OIL SPILL

TOWN OF BABYLON

SUFFOLK COUNTY, NEW YORK

OIL SPILL CONTINGENCY PLAN

(FOUNDED IN 1872)

New York Coastal Zone Management Program

ALLEN & GRANT, P.C.
CONSULTING ENGINEERS / SURVEYORS
50 Elm Street
Huntington New York 11743

1981

TOWN OF BABYLON

SUFFOLK COUNTY NEW YORK

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Town of Babylon

OIL SPILL CONTINGENCY PLAN
COUNTY OF SUFFOLK, NEW YORK

Prepared by

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50 Elm Street
Huntington, N.Y. 11743

September 1981

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PRELIMINARY

CONTENTS

SECTION I

OIL POLLUTION

I.1 The Problem

Oil is ever becoming a scarce commodity, but nonetheless remains one of the necessities of modern industrial society. Under control, serving its intended purpose, oil is efficient, versatile and productive. Out of control, it can be one of the most devastating substances in the environment. Spilled into water, it spreads for miles around.

Oil spills, large and small, have long been of concern to pollution control authorities. Once an area has been contaminated by oil, the whole character of the environment is changed. When it has encountered something solid to cling to, whether it be a beach, a rock, a piling, the feathers of water fowl, or a bather's hair, it does not readily let go.

Cleaning up an oil contaminated area is time consuming, difficult and costly. To the costs of the clean-up must be added the impacts on the environment, the destruction of fish and other wildlife, damage to property, contamination of public water supplies, and any number of other material and esthetic losses. Depending on the quantities and kinds of oil involved, these losses may extend for months, years and sometimes decades, with correspondingly heavy costs of restoring the area to its prior condition.

The risks of contamination by oil are as numerous and varied as the uses made of the product and the means of transporting it. These risks involve terminals, loading docks, refineries, tankers, freighters, pleasure craft, barges, pipelines, tank cars, trucks, filling stations, offshore drilling facilities, and everywhere that oil is used, stored, or moved. All are subject to mechanical failures compounded by human carelessness and mistakes. There are countless opportunities for oil to get out of control.

Federal, State and local regulations and ordinances have been developed in recent years in an attempt to discourage oil spills. In spite of preventive efforts there will still be spills, either due to carelessness or to calamities beyond human control.

Figure I-1, is a location map showing the Town of Babylon coastal areas that are prone to contamination from oil spills. A large 2000 scale map is included in the latter portion of this report and is intended to be an aid for oil spill prevention, containment, clean-up and disposal.

I.2 Oil Characteristics

The term "oil" is applied to a wide variety of petroleum products ranging from crude oils to different grades of refined products.

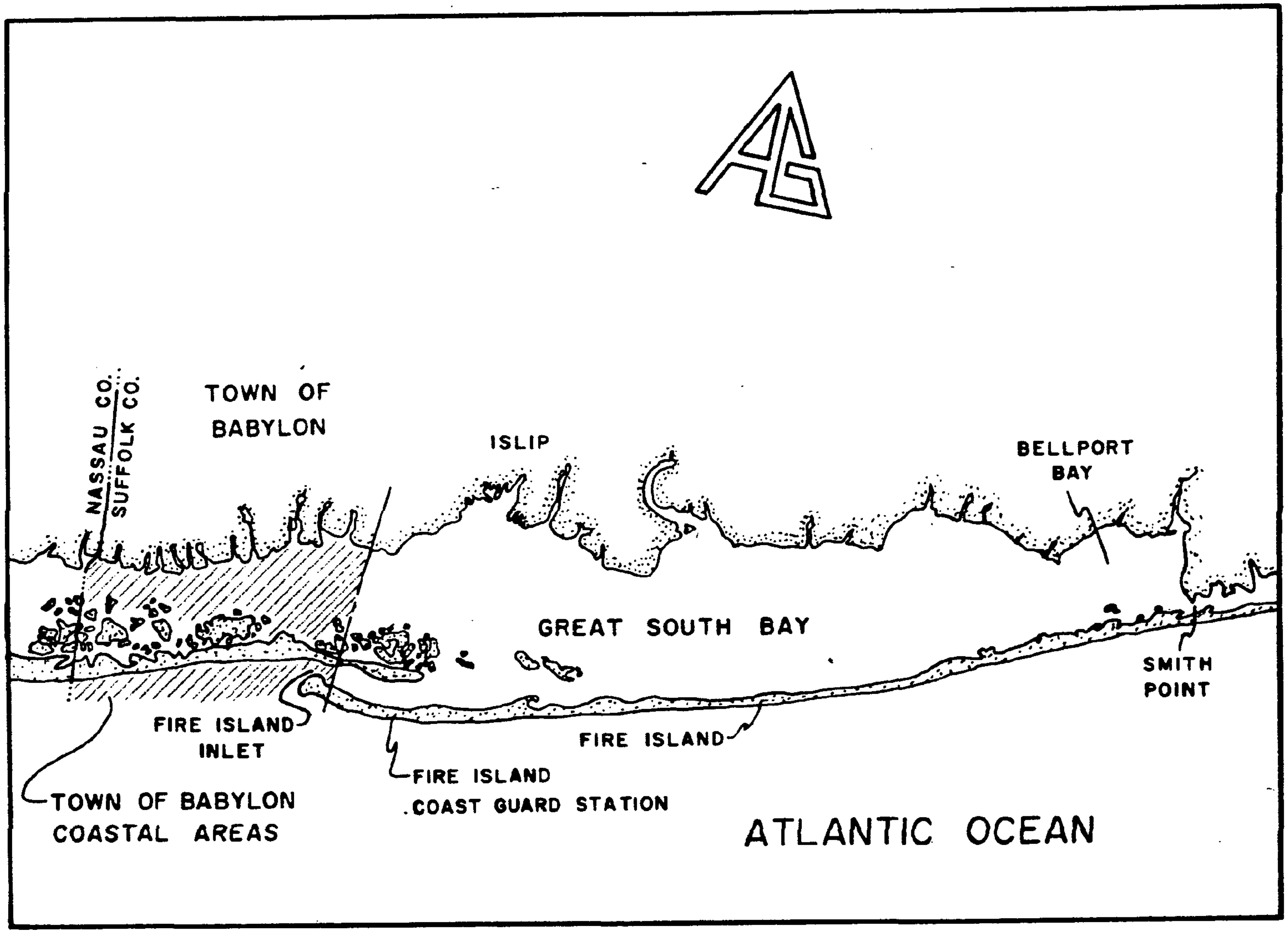

FIGURE-I-1 LOCATION OF COASTAL AREAS IN THE TOWN OF BABYLON.

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Crude petroleum, or crude oil, is not a uniform substance and its properties vary widely from one location of origin to another and even from one well to another within the same oil field.

Carbon and hydrogen are the most abundant elements in crude oil, accounting for more than 95 percent of the composition. The molecular weight of hyrdocarbons in crude oils ranges from a minimum of 16 to greater than 850. These hydrocarbons are separated from crude oils through boiling and vapor recovery processes. The lighter hydrocarbons generally vaporize at lower temperatures. As an example, gasoline would be one of the first products (low temperature) distilled from a crude oil, and lubricating oils are derived from a higher temperature fraction. The majority of compounds that make up residual fuels, such as bunker "C," come from the fraction left behind after most of the lighter fractions are distilled.

The physical properties of oil are important in assessing the method of clean-up to be initiated. Some of these properties include; density, viscosity, pour point, flash point and surface tension. These characteristics are often treated with laboratory precision in the petroleum industry, but at the site of an oil spill it would be most improbable to have this information at hand. The judgment and experience of the response team will more than likely be the only information available.

Some general information regarding the movement of an oil slick that may be of some use follows:

- o There are two main factors controlling the movement of oil, namely wind and current. If the wind is in excess of 5 to 9 knots, the wind will become the primary factor and drive an oil slick at about 3.4% of the wind velocity, and be independent of current.

- o Another accepted relationship for determining the direction and speed slick motion is

$$U_t = U_c + 0.03\ U_w$$

where U_t is the total motion vector; U_c is the current vector and U_w is the wind vector at the air/water interface. Thus the speed and direction of the slick mass is proportional to the vector sum of the current area surface winds. At low wind velocities (below 5 knots) the current is the significant factor while as higher velocities, the wind effects predominate.

- o Surface tension of oil dominates the spread of oil slick thickness as it becomes thin. The surface tension of oils vary from type and location of its source. Spreading rates and oil film (slick) thickness have been tabulated for various types of crude oils as follows:

Thickness in millimeters of slick from spillage of 100 M^3 (26,412 gallons) of oil after spreading for:

Type	10^2 sec.	10^3 sec.	10^4 sec.	10^5 sec.
Libyan	2.28	0.49	0.11	0.02
Iranian	3.27	0.70	0.15	0.03
Kuwait	2.10	0.45	0.10	0.02
Iraq	2.57	0.55	0.12	0.03
Venezula	2.55	0.55	0.12	0.03

Source: Manual of Practice for Protecting and Clean-Up of Shorelines: U.S.E.P.A.

- o Oil films are defined as an oil slick thinner than 0.0001 inch (0.00254 mm) and may be classified as follows:

Standard Terms	Gallons of Oil Per Sq. Mile	Appearance
"Barely Visible"	25	Barely visible under most favorable light conditions
"Silvery"	50	Visible as silvery sheen on water surface
"Slightly Colored"	100	First trace of color may be observed
"Brightly Colored"	200	Bright bands of color are visible

Source: National Oil and Hazardous Substances Pollution Contingency Plan

I.3 Coastal Contamination

Coastal processes that affect oil contamination of shorelines deal primarily with sediment transport on and off a beach. A beach begins below the surf zone of a shoreline and extends landward to the limit of storm wave activity usually marked by a storm ridge, vegetation, dunes, or a cliff. Beaches are generally divided into three areas: the backshore, intertidal, and nearshore. A profile of a typical beach is shown in Figure I-2.

The backshore area of a beach is located above the berm or level of normal wave activity. Exposure of the backshore to wave activity occurs only during exceptionally high tides or storm surges. Oil deposited in the backshore during these times can only be affected by wave action during subsequent exceptional high tides or storm surges.

Backshore areas can be biologically productive and sensitive as well as difficult to clean. Debris, trash, and/or log accumulations and vegetation are frequently present in the backshore and could cause clean-up difficulties. However, the location of this debris can provide a useful indicator of where the oil may concentrate by determining the maximum limit of the water level at the time of the last high water or storm level. The maximum inland distance that oil can be expected to be deposited during these periods of high water levels can then be estimated from the debris line. Special effort should be taken to protect backshore areas from contamination as soil penetration is likely and clean-up difficult. Damage to vegetation on sandy backshores could result in severe wind erosion problems.

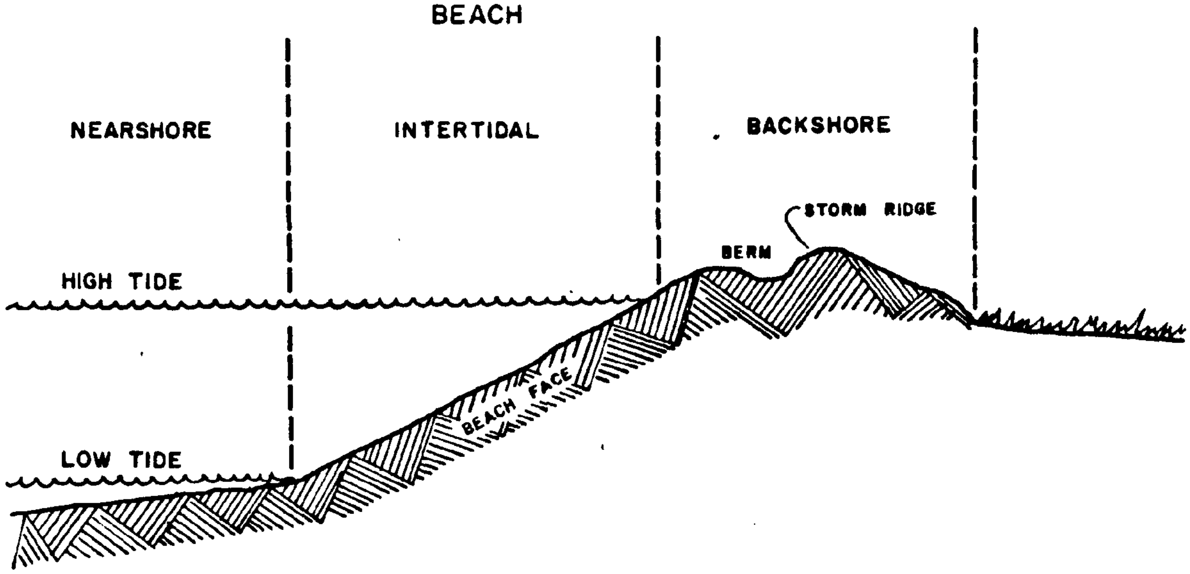

FIGURE I-2 TYPICAL BEACH PROFILE

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The intertidal zone is the area of the beach extending from the low water mark to the high water mark. Oil contacting a shoreline under normal conditions will be deposited within this area. On high-energy shorelines, the heaviest concentrations of oil occur along the upper intertidal area. The lower intertidal zone usually remains wet, and because oil does not readily adhere to a wet surface, oil in this area can be refloated by a flooding tide and carried to the upper parts of a beach. Oil deposited in the upper intertidal zone is, however, usually eroded rapidly if wave action is present. In low-energy environments or where large volumes of oil are washed ashore, oil can coat the entire intertidal zone.

The nearshore zone is located below the low water mark and within the zone of wave-generated processes. Because this area is always submerged, it receives little contamination except of the small amount of oil that sinks or from oil-coated sediments eroded from the shoreline.

SECTION II

OIL SPILL RESPONSE

GENERAL PLAN FOR THE TOWN OF BABYLON

II.1 Introduction

An oil spill within or around the Town of Babylon portion of Great South Bay or Atlantic Ocean, can cause serious environmental damage and my jeopardize the safety of human life and well-being. The purpose of this plan is to describe procedures to be followed by the Town of Babylon in the event of an oil spill. Federal as well as State and local agencies will be notified to take on the ultimate responsibility. In order to accomplish a timely and coordinated containment and clean-up effort, the Town of Babylon should cooperate as much as possible with these other agencies.

The general response plan contained herein presumes that the Town of Babylon will be the initial authority informed of an oil spill. The user of this plan should adjust his actions as necessary to insure proper and timely response of all agencies and organizations. The priorities of actions should first consider the protection of human life and limb, and second, to minimize ecological impact of spills.

II.2 Authority and Responsibility

The Federal Council on Environmental Quality was delegated responsibility in Executive Order 11735, to prepare a "National Oil and Hazardous Substances Pollution Contingency Plan." This plan is contained in Title 40 of the Code of Federal Regulations, Part 1510. The Plan seeks to insure a coordinated Federal response at the scene of an oil spill or other hazardous substance spills.

In the event of an oil spill, a predesignated Federal official, named the "On Scene Coordinator" (OSC), will have the responsibility to coordinate and direct the Federal response to the spill. Participation and assistance by State and local governments is encouraged by the Federal plan.

The OSC is designated by the U.S. Environmental Protection Agency for inland waters, and by the U.S. Coast Guard for the coastal waters. The OSC's for the Town of Babylon area are listed in the "Notification List" located further in this document.

Since it will be of utmost importance to act quickly in the event of an oil spill, the National Response Center (NRC) and designated On Scene Coordinator (OSC) should be contacted as soon as possible. The OSC has the authority to expend funds for private firms to assist in containment and clean-up activities. It is of the utmost importance that the Town of Babylon fully cooperate with the OSC, and assist wherever possible with men and equipment.

The OSC will have the ultimate responsibility for the coordination, containment and clean-up of an oil spill.

The Town of Babylon presently has the authority, as further described in The Unified Code of Ordinances, Chapter 6, Article I, Boats, Docks and Waterways, as amended by the Town Board on October 21, 1980, to fine the person or organization responsible for an oil spill. (A copy of the amended ordinance is included in the back of this section.)

Federal regulations require the person or organizations responsible for the spill to bear all costs related to the clean-up, containment and ultimate disposal. If the responsible party for the discharge or threat of discharge does not act promptly, or take proper removal actions, or if the party responsible for the discharge is unknown, the Federal OSC may authorize spill removal actions. A pollution discharge revolving fund, administered by the Commandant, USCG, has been established through Federal regulations to pay for necessary action. New York State also has a fund which is administered through the New York State Department of Transportation.

II.3 Definitions

The following is a list of Federal definitions and terms relevant to the Town of Babylon Oil Spill Response Plan:

National Response Center (NRC) - is the national communications center for activities related to pollution incidents. It is located at the Washington, D. C. Headquarters of the U.S. Coast Guard. First notice of pollution discharge should be made to the NRC Duty Officer, toll-free telephone (800)424-8802.

National Response Team (NRT) - consists of representatives from participating agencies, such as, U.S. Environmental Protection Agency (USEPA), and the U.S. Department of Transportation (USDOT). It is the national body for planning and preparedness before a pollution discharge and for coordination and advice during a discharge.

Regional Response Team (RRT)- serves as the regional body for planning and preparedness actions before a pollution discharge and for coordination and advice during a pollution discharge. The RRT consists of Federal, State and local government agencies and/or representatives.

On Scene Coordinator (OSC) - is the Federal official predesignated by the USEPA or the USCG to coordinate and direct Federal response to spills, and discharge removal efforts at the scene of a discharge.

Discharge - includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying or dumping of oil or hazardous substances.

Coastal Waters - generally means waters which are navigable by deep draft vessels, and other waters subject to tidal influence.

Inland Waters - generally means waters upstream from coastal waters.

Minor Discharge - a discharge to the inland waters of less than 1000 gallons of oil; or a discharge to coastal waters of less than 10,000 gallons of oil. (For Great South Bay use less than 1000 gallons.)

Medium Discharge - a discharge to the inland waters of 1,000 to 10,000 gallons of oil; or a discharge to coastal waters of 10,000 gallons to 100,000 gallons of oil. (For Great South Bay use 1,000 to 10,000 gallons.)

Major Discharge - a discharge of more than 10,000 gallons of oil to the inland waters; or more than 100,000 gallons of oil to the coastal waters. (For Great South Bay use 10,000 gallons or more.)

Note:

> The above discharge classifications were depicted from the "National Oil and Hazardous Substances Pollution Contingency Plan." The classifications are not meant to imply associated degrees of hazard to the public health or welfare, nor are they a measure of environmental damage. Any discharge that poses a substantial threat to the public health or welfare, or results in critical public concern shall be classed as a major discharge regardless of the above classifications.

II.4 Oil Spill Response Actions

In accordance with requirements of the National Oil and Hazardous Substances Pollution Contingency Plan, five sets of actions or "Phases" should be followed as response to an oil spill in Great South Bay or in the Atlantic Ocean where shore contamination is imminent.

Phase I - Discovery and notification

Phase II - Evaluation and initiation of action

Phase III - Containment and countermeasures

Phase IV - Clean-up, mitigation and disposal

Phase V - Documentation and cost recovery

The following describes in greater detail, each phase and what actions should be accomplished:

Phase I -Discovery and Notification

A discharge or potential discharge may be discovered by any number of means. When a spill is called in and/or discovered, the following information should be obtained where possible:

1. Name, title, address and telephone number of person making the initial notification.
2. Date and time of notification.
3. Type and quantity of oil spilled.
4. Quantity reaching watercourse.
5. Spiller - including address, phone number and contact.
6. Location of spill.
7. Action being taken to contain and clean-up spill, by the spiller, or other parties.

8. Probable direction and time of travel of discharged oil.

9. Natural resources, including fish and wildlife and their habitat and property which may be affected.

10. Other relevant information such as flammability, toxicity and safety precautions.

First notice of a discharge should be called into the NRC Duty Officer, Headquarters USCG, Washington, D.C., toll free telephone (800) 424-8802. The Federally designated On Scene Coordinator should also be immediately contacted, numbers for which are in the "Notification List" located in Section III of this document. A proposed "Discovery and Notification Form" is also included in Section III of this document.

Phase II - Evaluation and Initiation of Action

The OSC is responsible to make a detailed assessment of the oil spill. The OSC will need pertinent facts regarding the discharge, such as potential impacts on human health and welfare and the environment. Most of the needed information is listed in Phase I.

The OSC will advise and coordinate additional agency and response team efforts if the additional help is deemed necessary. The amount and types of equipment necessary should also be assessed during this phase. Aerial observation may be necessary to track the movements of the spill. Helicopter flights can be invaluable in planning strategy.

The OSC may require assistance from other agencies to insure adequate surveillance over whatever actions are initiated. It is extremely important for all involved to cooperate with the OSC.

Phase III - Containment and Countermeasures

Defensive actions should begin as soon as possible after a discharge is discovered. This phase may include actions to protect the public health and welfare such as:

- o Placement of physical barriers (booms,etc,) to deter spread of spill.
- o Analyzing water samples to determine the source and spread of the spill.
- o Procedure to control the source of discharge.
- o Measures to keep waterfowl and other wildlife away from the contaminated area.
- o Damage control or salvage operations.
- o Use of booms or barriers to protect specific installations or environmentally sensitive areas.
- o Use of chemicals and other materials in accordance with environmentally sound judgment and regulations.

The map developed for the Babylon coastal areas will be of great value in accomplishing this phase of the oil spill response. The map locates some of the more important environmentally sensitive areas in addition to access roads, navigation routes, deployment sites, boat ramps and potential spill sources such as marinas, storm drains and petroleum storage sites. It is intended that this map be a useful logistical and tactical aid for contaminant and clean-up efforts.

Phase IV - Clean-Up, Mitigation and Disposal

The purpose of the previous phase was to contain and control an oil spill. After that is accomplished, clean-up actions to recover the oil from the water can begin. These actions include the use of; skimmers, sorbants and other collection devices to pick up the floating oil. Skimmer boats, vacuum trucks, pump trucks, oil water separators and other auxiliary equipment are usually necessary to support this activity.

Disposal of oil waste and oily contaminated waste due to the clean-up efforts should be disposed of in an environmentally acceptable and approved manner. The OSC and supporting response team will have to make the ultimate disposal decisions on a case by case basis.

Phase V - Documentation and Cost Recovery

The costs involved with the containment, cleaning up and ultimate disposal of wastes as a result of an oil spill, can be astronomical, not to mention damage done to environment and property.

Documentation is necessary to provide a legal record for the possible recovery of costs from the party(s) responsible for the oil spill.

The OSC and other responsible agencies, should during the course of the contaminant clean-up and disposal operations, keep logs and records describing: daily clean-up operations, recording complaints, visual inspection of environmental and property damage, daily weather conditions, and any other items that may be relevant to the understanding of the pollution incident sometime in the future. Photographs showing the source and extent of pollution may be helpful. Samples of the oil should be collected for analysis to later ascertain the identification of the responsible parties and for future research and development. The samples and other information must be gathered as soon as possible after the spill, otherwise wind and current may disperse the evidence.

"RETYPED FROM A COPY OF THE ORIGINAL"

RESOLUTION NO. 9 OCTOBER 21, 1980
ADOPTING AMENDMENTS TO THE UNIFIED
CODE OF ORDINANCES.

The following resolution was offered by Councilman Canary and seconded by Councilman Maestri:

WHEREAS, the Town Board of the Town of Babylon having duly called and held a Public Hearing at the Town Hall, 200 East Sunrise Highway, Lindenhurst, New York, on the 21st day of October, 1980, upon the question of amending the Unified Code of Ordinances of the Town of Babylon,

NOW, THEREFORE, be it

RESOLVED AND ORDAINED by the Town Board that the amendments to the Unified Code of Ordinances of said Town Chapter 6, Article I, Boats, Docks and Waterways, In General, be and the same is hereby enacted as follows:

REPEAL: SECTION 6-17 through 6-20. ARTICLE I.

ENACT: SECTION 6-2 AMENDED, SECTION 6-17 through 6-20. ARTICLE I, as follows:

Section 6-2 Definitions - add

Garbage-shall mean putrescible animal and vegetable waste resulting from the handling, preparation, cooking and consumption of food, and readily combustible material such as paper, cardboard, wood, excelsior, cloth, food cans, glass food containers and bottles; also dead birds, cats, dogs, and other small animals.

Rubbish-shall include ordinary household or store trash of an inflammable character such as barrels, cartons, boxes, crates, furniture, rugs, clothing, rags, mattresses, blankets, small tree trimmings, small stumps and similar garden waste; large dead animals, hay, fodder, feed, meal, or other discarded animal or vegetable matter originally intended for animal consumption; planing mill waste, shavings, sawdust, and such other materials not otherwise defined herein as may be readily consumed by incineration.

Section 6-17 Dumping of Oil, Chemicals, Cesspool Waste, Garbage and Rubbish.

The dumping of oil, chemicals, cesspool waste, garbage and rubbish in canals, rivers, creeks, channel systems or the Great South Bay is prohibited.

Section 6-18 Discharging of Toilets in Basin, Marina, Dock and Bathing Areas.

The discharging of toilets is prohibited in areas designated as basin, marina, dock and bathing areas.

Section 6-20 Penalties for Offense.

A. Any person convicted of dumping rubbish or garbage in canals, rivers, creeks, channel systems or the Great South Bay shall be guilty of a violation and punishable as follows:

1. For a first conviction, by a fine of not less than $100.00 nor more than $250.00.

2. For a second conviction or subsequent convictions within five (5) years of a previous conviction for a like offense, by a fine of not less than $250.00 nor more than $500.00.

3. A misdemeanor for a third conviction within five (5) years of a previous conviction for a like offense and punishable by a fine of not less than $500.00 nor more than $1,000.00 or by imprisonment for not less than six (6) months nor more than one (1) year or by both such fine and imprisonment.

B. Any person convicted of discharging or dumping oil, chemicals, toilets, cesspool waste in canals, rivers, creeks, channel systems or the Great South Bay shall be guilty of a violation and punishable as follows:

1. A violation for a first conviction and punishable by a fine of not less than $250.00, nor more than $500.00, or by imprisonment for not more than fifteen (15) days, or by both such fine and imprisonment.

2. A misdemeanor for a second conviction or subsequent convictions within five (5) years of a previous conviction for a like offesne, and punishable by a fine of not less than $500.00 nor more than $1,000.00, or by imprisonment for not less than six (6) months, nor more than one (1) year, or by both such fine and imprisonment.

and be it further

RESOLVED, that the Town Clerk shall publish this amendment of said ordinances once in the Babylon Beacon.

VOTES: 5 YEAS: 5 NAYS: 0

The resolution was thereupon declared duly adopted.

DATED: TOWN OF BABYLON, NEW YORK
OCTOBER 21, 1980

SECTION III

NOTIFICATION LIST AND OTHER PERTINENT NUMBERS

*National Response Center (NRC) Duty Officer Headquarters, USCG Washington, D.C.	(800) 424-8802
*On Scene Coordinator USCG Captain, Port of New York	(212) 668-7920 or 668-7936
Fire Island	(516) 661-9100
*On Scene Coordinator Albany 24 Hour Oil Spill Notification	(518) 457-7362
New York State Department of Transportation	(516) 979-5030
Town of Babylon Department of Environmental Control	(516) 957-3153
New York State Department of Environmental Conservation	(518) 457-7362 (Albany) (516) 751-7900 (Local)
U.S. Environmental Protection Agency 24 Hour Notification	(201) 548-8730
Suffolk County Health Department	(516) 231-3900
Police Department	911
Fire Department	(516) 226-1212 (General Emergency Number)
Weather Bureau	(516) 936-1212 (Recording) (212) 399-5561 (Office)
U.S. Fish and Wildlife Service	(516) 271-2409 (516) 345-3300 (Alternate)
New York Oiled Bird Rescue	(516) 922-3200

*Important numbers to call immediately upon notification of an oil spill. Other numbers are for reference only.

Town of Babylon
Department of Environmental Control
Discovery and Notification Form

Date__________ Time of Notification___________ Official____________

A. Person(s) making initial notification

Name & Title____

Address ____

Tel. No. ____

B. Location of Spill

____

C. Type of Contaminant Spilled (i.e., oil, chemicals, etc.)

____

D. Spiller

Name ____

Address____

Tel. No.____

E. Quantity Spilled____

F. Quantity Reaching Watercourse________________________________

G. Probable Direction and Travel of Contaminant

____

H. Natural Resources and Environmentally Sensitive areas that have been/may be affected

____

____

I. Action being taken to contain and clean-up spill, by spiller, or other parties.

____

____

____

J. Other relevant information (such as flammability, toxicity and safety precautions)

SECTION IV

EQUIPMENT INVENTORY

An inventory of oil spill response and support equipment available within the Town of Babylon vicinity has been developed to gain rapid access to resources during emergencies. The inventory contained herein is essentially an update of information contained in the Long Island Regional Planning Board's report completed in 1979. Telephone numbers and other pertinent data were added in this revision to enable quick communication with the various organizations.

Large spills will more than likely require that a qualified private contractor be called in to handle the bulk of the containment, clean-up and disposal operations. They are well equipped and have perhaps greater experience dealing with spills. Prior to bringing in a private contractor, funds must be authorized to compensate them for their participation. The U.S. Coast Guard and New York State Department of Transportation presently have authority to use "General Funds" for this activity.

For smaller spills, mutual assistance from local governments and agencies may be practical. Although there is no present agreements between the various governmental groups, most appear to be willing to assist others if needed.

A reprint of "Response Times for Oil Spill Contractors in the Fire Island Inlet Area," is included as Table IV - 1 in the back of this section for general information.

Inventory of Equipment Owned by Federal, State and Local Agencies Which May be Available for Initial Oil Spill Response

Town of Oyster Bay

(Division of Environmental Control)

(516) 921-7347

Boats

1 - 30' Columbia Patrol Boat

2 - 20' Boston Whalers

2 - 17' Boston Whalers

1 - 20' Garvey

2 - 35' LRC 5 Amphibious Landing Craft

1 - 12' Dinghy

Vehicles

2 - Vans

1 - Plymouth Wagon

Equipment

1 - 1½" Fire Salvage Pump

1 - 1½" Wash Down Pump

1 - 500 GPM Fire and Salvage Pump

1 - Oil Spill Containment Boom

Town of Islip

(Department of Environmental Control)
(516) 224-5640

Boats

1 - 36' Lightnew Bt., Scow (1974)

1 - 55' LCM (1945)

1 - 20' Wellcraft Runabout (1974)

1 - LCVP with engine

1 - 28' Chris Craft (1973)

1 - 24' North American (1973)

1 - 36' Navy Vessel

1 - 26' Sembler (1975)

1 - 17' Mako (1978)

Materials

Limited amounts of sorbents may be on hand.

Town of Huntington

(Department of Environmental Protection)
(516) 351-3255

Boats

1 - 26' Work Boat with VHF Radio

2 - 23' Patrol Boats with VHF Radios

1 - 12' Skif

Vehicles

1 - 4 Wheel Drive GMC Pick-Up

1 - 6 Wheel Drive Truck and Trailer

Materials

300' - Absorbent Sweeps

500 - Absorbent Pads

50 - Absorbent Collars

Town of Hempstead
(Department of Conservation and Waterways)
(516) 431-9200

2 - Tugs

2 - Barges

1 - 30' Work Boat with hydraulic hoist - 15' boom (3 ton capacity) also contains a 2" salvage and fire pump.

1 - 40' Twin Screw Tug Boat (Sea going) with 2" fire pump.

1 - 38' Shallow Draft Work Boat contains a double drum hydraulic winch with 15' boom (4 ton capacity). Also has a 3" salvage and fire pump.

1 - 32' Flat Barge, used for transporting heavy equipment and materials.

1 - 30' Laboratory Boat, shallow draft, used for sampling purposes, could be utilized for rescue transportation.

1 - 16' Whaler, utilized for transportation purposes.

1 - 20' Utility Garvey (flat bottom).

4 - Patrol Boats

Vehicles

1 - Van

Boom

1 - 3500 lb. Trailer containing 1000' of MP oil containment boom

Equipment and Supplies (Contained on Trailer)

4 - 500 Watt Floodlights

300' Electrical extension cords

Town of Hempstead (Continued)

2 - Chain Saws

1 - Portable Electric 200 amp. Welder

2 - Acetylene Cutting Torches

2 - 3500 Watt Portable Generators

1 - 3" 400 GPM Pump

Mobile Portable Radio Equipment

Sorbents

20 Cases of Conweb Sorbent Pads.

Town of Brookhaven

(Department of Environmental Control)

(516) 654-7914

Boats

1 - 32' Uniflite

2 - 20' Sealarks

2 - 19' Garveys

1 - 19' Shamrock

Town of Babylon

See Equipment List on Page 95.

Fire Island National Seashore
(516) 289-4810

Boats

1 - 22' Outrage - Outboard

1 - 23' Skimmer - Inboard Tunnel

1 - 24' K.C. Patrick - Inboard Tunnel

1 - 21' Revenge - Outboard

1 - 19' Revenge - Outboard

5 - 17' Whalers - Outboard

1 - 21' Steiger - Outboard

1 - 30' FINS II - Inboard Diesel

1 - 32' FINS III - Inboard Diesel

1 - 27' FINS IV - Inboard Diesel

Vehicles

3 - 4 x 4 Cherokee Jeeps

3 - " Chevy Suburbans

1 - " Dodge Rack Truck

1 - " Dodge Club Cab

1 - " Dodge Pick-Up

1 - " Chevy Pick-Up

1 - " Jeep Pick-Up

Long Island State Parks & Recreation Commission

(516) 669-1000

Boats

2 - 18' Boston Whalers

1 - Work Barge with crane

1 - 27' Utility Boat

1 - 21' Fiberglass Runabout

Note: Boats are located at Jones Beach area.

Suffolk County Police Department

(516) 286-5000

Boats

3 - 37' Egg Harbors

1 - 31' Chris Craft

4 - 30' Columbias

2 - 20' Shamrocks

1 - 19" Revenge

3 - 16' Boston Whalers

1 - 15' Airgator

3 - 20' Challengers

Note: The Suffolk County Police Department has pointed out that some of these boats are not available on the south shore.

UNITED STATES COAST GUARD

CG Station Rockaway
(212) 634-2848

1000' containment boom
2 bales sorbent pads
250' sorbent boom
2--41' boats with radar
1--44' boat with radar
1--22' boat (stored in shed Nov-Feb)

CG Station Short Beach
(516) 785-2988

250' absorbent boom
2 bales sorbent pads
1--41' boat with radar
1--44' boat with radar
1--21' boat (stored in shed Nov-Feb)

CG Station Fire Island
(516) 661-9100

250' sorbent boom
2 bales sorbent pads
1--44' boat with radar
1--46' buoy boat with radar
1--41' boat with radar
1--21' boat (no winter use)
1--20' boat (no winter use)

CG Captain of the Port/Group New York
(212) 668- 7920 or (212) 668-7936

300' containment bood
20 bales sorbent pads
200' sorbent boom
5--32' boats without radar
2--41' boats with radar

Inventory of Oil Spill Contractors and Equipment

Name and Address of Contractor	Telephone
Marine Pollution Control, Inc. 460 Terryville Road Port Jefferson Station, L.I., N.Y. 11776	Bus.Hrs. (516)928-6222 24 Hr.# (516)473-9132 (516)928-0835
AAA Oil Pollution Specialists, Inc. 40-10 Crescent Street Long Island City, N.Y. 11101	(212)729-2122
Peabody Clean Industry, Inc. (Coastal Services, Inc.) 43-09 Vernon Blvd. Long Island City, N.Y. 11101	(212)729-2121
Duane Marine Corporation Box 435 Great Kills Staten Island, N.Y. 10308	(212)984-5566
Clean Venture P. O. Box 418 Linden, New Jersey 07036	(201)225-4130

Equipment

Marine Pollution Control, Inc.

Boom

3,000 ft   Jayton Harbor Boom 6" X 12"

1,500 ft   Uniroyal Sealdboom 6" X 12"

Skimmers

2 - Parker weir type

2 - Slurp weir type

Boats

1 - Salvage Barge

1 - 10,000 gal. Vacuum Barge

1 - 65 ft Utility Boat

1 - 60 ft Crew Boat

1 - 40 ft Crew Boat

2 - 56 ft LCM-6

2 - 50 ft LCM

2 - 24 ft Work Boat

2 - 18 ft Outboard Work Boat

2 - 12 ft Aluminum Work Boat

1 - Boston Whaler with 50 h.p. motor

1 - Debris Boat (Boatadozer)

Oil/Water Separation Equipment

3 - 2, 500 gal. vacuum trucks

1 - 1,100 gal. skid mounted vacuum unit

Miscellaneous Equipment

2 Backhoes

5 Front end loaders

1 Bulldozer

Numerous other applicable materials and equipment such as; sorbents, trucks, trailers, generators, floodlights, compressors, pumps, etc.

AAA Oil Pollution Specialists, Inc.

Boom

20,000 ft	Uniroyall Sealdboom	6" X 12"
12,000 ft	American Marine Optimax	6" X 18"
8,000 ft	Containment Systems	6" X 18" harbor

Skimmer

6 - Acme weir skimmers

4 - Acme FS-40 electric type

Boats

1 - 30 ft Work Boat

15- small work boats with outboard motors

1 - 21 ft Maco

Oil/Water Separation Equipment

4 - 3,000-5,000 gal. vacuum trucks

2 - 4,400 gal. tank trucks

3 - 3,000 gal. tank trucks

Miscellandous Equipment

2 high pressure washing units

Numerous other applicable materials and equipment such as; sorbents, trucks, trailers, 10 K.W. generator with search lights, pumps, etc.

Peabody Clean Industry, Inc.
(Coastal Services, Inc. - Long Island City Branch)

Boom

2,000 ft Marine Pollution 6" X 12"

1,000 ft Marine Pollution 12"X 24"

Skimmers

3 - Floatation skimmers

Boats

1 - 14 ft aluminum boat and motors

Miscellaneous Equipment

6 - Transfer and wash pumps

Numerous other applicable materials and equipment such as; sorbents, dispersants, and from satellite locations; additional boats, trailers, skimmers, oil separators, generators, etc.

Duane Marine Corporation

Boom

5,000 ft Cascade Harbor I 6" X 12"

5,000 ft Slickbar Harbor 6" X 12"

Skimmers

4 - Manta Ray skimmer heads

6 - Slurp skimmers

Boats

14 - 24 ft outboard work boats

Oil/Water Separation Equipment

2 - 2,500 gal. vacuum truck

2 - 2,700 gal. vacuum truck

1 - 20 cu. yd. vacuum induction truck

Miscellaneous Equipment

Numerous other applicable materials and equipment such as; sorbents, trucks, construction equipment, generators, compressors, pumps, etc.

Clean Venture

Boom

3,000 ft	Colloid boom	12" X 24"
7,000 ft	Parker Systems, Inc.	6" X 12"
1,000 ft	Colloid flat pack	6" X 12"
2,000 ft	Goodyear Hi Sea Barrier	12" X 24"

Skimmers

3 - Oela "Swiss" skimmers

2 - Slurp

2 - Duck-Bill (Manta Ray)

1 - Bennent MK VI E self-propelled

Boats

1 - 42 ft Harbor Tug

2 - 30 ft Steel work boats

4 - 22 ft work boats

20 -19 ft outboard work boats

5 - 12-16 ft outboard workboats

Oil/Water Separation Equipment

8 - 2,500-5,000 gal vacuum trucks

2 - 500 gal. skid mounted vacuum units

1 - 1,000 gal. skid mounted vacuum units

6 - 5,000-6,000 tank trucks

Response Times for Oil Spill Contractors in the Fire Island Inlet Area

Contractor	Distance to Inlet	Mobilization Time[1]	Travel Time[2]	Boom Deployment Time[3]	Boat Deployment Time	Total Response Time
Clean Harbors (Verrazano Bridge)	44 mi	1.5 hrs	1 hr	Compactible--1 hr Standard--2 hrs	.25 hrs	3.75 to 4.75 hrs
Clean Harbors (Upper Arthur Kill)	52 mi	1.5 hrs	1.3 hrs	Compactible--1 hr Standard--2 hrs	.25 Hrs	4 to 5 hrs
Clean Harbors (Perth Amboy)	.59 mi	1.5 hrs	1.5 hrs	Compactible--1 hr Standard--2 hrs	.25 hrs	4.25 to 5.25 hrs
Clean Venture (Linden)	55 mi	1.5 hrs	1.3 hrs	Standard--2 hrs	.25 hrs	5 hrs
Coastal Services (Elizabeth)	52 mi	1.5 hrs	1.3 hrs	Standard--2 hrs	.25 hrs	5 hrs
Marine Pollution Control (Fort Jefferson)	28 mi	1.5 hrs	.75 hr	Standard--2 hrs	.25 hrs	4.5 hrs
Duane Marine (Perth Amboy)	59 mi	1.5 hrs	1.5 hrs	Standard--2 hrs	.25 hrs	5.25 hrs
AAA Pollution (Long Island City)	43 mi	1.5 hrs	1.1 hrs	Standard--2 hrs	.25 hrs	5 hrs

[1]Includes .5 hrs for notification and 1 hr to get equipment on the road

[2]Average speed of 40 mph

[3]Time required to unpack, assemble, and launch 1,000 ft of boom

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TABLE IV-1

SECTION V

OIL SPILL CONTROL EQUIPMENT

V.1 This section describes the basic types of oil spill equipment. A "Product Index of Commercially Available Equipment" is included as a separate volume **(Appendix II)**, due to its voluminous nature.

The purpose of this section is to give the reader a general overview of equipment generally recognized for use during oil spills. Applicable publications and manufacturers should be consulted for more detailed information.

V.2 Booms

The initial action at the site of an oil spill is to contain the oil for subsequent clean-up. Containment is most often accomplished with booms. Booms are floating barriers or fences that can limit and contain the travel of floating substances such as oil.

There are many types, sizes and kinds of booms and are classified from lightweight general purpose booms to heavy duty offshore booms.

Lightweight booms are more common as they are easier to handle and have more applications. They are small, compact and easily stored. They are limited in use to inland, calm waters with little current.

Heavy duty booms are cumbersome to handle and require special equipment, such as a powered storage reel for deployment. They are designed for offshore use in choppy waters with large currents and high winds. Of course, these booms have limitations when conditions are severe.

Booms can be specified by wave height and current or wind speed. The materials and details of construction vary greatly among manufacturers. One should be aware that "stability" of a boom is important in high current, wave and wind conditions, as some booms regardless of type, tend to flop over or lie down in these situations allowing oil to escape.

A Table listing of Boom Capabilities for certain proprietary booms is listed in the back part of this section for general information (Table V-1).

V.3 Skimmers

A skimmer is a device which collects oil from the surface of the water. There are many types of skimmers commercially available today, and work on the basis of various principles, each with limitations and varying degrees of effectiveness. Many authorities in the oil clean-up business claim that under the majority of conditions, most commercially available skimmers are ineffective. The limits of usefulness of skimmers are critically dependent on wave heights, wind conditions, oil slick thickness and type of oil spilled.

The basic types of commercial skimmers are:

- o floating suction head skimmers
- o weir skimmers
- o adsorption skimmers
- o boat skimmers (which use the above basic principles).

A Table listing of Skimmer Capabilities for certain proprietary skimmers is listed in the back part of this section for general information (Table V-2).

V.4 Sorbents

Oil sorbents are materials which have an affinity to attract oil particles and not water or other substances. Sorbents will, in effect, soak up oil.

The use of sorbents for large spills is impractical and expensive. The major usefulness of sorbents is for "polishing" or picking up the final sheen, and for areas where other clean-up methods are impractical.

The basic sorbent materials are; mineral, natural organic and synthetic organic. Sorbents come in a wide variety of configurations and shapes such as; pads, pillows, booms, rugs, mesh, strips, etc.

V.5 Chemicals and Dispersants

Chemical agents for oil spill control are those elements, compounds or mixtures that dissolve, emulsify, neutralize, precipitate, reduce, solubilize, oxidize, concentrate, congeal, entrap, fix, gel, make the pollutant mass more rigid or viscous, or otherwise facilitate the mitigation of deletorious effects or removal of the oil from the water.

A decision to use chemicals should not be made until all other conventional methods of oil recovery are deemed ineffective. The use of chemical agents is closely regulated by the environmental agencies and can only be initiated in situations where it is deemed the most effective and least environmentally hazardous alternative. The authority to decide on the use of chemical agents has been given to the federally designated On Scene Coordinator and response team.

Chemicals can be applied using spray arms mounted to a marine vessel, or by aircraft in a crop-dusting fashion, or by manual application for very small spills or confined areas. Application of such chemicals can be extremely effective in preventing a slick from contaminating beaches, harbors, or land areas.

Prudent judgment and proper authority must be exercised prior to using chemicals for oil spill control.

V.6 Boats

Marine vessels are a major ingredient effecting the successfulness of containment and clean-up of an oil spill. Boats are generally necessary to deploy booms, skimmers, sorbents and other spill control equipment.

The size and horsepower of a boat should be matched to the type and quantity of equipment used and the conditions under which it will have to operate. For offshore spills, medium to large size boats or a tug with several thousand horsepower would be necessary. Inland spills may only require 14 ft. boats with twenty horsepower outboard motors and shallow drafts.

V.7 Trucks and Oil Water Separators

Collection of oil on the surface of water during an oil spill is, as previously mentioned, accomplished by some type of skimming method. It is virtually impossible to preclude water from entering the skimming device. Subsequently, the oil water mixture is directed to a storage container, such as a tank on a truck. Separation of oil and water takes place within the container given sufficient time. The excess water can then be "decanted" and will allow additional oil storage in the container. This process in effect acts as a rather crude type oil separator, and is used to collect, contain and concentrate the oil picked up. The effluent from the decant operation can be expected to have some traces of oil, but in the absence of any better methods, it is usually necessary to accept this type of operation.

Tank trucks and vacuum container trucks will most likely become the primary recovery vehicles during oil spill control operations.

Dump trucks are used for transporting debris and other waste material from the spill site to the disposal area.

V.8 Auxiliary and Construction Equipment

Heavy equipment is generally necessary to carry out oil spill containment, clean-up and disposal operations. Equipment such as a crane for launching skimmers and boats, road graders, bulldozers, backhoes, and loaders are used for cleaning beaches. Special beach cleaners are available specifically for this purpose.

Other construction equipment might include mulchers for spreading sorbents, four-wheel drive vehicles for hauling men and equipment to the clean-up site, and well drilling equipment for well point systems to contain subsurface contamination.

An assortment of other miscellaneous equipment would include: hand tools, shovels, rakes, baskets, two-way radios, portable pumps, generators and flood lights, steam cleaning equipment, and other essential items.

V.9 Oil Spill Response Inventory

A sample of a typically well-equipped oil spill response center and approximate costs is as follows:

Quantity	Description	Unit Cost	Approx.Total Cost
1000 ft.	Boom (lightweight)	$15/ft.	$ 15,000
1000 ft.	Boom(medium weight)	$30/ft.	$ 30,000
1000 ft.	Boom(heavy duty offshore)	$90/ft.	$ 90,000
2	16 ft. flat bottom boats and motors	$2,500	$ 5,000
1	25 ft. boat and motor	$10,000	$ 10,000
1	40 ft. open bow boat	$75,000	$ 75,000
2	4 wheel drive equipment trucks	$15,000	$ 30,000

Quantity	Description	Unit Cost	Approx.Total Cost
2	Vacuum trucks	$150,000	$ 300,000
5	Pumps with hoses	$ 3,500	$ 17,500
2	Skimmers	$ 2,500	$ 5,000
-	Stock of various sorbents		$ 50,000
-	Other miscellaneous equipment including anchors, buoys,hand tools, etc.		$ 20,000

Note: The foregoing information is intended only to show the general magnitude of prices for various items. Manufacturers should be consulted for exact quotes.

Some manufacturers can supply packaged oil spill response centers. One in particular can supply a mobile package consisting of a trailer with 1000 ft. of boom, buoys, anchors, pump, skimmer, hose, sorbents, portable pool, 14 ft. boat with motor, and other accessory equipment, for a price less than $50,000.

V. 10 Town of Babylon Oil Spill Response Inventory

An inventory of equipment that the Town of Babylon presently owns and can be used for oil spill containment can clean-up is listed in "Section IV, Equipment Inventory."

To enchance the Town's oil spill response capabilities, it is recommended that the Town obtain additional equipment. The following listing of oil spill response equipment should be considered as a minimum for the Town to add to its equipment inventory:

	Est. Cost
1000 ft Boom (light weight)	$15,000
Pontoon Boat	2,500
Assorted sorbents and sorbent booms	7,500
	$25,000

The above mentioned boat should be shallow draft, be easily transportable, have a large stable workdeck, be self propelled and be towable, and have space to store oil spill equipment.

Boom Capabilities

Boom	Boom Type	Freeboard	Draft	Max. Wave Height	Max. Current Speed	Stability	Shallow Water Use
Metropolitan Petroleum	Curtain	6 in	12 in	1-3 ft	1 kt	Moderate	Good
Metropolitan Petroleum	Curtain	12 in	24 in	5 ft	1 kt	Moderate	Limited
Uniroyal Sealdboom	Fence	6 in	12 in	1-2 ft	1 kt	Poor	Poor
Coastal	Fence	6 in	12 in	1-3 ft	1 kt	Poor	Poor
Coastal	Fence	12 in	24 in	1-3 ft	1 kt	Poor	Poor
B.F. Goodrich	Fence	12 in	24 in	3-5 ft	1 kt	Good	Poor
Acme	Curtain	6 in	12 in	1-3 ft	1 kt	Moderate	Good
Cascade		6 in	14 in	1-3 ft	1 kt		
Slickbar MK-6	Fence	6 in	12 in	1-3 ft	1 kt	Moderate	Poor
American Marine Optimax	Curtain	7 in	12 in	1-3 ft	1.5 kt	Good	Good
Kepner Supercompactible Sea Curtain	Curtain	8 in	12 in	1-3 ft	1 kt	Moderate	Good
Kepner Supercompactible Sea Curtain	Curtain	12 in	18 in	4 ft	1 kt	Moderate	Limited

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TABLE V-1

- Skimmer Capabilities

Skimmer	Portable or Vessel Mounted	Effectiveness vs. Oil Type: Light	Medium	Heavy	Solid	Max. Wave Height	Skimming Speeds**	Required Water Depth
JBF 3003	V.M.	High	Moderate to High	Low	Low	2-3 ft*	0-3 kts	6 ft
JBF 3001	V.M.	High	Moderate to High	Low	Low	2-3 ft	0-3 kts	4 ft
Bennent Mk IV	V.M.	High	Moderate	Low	Low	2-3 ft	1-2 kts	6 ft
Oela "Swiss"	P	Moderate to High	Moderate	Low	Not Effective	6"	NA	8"
Slurp	P	Low	Moderate	Moderate	Not Effective	1 ft	NA	1 ft
Oil Hawg	P	Low	Moderate	Moderate to High	Not Effective	6"	NA	6"
Oil Mop	P	High	High	*Low to Moderate	Not Effective	6"	NA	6"
Manta Ray	P	Low	Moderate	Low	Not Effective	6"	NA	6"
Acme	P	Low	Moderate	Low	Not Effective	6"	NA	1 ft
Coastal Barge Skimmer	V.M.	Moderate	Moderate	Low	Not Effective	1 ft	1-2 kts	3 ft

*Effectiveness improved with preheater.
**For vessel mounted types only.

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TABLE V-2

SECTION VI

OIL SPILL CONTROL TECHNIQUES

VI.1 Protection and restoration of a shoreline from an oil spill should be initiated immediately upon the spill's detection. Rapid and effective response is necessary to limit the spread of oil and to reduce or eliminate damage to the environment.

This section will describe in general terms, various techniques for the containment, clean-up and disposal of an oil spill.

VI.2 Booming Techniques

There are essentially three classifications of boom deployment. They are:

- o Containment Booming
- o Diversion Booming
- o Exclusion Booming

An additional type of booming that is classified within the above three is Sorbent Booming. These booming techniques will be discussed further.

VI.3 Containment Booming

This type of booming is used on open water to surround an approaching oil slick and contain it within the boundaries of the boom. Figure VI-1 illustrates the basic concept of this technique.

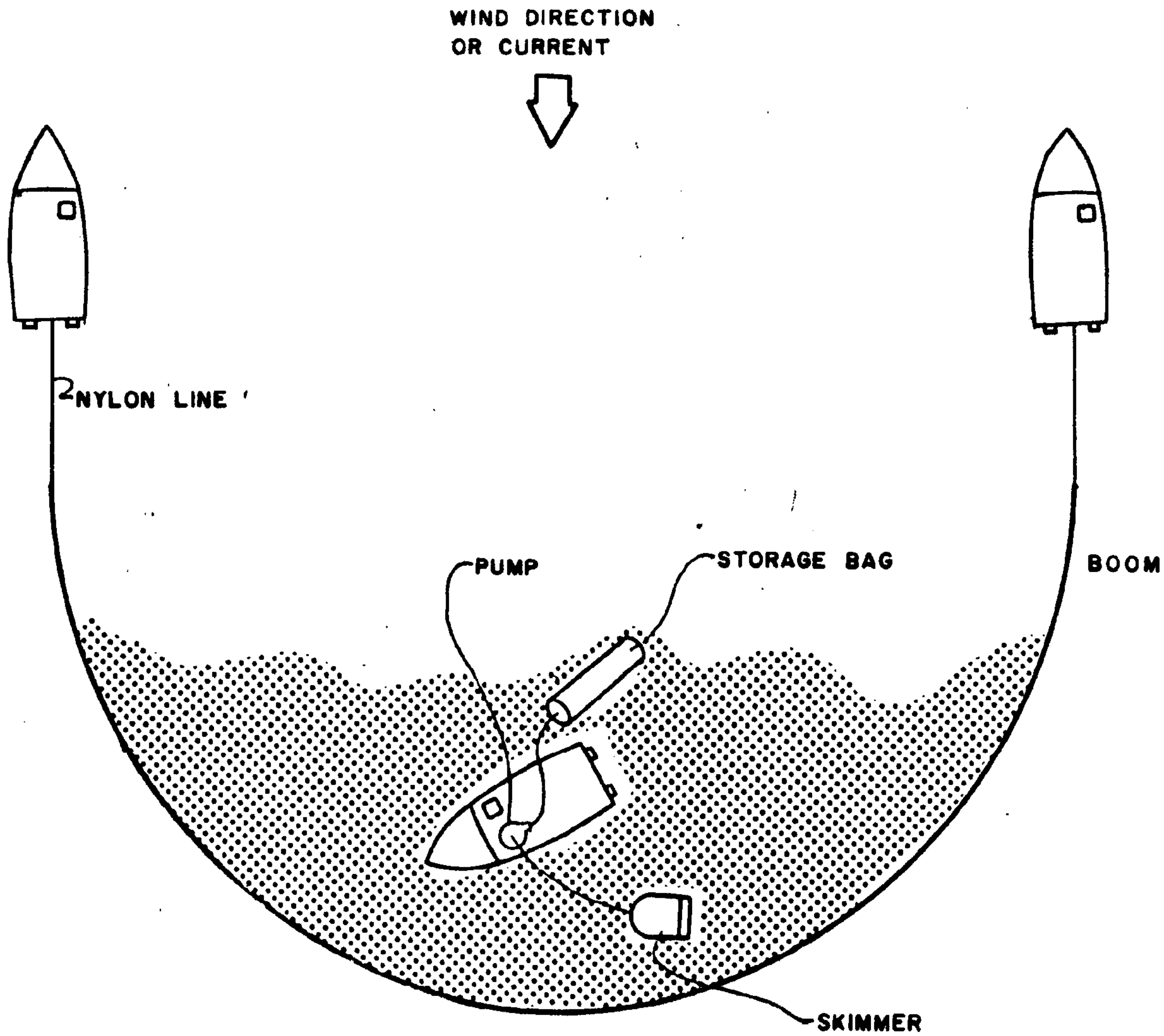

FIGURE-VI-1 CONTAINMENT : BOOMING

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Oil on water forms a slick and spreads into shapes dictated by surface currents, winds, and physical boundaries. In the absence of physical boundaries, a circular, elliptical, or triangular slick will be formed. A circular slick is formed when there are no significant surface currents or winds. An elliptical shape is formed by moderate surface currents and winds. High winds and strong currents will create a more triangular-shaped slick. The triangle will widen (spread) as the slick moves away from its source. Wave action, generally caused by wind, will rapidly distort these shapes, eventually forming streamers of oil. Therefore, it is important to try to contain an oil spill before it becomes too wide for effective containment and it breaks into streamers.

A spill that is fully contained by booms is best cleaned by a skimmer (preferably self-propelled) placed inside the boomed area as the oil will tend to concentrate against the boom. The skimmer should move to this area and continually position itself to skim the thickest area, as shown in Figure VI-1. When skimming becomes inefficient - after most of the spill has been removed or for small spills (less than 1 barrel) - sorbent pads or sorbent rolls may be used. Loose sorbent materials, however, should be avoided where possible. Sorbents should be used only with contained spills. This type of booming is also known as "sweep" booming.

VI.4 Diversion Booming

Diversion booming is useful for diverting oil from the mainstream current to environmentally acceptable shorelines where it can be more readily cleaned up. This type of booming should be used where the water current in an area is greater than one knot or if the area to be protected is so large that the available boom would not be sufficient to contain oil or protect the environmentally sensitive shorelines. Diversion booming is therefore useful to divert oil from sensitive areas to other shoreline locations that are less sensitive and more easily cleaned up.

Diversion booms should be deployed at an angle from the shoreline closest to the leading edge of the approaching oil slick to deflect oil toward shore, where pick-up of pooled oil is more effective. (See Figure VI-2)

When the boom is at right angles to the current, surface flow of water and oil is stopped. At current speeds greater than about one knot, vortexes (whirlpools) and entrainment (oil droplets shearing off from the underside of the oil layer) will drag the oil down beneath the skirt, rendering the boom ineffective. If the boom is placed at an angle to the current, surface flow is reduced and diverted, permitting the oil and water to move downstream

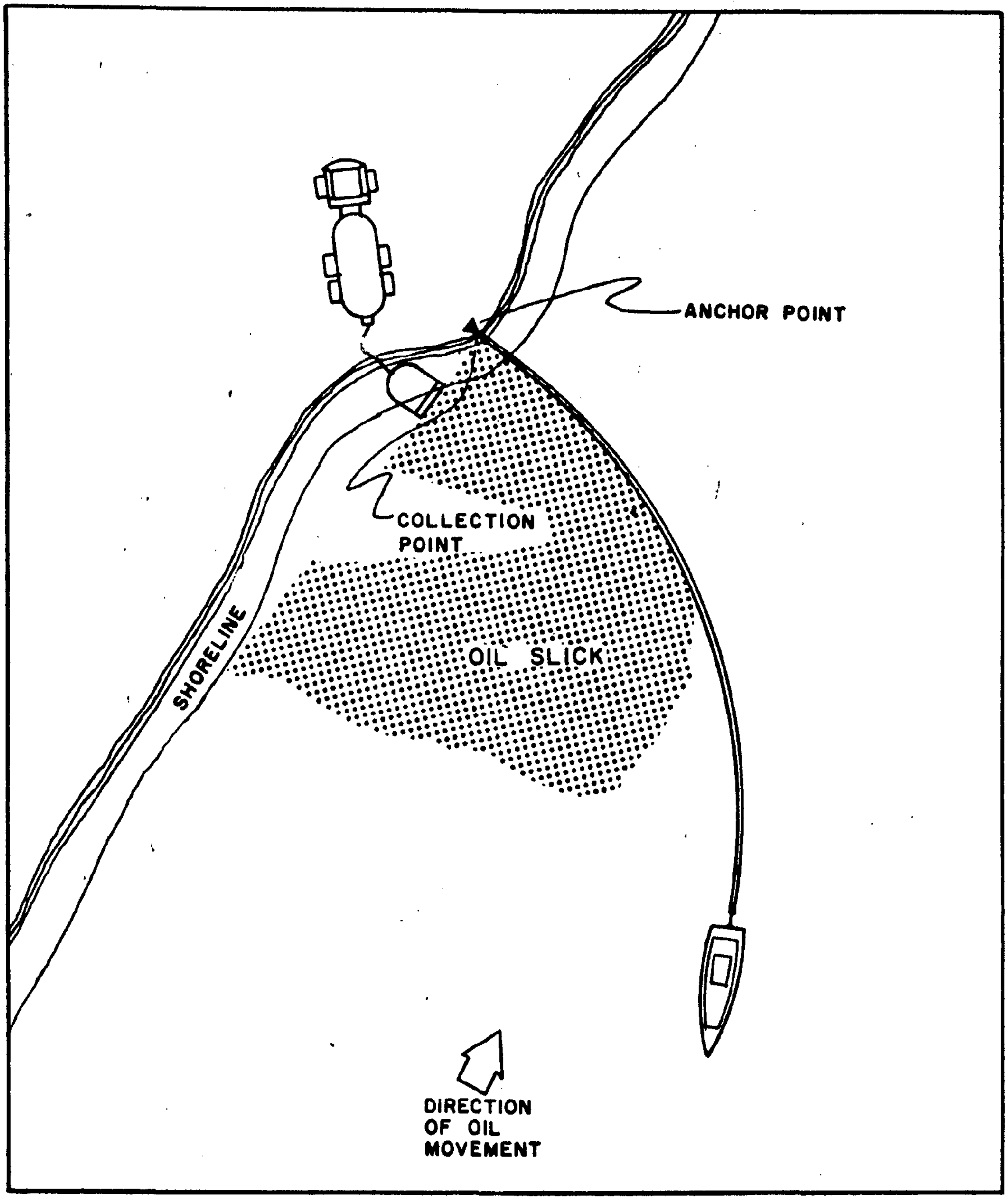

FIGURE VI-2 DIVERSION BOOMING ALONG SHORELINE along the boom into the collection area and/or against the shore. The reduction in current speed perpendicular to the boom is related to the decrease in the angle of the boom relative to the direction of current flow. (See Figure VI-2)

The optimum angle of boom deployment is dependent on the current speed and the length and type of boom used. To avoid boom failure in strong currents the angle must be smaller than in weak currents. The same relation is true with regard to boom length. The optimum deployment angle decreases as boom length increases.

The various types of booms available have varying degrees of stability under increasing current conditions. The more stable the boom, the larger the optimum deployment angle for a given current speed.

VI.5 Exclusion Booming

Exclusion booming is used to isolate and protect the more environmentally sensitive and other areas of concern from impending damage due to an oil slick. (See Figure VI-3)

Exclusion booming involves deploying the boom in a static mode, i.e., placing or anchoring the boom between two or more stationary points. This method is used primarily to prevent or exclude oil from entering harbors and marinas, breakwater entrances, lagoons, and inlets. Many of these entrances or channels have tidal currents exceeding one knot

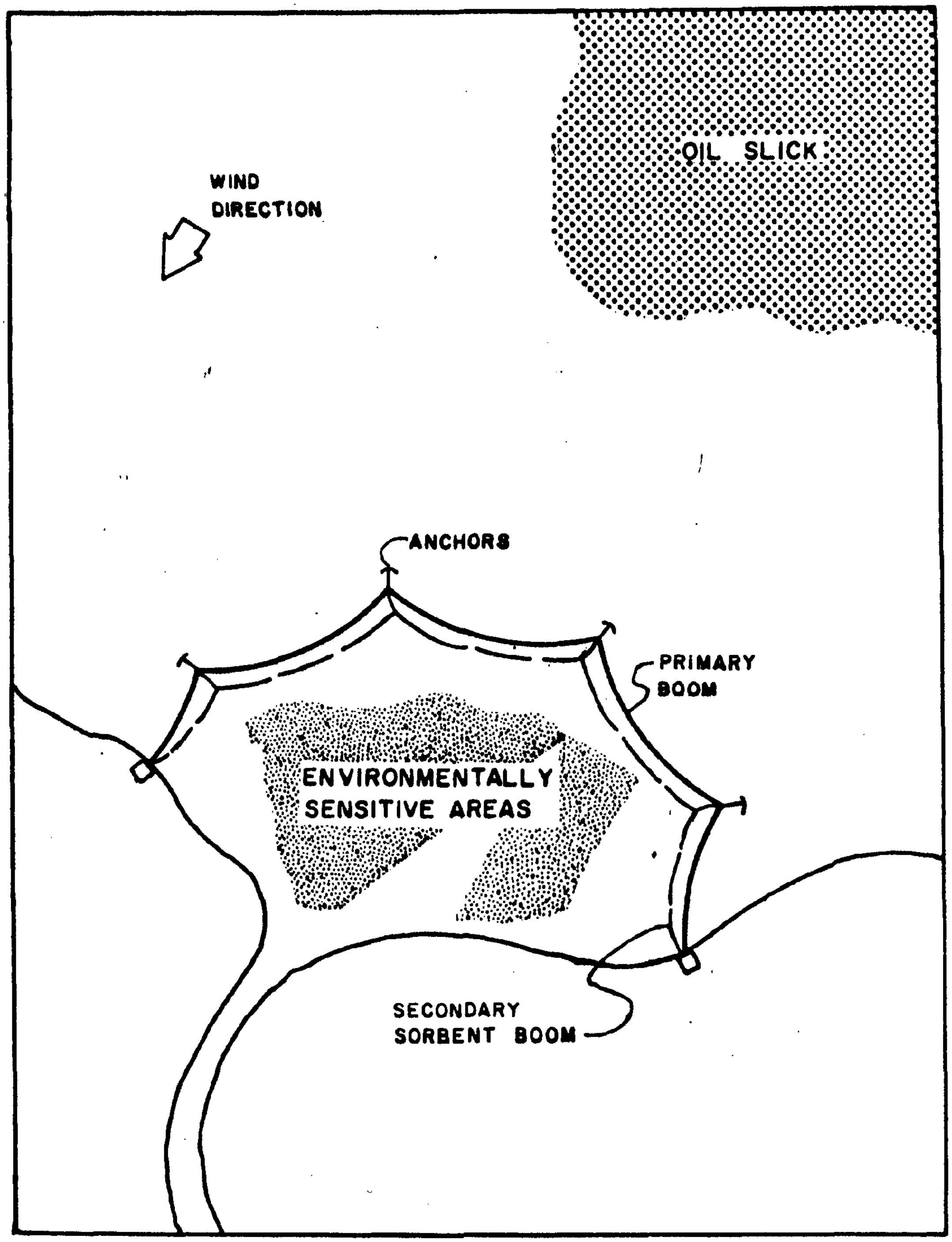

FIGURE VI-3 EXCLUSION BOOMING SENSITIVE AREAS & SECONDARY SORBENT BOOMING TECHNIQUE

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or surf breaking in the opening. Under these conditions, booms should be placed landward from the entrance in quiescent areas of the channel, harbor or inlet. Exclusion booms should also be deployed at an angle to a shoreline when possible (preferably in the direction of the wind) to guide oil to an area where vacuum trucks or skimming equipment can recover the oil. In many cases, the deployment of a secondary boom behind the primary boom is desirable to contain oil that may spill under the primary boom. Exclusion booming of harbors or inlets may require that a small work boat be stationed at the upstream end of the boom to open the boom for boat traffic entering or leaving the harbor. Figure VI-3 shows a typical application of exclusion booming for a sensitive area.

VI.6 Sorbent Booming

Sorbent booms are deployed much in the same manner as the other booming techniques except on a smaller scale. They are limited in use to very small quantities of oil and on the forces from winds and currents. They are used primarily on quiet waters with minor oil contamination.

These booms can be used as a back-up for standard booming operations. The sorbent booms are deployed several feet behind (downstream of) the primary booms to trap any oil splashing over or escaping under the containment boom. They can also be deployed behind skimmers to catch any oil that evades the skimmer.

Permeable sorbent barriers (filter fences) constructed on site have been suggested and are made of wire screen or mesh and sorbents. This can be used to contain or exclude oil from interior areas. Permeable barriers offer the advantages of non-interference with flow, conformance with bottom configuration, and response to tidal variation. Because of flow reverses in tidal areas, double barriers are required. The practicality of these barriers have been questioned and further experience may be necessary to prove their effectiveness.

VI.7 Clean-Up Techniques

There are numerous techniques available to clean-up a shoreline when contaminated by oil. The technique(s) chosen will be dependent on the amount of contamination, accessibility to the site, the type of equipment available, and how this equipment may effect the environment during its use. Some of the general aspects pertaining to types of equipment and their applicability to clean-up operations will be further discussed.

There are essentially three ways clean-up of a shoreline can be accomplished. They are:

Natural Recovery

Substrate Mixing

Physical Removal

"Natural Recovery" can be used on oil contaminated high energy beaches where wave action will remove most of the oil in a relatively short period of time. This method, although not totally desirable, may become a necessity for shorelines with no access or where clean-up operations would be environmentally hazardous and where weather conditions would prevent any other type of clean-up efforts. Usually, only minor spills, light contamination and relatively environmentally insensitive areas are conducive to this method. The spilled oil that is washed away would hopefully volatilize and degrade naturally over a period of time. Periodic visits to the contaminated area would be necessary to insure that natural processes are effective.

"Substrate Mixing" is a technique where the oil on the shoreline is not removed, but buried into the top layer of sediments and left to degrade naturally. Biodegradable additives to accelerate this natural degradation are available and should be confirmed environmentally safe prior to their use. This technique is very fast, efficient and can be used on non-recreational shorelines which are lightly contaminated. The method requires the use of a tracked loader or tractor towing a discer, similar to that used for tilling agricultural fields.

"Physical Removal" is perhaps the most costly method of oil spill clean-up, but apparently necessary when environmental and recreational areas are contaminated. The physical removal is usually accomplished with heavy construction equipment and much manpower. Construction equipment such as front end loaders, bulldozers, graders, etc., are used to scrape off the top layer of oil contaminated shoreline, and to transfer the oil/substrate mixture to an unloading area for further processing. The contaminated mixture can then be either trucked away to an approved disposal site, or may be treated on-site if the type of oil is conducive to simple gravity separation. The on-site treatment can consist of a simply constructed basin such as a lined trench, pond, or portable pool filled with water. The mixture of oil contaminated substrate is dumped into the basin and agitated to release the oil clinging to the substrate particles. The oil can then be skimmed from the top of the basin and disposed of. Care must be taken during the agitation process so that oil is not emulsified. When the basin is full of substrate, the relatively clean material can be removed and spread over a recuperation area where natural degradation can reduce the last remnants of the contamination.

Other supplemental techniques for clean-up include such things as; high and low pressure flushing, steam cleaning and sand blasting, for removing oil coatings and residues from man made structures, boulders and rocks. Pressure flushing is also useful, when applicable, for beach clean-up.

Manual clean-up by means of rakes, shovels, hand scrapers and collection bags, buckets and barrels are necessary to supplement most any clean-up efforts. Manual use of sorbents are not recommended for the initial phases of oil spill clean-ups, but for "polishing" later on. They can be used to remove small pools of light, non-sticky oils from mud, boulders, rock and man made structures. Sorbents can also be used to remove thin films or iridescence occurring during the final clean-up phases.

VI.8 Disposal

Disposal of waste oil and oil contaminated debris has become an ever increasing problem. Presently these contaminants are treated on a case by case basis at the judgment of the designated On Scene Coordinator.

There have been a number of "hazardous waste" contractors springing up lately, most claiming capabilities to store, process and sell recycled oils including oil/water mixtures from a spill. Providing these contractors survive environmental restraints and scrutiny, they may offer a reasonable disposal means for the oil portion of the waste.

Oil contaminated sand and debris, including spent sorbents, were previously disposed of in lined landfills. This disposal method is presently in doubt and other means are necessary. The future New York State hazardous waste facility may offer some solutions, but is still far off.

Perhaps at this point in time the only means of disposal are to; treat contaminated sand and debris on-site in temporary basins, dispose of burnable debris at an incinerator or resource recovery operation, and use governmental (state) approved private firms to remove and re-process oil/water mixtures. Wastes that are not conducive to treatment by any of the foregoing means would have to be trucked to a N. Y. State approved disposal area, possibly out of state.

VI.9 <u>Clean-Up of Birds</u>

In the event that waterfowl become oiled, it will be necessary to contact the U.S. Fish and Wildlife Service for technical assistance.

When a bird comes into contact with oil there are a number of possible adverse effects. A bird's feathers, if matted with oil, can impair their thermal insulating characteristics and cause chilling. Ingestion of some oils may produce toxic effects on the bird's body functions as well as other side effects.

Oiled birds, when captured, can be treated at the site or at a rehabilitation center if necessary. When captured, the bird's mouth and nostrils should be swabbed clean and should be checked for signs of oil toxicity. Birds are cleaned either in detergent or light mineral oil followed by detergent. Feathers must be thoroughly cleaned and rinsed to be waterproof. Any residue of oil or detergent which remains on feathers after cleaning will retard waterproofing.

Cleaning of birds is a very delicate operation that requires the guidance of an expert in the field. It is recommended that people with the proper experience and qualifications be called in if birds are affected by an oil spill.

Oiled Birds Designated Group
Coast Watch, N.Y. Oiled Bird Rescue
134 Cove Road
Oyster Bay, N.Y. 11771

Tel: (516) 922-3200

SECTION VII

OIL SPILL RESPONSE

SCENARIOS

VII.1 Introduction

The effective implementation of Babylon's oil spill control and containment plan for any oil spill is dependent upon a number of highly variable parameters. These parameters include location of spill, oil type and quantity, prevailing surface winds, temperature, currents, tide conditions, water depth, wave action and available Federal, State and Town resources. Different values for the parameters listed above will produce different assessments of the spill control measures necessary.

A fundamental aspect of oil spill control involves the estimation of the rate of slick growth and the direction and rate of slick movement since spill control usually depends on containment as the initial response. Critical factors in slick movement is surface wind velocity and surface current. Important factors in slick expansion are oil type and water/air and oil temperature. While broad generalizations can be made relative to these factors, quantitative and specific response to any one of an infinite number of possible situations can be difficult to determine. Specific cases (scenarios) have been selected to be evaluated and should be viewed as examples of typical responses to an oil spill using the tools provided here.

In this section we begin with the review and summary of the hydrographic and meteorological data pertinent for the prediction of slick movements. Within this section will be a general discussion of how oil slicks move under various environmental and physical conditions. Following this, a spill matrix has been developed which predicts the trajectory of a slick given wind and other pertinent information.

VII.2 Hydrographic Data

The study area is in the western-most part of Great South Bay. Great South Bay is characterized by its open water as opposed to the highly channelized South Shore Bays of Nassau County. Immediately adjacent to western Great South Bay (the study area) is South Oyster Bay and on the eastern end of the study area are the adjacent waters of Great South Bay. Fire Island Inlet offers a direct connection between the Bay and the Atlantic Ocean. In addition to the Bay and the Inlet, the study area includes the barrier beach that separates the Bay from the Atlantic Ocean.

To estimate the movement of oil one must necessarily consider the hydrodynamics of all bodies of water affecting the study area. Therefore, the hydrodynamic and meteorology of the study area and the adjacent land/water masses is discussed herein.

1. Tide and Tidal Currents in the Babylon Study Area

Tide gauges have been installed and maintained by different agencies over varying periods of time. Table VII-1, lists tide gauge locations and periods of operation in the vicinity of Babylon. Gauges are located as shown on Figure VII-1. Charts are available for determining hourly water levels.

Vertical elevation control has been established at all gauges by means of level runs between geodetic bench marks. All data, therefore, are relative to the geodetic mean sea level established in 1929.

Tidal circulation in Great South Bay is regulated by the ocean tide entering at Moriches Inlet, Fire Island Inlet, and Jones Inlet. The progressive tide wave initially enters Moriches Inlet. Twenty minutes later the wave enters Fire Island Inlet with another twenty minutes delay before entering Jones Inlet. After entering the shallow bays, friction and land masses modify the progressive wave changing its speed and amplitude. The impacts to the study area from Jones and Moriches Inlets are small compared to the impact from Fire Island Inlet. This is true on the west because the flow into this study area from the western Bay via Jones Inlet is severely restricted because of many marsh islands that restrict flow and the shallow depth of the water in this area (typically less than 3 feet), as compared to the depth in the study area of 4-6 feet. Similarily, the impact

Table VII-1

Selected Tide Stations in Babylon

Vicinity of South Shore Bays

Station	Period of Record
Corps of Engineers	
Oak Beach	1933 - Present
Timber Point	12/72 - 12/73
NOAA, National Ocean Survey	
Bay Shore	1975 - Present
Town of Hempstead	
Seamans Neck Park	1/74 - Present
Long Creek Marina	1/74 - Present
Nick's Marina	1/73 - Present
Point Lookout	1/73 - Present
Suffolk County Department of Public Works	
West Sayville	1965 - Present

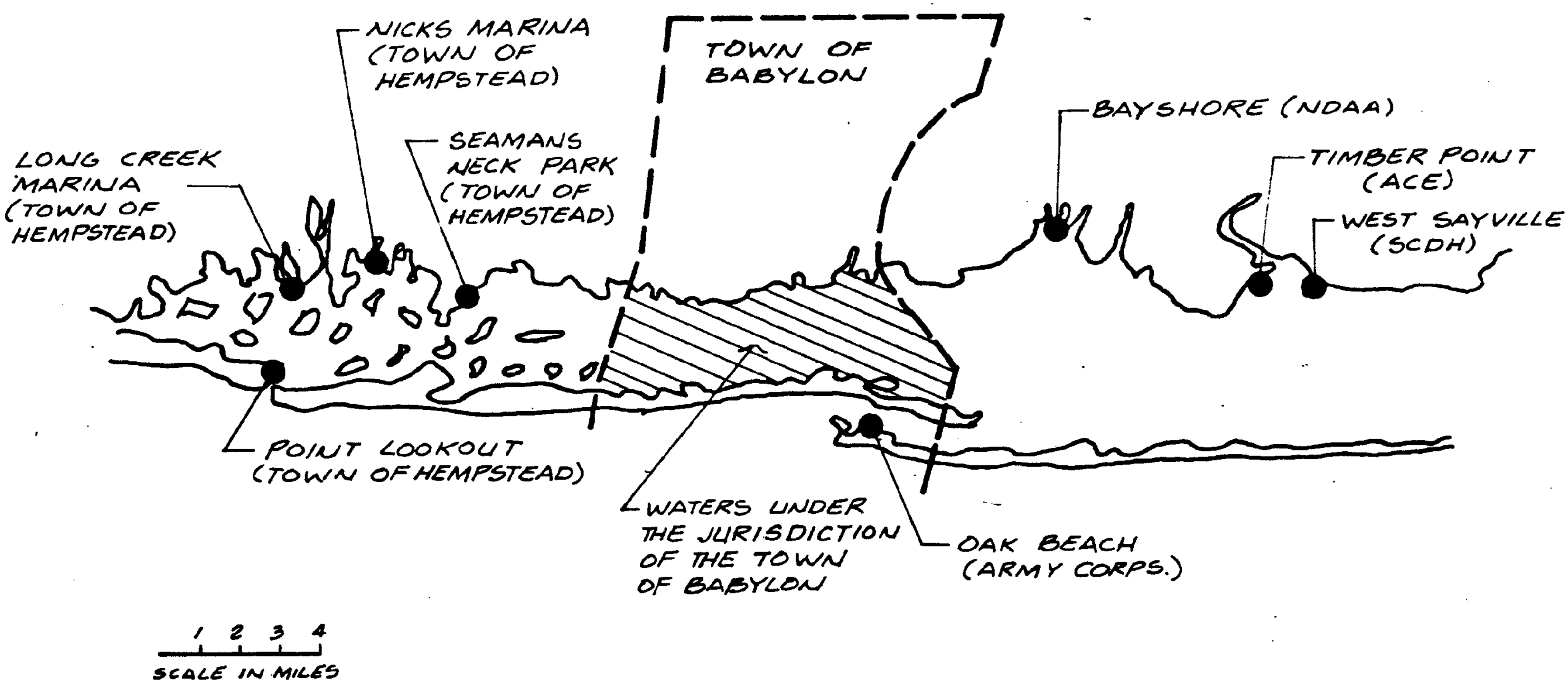


FIGURE VII-1

SELECTED TIDE GAUGE LOCATIONS IN VICINITY OF BABYLON

from Moriches Inlet is severely restricted by land masses and is distant from the study area and therefore has little impact on water movement.

The main channel of Fire Island Inlet is poorly defined because it shifts with time, however, the greatest tidal exchange (and maximum currents) flow here. Current velocities at ebb and flood tides as high as 3 knots occur in this region.

The predicted tide curve in Fire Island Inlet is that of the ocean tide as it enters the inlet. The measured curve for Smith Point represents the same ocean tide that has entered and traversed Moriches Bay to Smith Point. The tidal amplitude is smaller than the ocean tide. Additionally, the times of high tides and low tides occur at a later time than at the entrance. The tide curve for Sayville respresents the progressive wave that entered at Fire Island Inlet and has been further delayed and damped.

Figure VII-2, depicts the location of the crest of the predicted progressive tide wave at various times. Time zero is taken as the time of entry of the wave crest at Fire Island Inlet. This type of diagram illustrates the interaction of the tidal flux from different inlets. The peak tide fronts that have entered at Fire Island Inlet and Jones Inlet finally meet near Howell Point in the western edge of the study area approximately 3.2 hours after the wave first entered Fire Island Inlet. The meeting of these two progressive waves in the study area theoretically produces a

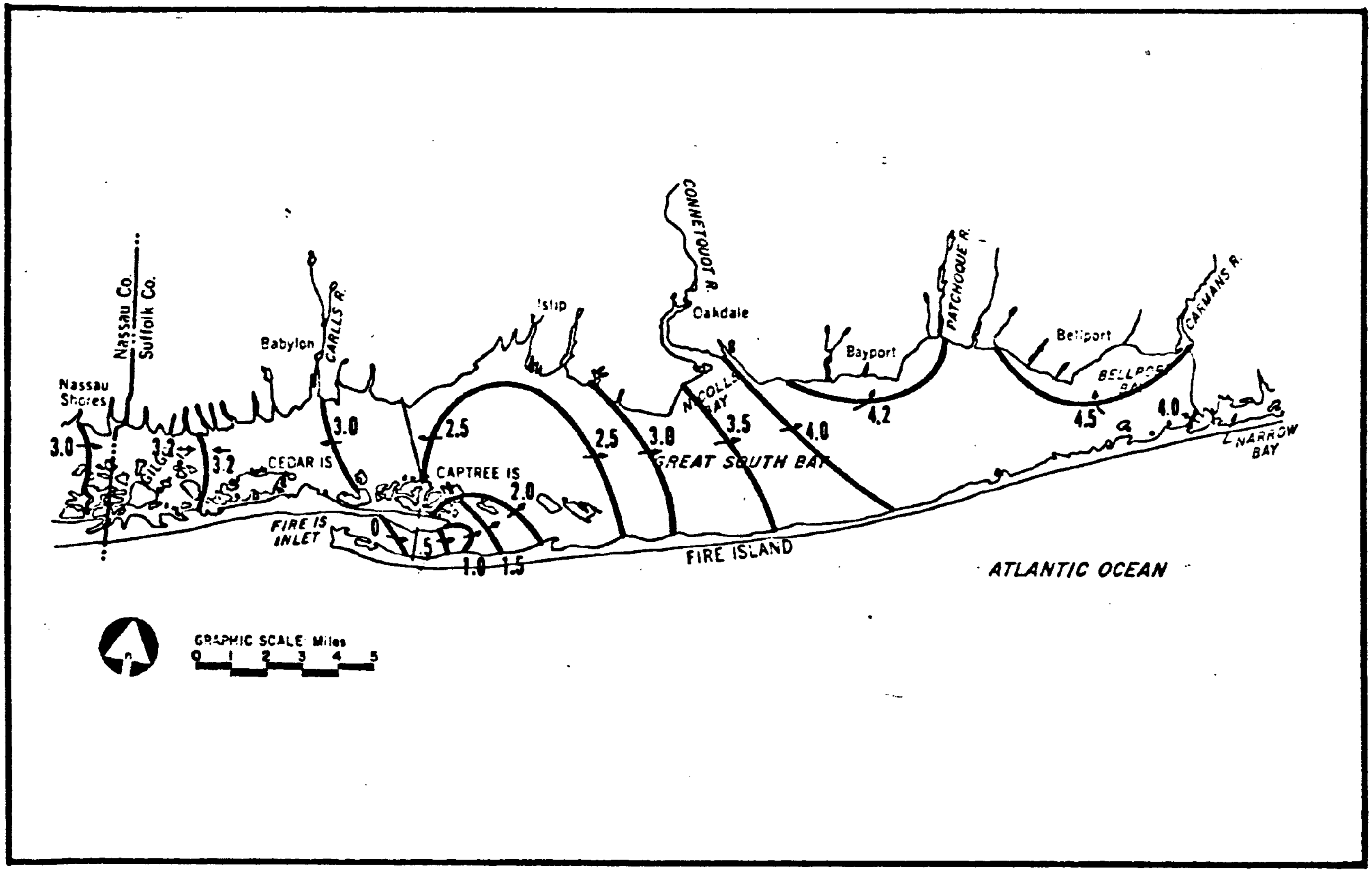


FIGURE VII-2

COTIDAL LINES WITH TIME OF ARRIVAL IN HOURS
FOR GREAT SOUTH BAY

SOURCE NS 208 STUDY

zero current velocity at this point. Hence, although not zero, we expect the currents throughout this portion of the study area to be minimal.

The tidal ranges within the study area are shown in Figure VII-3, and the damping of the tide as it moves away from the inlet is evident.

The surface current circulation patterns due to tidal flow in Great South Bay are not well known partly because of the sensitivity to changing wind conditions that hamper the separation of tidal and wind components. This is of particular importance in the shallow waters of Great South Bay.

A general tidal circulation pattern has been suggested by Hardy (L.I. 208). Western Great South Bay is influenced primarily by water entering Jones Inlet and then the State Boat Channel. Fire Island Inlet is less important in determining circulation patterns in this western region. The main flow into the study area from Jones Inlet and through South Oyster Bay appears to be along the State Boat Channel. In the study area it is suggested that these flows move in an easterly direction along the southern shore and westerly along the northern shore producing a counterclockwise circulation. Confirmation of such a complicated current pattern has yet to be verified. This suggests a complicated tidal current pattern, however, because it is of low velocity we would expect oil slick movement to be usually dominated by surface winds in this western area.

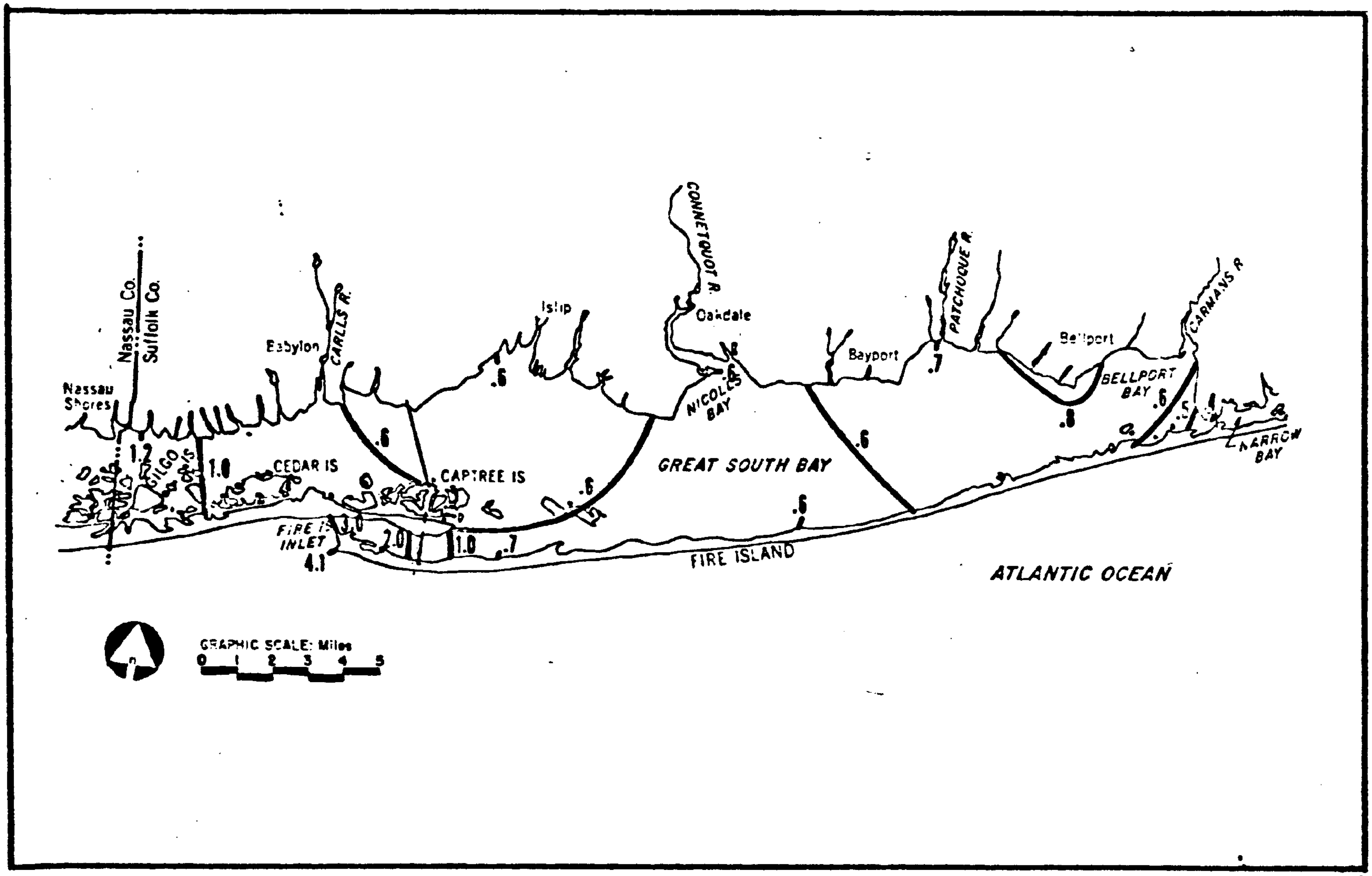


FIGURE VII-3

RANGE OF TIDE IN FEET IN GREAT SOUTH BAY

SOURCE NS 208 STUDY

In the vicinity of Fire Island Inlet, the current flow tends to be dominated by the tidal flux through the inlet. The tidal surface current velocity due to the tidal flux is small and hence is dominated by surface winds.

Transport of oil spills along the Atlantic side of the barrier beach (Jones Beach and Fire Island) is of interest to this Oil Spill Contingency Plan because some of these beaches are under the jurisdiction of the Town of Babylon and potential hazards exist from both oil transport and from boats and ships using oil. Generally, the surface currents are wind driven and will be described later.

Any changes in the friction acting upon the progressive tide wave may change the propagation pattern of the wave and tidal circulation within the Bay. Changes in eelgrass distribution and dredging of navigation channels, particularly in the inlets, are some of the ways friction of the bay bottom can change.

2. Meteorological Data

Climatological conditions including wind and temperature affect the natural weathering processes, slick size, shape and direction.

a) Temperature

The long term (30 year record)(*) average monthly temperatures at Mineola shown in Figure VII-4, illustrates mild seasonal changes. Records indicate July as the warmest month at approximately 78° F. and January as the coolest

(*)U.S. Department of Commerce, 1941-1970 Climatological

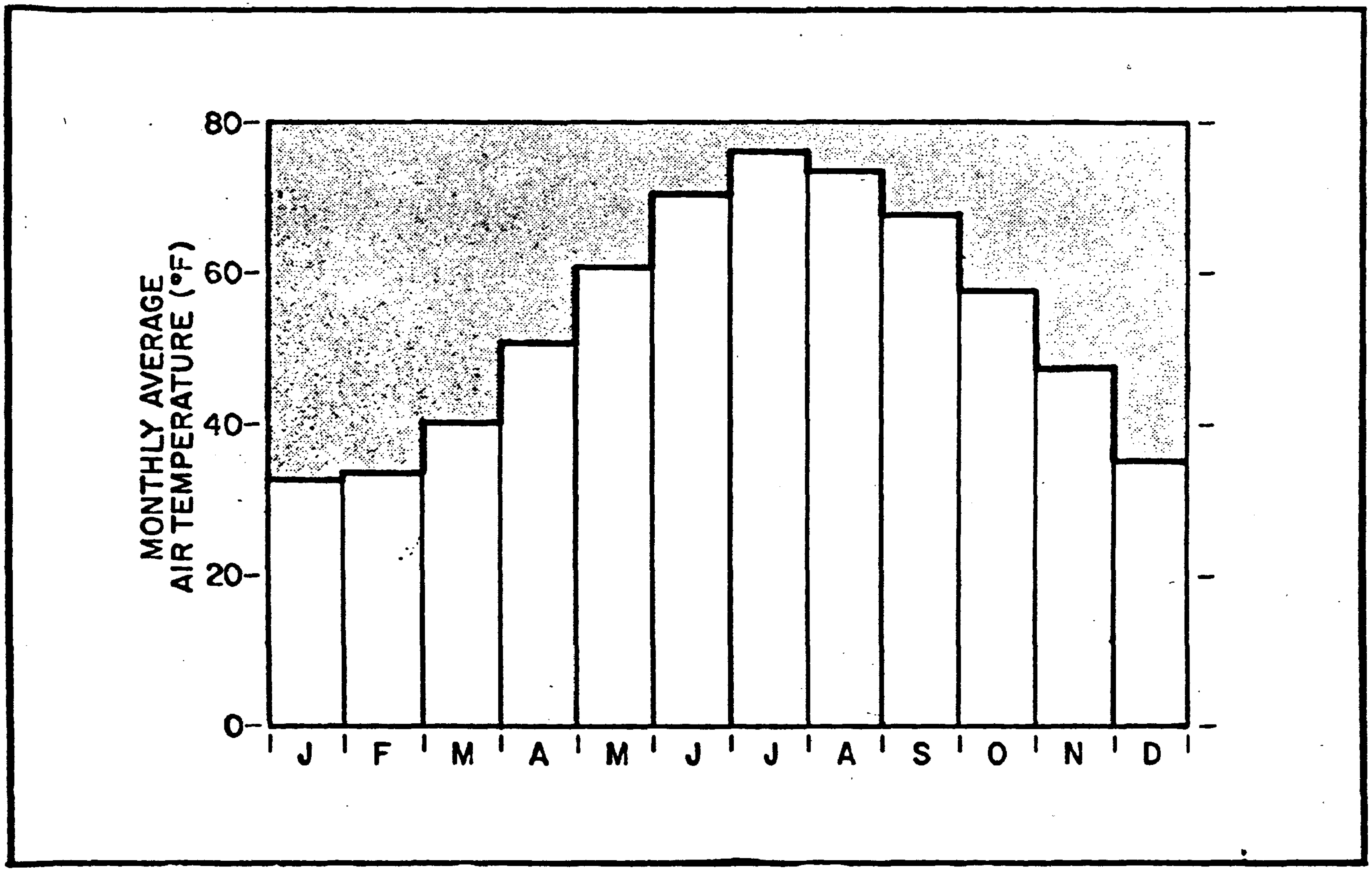


FIGURE VII-4

MONTHLY AVERAGE TEMPERATURE AT MINEOLA, LONG ISLAND

(U. S. DEPARTMENT OF COMMERCE) (1941-1970)

SOURCE L. I. 208

month at approximately 33° F. There are many non-recording temperature stations along the South Shore which provide daily maximum and minimum temperatures. Hourly and 3-hourly observations of temperature and humidity are made at John F. Kennedy Airport with records available from the National Weather Service.

Temperature affects the viscosity and surface tension of both the water and the oil. These factors in turn affect the rate of slick expansion. Because the oil absorbs sunlight differently than water, it is quite possible to have an oil temperature different (usually greater) than the surrounding water. Therefore, temperature effects are difficult to quantify in terms of slick development. For the Oil Spill Contingency Plan it can only be stated generally that an oil slick will tend to grow laterally more quickly in summer than in winter. Furthermore, slick break-up will occur faster in summer than in winter given the same sea state. Fortunately, reaction times to spill conditions are likely to be more rapid in summer than in winter therefore, the potential problems with slick development in the summer due to the higher temperature are probably minimal.

b) Wind Speed and direction

Wind speed and direction are one of the most important climatological factors for oil slick movement. In general, because of the low tidal current velocities the effects of surface winds usually predominates over all other driving forces except in a few locals of greatly restricted flow such as Fire Island Inlet itself as shown earlier.

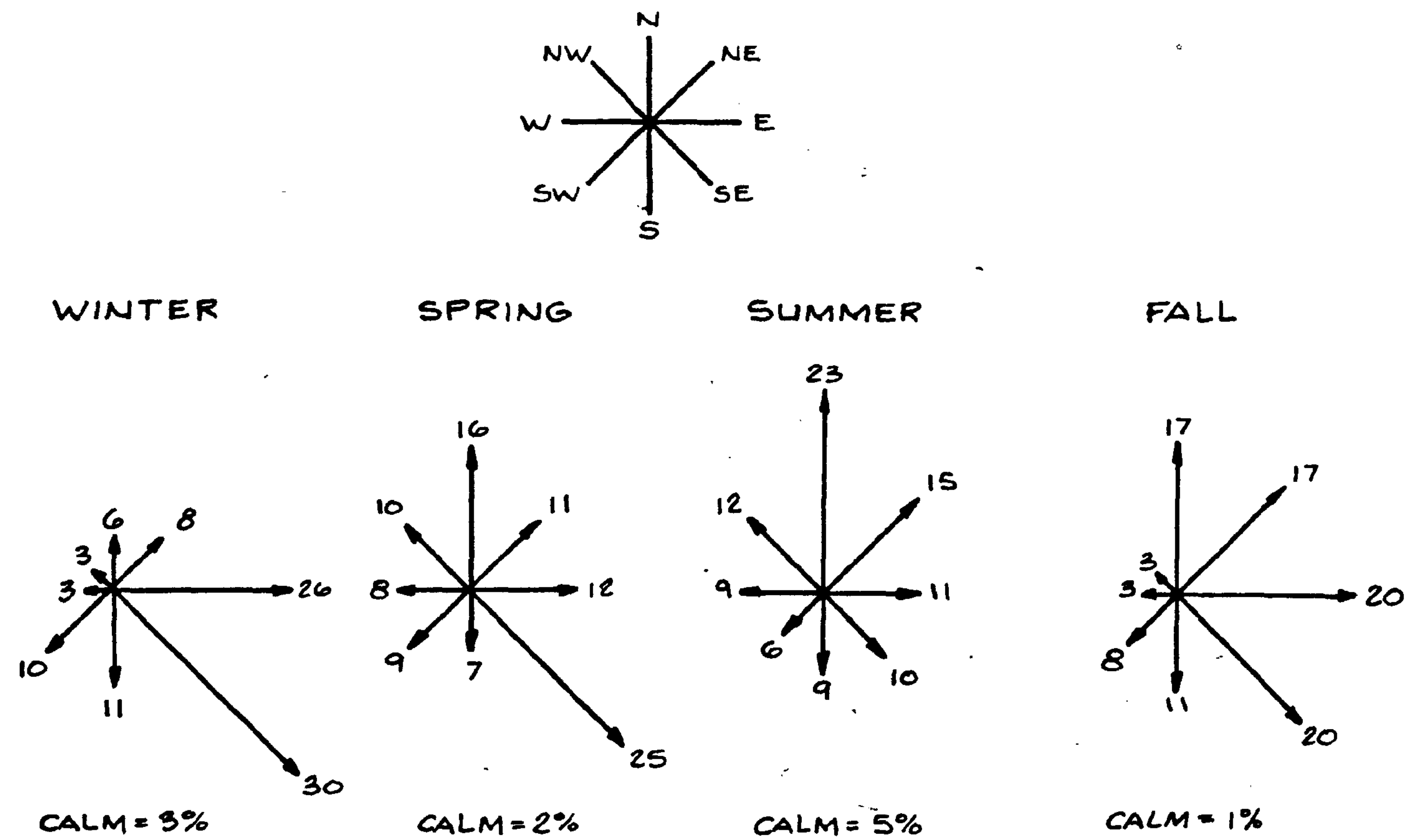
Many climatological parameters such as solar radiation, evaporation and barometric pressure require only a single monitoring station for both Nassau and Suffolk Counties because of their minimal lateral variability. Surface wind speed, however, is highly variable and therefore wind speed data must be obtained from stations located nearest the water body. Wind speed decreases rapidly as the air mass moves from a smooth, low friction water surface to the rough land surface. Inland observation stations therefore, typically yield lower wind velocities than coastal stations. Also important is the diurnal sea and land breeze phenomenon during the summer months on the South Shore of Long Island. Therefore, onshore recording stations will not adequately record the wind velocities acting on the surface waters in the study area.

Continuous chart records of wind speed and direction are available from Belmont Lake beginning in 1974, Medford beginning in 1973, and Smith Point since 1972. An additional recording anemometer has been installed recently at the Long Island Lighting Company Power Plant at Island Park. In addition to these continuous records, hourly observations of wind speed and direction are recorded in the operation log of the Village of Freeport Power Plant #1. The log records are available from 1973. Earlier records of hourly wind speed and direction for John F. Kennedy Airport are available from the National Weather Service. Hourly observation records are on file for January-February 1965; September 1965; March 1966; November 1967 and June 1969. Wind observations since June 1969 are recorded every three hours.

Seasonal "Wind Roses"* showing the average velocities and direction of winds based on data from various references including data from the U.S. Weather Service for Fire Island and Kennedy Airport are shown in Figure VII-5. These Wind Roses show the approximate direction and percentage of the time that the wind blows in a given direction which are broadly representative of the surface wind conditions offshore and within Great South Bay. Furthermore, the data shows averages (and hence essentially excludes) the diurnal shift in surface winds that is common in summer months. This diurnal shift caused by differential land/water temperatures, results in a landward breeze during the daytime and a seaward breeze at night.

As shown in Figure VII-5, the prevailing average surface winds appear to come mainly from the northwest in winter, shifting from the south to southwesterly direction in summer. Winds coming from west to northeast will cause an offshore slick to move out to sea because of the drift direction will tend to move the oil away from the coast of Long Island. Thus, the greatest problems appear to occur during

*Wind Roses are pedal diagrams showing direction of wind and the percent of time in that direction.



NUMBERS INDICATE PER CENT OF TIME THAT WIND PREVAILS IN DIRECTION SHOWN FOR RESPECTIVE SEASONS.

FIGURE VII-5

WIND DISTRIBUTION BY SEASON (PERCENT OCCURRENCE)
(WIND ROSES)

the late spring/summer/early fall when winds shift and become more southerly since these will tend to drive a slick onto the barrier beaches and possibly into Fire Island Inlet.

VII.3 Spill Matrix

Response to an oil spill requires some necessary preliminary information to predict the future status of the oil slick. Information such as; slick size, location, weather conditions, wind speed and direction, tidal conditions and a detailed knowledge of the area under consideration is helpful. Such detailed information will generally not be available, nonetheless, some guidelines are useful in establishing slick movement with a view toward estimating the trajectory, response time requirements, hardware requirements and environmental impact.

To enable a Town of Babylon official, or other responsible parties, to estimate or predict where and when an oil spill will eventually strand on the Babylon area shores, oil "Spill Transport Matrices" have been developed for four different conditions or scenarios. These matrices are detailed later in this section and summarized as follows:

- Transport Matrix 1 - Oil Slick Entering the Study Area from the East (Mid-Span Robert Moses Bridge)
- Transport Matrix 2 - Oil Slick Entering the Study Area from the West (State Boat Channel)
- Transport Matrix 3 - Oil Slick in Atlantic Ocean (10 Miles Off Fire Island Inlet)
- Transport Matrix 4 - Oil Slick in Fire Island Inlet

The Hydrodynamic information for this area indicates that surface currents in the Babylon area due to tidal flux are usually negligible compared to the wind induced surface currents. Hence, each matrix shows wind as the primary driving force. For the matrix development, the speed of the slick was estimated at 3 percent of the wind speed and the direction taken as the wind direction.

The matrices were developed for a 10 mile per hour surface wind in the eight primary directions (N, NE, E, SE, S, SW, W, NW). They are intended to be useful qualitative tools to predict oil slick movement. Care should be taken since a steady wind speed and direction almost never occurs on the South Shore. In fact, diurnal variation in wind speed and direction are likely on the South Shore in summer and should be factored into the slick trajectory prediction. All matrices list or consider the ultimate destination of the oil slick and the environmentally sensitive areas that should be protected first. A final column is given to indicate the time of travel for the oil slick centroid to reach the shoreline based on a 10 mile per hour wind speed.

Transport Matrices 1, and 2, show that only certain wind conditions will result in a major spill entering the study area. Moreover, a "nodal" point at Howles Point indicates surface currents in the study area to be a minor factor in oil transport. Hence, Transport Matrices 1, and 2, show the Babylon portion of Great South Bay to have a certain "natural

TRANSPORT MATRIX 1

OIL SLICK ENTERING THE STUDY AREA FROM THE EAST
(Mid-Span, Robert Moses Bridge)

Wind Direction (From)	Percent of Time (Summer)[2]	Slick Destination	Environmentally Sensitive Areas	Hours to Strand[1]
North	9	Captree Island, Grass Island, Oak Island	Captree Island, Grass Island, Oak Island	1 hr.
Northeast	6	Tidal Flats	Tidal Flats	1-2 hrs.
East	9	Sampwams Point to Nassau/Suffolk Border	Municipal Boat Launching Ramps, Indian Island Beaches	3-4 hrs.
Southeast	12	Out of Study Area	---	---
South	23	Out of Study Area	---	---
Southwest	15	Out of Study Area	---	---
West	11	Out of Study Area	---	---
Northwest	10	Out of Study Area	---	---
Calm	5			
	100			

(1) Windspeed = 10 MPH

(2) See Figure VII-5 for wind distributions during other times of the year

TRANSPORT MATRIX 2

OIL SLICK ENTERING THE STUDY AREA FROM THE WEST
(State Boat Channel)

Wind Direction (From)	Percent of Time (Summer)[2]	Slick Destination	Environmentally Sensitive Areas	Hours to Strand[1]
North	9	Tidal Flats on Nassau/Suffolk Border	Tidal Flats & Marshes	Immediate to 1 hr.
Northeast	6	Out of Study Area	---	---
East	9	Out of Study Area	---	---
Southeast	12	Out of Study Area	---	---
South	23	Jones Creek, Gilgo Island, N.W. Boundry of Babylon	Gilgo Island, Marshes & Tidal Flats	---
Southwest	15	Gilgo Island, Thatcher Island, Elder Island	Gilgo Island Thatcher Island, Elder Island	Immediate to 1 hr.
West	11	Gilgo Heading, Beach,Thatch. Gilgo State Pk., State Boat Channel	Gilgo Heading, Beach,Thatch. Gilgo State Pk., State Boat Channel	Immediate to 1 hr.
Northwest	10	Gilgo Heading Gilgo State Pk.	Gilgo Heading Gilgo State Pk.	Immediate to 1 hr.
Calm	5			
	100			

(1) Windspeed = 10 MPH

(2) See Figure VII-5 for wind distribution during other times of the year

protection" against oil pollution. However, if meteorological conditions are such that oil does get transported into the study area or a spill occurs in the study area, the spill response must be swift due to the short period of time to strand as indicated in column 5 of the matrices.

Transport Matrix 3, indicates that a spill in the Atlantic Ocean off the barrier beaches, will typically take several days to arrive on shore. If the spill originates 15-20 miles offshore, it may not arrive as a homogeneous mass due to weathering. The wind conditions of importance are from the east to southwest. These wind directions would cause major impacts on the recreational barrier beaches. Oil entering Fire Island Inlet would also be of concern.

Transport Matrix 4, shows what happens in the case of a spill in Fire Island Inlet. Oil spilled here will almost invariably create environmental problems somewhere within the Babylon area. Because of the high tidal currents that can occur (4-5 mph) and the environmental sensitivity of all surrounding areas, reaction must be rapid to minimize spread and grounding of a slick. On the flood tide, oil spilled will enter Great South Bay and ground on either the Fire Island barrier beach and/or the Captree Island depending on wind direction, in a very short time. For a north/south wind of any great magnitude (7-10 kts) much of the oil will strand on the shores of the Inlet as well as entering the Bay area. When the tide is a maximum ebb, the slick will tend to leave Fire

TRANSPORT MATRIX 3

OIL SLICK - ATLANTIC OCEAN[3]

(10 Miles off Fire Island Inlet)

Wind Direction (From)	Percent of Time (Summer)[2]	Slick Destination	Environmentally Sensitive Areas	Hours to Strand[1]
North	9	Out of Study Area	---	---
Northeast	6	Out of Study Area	---	---
East	9	Atlantic Beach to Mid-Fire Island	Barrier Beaches	5 days
Southeast	12	Atlantic Beach to Mid-Fire Island	Barrier Beaches	5 days
South	23	Mid Jones Beach to Moriches Inlet	Barrier Beaches	2½ days
Southwest	15	Jones Beach Inlet to Mid-Fire Island	Barrier Beaches	3½ days
West	11	Out of Study Area	---	---
Northwest	10	Out of Study Area	---	---
Calm	5			
	100			

(1) Wind speed = 10 MPH

(2) See Figure VII-5 for wind distribution during other times of the year

(3) For different distances, or wind speeds, a linear extrapolation can be used, e.g., if the distance is 5 miles, the stranding time will be halved, also if the wind speed is doubled, the stranding time will be halved.

TRANSPORT MATRIX 4

OIL SLICK AT FIRE ISLAND[3]

Wind Direction (From)	Percent of Time (Summer)[2]	Slick Destination	Environmentally Sensitive Areas	Hours to Strand[1]
North	9	W Fire Island (Bay side)	Barrier Beaches	30 minutes to 2 hrs.
Northeast	6	W Fire Island (Bay side)	Barrier Beaches	30 minutes to 2 hrs.
East	9	Adjacent Inlet Beaches/Wetlands	Inlet, wetland Beaches	30 minutes
Southeast	12	Adjacent Marsh Islands (Captree Island)	Captree Island	1 minute to 3 hrs.
South	23	Adjacent Marsh Islands (Captree Island)	Captree Island	1 minute to 3 hrs.
Southwest	15	Adjacent Marsh Islands (Captree Island)	Captree Island	1 minute to 3 hrs.
West	11	W Fire Island/wetlands,Marsh Islands	Marsh Islands, Inlet adjacent wetlands	30 minutes t 4 hrs.
Northwest	10	W Fire Island, (Bay side)	Fire Island, Barrier Beaches, Bay side, Fire Island Wetlands	30 minutes t 4 hrs.
Calm	5			
	100			

(1) Wind speed = 10 MPH[4] (Flood Tide)[5]

(2) See Figure VII-5 for wind distribution during other times of the year

(3) Inlet conditions are highly variable and the tidal currents are not negligible compared to the average prevailing winds. Tidal current flow can lead to an oscillaroty condition within the inlet when the wind velocity is low.

(4) Under calm conditions (or low wind speed) the slick drift will be toward Captree Island and will be grounding on the eastern shore of Captree Island about 1-4 hours after spill occurrence.

(5) For ebb tide conditions,.relative calm, oil slick will be driven from Fire Island Inlet to ocean side where it can be treated as an ocean borne slick.

Island Inlet and ground at the mouth of the Inlet on the barrier beaches, depending on the wind direction.

Further, as shown in Transport Matrix 1, it can be concluded that if a spill occurs to the east of the study area that only wind blowing from the north, northeast and east will transport the oil into Babylon Study area. The relative percentage of time this occurs in summertime is 24 percent. Hence, even if a spill were to occur at this location it is unlikely that it would enter the study area. The most difficult condition would be a wind from the north or northeast causing widespread oil contamination on the salt marches (Captree Island, Grass Island, etc.) The time of travel for the slick to reach the environmentally sensitive areas is between one and two hours under a north or northeast wind. For easterly wind conditions the time of travel is approximately three to four hours. As is apparent, due to the small amount of time, the slick movement may be too swift for preventing contamination and therefore clean-up efforts should be the initial emphasis.

Transport Matrix 2, shows a similar result. Only wind coming from the north, south, southwest, west and northwest cause oil slicks to migrate into the study area. The relative percentage of time this occurs in summertime is 68 percent. The worst condition would occur with winds blowing from the west or southwest. This would cause contamination of the large salt marshes, such as Gilgo Island, Thatcher Island and Elder Island. The time of travel for any oil slick to grounding the the area is less than one hour.

In addition to slick movement the slick will spread. In perfectly calm water, the distribution of oil will follow a Gaussian (bell curve) shape that gradually increases in size. Thus, the oil is thicker at the center (drop point) and thickness reduces rapidly toward the edges of the slick. The rate of expansion is a function of viscosity, slick temperature, the water temperature, as well as the oil viscosity. It is difficult to accurately assess slick spreading rates without detailed knowledge of the slick constituents, the oil/water temperature, etc. In addition, the slick shape will be distorted by the presence of complex surface currents. As a rule of thumb, for estimating slick size, Table VII-2, can be used for moderate sized spills in calm waters. Note that these values are only crude approximations and can be very strongly affected by many factors not considered. Also, thickness of oil films can be estimated from tables in Section I, of this report.

Slick weathering gradually changes the composition of an oil slick. The lighter more volatile and toxic constituents are volatilized while the heavier fraction remain. In general, this is important for the offshore slick case, where several days may elapse before the slick is stranded on the barrier beaches.

TABLE VII-2

SLICK SPREAD RATES (APPROXIMATE)

HIGH TEMPERATURE (25°C. SUMMER)

Oil Type	Spread Rate (Feet/Hour)
Light (Gasoline)	1000
Fuel Oil	500
Medium Crude Oil	200-500

LOW TEMPERATURE (5°Winter)

Oil Type	Spread Rate (Feet/Hour)
Light (Gasoline)	700-1000
Fuel Oil	300-500
Medium Crude Oil	100-300

VII.4 Scenarios

One objective of this undertaking is the development of a response plan to prevent or minimize the effects from oil pollution in the Great South Bay area and the barrier beaches of the Town of Babylon. Since there are unlimited possibilities for oil to enter the study area (based on variable wind, current, temperature, oil type, wave action and other environmental factors), two oil spill scenarios were selected as examples of how the information presented herein can be used for a spill containment and clean-up operation. These scenarios are based on characteristics of petroleum transport activities in the region as defined by the Long Island Regional Planning Board. The scenarios are:

1. The grounding of a 1000 dead weight ton coastal tanker carrying No. 2, fuel oil within Fire Island Inlet under the probable range of meteorological (wind, temperature) and hydrographic (wave, current, surface ice), conditions found in the inlet area.

2. The loss of an 85,000 dead weight ton tanker carrying crude oil south of Long Island at approximate location 73^{o} 20 minutes west, 40^{o} 27 minutes north, during summer weather conditions that are conducive to the normal transport of spilled oil. Oil from this spill event is assumed to strand on the South Shore of Jones Beach and Fire Island and also to enter the Fire Island Inlet and the Jones Beach Inlet.

To plan for the general protection of the Babylon area of Great South Bay it is necessary to know the general nature of the oil spill trajectory. This information along with a response plan, one can develop the feasibility of preventing or minimizing oil spill damage in the study area.

It should be noted that the degree to which oil spill control and containment actions can be effective is not only dependent upon the highly variable set of environmental factors previously mentioned, but also other factors that are associated with the Town of Babylon and surrounding areas such as available resources, e.g., manpower, private contractors, available equipment, etc. An assessment of the feasibility of spill control can then be done through the use of specific scenarios coupled to a specific response. The spill scenarios previously defined will be considered here. For completeness we will assume that under the first scenario (that is, the grounding of the 1000 dead weight ton coastal tanker) occurred during the winter months where ice could be a problem in Great South Bay. The offshore spill (scenario #2) will be considered for summer only because statistical wind conditions are such that the probability of an offshore spill grounding on the barrier beaches in winter is very small (e.g., less than 10%).

Each spill scenario will be investigated considering the predicted trajectory and the spread of each spill will be approximated for the scenario condition. Key factors in this effort include arrival time for the centerline of the spill, probable extent of shoreline contamination and environmentally sensitive areas that may be contaminated.

Scenario No. 1

Scenario No. 1, was originally investigated by the Long Island Regional Planning Board for the effects of oil spill in the Fire Island Inlet area. The most probable meteorological conditions in the study area are winds at about 10 mph coming from the southwest. Under these conditions the slick proceeded in a northeasterly direction being driven by the fast surface current in the Fire Island Inlet and the wind coming from the southwesterly direction. It appears that the slick is moving in the direction of the wind after it leaves the Fire Island Inlet. If the wind continues in a southwesterly direction the slick will probably never enter our study area. Hence, after a four hour period we will assume that the wind radically changes direction and blows in an easterly direction. After four hours the Long Island Regional Planning Board Study indicates a large part of the initial spill has grounded on the marshes of Captree Island. This was during maximum flood tide. We can expect that maximum ebb tide, occurring approximately 12 hours later, will transport some oil back out the inlet. However, prior to maximum ebb tide wind conditions at 10 mph will extensively carry the slick into the Great South Bay. With a shift in wind direction after four hours, towards the east, it is expected that the entire shoreline of Babylon (North Shore of study area) will be affected by the oil slick. As stated in the spill prediction matrix the environmentally sensitive areas on the heavily built up areas include

Indian Island, beaches, salt marshes, several parks, municipal launching ramps, marinas and private property. It should be noted that if we have a wind phase shift from the southwest to north, the more environmentally sensitive islands will be affected extensively by this kind of a wind shift. Specifically, Captree Island, Grass Island and the tital flats around the barrier beaches will be affected by the oil slick as shown in the oil slick prediction matrix.

An oil slick reaching the Babylon portion of Great South Bay from a Scenario No. 1 type occurance would in most probability be in a dispersed form and depending on wind direction, oil contamination may be scattered over large areas. Prevention of a large oil slick from entering the Babylon area would be essentially impossible. Control, containment and clean-up procedures should start immediately. Important environmentally sensitive areas should be exclusion boomed. Diversion booms should be set up along shorelines at locations where the greatest quantities of oil have grounded. Boats should be set into action using the containment booming technique. Advance determination as to where exact oil recovery points should be located would be highly speculative due to the infinite number of variable conditions that could occur for any oil spill. An oil spill, or a threat of oil contamination would have to be handled on a case-by-case basis, taking into consideration the variables at the time.

Scenario No 2

Spill scenario 2, describes a spill of crude oil in the summer off the South Shore of Long Island approximately 11 miles directly south of the Fire Island Inlet. As shown earlier, the probable wind conditions in the summer are typically from the south and southwest. This is conducive to a northerly transport of the oil. Under these conditions the oil has been calculated to reach the Fire Island Inlet at approximately 36 hours. The theoretical slick diameter at 36 hours was calculated to be about 5000 yards. The slick at this time would be relatively thin but still spreading. For purposes of analysis it has been assumed that the slick enters the Fire Island Inlet at approximately the same time that it enters the Jones Beach Inlet.

In this scenario there are three major areas of concern:

1. Oil entering the Fire Island Inlet and subsequently entering Great South Bay, into the Study area.
2. Oil stranding on the barrier beaches (ocean side).
3. Oil entering the Jones Beach Inlet and proceeding through the State Boat Channel and entering the southwesternmost portion of the study area.

Under the probably southwest wind condition the slick would move through the Fire Island Inlet and out into Great South Bay, and unless the wind conditions changed drastically, would behave much as the slick for scenario No. 1, when the spill entered the study area. As before, primary emphasis must be on protecting the wetlands associated with the Captree Islands. Little can be done to protect the intertidal areas in the Fire Island Inlet itself.

The oil stranding up on the ocean side of the barrier beaches will contaminate the entire length of the beach during the height of the recreational season. Several environmentally sensitive areas on the barrier beaches include the Cedar Beach Tern nesting colony, the overwash ponds, and brackish marsh ponds and the expanse of Jones Beach itself. Contamination can be expected to be in the form of "Weathered oil" such as tar balls which would coat the sands and make the beach unacceptable for recreational use. However, a significant amount of the toxic volatile fraction of the oil will have been driven off leaving less of an environmental hazard. The primary problem with the barrier beach will be the effects on recreation. About 70,000 tons of oil will distribute itself in some form along the barrier beach. There is no practical method for preventing this oil from landing on the barrier beach. Fortunately, the oil will be fairly well weathered before landing and some of it will have been degraded. Conventional clean-up operations (removal/burial) will be necessary to keep the beaches useful. Evidence indicates that natural conditions will pretty much complete a return to the natural conditions within a year of the clean-up. Because of the turbulence of the surf in the intertidal range, the benthic community residing in the intertidal zone is very limited and hence biological effects will be minimized.

The slick movement through the Jones Beach Inlet will only transport a small portion of the oil through the State Boat Channel and into the study area.

It has been estimated in the Long Island Regional Planning Board report that from the original spill for scenario No 1, about 30% will be lost by volatization and 70% of the original spill will be left to enter the Fire Island Inlet, strand on the barrier beaches and enter the Jones Beach Inlet. If the 70% is assumed to distribute evenly between Jones Inlet and Fire Island Inlet, about 10% will enter Fire Island and Jones Beach Inlets (approximately 8000 tons) of which about 40% (3200 tons) would travel into the study area with a southwesterly wind. If 40% of the oil entering via Jones Inlet (about 3200 tons) enters the study area in the southernmost portion of the study area, approximately a ton of oil will enter via the State Boat Channel. In addition, oil will surely strand on the tidal flats and the marshes in Nassau's South Oyster Bay, resulting in a smaller amount of oil that will be transported into our study area. Thus, because of the restrictions in the State Boat Channel and the limited transport from this source, coupled with the nodal point at the western edge of the study area, transport from this source will be of relatively small effect. A simple V boom/skimmer should take care of any oil entrant via the State Boat Channel.

If the wind conditions continue in a southwesterly direction, the greatest impact will be to Gilgo Island, which is a salt marsh island. The trajectory will split around the island and effect Thatcher Island, Elder Island, Great Island, and Little Island; all tidal marshes. As the oil enters the study area it is expected to impact the tidal marsh islands almost immediately.

SECTION VIII

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APPENDIX I

Map of Coastal Areas for the Town of Babylon

Precise location of an oil spill is necessary to start defensive actions and set up a strategy for containment and clean-up efforts. Information regarding the location of environmentally sensitive areas, access roads and navigational routes, and location of potential spill sources are also necessary when planning strategy.

A map of coastal areas for the Town of Babylon was developed, and is intended to act as a logistical and tactical aid for a pollution response. The mapping contains the following pertinent information:

I. Topographic and Hydrographic Data -

Roads, highways, elevations, depths, channels, boundaries, creeks, etc.

II. Environmentally Sensitive Areas -

The entire area is basically sensitive to pollution spills, however, the map locates some of the areas of greater environmental importance such as:

- o Densily populated clam beds
- o Wetland areas
- o Nesting areas
- o Beaches
- o Marinas

III. Access -

Countermeasures, containment and clean-up efforts are largely dependent on how and where men, material and equipment can be deployed. For this reason the mapping pays special attention to the following:

- o Access roads to the shorelines and barrier beaches.
- o Available boat ramps and other sites for the purpose of deploying water craft.
- o Navigational routes and channel depths for waterside access.

IV. Potential Spill Sources -

When a spill is discovered, many times it is difficult to determine its origin. To assist in possibly tracing back to the origin of a spill, the following information is included on the map:

- o Storm drain outfalls
- o Boat marinas
- o Petroleum terminals
- o Transformer sites
- o Other potential sites such as junk yards, etc.

Town of Babylon

Light and Heavy Equipment List

Department of Environmental Control 957-3153

2	H-90 Payloaders
3	10 Wheel Dump Trucks
1	TD25 Bulldozer
2	D8K Bulldozer
4	3/4 Ton Pickup
1	3/4 4 Wheel Drive Pickup
1	22' Boston Whaler Outrage
1	22' Wellcraft Airslot

Department of Buildings and Grounds 957-3096

3	Payloaders
2	10 Wheel Dump Trucks
16	Pickup Trucks
2	Packer Garbage Trucks
2	Tractor Drawn Surf Rakes
2	Flatbed Trucks

Highway Department

14	4 Wheel Drive 3/4 Ton Pickup Trucks
4	Catepillar Bulldozers
6	Road Graders
9	Payloaders
30	6 Wheel Dump Trucks
4	Dynahoe Backhoes
1	Gas Utility Truck
1	Tire Truck
8	10 Wheel Dump Trucks
1	Leroi Portable Compressor

LISTING OF PETROLEUM TERMINALS

Name/Address/Phone	Number of Tanks	Total Storage Capacity	Type of Fuel
Flame Oil Fuel Corp. 1080 Long Island Ave. Deer Park, NY (516) 667-7653	2	100,000 gallons	#2
Perillo Brothers 9 Murray Street Farmingdale, NY (516) 692-8147	4	83,000 gallons	#2 - 30,000 gal. & 20,000 gal. tanks Combustible Cleaner- 3,000 gal. tank
Deer Park Fuel Co. 806 Long Island Ave. Deer Park, NY (516) HA 3-3060	2	20,000 gallons	#2
Park Avenue Fuel 316 Little East Neck Rd. West Babylon, NY (516) 669-1030	2	30,000 gallons	#2
Amber Oil Co. 500 Marconi Blvd. Copiague, NY (516) 842-4100	1	100,000 gallons	#2
Long Island Reliable Corp. Evergreen Street West Babylon, NY (516) 226-0353	4	20,000 gallons	#2
Agway Petroleum Box 1333 Syracuse, NY	4	84,000 gallons	
Grieco Fuel 67 John Street Babylon, NY [illegible]	3	57,000 gallons	#2

LISTING OF PETROLEUM TERMINALS

Name/Address/Phone	Number of Tanks	Total Storage Capacity	Type of Fuel
Master Fuel Oil Co. Inc. 141 John Street Babylon, NY (516) 661-2580	1	200,000 gallons	#2
Flame Fuel Co. 195 Ketcham Ave. Amityville, NY (516) 598-0600	2	25,000 gallons	#2
Sunrise Household Svc. Co. 35 Mill Street Amityville, NY (516) 264-1060	4	180,000 gallons	#2
H & K Fuel 143 Dixon Avenue Amityville, NY (516) 643-5118	1	20,000 gallons	#2
Oil Associates Inc. 235 County Line Rd. Amityville, NY (516) 264-3432	4	390,000 gallons	#2
Maria Fuel Corp. 25 Sterling Place Amityville, NY (516) 691-3465	2	25,000 gallons	#2
Wilbur F. Heinley & Manna 238 Broadway Amityville, NY (516) 264-0249	2	40,000 gallons	#2

LISTING OF PETROLEUM TERMINALS

Name/Address/Phone	Number of Tanks	Total Storage Capacity	Type of Fuel
Diamond Fuel 119 West Montauk Highway Lindenhurst, NY (516) 226-5757	5	26,000 gallons	#2
State Utilities 290 West Hoffman Ave. Lindenhurst, NY	5	125,000 gallons	#2
L.I. Reliable Corp. 88 East Hoffman Avenue Lindenhurst, NY	7	260,000 gallons	#2; #4; Diesel; Kerosene
Slomins Fuel 590 West Hoffman Ave. Lindenhurst (516) 586-3700	1	210,000 gallons	#2
Mike & Pete Sarro Akron St. & NY Ave. Lindenhurst, NY	3	150,000 gallons	#2
Masters Fuel Oil Co. Akron Street Lindenhurst, NY (516) 661-2580	3	70,000 gallons	Diesel
Perfect Oil Co. Inc. 133 Cortland Street Lindenhurst, NY (516) 226-2750	2	25,000 gallons	#2
Cibro Petroleum of LI 120 West Sunrise Highway Lindenhurst, NY (516) 226-0505	6	91,080	Gasoline; Diesel; #2

LISTING OF MARINA FACILITIES (not shown on the map)
Marina Facilities <u>with</u> Possibile Spill Sources (west to east) Amityville to Village of Babylon

Name/Address/Phone	Marine Railway	Launching Ramp	Boat Lift (tons capacity)	Fuel	
				Gasoline	Diesel
Pearl Grey Fishing Sta. 247 South Ketcham Ave. Amityville, LI (516) AM4-0564	No	No	20 tons	Yes	No
Amity Harbor Marine 30 Merrick Road Amityville, NY (516) 842-1280	No	No	10 tons	Yes	No
Strong's Marine Centers 1060 Merrick Road Copiague, LI (516) 842-0339	No	No	3 tons	Yes	No
Wright Marine Basin 1160 Merrick Road Copiague, NY 11726 (516) 226-8010	No	No	10 tons	Yes	No
Stern's Boat Yard 75 Sterns Lane Copiague, NY (516) 842-3005	No	No	12 tons	Yes	No
Venice Marine 711 Montauk Hwy. Lindenhurst, NY (516) 226-3320	No	No	12 tons	Yes	No
Surfside Marine 846 South Wellwood Ave. Lindenhurst, NY 11757 (516) 888-4171	No	No	21, 13, 5	Yes	Yes

LISTING OF MARINA FACILITIES (not shown on the map)
Marina Facilities with Possible Spill Sources (west to east) Amityville to Village of Babylon

Name/Address/Phone	Marine Railway	Launching Ramp	Boat Lift (tons capacity)	Fuel: Gasoline	Fuel: Diesel
Anchorage Marina 401 East Shore Road Lindenhurst, NY (516) 957-9300	No	No	30, 35	Yes	Yes
Boatland Marine 710 So. Wellwood Ave. Lindenhurst, NY (516) 957-6161	No	No	16, 25	Yes	No
Rutherig Marine Service 640 Roosevelt Ave. Lindenhurst, NY 11757 (516) 957-5885	Yes 50'	No	50 tons	Yes	No
Babylon Cove Marine 415 Fire Island Ave. Babylon, NY 11702 (516) 669-2822	No	No	15, 5	Yes	Yes

LISTING OF MARINA FACILITIES (not shown on map)
Marina Facilities without Spill Sources, Amityville to Village of Babylon

Name/Address/Phone	Marine Railway	Launching Ramp	Boat Lift (tons capacity)	Fuel Gasoline	Fuel Diesel
Peterson Marine 144 Ocean Avenue Amityville, NY 11701 (516) 598-0353	Yes 25' 10' 15'	No	6	No	No
Delmarine Inc. 232 So. Ketcham Ave, Amityville, NY 11701 (516) 598-2946	No	Yes	20	No	No
Pauls Boat Yard 195 S. Ketchum Amityville, NY (516) 598-0580	No	No	7	No	No
Yacht Service Ltd. 144 Ocean Avenue Amityville, NY 11701 (516) 264-2267	No	No	No	No	No
Rosato's Marine Repair Svc. 37 Beach Avenue Copiague, NY 11726 (516) 842-2030	No	No	12	No	No
Herby's Boat Yard 786 South 9th Street Lindenhurst, NY (516) 228-7920	No	No	14	No	No
Karl Tank, Inc. 612 Roosevelt Ave. Lindenhurst, NY 11757 (516) 957-5050	No	No	15	No	No

LISTING OF MARINA FACILITIES (not shown on map)
Marina Facilities <u>without</u> Spill Sources, Amityville to Village of Babylon

Name/Address/Phone	Marine Railway	Launching Ramp	Boat Lift (tons capacity)	Fuel Gasoline	Fuel Diesel
Kehl Marine Corp. 541 W. Montauk Hwy. Lindenhurst, NY 11757 (516) 842-0777	No	No	2	No	No
Bergen Point Yacht Basin 601 Bergen Ave. W. Babylon, NY 11704 (516) 669-3990	No	No	40	No	No
Outboard Barn Inc. 13 Post Place Babylon, NY 11702 (516) 226-4348	No	No	9	No	No
Frost Boat Yard and Marine Store 21 Shore Road Babylon, NY 11702 (516) MO 1-3764	No	No	12	No	No

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