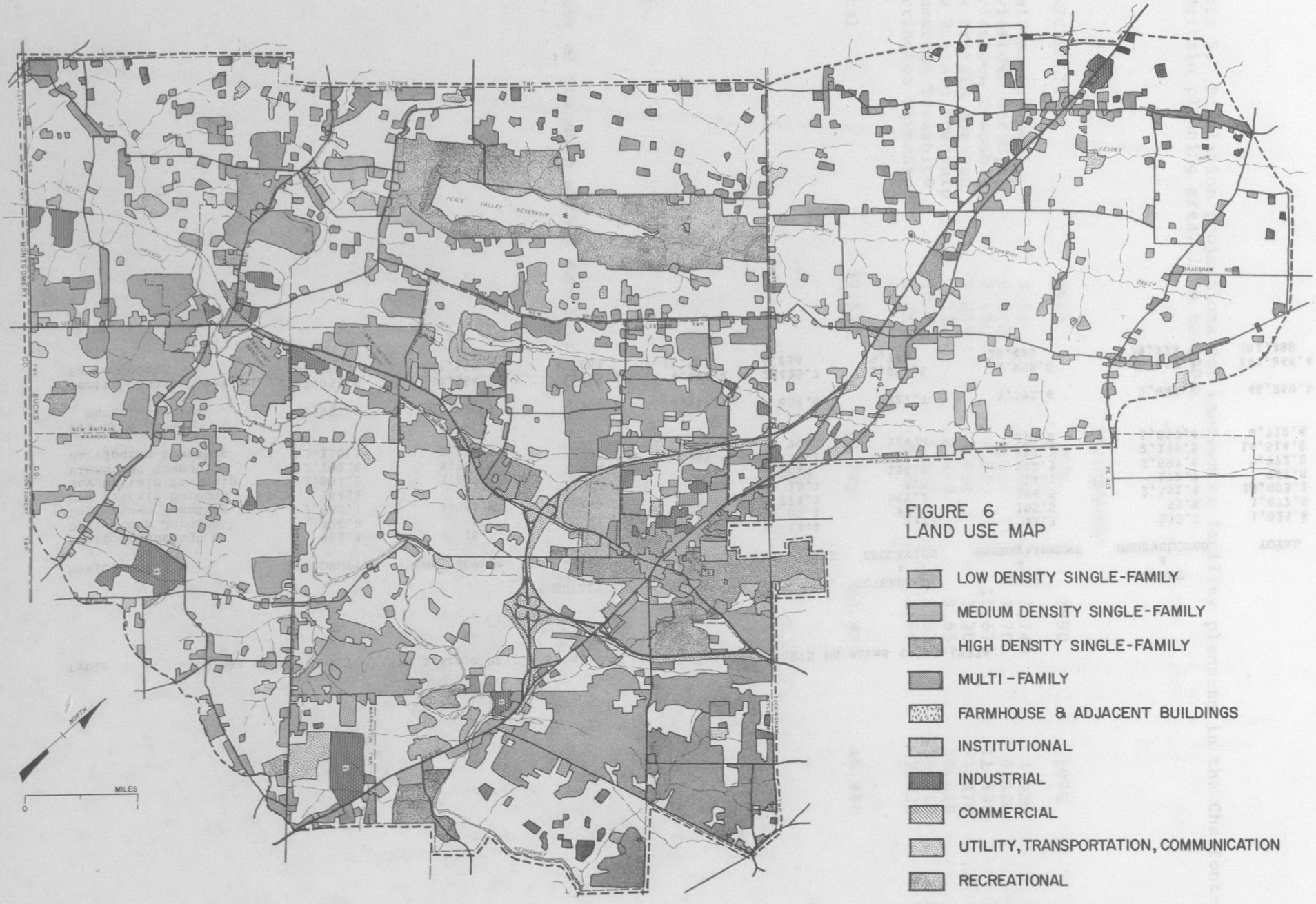


FIGURE 6
LAND USE MAP

- LOW DENSITY SINGLE-FAMILY
- MEDIUM DENSITY SINGLE-FAMILY
- HIGH DENSITY SINGLE-FAMILY
- MULTI-FAMILY
- FARMHOUSE & ADJACENT BUILDINGS
- INSTITUTIONAL
- INDUSTRIAL
- COMMERCIAL
- UTILITY, TRANSPORTATION, COMMUNICATION
- RECREATIONAL
- OPEN / UNDEVELOPED
- QUARRY
- WATER BODY

Future Land Use

Maps were prepared to depict existing (1979) and future (1990, 1995, 2000, and 2020) land development scenarios in the planning area. Figure 7 shows the year 2000 land development scenario. The amount of future development is based upon a reasonable rate of population growth for the planning area (see Table 7).

The purpose of projecting future land use is to provide a basis for wastewater management planning. The future land uses will act to guide the choice of appropriate technologies for wastewater collection and treatment. The planning for wastewater facilities is intended to accommodate but not to accelerate future growth.

Development Projection Methodology

A five step methodology was used to develop the maps which estimate future land development. The five steps include:

- The existing land use map was used to identify existing vacant and developed lands;
- Zoning district and land use maps of each municipality were studied to identify vacant lands which were zoned for residential development.
- Environmental constraints to development (floodplains, steep slopes, etc.) were mapped and used in overlay fashion to determine which of the vacant lands actually could be developed.
- The incremental population projections of each municipality were translated into dwelling unit projections based on estimates of average household size; and
- The dwelling units projected were allocated to residentially developable land according to relative development advantages and anticipated dwelling unit densities for the years 1990, 1995, 2000, and 2020.

The process of estimating and identifying future development areas should be considered as a scenario in which future land development is extrapolated from existing conditions. The maps prepared as a product of this process do not constitute future land use plans for these municipalities nor do they represent a detailed parcel-specific evaluation of development opportunity.

Projected residential development within the planning area was distributed using a growth attractiveness analysis. This analysis relied on location determinants, such as:

- Access to employment centers
- Access to existing and planned infrastructure
- Access to community services and other amenities.

In conjunction with the growth attractiveness analysis, the following key assumptions were made:

- All future residential development was assumed to occur in areas currently zoned for residential use;
- Maximum allowable densities, as prescribed by municipal zoning ordinances, were used to estimate the development potential of land areas;

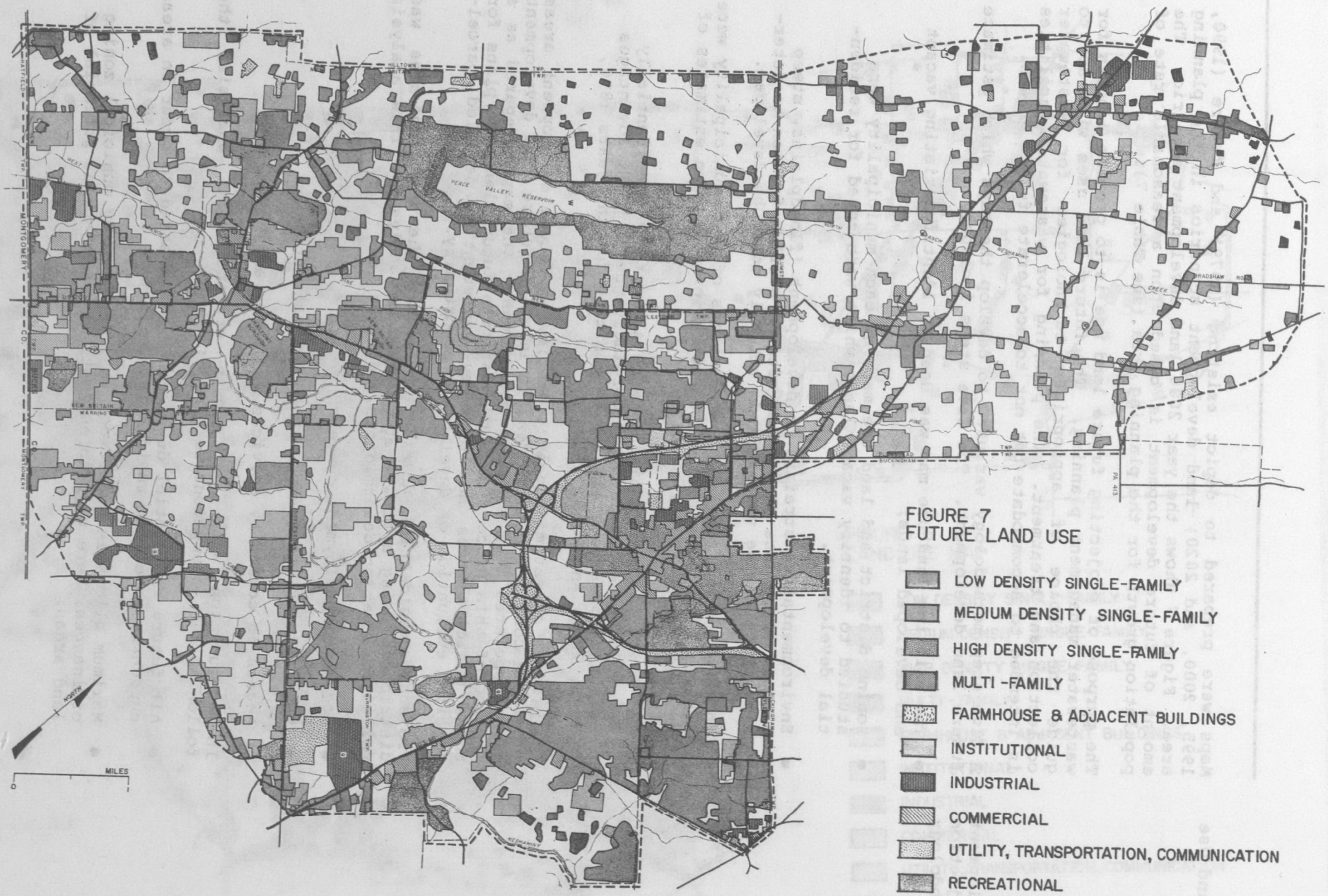


FIGURE 7
FUTURE LAND USE

- LOW DENSITY SINGLE-FAMILY
- MEDIUM DENSITY SINGLE-FAMILY
- HIGH DENSITY SINGLE-FAMILY
- MULTI-FAMILY
- FARMHOUSE & ADJACENT BUILDINGS
- INSTITUTIONAL
- INDUSTRIAL
- COMMERCIAL
- UTILITY, TRANSPORTATION, COMMUNICATION
- RECREATIONAL
- OPEN / UNDEVELOPED
- QUARRY
- WATER BODY

Table 7. Population and housing unit projections, 1979-2020, by municipality.

Municipality	Projection	1979 (existing)	1980	1985	1990	1995	2000	2020
Chalfont Borough	Population	3,033	3,120	3,430	3,740	3,920	4,100	4,820
	Dwelling Units	947	1,023	1,174	1,312	1,395	1,480	1,740
Doylestown Borough	Population	9,335	9,460	9,580	9,700	9,820	9,940	10,420
	Dwelling Units	3,618	3,739	3,786	3,804	3,866	3,929	4,118
Doylestown Township	Population	8,505	8,650	9,660	10,670	11,680	12,700	16,760
	Dwelling Units	2,779	3,089	3,591	3,996	4,441	4,941	6,521
New Britain Borough	Population	2,812	2,860	3,030	3,200	3,370	3,550	4,250
	Dwelling Units	671	673	725	765	812	865	1,036
New Britain Township	Population	6,917	7,320	8,480	9,650	10,810	12,000	16,700
	Dwelling Units	2,034	2,464	2,996	3,521	3,931	4,332	6,028
Plumstead Township*	Population	3,735	3,920	4,110	4,310	4,510	4,710	5,510
	Dwelling Units	1,216	1,370	1,452	1,523	1,605	1,641	1,919
Warrington Township*	Population	2,236	2,250	2,460	2,660	2,870	3,080	3,920
	Dwelling Units	604	696	791	877	969	1,054	1,342
Total Planning Area		36,573	37,580	40,750	43,930	46,980	50,080	62,380
		11,869	13,054	14,515	15,978	17,019	18,242	22,704

* Planning area portion only

- Any environmental performance standards stipulated by municipal zoning ordinances were considered applicable for estimating or locating future development;

- Municipal comprehensive plans were consulted and used to verify the objectives of local land management controls as defined by the zoning ordinance. Substantive judgments were required in instances in which comprehensive plans were considered outdated.

Development Proposals

Current plans for development in the Chalfont-New Britain area were compiled from county and municipal records. Although development plans are highly subject to change with the housing market and other factors, they are good indicators of the locations and sizes of developments to be anticipated in the future. The treatment plant capacities and service areas developed during the Facilities Planning/EIS processes are based on population and land use projections for the next 20 years, rather than on individual development plans which are pending at this time. The development plans are presented in this Draft EIS for information purposes only.

In all, 33 plans for residential development were documented (Table 8 and Figure 8). These proposals exist in varying stages of review, from sketch plans to approved developments which are under construction. The majority (2,953 out of 5,737 total units) of the proposed units are located within one of the existing public sewer service areas. Of the remainder, most (1,562 units) are within areas proposed for an extension of the existing sewer service area.

Economic Growth

Total employment in the planning area municipalities increased dramatically between 1960 and 1970. While employment in Bucks County grew by 79.3%, the number of jobs in the planning area municipalities increased by 106.8%. The municipalities that showed the greatest employment growth during that decade were New Britain Township (+325%), Chalfont Borough (+206%), and Warrington Township (+203%).

Between 1970 and 1976, employment growth stablilized, with the total number of jobs in the planning area increasing by only 0.2%. Employment levels actually declined in three of the seven planning area municipalities: Chalfont Borough (-26%), Doylestown Borough (-10%), and Warrington Township (-7%). Employment in New Britain Borough grew at the highest rate (64.1%). During this same 1970-76 period, the number of jobs in Bucks County increased by 19.7%.

Industrial Growth

Industrial growth in the planning area has been hampered in recent years by the lack of new highway construction and difficulties in obtaining sewer service (Telephone conversation, Mr. A. Heddon, Bucks County Industrial Development Corporation, 24 January 1979). The only four-lane highway in the planning area is Rt. 611 to Doylestown. The expansion of Rt. 202 to four lanes has been planned for many years, but has not been completed. The sewer connection ban imposed by several planning area municipalities also has restricted industrial development.

Since there is an ample supply of vacant land in the planning area, economic activity would likely increase once the transportation and sewer issues have been resolved.

The largest single category of employment in the planning area is manufacturing. Jobs in manufacturing accounted for 34.1% of the total employment in the planning area in 1976. The next three largest categories of employment were retail trade (15.9%),

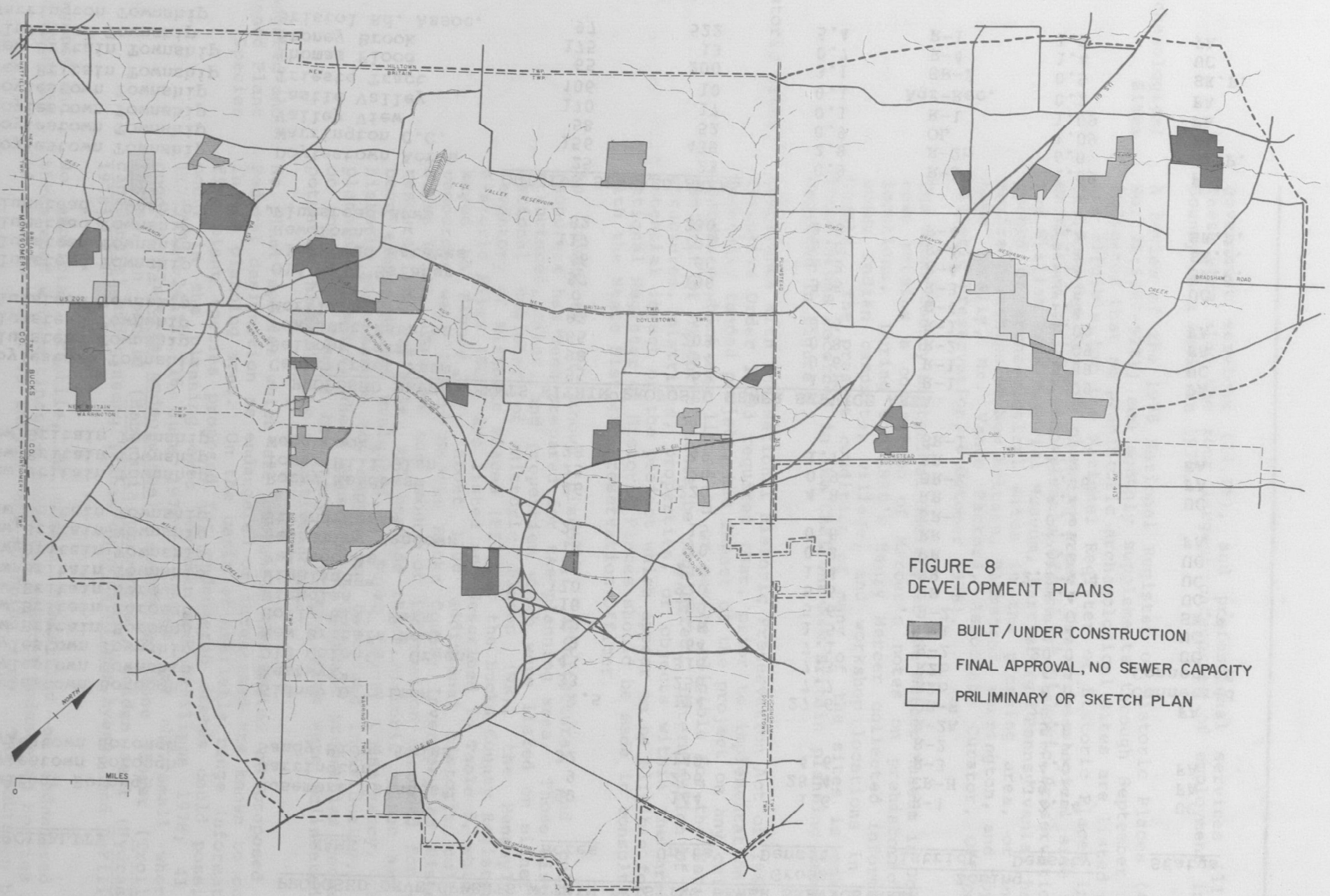


FIGURE 8
DEVELOPMENT PLANS

- BUILT / UNDER CONSTRUCTION
- FINAL APPROVAL, NO SEWER CAPACITY
- PRILIMINARY OR SKETCH PLAN

Table 8. Proposed developments. UC = under construction; FA = final approval; SK.P. = sketch plan; PA = preliminary approval.

MUNICIPALITY	NAME	Acres	Units	Gross Density	Zoning District	Zoning Density	Status
PROPOSED DEVELOPMENTS WITHIN EXISTING SEWER SERVICE AREA							
Chalfont Borough	Rosemore Estates*	90	144	1.6	R-1	2.34	UC
Doylestown Borough	Barrington	9	256	28.4	CR-H	29.2	FA
Doylestown Borough	Sandy Ridge Twins	32	148	4.6	R-3	4.0	FA
					R-2	3.5	
					R-2A	5.0	
Doylestown Borough	Sidney D. Simon	4.5	124	27.6	CR-H	29.2	FA
Doylestown Township	Westwyk*	33	256	7.7	R2b	6.0	Connected
Doylestown Township	Old Colonial Greene	43	316	7.3	R2b	6.0	Connected
New Britain Borough	New Britain Mews	9	64	7.1	R-2	20.0	UC
New Britain Borough	Holly Hill Farm	12	18	1.5	R-1	2.2	UC
New Britain Borough	Nicholas	18	100	5.6	R-2	9.6	SK.P.
New Britain Township	Highlands*	170	930	5.5	RR	4.4	UC
New Britain Township	Fairwooods*	193	274	1.4	RR	2.2-4.4	UC
New Britain Township	Neshaminy Meadows	13	10	0.8	RR	2.2	UC
New Britain Township	Strand-Carew	26	15	0.6	RR	2.2	FA
					SR-1	0.9	
New Britain Township	Rocky Meadows	46	220	4.8	RR	4.4	UC
New Britain Township	Tower Hill Glen*	23	20	0.9	SR-2	.46	FA
New Britain Township	Woodbrook*	28	49	1.75	RR	2.2	FA
					SR-1		
PROPOSED DEVELOPMENTS WITHIN PROPOSED SEWER SERVICE AREA							
Doylestown Township	Cedar Crest Farm*	55	62	1.1	R-1	1.09	PA
Plumstead Township	Belmont Farm*	98	54	0.6	R-1	1.09	UC
Plumstead Township	Fox Hunt Estates	265	203	0.8	R-2	1.09	FA
Plumstead Township	Morrison	93	53	0.6	R-1	1.09	FA
					R-4	1.4	
Plumstead Township	Old Mill Estates	57	198	3.5	R-3	3.5	UC
Plumstead Township	Plumstead Estates	46	60	1.3	R-4	1.4	SK.P.
Plumstead Township	New Town	117	702	6.0	R-4	1.4	SK.P.
Plumstead Township	Plumstead Mews	82	230	2.8	R-4	1.4	SK.P.
OUTSIDE SEWERED AREAS							
Doylestown Township	Doylestown Acres	25	23	0.9	R-1	1.09	FA
Doylestown Township	Warrington C.C.	156	439	2.8	R-2b	6.0	SK.P.
Doylestown Township	Valley View	58	52	0.9	OL	1.09	FA
Doylestown Township	Castle Valley	170	17	0.1	R-1	1.09	FA
New Britain Township	Trieste Tract	106	10	0.1	Agr-Rec.	0.2	FA
New Britain Township	Thomas Flood	65	200	3.1	SR-2	0.5	SK.P.
Plumstead Township	Stoney Brook	175	13	0.7	R-4	1.4	UC
Warrington Township	Bristol Rd. Assoc.	97	522	5.4	R-1	1.9	PA

*Developments affected by PA-DER 1979 ban (seeking to get ITP).

government services (14.1%), and professional services (11.5%). These were also the four largest categories of employment in the County as a whole in 1976.

Archaeological Sites

A review of the 1978 National Register of Historic Places (43 FR No. 26:5287-5291) and monthly supplements through September 1978, indicated that no prehistoric archaeological sites are listed on or are eligible for the National Register of Historic Places in the Chalfont-New Britain planning area. The archaeological site files maintained by the Pennsylvania Office of Historic Preservation at the William Penn Memorial Museum, Harrisburg, Pennsylvania, has no record of archaeological sites in the planning area, or in the entire Townships of New Britain, Plumstead, Warrington, and Doylestown (Orally, Mr. Vance Packard, Associate Curator, Office of Historic Preservation, 6 October 1978).

The Bucks County Historical Society at the Mercer Museum in Doylestown retains a collection of Mercer's notes on prehistoric site locations. During the 1890's Henry Mercer collected information about Indian campsite, village, and workshop locations in Bucks County. The present condition of many of the sites is unknown. Those sites recorded in the Chalfont-New Britain planning area are depicted in Figure 9.

Historic Sites

Compliance with the National Historic Preservation Act of 1966 and Executive Order 11593 requires that, prior to implementation of a Federally funded project, the impact of the project on any cultural resources which are listed on or may be eligible for the National Register of Historic Places be considered. Determination of those structures, districts, properties, or objects within the area of potential impact of the project which appear to be eligible for the National Register of Historic Places should be made in consultation with the State Historic Preservation Officer.

An inventory of known historic, architectural and cultural resources has been prepared for the planning area. Those historic structures, sites, and properties which were listed on either the National Register of Historic Places (NR), the Pennsylvania Inventory of Historic Places (PI), or the Bucks County Register of Historic Sites (BCR) are listed and described in Table 9, which is keyed to Figure 9. About 1200 additional historic cultural resources were listed on the Bucks County Inventory of Historic Sites (BCI). Because the amount of information recorded for each resource was variable, and because these historic values had not been examined and evaluated by Bucks County Conservancy, these historic places were not mapped and described individually. For planning purposes, where clusters of historic properties recorded on the Bucks County Inventory occurred, areas were delineated as potential historically sensitive areas.

Endangered and Threatened Plant Species

No plant species which are currently designated or proposed for Federal designation as endangered or threatened are known to occur in the planning area. On the basis of available range information five plant species proposed for endangered status could possibly occur in the planning area (Ayensu and DeFilipps 1978; 41 FR 117:24524-24572, 16 June 1976). These are the small whorled pogonia (Isotria medeoluides), spreading globe flower (Trollius laxus), an orchid (Habenaria peramoena), golden seal (Hydrastis canadensis) and ginseng (Panax quinquefolius; Ayensu and DeFilipps 1978).

Endangered and Threatened Wildlife

No amphibian, reptile, or mammal classified as endangered or threatened with extinction under the Federal Endangered Species Act of 1973 is known to inhabit the planning area. The southern bald

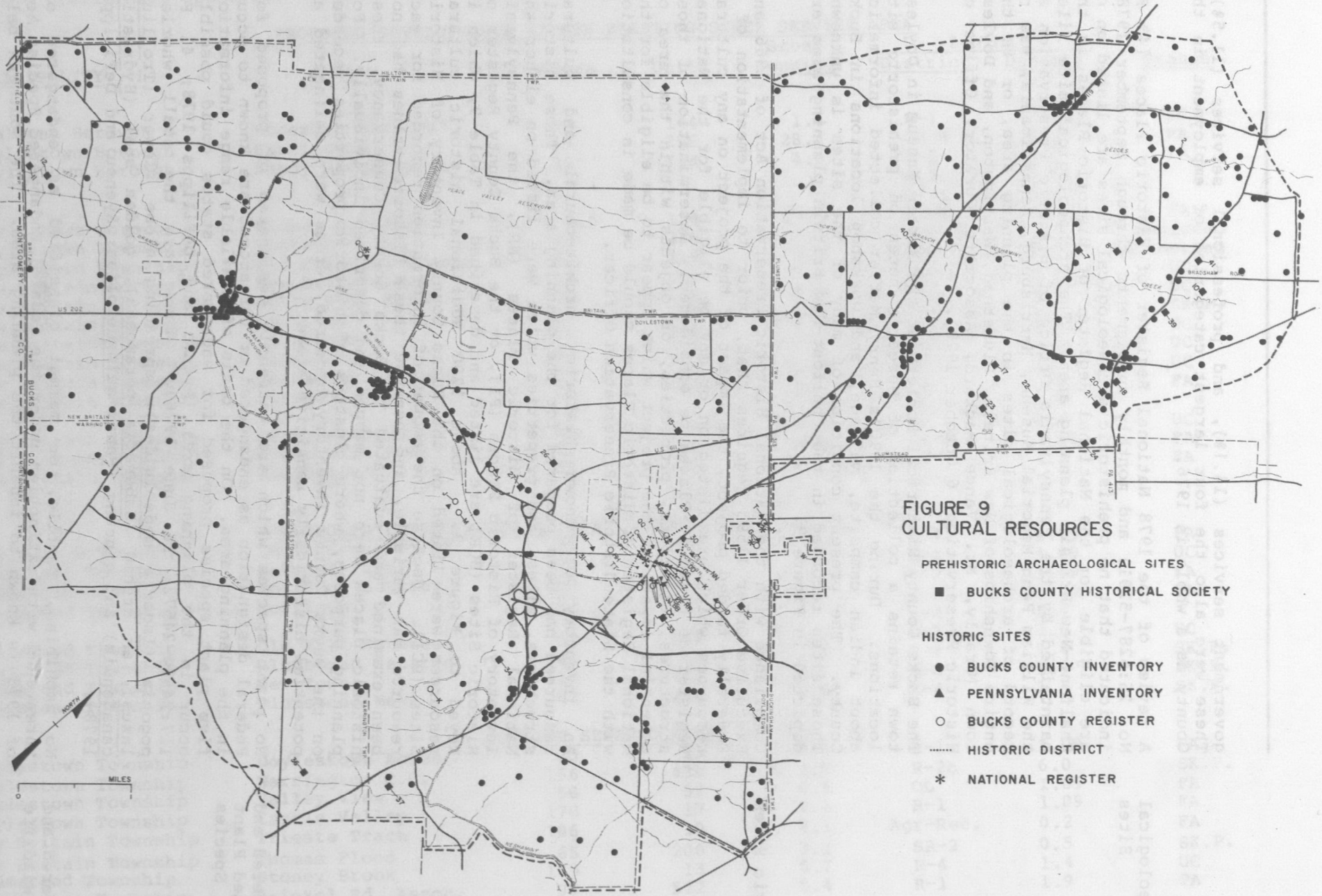


FIGURE 9
CULTURAL RESOURCES

PREHISTORIC ARCHAEOLOGICAL SITES

■ BUCKS COUNTY HISTORICAL SOCIETY

HISTORIC SITES

● BUCKS COUNTY INVENTORY

▲ PENNSYLVANIA INVENTORY

○ BUCKS COUNTY REGISTER

····· HISTORIC DISTRICT

* NATIONAL REGISTER

Table 9. Inventory of historic stuctures, places and properties. NR = National Register, PI = Pennsylvania Inventory, BCR = Bucks County Register, BCI = Bucks County Inventory.

DOYLESTOWN BOROUGH

Location	Status	Name
A'	NR, PI, BCR	Duncan Pugh House
A	NR, PI, BCR	James Lorah House
B	NR, PI, BCR	Mercer Museum and Bucks County Historical Society
C	NR, PI, BCR	The Fountain House
D	PI, BCR	Washington House or the Knickerbocker-Davis Home
E	PI, BCR	Doylestown Agriculture Works
F	BCR	The Magra Residence
U, V, X, Y, Z, BB-JJ; OO; NN; QQ-tt	PI	Doylestown Historic District: The District indicated in Figure 9 includes the following structures. A part of the Doylestown Historic District is listed on the National Register (Shaw Historic District). The Shaw Historic District is bounded by South Main, Ashland, Bridge, and South Clinton Streets.
U	PI, BCI	Old Emergency Hospital
V	PI, BCI	Presbyterian Church
X	PI, BCI	Swartzlander House
Y	PI, BCI	Musgrave House
Z	PI,BCI	Masonic Temple
BB	PI, BCI	Log Cabin
CC	PI, BCI	Lenape Hall
DD	PI, BCI	Intellingencer Building
EE	PI, BCI	The Harvey House
FF	PI, BCI	Hart Buildings
GG	PI, BCI	Greek Revival Building
HH	PI, BCI	Gothic Townhouse
II	PI, BCI	Federal Townhouse
JJ	PI, BCI	Doylestown Prison
NN	PI, BCI	Caretaker's House

Table 9. Inventory of historic stuctures, places and properties (concluded).

DOYLESTOWN BOROUGH (concluded)

Location	Status	Name
OO	PI, BCI	Brick Townhouses
QQ	PI, BCI	Doylestown Borough School
RR	PI, BCI	Stone Gothic House
SS	PI, BCI	Townhouse
TT	PI, BCI	Victorian House
	DOYLESTOWN TOWNSHIP	
G	NR, PI, BCR	Fonthill
H	NR, PI, BCR	Moravian Pottery and Tile Works
I	PI, BCR	The Hare Place
J	PI, BCR	"Painswick Hall", Farm No. 3, Delaware Valley College
K	BCR	Harry Steinback House
L	BCR	Robert A. Horne Home
M	BCR	Farm No. 1 at Delaware Valley College
N	BCR	James Pass Nelson House
O	BCR	Bridgepoint School
S	PI	Pine Valley Covered Bridge
T	PI, BCI	Worthington House
W	PI, BCI	Stone Farm House
AA	PI, BCI	Martin Residence
KK	PI, BCI	General W. W. H. David Residence
LL	PI, BCR	Clemens Homestead
MM	PI, BCR	Carpenter's Gothic House
PP	PI, BCR	Ranulph Bye House
	NEW BRITAIN BOROUGH	
P	BCR	New Britain Baptist Church
	NEW BRITAIN TOWNSHIP	
Q	NR, PI, BCR	James Morgan Homestead
R	BCR	Elias J. Mowry House

eagle, American perigrene falcon, and possibly Kirtland's warbler which are considered endangered at the Federal level may pass through the planning area during their annual migrations. None of these birds are known or expected to utilize the planning area for breeding purposes.

No bird or mammal considered endangered at the State level is known or expected to occur in the planning area. The planning area includes the ranges of the coastal plain leopard frog, the bog turtle, the red-bellied turtle, and the eastern mud turtle, which are considered endangered species in Pennsylvania (PA Fish Commission 1977). Due to their specific habitat requirements, it is unlikely that they occur in the planning area.

Chapter III

Public Participation and Coordination

CHAPTER III. PUBLIC PARTICIPATION AND COORDINATION

Introduction

Throughout the preparation of this Draft Environmental Impact Statement (EIS), the US Environmental Protection Agency (EPA) has continuously sought participation from local, regional, State and Federal agencies; citizen associations; individual citizens; and interested environmental groups. EPA has considered suggestions, criticisms, and objections from the public in documenting the need for wastewater treatment facilities, in developing wastewater management strategies, and in assessing potential impacts. EIS newsletters, pamphlets, advertisements and meetings with the public have been used to insure that all concerned parties were involved in the EIS decision-making process.

Public Participation Advisory Group

EPA regulations as described in 40 CFR 25 and 35.917 require that the Facilities Planning/EIS process ongoing in the Chalfont-New Britain area be accomplished by a full-scale public participation program. During the early stages of the process, the Chalfont-New Britain Joint Sewage Authority (CNBTJSA) appointed Mr. Harold Sursa, Executive Director of the Bucks County Water and Sewer Authority, as Public Participation Coordinator for the Facilities Planning activities. A Public Participation Advisory Group (PPAG) was established to provide area citizens an opportunity to closely participate in the Facilities Planning/EIS process. The PPAG represents a cross-section of the general public, consisting of equal representation from individual citizens, public interest groups, economic interest groups, and public officials. Mr. Sursa has scheduled meetings and acted as a liason between the PPAG, Gilbert Associates, Inc. (the Facilities Planning engineering firm), CNBTJSA, and representatives of EPA and PA-DER. The PPAG was established in order to provide a mechanism whereby all interested parties and participating municipalities would be informed of developments during the Facilities Planning/EIS process through their representatives on the PPAG, so that the ultimate choice in a wastewater management plan for the area reflects local opinions and advice.

The PPAG held a total of 13 meetings over the period from April 1980 through July 1981. Four of these meetings were public meetings and two were held jointly with the Sub-Region II Wastewater Management Commission. Ms. Thelma Schmidt served as secretary for the PPAG and has insured that adequate records of each meeting were distributed to all persons and groups who have expressed an interest in the project. Mr. Robert Moore, Director of the Bucks County Planning Commission was elected by the PPAG to serve as chairman and Mr. John Soderberg served as vice-chairman. Because there was a considerable amount of technical and governmental jargon associated with wastewater treatment planning, the PPAG chose to have a Technical Review Commitee to review chapters of the Facilities Plan for presentation to the PPAG in a more understandable form. The PPAG also chose to establish a Report Writing Committee to summarize their ideas and input for the Facilities Plan/EIS and a Publicity Committee. The PPAG, intended to be advisory to CNBTJSA as the grantee, will make a formal recommendation on the Group's preferred alternative after a public hearing is held to solicit comments on the Facilities Plan.

Although at times some PPAG members have undoubtedly questioned their precise role or their effect on the results of the EIS, their presence has provided a most important public forum in which to discuss any wastewater management issue, and has prepared the way for the upcoming selection and implementation of a long-term solution to the area's wastewater treatment problems. Below is a list of the PPAG members and their affiliations.

Public Participation Advisory Group

Harold Sursa, Coordinator

Citizens

Beverly Goulding, Buckingham Township
Bill Cadden, Doylestown Borough
John Soderberg, Doylestown Borough
Jack Nelson, Doylestown Borough
Dale Whittenberger, Doylestown Township
Harold Rothstein, Doylestown Township
Richard Moxey, New Britain Borough
Rolf Dethlefson, New Britain Township
Douglas McGill, Chalfont Borough
Nick Pasicznyk, Plumstead Township
James Rowan, Chalfont Borough

Public Interest Groups

Barbara Evans, League of Women Voters
Dorothy Batchelder, Bucks County Conservation Alliance

Economic Interest Groups

Frank McCartney, Bucks County Builders Association
Alan Hedden, Bucks County Industrial Development Authority
Will Heiser, Bucks County Chapter, Pennsylvania Society of Professional Engineers
Weldon Harrison, Central Bucks Chamber of Commerce

Public Officials

Evelyn Schulz, US Environmental Protection Agency
John Fabian, PA Department of Environmental Resources
Robert Gallagher, Delaware Valley Regional Planning Commission
Robert Moore, Bucks County Planning Commission
Robert Roop, Buckingham Township
George Getz, Chalfont Borough
John Carson, Doylestown Township
Louis Bienas, New Britain Township
Robert Benner, New Britain Township
Herman Silverman, Plumstead Township
Leonard Point, Warrington Township

Newsletters/ Pamphlets

At the beginning of the EIS process, EPA prepared and distributed pamphlets about the EIS to the public. The pamphlets were distributed via local post offices to all residents within the planning area. In addition, public meeting announcements were advertised in the Daily Intellingencer and Today's Spirit. Press releases were forwarded to all area newspapers and radio stations. EPA prepared periodic newsletters that were distributed to residents, groups and government officials who wished to be kept advised of the progress, the preliminary technical findings, the completion of project milestones, and other general information about the EIS.

Public Meetings

Since preparation of the Chalfont-New Britain and Buckingham EIS's began in August 1978, EPA has conducted three public information meetings in the study area. These meetings were designed to involve the public in all decisions as fully as possible. The information that EPA obtained from the people familiar with the local situation and also those who will be most affected by the outcome of the EIS was invaluable. The following meetings

generated considerable dialogue between EPA, PA-DER, the Facilities Planners, and the general public:

Date	Location	Topics Discussed
September 3, 1978	Lenape Jr. High School, Doylestown	EIS process, scope and issues
October 30, 1980	Lenape Jr. High School, Doylestown	EIS issues, environmental inventory
May 5,1981	Lenape Jr. High School, Doylestown	Wastewater management alternatives and their impacts

Central Contacts Committee

The Central Contacts Committee was established to monitor progress on the Chalfont-New Britian EIS. Its purpose was to insure that wastewater management planning efforts were consistent with Federal and State regulations, as well as coordinated with county and regional planning efforts. The Committee met at various milestones throughout the project to discuss and resolve issues as they arose. The following persons are members of the Committee.

Evelyn Schulz
Joseph Piotrowski
EPA -- EIS Preparation Section
Sixth and Walnut Streets
Philadelphia PA 19106

Barbara D'Angelo
EPA -- Construction Grants
Sixth and Walnut Streets
Philadelphia PA 19106

John Fabian
PA Department of Environmental Resources
1875 New Hope Street
Norristown PA 19401

Harold Sursa
Bucks County Water and Sewer Authority
Neshaminy Manor Center
Doylestown PA 18901

Kenyon Clarke
Chalfont-New Britain Township Joint Sewage Authority
101 N. Main Street
Chalfont PA 18914

Robert Moore
Bucks County Planning Commission
22-28 South Main Street
Doylestown PA 18901

Robert Gallagher
Delaware Valley Regional Planning Commission
Penn Towers Building
1819 J. F. Kennedy Boulevard
Philadelphia PA 19103

Thomas Concannon
Gilbert Associates, Inc.
P.O. Box 1498
Reading PA 19603

Valdis Jurka
WAPORA, Inc.
511 Old Lancaster Road
Berwyn PA 19312

Issues and Concerns

A number of issues and concerns have been raised at meetings of the PPAG, Sub-Region II Wastewater Management Commission, Central Contacts Committee, and the general public. Most discussions have focused on the level of treatment which the wastewater treatment plants in the area must achieve and the associated costs of advanced wastewater treatment. These concerns are summarized below.

- Extent of sewer service -- How far should public sewerage be extended based on the problems and needs of the area?
- On-site wastewater management district -- Are failing septic systems prevalent enough to warrant creation of a program for rehabilitation and maintenance? Will such a program be adequate to correct existing problems and those projected to occur over the next 20 years?
- Efluent limits -- The wastewater treatment standards which the area facilities must meet are set by PA-DER according to the existing and intended quality of Neshaminy Creek. Results of a stream survey to define allowable pollutant concentrations in discharges are pending.
- Per capita wastewater flows and infiltration/inflow -- The existing per capita wastewater flow rates are high due to the amount of infiltration/inflow when it enters the Chalfont-New Birtain and Doylestown Borough wastewater treatment plants. How much of the infiltration/inflow can be removed and what will the per capita flows be from future residential/commercial customers?
- Construction of Dark Hollow Dam -- The presence of a permanent pool above the proposed Dark Hollow Dam is, in part, the cause of the phosphorus removal requirement for sewage treatment plants in the Upper Neshaminy Basin.
- Ammonia, nitrate and nitrite-nitrogen concentrations in Neshaminy Creek -- The tertiary treatment required for all sewage treatment plants in the Upper Neshaminy Basin should help prevent excessive concentrations from occurring.
- Phosphorus concentrations in Neshaminy Creek -- Phosphorus removal is required of all sewage treatment plants in the Upper Neshaminy Basin which should control excessive plant growth and eutrophication.
- Chlorine toxicity to fish and macroinvertebrates below sewage treatment plant outfalls in Neshaminy Basin.
- Heavy metal toxicity to aquatic biota -- A substantial portion of heavy metals in wastewater are associated with suspended solids. Their content should be reduced substantially be the residual suspended solids removal required of treatment plants in the planning area.

CHALFONT EIS DISTRIBUTION LIST

FEDERAL AGENCIES

Advisory Council on Historic Preservation

Council on Environmental Quality

Federal Emergency Management Agency

National Agricultural Lands Study

US Bureau of Prison

US Department of Agriculture
- Soil Conservation Service

US Department of Commerce
- Office of Environmental Affairs

US Department of Defense

US Department of Energy
- Office of the Secretary for the Environment

US Department of Health, Education, and Welfare

US Department of Housing and Urban Development

US Department of Interior
- Bureau of Outdoor Recreation
- Fish and Wildlife Service
  - National Water Resource Analysis Group/Eastern Energy Land Use Team
- National Park Service

US Department of Transportation
- Federal Highway Administration
- Marine Environmental Protection Division

US Department of Treasury

US General Services Administration

Water Resources Council

STATE AGENCIES

Department of Commerce

Department of Community Affairs

Department of Environmental Resources
- Bureau of Air Quality
- Bureau of Water Quality Management
- State Health Center

Department of Health

STATE AGENCIES (continued)

Fish Commission

Game Commission

Historical and Museum Commission

State Clearinghouse

LOCAL AGENCIES

Buckingham Township
- Board of Supervisors

Bucks County
- Commissioners
- Conservation District
- Health Department
- Historical Tourist Commission
- Planning Commission
- Solid Refuse Administration Board
- Water and Sewer Authority

Chalfont Borough
- Council
- Planning Commission

Chalfont-New Britain Township Joint
- Sewage Authority

Delaware River Basin Commission

Delaware Valley Regional Planning
- Commission

Doylestown Borough
- Council
- Planning Commission
- Streets and Water Engineers

Doylestown Township
- Board of Supervisors
- Planning Commission
- Municipal Authority

Neshaminy Water Resources Authority

New Britain Borough
- Council
- Planning Commission

New Britain Township
- Board of Supervisors
- Planning Commission
- Zoning Hearing Board

Plumstead Township
- Board of Supervisors
- Planning Commission

LOCAL AGENCIES (continued)

Warrington Township
Board of Supervisors
Municipal Authority
Planning Commission
Water and Sewer Commission
Zoning Hearing Board

ELECTED OFFICIALS

Honorable Richard Thornburgh
Governor of Pennsylvania

Honorable H. John Heinz, III
United States Senator

Honorable Arlen Specter
United States Senator

Honorable Lawrence Coughlin
United States Representative

Honorable James K. Coyne
United States Representative

Honorable Richard T. Schulze
United States Representative

Honorable Steward J. Greenleaf
Pennsylvania Senate

Honorable H. Craig Lewis
Pennsylvania Senate

Honorable Edward L. Howard
Pennsylvania Senate

Honorable John M. Rodgers
Pennsylvania Representative

Honorable Jim Greenwood
Pennsylvania Representative

Honorable Benjamin H. Wilson
Pennsylvania Representative

Honorable Edward Burns
Pennsylvania Representative

Honorable James J. A. Gallagher
Pennsylvania Representative

Honorable James L. Wright, Jr.
Pennsylvania Representative

Honorable Paul L. Clymer
Pennsylvania Representative

CITIZENS GROUPS

America the Beautiful Fund
Audubon Naturalist Society of the Central Atlantic States, Inc.
Bucks County Audubon Society
Bucks County Board of Realtors
Bucks County Builders Association
Bucks County Conservation Alliance
Bucks County Farmers Association
Bucks County Fish and Game Association
Bucks County Historical Society
Bucks County Industrial Development Authority
Bucks County Land Use Task Force
Central Bucks Chamber of Commerce
Citizen's Advisory Council to PA Department of Environmental Resources
Concerned Citizens
Doylestown Township Civic Association
Environmental Defence Fund
Environmental Policy Center
League of Women Voters
Pennsylvania
Doylestown
National Parks and Conservation Association
Natural Resources Defense Council, Inc.
New Britain Civic Association
Oxbow Meadows Civic Association
Pennsylvania Environmental Council, Inc.
Pennsylvania Society of Professional Engineers - Bucks County Chapter
Pennsylvania Sanitary Disposal Association
Plumstead Township Civic Association
Sierra Club
Pennsylvania Chapter
Southwestern Group
Soil Conservation Society of America
The Wildlife Society
Tri-County Conservancy of the Brandywine, Inc.
Trout Unlimited
Village Improvement Association
Water Resources Association of the Delaware River Basin
Water Pollution Control Association
Wilderness Society
Women's Political Caucus

MEDIA

Newspapers

Beacon News
Bucks Advisor
Bucks County Courier Times

MEDIA (continued)

Newspapers (continued)

Bucks County News Bureau
Bucks County News Service
Daily Intellingencer
Daily News
Evening Bulletin
  Doylestown
  Montgomery County Bureau
Inquirer
  Doylestown
  Philadelphia
  Suburban News Bureau
Montgomeryville Spirit
New Hope Gazette
North Penn Reporter
Progress Newspapers, Inc.
The Reporter
Times Herald
Today's Post
Today's Spirit

Television

WCAU-TV
WKBS-TV
WPHL-TV
WPVI-TV
WTAF-TV
KYW-TV

Radio

KYW-AM
WBCB-
WBVX-
WCAU-AM
WCSD-FM
WDAS-AM
WFIL-AM
WFLN-AM
WHAT-AM
WIP-AM
WZZD-AM

LIBRARIES

Bucks County Free Library
Melinda Cox free Library
Warminster Township Free Library

OTHER

Gilbert/Commonwealth Engineers and
  Consultants
International Research and Evaluation
Tatman and Lee Associates, Inc.
WAPORA, Inc.

CITIZENS

Adamski, Robert E.
Ashburn, Jan
Auerbach, Elizabeth
Baeutigam, Robert O.
Baker, Robert J.
Baldwin, Mr. and Mrs.
Bauer, Philip
Benecke, H. O.
Benner, Robert
Berjstusni, Gary
Bischaff, Mr. and Mrs. U.
Braun, Jayne
Breish, Joseph
Brown, B.
Brown, C. Morell
Brown, Robert
Brown, Vince
Brownlow, James C. II
Buckley, Daniel Jr.
Byers, Bob
Cadden, Bill D.
Capetola, Robert J.
Carley, H. Edwin
Carr, Beverly
Carr, George M.
Carson, John
Chamberlain, Donald
Clark, William
Cogshall, J.
Coia, Mr. and Mrs. Anthony L.
Concannon, Ms.
Conray, N.
Cope, Richard
Cordell, David
Cotton, Robert
Crouthamel, Barbara
Curboney, F.
Dalton, John M.
Danaghy, R. E.
Davenport, John
Davies, Mr. and Mrs. J.
DeFazio, Anthony
Delgardo, Jim
Dengler, F.
de Richemond, Mr. and Mrs.
Dethlefsen, Rolf
Devine, James W.
Donaghy, Mr.
Dunbar, Mr. and Mrs.
Ehne, Charles
Ender, John
Eyre, Ken
Feldbaumer, William C.
Ferreron, S. Thomas Jr.
Fitzgerald, Dan
Flick, Kenneth Mrs.
Frabotta, Frank
Frekot, Mr. and Mrs.

CITIZENS (continued)

French, Ellery W.
Fritz, Mr. and Mrs.
Gaetzberger, M.
Gagner, G. J.
Gallagher, Raymond
Gallaton, Steven
Gampper, James H.
Gascinf, Stephen J.
Gatwalt, Paulette
Gemalouli, Ed
Gill, Earl P. Sr.
Gilmore, Steven D.
Gilmour, C. Allan
Goehorig, John
Gornian, Vincent
Goulding, Beverly A.
Grand, Lucille
Groenveld, Dave
Guagas, Mr. and Mrs.
Hall, E. F.
Hall, Patricia R.
Hamilton, Harold
Hanauer, Richard
Happ, W. J. Jr.
Hatcher, Doris
Haulta, Jeffrey
Heim, Mr. and Mrs. Stephen
Holmen, P. C.
Hour, Robert A.
Horn, E. A.
Hutchinson, Robert
Jarin, Barney
Jaylor, Joseph
Kahn, Harry
Kerns, Ira
Kerns, M. V.
Kianz, S. P.
Kiel, James S.
Knap, C. H.
Knight, Ernest
Kurilla, Joseph
Lamina, Francis
Lancaster, Graham
Lavenguth, Stephanie
Linn, Marie
Lorenz, Jerry
Lugar, Robert C.
Lyons, William F., III
MacTough, Mr. and Mrs.
Mahn, Jack
Maiabito, Gina
Manella, Mr.
Manne, Robert E.
Mayer, Barbara
McCarty, Donna
McGill, Douglas, R., Sr.
McLaughlin, R.
Morehouse, Daniel E.
Morris, John F.
Mount, Marty

CITIZENS (continued)

Mount, William
Moxey, Richard T.
Mueller, J. R.
Murphy, R. D.
Murray, Don
Neamond, Janet
Nelson, Jack F.
Nobel, Mr.
Noftsger, Michael D.
Noll, L.
Olsen, Robert F.
O'Molesky, Mark
Ota, Charles
Ott, Laura Jean
Pasicznyk, Nick
Pasicznyk, Dave
Pilecki, Alex
Post, Frank
Pratt, Barry
Prince, Albert R.
Prosser, Donald W.
Rabenold, George
Reardon, David L.
Redman, S. H.
Reed, David
Richards, James
Rickert, Dennis W.
Roland, S.
Rothstein, Harold
Rottrack, John H.
Roop, Robert
Rowan, James P.
Ryan, Nancy Bell
Ryan, James
Saunders, Gail
Scherb, Ester
Scherb, William
Schloo, William
Schmidt, Gordon
Schul, Emma
Schute, V. J.
Seckie, Catharine J.
Shaffer, Robert G.
Shemenski, Joseph
Siegel, K.
Spinnler, Joseph F.
Sprawls, Michael
Sterys, Julian J.
Stevens, Janet
Stranburg, Lil
Styles, Roger E.
Sugden, Harry
Tabako, P.
Terney, Betty
Thompson, Mr. and Mrs. J.
Titsworth, R.
Tomlinson, Cyrus
Triplett, Mr. and Mrs.
Veamand, David V.
Varcoe, Wilson

CITIZENS (continued)

Walsh, Joseph P.
Warren, Joseph
West, Robert
White, Ashton
White, Roger Greenlees
Whitehead, W. Norman
Whittenborger, R. Dale
Whittenburger, R. Dale
Wieland, Dick
Williams, Chip
Wolfe, Ron
Wramer, Lorraine
Yesk, Dot
Yost, Richard
Zommer, Ken

Chapter IV

Description and Development of Alternatives

CHAPTER IV. DESCRIPTION AND DEVELOPMENT OF ALTERNATIVES

Municipal Wastewater Treatment Facilities

There are currently three major municipal sewage treatment plants (STPs) within the Chalfont-New Britain planning area. These facilities, Chalfont-New Britain STP, Green Street STP, and Harvey Avenue STP, have rated design capacities of 2.0 mgd, 0.7 mgd, and 0.6 mgd, respectively (Figure 10). They each provide secondary levels of wastewater treatment removing approximately 90% of the pollutants from the wastewater. Of the three facilities, Doylestown Borough owns and operates the two plants (Green Street and Harvey Avenue) within its corporate limits. The Chalfont-New Britain facility is owned and operated by the Chalfont-New Britain Township Joint Sewer Authority and in part by the Bucks County Water and Sewer Authority (BWSA). It is the Bucks County Water and Sewer Authority and the Chalfont-New Britain Joint Sewer Authority that match the local share of the Step I Planning grant.

Each of the existing STPs is presently operating at, or close to, capacity. The Chalfont facility occasionally experiences hydraulic overloading, particularly during periods of prolonged rainfall which contributes extraneous flows to the wastewater known as infiltration and inflow (I/I). Since June 1979 the PA-DER has enforced a ban on the issuance of new connections to connect to the sewerage system of the Chalfont facility because of inadequate sewage treatment capacity. As a result, a number of approved developments have been unable to either begin or complete construction. Doylestown Borough has made recent improvements to its wastewater facilities. However, additional improvements are necessary to upgrade the level of treatment efficiency to meet the discharge conditions required by PA-DER.

Municipal Sewer Service Areas

Together, the three municipal facilities provide sewerage service to approximately 22,235 people, or 60% of the planning area population. The existing sewer service area of these facilities is depicted in Figure 10.

Required Wastewater Treatment

The degree of treatment required is based on effluent limitations set in the National Pollutant Discharge Elimination System (NPDES). These limits are set by the Pennsylvania Department of Environmental Resources (PA-DER) according to the quality and intended or protected use of the stream to which effluent will be discharged. PA-DER (1979) water quality criteria and PA-DER NPDES permit conditions regulate in-stream and STP effluent pollutant concentrations respectively, in the Neshaminy Creek Basin. In order to meet the effluent criteria established by PA-DER, planning area STPs will have to provide additional treatment so that 97 to 99% of wastewater pollutants are removed. Table 10 lists the effluent limitations that are currently in force. PA-DER has conducted water quality stream surveys which are likely to influence effluent limitations. It is not improbable that the effluent limitations will become less stringent, as the water quality system is better understood and smaller margins of safety are needed. If less stringent effluent limitations are established, then some cost savings in upgrading the municipal wastewater facilities can be expected.

EPA has a review policy (EPA 1979) for wastewater treatment projects designed to meet effluent requirements more stringent than secondary treatment. This review's goal is to ensure that the level of wastewater treatment is fully justified. Unless fully justified, Federal funding of all or the unjustified part of the project may be postponed.

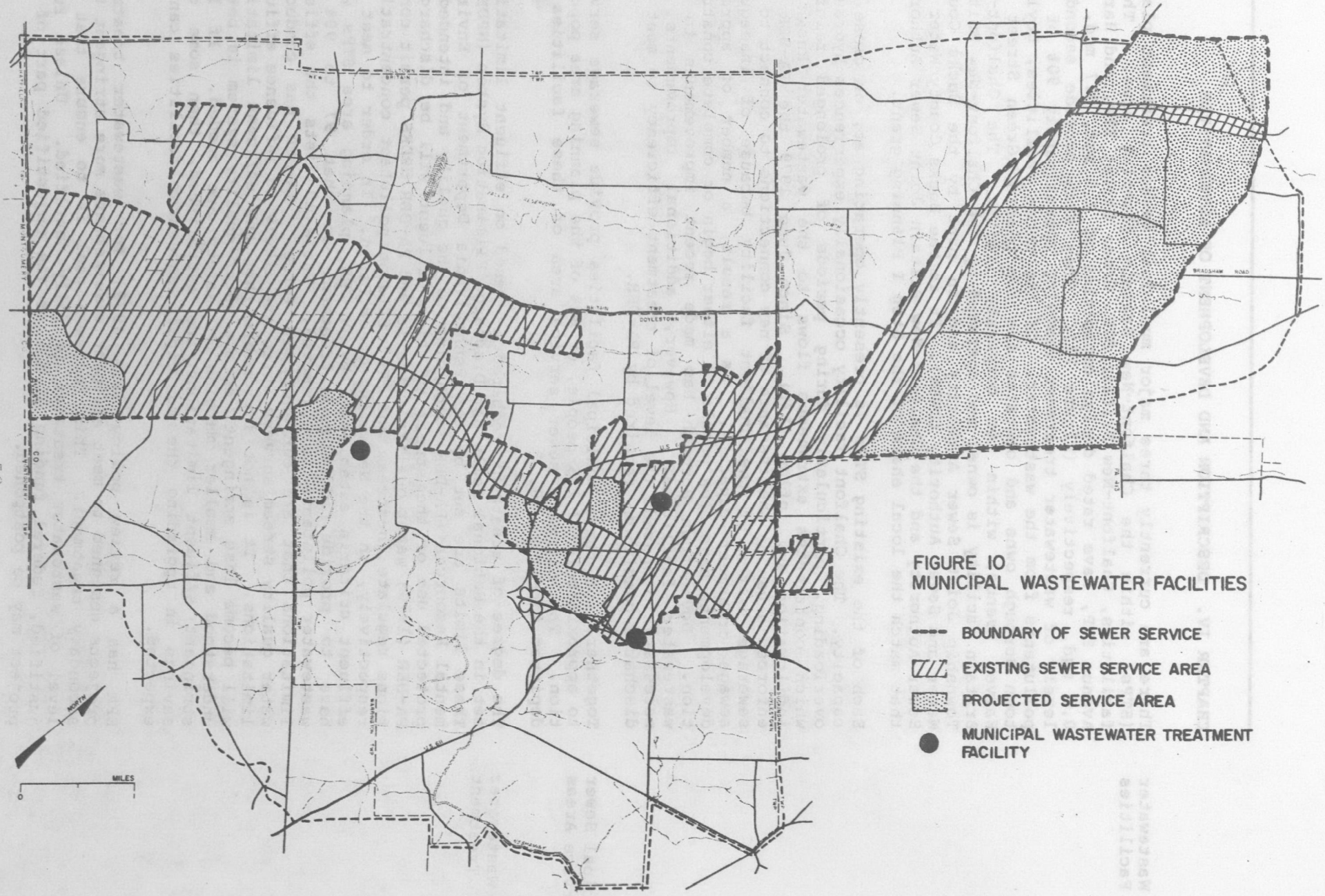


FIGURE 10
MUNICIPAL WASTEWATER FACILITIES

- BOUNDARY OF SEWER SERVICE
- EXISTING SEWER SERVICE AREA
- PROJECTED SERVICE AREA
- MUNICIPAL WASTEWATER TREATMENT FACILITY

Table 10. Effluent limitations for municipal wastewater treatment facilities.

Parameter	Monthly Average Limitation (mg/l)
5 day Biochemical Oxygen Demand	
(May 1 to October 31)	4
(November 1 to April 30)	8
Suspended Solids	15
Ammonia Nitrogen	
(June 1 to October 31)	3
(November 1 to May 31)	9
Total Nitrogen	
(June 1 to October 31)	8
(November 1 to May 31)	24
Total Soluble Phosphate	0.2
Fecal Coliform	200/100 ml
pH	6 to 9 standard units at all times
Dissolved Oxygen	5.0 mg/l minimum at anytime

Water quality parameters whose concentrations within the study area are frequently in violation of the established criteria include: dissolved oxygen, effluent BODs, effluent total suspended solids, effluent ammonia nitrogen, effluent total nitrogen, effluent and in-stream phosphate, chromium, nickel, zinc, and copper. Chlorine concentrations, for which there is no state criteria, are often present in levels toxic to aquatic biota and in excess of the EPA (1976) criteria of 0.01 mg/l below all STPs in the basin (Strekal 1976a & b).

Privately Owned Wastewater Treatment Facilities

In addition to these municipal facilities, there are three privately owned, smaller wastewater treatment facilities in the planning area. The Briarwood wastewater treatment facility, located in New Britain Township within the service area of the Chalfont STP, was built in 1963 with a capacity of 0.08 mgd to serve the Lenape Village development. This facility is not in continuous use, but is periodically reactivated when requested by PA-DER in order to provide additional capacity at times when the Chalfont facility becomes hydraulically overloaded. The Valley View Trailer Park treatment facility, located on Route 611 in Plumstead Township, has a rated capacity of 0.04 mgd. The facility was built in 1963 to serve the Valley View Trailer Park. The Neshaminy Manor Center treatment facility serves the Center in Doylestown Township. The plant has a rated capacity of 0.1 mgd with current flows of approximately 0.06 mgd.

Projected Service Area Population

The planning area population is projected to increase by about 13,500 persons (37%) between 1980 and 2000. Based on topography, soil suitability for on-lot systems, proximity to existing sewerage facilities, and the location of projected development, an expanded sewer service area has been proposed (Gilbert Associates 1981) (Figure IV-1) to accomodate a portion of this future increase. The total estimated number of persons within this proposed sewer service area by year 2000 is 36,675. Table 11 presents the existing and projected populations within the proposed sewer service boundaries.

Table 11. Existing and projected population within proposed service area.

	1980	% Change	2000
Chalfont Borough	3,033	35.2	4,100
Doylestown Borough	9,335	6.5	9,940
Doylestown Township	2,397	142.6	5,815
New Britain Borough	2,813	26.2	3,550
New Britain Township	4,789	98.8	9,519
Plumstead Township	2,872	30.6	3,751
SEWER SERVICE AREA TOTAL	25,238	45.3	36,675

The delineation of the proposed service area is intended to serve as a guide as to areas where extensions could be most efficiently made and will be most probably needed. The decision to connect existing homes and future development within the proposed service area to a public sewer system will ultimately be made by the municipality or authority which owns and operates the systems.

rojected Wastewater Flow

Table 12 summarizes wastewater flows projected during the planning period, i.e. through the year 2000. These flows are disaggregated by wastewater treatment plant service area. The derivation of these flows is described in the Facility Plan (Gilbert Associates, Inc. 1981) and is outlined in the notes to Table 12.

Doylestown Borough astewater Treatment Capacities

These wastewater flow projections show that flows to the Harvey Avenue plant would slightly exceed its capacity. Since the other Doylestown Borough facility (Green Street) would have some excess capacity and small residential/commercial flow increases are projected, the Facility Plan recommends that the existing wastewater treatment capacities be maintained and future industrial flows be directed towards the Green Street plant. The combined capacities of the Doylestown Borough plants is expected to be adequate to accomodate the 605 additional persons projected by the year 2000.

Chalfont Wastewater Treatment Capacity

The projected wastewater flow to the Chalfont-New Britain wastewater treatment plant (3.8 mgd) would exceed its current 2.0 mgd capacity. An additional 1.8 mgd capacity would be required to accomodate the additional 10,832 persons projected to reside within the proposed service area by the year 2000.

Preliminary Screening

The Chalfont-New Britain Facility Plan describes alternative wastewater management plans to meet the existing and future needs of the Chalfont-New Britain planning area. The development of these alternatives proceeded in a systematic manner in which numerous options for collection, treatment, and disposal of wastewater were screened in order to satisfy six basic objectives:

- technically feasible, yet readily adaptable to the planning area.
- capable of meeting the wastewater treatment needs of the area for the next 20 years
- least expensive while placing a minimal financial burden on the communities within the planning area
- environmentally acceptable with a minimum amount of adverse impacts
- implementable from administrative, regulatory, and legal standpoints
- acceptable to the public.

Preliminary screening of alternatives considered the following approaches:

- no action alternative
- utilization and optimization of existing facilities; and
- regional alternatives.

No-Action Alternative

The no action alternative was not considered to be a viable alternative for two reasons. First, it would not satisfy the current need to upgrade the existing treatment plants and it would not correct the currently identified on-lot wastewater system failures. Second, it would not provide the hydraulic capacity at the Chalfont plant for future connections nor would it solve the problems of future on-lot system failures.

Table 12. Future wastewater flows, mgd.

	Existing Minimums	Non-Removable I/I	Future Residential/ Commercial	Future Industrial	Total	Existing Wastewater Treatment Capacity
Doylestown Borough						
Harvey Avenue	0.47	0.13	0.04	0.03	0.67	0.6
Green Street	0.35	0.21	0.04	0.03	0.63	0.7
Subtotal	0.82	0.34	0.08	0.06	1.30	1.30
Chalfont						
CNBTJSA	0.87	0.15	0.88	0.09	1.99	
BCWSA	0.45	0.51	0.78	0.09	1.83	
Subtotal	1.32	0.66	1.66	0.18	3.82	2.0

NOTES:

Existing minimums - determined from annual minimum week flow records.

Non-removable I/I - estimated quantity of infiltration/inflow which cannot be removed from the wastewater collection system.

Future residential/commercial - based on the existing gallons per day per person (gpcd) values and the additional projected sewered population (existing gpcd values for residential/commercial flows are 125 for Doylestown Borough facilities and 153 for the Chalfont plant).

Future industrial - based on EPA criteria, which permits using 5% of the total design flow exclusive of existing or documented future industrial flows.

Optimum Use and Operation of Existing Facilities

Optimum use and operation of existing facilities would only partially meet the wastewater needs of the Chalfont-New Britain Planning Area. Flows to the Harvey Avenue plant are projected to exceed the present capacity but could be redirected and handled at the Green Street facility. The Chalfont plant, however, would not be able to handle the additional 1.8 mgd flow projected by year 2000. Furthermore, none of the existing treatment plants could comply with the proposed treatment standards without additional equipment. Improved maintenance of existing on-lot systems would minimize, but not eliminate completely, the identified malfunctioning systems throughout the planning area.

Treatment Plant Alternatives

Regional alternatives which involve combining the flows from the existing treatment plants at one or more of the existing sites or at new-sites were examined. The objective was to examine all possible combinations to identify a solution which is cost-effective for short-term (construction) and long-term (operation and maintenance) costs.

Alternative 1. The three existing treatment plants would be maintained at their present locations and upgraded to meet the new effluent requirements. The Chalfont facility would be expanded from 2.0 mgd to 3.8 mgd capacity (Figure 11).

Alternative 2. The Harvey Avenue and Green Street plants would continue to provide secondary treatment. Their secondary effluents would be combined for tertiary treatment at a regional Borough of Doylestown facility at the Harvey Avenue location which has more available space. A new pump station, force main, and gravity sewer would be required to convey the Green Street effluent to the Harvey Avenue Plant. The Chalfont plant would be expanded to 3.8 mgd and upgraded (Figure 12).

Alternative 3A. All tertiary treatment would be performed at an expanded Chalfont treatment plant site (5.1 mgd). The Harvey Avenue and Green Street plants would be maintained as secondary facilities. The same pump station, gravity sewer, and force main as in Alternative 2 would be required to convey Green Street flow to the Cooks Run interceptor, and a parallel sewer to Cooks Run would be required to convey the secondary treated effluent to the Chalfont site for tertiary treatment (Figure 13).

Alternative 3B. All treatment (secondary and tertiary) would be carried out at an expanded Chalfont plant (5.1 mgd); the Harvey Avenue and Greet Street plants would be abandoned. Force main and gravity sewer would be required to convey Green Street's flow to the Cooks Run interceptor. The Cooks Run interceptor does not have sufficient capacity to convey all of Doylestown flow and would require a parallel relief sewer for a portion of its length to the Chalfont plant (Figure 14).

Alternative 4A. All treatment (secondary and tertiary) would be carried out at a new site (5.1 mgd capacity) in the vicinity of the Neshaminy Manor Center. Each of the existing treatment plants would be abandoned. Harvey Avenue flow would connect into the Cook's Run interceptor and would flow by gravity to the Chalfont plant site area. New interceptors would be required to convey the flows from the Chalfont and Greet Street plants to the new treatment site (Figure 15).

Alternative 4B. All tertiary treatment (5.1 mgd capacity) would be conducted at a new regional site in the vicinity of Neshaminy Manor Center. The existing secondary treatment facilities would remain

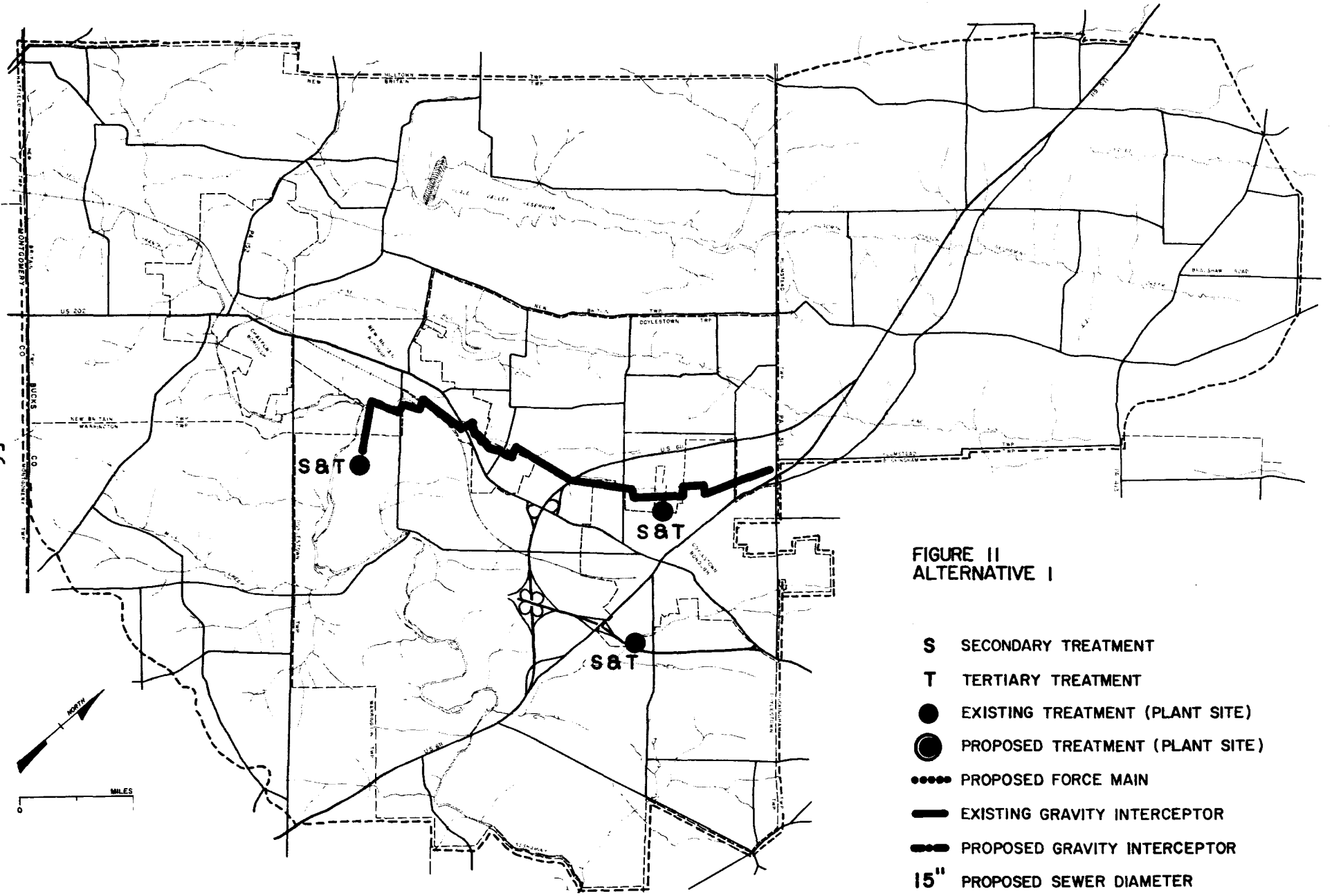


FIGURE 11
ALTERNATIVE I

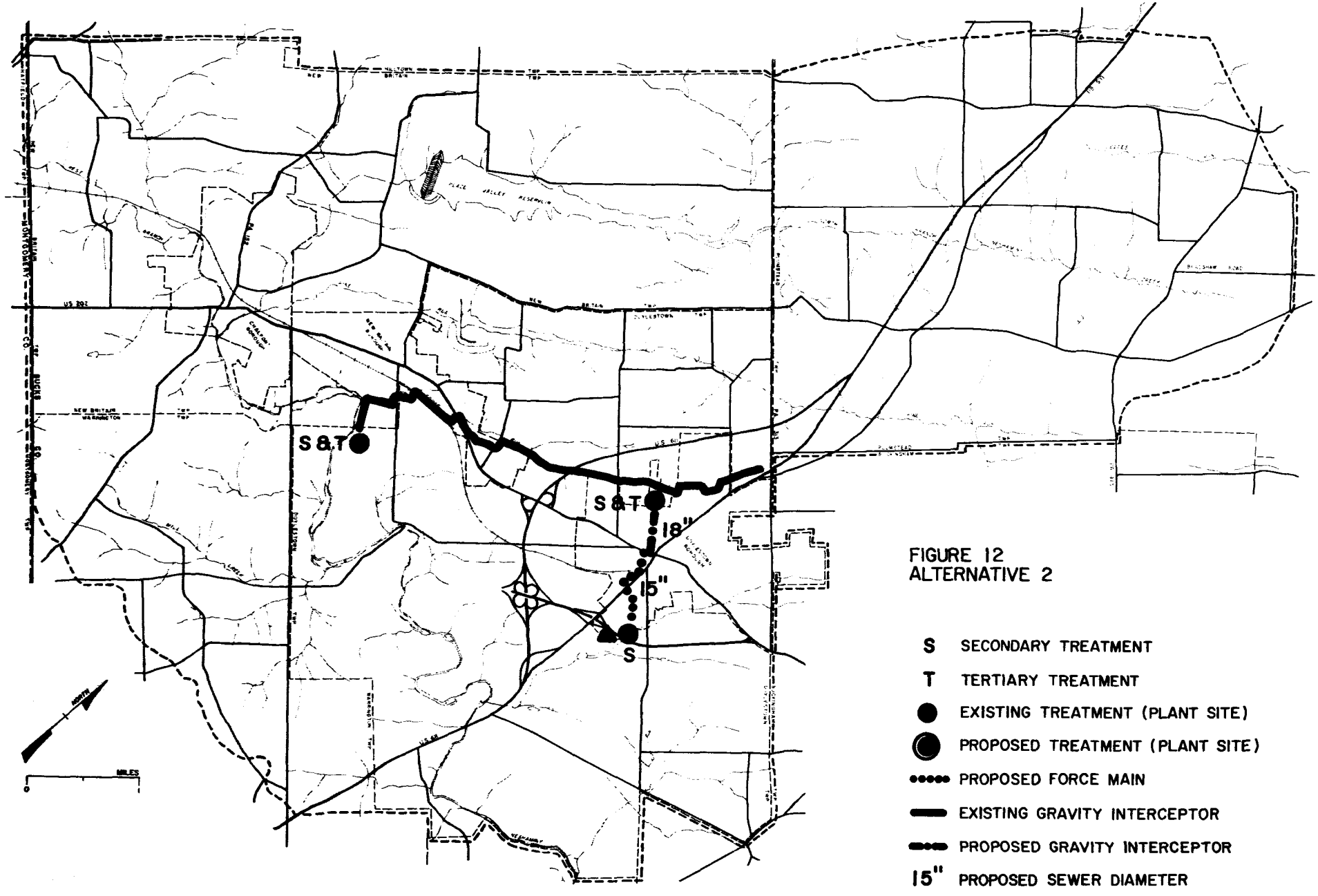


FIGURE 12
ALTERNATIVE 2

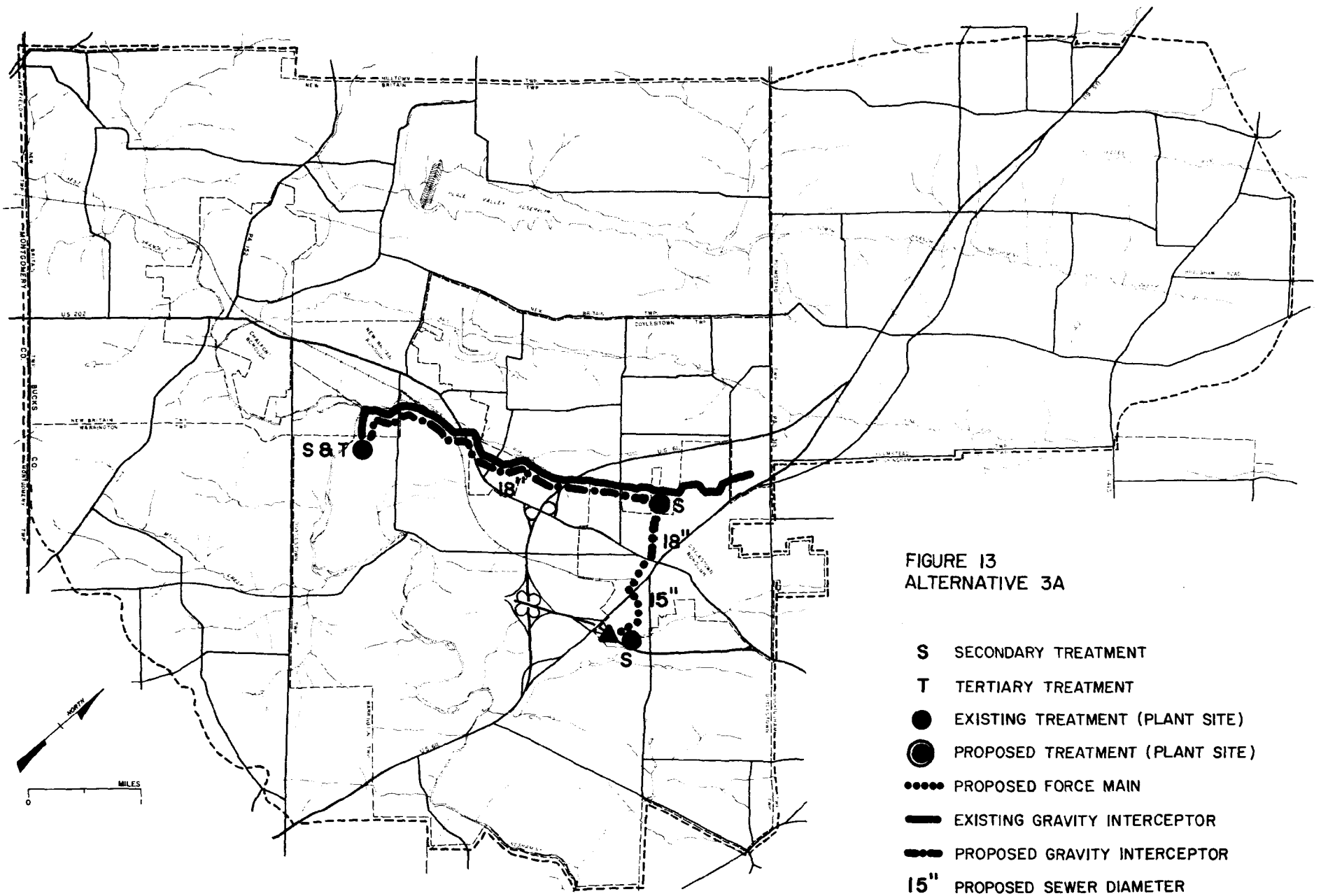


FIGURE 13
ALTERNATIVE 3A

S SECONDARY TREATMENT

T TERTIARY TREATMENT

EXISTING TREATMENT (PLANT SITE)

PROPOSED TREATMENT (PLANT SITE)

PROPOSED FORCE MAIN

EXISTING GRAVITY INTERCEPTOR

PROPOSED GRAVITY INTERCEPTOR

15" PROPOSED SEWER DIAMETER

PROPOSED PUMPING STATION

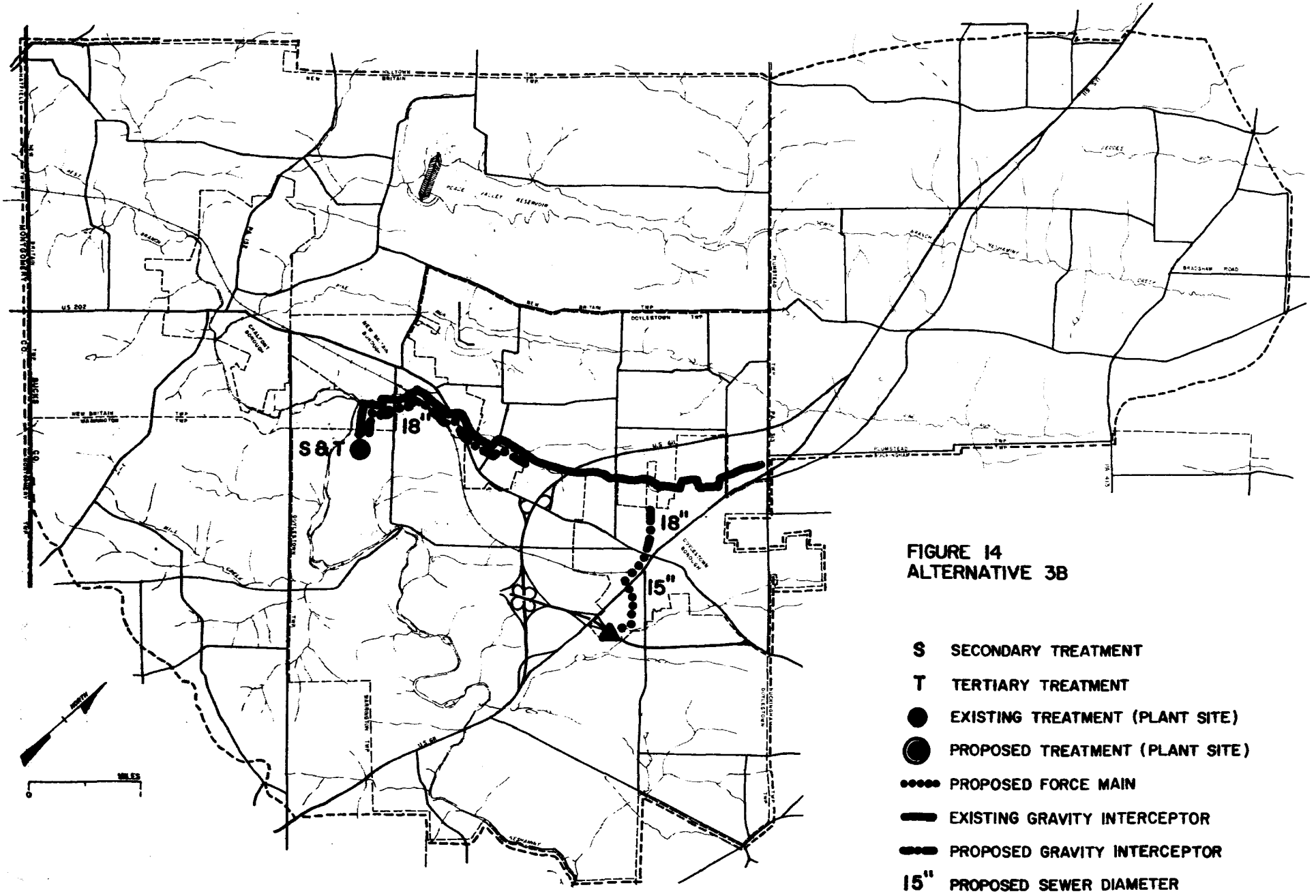


FIGURE 14
ALTERNATIVE 3B

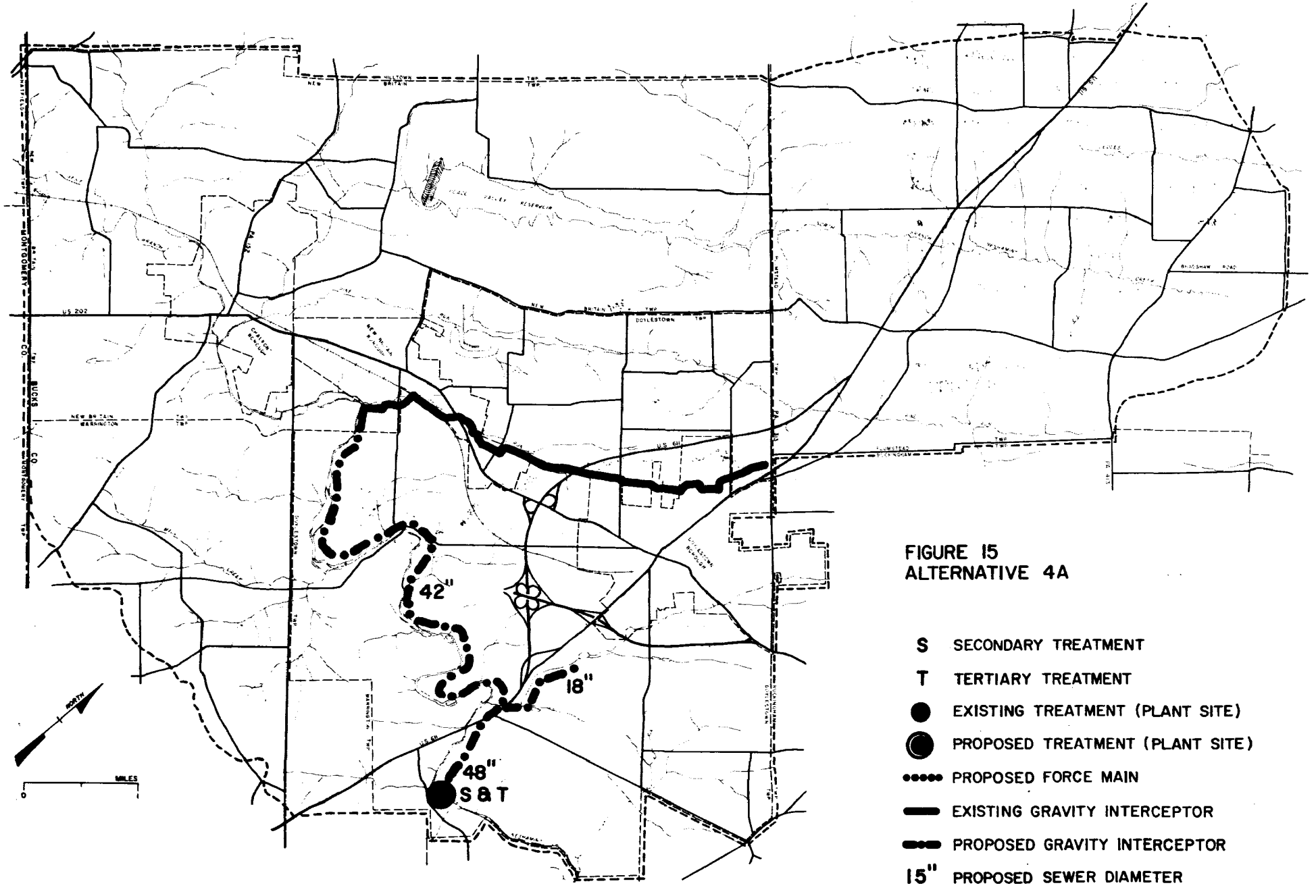


FIGURE 15
ALTERNATIVE 4A

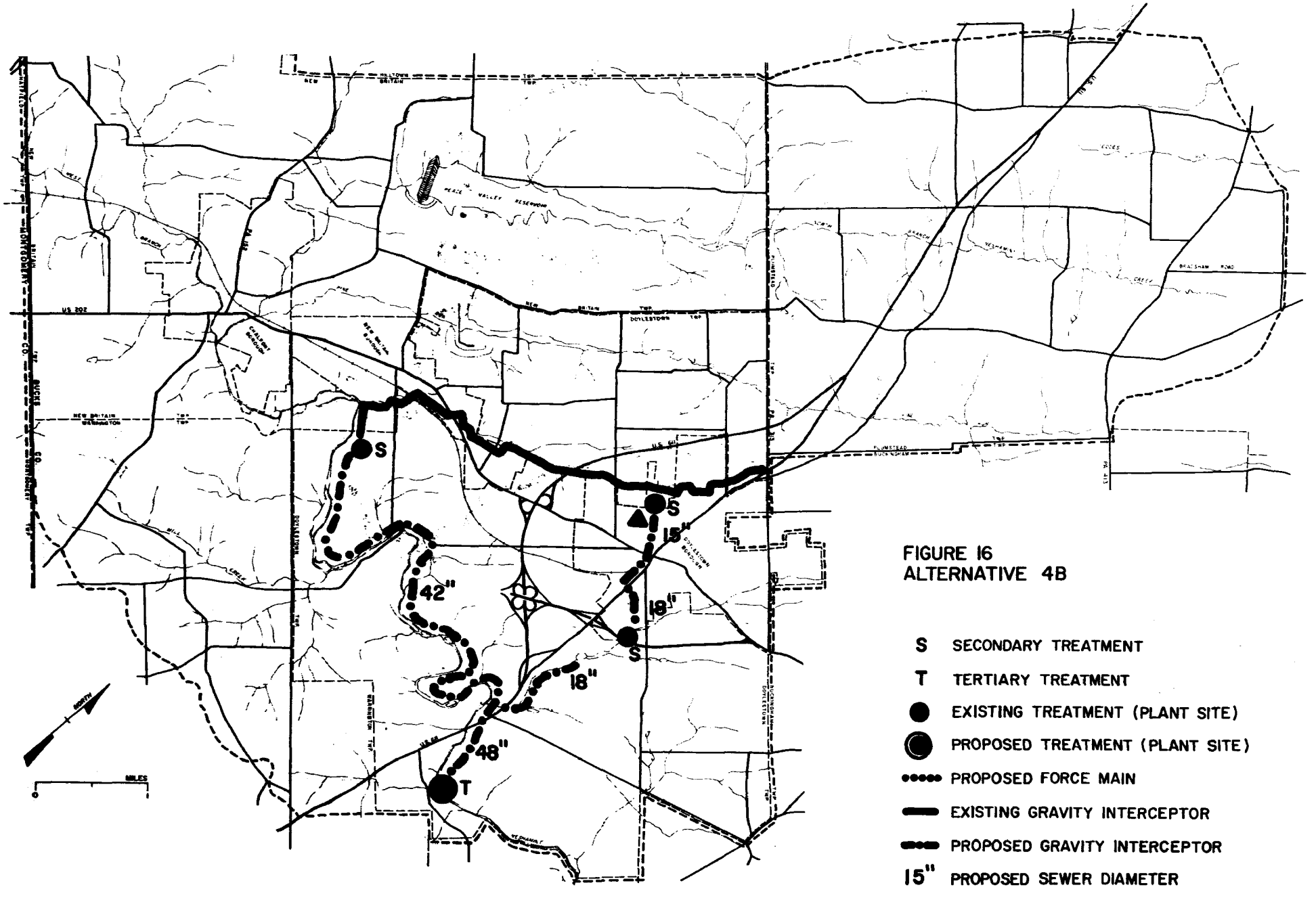


FIGURE 16
ALTERNATIVE 4B

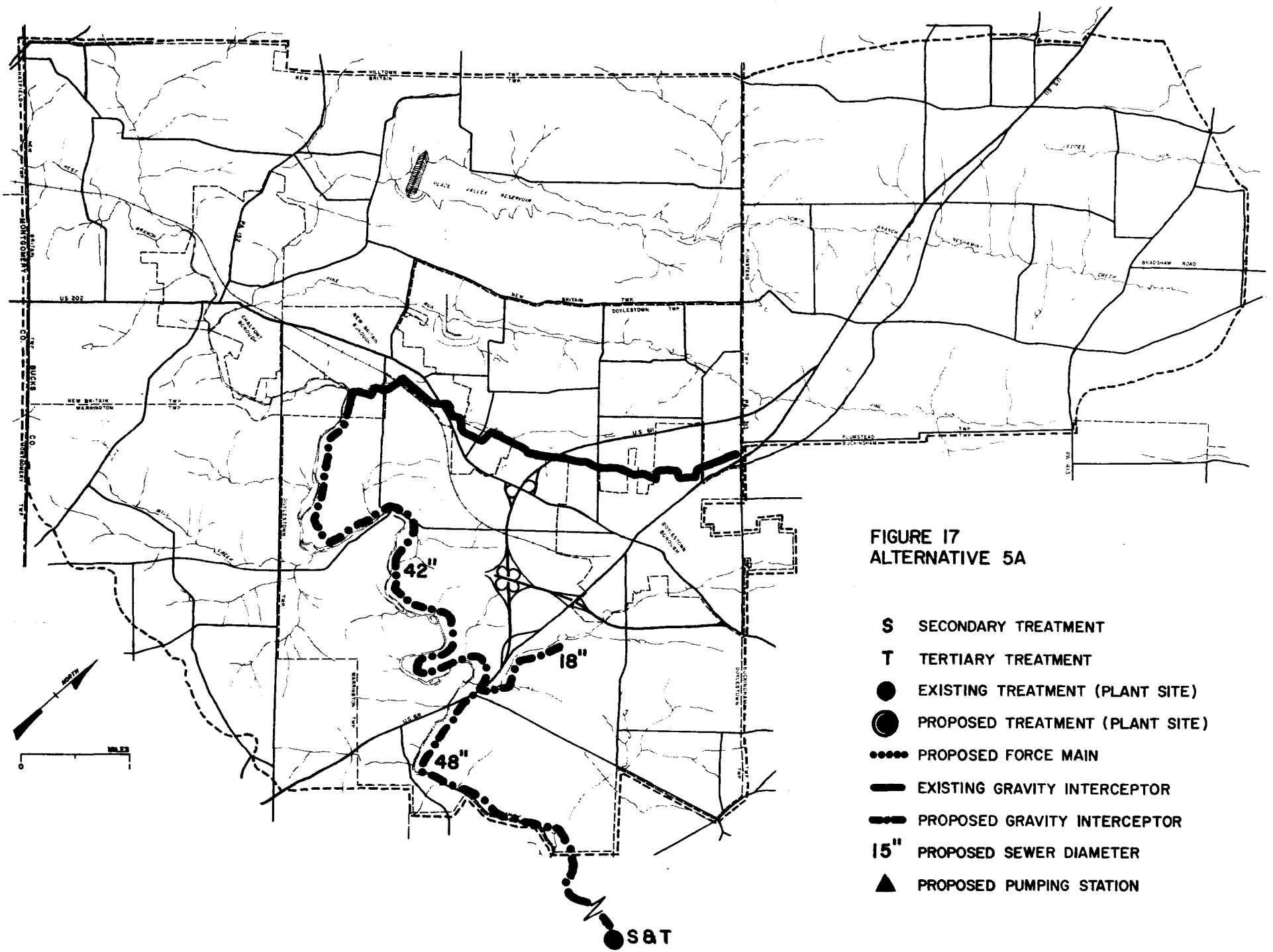


FIGURE 17
ALTERNATIVE 5A

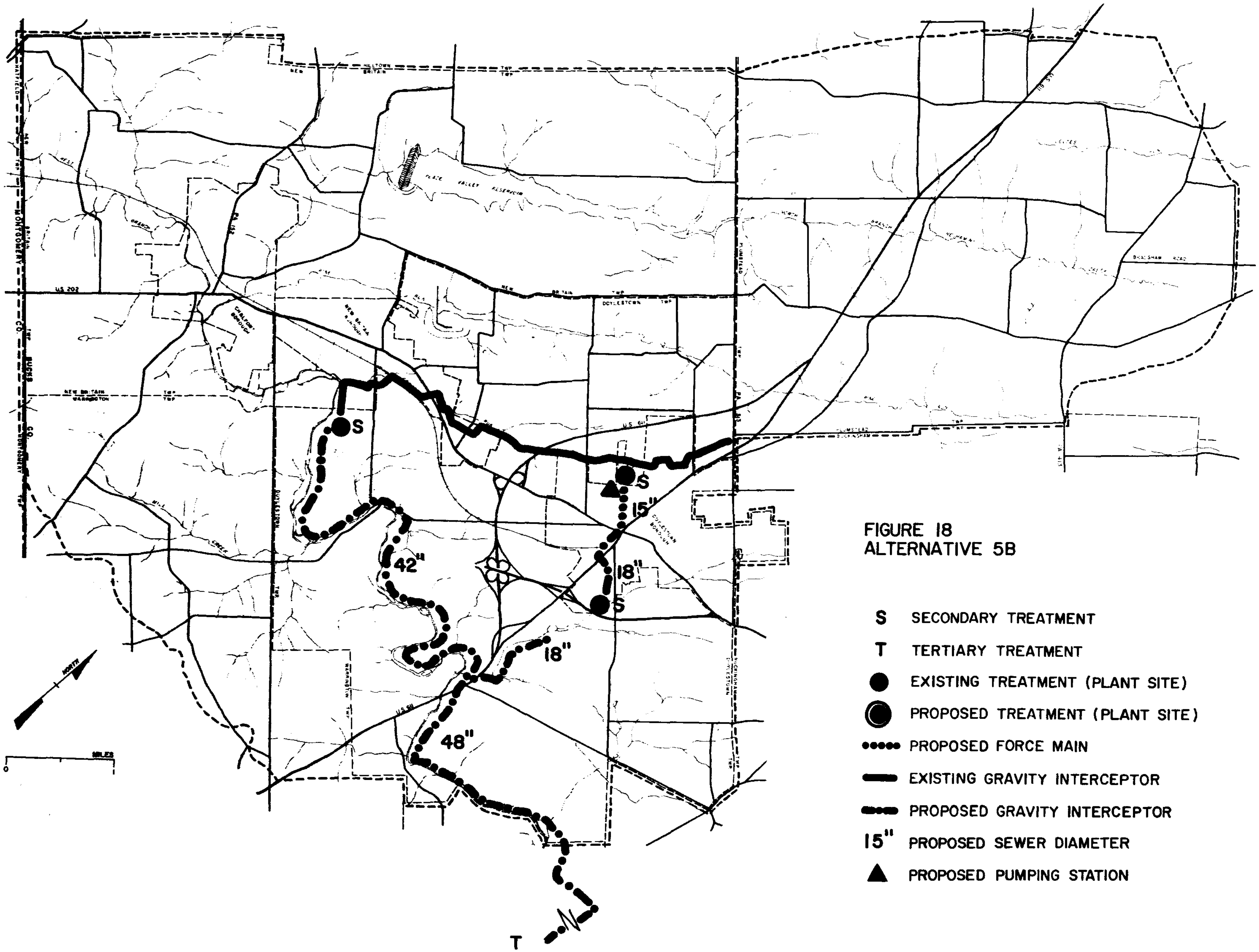


FIGURE 18
ALTERNATIVE 5B

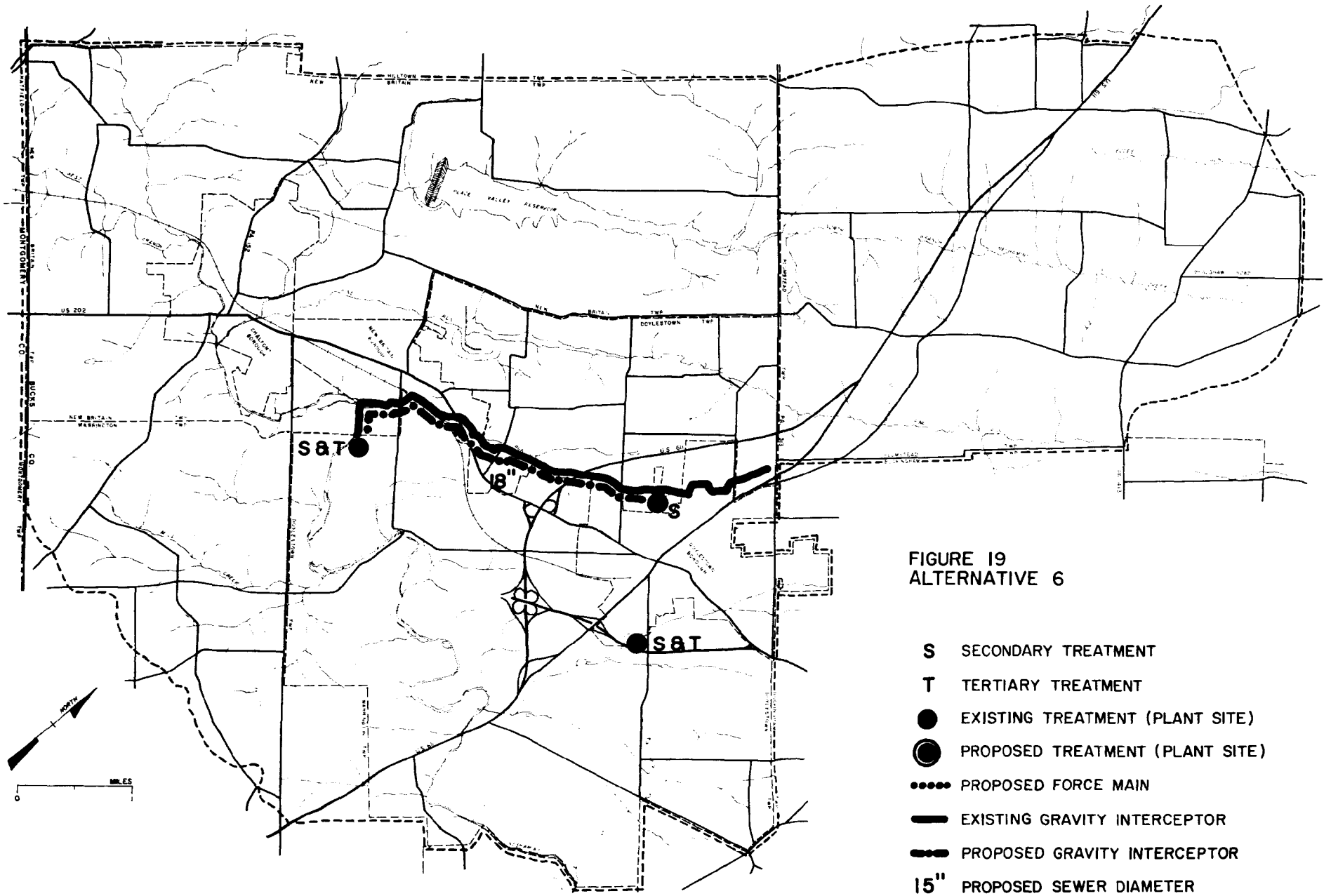


FIGURE 19
ALTERNATIVE 6

in service. New interceptors would be required to convey secondary effluents from the Chalfont plant and Green Street area to the new site. Because the secondary effluent from Harvey Avenue could not be placed in the Cooks Run interceptor for conveyance to the regional site, a pump station, force main, and gravity sewer will be required to deliver the flow via the Green Street plant area (Figure 16).

Alternative 5A. A new tertiary regional treatment plant (5.1 mgd capacity) would be constructed at a site located below the proposed Dark Hollow Dam. The treatment facility would not be required to remove phosphorus from the wastewater, as Neshaminy Creek "C" criteria prevail. Each of the existing secondary treatment plants would be abandoned and new interceptors to the site below Dark Hollow Dam would be required (Figure 17).

Alternative 5B. The existing secondary treatment facilities would be maintained. New interceptors conveying secondarily treated effluent would be constructed to a site located below the proposed Dark Hollow Dam. At this site tertiary treatment would be provided to meet Neshaminy Creek "C" criteria -- no phosphorus removal would be required (Figure 18).

Alternative 6. The Green Street plant would be maintained and upgraded. The Harvey Avenue treatment plant would also continue to perform secondary treatment; however, its treated flow will be directed to Chalfont for tertiary treatment. The tertiary treatment facilities will have a capacity of 4.3 mgd. A sewer parallel to the Cook Run interceptor will be required to separate the raw sewage from the treated wastewater (Figure 19).

Sludge Disposal

The Facilities Plan recommends that the ultimate disposal of sludge generated at the treatment facilities be accomplished via land application to approved sites; some appropriate sites may be those identified during the investigation of soils for land application of wastewater. Sludge disposal is currently contracted to private haulers.

Land Treatment

Land treatment of wastewater was considered as a possible alternative for the Chalfont-New Britain planning area in light of the stringent treatment requirements for wastewater discharged to Neshaminy Creek. Of the three major methods of land application (slow rate spray irrigation, rapid infiltration, and overland flow) spray irrigation was examined in detail since it would be able to provide the highest degree of phosphate removal.

The soils were evaluated with respect to their potential suitability for land application of wastewaters. Table 13 lists the soils with their depths to seasonal high water table and bedrock with a judgment as to their suitability. Approximately 650 acres of suitable soils are needed to effectively treat the entire 5.1 mgd flow from the planning area. However, sufficient suitable soils could not be located to treat all of this flow.

The possibility of treating a portion of the flow from one or more of the three existing plants by spray irrigation was then considered. Ten potential spray irrigation sites, all located in Doylestown Township, were identified. These sites could effectively treat a total of 1.41 mgd flow from the three existing treatment plants as follows: Chalfont 0.82 mgd, Green Street 0.26 mgd, and Harvey Avenue 0.33 mgd. Since only a small proportion of the total projected wastewater flow can effectively be treated by spray irrigation on the limited amount of suitable soils, expanded

Table 13. Soil suitability for land application.

Soil Series	Depth to Seasonal High Water Table (feet)	Depth to Bedrock (feet)	Suitability for Land Applicatic
Abbottstown	1/2-1 1/2	3 1/2-5	unsuitable; depth to seasonal high water table
Allenwood	>4	3 1/2-10	suitable
Alluvial land	Properties are too variable to estimate		unsuitable
Alton	>5	4-100	suitable
Bedington	>4	4-7	suitable
Bowmansville	0-1 1/2	3 1/2-12	unsuitable; depth to seasonal high water table
Chalfont	1/2-1 1/2	4-8	unsuitable; depth to seasonal high water table
Chester	>4	5-10	suitable
Clarksburg	1 1/2-3	5	marginal; depth to seasonal high water table
Culleoka	>3	2-3 1/2	marginal; depth to bedrock
Doylestown	0-1/2	4-7	unsuitable; depth to seasonal high water table
Duffield	>4	4-10	suitable
Duncannon	>4	>4	suitable
Fallsington	0-1/2	>5	unsuitable; depth to seasonal high water table
Hatboro	0-1/2	5-10	unsuitable; depth to seasonal high water table
Howell	>5	>10	suitable
Klinesville	>3	1-1 1/2	unsuitable; depth to bedrock
Lansdale	>3	4-7	suitable
Lawrenceville	1 1/2-3	4-8	marginal; depth to seasonal high water table
Lehigh	1-2	3 1/2-5	unsuitable; depth to seasonal high water table
Manor	>3	4-12	suitable
Marsh:	Properties are too variable to estimate		unsuitable

Table 13. Soil suitability for land application (concluded).

Soil Series	Depth to Seasonal High Water Table (feet)	Depth to Bedrock (feet)	Suitability for Land Application
Mount Lucas	1-2	5-10	marginal; depth to seasonal high water table
Neshaminy	>4	4-10	suitable
Penn	>4	1 1/2-3 1/2	marginal; depth to bedrock
Pope	>3	>5	suitable
Readington	1 1/2-3	3 1/2-6	marginal; depth to seasonal high water table
Reaville	1-2	1 1/2-2 1/2	unsuitable; depth to seasonal high water table and bedrock
Rowland	1-2	3 1/2-6	marginal; depth to seasonal high water table
Steinsburg	>4	2-3 1/2	suitable
Towhee	0-1/2	4-8	unsuitable; depth to seasonal high water table
Urban land			probably unsuitable because land is developed
Urbana	1-2	4-6	unsuitable; depth to seasonal high water table
Washington	>3	5-10	suitable
Weikert	>3	1-1 1/2	unsuitable; depth to bedrock
Woodstown	1 1/2-3	4-12	marginal; depth to seasonal high water table

and upgraded tertiary facilities still would be required to treat the remainder. A cost comparison using present worth analysis was performed. This analysis led to the conclusion that spray irrigation is not an economically feasible alternative for the Chalfont-New Britain planning area. Had there not already been a substantial pre-existing investment in wastewater treatment facilities, the cost-effectiveness of land treatment systems could be substantially improved.

Flow and Waste Reduction

Water supply shortages and the increasingly high cost for providing new water supplies and wastewater treatment have caused EPA to consider the impacts of flow and waste load reduction measures in all wastewater projects funded under the Construction Grants Program.

Flow and waste load reduction techniques can be incorporated into a local, publicly-oriented, water conservation program. If effective, this program can reduce water usage, lessening the amount of water that has to be supplied and subsequently treated as wastewater. This situation can lead to reduced operation and maintenance costs for both water and sewage systems, reduced service charges to water and sewer customers, and delayed need for new treatment facilities or expansions. Expensive development of new and increasingly scarce water supplies also may be avoided.

Various methods of flow and waste load reduction were evaluated in terms of their applicability to the Chalfont-New Britain planning area. The methods examined included:

- Reduction of excessive infiltration and inflow (I/I) in existing collection and conveyance facilities
- Reuse and recycling of sanitary discharges prior to treatment
- Installation in individual homes of water saving devices for toilets, showers, and laundry facilities
- Metering of water consumption accompanied by a graduated water use rate structure
- Continued use of functioning on-lot systems within the service areas of public sewer systems
- Enactment of special ordinances to legally restrict the manner in which water and sewerage facilities are constructed or installed
- Establishment of public participation/information programs to make citizens aware of the need and desirability to conserve water and to allow public input on types of flow and waste load reduction methods to be used.

Of these flow and waste reduction measures, all were considered to be feasible except for reuse/recycling. The actual implementation of any of these measures would be the decision and responsibility of county, municipal, or other local entities.

Infiltration/Inflow

One major problem is the existence of excessive infiltration/inflow in the sewers. Water from infiltration/inflow (I/I) sources reduces the capability of sewer systems and treatment facilities to transport and treat domestic and industrial wastewaters.

Infiltration occurs when water enters the sewer system from the ground through cracked or broken pipe, defective pipe joints or improper connections. Infiltration depends on groundwater levels, precipitation, and percolation of surface waters. It is at its maximum during high groundwater conditions and extended wet weather periods.

Inflow is defined as water entering the sewer system from such sources as roof drains, cellar, yard and area drains, sump pumps, cross-connections from storm sewers, catch basins, and manhole covers. Inflow occurs during periods of precipitation and surface runoff.

Sewer system rehabilitation is an expensive process and not always successful in the long-term. Therefore, it is usually more cost-effective to treat a portion of the I/I flow which enters the sewage treatment plant.

Of the I/I quantities in Table 14 it has been estimated that it would be possible to cost-effectively remove 20 percent of these extraneous flows. Because of the serious extent of I/I problems in the planning area a Sewer System Evaluation Survey (SSES) is underway to define the costs of rehabilitation and repair versus the benefits obtained. The detailed design (Step 2) of the project will incorporate the information gained during the SSES.

Table 14. Infiltration/inflow (I/I) quantities.

	Average Daily Flow (mgd)	Minimum Flow (mgd)	I/I (mgd)	Non-Removable I/I (mgd)
Doylestown Borough				
Harvey Avenue	0.64	0.47	0.17	0.13
Green Street	0.61	0.35	0.26	0.21
Chalfont				
CNBTJSA	1.06	0.87	0.19	0.15
BCWSA	1.09	0.45	0.64	0.51

n-Site Wastewater Disposal

Throughout the remainder of the planning area a large number of homes and businesses utilize on-site systems for the treatment and disposal of their wastewater. Not all of these systems are operating properly and may, in some cases, pose a threat to groundwater supplies and/or the public health.

An integral part of the Facilities Plan/EIS process is the evaluation of the need to repair or replace failing septic systems. This "needs documentation" can be accomplished in a number of ways. Several approaches were used in the Chalfont-New Britain area. First, soil maps showing suitabilities for on-site systems and maps of existing housing densities were compared. The relative densities of housing developments and the general unsuitability of soils implied that failing septic systems were probably a significant problem and that certain areas were prone to failures. Bucks County Health Department records of on-site system repairs and alterations were then reviewed. The information obtained from the files was based primarily on complaints and violation notices. Property owners may be reluctant to file complaints especially if

their own system may not be operating properly. Consequently, the number of malfunctioning systems was likely to be underestimated. The County does not currently perform regular inspections of all on-site systems after they have been installed. The locations of known repairs and alterations did not correlate well with the soils information. Consequently, it was not adequate to assess the potential success of continued use of on-site systems in the planning area over the next 20 years. As a result, EPA decided to use an advanced technology to better define the current status of all on-site systems within the 100 square mile planning area.

EPIC Septic System Analysis

In July 1980 a septic system analysis of the planning area was performed by the EPA Environmental Photographic Interpretation Center (EPIC). The EPIC analysis involved a remote sensing technique using color and color infrared aerial photography to detect septic system malfunctions and surfacing septic effluent.

The basic technique relies on the photo-interpretation of characteristic patterns of plant foliage distress and excessive soil moisture levels utilizing color infrared films. These methods are used to identify those septic tank malfunctions that are noticeable on the ground surface. Those malfunctions in which sewage backs up into the house or septic tank effluent percolates too rapidly through the soil to be adequately renovated cannot be detected by aerial imagery. The actual causes of septic tank failures may be from one or more of the following (Slonecker 1980):

(1) The soil in the absorption field has too slow a percolation rate to allow for adequate assimilation, filtration, and biodegration of sewage effluent flowing into it.

(2) The septic system is installed too close to an underlying impervious layer.

(3) The septic system is installed in an area where the seasonal water table is too high for its designed use.

(4) The soil in the absorption field has too high a percolation rate for effective attenuation of the septic effluent prior to its reaching the underlying groundwater.

(5) Mechanical malfunctions, or breakage, in the septic tank, distribution box, and/or drainfield pipes have occured.

(6) Caustic, toxic or otherwise harmful substances which could kill bacteria in the septic tank and/or absorption field, and cause subsequent clogging, have been introduced into the septic system.

(7) All or part of the system has been improperly installed.

The EPIC data is an indicator that major problems exist and not necessarily that each data point unquestionably defines a problem. Conversely, there may be additional malfunctions that were not identified. Thus, the use of EPIC data should be limited to a planning tool. A house-to-house survey would be required to detail the site-specific remedial measures. The development of alternative wastewater management plans can be based on the planning tools, resulting in an overall framework to solve the area's problems.

The EPIC analysis reported that a total of 1,118 homes in the Chalfont-New Britain area have septic system problems of varying

degrees (Figure 20). These data indicate that the planning area is experiencing severe problems with on-site wastewater systems and that the problems are widely scattered as well as clustered.

Six areas in the planning area were identified as having significant problems with on-lot systems (Timber Lane, Pebble Ridge, Pebble Hill, Sugar Bottom, Edison Furlong, and Sandy Pine). These six areas, because of the large number of concentrated failures, warrant special consideration for wastewater management solutions. However, the extensive nature of the on-site problems indicates that continuation of existing practices will result in similar problems with future on-site systems. These problems, which do not directly nor exclusively correlate with soil suitability factors, also can be related to improper or inadequate installation, operation, and maintenance of the systems as well as the density of development in areas using these systems. The needs for adequate wastewater treatment and disposal in these scattered areas also has been addressed.

On-Site and Collection Alternatives

Various on-lot and centralized wastewater systems were evaluated in terms of applicability to the planning area. These systems are being considered for those areas that are not currently sewered. Factors considered in screening the alternatives included, but were not limited to, climate, geology, soils, groundwater conditions, topography, and lot size. Five on-lot systems and four collection systems were examined:

On-Lot Systems

- septic tank-soil absorption system
- septic tank-mound system
- septic tank-evapotranspiration system
- septic tank-sand filter system
- cluster systems

Collection Systems

- conventional gravity sewers
- pressure sewers using either septic tank effluent pumps or grinder pumps
- small diameter gravity sewers
- vacuum sewers.

This preliminary screening process led to the conclusion that only septic tanks with sand mounds and cluster systems would be feasible on-lot system solutions in the Chalfont-New Britain planning area. Gravity, pressure, and vacuum sewers were all considered feasible collection systems.

n-Lot Wastewater nagement Program

Malfunctioning septic systems can often be repaired to operate successfully provided they receive proper operation and maintenance. EPA will participate in the initial funding of rehabilitation or replacement of on-lot systems if a management program is established to ensure that this will be a maintained program.

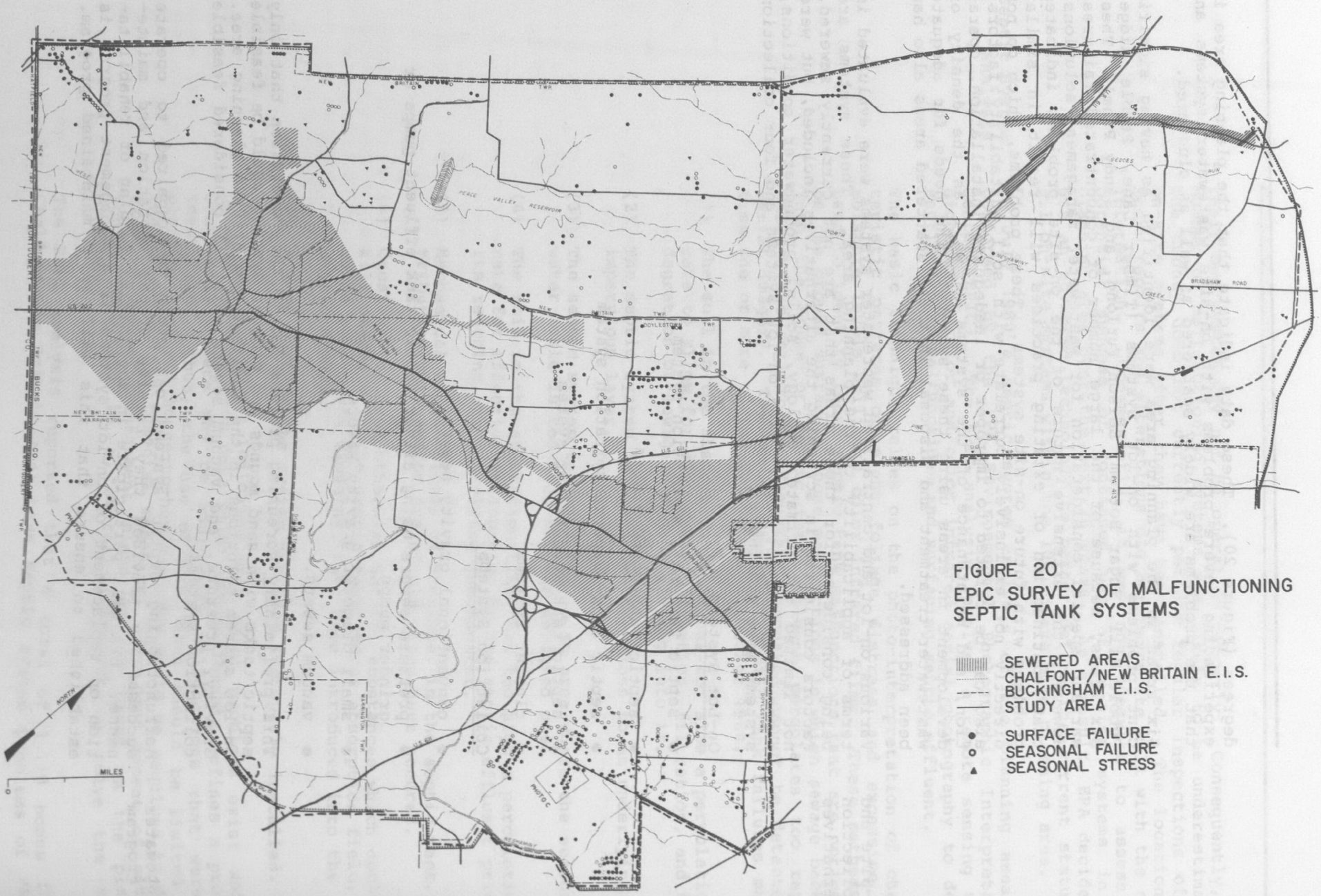


FIGURE 20
EPIC SURVEY OF MALFUNCTIONING SEPTIC TANK SYSTEMS

SEWERED AREAS
CHALFONT/NEW BRITAIN E.I.S.
BUCKINGHAM E.I.S.
STUDY AREA

SURFACE FAILURE
SEASONAL FAILURE
SEASONAL STRESS

Establishment of such a program has been proposed in the Facilities Plan as feasible for the Chalfont-New Britain area (see Chapter VI for a detailed discussion).

Concentrated Problem Areas

The six unsewered areas which have been identified with concentrated on-lot malfunctions were examined for various wastewater management solutions. Viable alternatives to provide wastewater collection capability included: gravity sewers, vacuum sewers, pressure sewers, septic tanks with sand mounds, cluster systems, and on-lot system management.

The first three previously mentioned alternatives require treatment by a conventional treatment facility. Due to Sandy Pine's location in relation to the existing sewer system in the planning area, its flow was assumed to be able to be treated at the Chalfont facility.

Due to its location, Pebble Hill was assumed to have the option to have its wastewater treated at the proposed King's Plaza plant or the Green Street plant. The Pebble Ridge area was assumed to be able to have its flow treated either at the existing Chalfont plant or the proposed Kings Plaza plant. An economic analysis indicated that the proposed Kings Plaza plant was the most cost-effective location for treatment of Pebble Hill and Pebble Ridge. Therefore, the remaining areas were also assumed to be treated at Kings Plaza.

Septage Management

Septage wastes are the residuals pumped from septic tanks by haulers. Currently, a county-wide septage management study is ongoing (Tatman and Lee Associates, Inc. 1981a). This study is being conducted separately, but in coordination with the Chalfont-New Britain wastewater facility planning efforts. Preliminary results of the septage management study indicate that the Chalfont-New Britain wastewater treatment facility, located in Central Bucks County, is a logical site for accepting septage for treatment. The reasons in the septage management study are:

(1) The proximity of the Chalfont-New Britain plant to septage generated within Bucks County -- more than 60% of septage generated is within 15 miles of the plant.

(2) The Chalfont-New Britain plant is larger than other facilities (Dublin and Quakertown) and may be less prone to wastewater treatment upsets.

(3) The sensitivity of the receiving stream (Neshaminy Creek) is less than the receiving streams of the Dublin and Quakertown plants.

(4) The ability to qualify and receive federal grants is greater for the Chalfont-New Britain plant due to the fact that a 201 Study is ongoing in the area.

The projected volume of septage to be received at the Chalfont-New Britain plant has been estimated (Tatman and Lee Associates, Inc. 1981a) as follows:

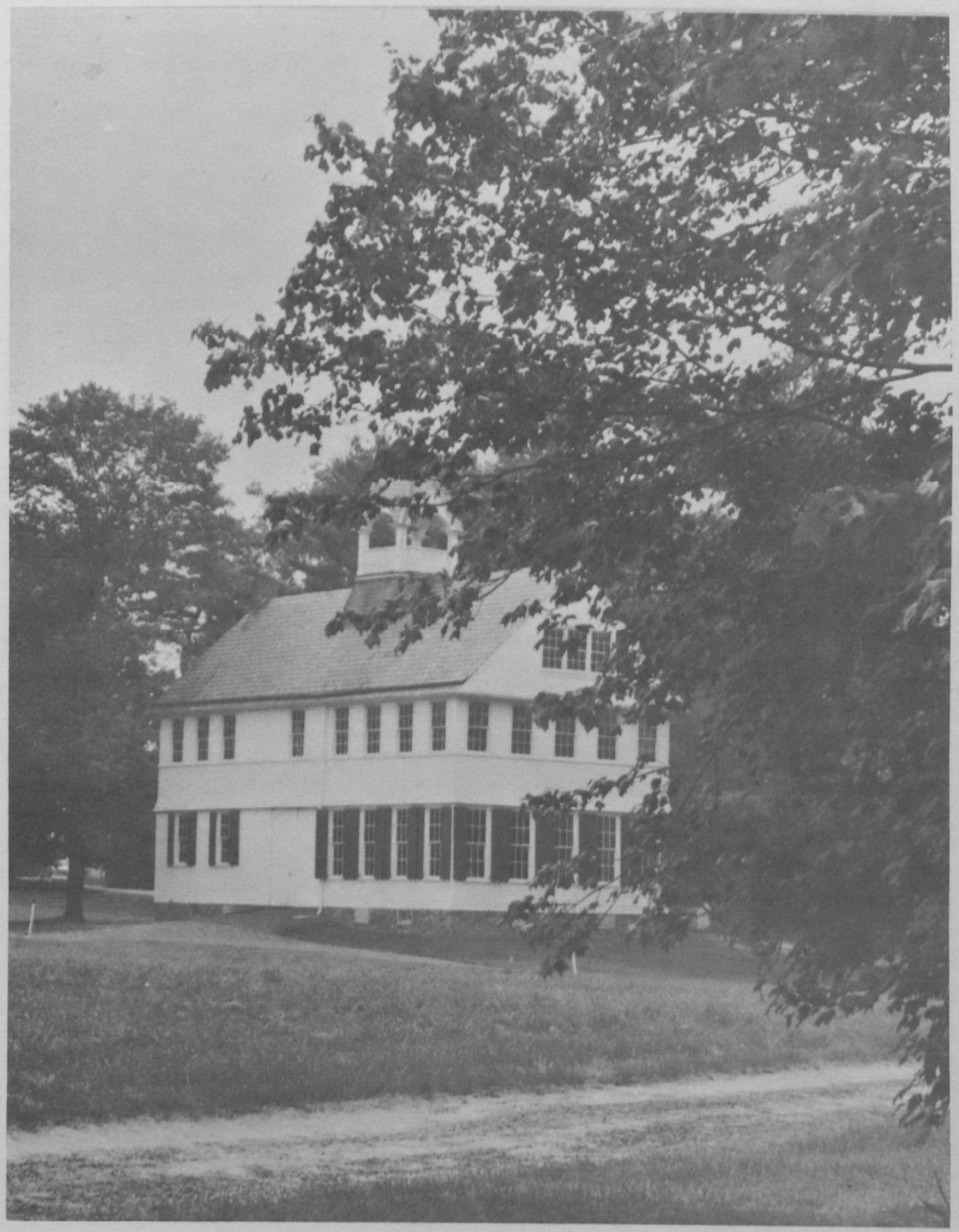
Annual - 9.1 million gallons per year
Peak - 105,000 gallons per day for 30 days
Average Daily - 35,000 gallons per day (based on 5 days/week)

However, concerns have been raised over the ability of wastewater treatment at Chalfont-New Britain to meet the existing effluent

limitations in the event that the high-strength septage were added. If the effluent limits are relaxed on the basis of PA-DER's stream analysis, septage treatment at the Chalfont-New Britain plant would become a more viable alternative. Pilot-scale testing during the Step 2 (detailed design) phase of the project will determine the chemical dosages and treatment processes required to maintain compliance with effluent standards. If septage treatment at the Chalfont plant proves to be not technically feasible, greater utilization of land disposal (agricultural) sites and/or other area treatment plants would be required.

Chapter V

Evaluation of Alternatives



CHAPTER V. EVALUATION OF ALTERNATIVES

ENVIRONMENTAL IMPACTS

The environmental consequences of providing wastewater treatment facilities can be primary (construction-related noise, dust or other disturbances) and secondary (increased development and loss of environmental values due to the availability of sewer service). In the case of the Chalfont-New Britain planning area, EPA's environmental review focused on the two components of each alternative wastewater management plan: construction of new and/or modification of existing wastewater treatment plant sites; and construction of new interceptors to convey wastewater flows to the treatment plants. The nine alternative wastewater management plans were carefully evaluated in terms of their potential impact on: floodplains, wetlands, prime agricultural lands, forests, steep slopes, wildlife habitats, historic/archaeological sites, stream crossings, ease of bedrock excavation (blasting requirements), and growth induced by the availability of sewer service. The following composite ranking in terms of environmental acceptability was developed:

	Environmental Ranking	Alternative
most environmentally sound	1/2	1/2
↓	3	3B
	4/5	3A/6
	6/7	4A/4B
least environmentally sound	8/9	5A/5B

Wastewater Treatment Plant Sites

The nine regional wastewater alternatives propose various actions which involve the three existing municipal treatment plants and/or one of two new regional facilities (Table 15). The extent to which the sites can accommodate new or expanded facilities depends largely on the characteristics at, and adjacent to, these sites (Table 16).

nt-New Britain STP

This location is suitable for any of the proposed new treatment facility alternatives. The existing Sewage Treatment Plant (STP) site is surrounded by agricultural land and is isolated from sensitive land uses, thereby minimizing the effect of potential noise and odor problems. Ample developable land exists at or adjacent to the site to accommodate new construction for upgrading to tertiary treatment and expansion of the facility. Where new construction is required (Alternatives 1, 2, 3A, 3B, and 6) care should be taken to keep the Neshaminy Creek floodplain free of obstructions.

vey Avenue STP

Land is available at this site, or immediately adjacent in Doylestown Township, to accommodate proposed new wastewater facilities. Alternative 2 involves the most extensive amount of additional facilities, in order to upgrade to tertiary treatment levels and accommodate expanded capacity. Part of the site is within the 100 year floodplain of Cooks Run, however, and the nearest residence is approximately 500 feet south of the site.

most of the 5 acres are already being utilized and residences exist in close proximity to the site. None of the proposed alternatives would require extensive additional facilities, however. No expanded capacity is proposed. Alternatives 2, 3A, and 3B each involve the addition of a pump station which easily could be accommodated at the site. Alternatives 1 and 6 propose to upgrade the existing facility to tertiary levels. The facilities necessary to

Table 15. Treatment actions to be undertaken at existing and proposed sewage treatment plants (STPs), by alternative.

Plant/Action	1	2	3A	3B	4A	4B	5A	5B	6
CNB STP									
Phase Out					X		X		
Upgrade to Tertiary Level	X	X	X	X					X
Expand	X	X	X	X					X
Keep as is						X		X	
Add Pump Station									
Harvey Avenue STP									
Phase Out				X	X		X		
Upgrade to Tertiary Level	X	X							
Expand		X							
Keep as is			X			X		X	X
Add Pump Station						X		X	
Green Street STP									
Phase Out				X	X		X		
Upgrade to Tertiary Level	X								X
Expand									
Keep as is		X	X			X		X	
Add Pump Station		X	X	X					
New King's Plaza STP									
Tertiary Treatment						X			
Secondary and Tertiary Treatment					X				
New Dark Hollow Dam STP									
Tertiary Treatment								X	
Secondary and Tertiary Treatment							X		

ıble 16. Wastewater treatment site characteristics as they relate to potential new facility construction and/or expansion. "Expansion Potential" primarily is based on availability of suitable land and proximity to sensitive land uses (eg., residential, floodplain).

	Chalfont-New Britain STP	Harvey Avenue STP	Green Street STP	Kings Plaza Area STP (Proposed)	Dark Hollow Dam STP (Proposed)
Existing Property Area (Acres)	15	25*	5	Unknown	Unknown
Surrounding Uses	Agriculture	Forest Agriculture Industry	Residential Forest Highway	Agriculture Forest	Agriculture Forest
Nearest Home/Direction	1,000 ft/North, East	500 ft/South	200 ft/West	>1,500 ft/ Northeast	1,000 ft/North
Bedrock	Stockton Arkose	Stockton Arkose	Stockton Arkose	Stockton Arkose	Unknown
Property in Floodplain	Western edge in Neshaminy Creek FP	Northern 1/3 in Cooks Run FP	Most in Country Club Run FP	Part in Neshaminy Creek FP	Unknown
Expansion Potential	Good	Fair	Poor	Good	Good

*Includes land shared with Borough Maintenance Facilities.

accomplish this action likely could be accommodated at the site, although floodproofing measures may be required since most of the site is within the 100 year floodplain of Country Club Run.

Proposed Kings Plaza Area STP

Alternatives 4A and 4B propose entirely new wastewater treatment facilities for this site. Ample land is available at this location to accommodate these proposed facilities. Residences are distant enough to preclude potential noise or odor problems. The Neshaminy Creek floodplain on this (northern) side of the stream extends from 100 to 200 feet in width and should be avoided. Concurrently, destruction of forest can be avoided since most of the floodplain is covered by forest.

Proposed Dark Hollow Dam STP

Alternatives 5A and 5B propose entirely new wastewater treatment facilities at this site. Since the proposed site is located in Warwick Township and is outside of the 201/EIS planning area, data were not collected for the area. Therefore, an evaluation similar to those presented above is not possible. However, utilization of other data sources (principally, aerial photos of the area at a scale of 1" = 1,000' dated February 1973), several factors can be determined or surmised. The proposed site is secluded from residential and other developed land uses, situated on land which is predominantly a mixture of farmland and forests along a bend in Neshaminy Creek. This location makes the site favorable for potential future expansion (if necessary) and also precludes potential noise or odor problems. The site is likely to be within the 100 year floodplain of the Creek. Potential adverse effects on historic/archaeologic resources cannot be determined. Soil types within the proposed site area also are unknown, but may be classified as prime or unique farmland. Construction at this site is likely to result in some loss of forest and at least temporary disruptions to wildlife movements and habitat.

Wastewater Conveyance Facilities

The environmental impacts associated with wastewater conveyance facilities can be both primary (construction-related) and secondary (indirect or induced by the operation and availablity of wastewater services). The nine regional wastewater alternatives involve new conveyance facilities ranging in construction requirements from no new sewer lines to approximately 63,000 feet of lines. Those alternatives which require new conveyance facilities (Alternatives 2 through 6) represent various combinations of six different routing segments (see Table 17 and Figure 21). These six routings are assessed in this section in relation to the following parameters: floodplains, wetlands, prime agricultural lands, forests, steep slopes, wildlife, historical/archaeological resources, stream crossings, ease of bedrock excavation, and induced growth potential.

Routing A: Alternatives 2, 3A, 3B, 4B, 5B

Green Street to Harvey Avenue (approximately 7,070 feet)

This routing traverses Doylestown Borough. No significant impacts are anticipated on floodplains, prime agricultural lands, geology, wetlands, steep slopes, forests, or wildlife. No stream crossings are required.

Primary impacts will result from effects of short-term construction (dust, noise, and other inconveniences) due to building through Borough streets.

Table 17. Correlation of conveyance facility routes with treatment alternatives.

Route	Description	Approximate Distance (feet)
A	Green Street STP - Harvey Avenue STP	7,070
B	CNB Interceptor at Harvey Avenue STP - New Britain Borough Border	6,535
C	New Britain Borough Border - CNB STP	11,860
D	CNB STP - New Kings Plaza STP	31,545
E	Green Street outfall - Kings Plaza Interceptor	5,395
F	Kings Plaza STP area - Dark Hollow Dam STP	19,000

Alternative	Routes	Approximate Total Distance (feet)
1	None	0
2	A	7,070
3A*	A, B, C	25,464
3B*	A, C	18,930
4A*	D, E	36,940
4B	A, D, E	44,010
5A*	D, E, F	55,940
5B	A, D, E, F	63,010
6*	B, C	18,395

*Alternatives 3A, 3B, 4A, 5A, and 6, would, in addition, require a certain length of sewer to connect the Harvey Avenue STP outfall with the existing CNB interceptor.

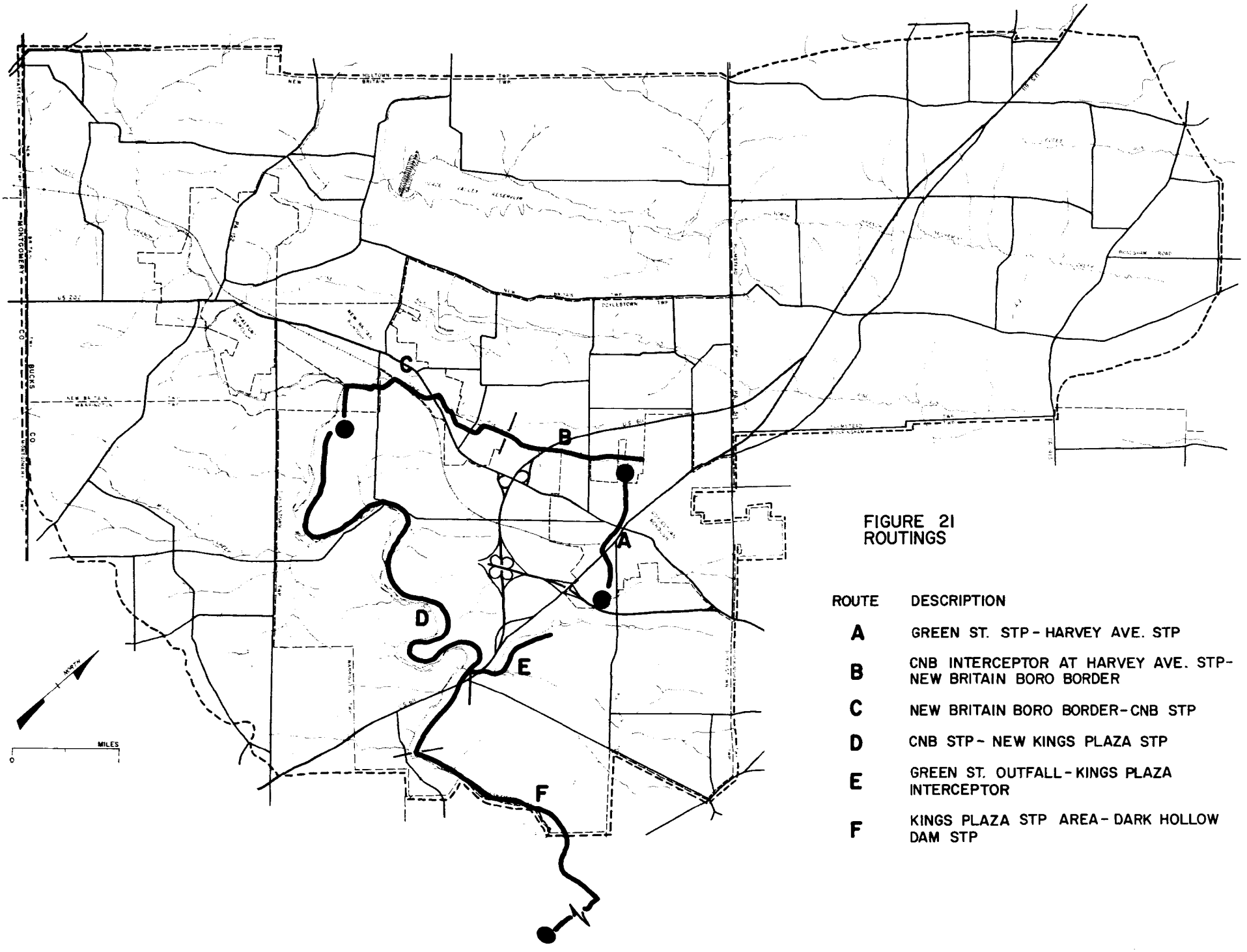


FIGURE 21
ROUTINGS

ROUTE	DESCRIPTION
A	GREEN ST. STP - HARVEY AVE. STP
B	CNB INTERCEPTOR AT HARVEY AVE. STP - NEW BRITAIN BORO BORDER
C	NEW BRITAIN BORO BORDER - CNB STP
D	CNB STP - NEW KINGS PLAZA STP
E	GREEN ST. OUTFALL - KINGS PLAZA INTERCEPTOR
F	KINGS PLAZA STP AREA - DARK HOLLOW DAM STP

This routing passes through the Borough Historic District and will pass numerous identified and/or registered historic sites. Care must be exercised not to disturb any of these sites. Potentially new, previously identified historic or archaeologic sites may be encountered by the attendance of a qualified archaeologist.

Routing B: Alternatives 3A, 6

CNB Interceptor at Harvey Avenue STP to New Britain Borough Border (approximately 6,535 feet)

This routing parallels the existing CNB interceptor along the northern side of Cooks Run Creek. No significant impacts on wetlands, geology, prime agricultural lands, steep slopes, or stream crossings are anticipated.

This routing will cause short-term, construction-related disturbances to the Cooks Run floodplain, forested areas, and wildlife habitat. Loss of forest cover and permanent disruption of wildlife corridors could be long-term impacts. One identified prehistoric, archaeological site (#26*) is located near this routing and also could be effected.

Routing C: Alternatives 3A, 3B, 6

New Britain Borough border - CNB STP (approximately 11,860 feet)

This routing continues to parallel the existing CNB interceptor along Cooks Run Creek and then Neshaminy Creek to the Chalfont-New Britain STP. No significant impacts on wetlands, steep slopes, geology, prime agricultural lands, or historic/archaeological resources are anticipated. The routing does, however, pass near several historic sites identified on the Bucks County Inventory, and special care should be exercised in those areas.

This routing will cause short-term, construction-related disruptions to the Cooks Run and Neshaminy Creeks floodplains, forested areas, wildlife habitat, and also will require four stream crossings. Loss of forest cover and permanent disruption of wildlife corridors could be long-term impacts.

Routing D: Alternatives 4A, 4B, 5A, 5B

Chalfont-New Britain STP - New Kings Plaza STP (approximately 31,545 feet)

This routing follows the Neshaminy Creek along the northern side. No significant impacts on prime agricultural lands, steep slopes, or historical/archaeological resources are anticipated. However, one historic site on the Bucks County Register and at least six historic sites on the Bucks County Inventory are close to this alignment, and special care should be exercised during construction in those areas.

Significant loss of forest, new construction in floodplains, and disturbance of wildlife habitat and corridors are associated with this routing. The potential for encountering wetlands is likely,

*Site of Indian battle at Vauxtown. Many relics of the battle were collected from this hill and adjacent fields near Vauxtown.

particularly along the southern one-half of this alignment. Up to seven stream crossings will be required.

Some of the adverse effects associated with this routing (especially those on forests, floodplains, and wildlife corridors) can be minimized by a realignment a short distance further from the Neshaminy Creek, if feasible.

This routing primarily passes through Lockatong argillite bedrock, the upper few feet of which may be excavated moderately easily. Unweathered bedrock of this type could require blasting.

Routing E: Alternatives 4A, 4B, 5B

Green Street STP outfall - Kings Plaza Interceptor (approximately 5,395 feet)

This routing follows the eastern side of Country Club Run Creek and requires two stream crossings. No significant impacts on wetlands, steep slopes, prime agricultural lands, or wildlife corridors are anticipated. At least five historic sites on the Bucks County Inventory are adjacent to this routing and care should be exercised during construction in those areas.

This routing will create short-term, construction-related disturbances to the Country Club Run floodplain, forested areas, and wildlife habitat. Some loss of forest cover could be a long-term impact.

This routing primarily passes through Lockatong argillite bedrock, the upper few feet of which may be excavated moderately easily. Unweathered bedrock of this type could require blasting.

Routing F: Alternatives 5A, 5B

Kings Plaza STP area - Proposed Dark Hollow Dam STP (approximately 19,000 feet)

This routing follows Neshaminy Creek south through Doylestown Township, Buckingham Township, and Warwick Township. Since the latter two are located outside the 201/EIS planning area, existing environmental data for approximately 14,500 feet of this routing were not collected. However, no significant impacts on prime agricultural lands or steep slopes are anticipated.

This routing will create short-term, construction-related disturbances to the Neshaminy Creek floodplain, forested areas, wildlife habitat, and the water quality and aquatic biota as a result of nine stream crossings. Long-term impacts associated with this routing potentially include loss of forest and small wetlands disruption. Most of this alignment passes through Lockatong argillite bedrock, the upper few feet of which may be excavated moderately easily. Unweathered bedrock of this type, however, could require blasting. Historic and/or archaeologic sites in Warwick Township were not explored for this study. The potential for disruption of such sites during construction must therefore be considered an adverse effect.

The specific routings associated with each alternative were combined to develop a composite environmental assessment for each alternative. Table 18 presents the relative effects of each of the nine alternatives in terms of ten environmental parameters. The

Table 18. Environmental assessment of alternative wastewater conveyance facilities.

Parameter	ALTERNATIVE 1	2	3A	3B	4A	4B	5A	5B	6
100-year Floodplain (amount of new construction in)	none	none	medium	medium	high	high	high	high	medium
Wetlands (possibility of encounter)	none	none	medium	low	high	high	high	high	medium
Prime Agricultural Land (amount disturbed)	none	none	minor	minor	minor	minor	minor	minor	minor
Forest Cover (amount disturbed)	none	none	medium	low	high	high	high	high	medium
Slopes greater than 15% (construction on)	none	none	none	none	none	none	none	none	none
Wildlife (habitat/corridors disturbed)	none	none	medium	low	high	high	high	high	medium
Historical/Archaeological Sites (extent of encounter)	none	high	high	high	high	high	high	high	high
Stream Crossings (number)	none	none	five*	four*	ten*	nine	nineteen*	eighteen	five*
Bedrock Excavation (possibility of blasting required)	none	none	none	none	medium	medium	mwdium	medium	none
Growth Inducement Potential	none	none	none	low	high	low	high	low	none

*Includes crossing Cooks Run Creek from Harvey Avenue STP outfall to connect with CNB interceptor.

ten parameters, the factors considered in developing a relative evaluation, and the environmental ranking of alternatives (from most sound to least) are described below.

Floodplains

The relative amount of new facility construction that occurs in the 100-year floodplain (as delineated in the National Flood Insurance Program) was the basis for ranking this parameter. Except in Route A (through Doylestown Borough) each of the proposed new interceptors is located within the floodplain of the stream it parallels, so the severity of the impact relates to the total length of new sewer.

Degree of Impact	Alternative
least	1, 2
↓	3B
	3A, 6
	4A, 4B
greatest	5A, 5B

Wetlands

Aerial photographs (scale 1" = 1,000') used to develop a Vegetation and Land Cover figure (scale 1" = 2,000'), indicated that there were numerous patches of wetlands (too small to be mapped at the figure scale) adjacent to Neshaminy Creek, Cooks Run, and Country Club Run near Routings B, D, E, and F. Unmapped patches of wetlands could also occur near Routing C. Only Alternatives 1 and 2 definitely would not encounter or disturb wetlands.

Degree of Impact	Alternative
least	1, 2
↓	3B
	3A, 6
	4A, 4B
greatest	5A, 5B

Prime Agricultural Land

The capability classification system used by the USDA-SCS in the Soil Survey for Bucks and Philadelphia Counties (1975) was the basis for determining prime agricultural land and the related effects of the alternatives. All identified Pennsylvania Prime Agricultural Lands in the planning area are in the Capability Classes I or II. At most, about 3% of any alternative's total conveyance construction will disturb Class I or II soils (Table 19).

Degree of Impact	Alternative
least	1, 2
greatest	3A, 3B, 4A, 4B, 5A, 5B, 6

Forest Cover

The amount of forest traversed by the alternative sewer routes was measured on the vegetation and land cover map (Table 20). The relative significance of forest disturbance was considered as follows:

Low -- up to 5,000 feet disturbed
Medium -- 5,000 to 10,000 feet
High -- greater than 10,000 feet.

Table 19. Prime agricultural land (Class I and II) disturbed by new conveyance construction, by alternative.

Prime Agricultural/ Capability Class	Alternative/Feet								
	1	2	3A	3B	4A	4B	5A*	5B*	6
I	0	0	0	0	370	370	0	0	0
II	0	0	535	140	390	390	1,485	1,090	535
III	0	0	1,115	690	5,500	5,500	1,115	690	1,115
IV	0	7,070	23,815	18,1000	37,750	39,340	47,230	16,745	

Prime Agricultural/ Capability Class	Alternative/Percent								
	1	2	3A	3B	4A	4B	5A	5B	6
I	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.0
II	0.0	0.0	2.1	0.7	1.1	0.9	2.7	1.7	2.9
I and II	0.0	0.0	2.1	0.7	2.1	1.7	2.7	1.7	2.9
III	0.0	0.0	4.4	3.6	0.1	12.3	2.0	1.1	6.1
IV	0.0	100.0	93.5	95.6	83.1	84.4	70.3	75.0	91.0

*No data for 14,000 feet of conveyance through Warwick and Buckingham Townships.

Table 20. Forest disturbed by new construction of conveyance facilities.

Alternative	Approximate Total Forest Disturbed* (Feet)	Forest Disturbed as % of Total New Conveyance Distance
1	0	0.0
2	0	0.0
3A	6,938	26.6
3B	4,441	22.8
4A	21,653	58.6
4B	21,653	49.2
5A	36,653	65.5
5B	36,653	58.2
6	6,938	37.7

*Total forest disturbed includes interior forest as well as edge forest.

Degree of Impact	Alternative
least	1, 2
↓	3B
	3A, 6
	4A, 4B
greatest	5A, 5B

Steep Slopes

Slopes greater than 15% were considered steep in terms of potential construction-related erosion and sedimentation problems. None of the proposed conveyance facilities are on slopes 15% or greater, thus they all rank equally.

Wildlife

Floodplains and forests (usually concurrently) provide desireable habitat and corridors for safe movement of much of the wildlife in the planning area. The combined effects on these two parameters for each alternative was considered as the basis for the valuation of relative impacts on wildlife.

Degree of Impact	Alternative
least	1, 2
↓	3B
	3A, 6
	4A, 4B
greatest	5A, 5B

Historical/ Archaeological Resources

Numerous individual and collective historic and archaeological sites were identified in the inventory chapter. Route A traverses an Historic District in Doylestown Borough with which are associated specific protection regulations. Many identified and registered historic sites are within the border of this Historic District, including a site listed on the National Register of Historic Places. Construction of wastewater conveyance facilities through this sensitive Historic District was evaluated as potentially significant in terms of effects on historic resources. However, new conveyance facilities will be constructed in existing roadways and should not adversely affect the historic sites, most of which are buildings. Secondary consideration in evaluating effects on historic resources was given to the number of known sites that exist along the routes of proposed new conveyance facilities.

Degree of Impact	Alternative
least	1
↓	2
	3A, 3B, 6
	4A
	4B
	5A
greatest	5B

Stream Crossings

USGS topographic maps (scale 1:24,000) of the planning area were used to count the number of streams to be crossed by conveyance facilities under each alternative. Construction across streams causes short-term, adverse effects on water quality and aquatic biota.

Degree of Impact	Alternative
least	1, 2
↓	3B
	3A, 4B, 6
	4A
	5B
greatest	5A

Geology-Bedrock Excavation

Construction of conveyance facilities for wastewater can involve cutting into bedrock. The portions of the planning area proposed for conveyance facilities are underlain by two formations: either Stockton Arkose or Lockatong Argillite. Excavation is relatively easy in the Stockton formation, but unweathered Lockatong could require blasting. Routes D, E, and F (Alternatives 4A, 4B, 5A, and 5B) are underlain by Lockatong Argillite.

Blasting Requirement	Alternative
least	1, 2, 3A, 3B, 6
↓	4A, 4B
greatest	5A, 5B

Induced Growth

The potential for secondary development is directly related to the alignment of new sewers through presently undeveloped areas. Secondary development is that which is induced by the availability of sewers in areas that otherwise would not develop, or would develop at a slower rate or lower density. Routings D, E, and F each traverse large areas of undeveloped land and thereby entail some potential for growth inducement. The majority of the soils on lands adjacent to these three routings are classified as unsuitable for standard on-site wastewater disposal systems. Most of the undeveloped land is zoned for low to medium density residential uses. Furthermore, the possibility exists that, were sewerage facilities to be made available through these areas, the current zoning could be amended to permit more intensive residential development. Consequently Alternatives 4A and 5A have the greatest potential for growth inducement along the proposed conveyance routes which extend beyond the proposed sewer service area. In addition, Alternative 3B has a small probability of inducing new development by the addition of a parallel conveyance sewer along Cooks Run Creek. Such development, however, would likely be confined to the planned sewer service area. Under Alternatives 4B and 5B the proposed new conveyance lines carry effluent already treated to secondary levels. Although it is conceivable that new development could connect into such a sewer, privately funded facilities would first be necessary to treat wastes to secondary levels prior to connection. The disincentives to bear this additional cost sharply limit the potential for induced development along these lines.

Growth Inducement	Alternative
least	1, 2, 3A, 6
↓	3B
	4B, 5B
greatest	4A, 5A

COSTS OF ALTERNATIVE WASTEWATER MANAGEMENT PLANS

Table 21 presents the costs of the alternative wastewater management plans and includes the capital cost to implement the alternative, the annual cost of operation and maintenance, and the salvage value at the end of the planning period.

Table 21. Present worth cost estimates of alternative wastewater management plans (Gilbert Associates 1981).

Alternate	Project Cost (millions of dollars)	Annual Operation and Maintenance Cost (millions of dollars)	Salvage Value (millions of dollars)	Total Present Worth (millions of dollars)
1	$10.08	$0.86	$ 7.76	$17.16
2	11.50	0.79	6.76	18.09
3A	15.32	0.70	9.26	20.36
3B	16.98	0.77	10.09	22.49
4A	29.42	0.74	17.82	32.61
4B	26.14	0.76	16.11	30.38
5A	35.66	0.65	23.73	36.50
5B	32.38	0.68	22.02	33.98
6	11.42	0.74	6.71	17.51

Alternative 1 - Local Treatment

Alternative 2 - Chalfont Alone and Harvey Combined with Green

Alternative 3A - All Tertiary Treatment at Chalfont with Harvey and Green providing Secondary Treatment

Alternative 3B - All Treatment at Chalfont, Harvey and Green Abandoned

Alternative 4A - All Treatment at a Regional Site (Vicinity of Neshaminy Manor Center)

Alternative 4B - Only Tertiary at a Regional Site (Vicinity of Neshaminy Manor Center), Existing Plants Provide Secondary Treatment

Alternative 5A - All Treatment Below Dark Hollow Dam

Alternative 5B - Only Tertiary Below Dark Hollow Dam, Existing Plants Provide Secondary Treatment

Alternative 6 - Green Street Alone, Combine Tertiary Facilities of Harvey Avenue and Chalfont

The following definitions explain the different cost elements and their significance:

Present Worth: The sum of money (which if invested now at a given rate) that would provide all necessary expenditures over the life of the project.

The present worth is used to compare projects on an equal basis. It enables a parallel comparison of alternatives which may cost more initially but are more economical to operate and maintain as contrasted with alternatives that are less costly to construct but more expensive to operate and maintain.

Project Cost: The costs necessary to construct wastewater treatment facilities. These include both the costs of construction and non-construction costs (e.g. engineering, legal, and administrative costs). These costs are eligible for Federal funding under the Construction Grants Program.

Operation and Maintenance: (frequently referred to as O&M) The costs of normal operation and maintenance of facilities, including electricity, chemicals, labor and other consumable items. These annual costs are not eligible for federal funding and must be borne by the users of the system.

Salvage Value: The mandated planning period for wastewater facilities is 20 years. At the end of the planning period, most components are still useful. The salvage value is used to represent the dollar value of still useful components at the end of twenty years.

Alternative 1, the maintenance of treatment at each of the three existing plants, is the most cost-effective with a total present worth cost of $17.16 million. Alternative 6, maintenance of treatment at Green Street, but combining Harvey Avenue and Chalfont flows for treatment at Chalfont, is close in cost to Alternative 1 with a present worth cost of $17.51 million. Alternatives 4 and 5 which propose completely new regional facilities are significantly more expensive. The ranking of alternatives from least to greatest cost is as follows:

	Present Worth Ranking	Alternative
least costly	1	1
	2	6
	3	2
	4	3A
	5	3B
	6	4B
	7	4A
	8	5B
most costly	9	5A

IMPLEMENTATION CAPABILITY AND COMPATIBILITY

A combined ranking of the alternatives according to cost-effectiveness, implementation requirements and compatibility with the Bucks County Master Sewer Plan and the 208 Water Quality Management Plan was developed as part of the Facilities Planning process. Components which were factored into implementation capability included system legality, level of administrative effort, jurisdictional problems, and the adequacy of existing institutional arrangements. Alternative 1 achieved the highest score, followed by Alternatives 2, 6, 3A, 3B, 4B, 4A, 5B, and 5A.

Alternatives 1 and 2 were judged almost equal with respect to implementation capability and compatibility. The ranking of alternatives from most "implementable" to least implementable is as follows:

	Implementability Ranking	Alternative
most implementable	1	2
	2	1
	3	3A/3B
	4	
	5	6
	6	4A
	7	5A
	8	4B
least implementable	9	5B

ON-SITE WASTEWATER MANAGEMENT

The EPIC aerial infrared survey in 1980 identified approximately 900 on-lot sewage disposal system failures throughout the planning area. Of these only about 65 are located within the proposed sewer service area and could be resolved by connection to the regional sewerage system. Of the remainder, many are clustered in six specific locations. In a manner similar to that used for the treatment plant alternatives, the Facilities Plan rated the on-lot system alternatives according to cost-effectiveness, implementation requirements and reliability. The on-lot system management program received the highest scroe, followed by gravity sewers, cluster systems, pressure sewers, sand mounds, and vacuum sewers. The Chalfont-New Britain Facility Plan recommends as the most cost-effective solution that the clustered as well as scattered homes with on-lot problems become customers in a management program (see Chapter VI for additional details).

Grant Eligibility

During the detailed design (Step 2) of a management program, a planning area-wide inspection of on-site systems will identify those systems which are malfunctioning. Without the management program, these systems would then need to be corrected with the property owner responsible for the costs. However, with the management program, 85% of the repair and/or rehabilitation costs will be eligible for funding by EPA Program Requirements Memorandum 79-8, Small Wastewater Systems.

It should be noted that one of the key eligibility criteria is that the principal residence or small commercial establishment must have been constructed before December 27, 1977. Thus, homes built after this date including new homes to be built during the planning period would not be eligible for 85% funding. In addition, Federal funding would be limited only to those homeowners whose systems were identified as failing during the 12-month Step II (design) phase of the project and as a result elected to join the management programs. The rationale is that EPA will help remedy existing problems, but will not spend water pollution control funds to solve future problems.

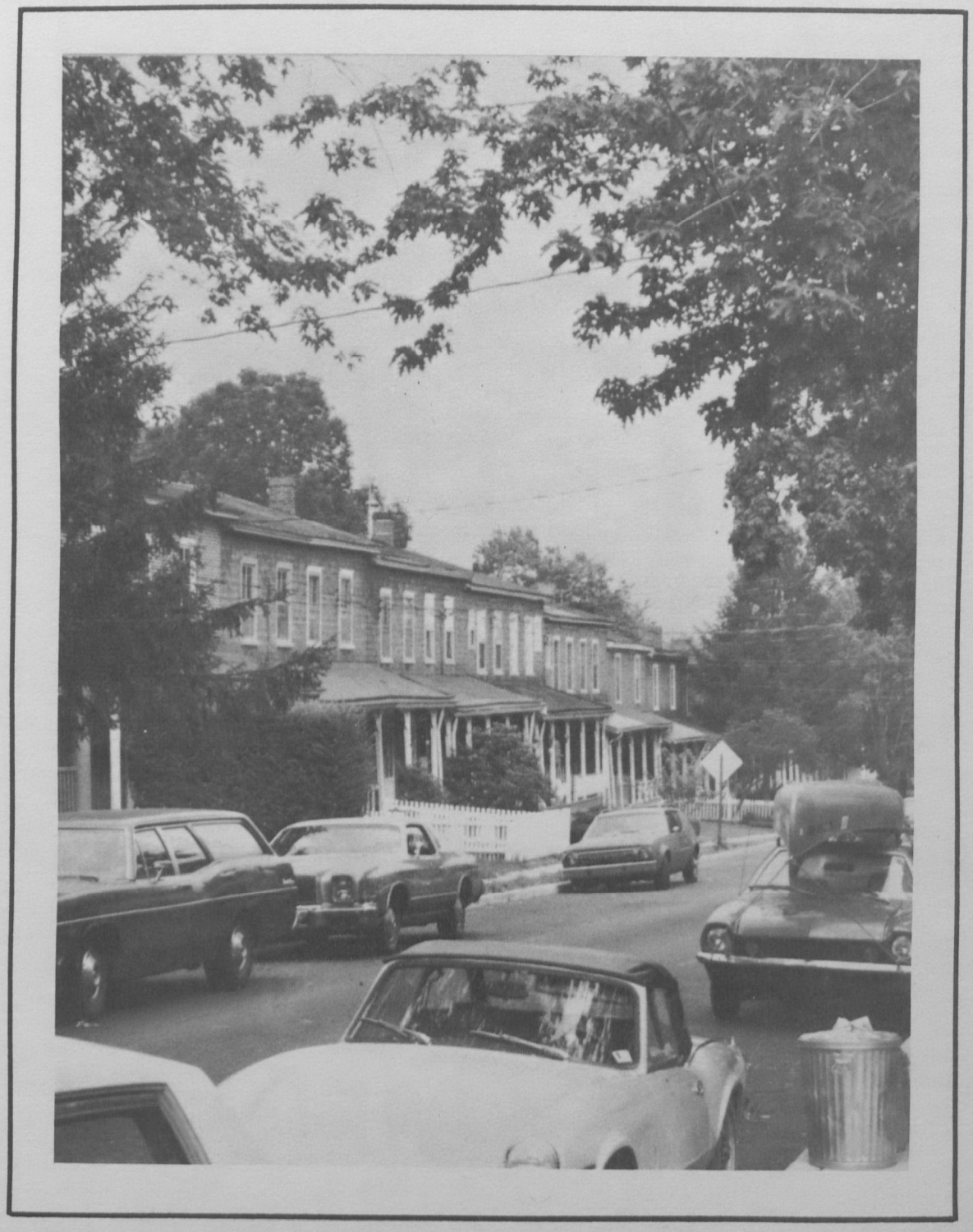
Environmental Impacts

The environmental effects of such a program are almost entirely beneficial. No development will be induced. Groundwater quality will be improved and recharged at the point of withdrawal. A limited amount of construction or rehabilitation would be required to upgrade or replace existing systems. This activity will result

in localized adverse air and noise effects. Those effects will be short-term and relatively insignificant. The construction also may have a short-term beneficial effect on local employment. No loss of forest or wildlife habitat are anticipated. Existing odor and health problems associated with some of the malfunctioning systems will be alleviated.

Chapter VI

Preliminary Recommendations



CHAPTER VI. PRELIMINARY RECOMMENDATIONS

The Recommended Plan

Following a detailed analysis of alternatives according to costs, engineering feasibility, and implementability, the Facilities Planners chose to recommend a wastewater management plan that is the most cost-effective and implementable. The selected plan is comprehensive, as it provides solutions through Alternative 1 for the advanced treatment required for areas served by public sewerage, as well as for the rest of the planning area which relies on on-site wastewater disposal methods. Alternative 1 recommends upgrading the three existing municipal wastewater treatment facilities and expanding the Chalfont-New Britain plant. EPA's screening and evaluation process (Chapter V) has concluded that Alternative 1 is also the most environmentally sound of the nine alternatives proposed in the Facilities Plan. Alternative 1 is endorsed by EPA as the most cost-effective, environmentally sound and implementable means of meeting the 20-year needs of the planning area. Under Alternative 2, tertiary treatment for the Borough of Doylestown would be provided by a regional facility at the Harvey Avenue plant. The total present worth cost of Alternative 2 would be $930,000 greater or only 5.4% more than Alternative 1. The environmental impacts of Alternative 2 would be short-term and principally related to sewer construction through Borough streets. Because of the minimal differences in cost and impacts, EPA may also consider Alternative 2 as eligible for Federal funding, although Alternative 1 is EPA's preferred alternative.

The Facilities Plan also recommends establishment of an on-site wastewater management program to address the problem of malfunctioning septic systems in areas which will not be served by sewers. The Chalfont-New Britain Township Joint Sewage Authority, the Bucks County Water and Sewer Authority, and the Doylestown Township Municipal Authority are jurisdictional agencies. EPA endorses and encourages the concept of on-lot wastewater system management by providing up to 85% Federal funding rather than the maximum of 75% funding allowed for conventional treatment plants. The success of such a management program, however, is based upon the committments by the jurisdictional agencies to operate the program and the local residents to participate. In such a situation, EPA will recommend its preferred alternative in the Final EIS after having reveiwed and evaluated comments from those who would participate.

Chalfont-New Britain Treatment Plant

This facility is recommended to expand its design capacity to 3.8 mgd from the existing capacity of 2.0 mgd. The rotating biological disc process, RBC, was chosen to accomplish both nitrification and denitrification at the Chalfont plant. Filtration was selected to accomplish residual BOD/SS removals. The sludge treatment train is recommended to be comprised of gravity thickening, anaerobic digestion, belt filter press and application to the land. In the case of each unit process for the Chalfont plant, the process selected also had the least present worth cost.

Green Street Treatment Plant

No change in the existing design capacity of 0.7 mgd is recommended for this facility. The parallel operation of the existing trickling filter plant and the activated sludge plant can be converted to a series operation to obtain nitrification. Therefore, no new units will be needed at Green Street to accomplish nitrification. RBC's were selected to accomplish denitrification along with filtration to obtain residual BOD/SS removal. Despite a higher present worth cost, filtration was selected over microscreening due to the very low BOD and total nitrogen effluent requirements. It was felt that microscreening would not reliably

meet the new effluent standards. Furthermore, filtration has a significantly lower energy requirement than microscreening. Sludge generated at Green Street will be treated as presently by: anaerobic and aerobic digestion with liquid sludge hauling. Gravity thickening of sludge will be added prior to digestion.

Harvey Avenue Treatment Plant

Projected wastewater flows to this facility are expected to exceed slightly the present 0.6 mgd capacity. However, no additional capacity is recommended. Instead, it was recommended that the minor amount of additional flow be redirected to the Green Street plant where there is expected to be unused capacity. Activated sludge was recommended for nitrification over the RBC process even though RBC's exhibited a lower present worth cost. The Harvey Avenue waste strength is considerably stronger than either the Chalfont or Green Street waste. Therefore, it was decided that the added flexibility of the activated sludge process would be necessary to meet the effluent requirements. RBC's were selected for denitrification along with filtration to obtain residual BOD/SS removals. As was the case with Green Street, filtration was not the least cost alternative, but the effluent requirement necessitates filtration.

Sludge handling would be maintained as previously accomplished, by aerobic digestion and liquid sludge hauling to the land. A gravity thickener is required.

Phosphorus Removal

Phosphorus removal also will be required at each plant. Bench scale or pilot plant data will be needed to determine which coagulant will be used and where that coagulant will be added. That work will be accomplished during Step II (detailed design). It has been assumed that a separate coagulation/flocculation clarifier will be used to accomplish phosphorus removal. No expansions or relief sewers are envisioned for the Borough of Doylestown. It is possible that relief sewers may be required for portions of Cooks Run. Further analysis will be possible upon completion of the infiltration/inflow study during Step II.

User Charges for Public Sewerage

The calculation of costs associated with public sewerage of the selected plan is presented in Table 22. Construction and project costs, and average user charges are broken out according to sewer authority and also are presented as they would be both with and without a 75% EPA grant.

On-Site Wastewater Management Program

A program of on-lot system management is recommended in the Facility Plan as the most cost-effective and environmentally sound solution for those areas exhibiting a need and lacking centralized sewage service. A system of gravity sewers which ranked first in terms of long-term reliability, received an overall second place ranking largely due to high cost.

Federal Funding

EPA will provide up to 85% funding for rehabilitation or replacement of individual on-site systems if a management agency is established to insure that they are operated and maintained properly. Tasks which the management agency must accomplish include: planning; system design, evaluation, and inspection; supervision of construction; and operation nd maintenance. As with centralized wastewater treatment, the issues of legal and fiscal authority, agency administration, project financing, and user charges must all be resolved by the authority who controls the on-site management program.

At the present time, the Bucks County Health Department issues building permits, oversees construction and inspects completed

Table 22. User Costs for those with public sewerage (Gilbert Associates 1981).

ITEM	CHALFONT WWTP		BOROUGH OF DOYLESTOWN			
	75% Federal Grant	No Federal Grant	Green St. (75% Federal Grant)	Harvey Ave. (75% Federal Grant)	Green St. (No Federal Grant)	Harvey Ave. (No Federal Grant)
Construction Cost	$6.03 x 10^6	$6.03 x 10^6	$0.79 x 10^6	$0.66 x 10^6	$0.79 x 10^6	$0.66 x 10^6
15% Contingency	0.90 x 10^6	0.90 x 10^6	0.12 x 10^6	0.10 x 10^6	0.12 x 10^6	0.10 x 10^6
Total	$6.93 x 10^6	$6.93 x 10^6	$0.91 x 10^6	$0.76 x 10^6	$0.91 x 10^6	$0.76 x 10^6
Project Cost	$9.35 x 10^6	$9.35 x 10^6	$1.23 x 10^6	$1.03 x 10^6	$1.23 x 10^6	$1.03 x 10^6
Grant Eligible Cost (90%)	$8.41 x 10^6	0	$1.11 x 10^6	$0.93 x 10^6	0	0
75% Federal Grant	$6.31 x 10^6	0	$0.83 x 10^6	$0.70 x 10^6	0	0
Bond Issue[A]	$3.04 x 10^6	$9.35 x 10^6	$0.40 x 10^6	$0.33 x 10^6	$1.23 x 10^6	$1.03 x 10^6
Annual Bond Payment - 8% @ 40 yrs ($/yr)	$255,000	$784,000	$ 34,000	$ 28,000	$103,000	$ 91,000
Annual WWTP O&M Cost ($/yr)	$435,000 (2.0 mgd)	$435,000 (2.0 mgd)	$225,000 (0.7 mgd)	$203,000 (0.6 mgd)	$225,000 (0.7 mgd)	$203,000 (0.6 mgd)
Total Annual Cost for Expansion and/or Upgrading	$690,000	$1,219,000	$259,000	$231,000	$328,000	$294,000
Number of Equivalent Dwelling Units - 1981 (BCWSA & CNBTJSA)	5,578	5,578	3,750		3,750	
Cost per EDU for Upgrading and Expansion	$ 123	$ 218	$ 131		$ 166	

Authority	CNBTJSA	BCWSA	CNBTJSA	BCWSA		
Existing Sewer O&M, Administration & Bond Payment Cost per EDU	$ 68	$190	$ 68	$190	$ 54	$ 54
Total Future Projected User Cost	$191	$313	$286	$408	$ 185	$ 220
Present User Cost	$105	$220	$105	$220	$ 100	$ 100

A - Bond Issue = Project Cost - Federal Cost
B - Total Annual Cost for Expansion and/or Upgrading = Annual Bond Payment + Annual O&M Cost

installation of on-site systems. They also respond to complaints and issue repair permits for failing systems. There is, however, no structure for regular inspection of each system in the planning area. Maintenance remains the responsibility of the homeowner who is often unfamiliar with the operation and upkeep of on-site systems. Rehabilitation and repair of on-site systems under this framework would not be eligible for Federal funding. The municipalities could elect to proceed with "business as usual" but totally at the expense of local government and residents.

Recommended Agencies

The Facility Plan recommends that the Chalfont-New Britain Township Joint Sewerage Authority, the Bucks County Water and Sewer Authority, and the Doylestown Township Municipal Sewerage Authority become the on-lot system wastewater management agencies for their respective jurisdictional areas. The functions to be performed by these agencies and the manner in which they are performed are a matter for each of the agencies to determine on their own.

Currently the Bucks County Health Department approves the design of new systems and repairs/alterations made to existing systems. Any jurisdictional agency should coordinate its on-lot management program with the Bucks County Health Department including septage management. In the development of an On-Lot System Wastewater Management Program each jurisdictional agency must establish procedures to ensure that:

- Any new on-lot system, system rehabilitation, or system modification is properly designed, constructed, operated, and maintained;
- Periodic maintenance checks and pump-outs are performed;
- Area wells are sampled periodically to detect any potential effects on groundwater (to be coordinated with PA-DER); and
- User fees are adequate to cover program administration as well as inspection, operation, maintenance, and disposal functions.

System Customers

The jurisdictional agencies must obtain the cooperation of the municipalities within this area to inspect and permit of operation on-lot systems within the municipality. Receiving such authority, the agency could then proceed to inspect all on-lot systems. At the time of initial inspection (at the outset of the program) the owners of those systems would have the option of becoming a customer of the agency, whether their system passed or failed the inspection. A non-customer of the program must allow and pay for an inspection of his on-lot system once every three years. The responsibility to correct any system malfunctions noted in the inspection is borne at full cost by each non-customer homeowner. A customer, on the other hand, would pay an annual user charge and allow unlimited access to his on-lot system at all reasonable times for such purposes as inspection, monitoring, rehabilitation, and maintenance. These services, and even replacement of the system, if necessary, would be provided to all customers at no additional charge beyond the annual user charge. The project and construction costs, as well as user charges, for the on-lot system management program are presented in Table 23. These costs are presented as they would be both with and without 85% funding by EPA.

EPA would participate in the funding of repairs to systems which are identified as having problems at the outset of the program only. Once the program is established, annual fees collected from customers must cover the operation and maintenance of the program,

Table 23. User charges for the on-lot system wastewater management program (Gilbert Associates 1981).

ITEM	85% Federal Grant	No Federal Grant
Construction and Rehabilitation Cost	$3.87 x 10^6	$3.87 x 10^6
15% Contingency	0.58 x 10^6	0.58 x 10^6
Total	$4.45 x 10^6	$4.45 x 10^6
Project Cost	$6.00 x 10^6	$6.00 x 10^6
85% Federal Grant	$5.10 x 10^6	0
Bond Issue[A]	$0.90 x 10^6	$6.00 x 10^6
Annual Bond Payment - 8% @ 40 years ($/yr)	$ 74,000	$503,000
Annual O&M ($/yr)	67,000	67,000
Total Annual Cost[B]	$141,000	$570,000
Number of Customers[C]	833	833
Projected User Cost	$ 169	$ 684

A Bond Issue = Project Cost - Federal Grant
B Total Annual Cost = Annual Bond Payment + Annual O&M Cost
C Includes all seasonal and surface malfunctions within the Study Area identified by EPIC (1980).

including repair or replacement of any new failures which are identified during regular inspections.

It should be noted that one of the key eligibility criteria is that the principal residence or small comercial establishment was constructed before December 27, 1977. Thus, homes built after this date including new homes to be built during the planning period would *not* be eligible for 85% funding -- the premise being that EPA will help remedy existing problems, but will not spend water pollution control funds to solve future problems.

Do We Want It?

It is up to the participating municipalities and designated jurisdictional to decide whether or not they wish to operate an on-site wastewater management program. Creating such a program would be analogous to adding a municipal service such as trash collection or road maintenance. The public health benefit and costs would be borne by the members of the program. The success of the program would be directly related to the degree of commitment by those who could participate. There are a number of questions which merit your consideration as you formulate opinions and comments:

- The decision that you make will be yours to live with for the next 20 years.
- A septic system management program will not allow homes to be built where septic tank permits have been denied in the past because of poor soils.
- The costs presented are based on the assumption that all homeowners with septic tank problems will join the program and will remain in the program for the 20 year planning period. What assurances will these have to be to prevent residents from joining in order to have expensive repairs done and then dropping out to leave the remaining customers with the bill?
- What actions will be necessary if a homeowner should refuse to make necessary repairs to his on-lot system?
- Should all homeowners with septic tanks be required to join the program as a form of "septic tank insurance"?

Yes, We Do

If the participating municipalities and designated jurisdictional agencies concur with the recommendations of the Facilities Plan/EIS that an on-site management system should be an integral part of the 20-year wastewater management plan, then EPA would consider a Step II (detailed design) application for Federal funding in the Construction Grants Program. During Step II, each septic system in the area would be inspected to determine: whether or not a failure exists; the cause of the failure (i.e., broken lateral, clogged drainfield, etc.); and whether the system should be repaired or replaced. Also during Step II, the actual details of the management agency(s), the required ordinances and agreements, and more accurate costs than those prsented in Table 23 would have to be developed.

No Thanks

If the participating municipalities and designated jurisdictions do not agree to adopt a septic system management program, then no further design work would be done. A Federal grant would not be issued for the detailed design (Step II) of a program if no grant application(s) were received.

Chapter VII

Adverse Impacts and Mitigating Measures

CHAPTER VII. ADVERSE ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES OF THE RECOMMENDED PLAN

No significant adverse environmental impact is anticipated as a result of the implementation of the recommended plan. The increased quality of effluent discharges would have a beneficial impact on the water quality and aquatic biota of Neshaminy Creek. The adverse impacts associated with the upgrading/expansion of the three existing treatment plants, as well as the institution of an on-lot system management program, are identified below. Appropriate measures to minimize adverse effects also are listed.

Air Quality

IMPACTS:

- Minor, short-term air quality deterioration in the vicinity of the three treatment plants during construction activities for upgrading and expansion of treatment facilities. These include generation of fugitive dust and engine emissions from construction vehicles. Similar, but less significant, localized effects will be associated with activities involving the repair or replacement of malfunctioning on-lot systems throughout the planning area during the course of the planning period.

- Potential increased odors from the expanded Chalfont treatment plant. This effect is primary in nature, resulting from the operation of sewage treatment processes. Although potentially long term, the effect is expected to be minimal.

- Odors resulting from future on-lot system malfunctions due to non-membership in the on-lot management program. Such malfunctions could persist for up to three years until the periodic inspection identifies and corrects them.

MITIGATIONS:

- Spraying water on soils exposed during construction activities to reduce dust;

- Using properly maintained construction vehicles equipped with effective emission control devices;

- Proper operation and maintenance of unit treatment processes to control, or contain on-site, any odors produced;

- Careful inspection of on-lot systems, with reinspection after any required rehabilitation, to minimize malfunctions between inspections.

Noise

IMPACTS:

- Localized, short-term increases in noise levels in the vicinity of each of the three treatment plants due to construction activities for upgrading and/or expansion. Similar, but less significant, noise increases at each lot which requires correction or replacement of a malfunctioning septic system.

- Long-term noise impacts of treatment plant operations at each of the three sites. Additional unit processes at the two Doylestown plants for tertiary levels of treatment, and the expanded and upgraded Chalfont plant operations, will not significantly increase ambient noise levels, however.

MITIGATIONS:

- Proper operation and maintenance using best available technology (and buffers, if necessary) will reduce construction equipment and operational noise.
- Enforcement of local noise control ordinances also will minimize noise effects.

Surface Water Quality

IMPACTS:

- Increased erosion and sedimentation. Each of the three treatment plants is located adjacent to the stream to which it discharges. Construction activity associated with upgrading or expansion will result in short-term adverse effects to these streams, although to a minimal degree.

MITIGATIONS:

- Temporary siltation basins should be constructed and maintained until a cover is re-established fully on the area disturbed during construction.

Groundwater Recharge

IMPACT:

- Future development which connects to the expanded Chalfont facility rather than utilizing on-site treatment will reduce groundwater recharge correspondingly. This situation represents a long-term secondary impact as it relates to the availability of public sewage services.

MITIGATIONS:

- The amount of groundwater recharge lost by eliminating on-site wastewater disposal systems may be reduced by use of water conserving devices in homes.

Energy

IMPACTS:

- Construction and operation of expanded and/or upgraded facilities at each of the treatment plants will result in a long-term irretrievable commitment of energy resources. The additional energy requirements associated with the operation of new unit processes at the three treatment plants were calculated to be 1,076 kilowatt-hours (KWH) per year. The energy requirements associated with the construction of the new treatment facilities was not estimated.
- Implementation and operation of the On-Lot System Management Program also is associated with an irretrievable commitment of energy resources. The relative amount was not calculated.

MITIGATIONS:

- The selected plan for centralized wastewater treatment involves the least amount of new construction of all of the alternatives considered. Therefore, although the energy associated with new construction activities was not calculated, it is reasonable to expect that the energy needs are less than the other alternatives.
- The operation-related energy commitment of 1,076 KWH per year is unavoidable since each of the treatment plants must upgrade their facilities to meet PA-DER effluent criteria. The

treatment processes selected represent the most energy-efficient means of accomplishing the required level of treatment given other constraints such as cost-effectiveness and reliability.

Land Commitment

IMPACT:

- New facilities constructed at each of the three treatment plant sites for the purpose of upgrading and/or expansion will irreversibly preclude alternative uses of that land during the life of the system. Vegetation and other visual amenities currently at the site will be destroyed.

MITIGATION:

- The area of disturbance should be minimized. Any vegetation on the area to be excavated should be removed in sods, balls, or blocks of soil and stockpiled for replanting. Stockpiled vegetation should be replanted, or revegetation should be accomplished, as soon as possible.

User Costs

IMPACT:

- Implementation of the selected plan for wastewater services will result in an increase in the annual user charge for customers. Currently, Doylestown Borough residents pay approximately $100 per household for sewerage service. With Federal funding this cost will rise to $185; without to $220. Sewered residents in Chalfont Borough and New Britain Township now pay $105 per household which would increase to either $191 or $286 depending upon Federal funding. Sewered residents in New Britain Borough, Doylestown Township, and Plumstead Township now pay $220 per household. This cost would rise to either $313 or $408 depending on Federal funding. Non-sewered residents of the planning area currently pay no annual charge. Implementation of the On-Lot Management Program would result in an annual cost of either $169 or $684, depending on funding, to customers of the agency. Non-customers would be required to pay a fee for a periodic inspection.

MITIGATION:

- **The selected plan represents the least costly alternative for managing wastewater needs in the planning area. Each of the other alternatives considered would necessitate larger increases in the annual user cost for sewerage services. Therefore, during the process of screening and selecting an alternative, this impact has been mitigated. Furthermore, funding of between 75% and 85% for the eligible project costs will significantly reduce the annual user charges.**

Chapter VIII

Option Areas

CHAPTER VIII. OPTION AREAS

There are two proposed wastewater treatment facilities (King's Plaza and Interim Treatment Plant) which have been proposed by private interests. The construction of these facilities is not eligible for any federal funding from EPA's Construction Grants Program for publicly-owned treatment works. Therefore, these facilities are beyond the specific scope of the 201 wastewater facility planning study conducted for the Chalfont-New Britain area. These two facilities are portrayed in this special section in order to provide a comprehensive view. In addition, potential development actions in Buckingham Township (curative amendments) were considered. One way of treating the wastewater to be generated from these potential developments is to make use of wastewater treatment facilities in the Chalfont-New Britain planning area.

King's Plaza STP

During the summer of 1980 the Doylestown Township Board of Supervisors approved a revision to the township sewage facility plan to allow construciton of a privately-built sewage treatment plant (STP) near the King's Plaza shoppping center. The agreement with the developer (the Barnes Organization) culminated five years of negotiations over the size of the site and capacity required. The proposed STP will be constructed on 1.8 acres of land on the north side of Almshouse Road near Route 611. The plant, designed to handle at least 325,000 gallons per day (gpd), is proposed to serve the King's Plaza Shopping Center, a proposed 385-unit Summit Ridge development at the Warrington Country Club, the Barn Cinema, Grandaddy's Restaurant, and Holbert's Volkswagen. The facility will replace a temporary holding tank which presently handles sewage from the shopping center. The new STP will be privately built by the developer at a cost of $0.65 to $1.0 million and then will be turned over to the township and will be operated by the Doylestown Township Municipal Authority. Bucks County government has an option to utilize 80,000 gpd of capacity from the plant or to request an expansion of the plant's capacity to 425,000 gpd in order to serve the Neshaminy Manor Complex on the northwest side of Route 611.

Interim Treatment Plant

During June of 1979 the PA-DER issued a ban on the issuance of building permits for construction that proposed to connect to the public sewerage system of the Chalfont-New Britain treatment plant. The ban was issued because PA-DER had determined that the Chalfont-New Britain STP was polluting the Neshaminy Creek with overflows of sewage. As a result of the ban, several private developers formed an organization called Interim Treatment Plant (ITP), Inc. which proposed to expand the capacity of the overloaded plant at no cost to the sewage authority. The proposed temporary expansion would allow the developers to continue or complete the construction of developments previously approved by the municipalities, but forestalled by the DER ban. All or parts of at least nine proposed residential developments in the municipalities of the 201/EIS planning area have been suggested for connection to the ITP. These nine developments together account for almost 2,000 dwelling units, some of which already are connected to the Chalfont-New Britain STP.

ITP, Inc. has estimated that the sewer plant expansion would cost about $1.0 million and would be financed entirely by the developers. Upon completion of construction, the plant would be turned over to the Chalfont-New Britain authority, who would then operate it as an interim facility until the 201/EIS study was completed.

Buckingham Township

Buckingham Township is adjacent to the Chalfont-New Britain planning area. Buckingham is preparing its own wastewater facility plan which considers meeting its existing and future needs. Buckingham gave special consideration to the "curative amendments".

Background of the Curative Amendments

In 1974, development interests filed amendments to the Buckingham Township zoning ordinance. The landowners challenged the zoning ordinance (enacted 1951) because it restricted new residential development to single-family units with minimum lot sizes of 10,000 square feet. In 1975 after adoption of a new zoning ordinance, the Township rejected the amendments on the grounds that the new zoning ordinance essentially "cured" the problems cited by the landowners' curative amendments.

The courts have supported the zoning appeals of the seven landowners, but the Township may be allowed to impose reasonable restrictions on the implementation of the proposed developments. The court decision stated that the zoning ordinance prevented the construction of apartments, townhouses, and a mobile home park.

The current status of the curative amendments still is uncertain. In 1980, the Commonwealth of Pennsylvania passed Act 249 which requires that a developer must sign a statement that he was unaware of a pending ordinance when the curative amendment was filed. The effect that this Act, passed after the curative amendments were submitted, has on the amendments has not been resolved. Furthermore, the "reasonable restrictions" have not been established, but they may affect the total number of units proposed.

Location and Size of Projects

The seven curative amendment sites are presented in Table 24. At 3.2 persons per dwelling unit, this represents a population increase of 25,904. The 1970 population was 5,150 and in 1975 it was 6,956. Preliminary reports from the US Census indicate that the 1980 population was 8,817. During the past 20 years the population of Buckingham Township approximately doubled. These seven proposed developments alone would triple the population during the next 20 years. This level of growth far exceeds populations projections for the Township prepared by the Bucks County Planning Commission and the Delaware Valley Regional Planning Commission.

ɔssible Wastewater Management Alternatives

The Buckingham Township Draft Facility Plan (Tatman and Lee Associates, Inc. 1981) examined both on and off-site wastewater treatment options for the curative amendments. On site treatment and disposal alternatives were not considered applicable largely due to the proposed development densities which leave insufficient area for wastewater facilities. Viable alternatives considered consist of spray irrigation and stream discharge and were divided into those applicable for the Northern sites and for the Southern sites, as follows:

Table 24. Summary description of the seven curative amendments in Buckingham Township, PA (Tatman and Lee Associates, Inc. 1980).

SITES	ACREAGE	DWELLING UNITS	PROJECTED WASTEWATER FLOWS (gpd)*
Northern Sites			
1 Enders	58.12	612	137,000
2 Yaroshuk	92.10	893	200,000
3 Barness	346.66	3,023	677,000
4 Schlanger	53.85	524	118,000
5 Enders/Sheddon	85.31	840	188,000
Sub-Total, Northern Sites	636.04	5,892	1,320,000
Southern Sites			
6 Fairway-Smith	158.00	1,001	224,000
7 Ciccone	120.23	1,202	269,000
Sub-Total, Southern Sites	278.23	2,203	493,000
TOTAL, ALL SITES	914.27	8,095	1,813,000

*Based on 3.2 persons per dwelling unit and residential wastewater flow of 70 gpcd.

NORTHERN SITES	SOUTHERN SITES
• stream discharge at one central point for all five curative sites.	• stream discharge at one central point (Mill Creek) for both curative sites.
• stream discharge by sewering to Chalfont-New Britain wastewater treatment plant.	• stream discharge at each curative site.
• land disposal (spray irrigation) on other parcels in area for all five curative sites.	• land disposal (spray irrigation) on other parcels in area for both curative sites.
• land disposal (spray irrigation) on curative sites.	• land disposal (spray irrigation) on curative sites.

One of the alternatives for handling the wastewater from the northern curative sites (5,892 dwelling units, 1.3 mgd wastewater flow) called for treatment at the Chalfont-New Britain plant. This was based on examination in the Chalfont-New Britain Facility Plan of the potential for wastewater treatment facilities in the Chalfont-New Britain planning area to accept the additional wastewater flows. However, the acceptance of wastewater flows at the Chalfont-New Britain facility would be dependent on several factors including:

- the necessary improvements (expansion and upgrading) at Chalfont-New Britain facility need to have been made -- currently it is estimated that the Chalfont project is at least 46 months away from being operational without any contributions from the curative amendments,
- approval by the US-EPA Regional Administrator to approve the additional needed capacity in the Chalfont-New Britain facility, and
- agreements among representatives of the curative amendments and the Chalfont-New Britain and Bucks County Sewer and Water Authorities.

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PREPARERS

This Environmental Impact Statement was prepared by the US Environmental Protection Agency - Region III, Philadelphia, Pennsylvania with assistance from WAPORA, Inc.

Key personnel from EPA included:

Evelyn Schulz	Project Monitor
Richard V. Pepino	Assistant Project Monitor
Rosemarie Baldino	Production Advisor

Key personnel from WAPORA, Inc. included:

David J. Lechel	Project Administrator
Valdis Jurka	Project Manager
Stephen P. Kunz	Planner
John Munro	Terrestrial Biologist
Elizabeth Righter	Archaeologist
Joseph Andrea	Aquatic Biologist
Jerome Gold	Graphics Manager
Elizabeth Kolb	Graphics Specialist
Susan Beal	Production Assistant