New Jersey. Coastal Zone Management Program

Township of Pennsauken Waterfront District Management Plan

FISH HOUSE COVE & TIPPIN'S POND

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PLANNING AND ENGINEERING REPORT FOR FISH HOUSE COVE AND TIPPIN'S POND

Prepared for
The Township of Pennsauken,
Camden County, New Jersey

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Planning and Engineering Report (Task A.b)
of the Waterfront District Management Plan:
Fish House Cove and Tippin's Pond

November, 1981

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Credits

John Rogers of RG&H was partner in charge of this project. Robert W. Pierson, Jr. was project manager. This report was written by Elizabeth Porter and Mr. Pierson and produced by Kim Tomlinson, Joan McCusker, Rich Barrett and Valerie Smith. Base maps were prepared by Patsy Eubanks and Kathryn Kester. Jack Fichter of Pennsauken Township provided a summary of historical information on the Pennsauken waterfront.

Project Support

This is the Planning and Engineering Report (Task A.b) of the Waterfront District Management Plan for Fish House Cove and Tippin's Pond. Appendices A and B, containing reports on project goals and potential funding sources, correspond to Tasks A.c and A.d, respectively. This report is one product of a planning and design study done for the Township of Pennsauken by Rogers, Golden & Halpern with funds awarded to the township by a Coastal Energy Impact Program (CEIP) Grant from the New Jersey Department of Energy.

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Introduction

Fish House Cove and Tippin's Pond are two adjacent areas of remarkable natural beauty along the Delaware River in Pennsauken Township. They are noteworthy not only for their beauty but also for their survival as rich ecological units in an area that is otherwise nearly totally urbanized by industrial and residential land uses. Both the cove and the pond lie along the Pennsauken waterfront just upriver from Petty Island, as shown in Figure 1.

Fish House Cove is a 123-acre remnant of a once extensive marsh and natural waterfront area that occupied the east bank of the Delaware between Petty Island and Delair. In this century much of the marsh along the riverfront has been filled for the dual purpose of disposing of spoil from navigation channel dredging and creating waterfront sites for industrial uses, particularly energy related facilities. The cove has a rich history of Indian battles, industrious Quaker farmers, and summer and winter recreational activities by previous generations of Pennsauken, Camden, and Philadelphia residents. For many years now the tradition of recreation in the cove has been silent except for the occasional report from a hunter's gun, as industrial uses predominate the waterfront area.

The origin of Tippin's Pond is obscure. Whether it is a remnant of the cove that was cut off by the construction of the railroad in 1834 or is a depleted clay pit or is a natural spring-fed depression draining to the cove is not clear today. However, as a natural area it provides a striking contrast to the broad skylines, extensive marsh, and open waters of the cove. Lying slightly above the cove but separated from it by the railroad tracks and deciduous woods, Tippin's Pond is an enclosed environment providing shelter from winds that often blow through the river valley. The pond offers a variety of visual experiences from the banks of the pond.

Both the pond and the cove offer habitat for fish, fowl and small mammals. The pond has provided informal recreation for generations of adventurous Pennsauken children seeking outdoor excitement in the midst of an urban environment: fishing, boating and exploring in the summer; ice skating and sledding in the winter.

The Township of Pennsauken has officially recognized the importance of waterfront areas by creating a Waterfront Management Area--an overlay zone in

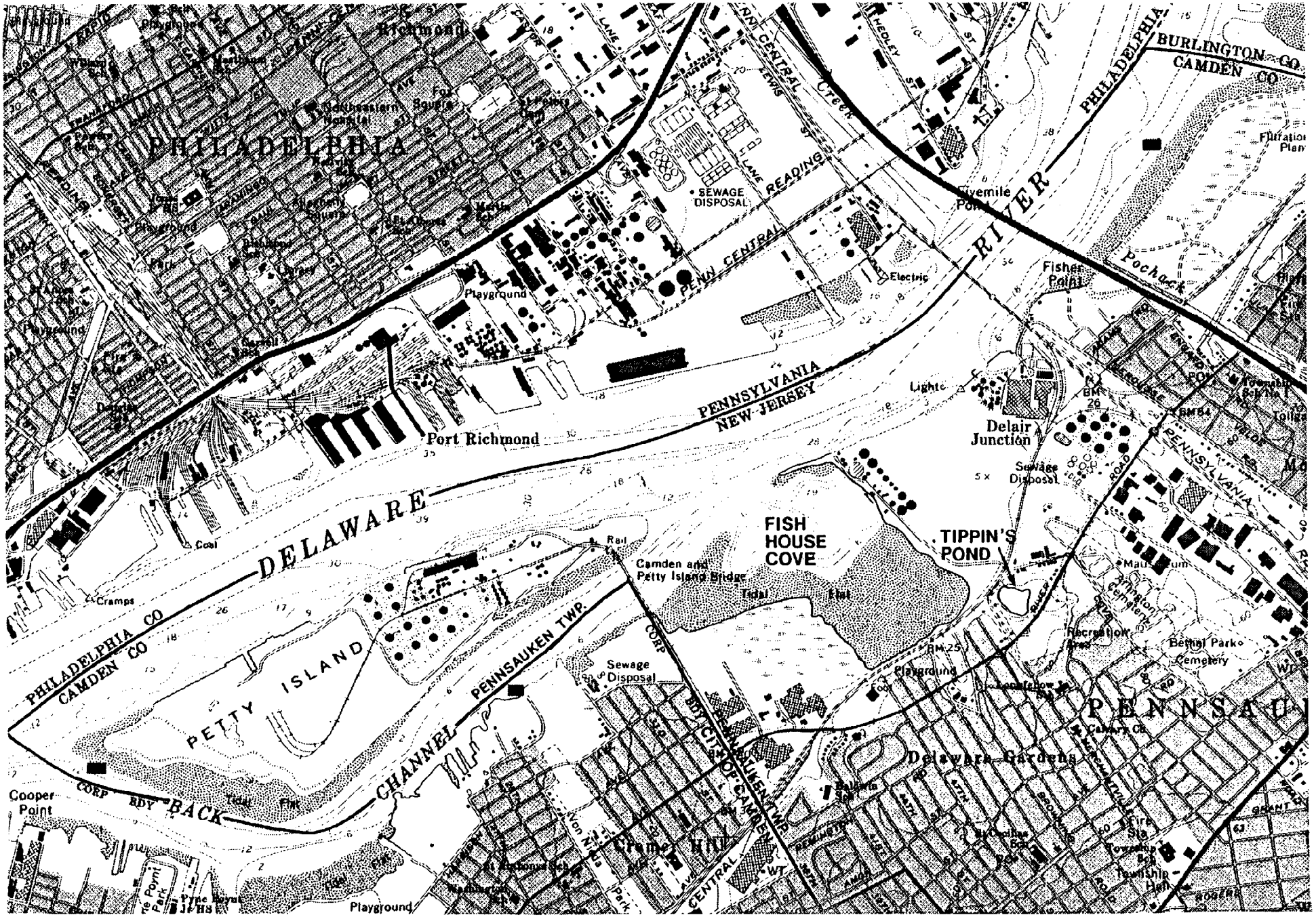


Figure 1. Regional Setting of Fish House Cove and Tippin's Pond (1"=2000').

its zoning ordinance which preserves the waterfront for water-related uses, particularly recreation. Furthermore it has established the Waterfront Management Committee to provide opportunities for citizen and Township officials to work together to plan for the waterfront areas, particularly to create an extensive waterfront park system in the Township. It is hoped that this park system will eventually link parcels currently in public ownership. Fish House Cove and Tippin's Pond are very important elements in this future park system. Fortunately, key parcels are already owned by the Township or the State of New Jersey. The current planning study of Fish House Cove and Tippin's Pond by Rogers, Golden & Halpern is one further step toward the implementation of the waterfront park system. This planning and engineering report summarizes previous studies made of the two sites and provides a basis for the concept plans for their recreational use. Two studies in particular were useful for our study. They are:

- Natural Resource Inventory, Pennsauken Creek and Tippin's Pond; prepared for the Pennsauken Township Environmental Commission by Environmental Analysis, Inc., 1975.

- Potential Environmental Impacts of Energy Facilities and Other Development on Fish House Cove; prepared for the New Jersey Department of Energy by the Camden County Environmental Agency with the assistance of WAPORA, Inc., 1980.

In this report, which corresponds to Task A.b of the study, available information on the two sites is summarized under various headings. The two sites are treated separately except where the topic does not warrant a separate discussion. The planning and engineering report concludes by summarizing and mapping various constraints to recreational use that will be addressed by the concept plan. All figures except 1 and 9 and reductions of base maps and three overlays (Task A.a) prepared at a scale of 1" = 100' which are available at the Pennsauken Township Municipal Building.

The goals of this recreation facility study and the consistency of these goals with local, state, and federal policies are set forth in Appendix A to this report. Posible funding sources for final project specification and construction that are available to the Township are presented and discussed in Appendix B.

Climate of Fish House Cove and Tippin's Pond

The climate of Camden County, where the sites are located, is humid and temperate.

The weather of the Fish House Cove and Tippin's Pond area is controlled primarily by inland weather patterns. Tropical maritime air masses move through the area in the summer, while cold continental arctic or polar air masses pass through in the spring, fall, and winter. Generally, the weather in the area is highly variable, with a succession of alternate high- and low-pressure systems moving from west to east, with very few periods of air stagnation. Average wind speed is 9.6 mph, with prevailing winds from the northwest from November to March, and from the southwest from April to October. Fish House Cove is subject to the full effects of the wind, while Tippin's Pond, surrounded as it is by a 15- to 30- ft ridge and woods on all sides, is somewhat protected. Average annual precipitation is 39.93 in, fairly evenly distributed throughout the year. The driest month is October, and the wettest month is August. The mean temperature of January, the coldest month, is 32.3° F, while the mean temperature of July, the warmest month, is 75.6° F (Environmental Analysis, Inc., 1975).

Soils of Fish House Cove and Tippin's Pond

The natural soils association for the Fish House Cove and Tippin's Pond Area shown on the Soil Conservation Service general soils map (USDA, 1966) is the Downer-Woodstown-Dragston association. These are gently sloping, grayish-brown sandy soils formed from materials in the Cape May, Pennsauken, Cohansey, and Bridgeton geologic formations. Minor soils in this association are Fallsington, Pocomoke, and Klej. The detailed soil survey does not map the soils for the whole area. However, areas that are mapped are shown primarily as "made" land, with a small area of the Freehold and Downer-Urban land complex southwest of Tippin's Pond.

Made land is land on which excavation, filling, or other disturbances have destroyed the original soil horizons. The made land along the Delaware River was primarily created by the pumping of dredged material from the river channel, and it is predominantly sand and gravel. This fill may also include boulders. The

eastern edge of Fish House Cove along the Texaco property is characteristic of this fill.

The Freehold and Downer-Urban land complex occupies areas that have not been filled. This mapping unit is used in urban areas where it is impractical to map each soil separately. The Freehold series, which is more extensive than the Downer series, includes dark grayish-brown, well-drained sandy soils low in glauconite, with a dark yellowish-brown or brown subsoil. These soils are derived from Mt. Laurel and Wenonah sands and Englishtown sand. The soils occur on high positions, such as on the southwestern rim of the Tippin's Pond basin. The stratified substratum is mostly loamy sand but contains thin layers of sandy loam and clayey material. Generally the Freehold soils contain little gravel. The soils are naturally extremely acid (pH 4.5-5.0), moderately fertile, moderately permeable, and they have a moderate-to-good water-holding capacity. The Downer series includes dark grayish-brown, well-drained soils with yellowish-brown subsoil. The soils occur on divides or below divides and are nearly level to gently sloping. Where these soils are shallow, they may be droughty, particularly if the subsoil contains considerable amounts of gravel. They are extremely acid (pH 4.5-5.0), moderately permeable to rapidly permeable, with low natural fertility and low available moisture-holding capacity.

The area around Fish House Cove, although not mapped, probably is almost entirely made land, although some of the original soils may be present at the base of the rail embankments. Marsh areas below the rail embankment along the southern edge of the cove might more accurately be mapped as tidal marsh, consisting mostly of silt and organic matter and supporting vegetation that can withstand daily flooding.

The Freehold and Downer soils of this complex have slight limitations for building sites, sanitary landfills, and septic effluent disposal, except that rapid permeability of the substratum in Downer soils may permit pollution of groundwater (USDA, 1966). These soils have moderate to severe limitations for lawns, ornamental plantings, and athletic fields due to low available water capacity, and slight limitations for parks, playgrounds, and campsites.

The made land has slight limitations for parks, playgrounds, and campsites, and variable limitations for other uses.

Topography of Fish House Cove

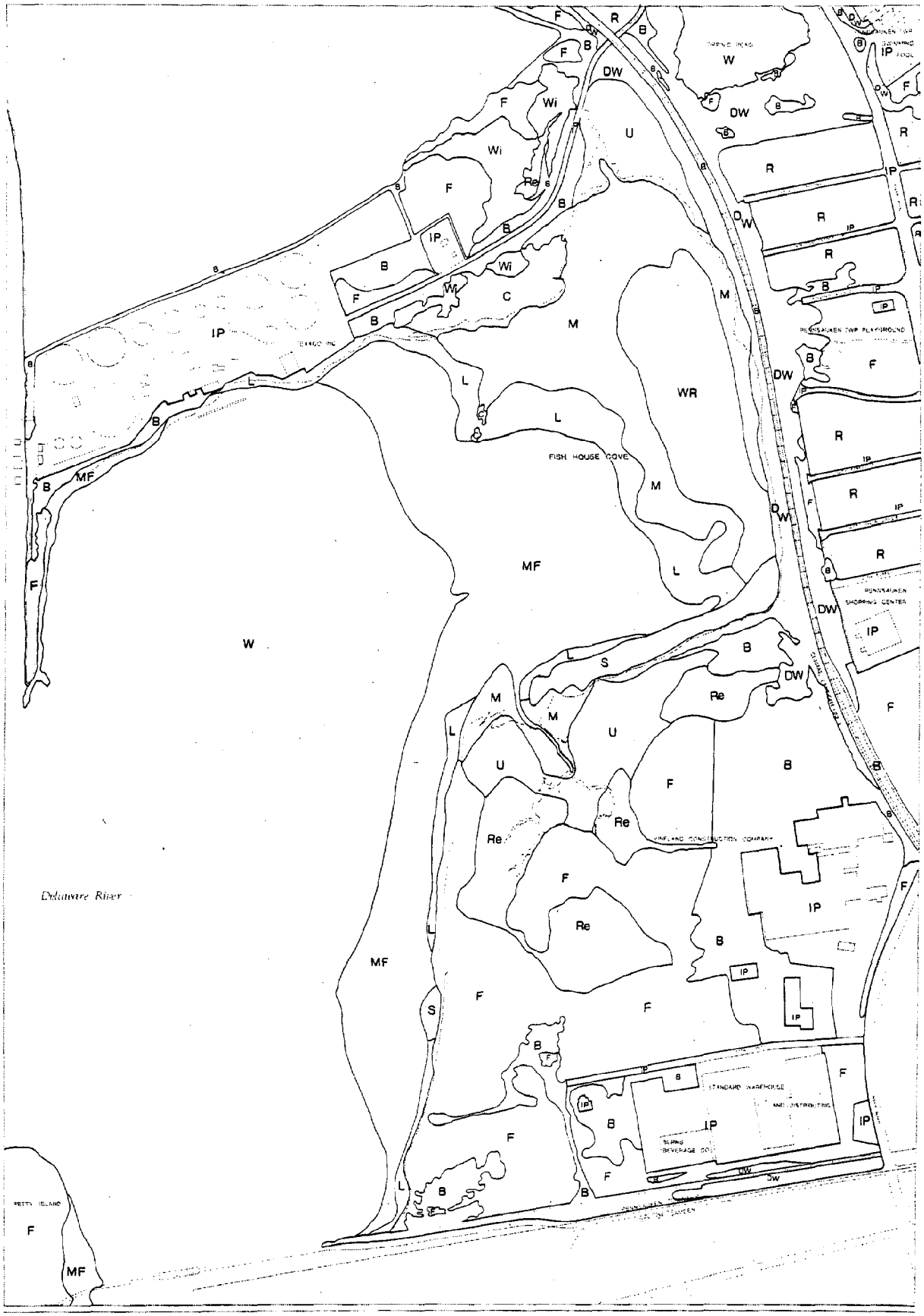
Most of the cove area is covered with water during high tide. The filled area along the cove's northeastern edge and onto the Texaco property rises gradually above the level of high tide and is quite flat until the deeper water of the cove is encountered where the shoreline rises more quickly to the tank farm. The southeastern edge of the cove is confined by the steep Penn Central railroad embankment, which is 20-30 ft above the cove along the tracks.

Topography of Tippin's Pond

Tippin's Pond is surrounded by rather steep bluffs on its southwestern edge and along River Road that are approximately 25-35 ft above the pond's surface. The Penn Central railroad embankment confines the pond on its northwestern edge, and a variety of slopes leading to the water's edge make up the northeastern shoreline; some slopes are gradual but others created by fill are rather steep. A gentle slope leads up to a cleared plateau overlooking the pond in the western corner of the site, and a wooded plateau perhaps 5 ft above the water surface juts into the pond along its northern edge.

Vegetation and Wildlife of Fish House Cove

In spite of the industrial and energy-related facilities that have encroached on Fish House Cove during this century, the remnant marsh, shores, and waters of the cove still support an abundant variety of plant and animal species. Bird species are particularly abundant here. The most recent vegetation and land cover mapping of the Fish House Cove area was published in 1980 in Potential Environmental Impacts of Energy Facilities and Other Development on Fish House Cove (CCEA, 1980) (see Figure 2). The study mapped wetland and upland areas and determined acreages of the wetland vegetation types. Monospecific stands of wild rice (*Zizania aquatica*), spatterdock (*Nuphar advena*), cattail (*Typha angustifolia*, *T. latifolia*), and common reed (*Phragmites communis*) were delineated; marsh areas supporting a mixture of wetland plant species also were delineated as



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

VEGETATION

Marsh		Lowland: Other Lowland		Upland		Other	
L	Lower mixed	Wi	Willow	F	Field	B	Barren
M	Middle mixed	MF	Mudflat	DW	Deciduous woodlot	IP	Impervious surface
U	Upper mixed	S	Beach	R	Residential (grass, shrubs, trees, and dwellings)	W	Water
WR	Wild rice						
C	Cattail						
Re	Reed						

Figure 2

lower, middle, and upper mixed marsh. Three small patches of willow lowland forest, predominantly black willow (Salix nigra), also were mapped.

The single stand of wild rice, found on the easternmost part of the cove, occupies 14% of the marsh area within the cove. It is the largest wild rice stand in Camden County (Ferren, 1976). A linear patch of spatterdock is found in the central section of the cove, and it occupies 6% of the marsh. Two stands of cattail, predominantly T. angustifolia, are found in the northeastern part of the marsh. These stands account for 4% of the marsh. Five stands of common reed in tidal areas occupy 14% of the marsh.

The lower marsh, totaling 18% of the marsh, is found in five areas adjacent to mudflats. The predominant species are threesquare (Scirpus americanus), pickerelweed (Pontederia cordata), and spatterdock, which are less intermixed in this marsh type than in the middle or upper marsh. Associated species include spikerush (Eleocharis sp.), great bulrush (Scirpus validus), common arrowhead (Sagittaria latifolia), bur arrowhead (Sagittaria rigida), and slender arrowhead (Sagittaria eatoni), as well as the submerged elodea (Elodea canadensis) and naiad (Najas flexilis) in more open-water areas.

Dominant species in the middle marsh include arrowheads, water smartweed (Polygonum punctatum), waterhemp (Acnida cannabina), pickerelweed, and bur-marigold (Bidens laevis). Associated species are arrow-arum (Peltandra virginica), jewelweed (Impatiens biflora), and wild rice. This middle marsh vegetation type occupies 28% of the marsh.

The upper marsh has the greatest species diversity of the three mixed marsh types and includes spiked loosestrife (Lythrum salicaria), arrowheads, clearstem (Pilea pumila), water purslane (Ludwigia palustris), arrow-arum, sweetflag (Acorus calamus), sensitive fern (Onoclea sensibilis), halberdleaf tearthumb (Polygonum arifolium), river bulrush (Scirpus fluviatilis), buttonbush (Cephalanthus occidentalis), and red willow (Cornus amomum). The upper marsh occupies 15% of the marsh. The upland areas, which were not differentiated into cover types, include suburban, urban, and industrial uses and a few fringe areas of native forest.

Four plant species considered uncommon in New Jersey, the beggar-ticks Bidens bidentoides, the sedge Cyperus brevifolius, grass-leaved sagittaria (Sagittaria graminea), and sessile-fruited arrowhead (S. rigida) were documented for Fish House Cove (Ferren, 1976). Fish House Cove is the only known location of these species in Camden County. Bidens bidentoides is currently under review for inclusion on the Federal list of endangered and threatened species. Three other species once collected in Fish House Cove have not been recorded in Camden County for 60-70 years, but they may still exist on the site. These are golden hedge-hyssop (Gratiola aurea var. obtusa), Parker's pipewort (Eriocaulon parkeri), and subulate sagittaria (Sagittaria subulata) (CCEA, 1980).

Upland vegetation beyond that mapped in the CCEA report is also shown in Figure 2. Based on interpretation of aerial photography of the area, RG&H created five upland cover categories:

- Barren areas - areas of recent fill or disturbance on which little or no vegetation was noted.

- Deciduous woodlot - areas with substantial tree cover with a natural understory.

- Field - areas covered with uncut grasses and other low plants and few or no trees.

- Residential - areas around residential structures of managed lawns, trees and shrubs. This category also includes houses and associated driveways.

- Impervious surface - areas covered by paved roads or parking areas.

The National Wetlands Inventory (USFWS, 1977) classifies and maps wetlands in Fish House Cove. The categories mapped include the following:

POW - Palustrine Open Water
PEM - Palustrine Emergent
PSSI - Palustrine Scrub/Shrub, Broadleaved Deciduous

RIDW - Riverine - Tidal - Open Water
R1FL - Riverine - Tidal - Flat

The CCEA report, however, contains much more detailed mapping which has been field checked, while the U.S. Fish and Wildlife Service (USFWS) maps are in draft form and have not been verified in the field.

Tidal wetlands have significant value to estuarine and marine organisms and to man. They are among the most productive ecosystems in the world. The twice-daily fluctuation in tides provides a flushing of nutrients for use by marine organisms not inhabiting these wetlands. Wetland plants provide valuable fish and wildlife habitat. The plants provide food and cover for many species as well as sites for reproduction and early growth. The nonvegetated shallow-water areas associated with these wetlands also provide food, cover, nursery, and spawning habitats. These wetlands aid in maintaining water quality by filtering sediments and absorbing pollutants.

The freshwater tidal wetland areas of Fish House Cove represent only a small fragment of what was once an extensive series of freshwater tidal marshes found along the Delaware River. Since the beginning of this century, many of these wetlands have been the depository of dredged materials or have been the site of landfills. Fish House Cove is now a significant area because of the scarcity of the freshwater tidal marsh habitat type in the Delaware River Valley and in Camden County. A USFWS study (1957) that inventoried fish and wildlife resources of the Delaware River from Camden to Trenton recommended Fish House Cove for acquisition and protection by the Federal government. A USFWS visit in 1979 confirmed the persistence of the high-quality wildlife habitat in Fish House Cove (CCEA, Inc., 1980) and a U.S. Army Corps of Engineers study in the same year cited Fish House Cove as an area "designated as a high value waterfowl area by USFWS not to be filled unless absolutely necessary" (U.S. Army Corps of Engineers, 1979).

Most of the documented observations of wildlife in Fish House Cove relate to bird sightings. Fish House Cove is a major habitat area for waterfowl and shorebirds. A one-year study of birds of Fish House Cove was conducted in 1972-73 by Tischner, and periodic observations have been made by the Camden County

Environmental Agency staff. Between 1972 and 1976, 229 bird species were observed (CCEA, Inc., 1980).

Fishery data (Tyrawski, 1979) for Delaware River segments near Fish House Cove include a wide variety of species. The list includes five anadromous species considered as criteria for designating Special Areas in the Coastal Resource and Development Policies reports (NJDEP, Div. Coastal Resources, 1980, 1981). These are alewife (*Alosa pseudoharengus*), American eel (*Anguilla rostrata*), blueback herring (*Alosa aestivalis*), striped bass (*Morone saxatilis*), and America shad (*Alosa sapidissima*).

Amphibians and reptiles expected to be found in the Fish House Cove site are those typically found in similar habitats in western Camden County (CCEA, 1980). These may include Fowlers toad (*Bufo woodhousei fowleri*), northern cricket frog (*Acris crepitans*), spring peeper (*Hyla crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans melanota*), southern leopard frog (*Rana utricularia*), snapping turtle (*Chelydra serpentina*), stinkpot (*Sternotherus odoratus*), eastern mud turtle (*Kinosternon subrubrum*), painted turtle (*Chrysemys picta*), red-bellied turtle (*Chrysemys rubriventris*), northern water snake (*Natrix sipedon*), eastern garter snake (*Thamnophis sirtalis*), eastern ribbon snake (*Thamnophis sauritus*), and northern black racer (*Coluber constrictor*).

Mammals expected to be found in Fish House Cove include those typical of marsh habitats and upland edge situations (CCEA, 1980). Raccoon (*Procyon locor*), muskrat (*Ondatra zibethica*), and eastern cottontail (*Sylvilagus floridanus*) are known to occur, while masked, shorttail, and least shrews (*Sorex cinereus*, *Blarina brevicauda*, and *Cryptotis parva*), eastern and starnose moles (*Scalopus aquaticus* and *Condylura cristata*), white-footed and house mice (*Peromyscus leucopus* and *Mus musculus*), Norway rat (*Rattus norvegicus*), opossum (*Didelphis marsupialis*) and striped skunk (*Mephitis mephitis*) may also occur. Eight species of bat may make forage flights over the site.

A number of State-listed endangered, threatened, undetermined, and declining wildlife species have been observed at Fish House Cove. The CCEA report lists 44 of these species, most of which are birds (see Table 1). The NJ Division of Fish, Game and Wildlife views Fish House Cove as an important area for wildlife,

Table 1. Endangered, threatened, undetermined, and declining wildlife species observed at Fish House Cove

Endangered Species

Osprey
Least tern
Black skimmer

Threatened Species

Pied-billed grebe
Great blue heron
Red-shouldered hawk
Marsh hawk
Merlin
Upland sandpiper (plover)
Cliff swallow
Short-billed marsh wren
Bobolink
Savannah sparrow
Grasshopper sparrow
Vesper sparrow

Undetermined Species

Black duck
Ruddy duck
Sharp-shinned hawk
King rail
American coot
Common snipe
Eastern bluebird
Northern cricket frog
Red-bellied turtle
Northern black racer
Hoary bat
Least shrew
Starnose mole
Keen's myotis
Silver-haired bat
Eastern pipistrelle

Declining species

Red-necked grebe
American bittern
Least bittern
Common tern
Least flycatcher
Horned lark
Purple martin
White-eyed vireo
Warbling vireo
Yellow-breasted chat
Hooded warbler
Eastern meadowlark

Peripheral Species

Atlantic croaker

Source: CCEA, Inc., 1980.

particularly for migratory waterfowl. Although the Division has no breeding records for any threatened or endangered bird species in the cove area, the species in Table 1 have been observed in the area during their migration.

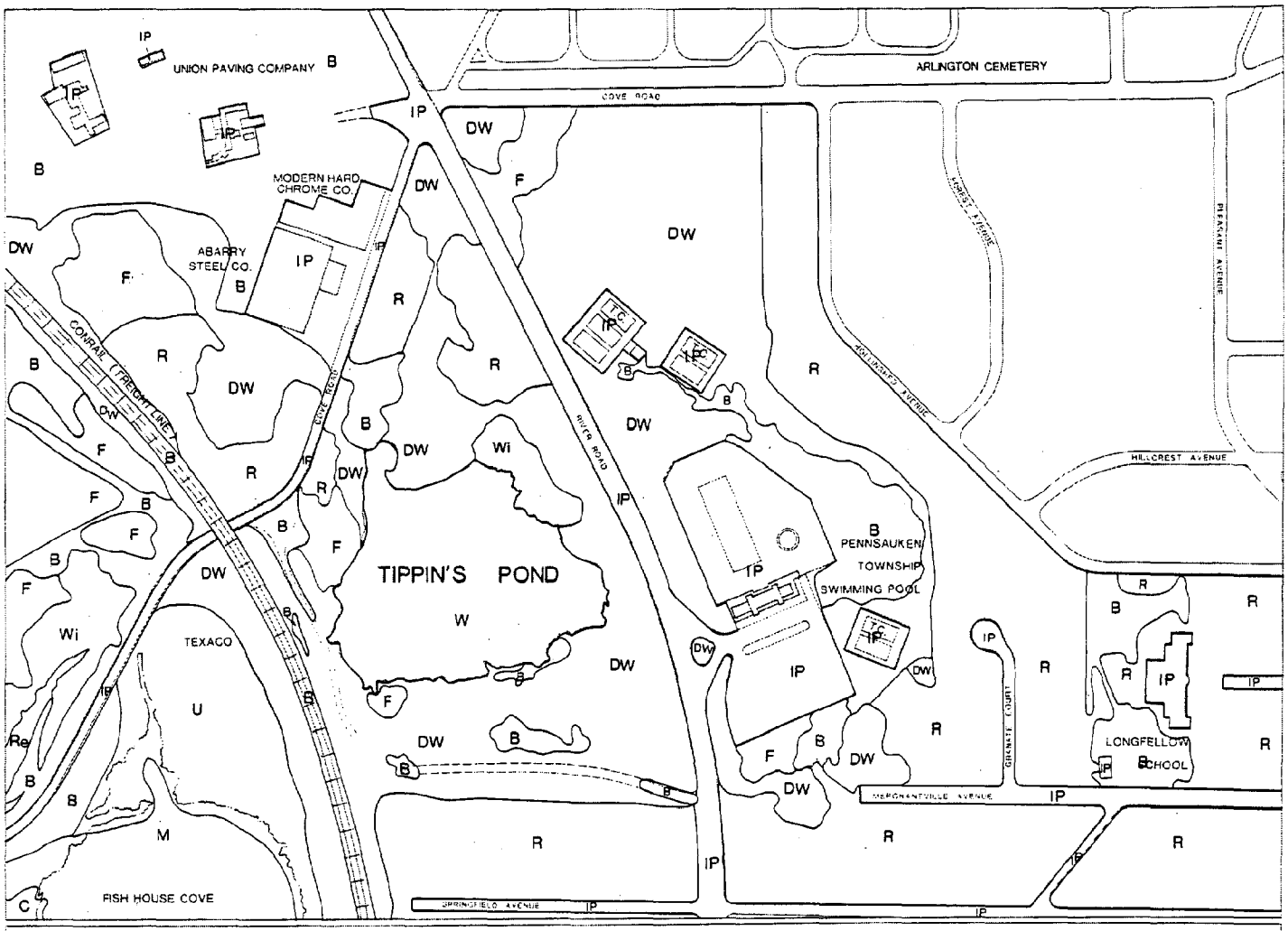
Vegetation and Wildlife of Tippin's Pond

The vegetation of Tippin's Pond was not mapped prior to this study. Field visits and interpretation of aerial photographs of the pond were used to delineate the vegetation types found.

Four land cover categories were mapped (Figure 3).

- Willow forest
- Deciduous woodlot - areas with substantial tree cover and with a natural understory.
- Field - areas covered with uncut grasses and other low plants typical of early stages of plant succession.
- Residential - areas around residential structures of managed lawns, trees, and shrubs. This category includes houses and associated driveways.
- Barren areas - areas of recent fill or disturbance on which little or no vegetation was noted.

The deciduous woodlots, located on the banks that surround the pond and on vacant lots near the pond, contains plant species characteristic of similar habitats throughout southern New Jersey. The overstory, which is discontinuous, includes sycamore (Platanus occidentalis), tulip tree (Liriondendron tulipifera), red maple (Acer rubrum), and a variety of oaks (Quercus spp.). The more continuous understory includes both weedy and exotic species, such as black cherry (Prunus serotina), tree of heaven (Ailanthus altissima) and white mulberry (Morus alba), and trees such as red maple, black gum (Nyssa sylvatica), and hackberry (Celtis occidentalis), which are common in many early successional lowland forests of the



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

VEGETATION

Lowland

Marsh
- M — Middle mixed
- U — Upper mixed
- C — Cattail
- Re — Reed

Other Lowland
- Wi — Willow

Upland
- F — Field
- DW — Deciduous woodlot
- R — Residential (grass, shrubs, trees, and dwellings)

Other
- B — Barren
- IP — Impervious surface
- W — Water

Figure 3

region. The diverse, dense shrub layer commonly includes arrow-wood (Viburnum dentatum), sweet pepperbush (Clethra alnifolia), and sassafras (Sassafras albidum), as well as grape (Vitus sp.), green-briar (Smilax sp.), and American chestnut (Castanea dentata).

A culvert running under the railroad once provided overflow drainage of the pond into Fish House Cove resulting in low water levels during late summer and fall. Subsequent filling of the railroad underpass and collapse of this culvert blocked this drainage of the pond. The result is in higher year round water levels in the pond because the only existing drainage is through seepage and evaporation. The willow forest occupies the eastern corner of Tippin's Pond near two storm drain inlets. A number of dead trees occur in this stand, probably due to prolonged periods of higher water since the culvert collapsed (Murphy, 1981). Some of the species occurring in this stand are willow (Salix sp.), buttonbush (Cephalanthus occidentalis), swamp rose mallow (Hibiscus palustris), common elder (Sambucus canadensis), touch-me-not (Impatiens biflora), smartweed (Polygonum sp.) and grasses.

The National Wetlands Inventory (USFWS, 1977) maps and classifies the wetland area of Tippin's Pond as Palustrine Open Water (POW). This classificatin does not take into account the wetland species described above based on field visits to the pond.

No wildlife data have been collected for Tippin's Pond. However, Environmental Analysis, Inc. prepared a Natural Resource Inventory for Tippin's Pond in 1975. The study emphasized the importance of Tippin's Pond for waterfowl, noting that almost 100 species of waterfowl pass through the area each year. A great blue heron and a green heron were observed during a field trip to the site in the late summer of 1981. The pond site can be expected to support animal species typical of similar pond areas, including raccoon, opossum, striped skunk, masked and short-tail shrew, starnose mole, boreal red-backed vole (Clethrionomys gapperi), eastern chipmunk (Tamias striatus), eastern gray squirrel (Sciurus carolinensis), eastern cottontail, and a variety of snakes, frogs, toads, and salamanders (Environmental Analysis, Inc., 1975).

Tippin's Pond, along with the Cove, is viewed by the New Jersey Division of Fish, Game and Wildlife as an important area for migratory waterfowl. There are no records of endangered or threatened species on the pond site, although such species have been observed migrating through the area (Frier, 1981, oral communication).

Water Quality of Fish House Cove

Water quality problems along the stretch of the Delaware River in the vicinity of Fish House Cove include frequently excessive concentrations of fecal coliform, low dissolved oxygen, especially in summer and fall, residual chlorine and cyanides that exceed the concentrations considered safe for aquatic organisms, and numerous industrial organic chemicals. Turbidity levels in the cove itself appear to be low. Salinity is low, indicating a freshwater condition in the cove.

Fish House Cove is located approximately at the center of the Delaware River Basin Commission's Water Quality Zone 3, at River Mile 103.5. The Commission has developed water quality standards for Zone 3 to protect the following uses (Tyrawski, 1979):

- public, industrial, and agricultural water supplies after reasonable treatment
- maintenance of resident fish and other aquatic biota
- passage of anadromous fish
- wildlife
- secondary contact recreation
- navigation

On September 5, 1979, the Jack McCormick and Associates Division of WAPORA, Inc., conducted water quality sampling of Fish House Cove (CCEA, 1980). Sampling was done at high and low tides.

The temperature readings were normal and within the allowable maximum stream standards. The pH was close to 7.0, also meeting the standards. Salinity and conductivity were low, indicative of a definite freshwater condition. Turbidity was low and light transmissibility high. The five-day biochemical oxygen demand

(BOD_5) and low dissolved oxygen levels indicated the presence of oxygen-demanding substances. Oxygen levels were low enough to stress fish and other aquatic organisms. This condition, which is typical for the Delaware River between Philadelphia and Camden, may present a barrier to the passage of anadromous fish. Orthophosphate was elevated. If other circumstances were favorable, the presence of this plant nutrient could stimulate a nuisance algal growth. Oil and grease were present, but there are no quantitative standards for levels of these substances.

Because the Delaware River in the vicinity of Fish House Cove is tidal and pollutants can travel considerable distances upstream (CCEA, 1980), point sources of pollution both downstream and upstream can be expected to affect water quality in the cove. Sixteen NPDES permits have been issued in the vicinity of Fish House Cove between River Miles 100 and 106 (see Table 2).

TABLE 2. NPDES permits issued in the vicinity of Fish House Cove

Downstream Discharges (between River Miles 100-103)
- New Jersey Water Company, Camden, N.J.
- Philadelphia Electric Company, Delaware Generating Station
- Cities Service, Pennsauken terminal, N.J.
- Allied Chemical, Camden, N.J.
- National Sugar Refining Company, Pa.

Upstream Discharges (between River Miles 104-106)
- Philadelphia Northeast Water Pollution Control Plant, Pa.
- Pennsauken Township Sewerage Authority, N.J.
- Moorestown Township Sewage Treatment Plant, Pa.
- Philadelphia Electric, Richmond Generating Station, Pa.
- Amerada Hess, Pennsauken, N.J.
- Texaco, Pennsauken Terminal, N.J.
- Georgia-Pacific Corporation, N.J.
- A.P. Green Refractories, Pa.
- U.S. Steel Products Division, Camden Plant, N.J.
- Rohm and Haas, Philadelphia Plant, Pa.

Source: Tyrawski, 1979, and CCEA, 1980.

The Philadelphia Northeast Water Pollution Control Plant, a municipal sewage treatment plant on the Pennsylvania side of the river almost directly opposite Fish House Cove, contributes significant quantities of organic wastes to the river. Currently steps are being taken by the City of Philadelphia to upgrade plant efficiency. The Camden municipal facility discharges less than 0.1 mi

downstream from the Cove, and observations in 1979 indicated that considerable amounts of foam were present at the outfall. The Pennsauken facility of Texaco discharges directly into the Cove. This facility's three discharge points discharge untreated boiler blowdown water and, after oil-water separation, stormwater and truck-washing water (CCEA, 1980).

At the present time, the freshwater marsh in Fish House Cove appears to support a healthy and diverse plant community with little evidence of stress or disease.

Water Quality of Tippin's Pond

There is no record of water samples being taken from Tippin's Pond for chemical analysis. However, aquatic organisms were sampled in February 1975, as reported by Environmental Analysis, Inc. The study showed that there were very few insect larvae in the pond. This was considered to indicate that pollutants were present in the pond. However, residents report that the pond does support sizable fish.

The sampling also revealed the presence of the dinoflagellate Gymnodinium, which can cause itching and irritation of the skin on contact.

Tippin's Pond is fed by three sources of water: groundwater, two 36" diameter concrete stormwater conduits draining River Road, and runoff from the immediate area surrounding the pond. These sources could be responsible for various pollutants entering the pond. Also, the runoff and stormwater components are particularly a problem for the pond with respect to sedimentation. The discharge from the conduits draining River Road has created a natural pool before the pond that acts as a sediment trap, partially protecting the pond from sediments and other pollutants entering the pond (Wagner, 1981, oral communication). Erosion on the back edge of the Pennsauken swimming pool property south of River Road contributes to the sedimentation problem, as does erosion of the banks surrounding the pond, particularly the southern and eastern banks. Stabilization of these areas is critical to arresting the erosion problem and retarding the gradual filling of the pond with sediment.

Coastal Flooding of Fish House Cove and Tippin's Pond

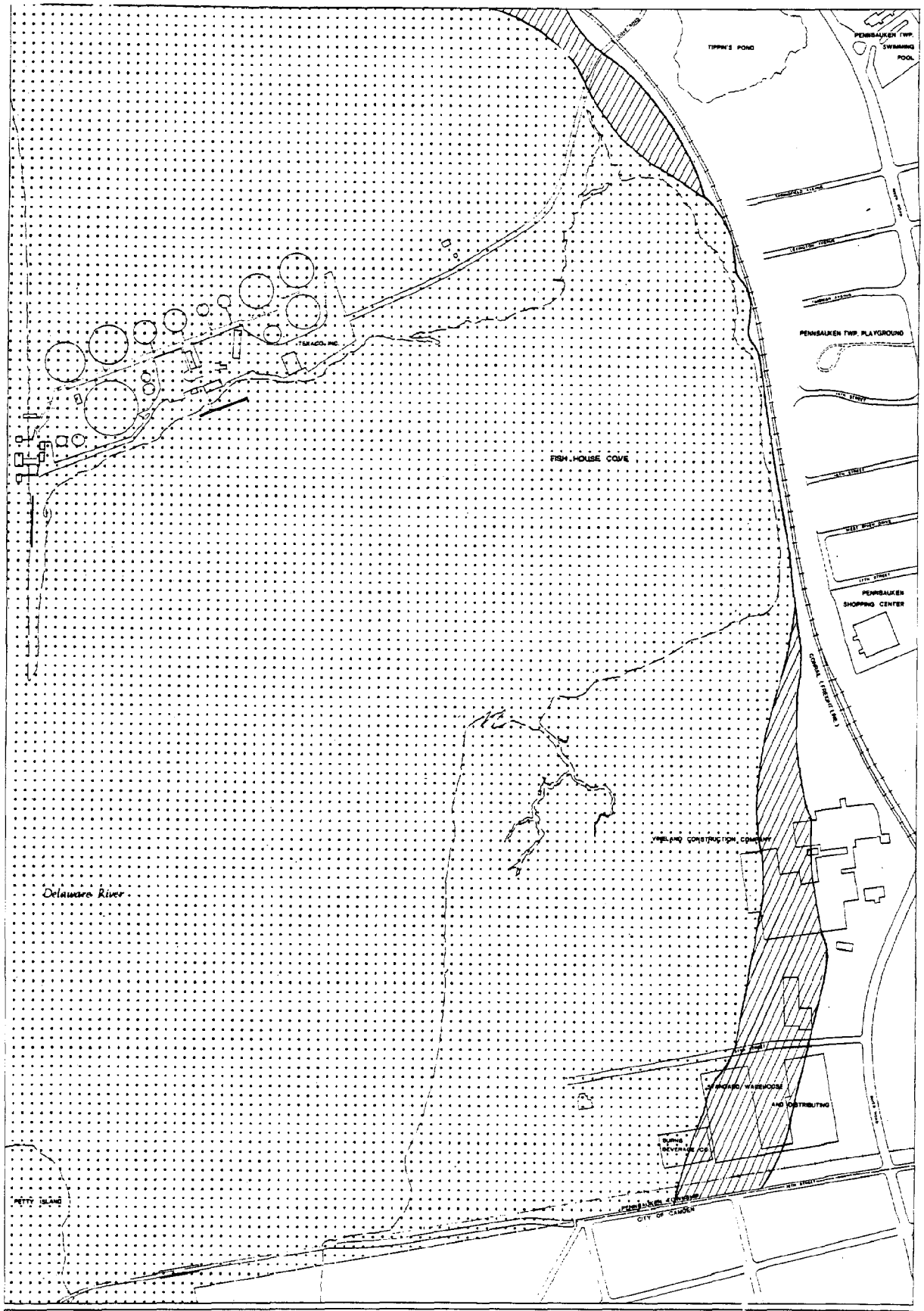
Coastal flooding is mapped by the U.S. Department of Housing and Urban Development Federal Insurance Administration. Both 100-year and 500-year flood boundaries are delineated on the Flood Boundary and Floodway Map, Figure 4. Most of the Fish House Cove site falls within the 100-year and 500-year flood boundary, while none of the Tippin's Pond site is subject to floods of these frequencies.

Currents and Tides in Fish House Cove

The Delaware River estuary, or the tidal portion of the river, extends upstream to Trenton. The twice-daily ebb and flow of tides, with a tidal range of about 6 ft in the river segment that includes the cove, creates constantly changing conditions of salinity, water depth, temperature, sediment concentrations, dissolved oxygen levels, and nutrients. River flow, wind, and weather, in addition to the tides, influence these parameters.

Although it varies slightly with the tide, the salinity level in the cove is definitely low enough for it to be considered a freshwater environment. The cove supports typical freshwater marsh species.

Water flows into and out of the cove along currents that are evidenced in the sedimentation and drainage patterns that are exposed at low tide. One prominent tidal drainage pattern meanders near the southern edge of the cove then turns east parallel to the rail embankment. Another stable tidal drainage pattern has developed in the hydraulic fill on the Vineland Construction Co. site. In winter, larger areas of these mudflats are exposed, whereas in the summer much of the area is covered with submergent and emergent marsh vegetation. Sediment drops out of these currents when the water slows down. The eastern corner of the marsh is one area where rafted debris and sediment are dropped. Based on examination of aerial photos taken since 1959, it appears that there are no areas where active erosion of the shoreline is taking place, except in the area of recent fill adjacent to the Texaco property.



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

FLOOD HAZARD AREAS

100 year flood

500 year flood

Figure 4

Recreational Activities at Fish House Cove

The major recreational activities that take place at Fish House Cove are birdwatching or other forms of nature walks, boating in the cove, and hunting.

The cove is an important area for waterfowl, especially during migration. This makes it attractive for both birdwatchers and hunters.

Recreational Activities at Tippin's Pond

A variety of recreational activities takes place at Tippin's Pond throughout the year. Picnicking, walking, boating, and fishing are common activities. Children play in the area and in winter use the pond for ice skating. Associated with cold weather activities is the building of fires near the pond's edge. Trail bikes have been observed running up and down the steep slopes around the pond and also along the trail at the edge of the pond.

Historical and Archaeological Features of Fish House Cove and Tippin's Pond

Several features of historic and archaeological significance are in existence on or near the Fish House Cove and Tippin's Pond sites. Prior to the arrival of colonial settlers, the Pennsauken area was occupied by Lenni-Lenape Indians who valued the area for its wild rice, peas, raspberries, blackberries, and wildlife. The cove was the site of a major Indian battle, involving warriors in over 100 canoes, in which the Lenni-Lenape were victorious. The Arlington Cemetery, adjacent to Tippin's Pond, is a former Indian hunting ground from which many artifacts have been recovered. The Fish House area was the home of Chief Tammane, who knew William Penn and became a well-known figure in Philadelphia in the late 1600's. In recognition of his honesty, the Democratic Club of New York chose to name its meeting hall after him, but subsequently scandals in that organization have unfairly linked the Tammane name with corruption in government.

The Pennsauken area was first explored by Europeans in 1633 by an English party of 15 led by Thomas Young and Robert Evelyn. They set up a fort near Pennsauken Creek and called it Eriwomac after a local Indian chief. With the establishment of New Sweden in 1643, some Swedish families settled in the

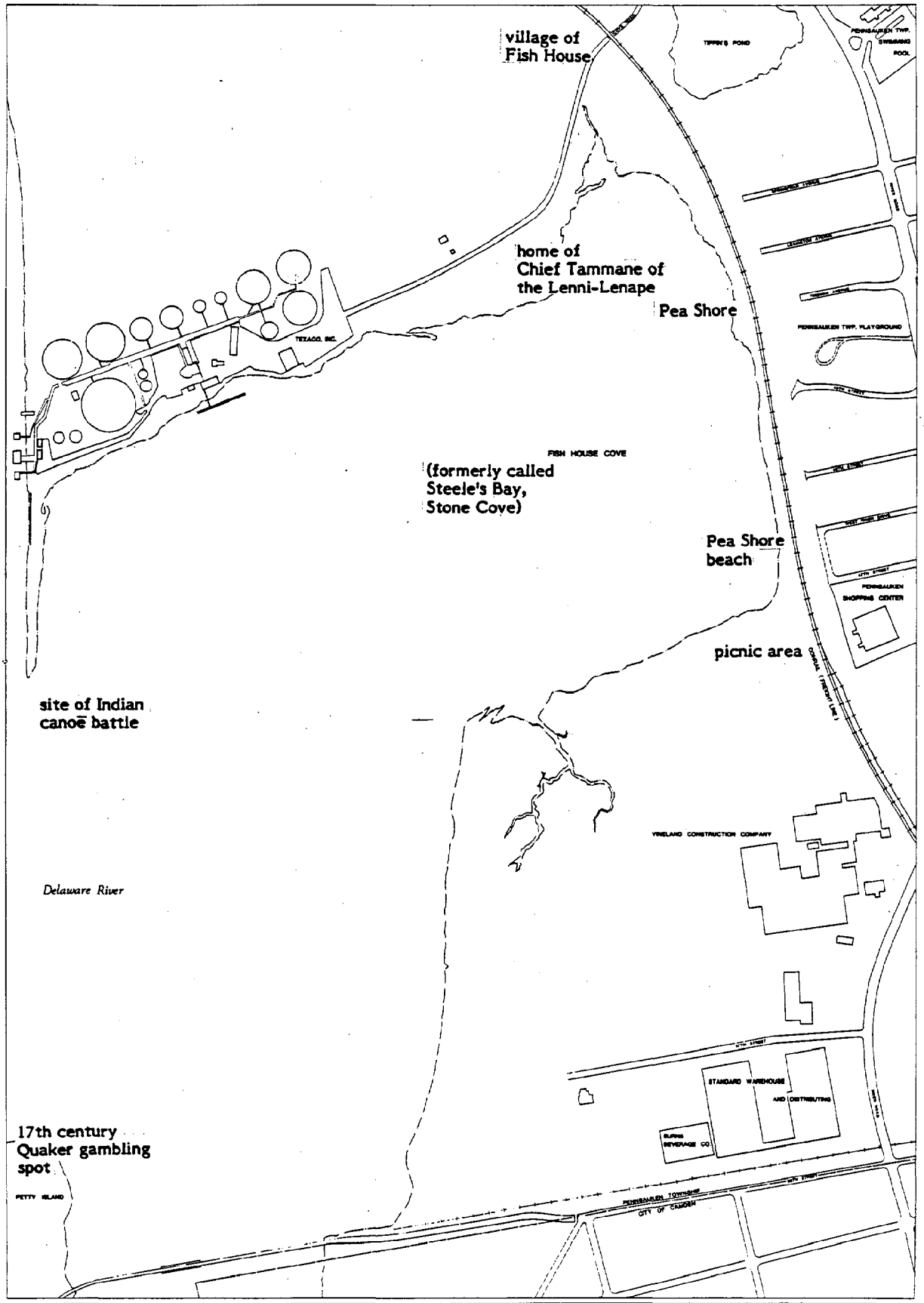
Pennsauken area. The Swedish influence is evidenced in the architectural style of the historic Griffith Morgan House in Delair. In the 17th century, many Quakers seeking religious freedom came to settle in the area. These early settlers were farmers, and through the 1800's the area was primarily characterized by farms and orchards. A stagecoach served the area, and one of the stagecoach stops was along Cove Road near Tippin's Pond. It is a privately owned home today. Another structure that stood until 1911 was the Half Way House, a tavern located near the entrance to Arlington Cemetery. Philadelphia Quakers, seeking freedom of another sort, came to Petty's Island off the cove to gamble, outside the reach of Philadelphia's laws (Fichter, 1975).

In 1834, the Camden and Amboy Railroad opened a line through Pennsauken that now divides Fish House Cove from Tippin's Pond. Local farmers opposed its opening, claiming that it was unsafe and that it made the chickens stop laying eggs.

The town of Fish House was created by Charles Price, a Pennsauken resident who constructed a group of houses along the river. The town was well known for fishing. In fact, what is now the southeastern shore of Fish House Cove, then called Pea Shore, was the home of four fishing clubs, none of which are still standing. In 1884, 28,000 shad were caught along this shore. An early yacht club is still standing on the Vineland Construction Corporation property on the Cove. Pea Shore Beach was a popular summer spot for tourists attracted to its sandy beaches. There were boardwalks built along Pea Shore, though none of them are there today. A popular winter sport started by the Hatch family was ice boating on the cove. Ice skating was also popular.

The popularity of the area for fishing dropped off after 1924, when a fish kill, attributed to pollution, destroyed the shad population. After the decline of fishing, the town of Fish House became a settlement of squatters. The settlement was dismantled after World War II by the local fire company. See Figure 5 for a display of places and events in the cove's history.

The Tippon family (original spelling) moved to the area in 1890. The pond was used for picnics, fishing, ice skating, and family reunions. The ruins of the Tippon's house, which burned to the ground in 1980, still are in existence on the



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

HISTORICAL PLACES

Figure 5

southwestern corner of the pond. The family ran a store and a tavern called Schillers Heights near the cove shore.

Early industry in the area included brick companies (e.g., the Hatch Brick Company of Delair), which located their kilns along the river banks. The Lennick China Company once owned the site of Tippin's Pond and mined clay where the township recreation area is presently located. In 1930, Rundles Manufacturing Company, a subsidiary of Sears and Roebuck Company that made bathroom fixtures, was built near the cove. Figure 6 shows some of the sites of historical interest near the pond.

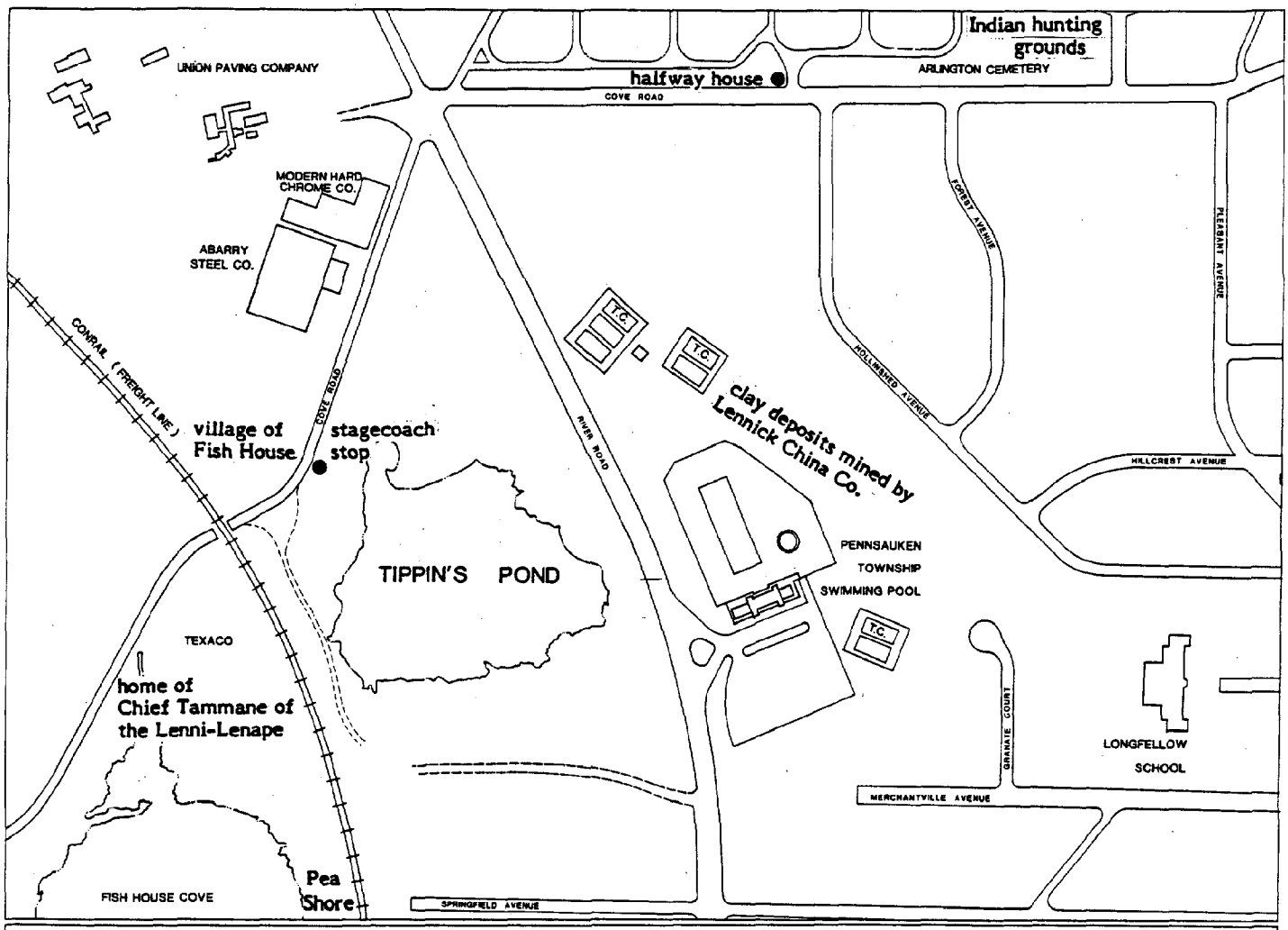
After World War II an industrial park program was begun in Pennsauken, with over 10 parks being built between 1958 and 1968. This industrial activity along the waterfront continued the trend of filling freshwater tidal marshes in the township.

Land Use of Fish House Cove and Vicinity

Although Fish House cove is a natural area consisting of a freshwater tidal marsh and a deepwater area beyond the marsh, it is surrounded on three sides by existing or proposed industrial uses: the Texaco Tank Farm, the Penn Central Railroad, and the Vineland Construction Company. Industrial uses continue beyond both the Texaco properties and those of the Vineland Construction Company. Future plans for the Vineland site call for a containerized cargo port/truck distribution center (Carruth, 1981, oral communication). A residential neighborhood with some recreation uses abuts the railroad tracks upland from the cove. The Tippin's Pond area is adjacent to the cove in its eastern corner across the railroad right-of-way. Land uses are shown on Figure 7.

Land Use of Tippin's Pond and Vicinity

The areas immediately around Tippin's Pond are vacant and support deciduous woods and small fields. There are extensive residential neighborhoods stretching for several miles to the southwest, south, and southeast of the pond, with the exception of the Pennsauken swimming pool and tennis courts that are directly across River Road from the pond. Between Cove Road, River Road, and the pond, there is a small residential neighborhood, but across Cove Road several industrial



TIPPIN'S POND

RECREATIONAL AREA

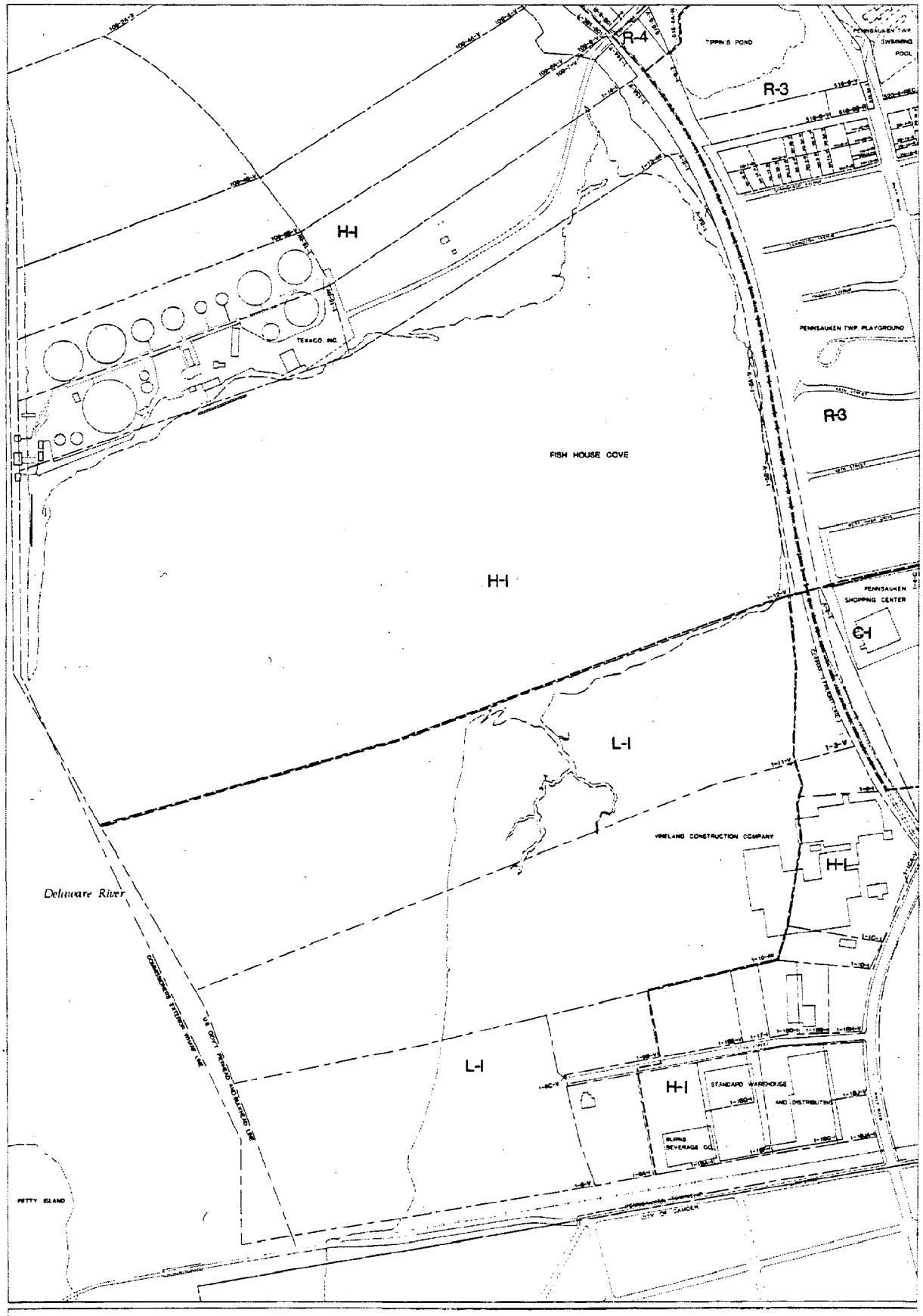
PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

0 100 ft 200 ft 400 ft

HISTORICAL PLACES

Figure 6



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

LAND USE

-R	Residential
-C	Commercial
-I	Industrial
-IW	Industrial with water access
-REC	Recreation
-T	Transportation
-V	Vacant
	Water

Figure 7

uses are found. The Penn Central Railroad line and the vacant land beyond are found on the northwestern edge of the Tippin's Pond site. Figure 8 shows land uses, by property, for the area around Tippin's Pond.

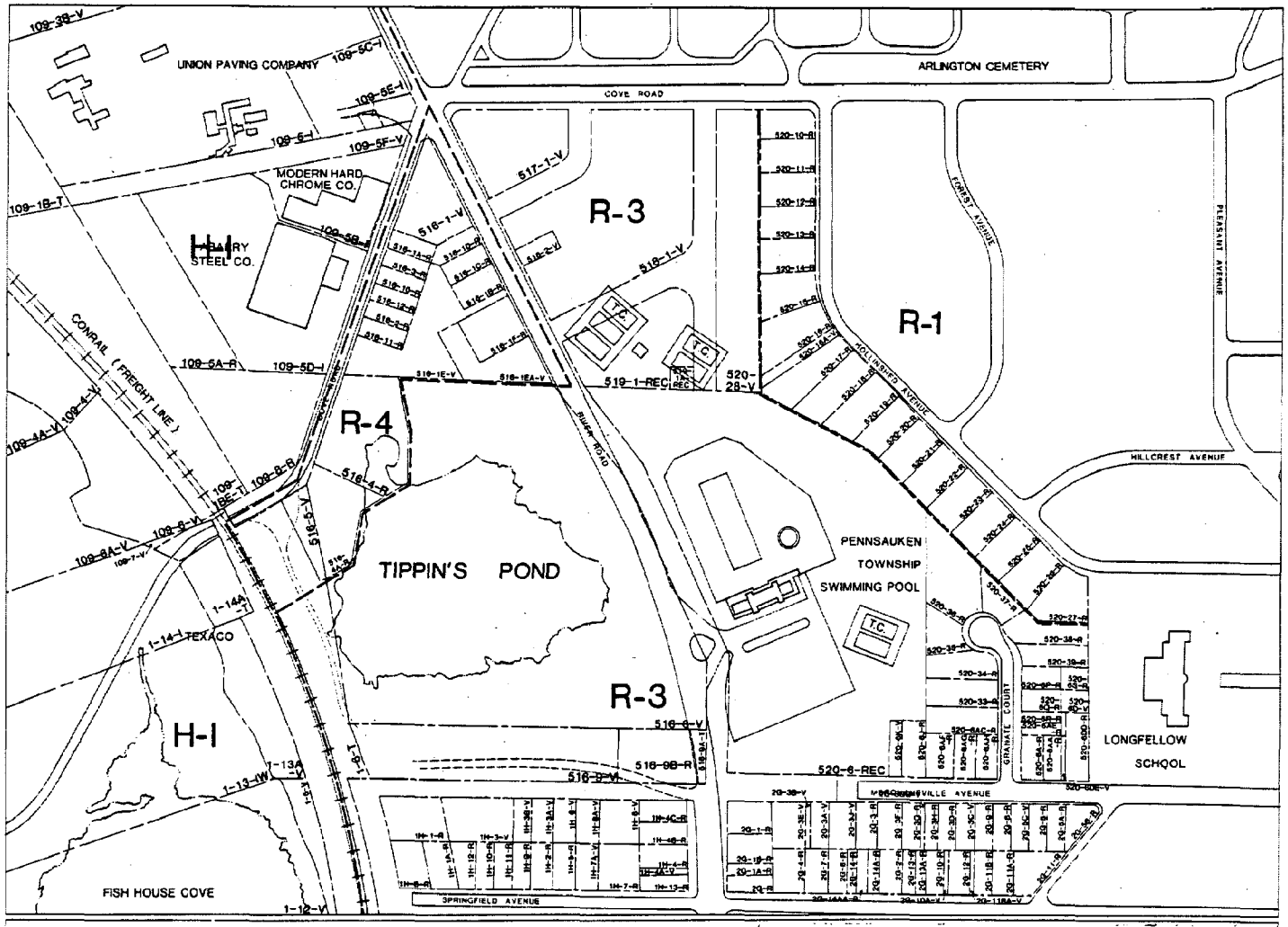
History of Filling in Fish House Cove

Since the beginning of the century, extensive filling of marshlands has been undertaken along the Delaware River shoreline, much of this in conjunction with spoils disposal from navigation channel dredging and from industrial park development. A chronology of this filling activity and consequent loss of natural shoreline and historical recreational uses can be constructed by comparing maps and aerial photos of the Cove area covering an extended period of time (see Figure 9).

The following aids were used in constructing this chronology:

- o 1909 U.S. Army Corps of Engineers Survey Map
- o 1917-1918 Riparian Conveyances Map
- o 1932 U.S. Army Corps of Engineers Survey Map
- o 1939 U.S. Army Corps of Engineers Harbor Lines Map
- o 1959 aerial photograph, Camden County Planning Board
- o 1965-1966 aerial photo and U.S. Army Corps of Engineers Survey Map
- o 1971 aerial photograph, Camden County Planning Board
- o 1978 aerial photograph, Aerial Data Reduction Associates, Inc., Pennsauken
- o 1979 aerial photograph, Aerial Data Reduction Associates, Inc., Pennsauken

The 1909 survey shows the cove as a rather smooth and gradual incurving of the river, roughly between upper Petty Island (about 1/4 mile downstream of the upper end) to Delair. The 1917-1918 map shows minor changes in the shoreline, indicating limited filling activity. By 1932 a dramatic change had occurred as hydraulic fill was placed between the shore and Fisher Point Dike, and at the western edge of the cove by Farragut Avenue. By 1939 the area between the Petty Island Branch line of the railroad and 47th Street was filled, extending about 2,000 ft into the Cove from the original shoreline. The 1930's appear to be the most active period of filling along the southern shore of the Cove. Subsequent changes



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

0 100 ft 200 ft 400 ft

LAND USE

-R	Residential	-REC	Recreation
-I	Industrial	-T	Transportation
-IW	Industrial with water access	-V	Vacant
-E	Institutional		Water

Figure 8

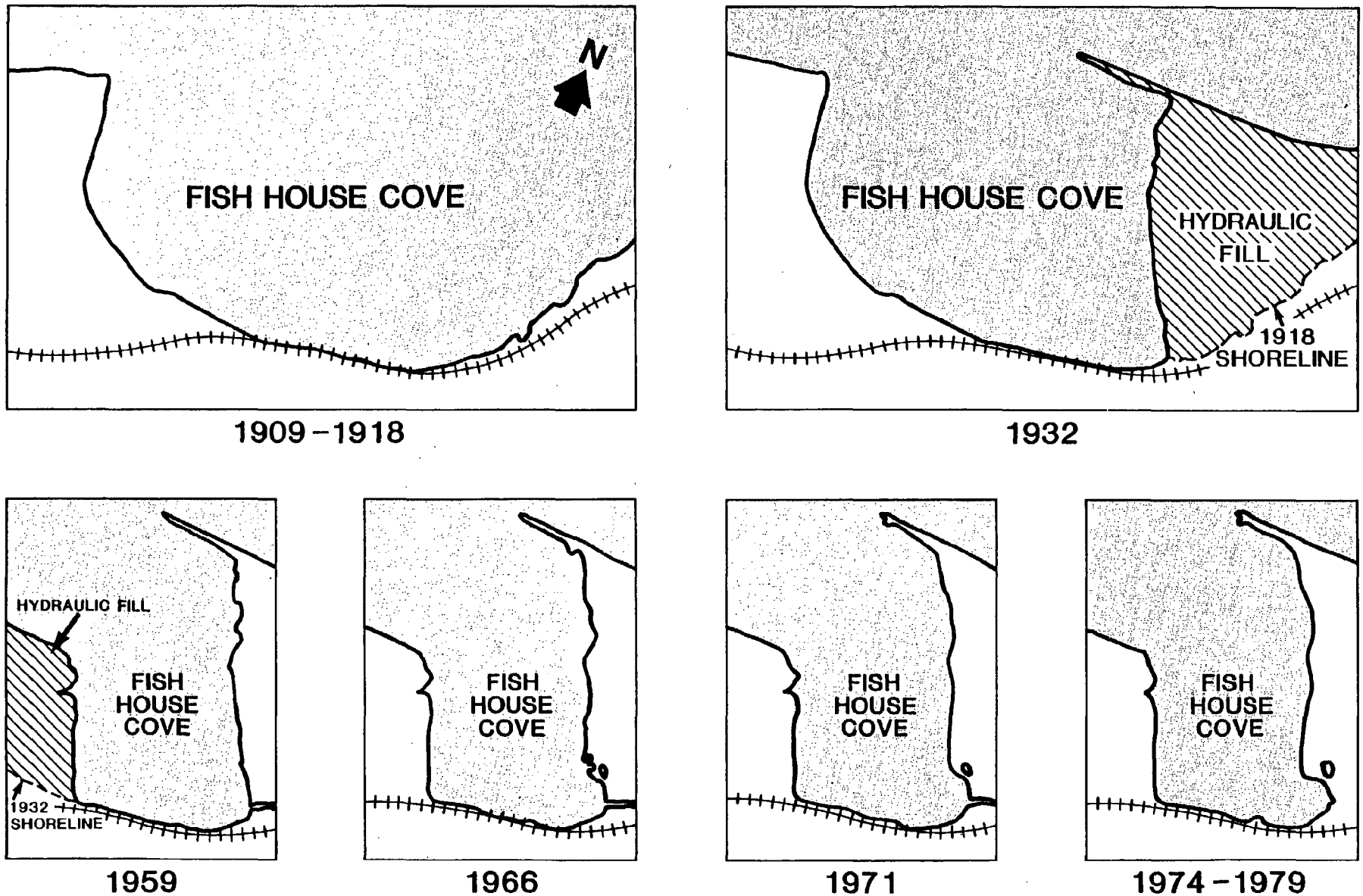


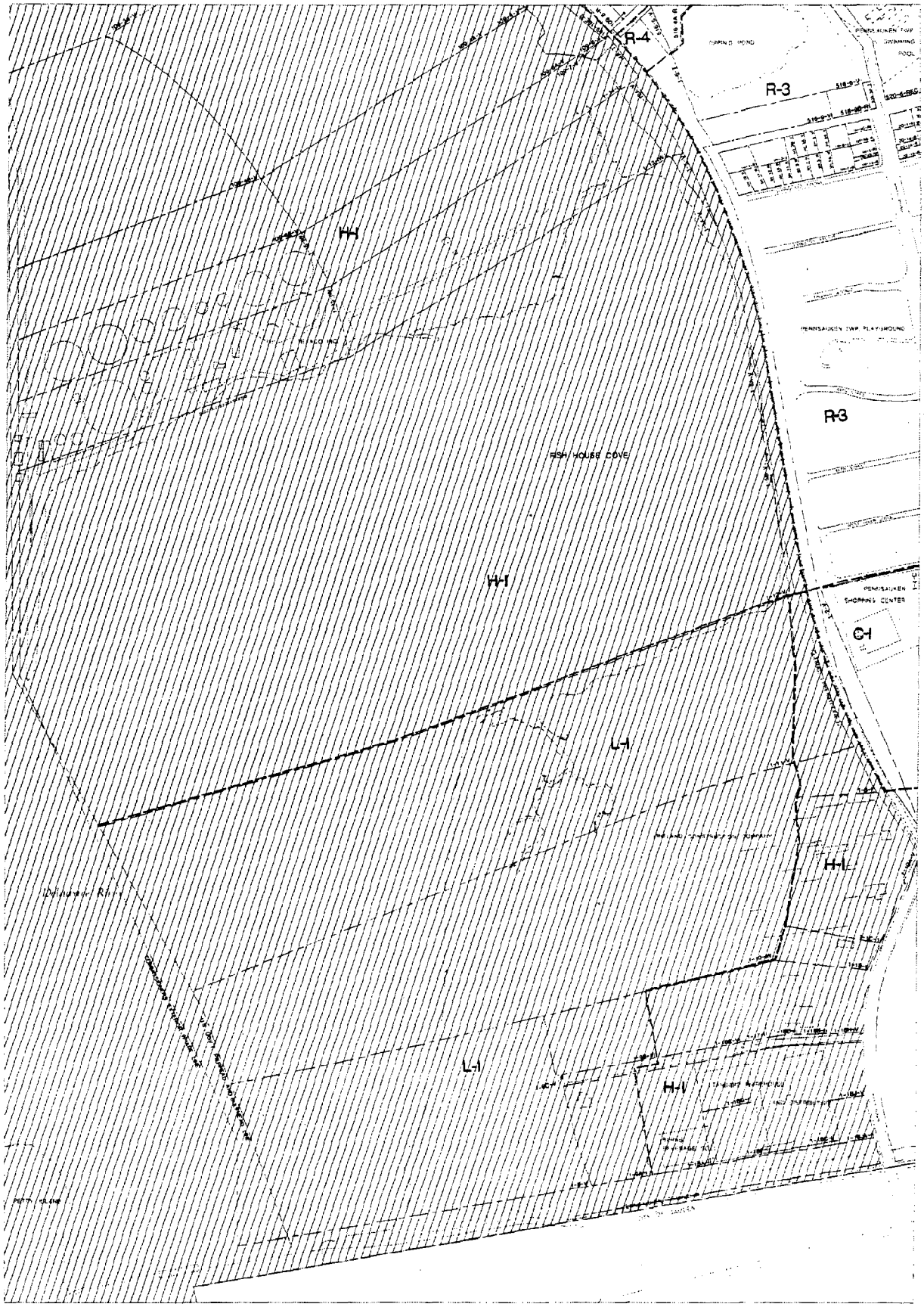
Figure 9. History of Filling in Fish House Cove.

include additional fill along the northeastern side of the Cove progressing gradually between the 1959 photo and 1979. Through the 1970's, a small area along the southeastern shore of the cove below the railroad appears to be the site of some small-scale filling.

These changes in the shoreline for purposes of dredge disposal and industrial development have severely diminished the size of Fish House Cove and have reduced the length of tidal wetland-type shoreline available for recreational use. The loss of marsh habitat is difficult to assess because only the early shoreline, not the extent of marsh habitat, is known. Differences in tide levels and season when the aerial photographs were taken also makes a determination of actual marsh habitat difficult.

Zoning in the Fish House Cove Area

The Fish House Cove area from the Pennsauken Township-Camden City boundary to the north along the waterfront is zoned for industrial uses, either limited industrial (L-I) or heavy industrial (H-I). Pennsauken Township has a Waterfront Management Area that is an overlay zone north and west of the railroad tracks. It consists of land and water areas that are generally within the 500-year floodplain of the Delaware River and its major tributaries. The purpose of the Waterfront Management Area provisions of the zoning code (Sec. 126-701.1: Township of Pennsauken, 1981A) is to ensure a balanced and compatible mix of waterfront land and water uses with particular emphasis on protection of the natural environment along the river, public use of waterfront areas, and public access to the waterfront. To achieve these purposes, certain areas within the Waterfront Management Area may only be used for public recreation, and all new uses proposed for the area must be intrinsically dependent on access to the waterfront. Landward of the railroad right-of-way are C-1 (commercial), R-3 (residential with minimum lot size 5,000 sq ft), R-4 (residential with minimum lot size 4500 sq ft or various multifamily not exceeding 15 families per acre), and H-I zones. The distribution of these zones is shown in Figure 10.



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

ZONING

L-I	Limited industrial
H-I	Heavy industrial
C-I	Commercial
	Waterfront Management Area (overlay zone)

Residential

R-1	9000 sq ft	minimum lot size
R-2	6000 sq ft	
R-3	5000 sq ft	

Figure 10

Zoning in the Tippin's Pond Area

The land use zones found in the Tippin's Pond area are shown in Figure 11. The pond and areas to the south and across River Road are zoned R-3 residential, which allows single-family residential use on 5,000 sq ft (minimum) lots. The area between the pond and Cove Road is zoned R-4, permitting single-family semi-detached dwellings on 4,500 sq ft lots and townhouse (10 families per acre maximum) and garden-type multifamily development (15 families/per acre maximum). Areas to the north of Cove Road and to the west of the railroad tracks are zoned H-I, heavy industrial zoning that permits most industrial uses except private dumps or automobile graveyards.

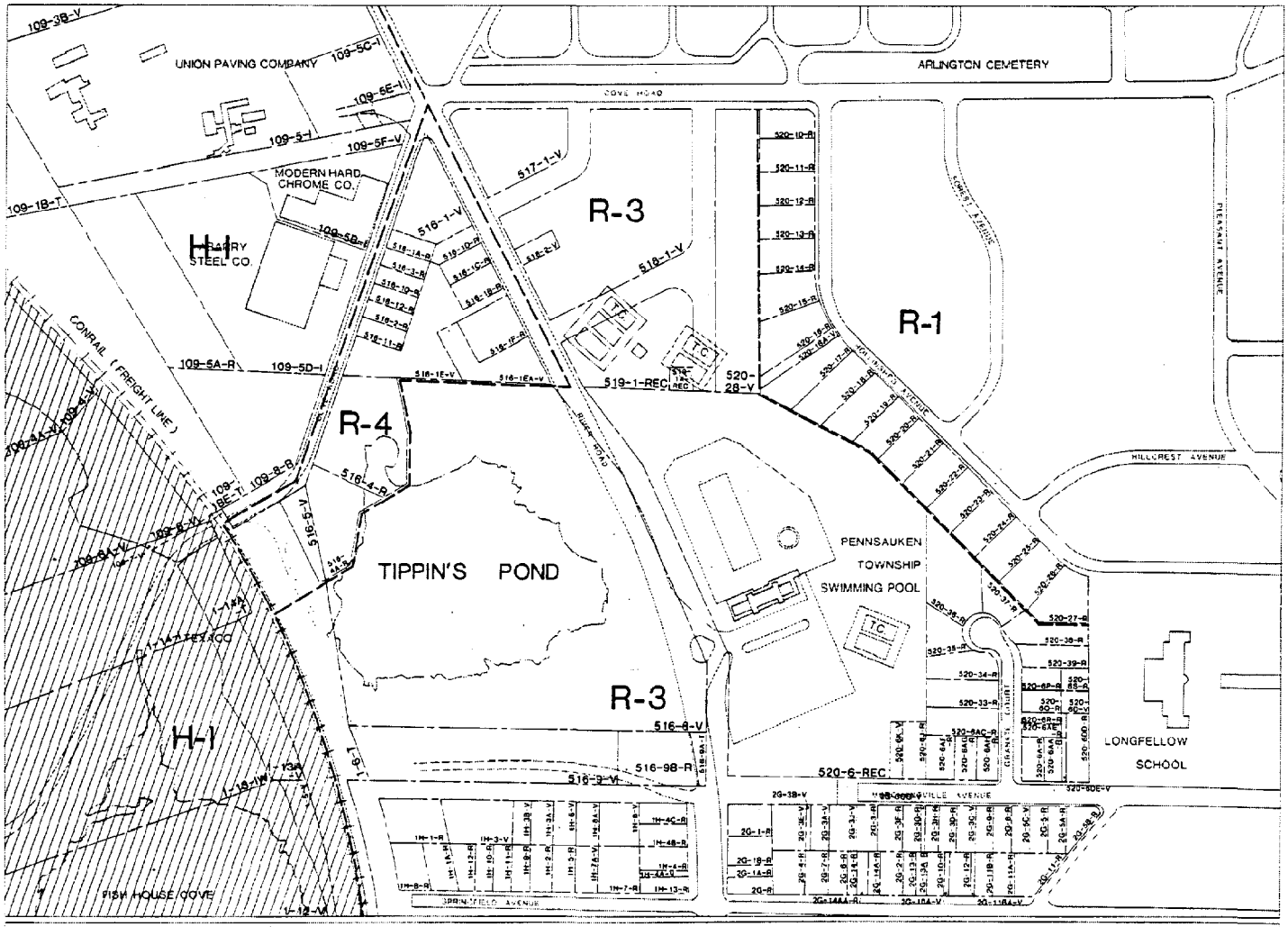
Land Ownership in the Fish House Cove Area

The main parcel of Fish House Cove is owned by the State of New Jersey (lot 12, block 1). This 122.6-acre parcel is surrounded by lands owned by the Vineland Construction Company, Texaco, or the Penn Central Railroad. There are three very small properties between the large State-owned parcel and the railroad property. Two are in private ownership and the third is owned by the State. Beyond the Texaco properties are large parcels owned by the Amerada Hess Corporation. Beyond the holdings of the Vineland Construction Corporation are other corporate-owned parcels. Land ownership paterns around the cove are shown in Figure 12 (Township of Pennsauken, 1981B).

Based on a comparison of aerial photographs and tax maps, the exact location of the property line separating lot 12 from the Texaco properties (lots 13 and 15, block 1) is not clear. There is the possibility that much of the filled land edge along the Texaco properties actually lies on state riparian lands.

Land Ownership in the Tippin's Pond Area

The main parcel of Tippin's Pond covering most of the pond area and its immediate shore is owned by the Township of Pennsauken (lot 6, block 516). The Township also owns a small parcel fronting on Cove Road that touches the main parcel (lot 5, block 516) and all the land across River Road from the pond up to the intersection with Cove Road. Other parcels along the northern and southwestern



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

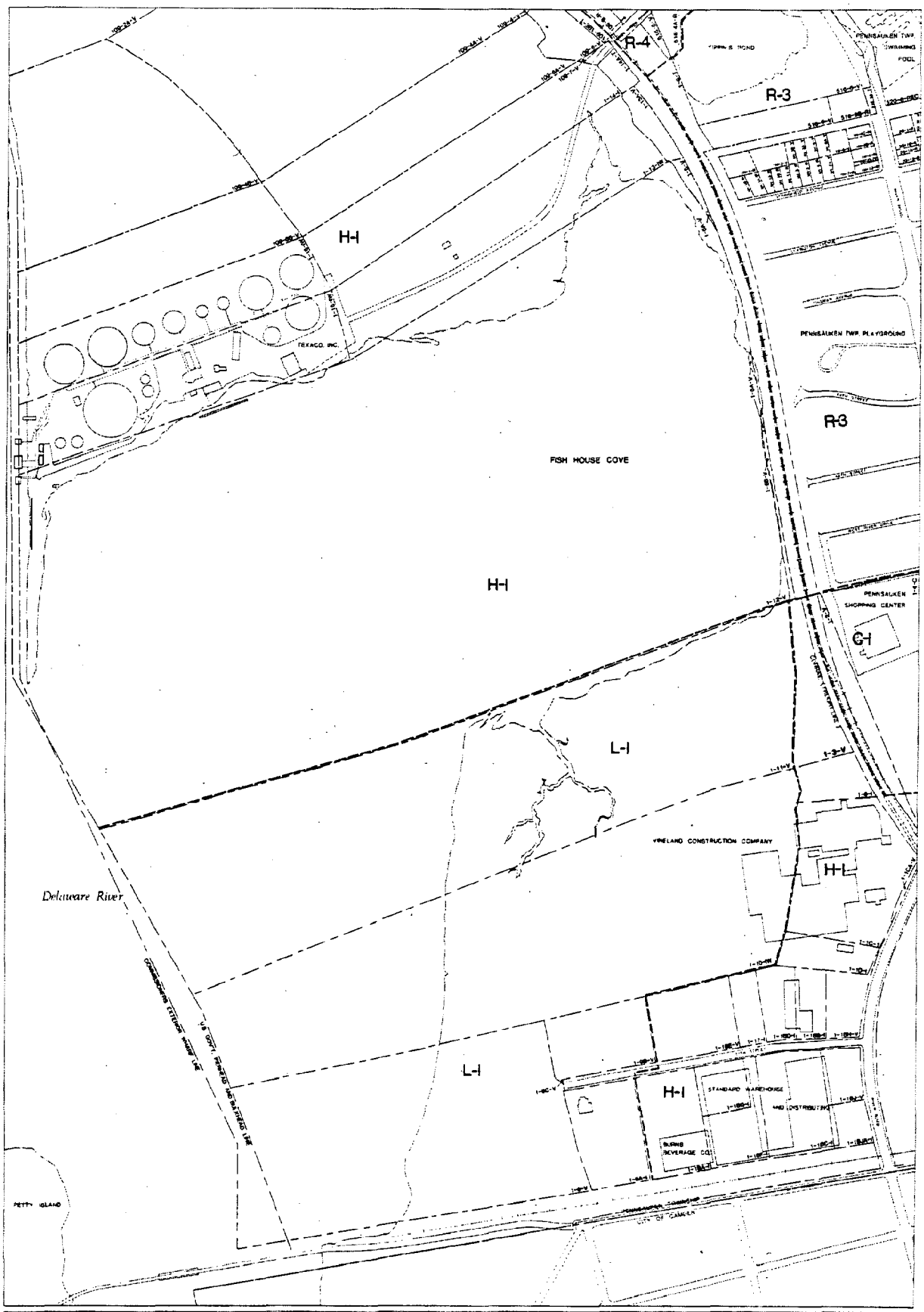
ZONING

Residential

R-1	9000 minimum ⌀
R-3	5000 lot size ⌀
R-4	Apts., townhouses 15 DU/acre maximum

H-I	Heavy industrial
	Waterfront Management Area (overlay zone)

Figure 11



FISH HOUSE COVE
WILDLIFE SANCTUARY
PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

LAND OWNERSHIP

Public		Private		
	Pennsauken Township		Paragon Oil Company (Texaco)	Other Corporation
	State of New Jersey		Amerada Hess Corporation	Individual
			Vineland Construction Company	

Figure 12

edge of lot 6 are privately owned, notably lot 9 (block 516), a 2-acre vacant parcel that runs along the steep bluff overlooking the pond. The western edge of the site along the railway is owned by the Penn Central Railroad. This right-of-way widens from approximately 90 ft as it approaches the Pond area to nearly 200 ft as it nears Cove Road.

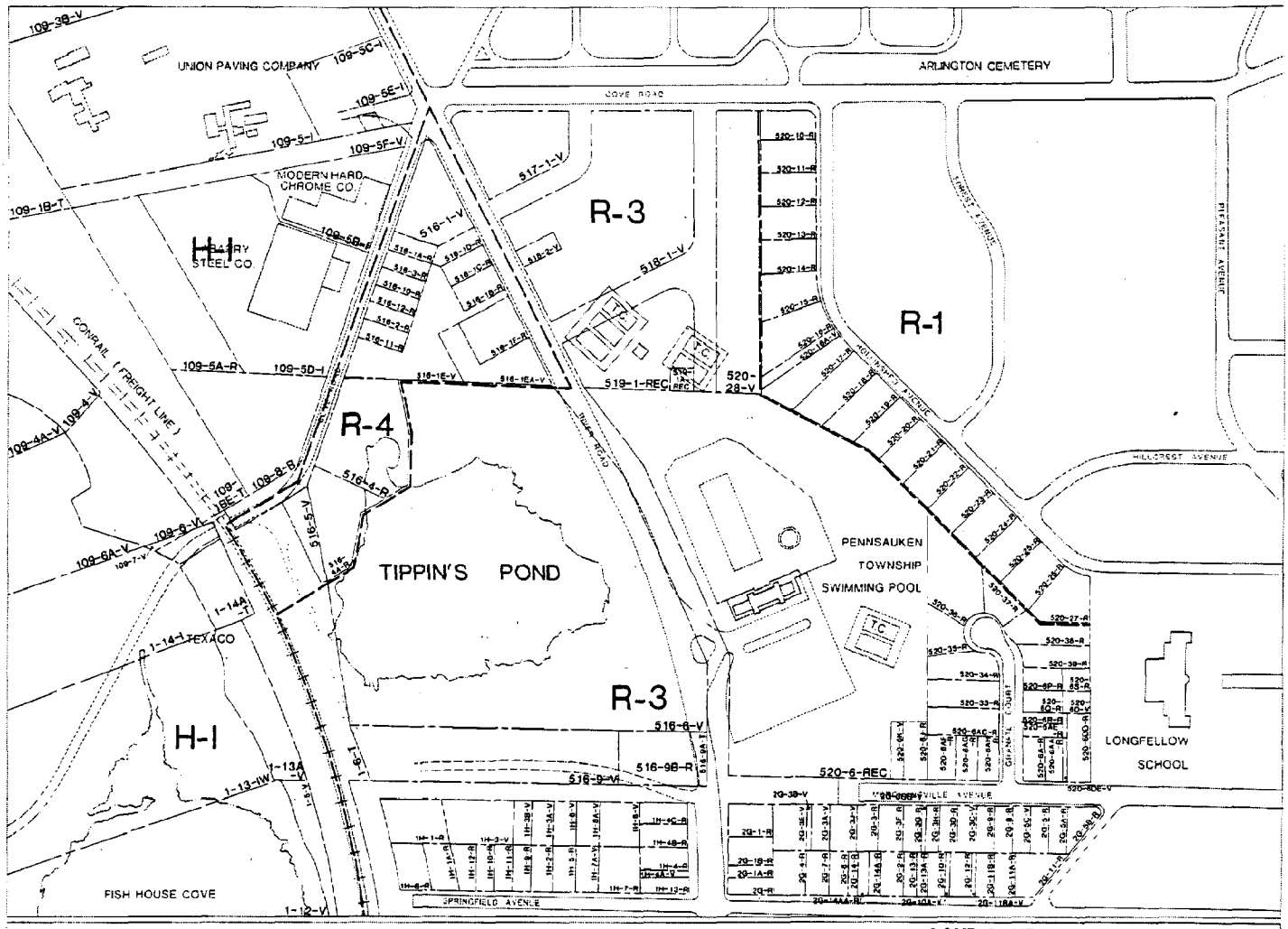
Most parcels to the north of Cove Road are in corporate ownership, while the small parcels between Springfield Avenue and the unimproved right-of-way for Merchantville Avenue are privately owned. Land ownership patterns in the Tippin's Pond area are illustrated in Figure 13 (Township of Pennsauken, 1981B).

Riparian Lands Status of Fish House Cove and Tippin's Pond

In New Jersey any lands now or formerly flowed by the mean high tide are considered riparian lands. The State owns riparian lands unless it has divested itself of ownership by issuing a riparian conveyance. Three types of conveyance may be issued by the State--a grant in fee for occupying lands with solid fill, a 15-year lease for solid fill and pier-type structures, and a 10-year license, payable annually, for resident-type structures. No new construction, dredging, repair, or replacement work may be done on riparian land without first obtaining a riparian construction permit (sometimes known as a waterfront development permit) from the State. The plans for such work must be signed and sealed by a licensed engineer. In order to repair a legally existing structure or to do maintenance dredging, an administrative approval permit must be obtained. For all marine construction, a permit must be obtained from the U.S. Army Corps of Engineers. Other permits that may be required include Wetlands, Stream Encroachment, and Waterfront Development permits.

The Fish House Cove site, lot 12, block 1, was the subject of a riparian grant issued to Joseph Cramer, Inc., June 21, 1926, and was reconveyed to the State by the Legislature in 1934. Lots 5, 5A and 5B (block 1) are the upland properties.

The title study and riparian maps of the Tippin's Pond area have not yet been completed but must be within one year if the State is to claim the area as riparian due to the recent passage of the riparian referendum.



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

LAND OWNERSHIP

Public	Private
Pennsauken Township	Paragon Oil Company (Texaco)
State of New Jersey	Amerada Hess Corporation
Other, tax exempt	Other Corporations
	Individuals

Figure 13

Utilities and Services in the Fish House Cove Area

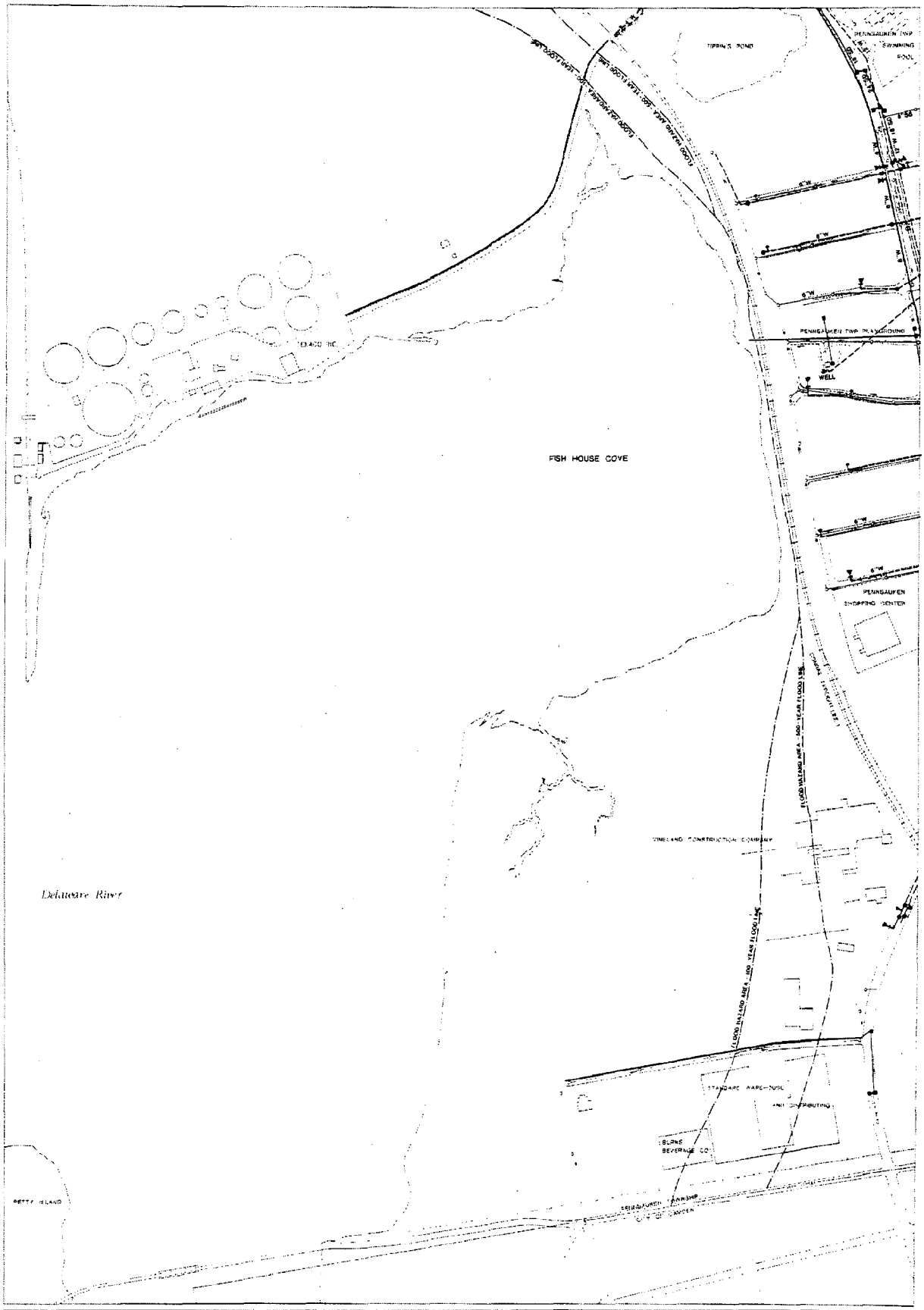
Although utilities and services are generally available in the Fish House Cove area, direct connections to sanitary sewer and water distribution lines are not available on the cove side of the railroad right-of-way. Electric power lines cross the tracks at Cove Road. Storm sewers on the cove side of the tracks are not needed due to the limited land area there and its direct drainage to surface water. Utilities and services are shown in Figure 14.

Utilities and Services in the Tippin's Pond Area

Electric power lines (13, 14, and 26 kV) run close to the Tippin's Pond site along River Road and Cove Road. Sanitary sewer lines serve the southwestern edge of the site along Springfield Avenue. Any facility in the Tippin's Pond basin needing sanitary sewage removal would have to pump it to lines along Springfield Avenue. Because there are no impervious surfaces in the pond basin, storm sewers are not needed. However, two storm sewer outlets discharging drainage from River Road and the Pennsauken Swimming Pool Facility create a sedimentation and water pollution problem for the pond as well as contributing to fluctuations in the pond's water level that may be responsible for occasional flooding of shoreline paths. Water distribution lines are found all around Tippin's Pond except for a short distance along the Penn Central right-of-way. Telephone service is available everywhere in this area of the Township. Figure 15 shows utilities and services in the vicinity of Tippin's Pond.

Circulation and Parking for Fish House Cove

Regional access approaching Fish House Cove is adequate along heavily traveled River Road, which connects to Route 73 and Federal Street in Camden. There is no public access by land to the Cove. By automobile, the points of closest approach are on the several streets from 47th to Springfield Avenue that dead-end at the railroad right-of-way and on the section of Cove Road that continues on the cove side of the tracks for a short distance. Access from these areas must be by foot across the tracks and down the railway embankment or through lowland vegetation on private land if Cove Road is used. Off-street parking is limited to a



FISH HOUSE COVE

WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

UTILITIES

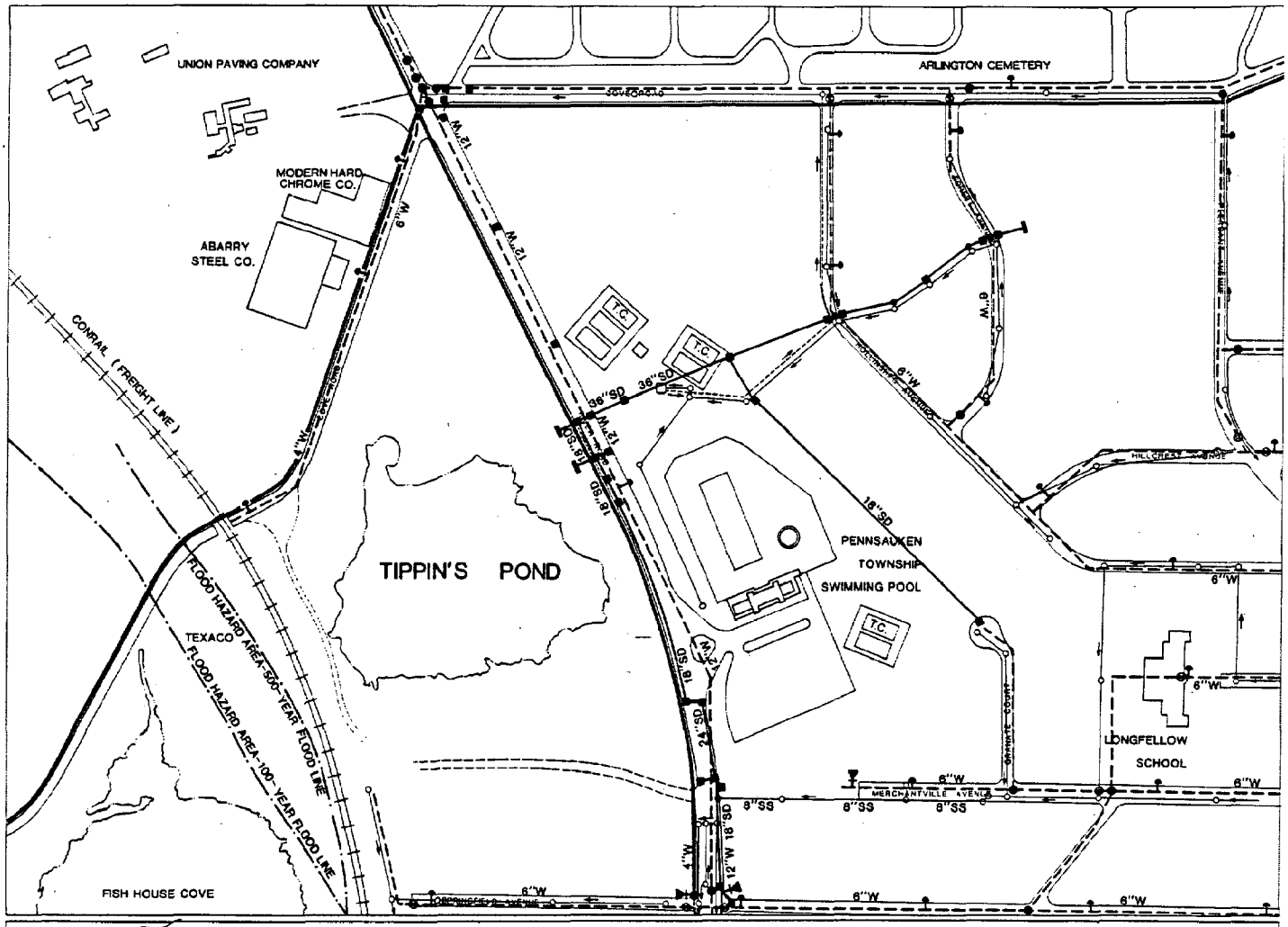
STORM SEWERS
- 18"SD Pipes
- Headwall
- Inlets
- Manhole

SANITARY SEWERS
- 8"SS Gravity Main
- Force Main
- Pumping Station
- Manhole

WATER DISTRIBUTION
- 6"W Main
- Hydrant
- Valve Box
- Blow Off
- Manhole

ELECTRICAL DISTRIBUTION
- 13,14,26 kV Lines

Figure 14



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

0 100 ft 200 ft 400 ft

UTILITIES

STORM SEWERS:
- 18"SD — Pipes
- Headwall
- Inlets
- Manhole

SANITARY SEWERS:
- 8"SS — Gravity Main
- Force Main
- Pumping Station
- Manhole

WATER DISTRIBUTION:
- 6"W — Main
- Hydrant
- Valve Box
- Blow Off
- Manhole

ELECTRICAL DISTRIBUTION:
- 13,14,26 kV Lines

Figure 15

small gravelled lot owned by the Township, off Cove Road but across the tracks from the cove.

Bus 9 of Transport of New Jersey, originating in Philadelphia and stopping in Camden, services River Road and the Fish House Cove/Tippin's Pond area on a regular basis.

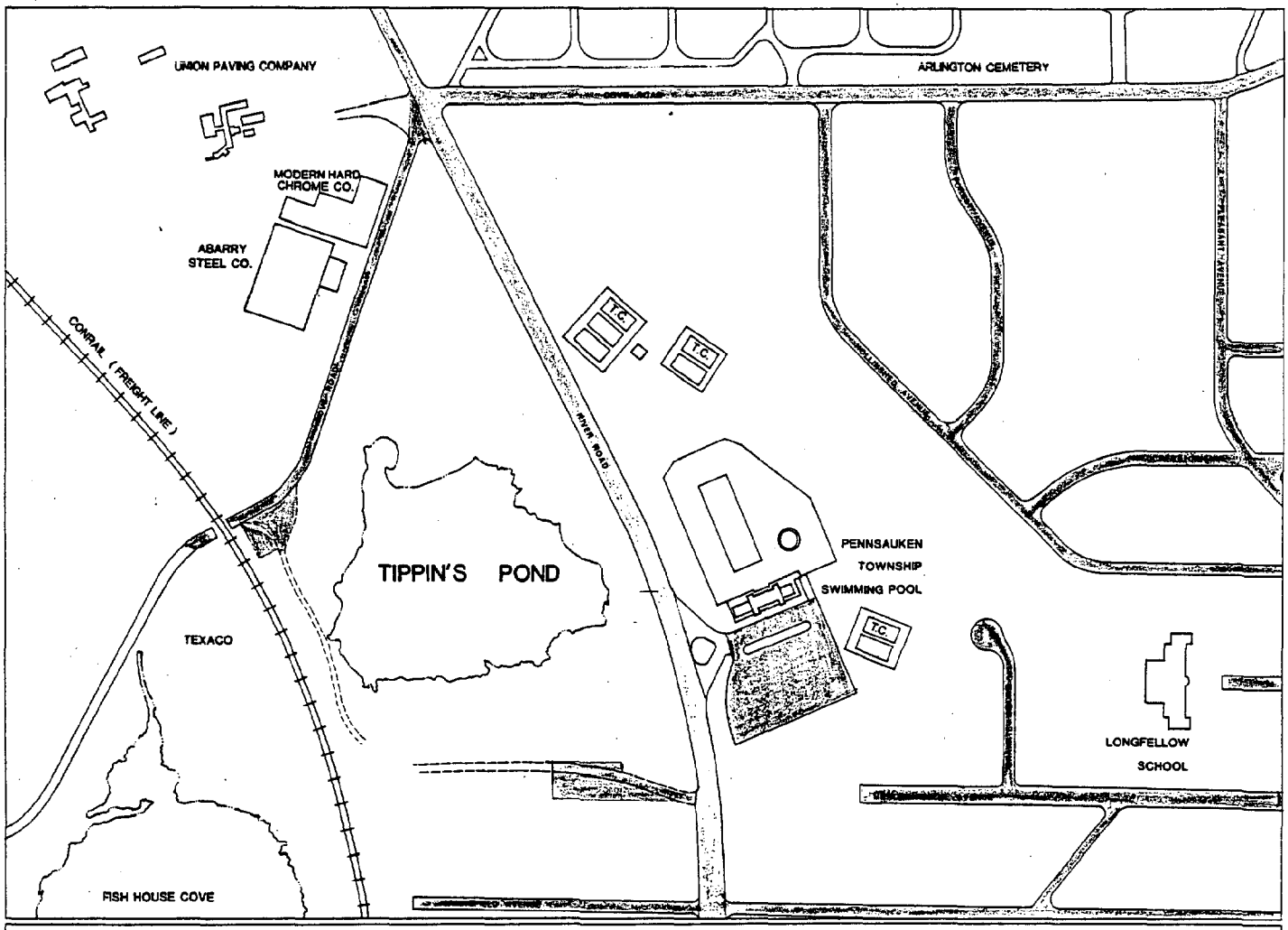
Immediate access to the Cove is by way of Tippin's Pond: see discussion and Figure 16 below.

Circulation and Parking for Tippin's Pond

Regional access for Tippin's Pond is provided by River Road, which connects to many other streets and highways in the township, and by Cove Road, which runs to the north of the site. River Road at the Pennsauken Township Swimming Pool is heavily travelled, carrying about 10,300 vehicles per day (annual average - Camden County Department of Highways, 1981). Although there are many public parking places available at the swimming pool facility, these spaces are cut off from the Pond by this heavy traffic on River Road and by difficult access to the pond along the north side of that road. A small gravelled lot near the intersection of Cove Road and the railroad is owned by the Township and can accommodate about a dozen cars. If the right-of-way of Merchantville Avenue north of River Road were cleared and a driving surface installed, another access point for automobiles could be readily created. From either the Cove Road or the potential Merchantville Avenue approaches, there is easy access to the pond by foot within 500 ft. Formerly an underpass beneath the tracks permitted access from the pond to the cove, but it is now filled in. Opening it again would provide safe pedestrian access to the cove by way of the pond. See Figure 16 for circulation and parking information.

Special Areas in the Fish House Cove and Tippin's Pond Area

Under the New Jersey Coastal Management Program, a report called Coastal Resource and Development Policies (June, 1981) spells out the policies that are the criteria for permit decisions under CAFRA, the Wetlands Act, and the Waterfront Development Act and that will guide NJDEP recommendations to the Tidelands



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

0 100 ft 200 ft 400 ft

CIRCULATION AND PARKING

- Collector highway
- Local street
- Parking area
- Potential parking area

Figure 16

Resource Council and other coastal zone management decisions. The report lists 44 types of coastal areas (Special Areas) "which merit focused attention and special management policies."

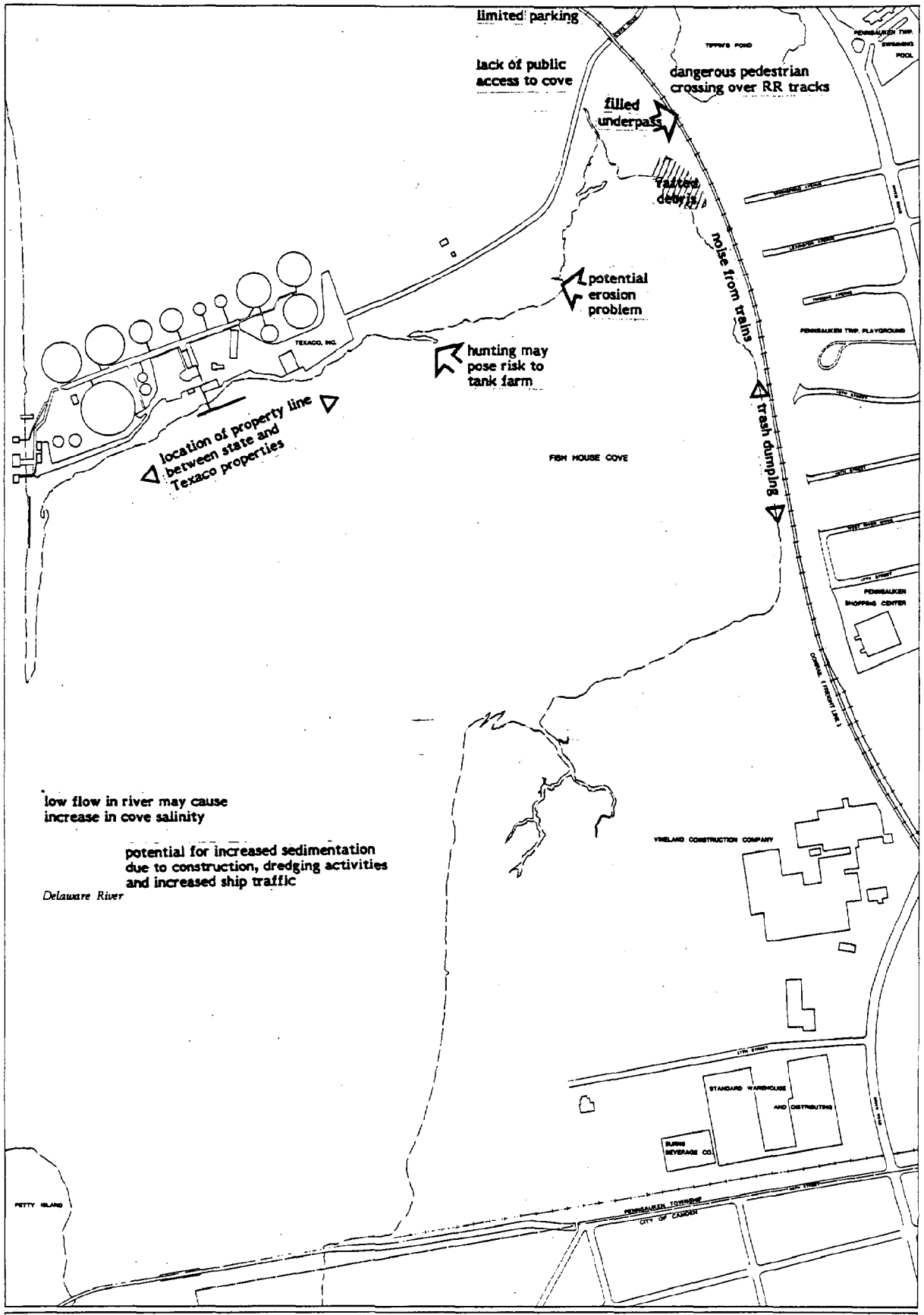
Special Areas that may be relevant to the Fish House Cove and Tippin's Pond sites include the following:

- Prime Fishing Areas
- Finfish Migratory Pathways
- Navigation Channels
- Submerged Infrastructure Routes
- Intertidal Flats
- Filled Water's Edge
- Natural Water's Edge Floodplains
- Alluvial Flood Margins
- Beaches
- Wetlands
- Wetlands Buffer
- Steep Slopes
- Specimen Trees
- Endangered or Threatened Wildlife or Vegetation Species Habitats
- Critical Wildlife Habitats
- Public Open Space

Definitions, policies, and rationales for these policies, as presented in the NJDEP report (1981), are reproduced as Appendix C.

Constraints to Recreational Use of the Fish House Cove and Tippin's Pond Sites

Intrinsic site characteristics may place constraints on the development design or pose problems that must be addressed and resolved in the planning and design phases for recreation development of Fish House Cove and Tippin's Pond. This section deals with the potential problems and constraints presented by the two sites. Figures 17 and 18 illustrate many of the problems discussed in this section.



FISH HOUSE COVE

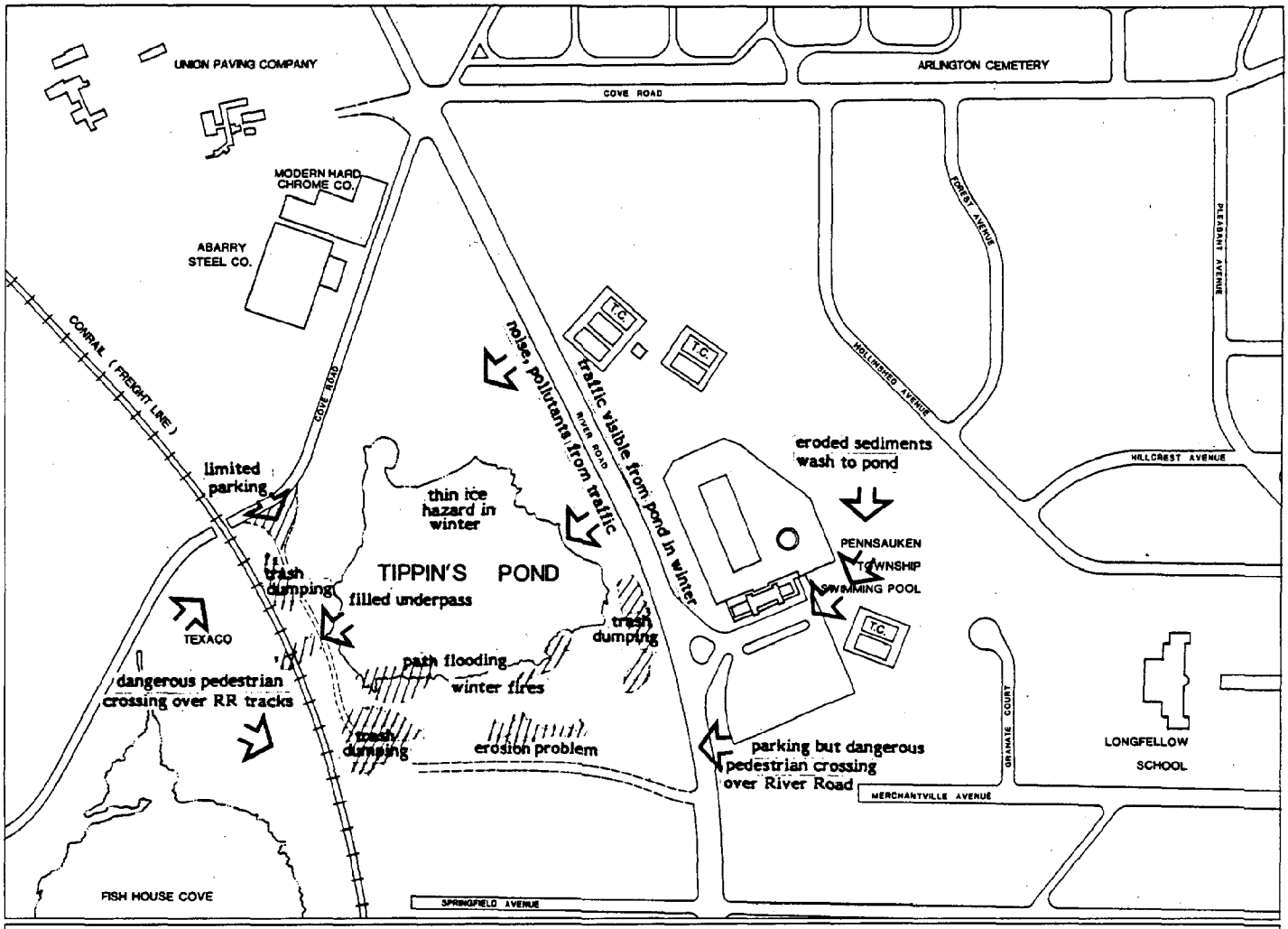
WILDLIFE SANCTUARY

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

POTENTIAL CONSTRAINTS TO RECREATIONAL USE

Figure 17



TIPPIN'S POND

RECREATIONAL AREA

PENNSAUKEN TOWNSHIP
WATERFRONT DISTRICT MANAGEMENT PROGRAM

ROGERS, GOLDEN & HALPERN
PHILADELPHIA, PENNSYLVANIA

0 100 ft 200 ft 400 ft

POTENTIAL CONSTRAINTS TO RECREATIONAL USE

Figure 18

Accessibility/Parking for Fish House Cove. There is currently no public access to Fish House Cove. Cove Road, as a public right-of-way, ends about 100 ft on the cove side of the railroad tracks. All land surrounding the cove is owned by the railroad or is in private ownership. Formerly there was a passageway under the tracks from the western corner of the pond area to the cove for pond drainage and pedestrian traffic. This underpass is now filled in, although two substantial retaining walls are visible on both sides of the track embankment. There is a small parking area owned by the township off Cove Road but on the other side of the tracks from the cove. The major problem associated with the current parking area location is the danger involved in uncontrolled pedestrian traffic across the railroad tracks. This is a particularly serious issue when considering the use of the areas by unsupervised children.

Accessibility/Parking for Tippin's Pond. The best access to Tippin's Pond by car is from Cove Road. Persons arriving by car can park on a small township-owned property near the pond and walk down a gravel path to the pond's edge closest to the railroad tracks. Parking is also available across River Road at the township recreation area; however, heavy traffic presents a safety hazard, particularly for unsupervised children attempting to cross River Road to get to the pond area. Foot access along the trail that partially circles the pond may be impeded by periodic flooding as the pond level rises in response to direct discharge of stormwater from River Road and more gradual flow of groundwater following storms or snow melt.

Pond Drainage—Tippin's Pond Site. Since the culvert collapsed that formerly drained Tippin's Pond to Fish House Cove, a new and higher mean water level is established in the pond. The higher water levels have caused the death of many trees formerly on the banks but now well within the pond itself. These higher levels have also resulted in periodic flooding of portions of the perimeter path particularly near the western corner of the pond. This presents a problem in terms of trail location and maintenance and in terms of designing facilities to contend with these fluctuations. For example, installation of a boardwalk may be necessitated to allow crossing of periodically flooded areas, whereas a stabilized water level by means of an overflow device would allow the use of conventional walking trails.

Erosion. Several points along the southern bluffs overlooking Tippin's Pond are severely eroded. If corrective measures are not taken, erosion will continue as trail bikes and sleds are used on these slopes. Gradually, larger areas will be affected, resulting in death to hillside vegetation as root zones are exposed and eventually a leveling of the bluffs themselves. This erosion does not pose a direct threat to the pond itself due to the flat areas at the foot of the bluff that trap the sandy soil particles. Erosion from the bare sandy soils at the back of the Pennsauken Swimming Pool site, however, does affect the pond as soil particles are washed across the parking lot, across River Road, and into storm sewers where they are directed to the pond's edge.

Erosion into Fish House Cove does not appear to be a major problem, as the steep banks along the railroad right-of-way and Vineland Construction Corporation properties are well vegetated. Some areas that may be actively eroding are the areas of recent fill along the edge of the Texaco property.

Impacts of Adjacent Land Uses on Fish House Cove. The influence of adjacent land uses on the Fish House Cove site include railroad and truck traffic noise, possible air and water pollution, sedimentation, and salinity problems. The adjacent Penn Central rail line is traveled frequently by slow-moving freight trains. The rather heavily traveled River Road generates a steadier but faint noise.

Sediment from eroding soils at the edges of recently filled areas may present design and maintenance problems, particularly in terms of stabilizing areas with vegetation. If sedimentation levels in the cove were to increase due to adjacent filling, dredging, development or ship traffic, the seeds of annual marsh plants might be buried sufficiently to prevent successful emergence of seedlings, or young plants could be buried. If this were to happen, perennial plants like common reed might have a competitive edge and extend into the areas formerly occupied by these annuals.

A change in the cove's salinity level, which is now extremely low, could affect species composition in the marsh. The shift in the species present would depend on the physiological tolerances of the various species. The salt wedge in the Delaware River extends past Fish House Cove in summer periods of low water

flow. Salinity in the cove could be increased by channel dredging, increased tanker or ship traffic, diversions of fresh water from the upper Delaware River, and drought conditions that would reduce the freshwater inflow (CCEA, 1980).

There is a critical ownership issue concerning the filled edge lying along the boundary separating the state riparian lands of Fish House Cove (lot 12, block 1) and the Texaco parcels (lots 13 and 15, block 1). As noted above, there is the possibility that parts of this filled edge used by Texaco are on state riparian lands. Due to the approval of the riparian lands referendum in November 1981, the state has but one year to assert ownership of that part of lot 12 that may be filled as an extension of the fill on Texaco's lots 13 and 15.

A major dock and warehouse facility planned for the Vineland Construction Co. site has the potential for disrupting the ecological balance of Fish House Cove both during construction and operation if mitigative measures are not taken. One way to assure protection of the cove marsh would be to incorporate a planted and fenced buffer strip along the northern land boundary of the Vineland site including the tidal drainage pattern that has developed in the hydraulic fill.

Impacts of Adjacent Land Use on Tippin's Pond. The main impacts of adjacent land use on Tippin's Pond are noise from railroad, truck, and automobile traffic, erosion and sedimentation problems, and illegal dumping of trash.

The noise generated by the Penn Central freight line is intermittent, while the traffic noise from River Road is steady. Truck traffic along River Road is particularly noticeable. Summer foliage at the pond's edge effectively blocks the road traffic from the view of the pond; River Road traffic is visible in winter.

Erosion of nearby land areas draining into the pond via the banks or storm sewers presents a sediment problem, and the pond is gradually filling. The barren slopes along the pond's southwestern edge and along the rear of the Township Swimming Pool area probably contribute sediment to the pond during storms. Pollutants from roads and other unidentified sources may enter the pond with stormwater via two storm sewers discharging to the pond along River Road. Dumping of trash, primarily where there is access by car, is a problem on the Tippin's Pond site. In particular, three areas located off the sand road running

along the northwest edge of the pond and in the western corner of the pond site are badly affected by this illicit activity.

Safety at the Fish House Cove Site. Major safety factors along Fish House Cove include train traffic, hunting, rafted debris, and security.

The railroad line, although the freight trains are slow moving, may present a hazard to people using the area. The most serious danger is associated with uncontrolled access to and from the site across the tracks.

Another safety aspect to be considered is the potential for criminal activities, such as robbery or assault, that can take place, particularly in the more isolated areas of the cove. Adequate policing of these areas would be called for, as well as a design that takes this vulnerability of users into account.

The presence of shotgun shells observed along the cove shore attests to hunting activity. Shooting may conflict with other recreational uses of the site and could present an additional hazard if the oil storage tanks on the Texaco property were incidentally damaged.

Loose pilings and debris are rafted into the cove on the tide. These could act as battering rams, posing a threat to structures placed in the cove areas affected.

Safety at the Tippin's Pond Site. Safety issues at Tippin's Pond are the depth of the pond, ice safety in winter, the building of fires along the pond edge, and security.

Water depth is a safety factor to be considered for any water body where recreational activities are involved. Ice skating is a popular activity in the winter, and water depth is a particular concern if the ice is not thick enough to support people.

Another safety aspect to consider is the potential for criminal activities, such as robbery and assault, that can take place, particularly in the more isolated areas of the site.

Usually associated with such cold-weather activities as ice skating is the building of fires around the pond. In addition to the real safety concern, these fires present a nuisance because passing motorists think the woods are on fire and repeatedly alert the local fire department, which has to investigate all such reports (Carruth, 1981, oral communication).

Construction of Recreational Facilities in Fish House Cove. Due to the waterfront location of the cove, construction and use of recreational facilities in the cove such as boardwalks or observation stations on pilings will require certain state permits including a riparian construction, wetlands, and stream encroachment permits.

Removal of Trash and Prevention of Dumping. The railroad embankment and the vacant lands around Tippin's Pond have been the site of illegal dumping of demolition debris, excess road aggregate, old newspapers and household trash. Any plan to create a park around Tippin's Pond must include steps to remove this unsightly refuse and design features to prevent access to those who would continue to desecrate these natural areas.

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APPENDIX A. PROJECT GOALS AND THEIR EFFECTS ON POLICIES AND PLANS OF OTHER AGENCIES

Pennsauken Township seeks to create a network of public parks for a variety of recreational and resource conservation purposes along the waterfront of the Delaware River and Pennsauken Creek. This endeavor presents a major strategic and financial challenge to the Township and will require the cooperation of citizens, business, industry, and various levels of government to achieve. Spearheading this effort is the citizens Waterfront Management Committee.

Starting with land already in public ownership the Township must assemble by fee simple purchase or lesser interest other key parcels as part of this open space corridor. By focusing on the land-water edge, the Township has chosen to preserve or restore to a natural state a varied and dynamic ecological situation that serves as habitat for a wide variety of plants and animals. For these reasons and because our own species holds the water's edge as a particularly fascinating place for recreation, the Township's choice is a good one.

GOALS FOR THE PRESERVATION AND USE OF FISH HOUSE COVE AND TIPPIN'S POND

Fish House Cove and Tippin's Pond, as the subjects of the present study, are the first elements of the Pennsauken riverfront park system. It is necessary to establish goals for these two sites and to examine the compatibility of these goals with local, regional, state, and federal policies and regulations.

Goals for Fish House Cove

To preserve Fish House Cove as a wildlife sanctuary.

To provide passive recreational opportunities for the citizens of New Jersey in the cove that are compatible with its function as a wildlife sanctuary.

To acquire interest in land adjacent to Fish House Cove that will be sufficient to ensure its preservation as a wildlife sanctuary and a place for passive recreation and to provide convenient public access to it.

Goals for Tippin's Pond

To preserve Tippin's Pond and its adjacent lands as a natural area of woods, fields, ponds, and wetlands.

To provide recreational opportunities for the citizens of New Jersey on and around Tippin's Pond that are compatible with its natural state.

To acquire interest in land adjacent to Tippin's Pond that will be sufficient to protect the pond as a natural area.

The first goal for both sites recognizes their inherent natural values. The second goal places human activities in the natural setting only to the extent that these activities do not jeopardize the natural values. The third goal is an action-oriented statement that is the first step necessary to achieving the first two goals.

PLANS AND POLICIES AFFECTING FISH HOUSE COVE AND TIPPIN'S POND

In the sections that follow, we will examine various government policies in effect for compatibility with the recreational use of Fish House Cove and Tippin's Pond.

Pennsauken Township

The Comprehensive Master Plan now in effect designates Fish House Cove for industrial use. Such a designation is clearly in conflict with the goals for Fish House Cove. However, this plan is currently being updated. According to the Township's Planning consultant, the new plan will reserve Fish House Cove for resource protection or recreational use. Tippin's Pond is shown for residential use.

The Zoning Map for Pennsauken shows Fish House Cove in a heavy industrial zone. This area is also in the Waterfront District Management Zone, zoning

regulations pursuant to which reserve this overlay zone for water related uses. Here, public open space and resource protection are given particular emphasis. The land immediately surrounding Tippin's Pond is zoned to several categories of residential, much of which is already in residential use. Non-commercial parks and recreational uses are permitted in all residential zones.

Camden County

The Comprehensive Plan for Camden County (1972) supports in its goals for recreation, open space, and conservation the concept of a wildlife sanctuary for Fish House Cove and recreational use of both the Cove and Tippin's Pond as well as the principle of an interconnected system of parks in the County. On the Comprehensive Plan, no use is assigned to either the cove or to Tippin's Pond. The alignment of the Camden-Burlington Expressway would have cut between the cove and the pond, but plans to build this highway have since been abandoned.

Delaware Valley Regional Planning Commission

The year 2000 Land Use and Open Space Plan (October, 1979) designates Fish House Cove as a proposed open space preservation or conservation area--"natural areas of regional significance, not presently preserved, which are desirable as permanent open space....urban or suburban development is not recommended for these areas." Although the map scale does not allow an exact determination, it appears that the Tippin's Pond area is designated on this regional plan as a growth area 1970-2000. However, the commission expects that much of the land so designated will remain open.

New Jersey Coastal Management Program

Part III of the Coastal Management Program (August 1980) is entitled "Description of the New Jersey Coastal Zone: Affected Environment." In this part of the program, the boundary of New Jersey's Coastal Zone is delineated and visions for the future of specific parts of the coastal zone are suggested based on the eventual implementation of coastal zone policies. In the section that discusses the Camden Region (p. 329), the following statements are made:

> The preservation of the few remaining areas (along river waterfronts) still relatively open and undisturbed in the Region will also be a goal of the Coastal Program. These include the lower reaches of Big Timber Creek, the marina area on the Cooper River, and Fisherman's Cove, which could be maintained as natural areas for carefully managed recreational activities.

Conversations of RG&H with the Bureau of Coastal Planning and Development indicate that the Fisherman's Cove refered to is Fish House Cove. Thus, New Jersey's coastal management program suggests a use for the cove that is identical with the Township's own current plans for its use.

U.S. Fish and Wildlife Service

Although Fish House Cove was a candidate site for dredge disposal in the Delaware River Dredging Disposal Study (U.S. Army Corps of Engineers, 1979), the U.S. Fish and Wildlife Service has designated the cove as a high value water fowl area, which designation essentially removed it from consideration as a disposal site.

PERMITS FOR CONSTRUCTION OF RECREATIONAL FACILITIES

Permits that may be required for construction of recreational facilities in Fish House Cove and Tippin's Pond are described briefly below. Most will apply only to the Cove.

Wetlands Permit (See Wetlands Act, N.J.S.A. 13:9A)

Any development in the tidally influenced wetlands of Camden County is required to have a wetlands permit if the wetland in question is delineated and mapped as a wetland by the N.J. Department of Environmental Protection. Mapping of wetlands in Fish House Cove is currently underway and will have the force of law in early 1982.

Waterfront Development Permit (See Waterfront Development Law, N.J.S.A. 12:5-3)

All new construction on or in tidal waters is required to have a Waterfront Development Permit. This would apply to Fish House Cove but not to Tippin's Pond.

For more information on these two permits contact:

Bureau of Coastal Project Review
Waterfront Region
CN 401
Trenton, NJ 08625
(609) 292-2895

Tidelands Grants, Leases, and Licenses

For Pennsauken Township to apply for a Waterfront Development Permit, it must first obtain a grant, lease, or license for the principal Fish House Cove parcel (Block 1, lot 12). In order to have standing to request a riparian interest, the Township must be in control of the uplands immediately adjacent to this parcel. One of three narrow upland strips is owned by the State, and two others are in private ownership. It is currently the practice of the Tidelands Resource Council, the agency that reviews applications for tidelands conveyances, to issue only licenses in order to maintain State ownership of tidelands. Licenses are for renewable 10-year periods.

The riparian status of Tippin's Pond is not yet decided.

For more information contact:

Bureau of Tidelands
CN 401
Trenton, NJ
(609) 292-2573

Stream Encroachment Permit

A Stream Encroachment Permit is required for any construction within the 100 year floodplain of any stream or river. All of Fish House Cove is in the 100 year floodplain and thus recreational facilities there would require a Stream Encroachment Permit.

For more information contact:

Division of Water Resources
CN 029
Trenton, NJ 08625
(609) 292-2373

Delaware River Basin Commission Approvals

The Delaware River Basin Commission is an interstate agency with responsibilities involving water utilization and conservation on lands drained by the Delaware River and tributaries within New Jersey, Pennsylvania, Delaware, and New York. An approval must be obtained prior to all public and private projects that may affect water resources in these regions. The Commission has also established minimum restrictions for development along non-tidal streams in the four-state basin. For more information contact:

Delaware River Basin Commission
25 State Police Drive
Box 7360
West Trenton, NJ 08628

Section 10 and Section 404 Permits

The U.S. Army Corps of Engineers requires a federal permit for any construction in navigable waters (section 10 of the Rivers and Harbors Act of 1899) or any filling or spoil disposal activities in navigable waters (section 404 of the Clean Water Act). If both permits are necessary for the same development, the Corps issues a single permit, citing the authority of both acts. It should be noted that under section 404 of the Clean Water Act, the Corps has recently extended

significantly their definition of navigable waters to include new water areas and wetlands that were not previously incorporated. For more information contact:

U.S. Army Corps of Engineers
Philadelphia District, Permits Branch
Second and Chestnut Streets
Philadelphia, PA 19106 (215) 597-2812

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APPENDIX B. FUTURE FUNDING FOR LAND ACQUISITIONS AND RECREATIONAL DEVELOPMENT OF TIPPIN'S POND AND FISH HOUSE COVE

INTRODUCTION

Pennsauken Township is planning for the preservation and recreational use of Fish House Cove and Tippin's Pond and will seek funding sources for land acquisition, final facility design, and development to implement these plans. As part of its work with Pennsauken Township, Rogers, Golden & Halpern has reviewed potential funding sources to which the township might apply. One conclusion is straightforward. Many federal and state programs whose purpose or eligibility requirements closely match the Township's plans for the two sites have either been eliminated or are undergoing revisions and are not currently active, having fallen victim to the overall federal budget reductions that occurred in 1981. The major exceptions to this trend are the continued availability of grant monies from New Jersey's Green Acres Program, administered by the Department of Environmental Protection, the recent release of CEIP monies to the New Jersey Department of Energy, HUD grant programs, and a U.S. Department of Agriculture grant program. The various grant programs that were examined are presented in Table 1. These include:

- New Jersey Green Acres Program
- Coastal Energy Impact Program (CEIP)
- Community Development Block Grant and Urban Development Action Grant Programs
- Resource Conservation and Development Program
- Maritime Preservation Grants Program
- Urban Park and Recreation Recovery Program
- EPA/NJ grants for restoring publicly owned fresh water lakes

Table 1. Summary of Grant Programs for Public Recreational Projects

NEW JERSEY GREEN ACRES PROGRAM

Purpose	To increase the public use and enjoyment of permanent outdoor recreational areas. Funding includes site design, land and development of recreation and open space projects.
Matching requirements	State: 50% Local: 50%. Local share can come from many other sources of funding.
Application deadline	March 31, 1982
Status	Active
Contact	Dennis Davidson Land and Water Conservation Fund and Green Acres Program N.J. Department of Environmental Protection P.O. Box 1380 Trenton, NJ 08625 (609) 292-2752

COASTAL ENERGY IMPACT-FORMULA GRANTS

Purpose	To prevent or reduce loss of waterfront land uses if impacted by coastal energy facility
Matching requirements	100% Federal grant
Application deadline	Early 1982
Status	Active
Contact	Geraldine Fenner-McNulty CEIP Project Planner New Jersey Department of Energy 101 Commerce St. Newark, NJ 07102 (201) 648-3440

COMMUNITY DEVELOPMENT BLOCK GRANT AND URBAN DEVELOPMENT ACTION GRANT PROGRAM

Purpose	To aid in the elimination of slums or blight and address urgent needs of recent origin for the principal benefit of low and moderate income persons
Matching requirements	100% Federal grant

Table 1 (Continued)

Application deadline	January 5, 1982 for special projects February 1 for municipally sponsored projects
Current status	Pennsauken Townhsip recently joined a consortium of Camden County municipalities as an entitlement area. The consortium decides upon the distribution of grant monies among its members.
Contact	Mr. Bruce Frankel Director Camden Co. Community Development Program (609) 757-6747

RESOURCE CONSERVATION AND DEVELOPMENT PROGRAM

Purpose	To provide technical and financial assistance to local groups for planning and development of a variety of resource conservation and utilization projects including water based recreation wildlife preservation, flood prevention, land drainage, and forestry product development.
Matching requirements	50% Federal 50% State or local
Application deadline	Open: Council meets once a month to review project applications. Project priority for funding is set in September of each year.
Current status	Active
Contact	Mr. Tony Dore Project Coordinator South Jersey Resource Conservation and Development Program OCKAP Building Hammonton, NJ 08037 (609) 561-3223

MARITIME PRESERVATION GRANTS PROGRAM

Purpose	To assist and encourage the acquisition, protection restoration, preservation, reproduction and exhibition of vessels, artifacts, collections, structures and water related sites of significance in the maritime history of America To perpetuate the skills associated with all types of water borne craft To focus attention on all aspects of America's maritime heritage

Table 1 (Continued)

Matching requirements	50% matching of grant monies must be met by applicant. Although the matching share is usually cash, services may be counted if from sources outside the applicant organization. Federal monies may not be used as a match.
Application deadline	Not yet set
Current status	Uncertain. Program decisions for 1982 will be made early in 1982.
Contact	Director, Maritime Preservation National Trust for Historic Preservation 740-748 Jackson Place, N.W. Washington, D.C. 70006 (202) 673-4000

THE URBAN PARK AND RECREATION RECOVERY PROGRAM

Purpose	To rehabilitate existing indoor and outdoor recreation facilities To demonstrate innovative ways to enhance park and recreational opportunities at the neighborhood level To develop local Recovery Action Programs that identify community heads, objectives, action priorities and strategies for revitalization of the total, public and private, recreation system
Matching requirements	Rehabilitation grants 70% Federal 30% local Innovation grants 70% Federal 30% local Recovery Action Programs 50% Federal 50% local Note: A Recovery Action Program is required for participation in the grant program.
Application deadline	
Current status	Only grants available are for extensions of Innovation Grants by current grant recipients.
Contact	National Park Service State Programs (202) 272-3660

Table 1 (Continued)

GRANTS FOR RESTORING PUBLICLY OWNED FRESHWATER LAKES

Purpose	To restore publicly owned freshwater lakes for recreational use by the public Phase I, "Diagnostic Feasibility" studies - for background data gathering and planning purposes Phase II, Implementation
Matching requirements	Phase I: Federal 70% State (Green Acres) 15% local 15% Phase II: Federal 50% State (Green Acres) 40% local 10%
Application deadline	
Current status	Program terminated by ERA
Contact	Lakes Management Coordinator New Jersey Department of Environmental Protection Division of Water Resources P.O. Box CN-029 Trenton, NJ 08625 (609) 292-2203

DISCUSSION

In the sections that follow we will describe in more detail the first four grant programs listed in Table 1.

Green Acres Program

The Green Acres Grant Program for New Jersey was established in 1974 to increase the public use and enjoyment of permanent outdoor recreational areas. This program is implemented by state funds that are available to selected qualifying projects in New Jersey municipalities and counties for the development of outdoor recreational facilities (Development Grants) and for the acquisition of open space lands (Acquisition Grants). Local assistance matching grants under both programs are made in amounts up to 50% of the total allowable project cost. The applicant mav draw upon a wide variety of financial sources for its 50% matching share, including private agency, group or foundation, state or federal programs, or local public sources.

The Green Acres funding cycle works on the following schedule:

October - DEP solicits program interest from counties and municipalities.

March - Local units inform DEP of their potential interest for the coming year by March 31. The municipality has one year to submit all application based on submission of the Program Participation Interest form.

April - DEP develops program priority lists and funding schedule for applications received during the previous year.

The specific procedure to be followed in applying for a Green Acres Development Grant are given below:

1. Letter of Intent. In the year ending March 31 following submission of the Program Participation Interest form, the local unit should submit a letter of intent to Green Acres for each project. This letter should include
   - narrative description of the project
   - estimated cost breakdown
   - preliminary site plan
   - letters of support, photographs, endorsements and other pertinent information to support letter of intent

2. Public Hearing. The local unit must hold a public hearing, properly advertised, that deals specifically with the proposed project. A summary of the hearing must accompany the project application.

3. Pre-application meeting. An informal meeting between Green Acres staff and the applicant is held to exchange information on the project and for the Green Acres staff to answer questions on the program and application procedures and to make specific recommendations for the application to follow.

4. Formal Application. Based on the information obtained at the preapplication meeting, the applicant submits the following documents that together comprise the Application for a Green Acres Development grant:

   - Development grant application
   - Enabling resolution
   - Engineer's cost estimate
   - Proposed development analysis
   - Recreation and open space inventory and map.
   - Narrative description
   - Assessment of Environmental Impact
   - Park ordinance
   - Tax map referencing the site(s) to be developed
   - Graphic illustration
   - Site plan
   - Floor plans of any buildings to be built

- Fee schedule
- Twenty five year lease
- Photographs of site
- Estimate of annual operating expenses

Green Acres staff reviews the application for completion and presents it to the Commissioner of DEP for project reviews and decision. Upon approval, DEP and the local unit enter into a contractual agreement that specifies the grant amount, the project scope and its time period. The state makes payment to the local unit after the local unit documents the completion of the project or a discrete phase of the project.

More detailed information, on which this description is based, may be found in the Green Acres Procedural Guide.

Coastal Energy Impact Program

Coastal Energy Impact Program (CEIP) funds derived from outer continental shelf (OCS) leases for oil and gas development were recently released to New Jersey based on the outcome of OCS boundary delineation between New Jersey, New York, and Delaware. These funds are available to any local government unit in New Jersey for qualifying projects to offset the negative impacts of energy related facility development in the coastal zone and can include land acquisition for the restoration of recreational opportunities.

According to NJ Department of Energy officials, the CEIP grant review committee may meet as early as January of 1982 to review project applications and may award grants in March. A preapplication can be submitted now that describes the project purpose, intergovernmental coordination (local, county) and the status and approximate cost of any lands to be acquired with grant monies. The local unit can request that it be allowed to give a presentation before the review committee.

HUD Block and Action Grant Programs

Camden County Community Development Program is currently holding preapplication hearings for projects for community improvements in low and moderate income areas of consortium municipalities. Local projects competing for funds must meet the criteria of need and of location in a low and moderate income area. There are two categories of grants: one is distributed by the consortium directly; the other is distributed by several special groups in the county. Application deadlines are February 1, 1982 for the former and January 1, 1982 for the latter.

Resource Conservation and Development Program

Although this grant program takes several years to mature for a successful project, it is one that fits the purpose of Pennsauken's plans for Fish House Cove and Tippin's Pond. Applications can be made at any time through the local Soil Conservation District. Local support weighs heavily in project success. Projects are reviewed by the RC&D Council for South Jersey and funding priorities are set in September of each year. The Council is made up of the Freeholder from each of the South Jersey Counties (Freeholder Roberts represents Camden County) and one representative from each of the eight Soil Conservation Districts. Before a development project is funded, a Measure Plan must be drawn up and approved. This plan includes the presentation of several alternatives and selection of one by the community based on public meetings. Technical assistance from USDA scientists is available in producing an acceptable Measure Plan.

COURSE OF ACTION FOR PENNSAUKEN TOWNSHIP

It is recommended that Pennsauken Township vigorously pursue in the immediate future an application for a CEIP grant toward fee simple purchase or lesser interest of a select number of key properties adjacent to parcels now owned by the Township or by the State of New Jersey in and around Fish House Cove and Tippin's Pond. Concurrently, the Township should begin the application process for a Green Acres Development Grant and apply the CEIP grant, if received, as its

matching share. It should be clarified at the outset whether local funds applied to land acquisition qualify as the matching share for Development Grants.

At the same time the Green Acres and CEIP grants are being pursued, the township should also quickly investigate the Camden County Community Development Program's HUD Block and Action Grants for which applications are due January 4 and February 1, 1982. Furthermore, as a contingency move, the township should also begin application for a Resource Conservation and Development Program grant through the local Soil Conservation District.

REFERENCES

National Oceanic and Atmospheric Administration, 1980. Improving your waterfront: a practical guide. Office of Coastal Zone Management, U.S. Department of Commerce.

U.S. Department of Housing and Urban Development, 1980. Departmental Programs.

New Jersey Department of Environmental Protection, undated. Green Acres Procedural Guide: Local Assistance Program.

APPENDIX C. DEFINITIONS, POLICIES, AND RATIONALE FOR SPECIAL AREAS IN THE NEW JERSEY COASTAL REGION (NJDEP, 1980)

7:7E-3.4 Prime Fishing Areas

(a) Definition

Prime Fishing Areas include tidal water areas and water's edge areas which have a demonstrable history of supporting a significant local quantity of recreational or commercial fishing activity. The area includes all coastal jetties and groins and public fishing piers or docks. Prime Fishing Areas also include all red line delineated features within the State of New Jersey's three mile territorial sea illustrated in: B.L. Freeman and L.A. Walford (1974) Angler's Guide to the United States Atlantic Coast Fish, Fishing Grounds and Fishing Facilities, Section III and IV. While this information source applies only to the Delaware Bay and Atlantic Ocean shorefronts, prime fishing areas do occur throughout the coastal zone.

(b) Policy

Permissible uses of Prime Fishing Areas include recreational and commercial finfishing and shellfishing, as presently regulated by NJDEP Division of Fish, Game, and Wildlife, scuba diving and other water related recreational activities.

Prohibited uses include sand or gravel submarine mining which would alter existing bathymetry to a significant degree so as to reduce the high fishery productivity of these areas. Disposal of domestic or industrial wastes must meet applicable State and federal effluent limitations and water quality standards.

(c) Rationale

Natural bathymetric features, such as the Shrewsbury Rocks and important sand ridges, and artificial structures act as congregation areas for many species of finfish, shellfish, and a diversity of invertebrate species which are essential to marine ecosystem functioning. These areas are heavily utilized by recreational and commercial fishermen. Commercial fishing occurs primarily along the Delaware Bay and Atlantic Ocean. Over 2.7 million people annually participate in marine sport fishing and shellfishing in New Jersey. This represents the highest number of participants in any state, from Maine to Maryland. Of that total, 1.6 million reside in New Jersey, with the remaining number coming mostly from Pennsylvania and New York (792,000 and 300,000 respectively.) The Mid-Atlantic Regional Fisheries Management Council manages fishing activities seaward of the State's coastal zone.

7:7E-3.5 Finfish Migratory Pathways

(a) Definition

Waterways (rivers, streams, creeks, bays inlets) which can be demonstrated to serve as passageways for diadromous fish to or from seasonal spawning areas, including juvenile anadromous fish which migrate in autumn and those listed by H. E. Zich (1977) "New Jersey Anadromous Fish Inventory" NJDEP Miscellaneous Report No. 41, and including those portions of the Hudson and Delaware Rivers within the coastal zone boundary are defined as Finfish Migratory Pathways. Species of concern include: alewife (river herring) (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), striped bass (*Morone saxatilis*), and American eel.

(b) Policy

Development, such as dams, dikes, spillways and intake pipes, which creates a physical barrier to the movement of fish along finfish migratory pathways is prohibited, unless acceptable mitigating measures such as fish ladders, erosion control, or oxygenation are used. Development which lowers water quality to such an extent as to interfere with the movement of fish along finfish migratory pathways or to violate State and Delaware River Basin Commission water quality standards is prohibited.

Mitigating measures are required for any development which would result in: lowering dissolved oxygen levels, releasing toxic chemicals, raising ambient water temperature, impinging or suffocating fish, causing siltation, or raising turbidity levels during migration periods.

Water's edge development which incorporates migration access structures, such as functioning fish ladders, will be conditionally acceptable, provided that the NJDEP, Division of Fish, Game, and Wildlife approves the design of the access structure.

(c) Rationale

Striped bass are one of New Jersey's most prized sport fish and are actively sought wherever they occur in New Jersey. This species spawns in the Delaware, Hudson and Maurice Rivers. American Shad, once much more numerous and formerly an important commercial species, continue to make an annual spawning run in the Delaware and Hudson Rivers, where there is an active sport fishery. A much reduced commercial fishery exists in the Delaware Bay and River. Herrings are important forage species and spawn annually in many of New Jersey's tidal tributaries including the Raritan and Hackensack Rivers. Herrings are fished during spring runs, for direct human consumption, garden fertilizer and for use as bait.

7:7E-3.7 Navigation Channels

(a) Definition

Navigation channels include water areas in tidal rivers and bays presently maintained by DEP or the Army Corps of Engineers and marked by U.S. Coast Guard with buoys or stakes, as shown on NOAA/National Ocean Survey Charts: 12214, 12304, 12311, 12312, 12313, 12314, 12316, 12317, 12318, 12323, 12324, 12326, 12327, 12328, 12330, 12331, 12332, 12333, 12334, 12335, 12337, 12341, 12343, 12345, 12346, and 12363. Navigation channels also include channels marked with buoys, dolphins, and stakes, and maintained by the State of New Jersey, and access channels and anchorages. Navigation channels are approximately parallel to the river bed. Access channels are spurs that connect a main navigation channel to a terminal. Anchorages are locations where vessels moor within water at or near the water's edge for the purpose of transferring cargo, or awaiting high tide, better weather, or fuel and terminal availability.

(b) Policy

New or maintenance dredging of existing navigation channels, is conditionally acceptable providing that the condition under the new or maintenance dredging policy is met (see Section 7:7E-4.10(e) and (f)). Development which would cause terrestrial soil and shoreline erosion and siltation in navigation channels shall utilize appropriate mitigation measures. Development which would result in loss of navigability is prohibited.

(c) Rationale

Navigation channels are essential for commercial and recreational surface water transportation, especially in New Jersey's back bays where water depths are very shallow. Channels play an important ecological role in providing estuarine circulation and flushing routes, and migration pathways and wintering and feeding habitat for a wide diversity of finfish, shellfish, and waterfowl.

Navigational channels, access channels and anchorages form a network of areas that have a depth sufficient to enable marine trade to operate at the limiting depth of the channel. If one part of the system is not maintained, the entire system might be unable to function.

7:7E-3.12 Submerged Infrastructure Routes

(a) Definition

A submerged infrastructure route is the corridor in which a pipe or cable runs on or below a submerged land surface.

(b) Policy

Any activity which would increase the likelihood of infrastructure damage or breakage, or interfere with maintenance operations is prohibited.

(c) Rationale

Submerged infrastructure routes are a large capital investment and much depends on the safe functioning of the infrastructure. Both human and natural systems suffer from accidental breakage, especially of large oil or gas pipelines. Activities which increase hazard for submerged infrastructure must therefore be excluded.

7:7E-3.16 Intertidal Flats

(a) Definition

Intertidal Flats are extensive areas between the mean high water line and mean low water line along tidal bayshores. Intertidal flats are found along Delaware Bay in Cape May County and in other tidal bayshores.

(b) Policies

(1) Development, filling, new dredging or other disturbance of intertidal flats is discouraged.

(2) Submerged infrastructure is conditionally acceptable, provided that (i) there is no feasible alternative route that would not disturb intertidal flats, (ii) the infrastructure is buried deeply enough to avoid exposure or hazard, and (iii) all trenches are backfilled with naturally occurring sediment.

(c) Rationale

Intertidal flats play a critical role in estuarine ecosystems. They are a land-water ecotone, or ecological edge where many material and energy exchanges between land and water take place. They are critical habitats for many benthic organisms and are critical forage areas for many migrant waterfowl. The sediments laid down in intertidal flats contain much organic detritus from decaying land and water's edge vegetation, and the food webs in these areas are an important link in the maintenance of estuarine productivity. Preservation is, therefore, the intent of these policies, with limited exceptions to allow for needed water-dependent uses and submerged infrastructure.

7:7E-3.17 Filled Water's Edge

(a) Definition

Filled Water's Edge areas are existing filled areas lying between Wetlands or Water Areas, and either: (1) the upland limit of fill, or (2) the first public road or railroad landward of the adjacent Water Area, whichever is closer to the water. Some existing or former dredge spoil and excavation fill areas are Filled Water's Edge Area.

(b) Policies

(1) Water dependent (see section 7:7E-1.6(c) for definition) uses are acceptable in the Filled Waters' Edge.

(2) Non-water dependent development in the Filled Water's Edge is conditionally acceptable provided (a) it would not preempt use of the waterfront portion of the Filled Water's Edge for potential water dependent uses, and (b) it would not prevent public access along the water's edge.

(c) Rationale

Filled Water's Edge areas are of less environmental concern than undisturbed water's edge areas. The buffering functions of the water's edge have already been largely lost through excavation, filling and the construction of retaining structures. It is acceptable to allow certain kinds of development up to the limit of fill. Because the waterfront is a scarce resource, it is desirable to limit waterfront development in these areas to uses that are water dependent unless, because of their location, they do not have the potential to attract water dependent uses.

7:7E-3.19 Natural Water's Edge-Floodplains

(a) Definition

Natural Water's Edge-Floodplains are the Flood Hazard Areas around rivers, creeks and streams as delineated by DEP under the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50), or by the Federal Emergency Management Agency (FEMA); or the Flood Hazard Area around other coastal water bodies as defined by FEMA. Floodplains include the areas subject to both tidal and fluvial flooding. Where Flood Hazard Areas have been delineated by both DEP and FEMA, the DEP delineations shall be used. Where Flood Hazard Areas have been delineated by neither DEP nor FEMA, the 10-foot contour line shall be used as the inland boundary of the Floodplain. The seaward boundary shall be the mean high water line.

The Natural Water's Edge-Floodplain policy shall not apply on Barrier Islands, Spits or Headlands nor in portions of a Floodplain which meet the definition of another Special Water's Edge type (Filled Water's Edge, Existing Lagoon Edge, Alluvial Flood Margins, Beach and Dune Systems, Central Barrier Island Corridor, Wetlands, Cranberry Bogs, Wet Borrow Pit Margins, Coastal Bluffs, Intermittent Stream Corridors). A complete list of streams where DEP has delineated the Flood Hazard Area can be found at N.J.A.C. 7:13-1.11 et seq.

The U.S. Army Corps of Engineers has delineated the tidal Floodplain for FEMA in most Coastal Zone municipalities. The geographic extent of the tidal flood hazard areas are indicated on USGS topographic maps at a scale of 1:24,000 as "flood prone" areas.

(b) Policies

1. Development is prohibited in the Natural Water's Edge-Floodplains within 100 feet of a navigable water body, unless the use is water dependent. NOTE: "Navigable" and "water dependent" are defined at 7:7E-1.6(c).

2. Development elsewhere in the Natural Water's Edge-Floodplains is discouraged unless:

   (i) it has no feasible alternate site, and

   (ii) it would not preempt use of the waterfront portion of the Floodplain for potential water dependent use.

3. Development must be consistent with all other coastal policies, in particular the performance standards found in the Flood Hazard Area Resource Policy (7:7E-8.23).

4. Detention basins are prohibited in river floodplains.

(c) Rationale

The goal of this policy is to reduce losses of life and property resulting from unwise development of floodplains, but to allow uses compatible with periodic flooding -- agriculture and forestry, recreation, and fish and wildlife habitat -- and uses which require a Water's Edge location. This policy is consistent with national objectives as expressed in the President's Executive Order 11988 on Floodplain Management. It is also consistent with the State Waterfront Development Law's objective of safeguarding port facilities and waterfront resources for the public's overall economic advantage. The policy will ensure that the State's waterfront is not pre-empted by uses which could function equally well at inland locations.

River Floodplains are subject to flooding in severe fluvial storms. They are also critical elements of the coastal ecosystem, providing flood storage capacity, physical and biochemical water filtration, primary productivity and wildlife habitats.

For these reasons, the preferred policy is to preserve these corridors in their natural state with native adapted forest vegetation, allowing limited exceptions for water dependent uses and uses for which there is no feasible alternate location.

7:7E-3.20 Alluvial Flood Margins

(a) Definition

Alluvial Flood Margins are mainland areas adjacent to, and upland from, Floodplains. They extend inland to the limit of alluvial soils with a seasonal high water table equal to, or less than, one foot. Alluvial soils are those developing in recent sediment deposited by surface water and exhibiting essentially no modification of the deposited materials.

NOTE: Where an Alluvial Flood Margin is also an Intermittent Stream Corridor, only the Intermittent Stream Corridor Policies (Section 7:7E-3.27) shall apply.

(b) Policy

1. Wildlife refuge and low intensity recreational use is encouraged.

2. Development is discouraged in Alluvial Flood Margins unless no feasible alternative site exists, or it is a landward extension of a water dependent use.

(c) Rationale

Alluvial flood margins are parts of floodplains. Although above the 100 year flood level, they have been deposited by flood waters and do provide flood storage capability in the severest storms. If left undisturbed they contribute to the critical water quality buffering and wildlife habitat functions of floodplains and provide some primary productivity to estuaries through nutrients flushed to adjacent bays, rivers or streams. The high water table and compressiblility of these areas make them costly for development. Conservation is the preferred use.

7:7E-3.21 Beaches

(a) Definition

Beaches are gently sloping unvegetated areas of sand or other unconsolidated material that extend landward from the mean high water line to either: (1) the vegetation line, (2) a man-made feature generally parallel to the ocean, inlet, or bay waters such as a retaining structure, seawall, bulkhead, road or boardwalk, except that sandy areas that extend fully under and landward of an elevated boardwalk are considered to be beach areas, or (3) the seaward or bayward foot of dunes, whichever is closest to the bay, inlet or ocean waters. See Figure 16.

(b) Policies

1. Development is prohibited on beaches, except for development that has no prudent or feasible alternative in an area other than a beach, and that will not cause significant adverse long-term impacts on the natural functioning of the beach and dune system, either individually or in combination with other existing or proposed structures, land disturbances or activities. Examples of acceptable activities are:

(i) Demolition and removal of paving and structures,

(ii) Dune creation and related sand fencing and planting of vegetation for dune stabilization,

(iii) The reconstruction of existing amusement and fishing piers and boardwalks,

(iv) Temporary recreation structures for public safety such as first aid and lifeguard stations,

(v) Shore Protection Structures which meet the Use conditions of Section 7:7E-7.11(e), and

(vi) Linear development which meets the Policy on Location of Linear Development (7:7E-6.1).

2. Public access to beaches is encouraged. Coastal development that unreasonably restricts public access to beaches is prohibited.

(c) Rationale

Undeveloped beaches are vital to the New Jersey resort economy. Unrestricted access for recreational purposes is desirable so that the beaches can be enjoyed by all residents and visitors of the state. Public access will be required for any beaches obtaining state funds for shore protection purposes. Beaches are subject to coastal storms and erosion from offshore currents. Public health and safety considerations require that structures be excluded from beaches to prevent or minimize loss of life or property from storms and floods, except for some shore protection structures and linear facilities, such as pipelines, when nonbeach locations

7:7E-3.26 Wetlands

(a) Definition

Wetlands are areas where the substrate is inundated or saturated by surface or groundwater water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions which are subject to the Wetlands Act, or the Coastal Area Facility Review Act (CAFRA) or the Waterfront Development Law.

Wetlands regulated under the Wetlands Act of 1970 are delineated at a scale of 1:2,400 on official maps as listed at N.J.A.C. 7:7A-1.13. All coastal wetlands situated in the Raritan Basin, south along the Atlantic Ocean and north along Delaware Bay and River are subject to the Wetlands Act.

Under CAFRA, DEP regulates freshwater wetlands and forested wetlands such as white cedars on sites proposed for the major developments requiring a CAFRA permit.

Generalized location maps of White Cedar Stands and other woody wetlands can be found in J. McCormick and L. Jones, The Pine Barrens Vegetation (1973), and forest type maps within DEP's Bureau of Forestry, and, in some areas, in the vegetation maps prepared by the N.J. Pinelands Commission for the Comprehensive Management Plan.

The Waterfront Development Law regulates all wetlands north of the Raritan Basin, except for areas within the Hackensack Meadowlands District not now or formerly flowed by the tides, and all coastal wetlands in the Delaware River Basin and Raritan River Basin not regulated under the Wetlands Act.
Generalized locations of both coastal and inland Wetlands can be found at a scale of 1:24,000 on maps produced for the National Wetlands Inventory by the U.S. Fish and Wildlife Service.

Generalized locations of some wetland types can be found in county soil surveys prepared by the U.S. Department of Agriculture, Soil Conservation Service.

(b) Policy

(1) In general, development of all kinds is prohibited in wetlands, unless DEP can find that the proposed development meets the following four conditions (see also N.J.A.C. 7:7A-1.5 and 1.7):

(i) Requires water access or is water oriented as a central purpose of the basic function of the activity (this policy applies only to development proposed on or adjacent to waterways),

NOTE: This means that the use must be water dependent as defined in Section 7:7E-1.6(c)8.

(ii) Has no prudent or feasible alternative on a non-wetland site,

(iii) Will result in minimum feasible alteration or impairment of natural tidal circulation (or natural circulation in the case of non-tidal wetlands), and

(iv) Will result in minimum feasible alteration or impairment of natural contour or the natural vegetation of the wetlands.

(2) In particular, dumping solid or liquid wastes and applying or storing certain pesticides on wetlands are prohibited.

(3) Both the restoration of degraded wetlands as a mitigation measure for certain types of approved wetlands development and the creation of new wetlands in non-sensitive areas are encouraged. The Division of Coastal Resources previously has required restoration of temporarily disturbed wetlands and will continue to do so on a case-by-case basis.

(4) Under the Wetlands Act, the activities of DEP, the Tidelands Resource Council, the State Mosquito Control Commission and county mosquito control commissions are exempted from the coastal wetlands policies within mapped coastal wetlands. Voluntary administrative compliance with the regulations adopted by DEP under to the Act is not, however, precluded.

(5) Development that adversely affects white cedar stands is prohibited.

(c) Rationale

The environmental values, and fragility of coastal wetlands have been officially recognized in New Jersey since the passage of the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.) Coastal wetlands are the most environmentally valuable land areas within the coastal zone.

Coastal wetlands contribute to the physical stability of the coastal zone by serving as: (i) a transitional area between the forces of the open sea and upland areas that absorb and dissipate wind-driven storm waves and storm surges, (ii) a flood water storage area, and, (iii) a sediment and pollution trap.

Also, wetlands naturally perform the wastewater treatment process of removing phosphorous and nitrogenous water pollutants, unless the wetlands are stressed.

The biological productivity of New Jersey's coastal wetlands is enormous and critical to the function of estuarine and marine ecosystems. The emergent cord grasses and associated algal mats convert inorganic nutrients into organic plant material through the process of photosynthesis. In this way, the primary base for estuarine and marine food webs is provided. The principal direct dietary beneficiaries of organic wetland detritus are bacteria and protozoan, which are in turn fed upon by larger invertebrates. Important finfish, shellfish, waterfowl, and other resources feed upon these invertebrates. New Jersey's Coastal Wetlands are prime wintering habitat annually for hundreds of thousands of migratory waterfowl. Approximately two-thirds of marine finfish and shellfish are known to be estuarine, and, therefore, wetlands-dependent.

Inland herbaceous wetlands, such as bogs, play an important role in regulating the quality of water in streams that flow to the estuaries. They retard runoff and store storm waters. They are important areas of primary productivity for estuarine systems. They are critical habitats for several species of plants and animals that are endangered or threatened. They are productive habitats for other game and non-game animals, such as deer. These wetlands also serve as fire breaks, and may limit the spread of forest, brush, or grass fires. They are inappropriate development sites due to poor drainage and load bearing capacity of the underlying soils.

Forested Wetlands play a critical role in coastal ecosystems. Roots and trunks stabilize shorelines and trap sediment. They are physical and biochemical water filter areas maintaining tidal stream water quality. They are critical habitats, breeding areas and movement corridors for many coastal species including rare and endangered species. High productivity, high water availability and high edge to area ratio make these areas especially productive wildlife areas.

White cedar stands, as well as other lowland swamp forests, play an important role in purifying water in coastal streams, retarding runoff, providing scenic value, and serving as a rich habitat for many and endangered plant and animal species, as well as game species, such as deer. White cedars also act as forest fire breaks. White cedar stands most commonly occur in flood plains and in the fringe areas of drainage ways and bogs, which are frequently underlain with saturated organic peat deposits. This material is particularly unsuited for development unless highly altered.

White cedar is New Jersey's most valuable timber species and grows in discrete stands. The wood has a long tradition of maritime and local craft uses. Unfortunately, white cedars have been eliminated from much of their previous range in New Jersey.

7:7E-3.27 Wetlands Buffer

(a) Definition

All land within 300 feet of Wetlands as defined in N.J.A.C. 7:7E-3.26 and within the drainage area of those Wetlands comprises an area within which the need for a Wetlands Buffer shall be determined.

(b) Policy

Development is prohibited in a Wetlands Buffer unless it can be demonstrated that the proposed development will not have a significant adverse impact and will cause minimum feasible adverse impact, through the use of mitigation where appropriate (1) on the Wetlands, and (2) on the natural ecotone between the Wetlands and the surrounding upland. The precise geographic extent of the required actual Wetlands Buffer on a specific site shall be determined on a case-by-case basis using these standards.

(c) Rationale

Development adjacent to Wetlands can adversely affect the Wetlands through increased runoff, sedimentation, and introduction of pollutants.

The coastal zone includes a diversity of types of wetlands, of varying widths, quality, and importance to the ecosystem, from large forested freshwater wetlands, to narrow strips of coastal wetlands. For this reason, the appropriate buffer necessary to protect the wetlands adjacent to proposed land disturbances must be determined on a case-by-case basis, but using a standard that requires no significant impact on, and minimum feasible disturbance to, the wetlands.

The preservation of a transitional area of native vegetation in the portion of the Wetlands Buffer adjacent to a Wetlands and the construction of detention basins or berms if necessary to control runoff, could mitigate impacts and make development permissible in the remainder of the Wetlands Buffer.

Buffers that support stands of native vegetation perform the following ecological and physical functions:

(i) Stabilization of soil and prevention of erosion,

(ii) Filtration of suspended solids (silt) to prevent their deposition on wetlands. Siltation onto wetlands can lead to undesirable changes in vegetation, e.g. from cord grass (Spartina) to reeds (Phragmites), which contribute less to the estuarine and marine food chain.

(iii) Water turbidity control,

(iv) Inhibition of pollutant introduction into wetlands soil, water and food chains. Without Wetlands Buffers, "urban" runoff from adjacent housing will almost always cause an increase in contaminants, such as coliform, following rain,

(v) Storm water storage,

(vi) Formation of a barrier to floating debris,

(vii) Contribution to estuarine productivity, especially if the buffer is a forested floodplain.

As transition areas between differing vegetation communities (habitat areas), appropriately vegetated Wetlands Buffers function as ecotones, supporting species diversity and use, and serving as wildlife movement corridors.

Wetlands Buffers are used as lookout perches for raptors; nesting sites for Marsh Hawks, Black Crowned Night Heron, and Osprey; fall migration foraging stopovers for birds, including Woodcock; nesting sites for Wood Ducks, Black Ducks, and Mallards; and forage routes into and out of Wetlands for Raccoons, Mink, Muskrat, Fox, Deer, and others. Grassy wetlands edges serve as feeding sites for Wilson's Snipe, Ruffled Grouse, Quail and song birds.

7:7E-3.33 Steep Slopes

(a) Definition

Steep slopes are areas with slopes greater than 15 percent, which are not coastal bluffs (7:7E-3.30).

(b) Policy

Development on steep slopes greater than 15% is prohibited, unless the regrading of a very small part of a site (typically, less than 5%) is essential to the overall landscaping plan for the site, in which case the grading shall be done to less than a 10% slope.

Man-made steep slopes above the slope at which the sediments normally stabilize (angle of repose) shall either be regraded to a slope at least 20% below the angle of repose, or stabilized and planted with native woody vegetation.

(c) Rationale

Only a few Steep Slopes Areas exist in the relatively flat Coastal Plain of New Jersey. Isolated steep slope areas are found near headwaters of coastal streams.

Preservation of steep slopes controls soil erosion, protects up-slope

lands, minimizes pollution of surface waters, reduces flooding, preserves banks of streams and intermittent streams and maintains water flow in headwaters. When vegetation is stripped, rainfall strikes surface soils causing soil particle movement through surface water flow and gravity, which result in increased surface runoff and downstream flooding. When this silty water enters a surface water body, increased turbidity and sedimentation usually follow which can cause reduction of productivity and flood water storage capacity. Aesthetics are also affected when erosion occurs and topsoil is lost.

Slope maps are available from NJDEP-DCR based on U.S.G.S. Topographic Quadrangle sheets (1:24,000 scale). These maps show slopes in the following ranges. 0-2%, 2-5%, 5-10%, 10-15%, and more than 15% in the coastal plain; and 0-3%, 3-8%, 8-15%, and 15-25% in other parts of the State.

There are some man-made steep slopes left after such activities as mining and road grading. If such slopes are above the angle of repose of the sediments, there is danger of slumping.

7:7E-3.36 Specimen Trees

(a) Definition

Specimen trees are the largest known individual trees of each species in New Jersey. The DEP-Bureau of Forestry maintains a list of these trees (see New Jersey Outdoors, September-October 1977 for a listing of specimen trees). In addition, large trees approaching the diameter of the known largest tree shall be considered Specimen Trees.

(b) Policy

Development is prohibited that would significantly reduce the amount of light reaching the crown, alter drainage patterns within the site, adversely affect the quality of water reaching the site, cause erosion or deposition of material in or directly adjacent to the site, or otherwise injure the tree. The site of the tree extends to the outer limit of the buffer area necessary to avoid adverse impacts, or 50 feet from the tree, whichever is greater.

(c) Rationale

Many interested citizens have assisted DEP, over decades, in locating specimen trees. This process includes reporting large trees that can be considered specimens even though they may not be the largest in New Jersey of a species. Specimen trees are an irreplaceable scientific and scenic resource. Often these trees have also been associated with historical events.

7:7E-3.37 Endangered or Threatened Wildlife or Vegetation Species Habitats

(a) Definition

Land, Water's Edge, or Water Areas known to be the habitat of any wildlife (fauna) or vegetation (flora) identified as "endangered" or "threatened" species on official federal or state lists of endangered or threatened species, or under active consideration for state or national listing, are considered special areas. The definition also includes a sufficient buffer area to insure continued survival of the species. DEP intentionally restricts dissemination of data showing the geographic distribution of these species habitats, in order to protect the habitats.

(b) Policy

Development that would adversely affect the habitats of endangered or threatened species is prohibited. DEP will review proposals on a case-by-case basis.

(c) Rationale

Endangered and threatened species are organisms which are facing possible extinction in the immediate future due to loss of suitable habitat, and past overexploitation through human activities or natural causes. Extinction is an irreversible event and represents a loss to both future human use, education research and to the interrelationship of all living creatures with the ecosystem.

At present, the official list of endangered wildlife (fauna) species in New Jersey, available from DEP, Division of Fish, Game and Wildlife (see N.J.A.C. 7:25-11.1), includes the following species: Shortnose sturgeon, Blue-spotted salamander, Eastern tiger salamander, Bog turtle, Bald Eagle, Peregrine Falcon, Osprey, Cooper's Hawk, and Indiana Bat, as well as various marine mammals and marine reptiles. Additional species have threatened status. No official state or federal list of endangered or threatened vegetation (flora) species exists, although the Smithsonian Institution did submit a report to the U.S. Fish and Wildlife Service in 1975 identifying seventeen species of New Jersey plants for consideration for adoption on federal lists (see 40 FR, No. 1217: 27863-27864, July 1, 1975). Habitats of species eligible to be on the list are included in the definition so that the policy will apply to species identified since the last promulgations of the official list.

7:7E-3.38 Critical Wildlife Habitats

(a) Definition

Critical Wildlife Habitats are specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating. Rookeries for colonial nesting birds such as herons, egrets, ibis, terns, gulls, and skimmers, stopovers for migratory birds, such as the Cape May Point region, and natural corridors for wildlife movement merit a special management approach through designation as a Special

Area. Ecotones, or edges between two types of habitats, are a particularly valuable Critical Wildlife Habitat. Many Critical Wildlife Habitats, such as salt marsh water fowl wintering areas, and muskrat habitats, are singled out as Water or Water's Edge Areas.

Definitions and maps of Critical Wildlife Habitats are currently available only for colonial waterbird habitat in 1979 Aerial Colony Nesting Waterbird Survey for New Jersey (NJDEP, Division of Fish, Game and Wildlife). Until additional maps are available, sites will be considered on a case by case basis by the NJDEP Division of Fish, Game and Wildlife.

(b) Policy

Development that would adversely affect Critical Wildlife Habitats is discouraged, unless: (i) minimal feasible interference with the habitat can be demonstrated, (ii) there is no prudent or feasible alternative location for the development, and (iii) the proposal includes appropriate mitigation measures. DEP will review proposals on a case by case basis.

(c) Rationale

The State of New Jersey, as custodian of a particular portion of the national wildlife heritage, has the obligation of stewardship on behalf of the people of the state and nation to perpetuate wildlife species within its borders for the use, education, research, and enjoyment by future generations.

7:7E-3.39 Public Open Space

(a) Definition

Public Open Space constitutes land areas owned and maintained by state, federal, county and municipal agencies or non-profit private groups (such as conservation organizations and homeowner's associations) and dedicated to conservation of natural resources, public recreation, or wildlife protection or management. Public Open Space also includes State Forests, State Parks, and State Fish and Wildlife Management Areas and designated Natural Areas (N.J.S.A. 13:1B-15.12a *et seq.*) within DEP-owned and managed lands.

(b) Policy

(1) New or expanded public or private open space development is encouraged at locations compatible or supportive of adjacent and surrounding land uses.

(2) Development that adversely affects existing public open space is discouraged.

(3) Development within existing public open space, such as campgrounds and roads, is conditionally acceptable, provided that the development complies with the Coastal Resource and Development Policies and is consistent with the character and purpose of the public open

space, as described by the park master plan when such a plan exists.

(c) Rationale

As the rapid urbanization of New Jersey continues and leisure time increases, open space will play an increasingly important role in maintaining a desirable living environment for the residents of New Jersey. Even though the supply of open space has decreased under the growing pressure for development, the State's expanding population will require more public open space to satisfy its needs.

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