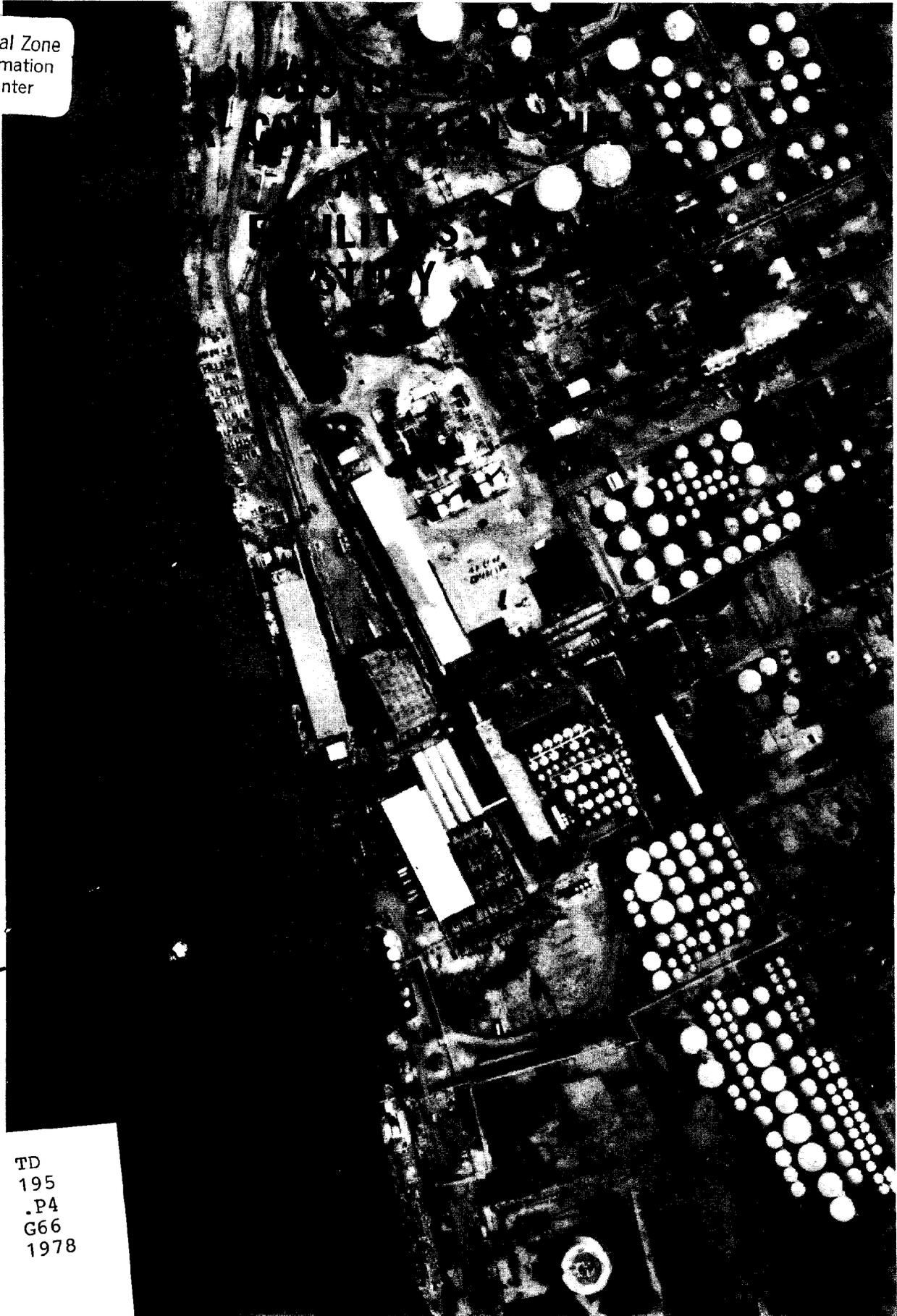


Coastal Zone
Information
Center

New Jersey Dept. of Environmental Protection

TD
195
.P4
G66
1978



THE COVER is an aerial photograph of a portion of Mobil's Paulsboro Refinery along the Delaware Riverfront. The photograph depicts distillation units, packaging and storage facilities, offices and docking facilities. An oil tanker, which supplies imported crude oil to the refinery, can be seen at dockside in the lower portion of the photograph.

12182

JUN 9 1978

GLOUCESTER COUNTY OUTER CONTINENTAL
SHELF AND ENERGY FACILITIES PLANNING STUDY

**COASTAL ZONE
INFORMATION CENTER**

Prepared by:

Gloucester County Planning Department

January, 1978

U. S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Property of CSC Library

This report was prepared under terms to the New Jersey Department of Environmental Protection, Office of Coastal Zone Management, with financial assistance under the provisions of Section 305 of P.L. 92-583 Coastal Zone Management Act of 1972.

New Jersey Dept. of Environmental Protection

TD 195.74 G66 1978

OCT 15 1987

W.P.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
I. Introduction	1
II. Objectives and Assumptions of the County Outer Continental Shelf and Energy Facility Studies	5
III. Summary of Conclusions	13
IV. Inventory of Existing County Characteristics and Resources	15
A. Land Use Pattern	17
1. Delaware Riverfront Area	19
B. Industrial Zoning	22
C. Energy Facilities	27
1. Oil Refineries	27
2. Pipe Lines	27
3. Electric Transmission Lines	30
D. Transportation	30
1. Highways	30
2. Railroads	33
3. Marine Facilities	33
4. Airports	33
E. Environmentally Sensitive Areas	34
F. Socio-Economic Characteristics	43
V. Potential Outer Continental Shelf and Energy Related Facilities	47
VI. Opportunity Areas for Coastal Energy Facility Siting	59
A. Energy Facilities Siting Criteria	61
B. Suitable Areas for Energy Facility Siting	63
VII. Prospects and Siting Recommendations for OCS and Energy Related Facilities	71
VIII. County Role in Coastal Energy Facility Siting	81
IX. County View of State and National Interests in Coastal Energy Siting	85
X. County View of State and Federal Assistance in Coastal Energy Siting	87

LIST OF CHARTS

<u>No.</u>		<u>Page</u>
1.	Gloucester County Land Use Acreage by Municipality	18
2.	Industrial Land Use	19
3.	Industrially Owned Acreage	23-24
4.	Existing Pier Facilities	34
5.	Airports in County	34
6.	Population Change	44
7.	Facility Rankings	79

**COASTAL ZONE
INFORMATION CENTER**

LIST OF MAPS

<u>No.</u>		<u>Page</u>
1.	Proximity to Offshore Oil	12
2.	Industrially Owned Land	20
3.	Major Petro-Chemical Industries	21
4.	Major Vacant Industrial Tracts	25
5.	Heavy Industrial Zones	26
6.	Major Oil Product Pipelines	28
7.	Major Gas Transmission Lines	29
8.	Major Electrical Transmission Lines	31
9.	Major Transportation Corridors	32
10.	Flood Prone Areas	36
11.	State Designated Coastal Wetlands	37
12.	Surface Water Features and Watersheds	38
13.	Steep Slopes	40
14.	Wooded Areas	41
15.	Prime Aquifers	42
16.	Opportunity Areas for Coastal Energy Facility Siting	64
17.	Proposed Pipeline Corridors	69
18.	Location of Offshore Oil to Area Refineries	70

CHAPTER I

INTRODUCTION

This chapter provides a background and planning methodology of Gloucester County's "Outer Continental Shelf and Energy Facility Planning Study."

In January of 1977, Gloucester County became one of twelve New Jersey counties to participate in a program funded by the federal National Oceanic and Atmospheric Administration (NOAA) and contracted through the New Jersey Department of Environmental Protection, Office of Coastal Zone Management, (NJDEP, OCZM) to evaluate the potential effects of Outer Continental Shelf (OCS) and energy facilities development. It was the purpose of OCZM in contracting with the counties that local capabilities in dealing with the issue of energy facility siting would be improved while, at the same time, OCZM would be provided with invaluable local input into the development of a State Coastal Zone Management Plan.

The County's early activities in this program involved a great deal of research and review of various OCS relevant studies, energy studies, and state and federal policies and actions. This research was supplemented with several meetings at the OCZM offices in Trenton with oil industry representatives to gain a better understanding of industry needs and operations in developing outer continental shelf (OCS) resources. This research was further supplemented with a meeting at the American Petroleum Institute (API) in Washington, D.C. and an "Onshore Impacts of Outer Continental Shelf Oil and Gas Development" workshop sponsored by the American Society of Planning Officials (ASPO).

An inventory was subsequently prepared of relevant facilities, resources and characteristics of Gloucester County to serve as a basis for evaluating the feasibility of the County in accommodating OCS related facilities. The inventory included information collected on existing land use, industrial facilities, industrially owned land, existing major pipelines, environmentally sensitive areas, transportation facilities, and zoning. Much of this information was also mapped.

Analysis of this information was performed in order to identify the feasibility of areas within the County to support various OCS and energy related activities. Accordingly, siting criteria were established. Areas suitable for OCS and energy related development sites were then recommended, along with the prospects that can be expected for each facility type. The

findings and recommendations of the County's study are to be evaluated by the State as input into an overall State plan and policy.

Throughout this study, regular monthly meetings were held with representatives from the Office of Coastal Zone Management and other participating counties to exchange information and coordinate study efforts. An additional meeting was held with representatives from Ocean, Atlantic, Burlington, and Camden Counties to discuss potential pipe line routes of mutual concern.

An important activity during the project was providing OCS related information at the local level and requesting local input. Informational letters were distributed to municipal officials and input was requested during the preparation of the study. In addition, final drafts of the study were distributed to local officials for their comments prior to its completion. An informational regional public meeting was also held at Gloucester County College that included the participation of representatives of Burlington, Camden, Salem, and Cumberland Counties as well as Gloucester County, in order to provide local officials and the public with a regional perspective of OCS related issues.

CHAPTER II

OBJECTIVES AND ASSUMPTIONS OF THE COUNTY OCS AND ENERGY FACILITY STUDIES

This chapter provides the objectives and assumptions of the County OCS and Energy Facility Studies that have been formulated by the New Jersey Department of Environmental Protection - Office of Coastal Zone Management (project contractor) with the cooperation of the participating counties.

Objectives and Assumptions of
County OCS and Energy Facility
Studies

In accordance with the national policy to accelerate the development of energy resources in frontier areas such as the Atlantic Ocean, the Department of the Interior and the oil and gas industry have identified potential areas for oil and gas development. To help states cope with the possible onshore effects of such potential development, the Federal Office of Coastal Zone Management within the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce made available in 1976 additional monies for states to plan for development of outer continental shelf (OCS) oil and gas. New Jersey is located adjacent to the Baltimore Canyon which extends from offshore Long Island to North Carolina and is believed to contain between 0.4 to 1.4 billion barrels of oil and 2.6 to 9.4 trillion cubic feet of gas. New Jersey received a grant of \$337,000 to plan for possible energy activities resulting from OCS development and allocated \$180,000 of these planning funds to the twelve counties believed most likely to be affected by outer continental shelf and other energy facility development.

The exploration of the OCS for energy represents a novel industrial enterprise for New Jersey and other Mid-Atlantic states and will involve them and the oil and gas industry, federal and local governments and the private sector in a new set of relationships. The purpose of this study was to provide counties with an opportunity to evaluate land uses as they might or might not be suitable for OCS and other energy related facilities; to assist the state in developing guidelines for the management of siting of such facilities and also to aid it in developing the energy element as mandated by the New Jersey Coastal Area Facility Review Act of 1973 and the federal Coastal Zone Management Act Amendments of 1976.

BACKGROUND

The U.S. Bureau of Land Management which has supervision over public

lands and resources within the Department of the Interior has scheduled two sales for the Mid-Atlantic states. Lease Sale No. 40 took place in August 1976. Action on it had been held up pending litigation. A second sale, No. 49 is scheduled for 1978. Estimates of recoverable oil and gas from lease sale No. 40 range from 0.4 to 1.46 billion barrels of oil and from 2.6 to 9.4 trillion cubic feet of gas respectively. Recovery of this oil could take place between 20 to 25 years.

The litigation which had held up exploratory drilling had centered on the adequacy of the environmental impact statement prepared by the Department of the Interior and particularly on the adequacy of safeguards in the event of damage to the coastal environment which constitutes a recreational resource to millions of people in the affected region. There is little doubt that drilling in the Atlantic will take place in the not too distant future and that the litigation has served to delay rather than postpone operations.

Until exploration of the leased tracts actually takes place, no one will know for sure whether federal government and industry estimates of oil and gas are correct. Exploration for oil and gas off New Jersey's shore in the not too distant future, however, appears likely. New Jersey's response to this federal program was enunciated by the Governor in testimony before the Department of the Interior in 1976. He said that it is in New Jersey's interest to support such activity as long as it is carried out in an environmentally sound manner. The state has applied for federal planning monies to learn more about OCS related activity and ensure that facilities be sited in locations which will respect existing land uses and the environment.

Objectives

Below are listed a number of objectives which the study was to achieve:

1. To provide counties with the opportunity to analyze the capability of local government to cope with problems and respond to the opportunity that OCS and energy facility development could present.
2. To permit counties to identify geographic areas which might or might not be suitable for specific energy facilities from the local government's perspective.

3. To rank facilities in terms of their feasibility and compatibility with existing land uses.
4. Permit counties to establish or recommend a process to the state to facilitate decision-making respecting energy siting within the context of New Jersey's coastal zone management program and the ongoing CAFRA permit program and to recommend alternative strategies to the state concerning energy facility siting.
5. Permit counties to address the subject of energy production within the context of state and national interests and the extent to which energy facilities should or should not accommodate state, regional or national interests.

Assumptions

The following assumptions were made about the study:

1. Each of the counties would have to deal with some form of new or expanded energy facility within their jurisdiction within the next few years.
2. Some OCS activities such as exploration and development would take place within the next few years.
3. Such energy facilities would affect the various counties differently.
4. The counties were permitted to shape the state's basic scope of work to their individual specifications based on their geographic location, economy and life styles. If one county were to focus in depth on one aspect of energy facility siting such as LNG or pipelines, for example, it was free to do so. Each county was, however, to include in its report:
 - a. an inventory of existing facilities, land and water uses and coastal resources including zoning.
 - b. analysis of these facilities as they might affect future development.

- c. report how it had coordinated with local and state government in coming to conclusions concerning constraints and potential development.
 - d. recommendations to the state with respect to
 - (i) ranking facilities,
 - (ii) providing alternatives to proposed facilities where feasible,
 - (iii) political constraints, and
 - (iv) improved state-local coordination
5. The study was designed to be carried out by one person working full time for a period of one year.
 6. The state recognized that each county would be approaching OCS development and energy facility siting from a different level of concern and expertise.
 7. The study assumed coordination and interaction between participating counties.
 8. The final product would consist of twelve individual county recommendations based on findings which would be tied together by an "introduction" and "conclusion" prepared by the New Jersey Office of Coastal Zone Management, sponsor of the project.

Participants in the Study

As OCS activities may impact the coast, the New Jersey Office of Coastal Zone Management invited counties bordering on New York-New Jersey Harbor, the Atlantic Ocean and the Delaware River to participate in a study to evaluate the possible impacts of OCS activity on their counties. Twelve counties accepted the offer and received \$15,000 to carry it out. They are Hudson, Union, the CAFRA counties - Middlesex, Monmouth, Ocean, Burlington, Atlantic Cape May, Cumberland, Salem - and Gloucester and Camden. Because of administrative problems, Hudson County only worked on this project for four months.

Interaction between States and Counties

To provide a mechanism for state and counties to meet and discuss common problems, meetings were scheduled in a different location each month. When sufficient interest was evinced in a particular subject representatives from other state and federal agencies or from outside industries were invited to attend meetings. In addition, counties filed monthly reports of their progress. Midway through the study, counties were also asked to file interim reports of progress to date or hand in a detailed chapter outline of their final product. During the last few months since the Department of Energy was established, a representative from that Department has attended the monthly meetings and been invited to attend any county OCS related gatherings.

CHAPTER III
SUMMARY OF FINDINGS

Oil refineries are the major type of energy facility that presently exists in the County, having two of the four refineries that are in operation in the State. Gas and oil product pipelines are another type of energy related facility that is prevalent in the County.

Petroleum and chemical production industries are an integral part of Gloucester County's economic base. These industries dominate the County's Delaware Riverfront area.

From most indications, local refineries would probably substitute offshore oil, if found suitable, for oil presently imported, rather than there be the construction of new refineries solely due to offshore oil.

A pipeline linking offshore oil to area refineries appears to be the most probable type of OCS related development that the County can expect, should large enough commercial quantities of suitable oil be found offshore.

Pipelines are the most environmentally "safe" means of transporting oil or gas.

Pipelines should be limited to one or two corridors and should parallel existing transportation corridors in order to mitigate impact to existing land use patterns and environmentally sensitive areas. Three suggested corridors have been designated; the Atlantic City Expressway, proposed Route 55, and an existing South Jersey Gas Company major transmission line.

Gloucester County is approximately 200 miles by water from offshore tracts leased for drilling. Primarily because of this distance, the likelihood for the siting of some types of OCS related development, such as service bases, is not considered great.

Coastal sites are preferred for a gas processing and treatment plant, but

land availability is the primary determinant. Should government action, such as the denial of necessary CAFRA permits, prevent the location of a gas processing and treatment plant in a coastal area, Gloucester County may be looked upon by industry as a viable alternative.

A gas processing and treatment plant can provide feedstock for petro-chemical industries, an integral part of Gloucester County's economic base. It should be pointed out, however, that a gas plant is not a big employer during operation and care must be taken to prevent environmental degradation.

Four sites have been designated as areas of opportunity for OCS and energy related development - the Tenneco Tract and Mid-Atlantic Industrial Park in West Deptford Township and Raccoon Island and Pureland Industrial Park in Logan Township.

Each site designated meets the County's siting criteria for energy related facilities reasonably well. Areas not meeting this siting criteria, at least reasonably well, should be considered constraint areas for energy siting.

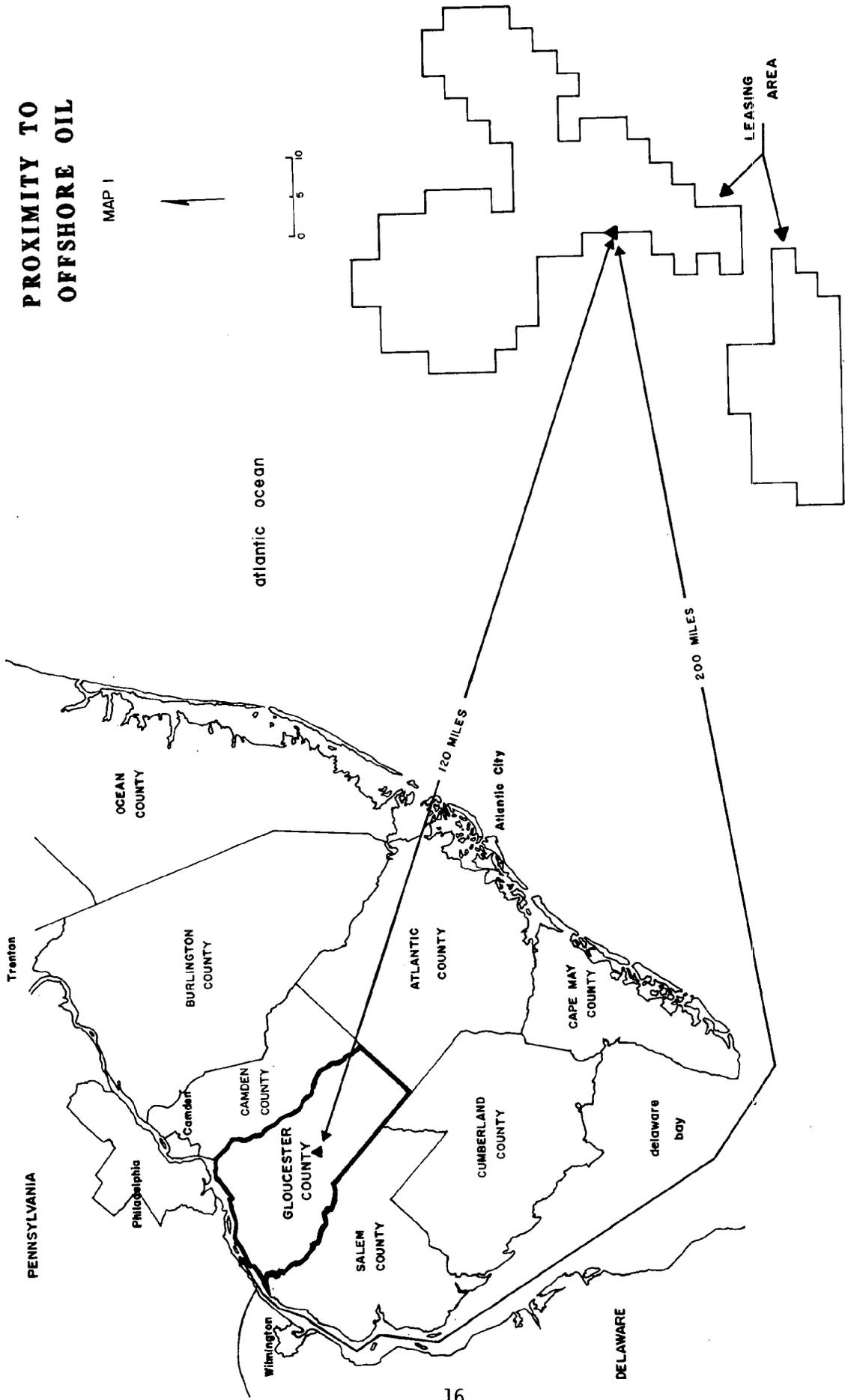
CHAPTER IV

INVENTORY OF EXISTING COUNTY CHARACTERISTICS AND RESOURCES

The following chapter provides an inventory of information gathered on pertinent facilities, resources, amenities, etc., which will help serve as a basis for evaluating the feasibility of accommodating Outer Continental Shelf (OCS) and energy related facilities in Gloucester County.

PROXIMITY TO OFFSHORE OIL

MAP 1



LOCATION

Gloucester County is located in the southwestern portion of New Jersey, sharing boundaries with Camden, Atlantic, Cumberland, and Salem Counties, as well as the Delaware River along its northwestern border. Situated in the Philadelphia Standard Metropolitan Statistical Area (SMSA), the County is within close proximity to the City of Philadelphia, which lies directly north on the opposite side of the Delaware River.

The County lies approximately 120 air miles from the area leased for offshore oil drilling under the U.S. Department of Interior's lease sale #40. However, in terms of distance by water, the County is located approximately 200 miles from offshore oil, including 90 miles up the Delaware from the Atlantic Ocean.

LAND USE PATTERN

Although located adjacent to the highly urbanized Philadelphia-Camden area, Gloucester County has remained primarily rural in character, with approximately 80% of the County's 329 square miles still undeveloped. Agriculture remains an integral part of the County's overall land use pattern.

In recent years, however, Gloucester County has been experiencing a fairly high growth rate, which has been changing the character of the County from rural to suburban. The suburbanization trend has been rapid in the eastern sections of the County, particularly in the Townships of Washington and Monroe, where growth patterns are typified by the prevalence of the development of low density single family detached residential major subdivisions. In addition, Logan Township, in the northwestern portion of the County has also been recently experiencing growth with the development of the initial stages of a new town proposal (Beckett) and a major industrial park (Pureland). Generally speaking, most development is in proximity to the Philadelphia-Camden urban area near major transportation corridors found in the northern and eastern portions of the County, while the southwest has remained basically rural. Table 1 shows the land use composition of each of the County's 24 municipalities.

ACREAGE BY MUNICIPALITY

GLOUCESTER COUNTY LAND USE

MUNICIPALITY	1975										1975					MUNICIPAL TOTAL
	DEVELOPED LAND USES										UNDEVELOPED LAND					
	SINGLE FAMILY RESIDENTIAL	MULTI FAMILY RESIDENTIAL	INDUS-TRIAL	COMMER-CIAL	PUBLIC/ QUASI-PUBLIC	RECRE-ATION	TRANS-PORTA-TION	TOTAL DEVELOPED	AGRICULTURE	VACANT	WOODED	WET	WATER	TOTAL UNDEVELOPED		
Clayton	634.4	36.7	48.4	77.4	87.7	79.2	131.0	1,114.8	1,332.0	288.6	1,831.2	123.6	14.2	3,589.6	4,704.4	
Deptford	2,082.6	117.4	318.2	397.6	285.5	181.6	715.6	4,098.5	1,668.1	2,051.0	2,947.5	333.7	256.1	7,256.4	11,354.9	
E. Greenwich	713.5	31.3	51.8	31.5	152.5	15.6	342.1	1,338.3	5,305.4	942.9	1,565.7	351.7	136.5	8,302.2	9,640.5	
Elk	1,016.3	11.0	44.9	62.5	42.8	139.6	187.8	1,508.9	6,186.5	378.9	3,606.6	711.6	297.3	11,180.9	12,685.8	
Franklin	2,183.8	20.1	220.9	209.3	86.1	199.3	605.8	3,525.3	10,221.7	1,961.2	19,543.9	767.5	357.5	32,851.8	36,377.1	
Glaesboro	882.9	146.2	194.5	147.9	189.2	100.6	348.2	2,009.5	1,257.4	808.2	1,771.1	188.7	40.1	4,071.5	6,081.0	
Greenwich	580.0	18.0	1,101.4	31.6	25.3	33.1	249.2	2,038.6	819.7	429.3	308.6	2,133.2	136.1	3,826.9	5,865.5	
Harrison	520.8	18.7	125.8	97.6	56.6	26.6	185.8	1,031.9	8,038.8	791.4	2,097.2	197.3	116.7	11,241.4	12,273.3	
Logan	302.8	12.1	355.0	65.8	79.2	2.2	681.5	1,298.6	5,696.8	585.4	789.2	5,929.2	603.9	13,604.5	14,903.1	
Mantua	1,368.1	10.6	241.8	125.5	95.6	425.5	344.1	2,611.2	3,334.8	1,384.3	2,694.4	113.2	135.6	7,662.3	10,273.5	
Monroe	2,425.6	54.9	282.6	223.5	244.1	107.7	635.2	3,973.6	5,584.2	2,182.0	17,726.5	328.9	365.1	26,186.7	30,160.3	
National Pk.	225.0	22.5	6.8	14.3	20.3	30.7	79.8	399.4	2.1	76.8	60.7	92.4	28.8	260.8	680.2	
Newfield	235.4	3.4	70.2	12.2	36.9	10.1	46.2	414.4	282.3	17.6	357.9	10.9	1.9	670.6	1,085.0	
Paulsboro	332.1	70.7	211.1	49.8	27.0	18.3	164.6	873.6	0.0	173.8	15.4	232.1	60.3	481.6	1,355.2	
Pitman	705.1	49.5	49.6	42.3	42.0	40.7	202.3	1,131.5	53.0	136.2	149.3	0.0	29.7	368.2	1,499.7	
S. Harrison	325.5	1.3	4.6	6.9	4.3	1.5	135.2	479.3	6,557.2	332.4	2,600.6	45.7	43.5	9,579.4	10,058.7	
Swedesboro	118.8	45.6	52.5	31.2	30.8	7.8	44.0	330.7	57.2	28.1	52.8	13.0	16.8	167.9	498.6	
Washington	2,522.6	149.1	290.6	370.4	179.8	288.2	568.9	4,319.6	4,446.2	2,087.6	2,910.4	3.3	183.2	9,650.7	13,970.3	
Henonah	305.5	7.4	0.0	6.6	9.2	22.9	82.8	438.4	6.2	49.4	110.0	19.5	19.6	204.7	639.1	
W. Deptford	1,637.0	178.3	1,289.6	241.1	189.3	202.5	708.3	4,466.1	1,404.2	1,556.8	1,315.4	285.3		6,115.5	10,581.6	
Westville	191.0	28.9	37.4	24.1	11.2	18.4	114.8	425.8	0.0	54.6	20.5	15.9	7.4	98.4	524.2	
Woodbury City	514.8	82.2	20.6	99.5	59.4	103.6	255.1	1,135.2	0.0	67.4	77.5	6.9	53.3	205.1	1,340.3	
Woodbury Hts.	308.9	3.8	21.3	31.8	16.9	37.6	157.0	577.3	6.6	66.7	138.1	5.2	4.2	220.8	798.1	
Woolwich	262.6	3.8	99.9	28.0	80.7	260.7	311.8	1,047.5	9,290.6	638.0	2,034.5	561.6	176.7	12,701.4	13,748.9	
TOTALS	20,415.1	1,123.5	4,939.5	2,378.4	2,052.4	2,354.0	7,317.1	40,580.0	71,551.0	17,088.6	64,989.4	13,500.5	3,360.8	170,490.3	211,070.3	

Source: Gloucester County Planning Department

Delaware Riverfront Area

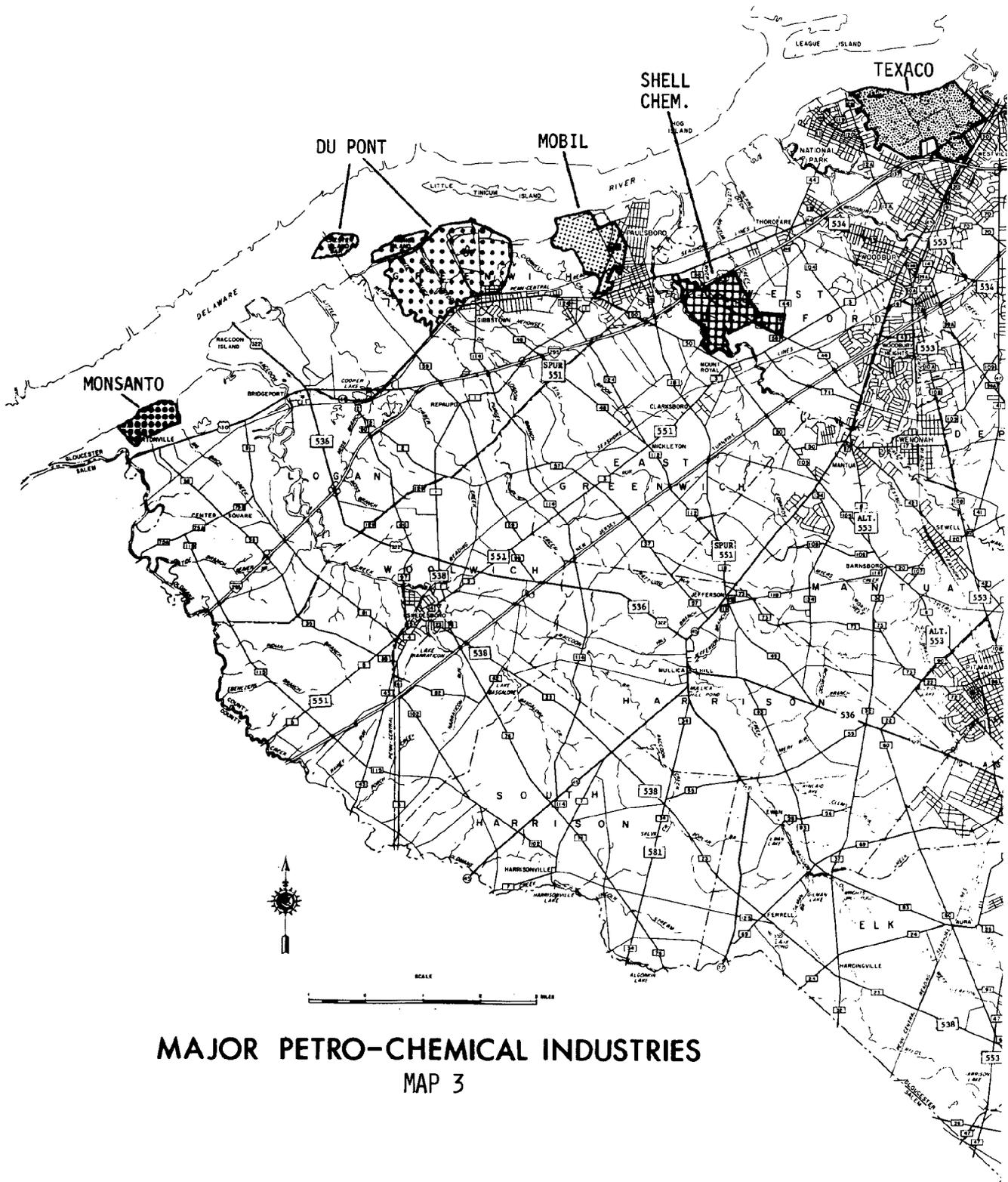
While much of Gloucester County can be characterized by its rural areas of highly productive farmland and its generally "bedroom" suburban areas for commuting workers, the riverfront area is highly contrasting with its predominance of heavy industry. The two riverfront municipalities of Greenwich and West Deptford Townships alone account for nearly one-half the total amount of land devoted to industrial uses that exist in the entire County.

The major types of industries that exist in this area are petroleum refining and petro-chemical production, which apparently have found this riverfront area particularly attractive with their characteristic need for a water and market oriented location. Accessibility to rail and highway facilities also add to the area's attractiveness to these industries.

In total, there are 903 acres of land in the County devoted directly to petroleum production and another 571 acres to chemical production, excluding storage tank farms not directly involved in production and buffer areas owned by industry. By comparison, a total of 869 acres in the County is directly involved in all other types of industrial production. Petroleum and chemical production are clearly the predominant industries in the County, as seen in the following table.

TABLE 2 - INDUSTRIAL LAND USE

<u>SIC NO</u>	<u>TYPE</u>	<u>ACRES</u>
2100	Food and Kindred Products	135
2200	Textile Mill Products	2
2300	Apparel Products	49
2400	Lumber and Wood Products	27
2500	Furniture and Fixtures	15
2600	Paper and Allied Products	1
2700	Printing, Publishing and Allied Industries	67
2800	Chemicals and Allied Products	571
2900	Petroleum Refining and Related Industries	903
3100	Rubber and Miscellaneous Plastic Products	39
3200	Stone, Clay, and Glass Products	52
3300	Primary Metal Industries	34
3400	Fabricated Metal Products	243
3500	Professional, Scientific, and Control Instruments	67
3900	Miscellaneous Manufacturing	139



MAJOR PETRO-CHEMICAL INDUSTRIES
MAP 3

The extent to which industry, and particularly petroleum related industry, dominates the Delaware Riverfront can be shown in an inventory of industrially owned land that was prepared for the County's municipalities bordering the Delaware River--Westville Borough, West Deptford Township, National Park Borough, Paulsboro Borough, Greenwich Township, and Logan Township. The inventory includes both land that is industrially developed and vacant land that is industrially owned. See Table 3.

Among the significant industrial facilities are the Texaco Refinery, Pennwalt, Shell Chemical, and Colonial Pipeline in West Deptford Township, the Mobil Refinery and Du Pont in Greenwich Township, and Monsanto in Logan Township. Significant large tracts of vacant land owned by industry include the 1100 acre Tenneco Tract in West Deptford Township that had been proposed for a Liquefied Natural Gas (LNG) terminal, the 1600 acre site in Logan Township that Shell Oil had proposed for an oil refinery, and the 2300 acres owned by American Dredge in Logan Township, part of which had been proposed by Transco for a liquefied natural gas (LNG) terminal. Map 2 illustrates the extent of both developed industrial facilities and vacant land owned by industry along the Delaware River.

INDUSTRIAL ZONING

An inventory was prepared of heavy industrial zoning districts in Gloucester County that could probably accommodate most OCS related facilities. Heavy industrial zones were defined as those zones in local ordinances that permitted the production and processing of heavy machinery and chemicals and other similar activities - allowing "any legal use" subject to certain exceptions and control criteria.

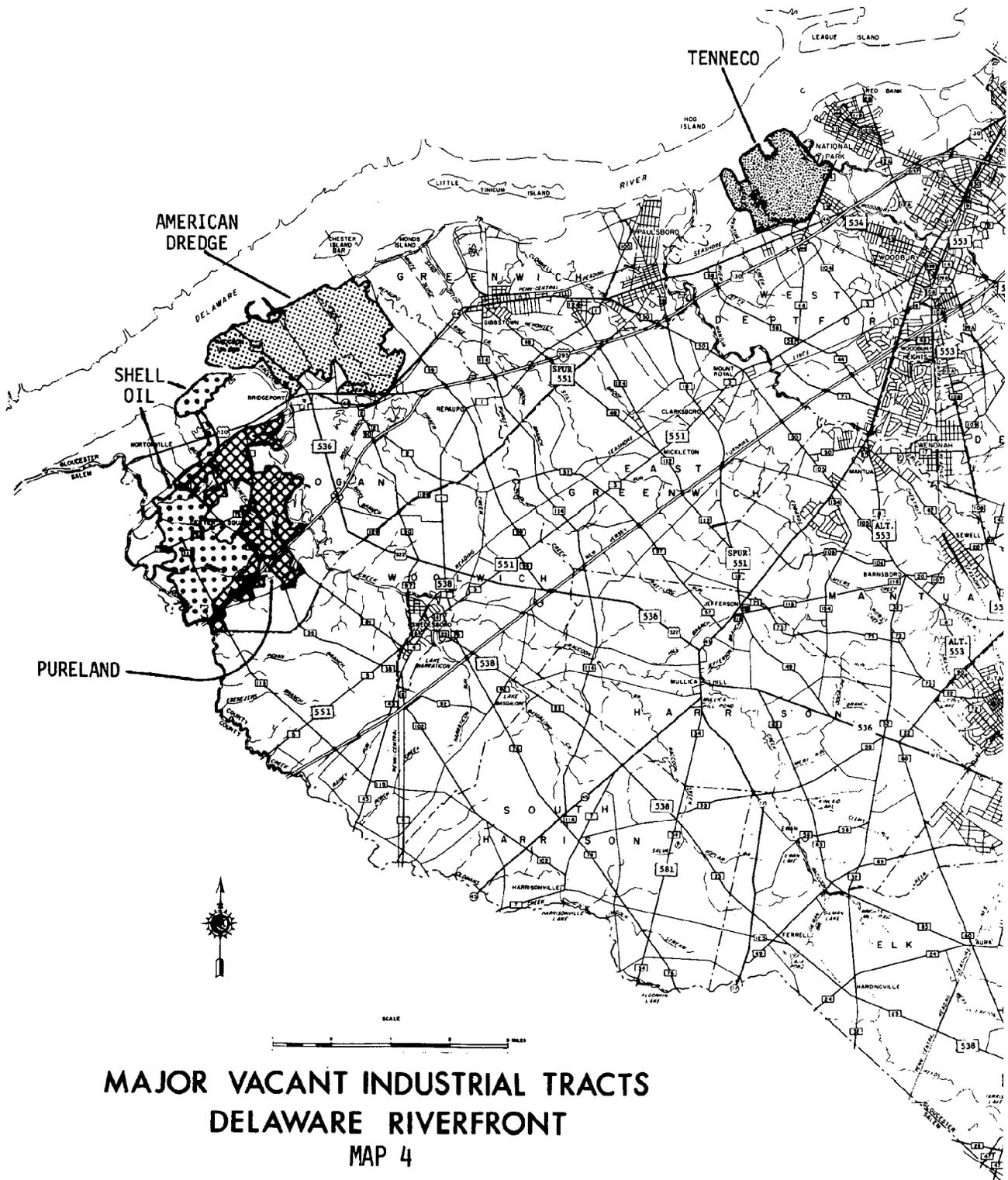
Not surprising, it is along much of the Delaware Riverfront area that has been zoned by the local municipalities for heavy industry. Logan Township has zoned 8300 acres for heavy industrial use, Greenwich Township 3000 acres, and West Deptford Township 4800 acres, accounting for approximately one half of the total land area in each of these municipalities. Map 5 indicates the location of these heavy industrial zone districts.

TABLE 3 - INDUSTRIALLY OWNED ACREAGE

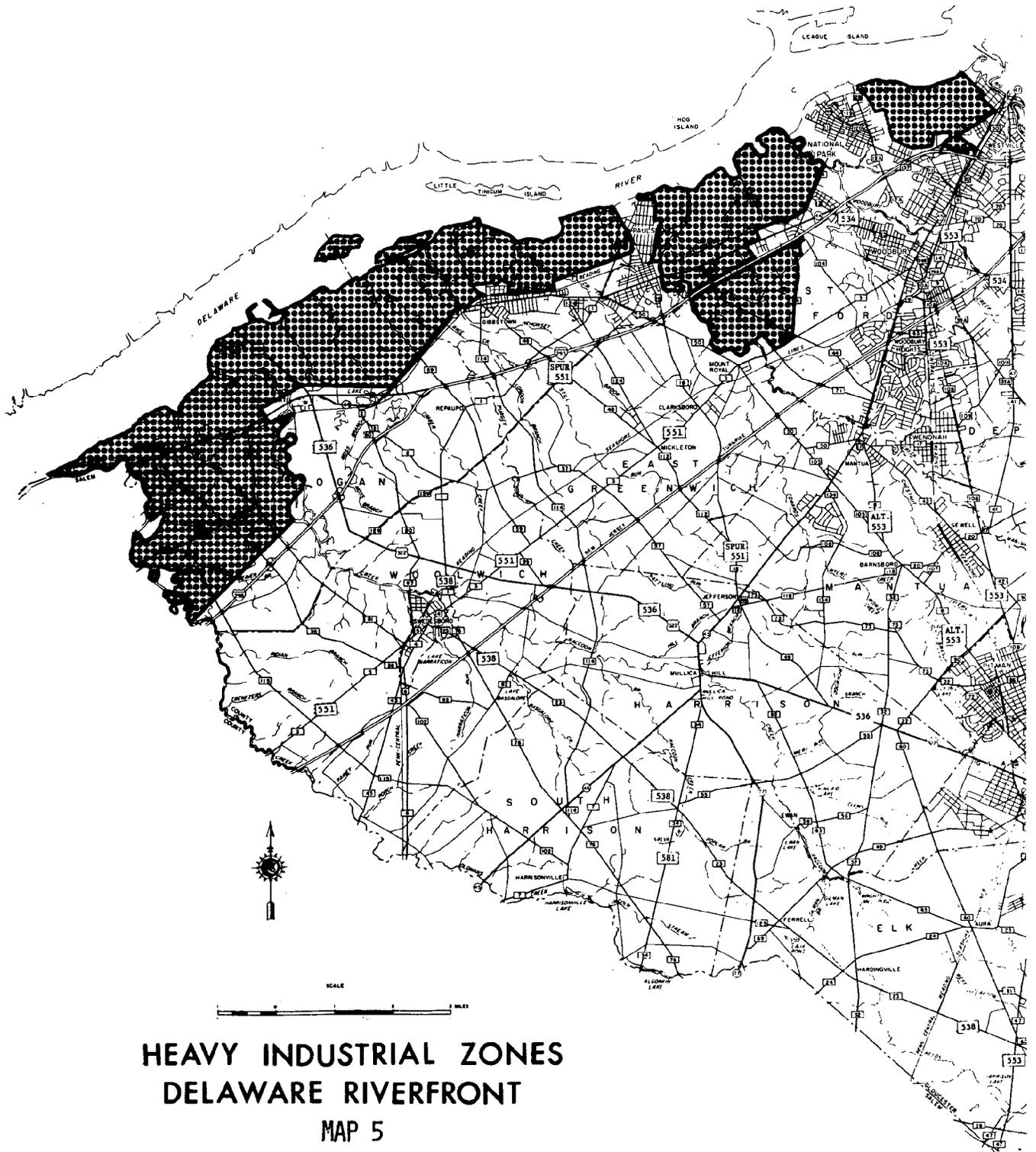
<u>Municipality</u>	<u>Industry</u>	<u>Acres</u>
Greenwich	American Dredge	21
	Carroll Manufacturing	1
	Sun Pipe	5
	Atlantic City Electric	49
	Hercules Corp.	302
	Houdry Chemical	5
	DuPont	1,804
	Mobil	<u>747</u>
	TOTAL	2,934
National Park	PSE&G	20
Paulsboro	Essex Chemical	26
	BP	111
	Olin Mathieson Chemical Corp.	41
	Hercules Corp.	10
	PPG Industries	29
	Mantua Chemical Terminal	23
	Paktank	23
	Petro Tex Terminal Corp.	4
	General Transportation Corp.	26
	Coastal Service, Inc.	3
	Central Piping	8
	Mobil	40
	Sun Oil	8
	Exxon	39
Pennsylvania Petro	1	
Carroll Manufacturing	<u>2</u>	
	TOTAL	394

TABLE 3 - INDUSTRIALLY OWNED ACREAGE (Con't)

<u>Municipality</u>	<u>Industry</u>	<u>Acres</u>
Logan	Sun Oil	558
	Monsanto	460
	Pureland	1,620
	American Dredge	2,282
	Polyrez	35
	Shell Oil	1,544
	Logan Industrial Enterprises	57
	Chemical Leasing Company	13
	Chemical Leaman Tank	18
	TOTAL	6,587
Westville	Texaco	29
West Deptford	Texaco	1,196
	Pennwalt	244
	PPG Industries	2
	Mantua Chemical Terminal	46
	Paktank	7
	General American Transportation Corp.	377
	Tenneco	1,139
	National Steel	222
	ARCO	25
	Shell Chemical	610
	Gulf	35
	Sohio	57
	Colonial Pipeline	58
TOTAL	4,018	



**MAJOR VACANT INDUSTRIAL TRACTS
DELAWARE RIVERFRONT
MAP 4**



**HEAVY INDUSTRIAL ZONES
DELAWARE RIVERFRONT
MAP 5**

ENERGY FACILITIES

OIL REFINERIES

Oil refineries are unquestionably the major type of energy facility that exists in the County, having two of the four refineries that are presently in operation in the State. The Mobil Refinery, in Greenwich Township near Paulsboro, has a plant capacity of 100,000 barrels per day, while the Texaco Refinery at Eagle Point in West Deptford Township has a plant capacity of 88,000 barrels per day. All crude oil is presently transported to both refineries by tanker on the Delaware River.

PIPELINES

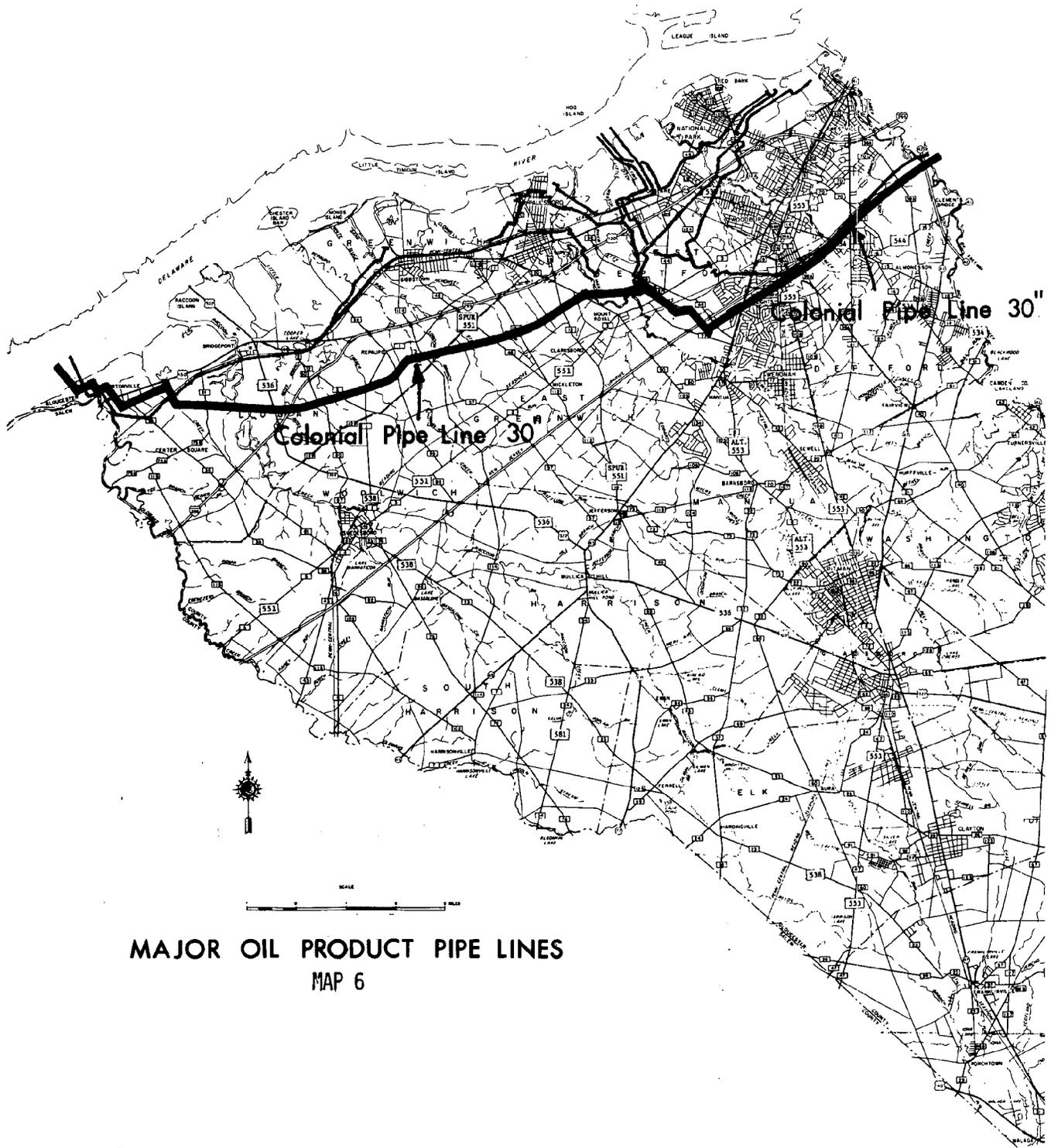
Oil Product Pipelines

There are presently seven major oil product pipelines in Gloucester County. These include Sun Olin, Colonial, Sohio, Gulf, Laurel, Mobil, and Texas. It should be pointed out that there are no crude oil pipelines that presently exist in the County.

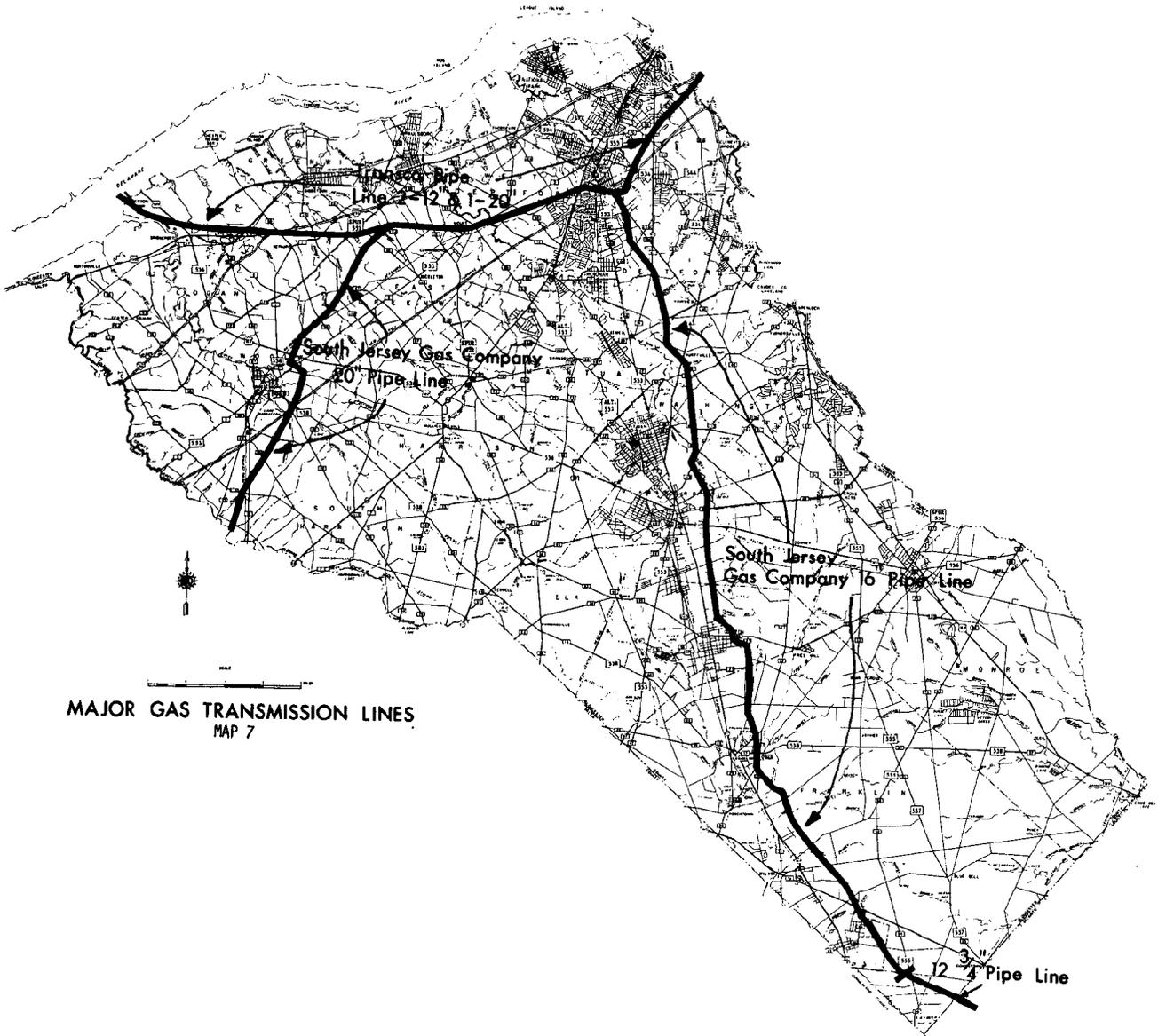
Generally speaking, these pipelines traverse the County in a southwest-northeast direction, paralleling the Delaware River in the northern part of the County in close proximity to the County's existing petro-chemical industries. Of particular interest is the large 30" Colonial Pipe Line, which traverses through the County as part of its route from Houston, Texas to New London, Conn. Map 6 indicates the size and location of these oil product pipe lines.

Gas Pipelines

There are presently four major gas transmission pipelines located in Gloucester County. The Transco Pipeline, transporting gas from the Southwest for much of the Northeast, crosses the Delaware River into Logan Township, then proceeds in a northeasterly direction in the northern part of the County. In addition, South Jersey Gas Company maintains three major lines that branch from the Transco Line. Of those, the Woodbury Line is the most important from a Gloucester County perspective, running through the County in a south-



MAJOR OIL PRODUCT PIPE LINES
MAP 6



MAJOR GAS TRANSMISSION LINES
MAP 7

easterly direction and eventually terminating in the Atlantic City area. Map 7 indicates the location of these gas pipelines.

ELECTRIC TRANSMISSION LINES

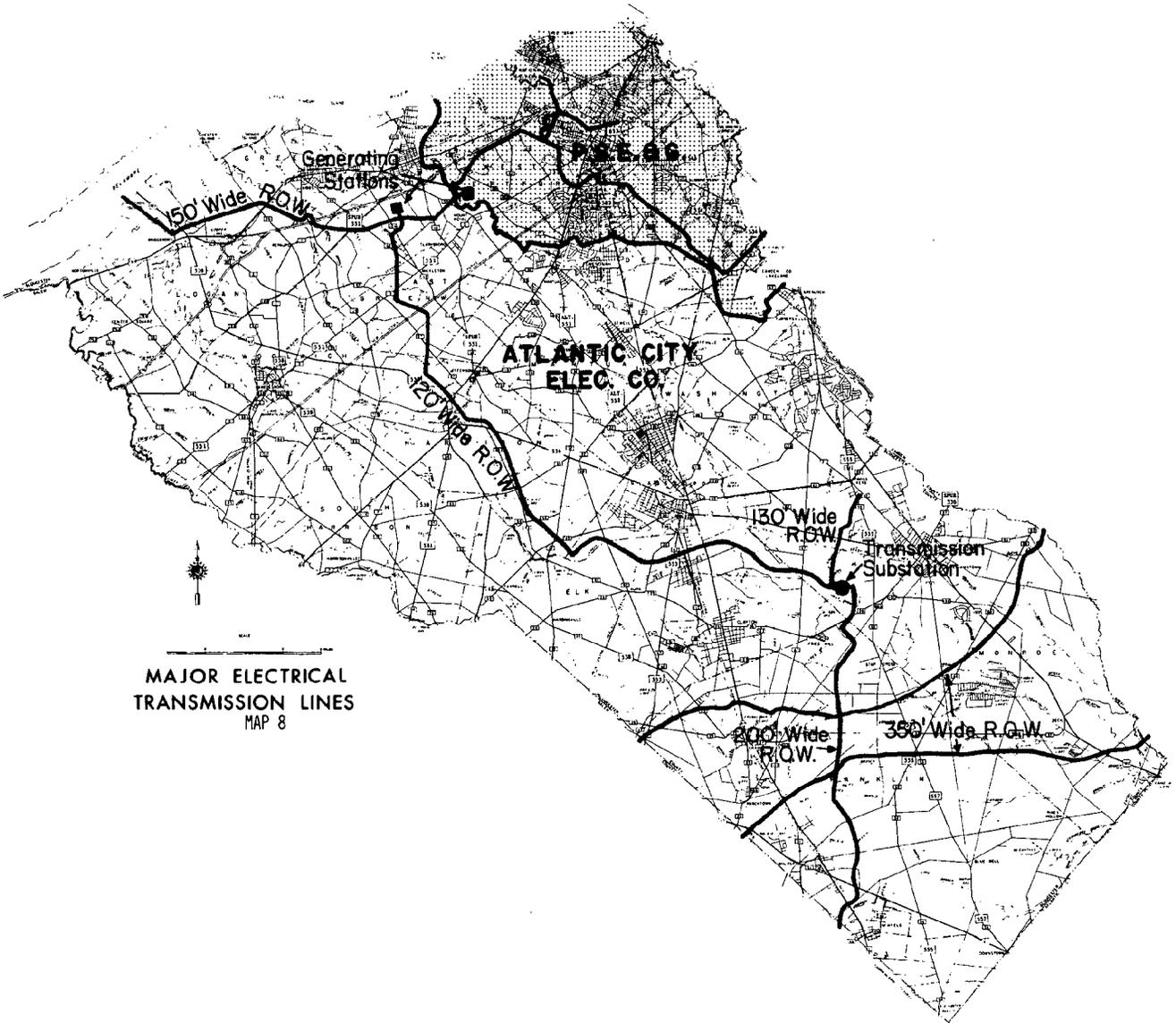
Electrical service is provided to Gloucester County by Public Service Gas and Electric Co. (PSE & G) and Atlantic City Electric Company. Both have major transmission lines and related facilities within the County, with the Public Service Electric and Gas serving the northeastern section of the County and Atlantic City Electric Company the remainder. Map 8 shows the location of major transmission line rights of way and related facilities in the County.

TRANSPORTATION

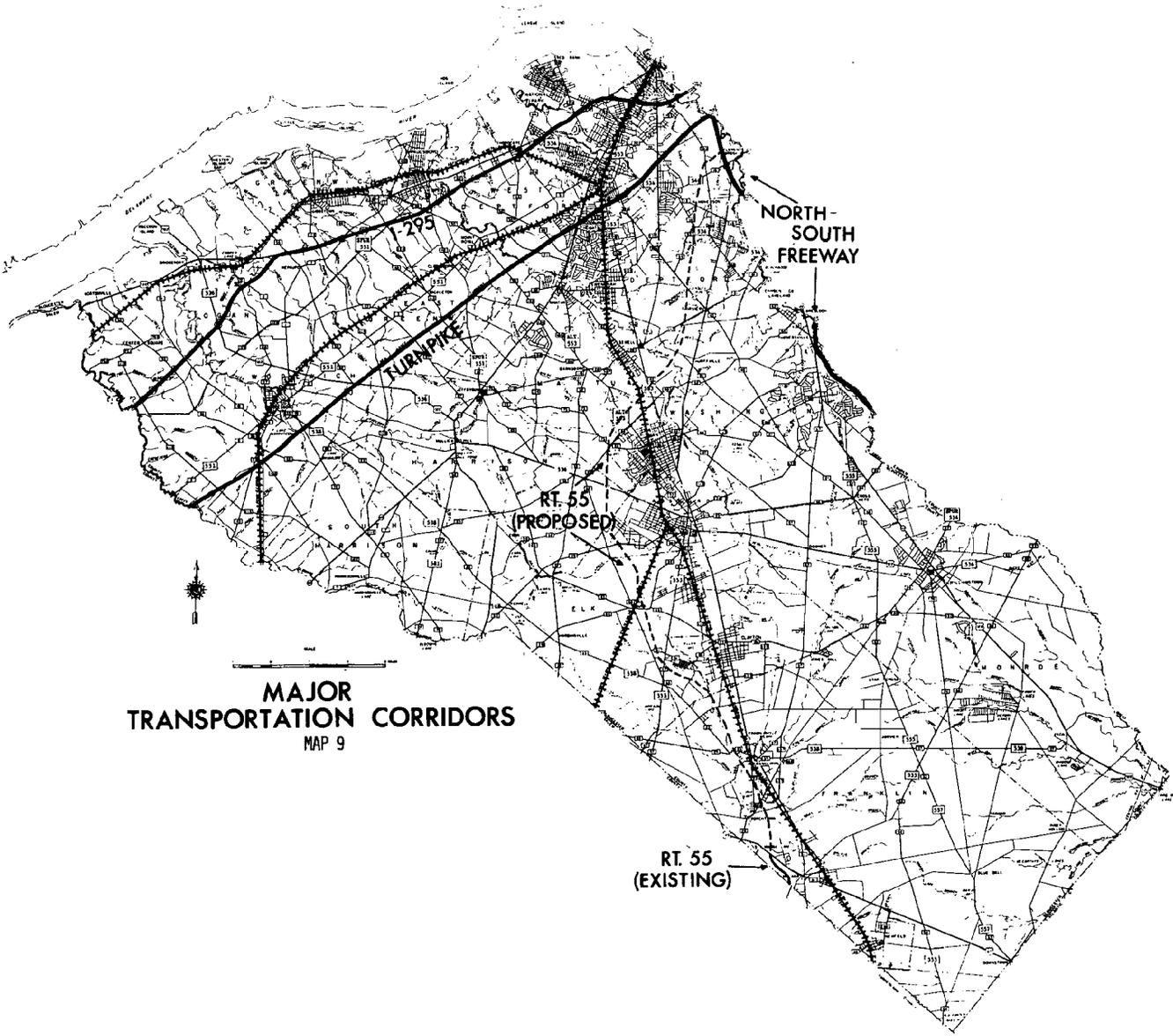
HIGHWAYS

There are 1241 linear miles of roads in Gloucester County, including 132 miles of State Highways and 408 miles of County highways. Most of the major highways in the County radiate from the northeast, linking Gloucester County with the highly urbanized Philadelphia-Camden area. The Volume Capacity Ratio totalled for all roads in Gloucester County is 0.46. Therefore, generally speaking, there are no capacity problems in the County highway system being able to handle increased traffic loads, although site specific problems exist.

Highways that would appear to be of particular interest to potential OCS activity are I-295, which presently serves existing industries in the northern part of the County along the Delaware River, and the North-South Freeway (NJ 42) which intersects with the Atlantic City Expressway and the Black Horse Pike. Also having potential OCS impact is the proposed Route 55, which presently runs north-south through Cumberland County, terminating at US 40 near the Cumberland-Gloucester County Border. When completed, Route 55 will connect with the North-South Freeway (NJ 42) in Deptford Township in the northeast section of the County. Map 9 indicates Gloucester County's major highways, both existing and proposed.



MAJOR ELECTRICAL
TRANSMISSION LINES
MAP 8



**MAJOR
TRANSPORTATION CORRIDORS**
MAP 9

RT. 55
(EXISTING)

RAILROADS

Gloucester County is provided with freight services from four branches operated by the Consolidated Railroad Corporation (Conrail), formerly the Pennsylvania Reading Seashore Line (PRSL). There is no passenger rail service in the County. Like the County's highway system, the County's railroad system also radiates from the northeast part of the County. Map 9 indicates the location of these rail facilities.

There is a total of 61 miles of track on all four branches, not including spurs, sidings, and storage tracks. These branches have relatively narrow right of way widths, conforming to former standards ranging from 33 feet for single track to 60 feet for dual track. With a fixed system of tracks, there is little room, if any, for major expansion, although minor expansion, in the form of new sidings, may be possible in some locations. However, generally speaking, no upgrading of track appears necessary for increased rail use demand that might be generated from OCS activity.

MARINE FACILITIES

The Delaware River provides the County's more coastal dependent industries with a water borne transportation access to the Atlantic Ocean. The U.S. Army Corps of Engineers maintains a channel depth in the River of 40 feet, thus providing fairly deepdraft ocean-going vessels with access to port facilities in the Philadelphia area. For the most part, the depth of the Delaware River along the Gloucester County shore front is very shallow where it exists in a natural state. However, with the aid of dredging operations, and in most cases, the extension of piers into the River, docking facilities have been constructed to serve the County's petroleum and chemical industries. Table 4 lists these existing docking facilities.

TABLE 4 - EXISTING PIER FACILITIES

<u>FIRM</u>	<u>LOCATION</u>	<u>DEPTH AT PIER (in feet)</u>
Monsanto	Logan Township	32
Dupont	Greenwich Township	30
Mobil	Greenwich Township	34
Mobil	Greenwich Township	35
Mobil	Greenwich Township	40
Exxon	Paulsboro Borough	38
British Petroleum	Paulsboro Borough	36
Mantua Terminal	West Deptford Township	34
Texaco	West Deptford Township	47
Texaco	West Deptford Township	44
Texaco	West Deptford Township	36

AIRPORTS

There are four small airports located in Gloucester County. Major commercial freight and passenger needs above air taxi level of service is provided by Philadelphia International Airport, which lies directly across the Delaware River from Gloucester County. Table 5 lists the County airports.

TABLE 5 - AIRPORTS IN COUNTY

<u>NAME</u>	<u>LOCATION</u>	<u>RUNWAYS</u>
Bridgeport	Logan Township	2 paved runways, each 2200 ft long
Cross Keys	Monroe Township	1 paved runway, 2280 ft long
Pitman	Mantua Township	1 turf runway, 2460 ft long
Vineland-Downstown	Franklin Township	2 turf runways, 1860 and 2500 ft long

ENVIRONMENTALLY SENSITIVE AREAS

The following defines areas of critical environmental features that were chosen to have characteristics that could adversely affect or be adversely affected by the siting of OCS related facilities.

FLOOD PRONE AREAS

These areas are defined as relatively flat areas adjoining the channel of a natural stream which have been or may be periodically covered with floodwater and which are required to carry the flow of floodwaters, acting as extensions of stream channels during periodic stream overflows. The indiscriminate development of flood prone areas may therefore result in property damage and adversely affect the area's natural capacity to carry storm water. There are approximately 26,000 acres in Gloucester County that can be defined as flood prone, comprising 12 percent of the County's total land area.

COASTAL WETLANDS

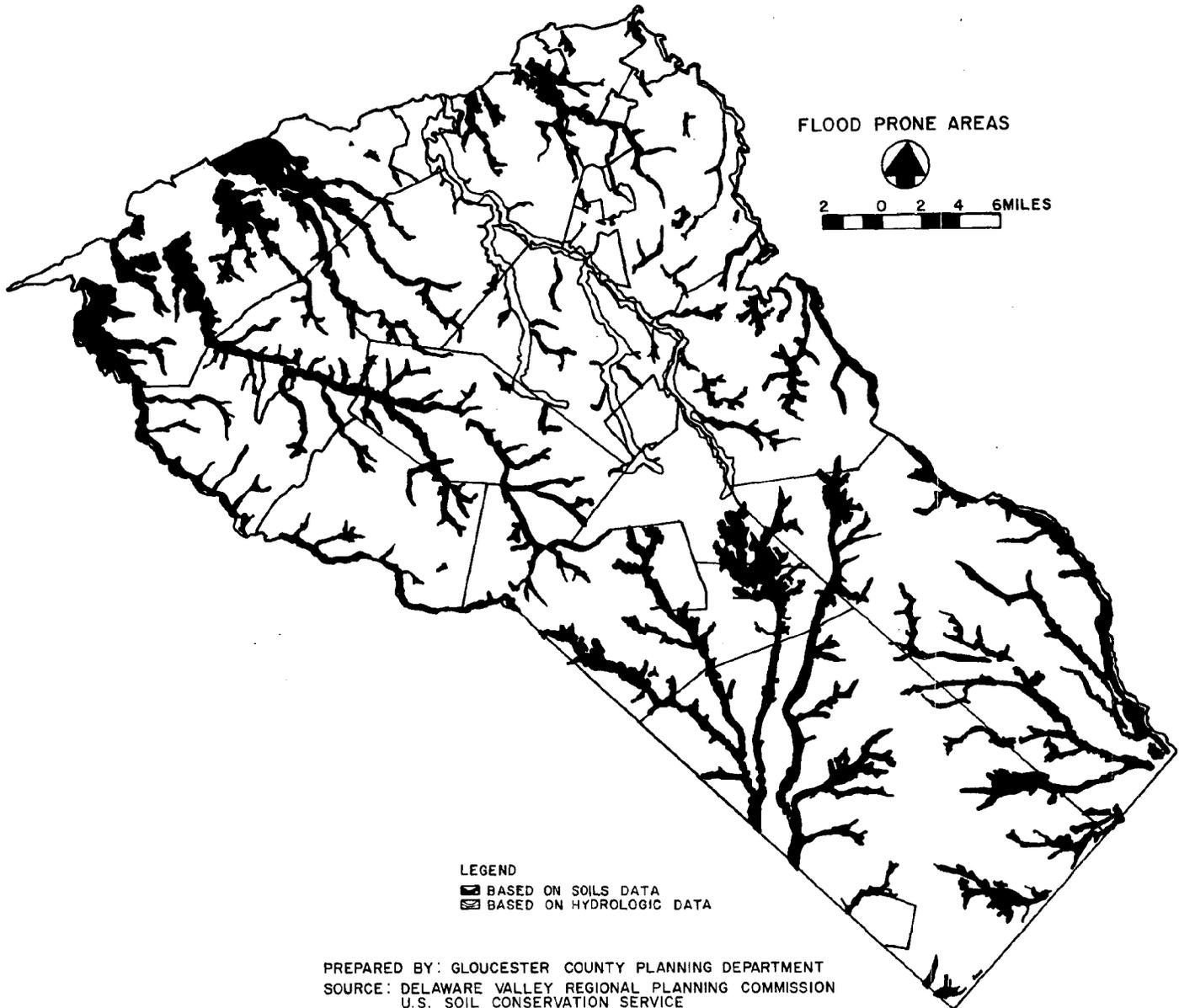
Coastal wetlands are any marsh, bank, swamp, meadow, or other lowland covered by year round or intermittent shallow water that is subject to tidal action and is capable of growing certain vegetation, as defined in accordance with the provisions of the Wetlands Act of 1970. In Gloucester County, coastal wetlands are located along the Delaware River and its tributaries, including Oldmans, Raccoon, Repaupo, and Mantua Creeks.

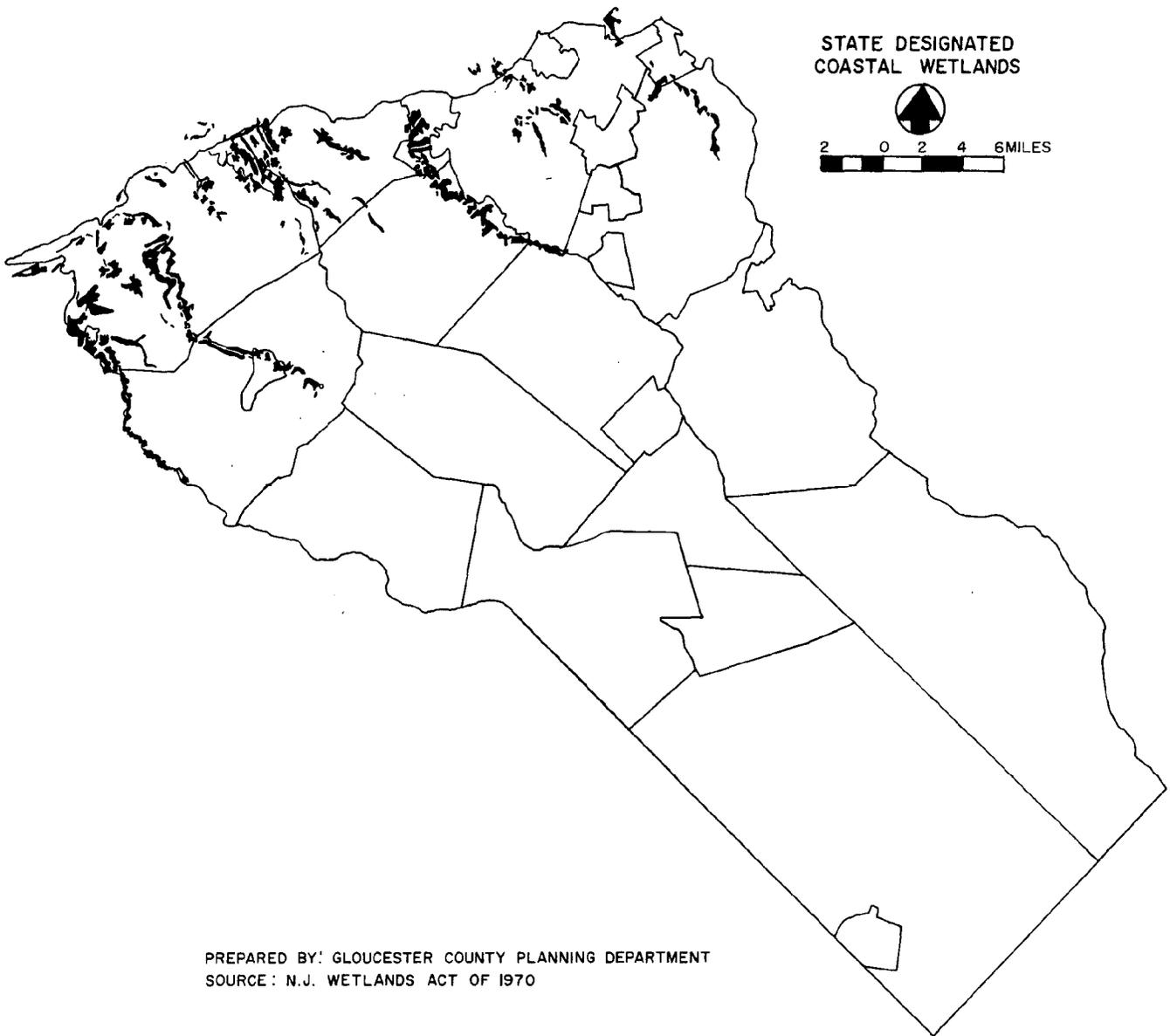
SURFACE WATER

Surface water includes major tidal and non-tidal streams and their tributaries; major bodies of surface water such as lakes and ponds; and major headwater drainage courses. Uncontrolled development on stream corridors and along corridors and along the perimeter of lakes and ponds can result in the sedimentation and pollution of these surface waters. There are over 3,300 acres of surface water in Gloucester County, excluding the waters of the Delaware River.

SEASONAL HIGH WATER TABLE AREAS

Seasonal high water table areas are defined as those areas which are characterized with a high water depth of 18 inches or less during some time of the year, excluding wetlands and flood prone areas, which of course are also high water table areas. If developed, seasonably high water table areas are highly susceptible to pollution, which may be transmitted to adjacent



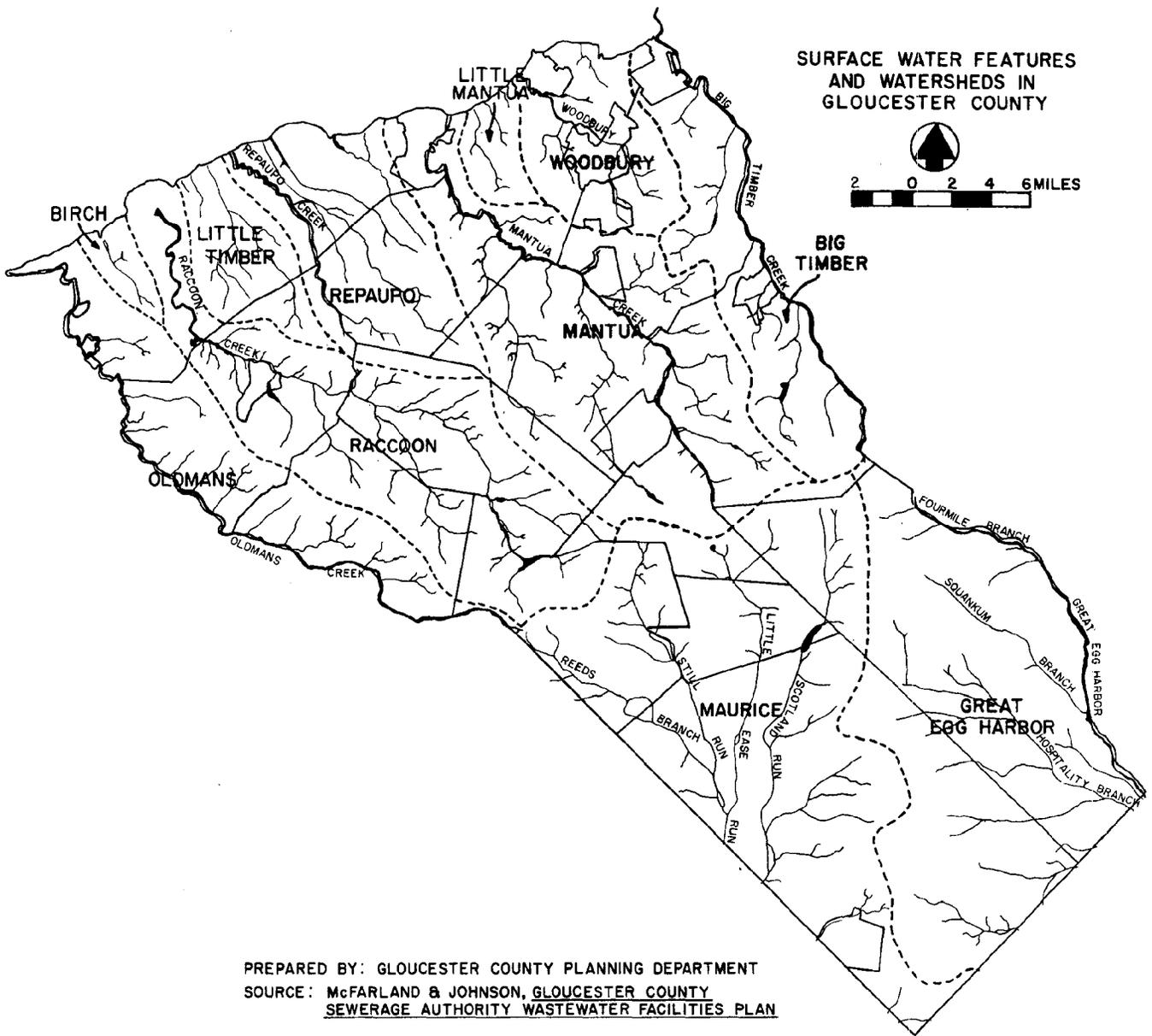


STATE DESIGNATED
COASTAL WETLANDS



2 0 2 4 6 MILES

PREPARED BY: GLOUCESTER COUNTY PLANNING DEPARTMENT
SOURCE: N.J. WETLANDS ACT OF 1970



PREPARED BY: GLOUCESTER COUNTY PLANNING DEPARTMENT
 SOURCE: MCFARLAND & JOHNSON, GLOUCESTER COUNTY
SEWERAGE AUTHORITY WASTEWATER FACILITIES PLAN

streams and waterways. These areas comprise about 19,000 acres, about 9 percent of the County's land area.

STEEP SLOPES

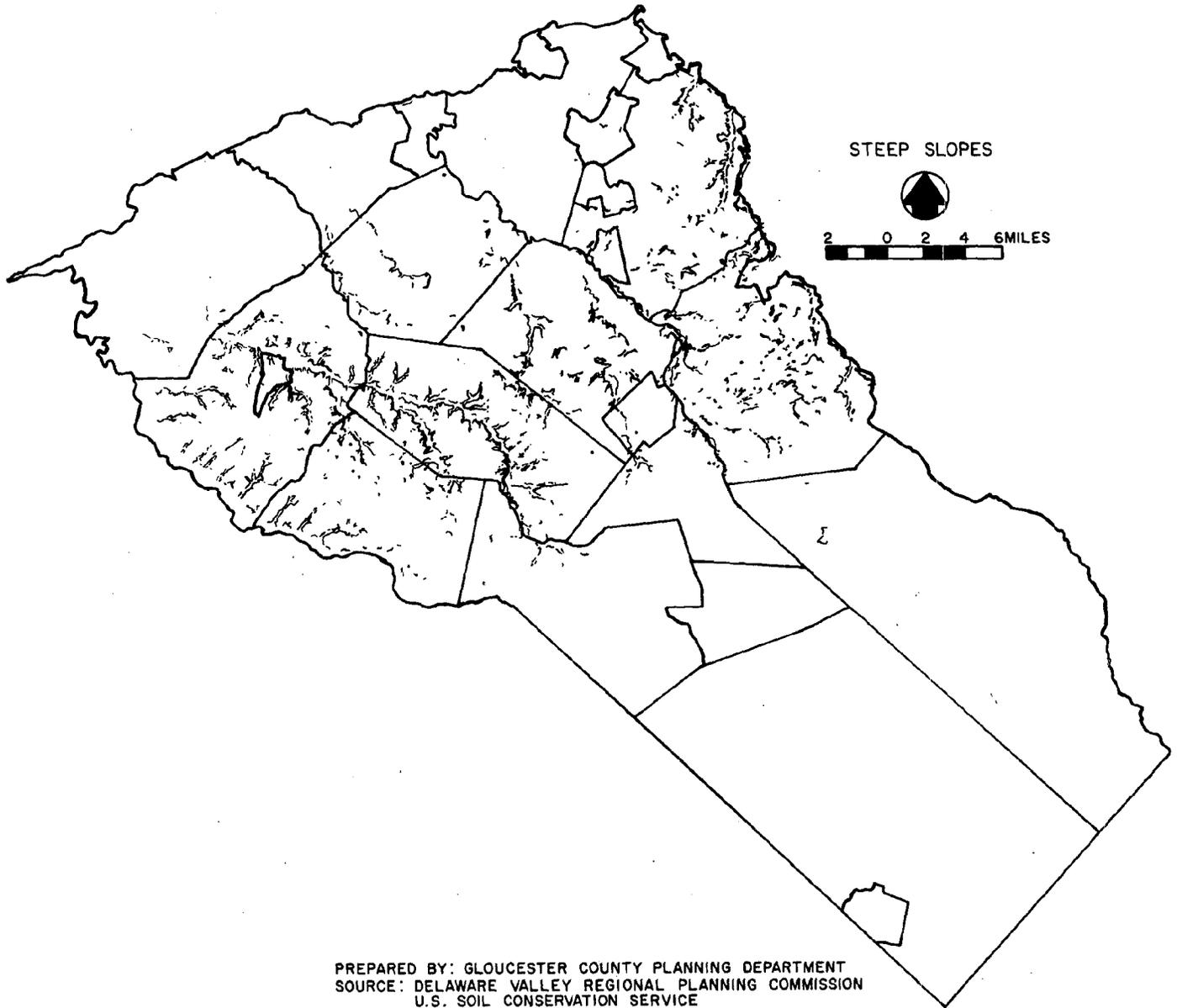
Steep slopes are defined as those areas where the change of topography exceeds a 15 percent gradient. Development on these areas can create severe environmental problems that are associated with increased rates of water runoff - flooding in low-lying areas, increased erosion of stream banks, and severe siltation and pollution of streams. Steep slopes occupy a somewhat small portion of the County's land area with approximately 4,500 acres. Most of this land is located in the northern sections of the County, primarily along stream corridors.

PRIME AND CRITICAL WOODED AREAS

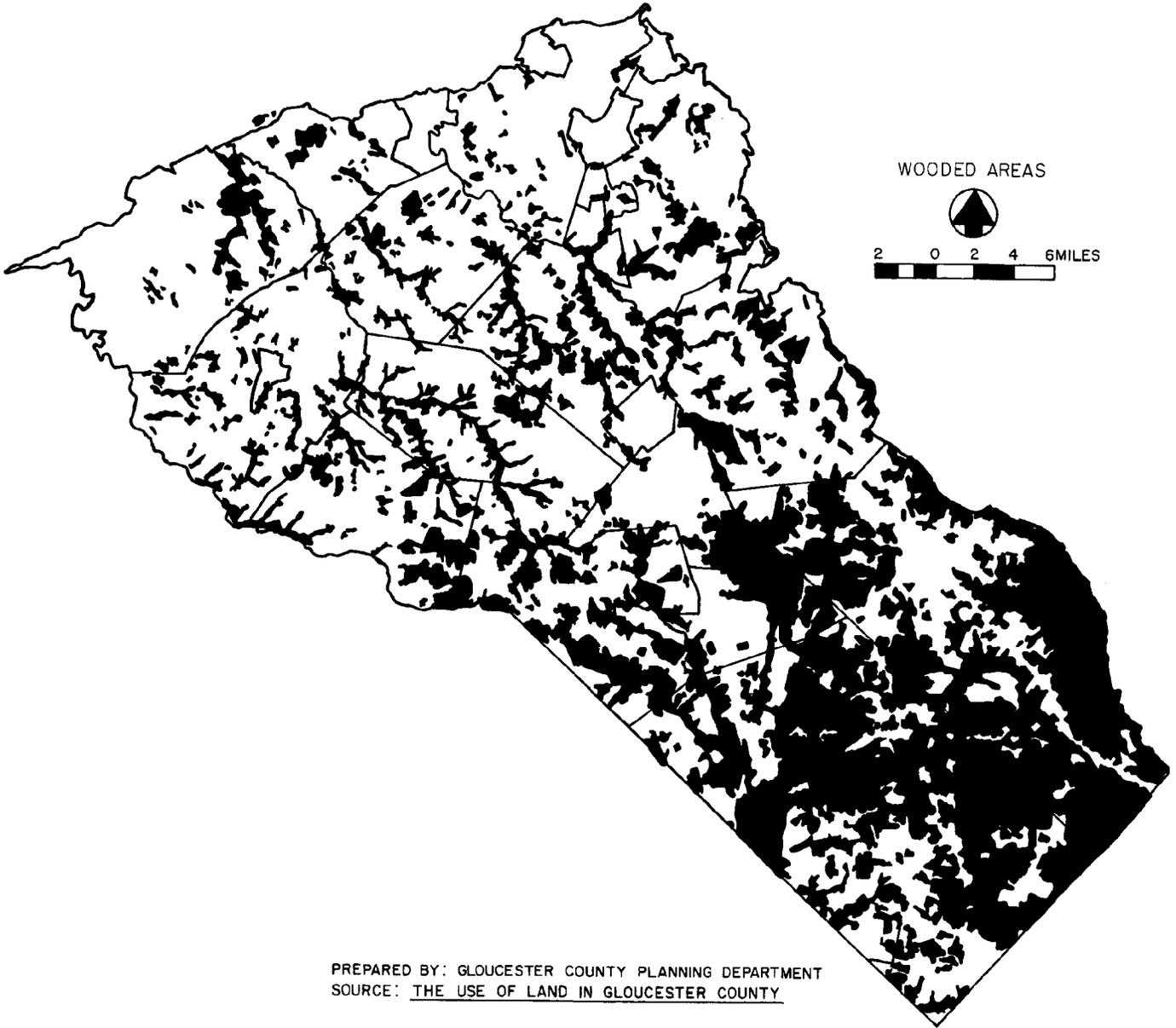
Prime and critical wooded areas are extensive or linear land areas consisting of dense and mature or potentially mature tree growth complemented by various types of plants and other vegetative cover. These areas serve material protective functions and may consist of deciduous, coniferous, or mixed growth. Much of Gloucester County's prime and critical wooded areas are situated in the southern half of the County, with the remainder occupying flood prone areas, streambanks, slopes, or wet areas throughout the County.

PRIME ACQUIFERS AND CRITICAL RECHARGE AREAS

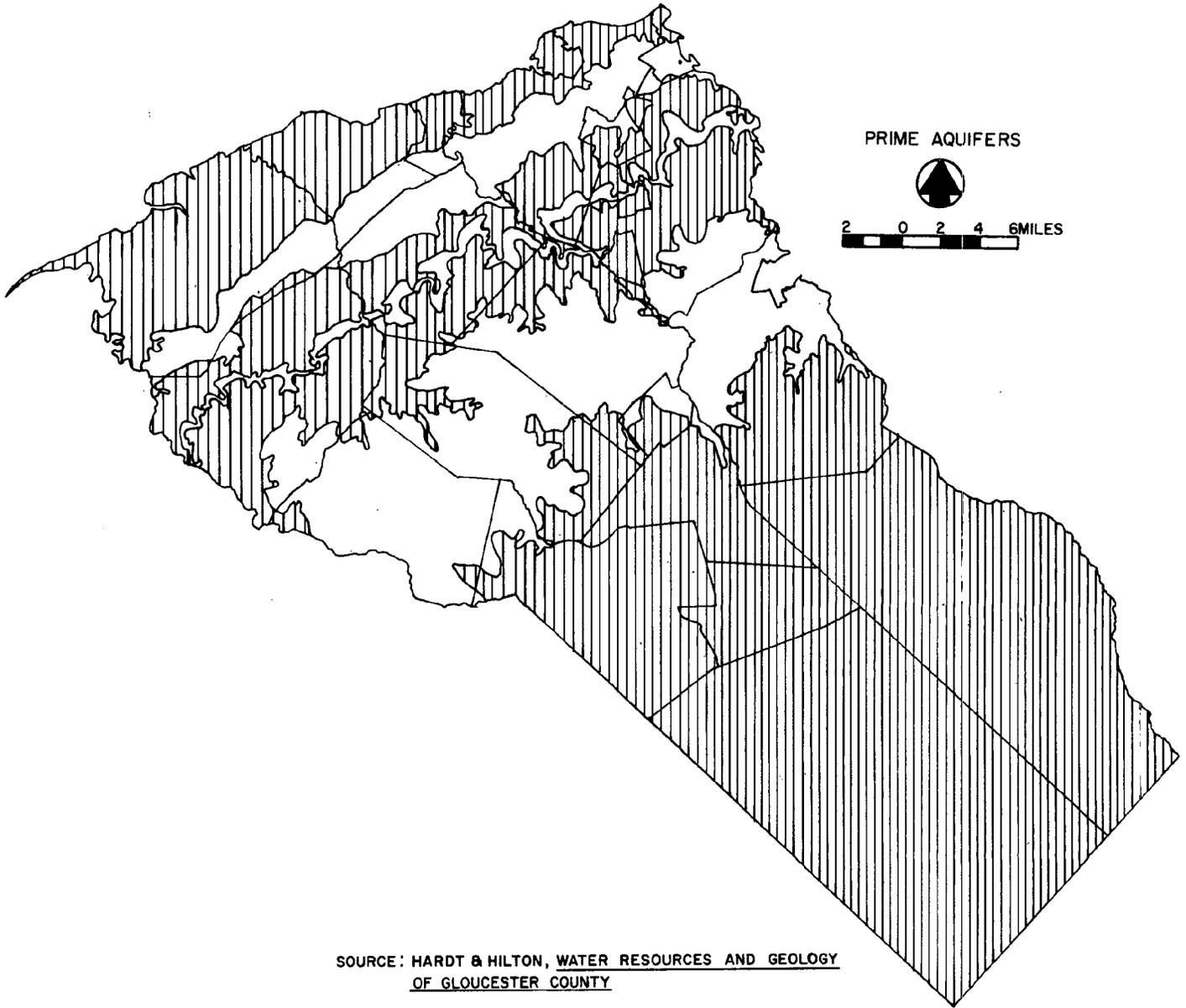
Prime aquifers (geologic strata of rock, gravel, or sand underlying areas of land which store or yield significant amounts of water) provide Gloucester County with all its drinking and domestic water supply and much of its water for industry and agriculture. Critical aquifer recharge areas are where the process occurs by which surface water and precipitation are absorbed by the soil and moved into underlying prime aquifers. It is therefore essential that prime aquifers and critical recharge areas in the County are protected in order to assure a continuous and permanent supply of high quality groundwater.



PREPARED BY: GLOUCESTER COUNTY PLANNING DEPARTMENT
SOURCE: DELAWARE VALLEY REGIONAL PLANNING COMMISSION
U.S. SOIL CONSERVATION SERVICE



PREPARED BY: GLOUCESTER COUNTY PLANNING DEPARTMENT
SOURCE: THE USE OF LAND IN GLOUCESTER COUNTY



SOCIO--ECONOMIC CHARACTERISTICS

POPULATION GROWTH

Gloucester County has been experiencing a fairly rapid population growth rate. The County's population was 134,840 in 1960, 172,681 in 1970 and has been estimated as being 200,945 in 1977, representing a growth rate of 49% during this 17 year period. This growth, however has not been uniformly distributed among the County's 24 municipalities, as can be seen in Table 6. Approximately 60% of this growth has been from net in migration. Although Gloucester County's growth rate has been somewhat dramatic over the past twenty years, the County population's proportionate distribution of age, sex, and race has remained surprisingly stable.

ECONOMIC BASE*

Employment in Gloucester County is not diversified. Jobs are concentrated in five categories: manufacturing, wholesale and retail trade, services, state and local government, and non-farm proprietorships, comprising 82.3% of the total employment in Gloucester County. Moreover, manufacturing employment in Gloucester County is concentrated in four industries: petroleum and coal products (SIC 29) electrical and electronic equipment (SIC 36), chemical and allied products (SIC 28), and fabricated metal products (SIC 34) comprising 64.0% of the County's total manufacturing employment. In addition, Gloucester County is clearly a suburban "bedroom" County, with about one quarter of the income earned by County residents being from the net export of labor.

The relatively high concentration of employment in a few industries makes the County's economy susceptible to changes in a few areas of employment, particularly in durable goods industries; which are especially sensitive to movements in the business cycle. Moreover, the economic health of Gloucester County is dependent on that of the whole SMSA, with almost half the County's employed residents working at jobs outside the County. In general, the economic health of the Philadelphia SMSA is not good.

*This section is based upon the Gloucester County Development Council, Inc., "An Economic Overview of Gloucester County, New Jersey", Sept. 1977.

TABLE 6 - POPULATION CHANGE

	1960	1970	1977 Est.	Change 1960-1977
Clayton	4,711	5,193	5,445	734
Deptford	17,878	24,232	28,521	10,643
East Greenwich	2,722	3,280	3,486	764
Elk	2,635	2,707	2,973	338
Franklin	7,451	8,990	9,918	2,467
Glassboro	10,253	12,928	16,486	6,233
Greenwich	4,065	5,676	6,161	2,096
Harrison	2,410	2,661	2,909	499
Logan	1,924	1,840	2,698	774
Mantua	7,991	9,643	10,339	2,348
Monroe	9,396	14,071	19,206	9,810
National Park	3,380	3,730	3,876	496
Newfield	1,299	1,487	1,661	362
Paulsboro	8,121	8,084	7,984	(137)
Pitman	8,644	10,257	10,782	2,138
South Harrison	974	1,226	1,353	379
Swedesboro	2,449	2,287	2,275	(174)
Washington	4,923	15,741	23,317	18,394
Wenonah	2,100	2,364	2,512	412
West Deptford	11,152	13,928	16,578	5,426
Westville	4,951	5,170	5,109	158
Woodbury	12,453	12,408	12,030	(423)
Woodbury Hts.	1,723	3,621	4,259	2,536
Woolwich	<u>1,235</u>	<u>1,147</u>	<u>1,067</u>	<u>(168)</u>
COUNTY	134,840	172,681	200,945	66,105

However, generally speaking, Gloucester County would appear to be a growth area within an otherwise stalled SMSA. From 1970 to 1976, total employment increased 16.36% in Gloucester County, but only 0.93% in the SMSA. In addition, from 1970 to 1974, total payroll increased 46.17% in Gloucester County but only 29.78% in the entire SMSA. Also, employment in Gloucester County manufacturing increased steadily from 1970 to 1976, while it declined in the Philadelphia SMSA and the United States. In 1970, the County provided 12,972 manufacturing jobs and 13,784 in 1976, with the County's principle industries, particularly petroleum refining, (which accounts for almost one-fourth of all County manufacturing jobs) and the migration of industries from high cost urban areas, providing most of the growth.

The characteristics of the County's economic base seems to indicate that, in order to enhance orderly economic growth, firms with products related to those of established firms should be encouraged to locate in Gloucester County, i.e., with refineries in the County, more users of refining products such as chemical and plastics firms should be solicited.

CHAPTER V

POTENTIAL OUTER CONTINENTAL SHELF AND ENERGY RELATED FACILITIES

In order to evaluate the potential effects on Gloucester County of siting OCS and energy related facilities, it is important to understand specifically the types of facilities that are involved. The following chapter provides a brief description of these various facilities, as well as their siting requirements and impact. Most of these facilities are waterfront oriented, therefore it can be assumed that the Delaware Riverfront area has a greater siting potential. However, impacts from employment, wages, pollutants, and housing and services demands can be expected to occur inland as well.

TEMPORARY SERVICE BASE - relatively small operations used as a staging area established for shipping equipment, supplies, and personnel to offshore oil rigs during exploratory drilling. Companies look for available vacant land in ports closest to offshore activity (usually within 150 miles of offshore oil) that can be leased on a short term basis, although other factors may influence locational decisions.

Requirements and Impacts

Land: 5-10 acres on all-weather harbor
Waterfront: 200 ft. of wharf/rig - 15-20 ft. water depth at pier
Water: 5.2 million gallons/rig/year for supply boats
Fuel: 12,800 barrels/rig/year for supply boats
13,272 barrels/rig/year at drilling site
Labor: 45 onshore service base jobs/rig (75% local)
Wages: Approximately \$735,000/year; \$17,000 average wage
Capital Investment: \$150,000 - \$250,000 for land leasing and construction
Noise: Up to 85 decibels; 24 hours/day
Solid Waste: Up to 6 tons/day including oil contaminated drill cuttings

PERMANENT SERVICE BASE - essentially the same logistical support and services during the development phase of drilling as the temporary base does during the exploratory phase. However, the size and intensity of required support and services can increase dramatically during the development stage. As with temporary bases, siting is influenced by distance, cost, land availability, public attitude, available harbor facilities, and social facilities.

Requirements and Impacts

Land 25-30 acres on all-weather harbor
Waterfront: 200 ft. of wharf-platform; 15-20 ft. depth at pier
Water: 8.2 million gallons/platform/year during development drilling;
little during production

Fuel: 54,000 barrels/platform/year during development
19,200 barrels/platform/year during production
Labor: 50-60 jobs/platform during drilling (50% local initially,
rising to 80% local)
Wages: Approximately \$1 million; average wage \$17,000
Capital Investment: \$1-3 million
Air Emissions: Hydrocarbons from fuel storage and vehicle operations
Wastewater Contaminants: Hydrocarbons, heavy metals from bilge and
ballast water
Noise: Up to 85 decibels; 24 hours/day
Solid Waste: Up to 6 tons/day during drilling

REPAIR AND MAINTENANCE YARDS - refers loosely to the many firms which provide repair service for boats and equipment used for OCS development. Repairs vary widely, but are likely to include hull, electronic, mechanical, and inspection work for 60-200 foot tug, crew, supply, and research vessels, as well as repairs to a wide variety of equipment.

Fast, efficient, and available service and highly skilled labor are primary requirements of oil companies for repair and maintenance work. Accessibility to road, rail, and air transport is necessary for fast delivery of supplies and parts. Skills required may include certified welders, ship-fitters, electricians, mechanics, machinists, riggers, carpenters, pipe-fitters, sandblasters and painters.

GENERAL SHORE SUPPORT - There are various general shore support, ancillary industries that oil companies contract for specific operations, equipment, supplies and services such as:

Supply Drilling Base supplies all the equipment part needs of an oil rig- drill bits, tool joints, drill collars, pump parts, etc. Supply companies look for vacant warehouses within 75 miles of dockside to set up a support

base for offshore oil. Supply bases employ 4-5 during exploratory phase and up to 30 at peak development.

Drilling mud supply base - Drilling mud is a term used for a mixture of water with such substances as clay, bentonite, and barite, that is used in the drilling process to remove cuttings, lubricate the bit, and control subsurface pressures. A warehouse of at least 5,000 sq. ft, usually located along rail facilities, is used to store the drilling mud material. The material is usually shipped and stored in sacks or bulk form, but it can also be stored in liquid form in mud tank farms. Drilling mud supply bases employ approximately 9-10 persons.

Catering Services - feeds and housekeeps for the workers on offshore production and drilling platforms, providing the personnel, food, sanitary supplies, linen and incidental equipment. In the Gulf Coast area, catering services employ an estimated 2,500 persons with an approximate annual payroll of \$20 million. Spinoff benefits to the local economy can be expected from the purchasing of food, linen, restaurant equipment, trucks, etc.

STEEL PLATFORM FABRICATION YARDS - large waterfront facilities consisting mostly of leased land, buildings, shops, and administration offices. The steel platforms are constructed on their sides close to marginal wharves. The platforms are subsequently floated from the wharves to the drilling sites for installation.

Requirements and Impacts

Land: 200-1000 acres on navigable waterway

Waterfront: 15-30 foot depth at pier

Sea Access: 210-350 ft. (horizontal clearance and vertical)

Water: 100,000 gallons/day

Labor: 250-550 workers/steel platform; 80% local

Wages: Average wage \$19,000.00

Capital Investment: \$30-\$60 million

Wastewater Contaminants: heavy metals, particulates

Solid Waste: Packaging materials, metal scraps, debris

Air Emissions: Sand and metal dust from sandblasting; hydrocarbons and organic compounds from paint evaporation; carbon monoxide; sulphur oxides, nitrogen oxides from vehicles

Noise: 80-100 decibels: 24 hours/day

STEEL PLATFORM INSTALLATION SERVICE BASES - supports the installation process of drilling platforms. Similar to temporary service bases in siting requirements, these bases require wharfage and waterfront warehouse space, and repair and maintenance facilities for vessels and barges.

Requirements and Impacts

Land: Approximate 5 acres of waterfront land
Wharfspace: 200 ft/4 platforms installed
Water Depth: 15-20 ft. at pier
Offshore Labor: Approximately 100/installation spread (25% local)
Offshore Wages: Average wage \$18,000
Onshore Labor: 25 workers/installation spread (50%)
Onshore Wages: Approximately \$425,000; annual average wage \$17,000
Environmental Impact: Approximately the same as temporary service base

PIPELINE INSTALLATION SERVICE BASES - supports offshore pipeline installation operations. As with other service bases, distance from installation site is the most important siting consideration.

Requirements and Impacts

Land: Approximately 5 acres
Waterfront: 200 foot wharf/spread; 15-20 foot depth
Labor: Approximately 25 onshore jobs
Wages: Approximately \$425,000 annually; average wage \$17,000
Environmental Impacts: Similar to temporary service bases

PIPE COATING YARDS - prepares the pipe for underwater use through the application of concrete and asphalt sealers to protect it and permit it to sink.

These facilities are large, characterized by rows of stacked pipe, lanes for forklifts and other mobile equipment, and several low, sprawling structures in which the pipe is prepared and coated.

Requirements and Impacts

Land: 100-150 acres on waterfront (95% storage, 5% operations)

Marginal Wharf: 750 feet

Water Depth: 20-30 feet at pier

Water: 3,000-15,000 gallons/day

Energy: 1 million KWH; 12-13 million cu. ft/year gas

Labor: 100-200 workers during season (March-September)

Wages: \$2 million (assuming 175 workers) average wage \$11,500

Capital Investment: \$8-10 million; 1 million for portable plant

Air Emissions: Particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons

Wastewater Contaminants: Hydrocarbons, alkaline substances, particulates, metal fragments

Noise: 90-100 decibels (uncontrolled)

Solid Waste: Concrete, metal scraps, contaminated and uncontaminated debris

PIPELINES - a primary transportation mode of hydrocarbons. Major factors that influence the decision to build pipelines include the estimated total oil and gas reserves, their distribution, the rate of production, distance and rate from tracts to point of delivery, capital costs, value of the oil or gas, and existing costs. Most offshore oil and virtually all offshore gas has been brought to shore by pipelines in the United States.

Requirements and Impacts

- Location: Shortest distance between offshore tract and distribution point, modified by land use constraints and environmentally sensitive areas.
- Land: Minimum 50-100 foot right of way, 40 acres for pumping station and 60 acres for terminal, if required, and 2-3 acres for compressors
- Labor: A significant amount of employment during construction but very little during operation. Except for pipeline welders, who are required to have special training and skills, most construction work involved in laying the pipeline would probably be awarded to local contractors.
- Onshore Wages: \$16,000 average annual
- Capital Investment: Varies with pipe diameter from approximately \$700,000/mile for 8" pipe to \$2 million/mile for 42" pipe
- Air Emissions: Minimal; chiefly hydrocarbons, nitrogen oxides and sulfur oxides from compressors along route
- Noise: 90-100 decibels from compressors; 140 decibels from annual pipeline venting

PARTIAL PROCESSING PLANT - separates oil, gas, water and mineral impurities from the petroleum mixture pumped from wells. Resembling a very small refinery, such facilities can be sited either onshore or offshore with no waterfront facilities required.

Requirements and Impacts

- Land: 15 acres/100,000 barrels processed
- Water: 10,000 gallons/month
- Energy: 1.5 million cu. ft/day gas; 400,000 KWH/month
- Labor: 150 construction jobs for 15 months; 10 jobs during operations
- Wages: \$15,400/year average wage
- Capital Investment: \$13 million
- Air Emissions: Hydrocarbons, hydrogen sulfide, sulfur oxides, nitrogen oxides
- Wastewater Contaminants: Suspended solids, oil and grease, heavy metals, phenols, halogens, chromium
- Noise: 80-96 decibels

GAS PROCESSING AND TREATMENT PLANTS - Designed to strip impurities and valuable liquifiable hydrocarbons, such as ethane, butane and propane from the raw gas stream before it enters the commercial gas transmission line. If a commercially valuable quantity of natural gas is found offshore, the construction of one or more gas plants is virtually assured. It should be noted that gas plants can provide feedstock (primarily ethane) for petrochemical plants, an important industry of Gloucester County's economic base.

Requirements and Impacts

(for a hypothetical/billion cubic ft/day facility)

Location: Must be sited between where the raw gas pipeline comes on shore and the closest commercial transmission pipeline. Coastal sites are preferred, but land availability is the primary determinant.

Land: 50-75 acres

Water: 200,000 gallons/day

Energy: 5.4 million KWH/month
360 million cubic ft/month natural gas from feedstock

Construction Labor: 500 workers for 1 1/2 years

Operation Labor: 45-55 workers (60% local)

Operation Wages: Approximately \$750,000/year; \$15,000 average annually

Capital Investment: \$85 million

Air Emissions: Hydrogen sulfide, sulfuric oxides, hydrocarbons, particulates, carbon monoxide, nitrogen oxides

Wastewater Contaminants: Dissolved hydrocarbons, sulfuric acid, chromium, zinc, phosphates, bases, sulfite

Noise: 80-100 decibel from boilers, compressors and flarestacks: 24 hours/day

Solid Wastes: Sludges, scale, spent dessicants, filtration media, oil absorbents

MARINE TERMINAL - required whenever waterborne shipments of crude oil or products are made, typically consisting of a berthing system for vessels, loading equipment, storage tanks, safety equipment, and navigational facilities.

Requirements and Impact

(For a 250,000 barrel/day through port terminal with storage capacity of 1 million barrels in four 250,000 tanks)-

Land: Approximately 30 waterfront acres

Water Depth: 50-60 feet

Fresh Water: limited

Construction Labor: 560 workers, 20% local

Construction Wages: \$19,600 average annually

Operation Labor: 10-90 (depending on degree of contract labor used) 70% local

Operation Wages: \$16,000 average annually

Capital Investment: Approximately \$50 million

Air Emissions: Hydrocarbons from tanks and transfers, exhaust emissions from compressors

Wastewater Contaminants - BOD: COD: suspended solids; oil and grease from bilge, ballast, and storm water, chronic small spills; potential for larger spills

Solid Wastes: Contaminated sludge and sediments

REFINERY - Chemically and/or physically alters crude oil into various petroleum products. A typical refinery includes processing units, storage tanks, water treatment facilities, offices, machine shop, storage and warehouses, electrical substations, firehouses, pumping stations, truck loading areas, pipelines, rail spur, parking areas, and buffer zones. Sites are often large but with only a small percentage of total area in intensive use. It should be noted that there is currently no direct correlation between the discovery of a commercial quantity of offshore oil and the development of a refinery in an adjacent area.

Requirements and Impacts

(for a moderately complex 250,000 bb/day refinery)

Land: 1000-1500 acres clear, flat, industrially zoned land

Water: 10.5 million gallons/day withdrawn; 4.5 million gallons/day consumed

Energy: 1.45 million KWH/day

Construction labor: 1800 average over 3 years; 3500 peak employment;
70% local

Construction wages: \$38.5 million; \$18,000 average annual

Operation labor: 410; 80% local

Operation wages: \$6.5 million; \$15,250 average annual

Capital investment: \$500-750 million

Air emissions: carbon monoxide, sulfur oxides, nitrogen oxides, hydrocarbons, and particulates

Wastewater contaminants: thermal effluent, anti-fouling chemicals, a variety of contaminated process waters, BOD, COD, etc.

Noise: 50 decibels at boundary

Solid waste: Contaminated process solids and effluent, solids requiring special handling, variety of general packaging and domestic solid waste

PETRO-CHEMICAL PLANTS - refers to a variety of processing facilities producing a variety of chemicals derived from petroleum sources, including natural gas, natural gas liquids from gas processing plants, and products of oil refineries. Because of the complexity of the industry, there is no standard size nor standard combination of products produced by petrochemical plants. A plant may simply consist of several additional processing units added to an oil refinery, while at the other extreme, it may be a huge complex producing a large number of products and occupying sites of several hundred acres. Generally speaking, a plant located in a frontier region may tend to be less complex than one located in an area with an existing petrochemical infrastructure. Like the siting considerations for an oil refinery, the discovery of commercial quantities of oil and gas in frontier areas does not necessarily imply that petrochemical plants will be developed, since there are many complex factors which influence petrochemical plant development.

LIQUIFIED NATURAL GAS (LNG) TERMINAL - consists of import-receiving terminals for large ocean - going LNG tankers, storage depots and gasification plants, and gas transmission pipelines. Liquified natural gas (LNG) is 1/600 the volume of natural gas, making it much more economical and convenient for transportation and storage. As U.S. domestic supplies have declined, gas suppliers have been looking at LNG as a source of additional supplies. If present plans and proposals pending approval were implemented, there would be a rapid increase in the use of liquified natural gas in the United States over the next decade with more than 50 LNG tankers involved. Some project that at least 10% of the total U.S. gas demand will be supplied by LNG imports by 1985 and that investments in LNG transportation facilities could be as much as \$18 billion.

CHAPTER VI

OPPORTUNITY AREAS FOR COASTAL ENERGY
FACILITY SITING

This chapter identifies areas that appear suitable for the siting of various OCS and energy related facilities. In addition, an explanation is provided of the siting criteria that were developed and used as guidelines in making the facility siting determination.

An important objective of this study is to actually make a determination of what areas within the County may or may not be suitable for specific OCS and energy related facilities. In order to do so, specific siting criteria are required. The following criteria were used, which sets forth certain guidelines that should be carried out as siting policies. Hopefully, these guidelines will be viewed as having a rational, balanced approach to energy facility site selection, neither intending to prohibit industry from siting needed energy facilities in the County, nor allowing uncontrolled, haphazard facility siting into areas of the County that could prove detrimental for various reasons. It is assumed that any area that does not meet this criteria, at least reasonably well, should be considered a constraint area for energy facility siting.

ENERGY FACILITIES SITING CRITERIA

LAND USE COMPATIBILITY

Areas designated for the siting of energy related facilities must be compatible with surrounding existing land uses. An area that is already industrially developed, or an area that is largely vacant or undeveloped, would, of course, suffer far less severely from the impact of an energy facility than an adjacent residential area would. Many types of industries, in fact, would clearly be enhanced by the siting of energy facilities, such as the siting of a gas processing plant that could provide feedstock for a nearby petrochemical plant.

CLUSTERING

Energy facilities should be clustered into designated use areas, rather than dispersed throughout the region where the impact would undoubtedly be felt more widely.

PROXIMITY TO TRANSPORTATION FACILITIES

Areas designated for OCS and energy related sites should be able to meet

the transportation needs of the energy facility, whether it be for rail, water, airport or highway uses. Energy facilities should not be located in areas that would overburden the local transportation system. The availability of transportation facilities was discussed on Chapter IV.

AVAILABILITY OF LOCAL RESOURCES AND SERVICES

Sites should be considered where the impact from the demands of energy facilities for local resources and services will be felt less severely. Areas that would be overburdened by demands placed on its water supply, for example, should be avoided.

ENVIRONMENTALLY SENSITIVE AREAS

Areas that are environmentally sensitive should be avoided. Seven categories have been identified as having environmentally sensitive characteristics which include:

Flood Prone	Steep Slope
Coastal Wetlands	Prime and Critical Wooded Areas
Surface Water	Prime Aquifers
Seasonal High Water Table	

These environmentally sensitive areas were defined and mapped in Chapter IV of this study.

CONSISTENT WITH LOCAL PLANS

The location of designated facility siting areas should be consistent as much as possible with local wishes and desires as reflected in municipal master plans and zoning ordinances. Again, Chapter IV identified areas that have been zoned for heavy industry and could therefore accommodate the siting of most OCS and energy related facilities.

LARGE CONTIGUOUS VACANT TRACTS

Many types of OCS and energy related facilities require very large tracts of vacant land - some as much as 2000 acres including expansive buffer areas. It is for this reason, combined with the desire to cluster various facilities,

that it is necessary that areas designated for energy facility siting be large, contiguous vacant tracts.

PIPELINE SITING CRITERIA

Pipelines should be limited to one or two corridors. Existing transportation rights of way, including existing pipeline rights of way, should be utilized to the maximum extent possible in order to mitigate the impact to environmentally sensitive areas and to avoid possible land use conflicts.

SUITABLE AREAS FOR COASTAL ENERGY FACILITY SITING

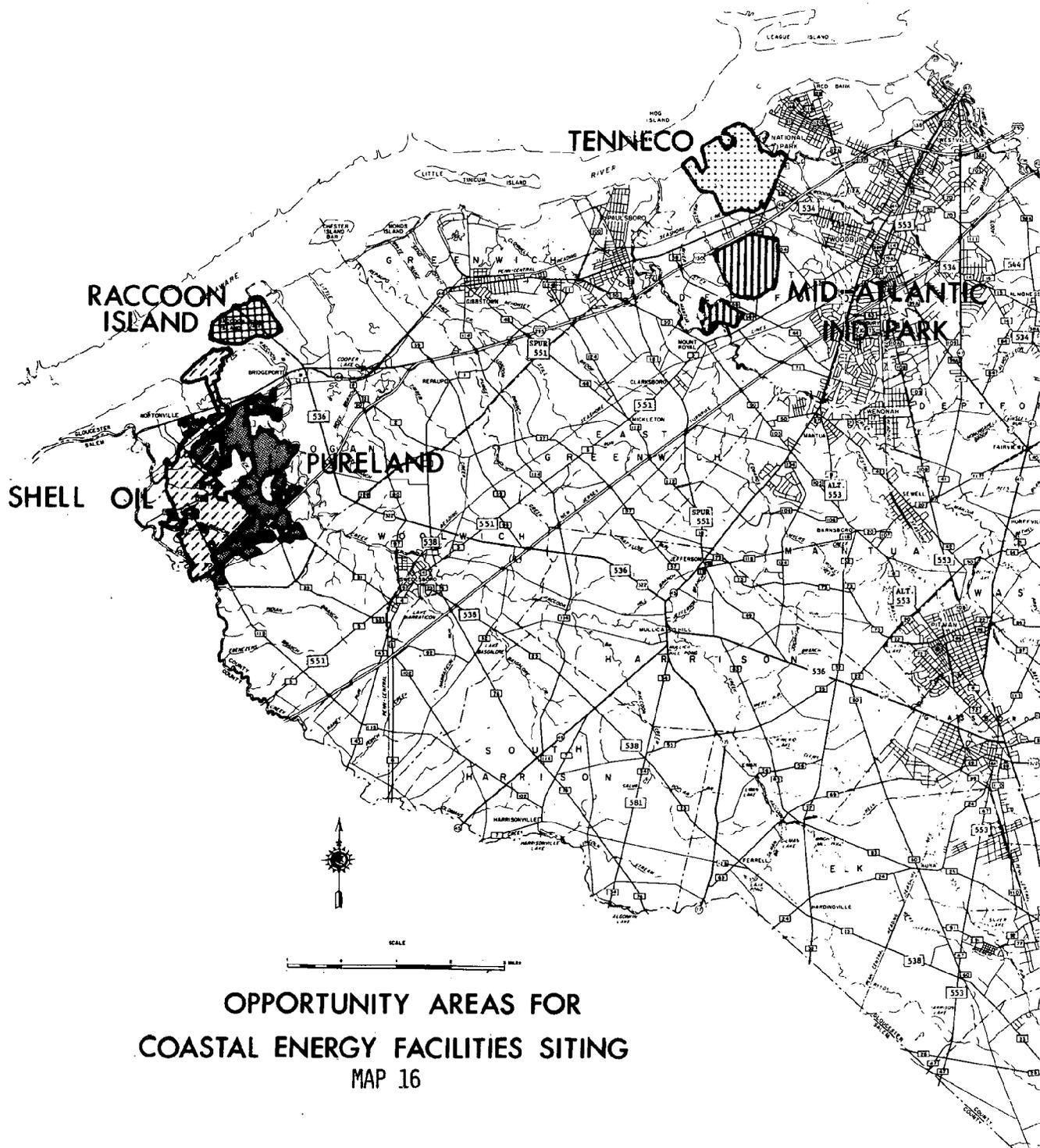
Using the criteria established previously in this chapter, areas within the County have been designated as being suitable for accommodating various OCS and energy related facilities. A total of four sites have been selected. All but one of the sites are along the Delaware River, since most OCS related facilities require a waterfront location.

TENNECO TRACT

This site is located in West Deptford Township along the Delaware River, directly across the River from the Philadelphia International Airport. The site is bordered on the east by Woodbury Creek and the Borough of National Park; on the north by the Delaware River and on the west by low density industrial development. The southern border consists of Grove Road, the community of Thorofare within West Deptford Township, and a branch of Conrail. The site is approximately 90 miles up the Delaware from the Atlantic Ocean.

The site is composed of two tracts that total 1,100 acres together. The western tract, which consists of 529 acres, has been proposed by Tenneco for a controversial liquified natural gas (LNG) terminal facility. There are no known plans for the remaining 616 acre tract owned by Tenneco, other than as a very large buffer.

The site is presently undeveloped, consisting of made land, farm land and open fields, marshlands, wooded swamplands, and old orchards. Approximately 530 acres of the site have been used as a disposal area for dredge spoils from the Delaware River.



**OPPORTUNITY AREAS FOR
COASTAL ENERGY FACILITIES SITING
MAP 16**

The site offers a potential variety of transportation facilities. As mentioned above, Philadelphia International Airport lies across the Delaware River from the site and the site is bounded in the south by a branch of Conrail (formerly the Penn Central Reading Seashore Line Railroad). A major interstate highway, U.S. I-295, is within close proximity southeast of the site. Because of the existing shallow depth of the Delaware River, the present condition of this site could not offer docking facilities. However, an extension of the Mantua Creek Anchorage area, which lies adjacent to this site, was authorized by Congress in 1958, and if developed, would extend into this proposed siting area. Current levels of shipping operations have not warranted the construction of the anchorage extension.

This site is located within the Consolidated Region service area of the Gloucester County Sewerage Authority, which presently serves approximately one third of the County. The Regional Sewerage System's plant presently treats approximately 13 million gallons/day including a variety of industrial wastes. The plant has a present capacity of 15 million gallons/day with an ultimate capacity possibly as high as 25 million gallons/day.

It should be noted, however, that the eastern portions of this tract are within close proximity to the County's proposed expansion area of the existing Red Bank Battlefield Park. Buffering and other protective measures should therefore be taken in developing any type of facility at this site to prevent the aesthetic and environmental degradation of adjacent areas. Also, this tract, as well as the entire Delaware Riverfront area, lies on the Raritan Magothy aquifer, a major domestic water supply source. Great care must also be taken, therefore, to protect the area so that a continuous, permanent supply of high quality drinking water can be assured.

RACCOON ISLAND

This site is a 560 acre tract located in Logan Township in the northwestern portion of Gloucester County. The site is bounded on the north and west by the Delaware River and on the south by Raccoon Creek. The eastern boundary is U.S. Route 322, which has been relocated further east, aligning it with the Commodore Barry Bridge, which was completed in 1974, linking the area with Chester, Penna. Although this site actually was an island originally, it has since been elevated and joined to the mainland by dredge spoil disposal operations, which began in the mid-thirties and contin-

ued through the mid-sixties. The site is approximately 80 miles up the Delaware from the Atlantic Ocean. Like the Tenneco Tract, Raccoon Island has been the subject of controversy, having been proposed by Transco as a liquified natural gas (LNG) import terminal. The Transco Gas Pipeline, as well as an Atlantic City Electric Transmission Line, runs through the site.

Contrasting to the highly industrialized Pennsylvania side of the Delaware River, the area surrounding this site is very sparsely developed, with a few exceptions. There are two petro-chemical plants in the vicinity; Monsanto Chemical to the southwest of the site; and Polyrez to the southeast. Also to the southeast is the primarily residential settlement of Bridgeport. The developing Beckett New Town is located approximately six miles south of the site.

Raccoon Island offers many of the siting characteristics that the Tenneco Tract offers. The site has been zoned for heavy industry by Logan Township, and this is reflected in the Township's master plan. Transportation facilities are extensive. As previously mentioned, U.S. Highway 322 borders the site, and Interstate 295 is in the vicinity. Two major airports, Philadelphia International and Wilmington, are within a 15 mile radius and a small airport, Bridgeport, is close by. The same branch of Conrail that passes by the Tenneco Tract is within close proximity of this site. The heavily trafficked Delaware River provides a major waterway for the site, although dredging and/or the use of extended piers would be required.

All of Logan Township is within the Logan Township Municipal Utilities Authority's sewerage service area. Present plant capacity is one million gallons/day, including treatment for a variety of industrial wastes, with a proposed plant capacity of five million gallons/day.

Like the Tenneco Tract, Raccoon Island lies on the Raritan-Magothy Acquifer, a major high quality water supply source. In developing any type of facility, great care must be taken to protect this area.

PURELAND INDUSTRIAL PARK

Pureland is an expansive industrial park that is in the early stages of development. Like Raccoon Island, Pureland is also located in Logan

Township, south and west of Raccoon Island and north of Beckett New Town.

The area surrounding Pureland is sparsely developed, consisting primarily of farmland, vacant land, and marshes. Pureland is a very irregularly shaped parcel of land, but, generally speaking, its northern boundary is the Delaware River and Monsanto Chemical, its western boundary is Oldmans Creek (which is also the Gloucester County-Salem County Border) its southern border is Route I-295 and its eastern border is Raccoon Creek.

The total size of the industrial park is 3000 acres, of which approximately one third is owned by Shell Oil Corporation. In 1973, Shell Oil had proposed to build an oil refinery at this site. Shell's future plans for the site are highly speculative. Excluding the area that is presently owned by Shell Oil, and also excluding wetlands, raparian lands, marshes, etc., Pureland has approximately 1000 acres that are buildable. To date, Pureland has developed 55 acres, with a total of 888,000 sq. ft. of warehouse storage space. There are 50,000 sq. ft. of vacant warehouse space presently available.

The area has been zoned for industry by Logan Township. Highway access is provided by Route I-295, rail access by a branch of Conrail, and barging facilities are available on the Delaware. Sewer service is provided by the Logan Township Municipal Utilities Authority. Like the other sites previously mentioned, Pureland lies on the Raritan Magothy aquifer. Proper measures must therefore be taken in developing this site so that the quality of this important water supply source does not deteriorate.

MID-ATLANTIC INDUSTRIAL PARK

Mid-Atlantic Industrial Park is a 600 acre tract located in West Deptford Township directly south of the Tenneco Tract. Its northern border is Interstate Highway I-295. Shell Chemical and Mantua Creek lie west and south of the Park. East of the Park are primarily open fields. Further east are open fields, wooded areas, and residential development. The City of Woodbury is about a mile to the east. The Park is currently developing. Approximately two hundred acres of the six hundred acre site have been developed with about 330 acres remaining for the development of light industry and 70 acres for heavy industry. There are presently about 100,000 sq. ft. of warehouse space available.

Mid-Atlantic Industrial Park offers major highway access via Route I-295 and rail access via a branch of Conrail. Unlike the other sites mentioned, Mid-Atlantic has no water access. The area has been zoned for industry by West Deptford Township, and it is within the service area of the Gloucester County Sewerage Authority.

PIPE LINE CORRIDORS

Three hypothetical corridors have been proposed, all of which primarily follow existing transportation corridors. It is assumed that a crude oil pipeline would be sited to link offshore oil with the oil refineries in the Philadelphia-Gloucester County area. These hypothetical pipeline corridors are as follows:

ATLANTIC CITY EXPRESSWAY

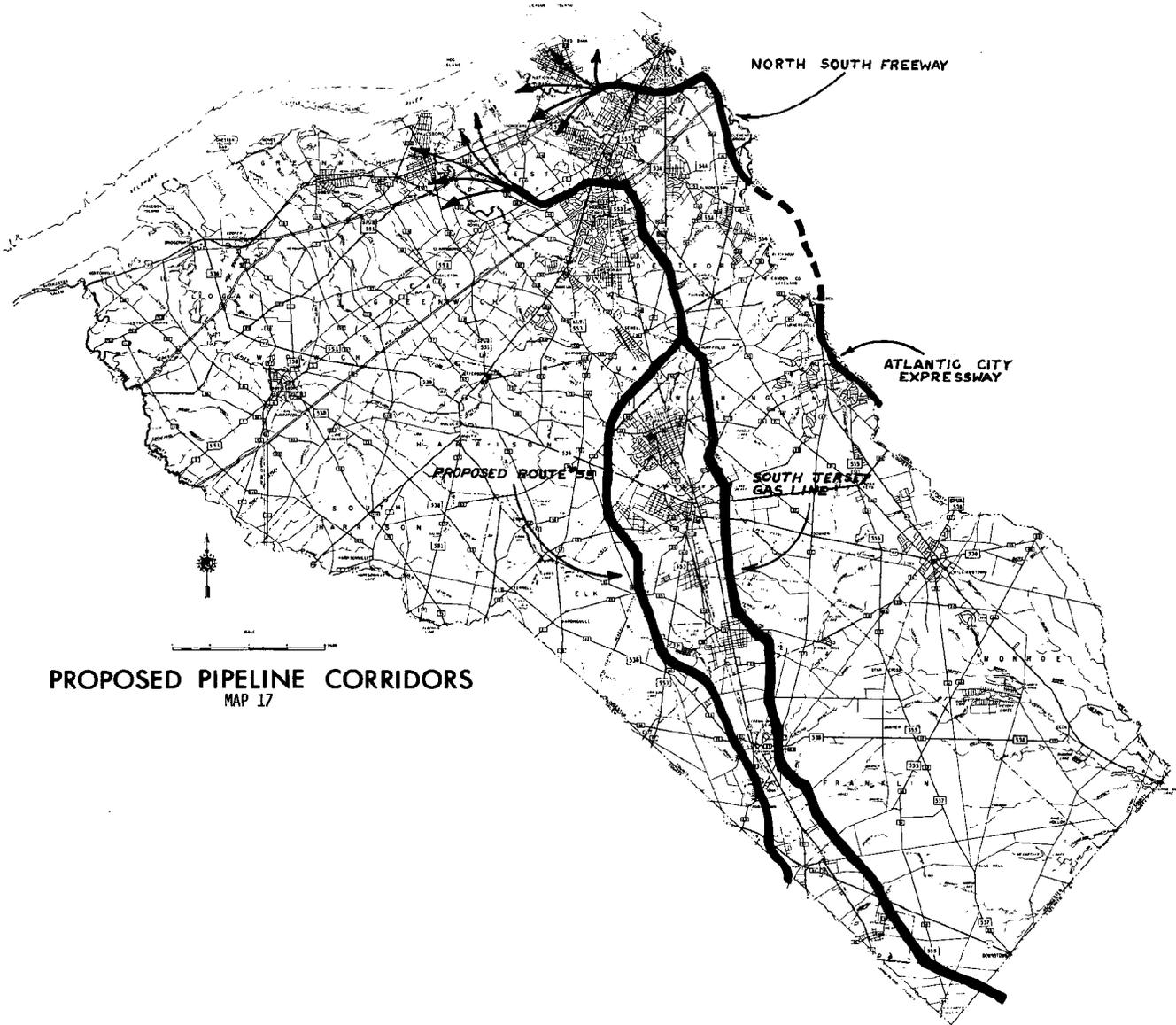
This hypothetical route would follow the Atlantic City Expressway from the Atlantic City area to the North-South Freeway (Rt. 42), then follow I-295 to the vicinity of the County's refineries. Various existing oil product pipeline rights of way could be followed directly to the refineries or across the Delaware River to the refineries on the Pennsylvania side.

SOUTH JERSEY GAS COMPANY TRANSMISSION LINE

This route would parallel the 50 foot right of way gas transmission line that South Jersey Gas maintains from the Atlantic City area to the Transco Pipe Line in the northern part of the County. Again, at this point, various existing rights of way could be followed directly to area refineries.

PROPOSED ROUTE 55

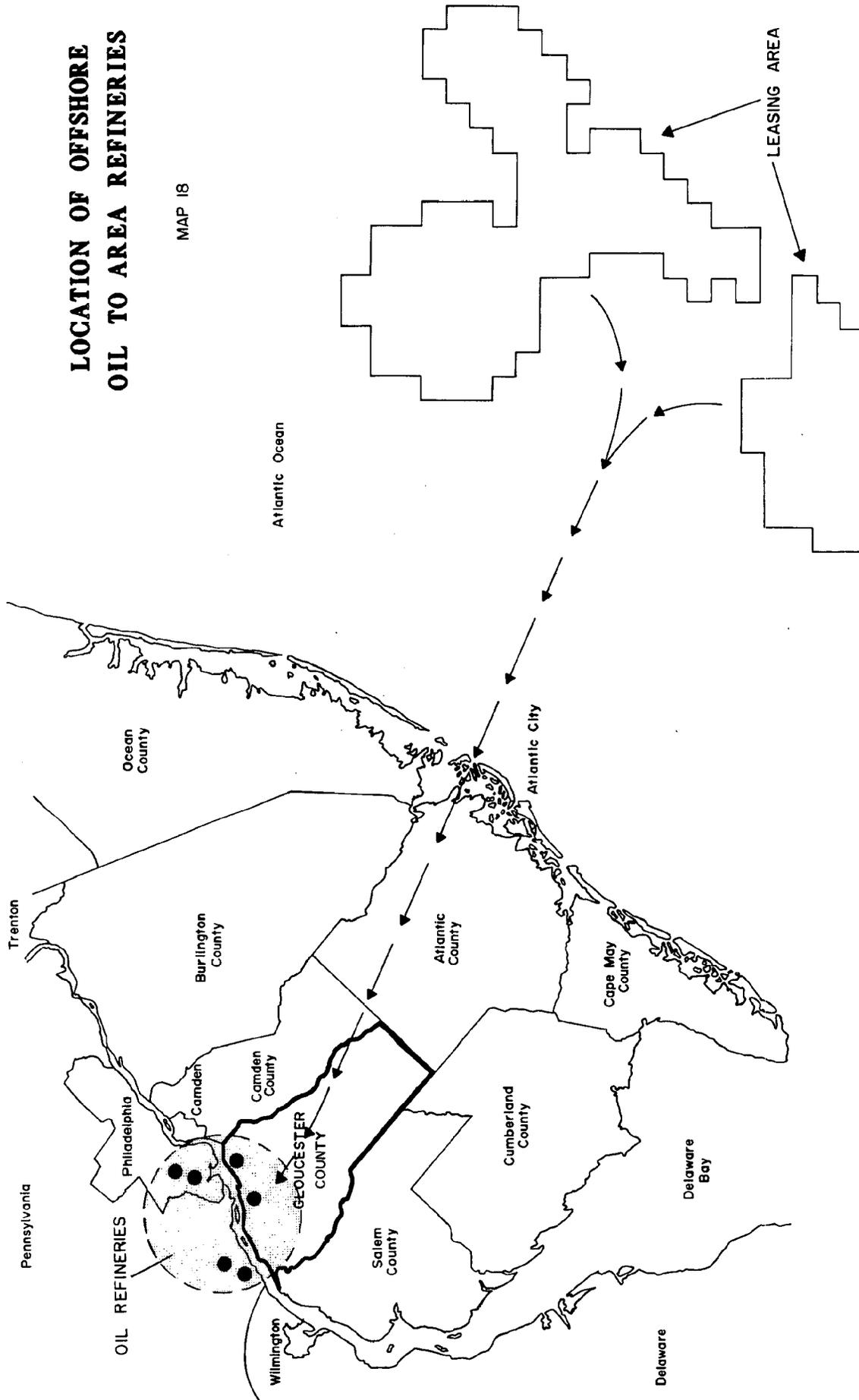
This route would follow the major limited access highway Rt. 55 up through Cumberland County to Route 40 near the Cumberland-Gloucester border, where the highway presently ends. From this point, it would follow the proposed location of the Route 55 right of way to the vicinity of the South Jersey Gas Transmission Line right of way.



PROPOSED PIPELINE CORRIDORS
MAP 17

LOCATION OF OFFSHORE OIL TO AREA REFINERIES

MAP 18



CHAPTER VII

PROSPECTS AND SITING RECOMMENDATIONS FOR OCS AND ENERGY RELATED FACILITIES

Chapter V provided a brief description of various OCS and energy related facilities, along with their siting requirements and potential impacts. This chapter discusses the prospects and siting recommendations for these various facilities from Gloucester County's perspective.

TEMPORARY AND PERMANENT SERVICE BASES

The County's siting potential for service bases must be considered slight since companies look for available vacant land in existing ports closest to offshore activity (usually within 150 miles). The County has very little to offer in the way of existing vacant harbor facilities that could presently service this type of facility. The major docking facilities that do exist in the County have been designed almost exclusively to accommodate the berthing of tankers and other vessels related to the County's petro-chemical industries. In addition, distance from offshore oil activity is not in the County's favor. The County is approximately 80-100 miles up the Delaware from the Atlantic Ocean and it is at least another 75 miles to the offshore tracts. As one industry spokesman succinctly phrased it, "It's a long ride to Camden". It's almost as far to Gloucester County. Camden, at least, can offer existing vacant harbor facilities available to support service base activities.

REPAIR AND MAINTENANCE YARDS

For much the same reasons that a service base is unlikely to locate in Gloucester County, it is also unlikely that repair and maintenance yard activities would locate in the County. The County simply does not have the types of existing facilities required to support such activities; nor does the County have an advantageous location compared to sites near or along the Atlantic Coast.

GENERAL SHORE SUPPORT INDUSTRIES

Capital investment, land, water, power and labor requirements of these various ancillary industries, such as supply drilling bases, drilling mud supply bases, and catering companies, are small individually. But, together, they are likely to generate significant economic activity including increased jobs, tax revenues, business opportunities, and cash flow in the area developed.

Some ancillary industries require coastal waterfront dock space but others, such as supply drilling bases, do not. All require a certain amount of warehouse storage space, usually between 5000 and 20,000 sq. ft., and also

access to adequate highway and rail facilities. Both Pureland Industrial Park and Mid-Atlantic Industrial Park offer abundant storage space and rail and highway access and are therefore suggested as potential sites in Gloucester County for these types of activities. Whether these industries would consider locating at these sites, however, given their distance from the Atlantic Coast, is somewhat questionable.

STEEL PLATFORM FABRICATION YARDS

It is unlikely that a steel platform fabrication yard would or possibly even could locate in Gloucester County for several reasons. First, a platform is a highly mobile apparatus. Platforms that are fabricated in the Gulf Coast and in the North Sea area can be transported to the Mid-Atlantic for use. Second, should activity in the Mid-Atlantic increase to the point that would warrant siting a fabrication yard in the Mid-Atlantic area, it is important to note that there are already tentative plans for a fabrication yard in the vicinity of St. Charles on the Chesapeake Bay on the Delmarva Peninsula in Virginia. The need for more than one additional site is questionable. Third, height restrictions in the Delaware due to the Commodore Barry and Delaware Memorial Bridges pose a serious problem. Low water clearance of the Commodore Barry Bridge is 179 feet and 175 feet for the Delaware Memorial Bridge. Platforms require a vertical clearance of 210 feet.

Nevertheless, should additional sites be needed, and industry can address and resolve the bridge clearance problem, it is recommended that a moderately sized fabrication yard could be located at either the Tenneco, Raccoon Island or Pureland sites.

PLATFORM AND PIPELINE SERVICE BASES

Siting requirements for these types of service bases are similar to that of temporary and permanent service bases. It is therefore for the same reasons that the siting in Gloucester County of temporary and permanent service bases are unlikely that platform and pipeline bases are also unlikely. Distance from offshore oil and the unavailability of existing vacant harbor facilities appear to make Gloucester County an unfeasible location for these service bases.

PIPE COATING YARDS

The Tenneco Tract, Raccoon Island, and Pureland all offer good rail and major highway access and, with modifications, waterway access; all major requirements of a pipe coating yard. However, as with various other OCS related facilities, distance from the offshore operations, particularly marine pipe laying operations, may pose a fairly important siting problem.

PIPE LINES

Should large enough quantities of oil and/or gas be found offshore, the likelihood of a pipeline being located somewhere in the County appears to be the most probable type of OCS related development that can be expected. Considering the location of two major refineries in the County along the Delaware, as well as four other refineries located in the Philadelphia area, it seems likely that a pipeline would be built to link offshore oil to these refineries - with Gloucester County in its path. Of course, much depends on who finds what amount and where. In addition, a gas pipeline could be built to link offshore gas that is discovered with the major Transco commercial gas transmission pipeline that runs through the northern part of Gloucester County.

Three alternative pipeline routes were discussed in the previous chapter - Atlantic City Expressway, South Jersey Gas Transmission Line, and proposed Route 55. It is expected that a pipe line would follow one of these routes in order to mitigate impact to existing land uses and environmentally sensitive areas.

GAS PROCESSING AND TREATMENT PLANTS

Coastal sites are preferred for gas plants but land availability is the primary determinant. Should government action, such as the denial of necessary CAFRA permits, prevent the location of a gas processing and treatment plant in a coastal area, Gloucester County may possibly be looked upon by industry as a viable alternative.

If a gas plant were to be located in Gloucester County, it should be sited in one of the four designated areas described previously. All four

areas are within close proximity to a major commercial transmission pipeline (Transco), an important siting consideration for a gas plant. Furthermore, in conjunction with the desire to cluster facilities, each would provide a site for a gas plant that is in the vicinity of the County's petrochemical industries.

As mentioned previously, a gas plant can provide feedstock for petrochemical industries, which, of course, are an integral part of Gloucester County's economic base. On the other hand, gas plants are not big employers during operation; they are visually unattractive, and care must be taken that air and water quality standards are not violated.

REFINERIES

As previously mentioned, there are already two refineries that exist in Gloucester County. From most indications, it seems likely that the County's existing refineries would probably substitute offshore oil for oil presently imported rather than there be the construction of new refineries - should the oil be found suitable and in large enough quantities. There is currently no direct correlation between the discovery of commercial quantities of offshore oil and the construction of a refinery in an adjacent area. However, the expansion and/or modernization of either refinery or both would appear viable if air and water quality standards are not violated.

The possibility of the construction of a new refinery cannot be completely ruled out, however, since Shell Oil still owns a 1600 acre tract in Pureland Industrial Park where Shell had proposed a refinery in 1973. Shell Oil, it should be pointed out, was one of the major successful bidders of lease sale #40. On the other hand, with Gloucester County already having two major oil refineries, an argument could be made concerning the ability of the County to accommodate another refinery without severely jeopardizing air and water quality.

MARINE TERMINALS

There already exists a large number of marine terminals in Gloucester County that are related to the County's present petrochemical industries.

The County's two refineries, for example, depend on imported crude oil brought to the refinery by tanker on the Delaware as their supply source. They therefore presently require terminals with a large storage tank capacity in order to insure a constant supply of crude oil during refining operations. The Texaco Plant's present gross tankage capacity is 9.5 million barrels; Mobil's is 8.3 million. Should a large quantity of crude oil be discovered offshore and a pipe line be built to carry the oil to the refineries, this large storage tank capacity probably would not be needed. At the least, there certainly would be no need for expansion. The construction of any new marine terminals, particularly due to any OCS related activity, would therefore seem highly unlikely. If, however, for any reason, there might be a need for more marine terminal facilities, it is recommended that existing facilities be expanded rather than there be the construction of terminal facilities in new, undeveloped areas.

PETRO-CHEMICAL PLANTS

As mentioned previously, petro-chemical industries are an important contribution to Gloucester County's economic base. At the same time, it should be pointed out that, like refineries, there are many complex factors which influence petrochemical plant development and that the discovery of commercial quantities of oil and gas does not necessarily imply that petro-chemical plants will be developed. Increased petro-chemical industrial activity cannot be expected, therefore, simply because of OCS related activities. Should there be an increase in such activity, however, it is recommended that new facilities be clustered in areas of existing petro-chemical industries.

LIQUIFIED NATURAL GAS (LNG) TERMINALS

Two sites in Gloucester County have been proposed for LNG terminals- the Tenneco Tract in West Deptford Township and Raccoon Island in Logan Township. These two sites have also been recommended in this report as areas of opportunity for OCS and energy facility siting.

The siting of LNG facilities is a highly controversial issue, and has become particularly controversial in Gloucester County because of these two

LNG siting proposals. Local municipalities have opposed their siting. Concerns dealing with the issue of safety have been expressed by various groups in Gloucester County communities along the Delaware River, as well as by groups in communities in neighboring counties and states. These two sites would involve LNG tanker transit up the heavily trafficked Delaware River, passing through the navigationally hazardous Marcus Hook area. There are some who have therefore suggested a very real possibility of a substantial LNG spill, with a subsequent LNG vapor plume and potential ignition into a firestorm, resulting in a significant risk to nearby populace.

Whatever the risk factors involving LNG truly are, it seems rather obvious, from all the controversy that has been generated, that these risks have not been clearly identified. Unless these risks were to be absolutely identified and overcome, the use of either site for an LNG terminal would seem unjustifiable. It is therefore recommended that the Tenneco Tract and Raccoon Island could be used for various OCS and energy related facilities, as mentioned previously in this report, but not for LNG facilities.

FACILITY RANKINGS

An objective of this study is to rate and rank these various OCS and energy related facilities on the basis of their feasibility and compatibility. Feasibility has been defined in this context as a perception of how industry would probably view the potential of siting various facilities in Gloucester County. Compatibility is defined as how well these facilities are suitable to Gloucester County, considering such characteristics as existing land use, economy, environmental resources, existing industries, transportation facilities, etc. A rating of five signifies very feasible or very compatible; a rating of one signifies very unfeasible or very incompatible. A major assumption in these rankings is that a large commercial quantity of oil and gas will be found. These rankings are, of course, subjective.

	<u>Feasibility</u>	<u>Compatibility</u>	<u>Total</u>
Pipe Lines	5	5	10
General Shore Support	3	5	8
Gas Processing & Treatment Plant	3	3	6
Temporary and Permanent Service Bases	2	3	5
Repair and Maintenance Yards	2	3	5
Steel Platform Fabrication Yards	2	3	5
Platform & Pipeline Service Bases	2	3	5
Pipe Coating Yards	2	3	5
Refineries	2	3	5
Petro-Chemical Plants	2	3	5
Marine Terminals	1	3	4
Liquified Natural Gas	3	1	4

As seen above, pipe lines rank first, followed by general support industries, then gas processing and treatment plants. Pipe lines rank high in feasibility due to the County's location "between" offshore oil and area refineries, as explained earlier in this report. It ranks high in compatibility due to the fact that pipelines are the most environmentally safe means

of transporting oil and are "invisible" after construction. There are already many major oil and gas pipelines in Gloucester County that have little or no impact.

General shore support industries rate a qualified feasibility ranking because of the County's distance from the shore, but high in compatibility since these types of facilities can utilize existing warehousing facilities. A gas processing plant is rated somewhat feasible; coastal locations are preferred, but industry may find land availability a problem. A gas processing plant is also rated somewhat compatible since, although these facilities can hardly be considered aesthetically or environmentally attractive, and although they are not major employers, they are compatible with the County's existing petro-chemical industries since they provide feedstock for their operations.

CHAPTER VIII

COUNTY ROLE IN COASTAL ENERGY FACILITY SITING

This chapter discusses the County's role in siting energy facilities from a perspective of the County's relationship with the State, other counties, the County's municipalities and the public.

County government in the State of New Jersey is very weak in terms of land use controls under enabling legislation. County planning boards have few defined powers other than to regulate development as it affects county roads. The recently enacted Municipal Land Use Law hardly even mentions the word "county".

Nevertheless, generally speaking, a certain amount of expertise has centered at the county planning board level that is not usually available at the municipal planning board level. With this expertise, county planning boards, in most cases, have been able to generate a great deal of pertinent planning information that can be used in making land use decisions. In addition, this planning information generated at the county level tends to be far more comprehensive than information generated at the state level.

COUNTY-STATE RELATIONSHIP

The State apparently recognized this county level of expertise in granting planning funds to Gloucester County, as well as eleven other New Jersey counties, to assist the State in developing the energy element that is mandated by the New Jersey Coastal Area Facility Review Act of 1973 and the Federal Coastal Zone Management Act of 1976. Accordingly, Gloucester County views its relationship with the state in coastal energy facility siting as basically being of one of disseminating to the state local oriented information and providing the state with input that reflects local plans and policies.

COUNTY-COUNTY RELATIONSHIPS

There are many coastal energy facility siting characteristics that take on regional significance, such as the laying of a pipe line. It is for this reason that co-ordination among counties is viewed as being of particular importance. During the time frame of the OCS and energy facilities contract, Gloucester County co-ordinated its efforts with other counties a number of ways. The County met monthly with the State and the eleven other counties to discuss the energy facility plans each county was developing. Monthly reports of findings were also shared. In addition, Gloucester County met with representatives from Ocean, Atlantic, Burlington, and Camden Counties to discuss potential pipe line corridors of mutual interest and concern.

Further, the County co-ordinated efforts with Burlington, Camden, Salem and Cumberland Counties in holding a Delaware River and Bay regional public meeting on energy facility siting. Because of the regional impact of many energy related facilities, efforts of communication and co-ordination among counties should continue.

COUNTY-MUNICIPAL RELATIONSHIP

The Gloucester County Planning Board provides technical assistance to local municipalities, primarily in the form of disseminating pertinent planning information that the municipalities can use in making planning decisions. The County's role in coastal energy facility siting is seen as a further expansion of this role. During this contract, information concerning OCS and energy facility siting was distributed to the municipalities, as well as requests for local input. The County is also seen as a liaison between the state and local governments, relating to each the plans, viewpoints, and policies of the other.

COUNTY-PUBLIC RELATIONSHIP

Similar to the County's relationship with the municipalities, the County is seen as a clearinghouse for disseminating pertinent information dealing with energy facility siting issues.

CHAPTER IX

COUNTY VIEW OF STATE AND NATIONAL INTERESTS IN COASTAL ENERGY SITING

The County recognizes that the resulting effects of siting many types of energy facilities are regional, and some even national in scope. The development of the Alaskan pipe line, for example, had national and even world-wide ramifications, even though its impact was most directly felt in Alaska. This would undoubtedly also be true should oil and gas reserves be developed off the Mid-Atlantic Coast.

The siting of energy related facilities is not new to Gloucester County. With two refineries and various other petro-chemical industries, the County has already been playing an important role in providing for state and national energy needs. The need for the development of new vital sources of energy is full recognized by the County.

It is important that we take a rational, balanced approach in evaluating the siting of energy related facilities - adequately meeting state and national interests while at the same time not sacrificing local compatibility. Hopefully, this study has recommended ways that the County could accommodate additional energy related facilities with few adverse effects while at the same time realizing state and national needs and interests in developing energy resources.

CHAPTER X

COUNTY VIEW OF STATE AND FEDERAL ASSISTANCE IN COASTAL ENERGY SITING

The impacts that are felt from the siting of various energy related facilities cover a very broad range. Some impacts can be beneficial, such as increased employment and high tax rates. Other impacts can adversely affect an area with increased demands overburdening local resources and services. Furthermore, these impacts can also be inequitably distributed from municipality to municipality, region to region, and state to state. One community may enjoy the benefits of a "good rate" while an adjacent community may experience a degradation of its air and water quality and increased demands for public services while receiving no economic benefits. Also, one region may be required to carry a disproportionate share of the energy facility siting burden so that another region can reap the benefits of having a dependable energy source.

Gloucester County therefore recommends that federal and state assistance be provided to county and local governments in order to mitigate potential adverse impacts from the siting of energy related facilities. Funds should be readily available for purposes such as to help communities provide for the increased demand for public facilities and to help prevent potential environmental losses or degradation.

BIBLIOGRAPHY

1. Alternatives for the Coast, 1976, New Jersey Department of Environmental Protection
2. Anticipated Impact of Offshore Oil and Gas Drilling on the Cumberland County Area, 1976, Mark Forrest Associates
3. As Built "16" Natural Gas Pipe Line Gloucester County New Jersey, 1951, South Jersey Gas Company
4. California Coastal Plan, December, 1975, California Coastal Zone Conservation Commission
5. "Call for Information" on Coastal Energy Facility Siting: An Analysis of Response, March, 1977, New Jersey Department of Environmental Protection
6. Coastal Effects of Offshore Energy Systems, November, 1976, Office of Technology Assessment, United States Congress
7. Delaware River, Wilmington to Philadelphia Navigational Chart, 1976, U.S. Department of Commerce, National Oceanic and Atmospheric Administration
8. Economic Overview of Gloucester County, New Jersey, September, 1977, Gloucester County Development Council
9. Educators Tour, July, 1976, Association of Oil Pipe Lines
10. Environmental Aspects of Drilling Muds and Cuttings from Oil and Gas Extraction Operations in Offshore and Coastal Waters, May, 1976, Sheen Technical Subcommittee
11. Environmental Map of New Jersey - Energy, June, 1976, Department of Environmental Protection
12. Final Environmental Impact Statement for the Construction and Operation of an LNG Import Terminal at Raccoon Island, Gloucester County, New Jersey, June, 1976, Federal Power Commission
13. Gloucester County Housing Needs Study 1973-1985, July, 1976, Gloucester County Planning Department
14. Gloucester County Land Use Update - 1975, September, 1976, Gloucester County Planning Department
15. Introduction to the Oil Pipeline Industry, May, 1966, Petroleum Extension Service, University of Texas
16. Marine Service Bases for Offshore Oil Development, July, 1976, Alaska Consultants, Inc.
17. Mid-Atlantic Regional Study, October, 1975, Woodward-Clyde Consultants
18. Natural Resources Planning Study, June, 1977, Gloucester County Planning Department

19. NERBC-RALI Project Factbook, November, 1976, New England River Basins Commission
20. Oil Pipeline Construction and Maintenance, Second Edition, March, 1975, Petroleum Extension Service
21. Petroleum Pipelines in the Delaware River Basin, June, 1974, Delaware River Basin Commission
22. Primer of Offshore Operations, 1976, Petroleum Extension Service, University of Texas
23. Real Estate Atlas of Gloucester County, New Jersey, Eighth Edition, 1975, Real Estate Data, Inc.
24. Transportation of Liquefied Natural Gas, September, 1977, Office of Technology Assessment, Congress of the United States
25. Waterborne Commerce of the United States, 1975, U.S. Army Corps of Engineers
26. West Deptford LNG Project, Draft Environmental Impact Statement, December, 1976, Federal Power Commission
27. Who's in Charge? Governmental Capabilities to Make Energy Facility Siting Decisions in New Jersey, July, 1977, David Morrell, Center for Environmental Studies, Princeton University
28. Zoning in Gloucester County, October, 1971, Gloucester County Planning Department

Other Sources

Ron Jones, Transportation Department, American Petroleum Institute, Interview, March, 1977

Lawrence Ogden, Director, Construction and Operations, Interstate Natural Gas Association of America, Interview, March, 1977

Stanley M. Frasier, Chief Engineer, South Jersey Gas Company, Interview, September, 1977

John Crandall, Director, Gloucester County Development Council, Meeting, March, 1977, and Letter Responses, August, 1977 and January, 1978

R. R. Dickinson, Plant Manager, Eagle Point Plant, Texaco, Inc., Letter Response, May, 1977

R. J. Niederstadt, Refinery Manager, Paulsboro Refinery, Mobil Oil Corporation, Letter Response, July, 1977

Ensign Paul, U.S. Coast Guard, Gloucester City Base, Telephone Conversation, September, 1977

Meetings with various oil and gas industries' representatives at DEP/OCZM offices, March 2, April 14, May 13, and June 13, 1977

ASPO Mid-Atlantic Workshop on onshore impacts of OCS oil and gas development, May 23-25, 1977

