March 31, 1965

Singer Manufacturing Company
321 First Street
Elizabeth, New Jersey

Gentlemen:

Take Notice that the New Jersey State Department of Health, in cooperation with the Interstate Sanitation Commission, is executing a comprehensive stream pollution control and abatement program in the Arthur Kill area. In this program, it has been determined that you are discharging wastes of a polluting nature into the Arthur Kill, or a tributary thereof. Our information also is to the effect that there are public sewerage facilities available in your immediate vicinity.

You are requested to advise this Department within 30 days of the actions which you will take in order to eliminate the discharge of polluting materials into the Arthur Kill, or a tributary thereof. Please feel at liberty to call upon us for discussion of any details in relation to this problem.

Your cooperation will be appreciated very much.

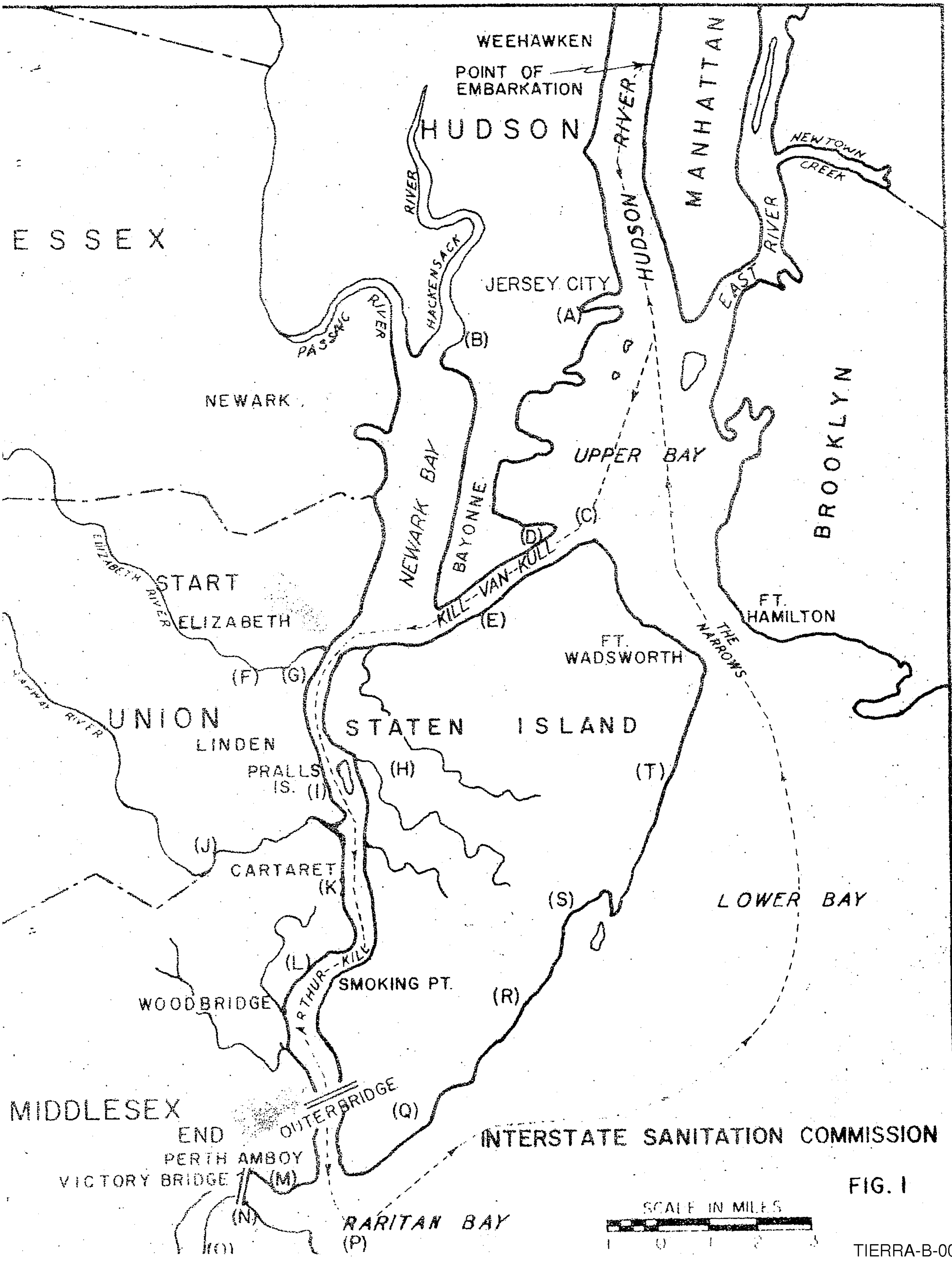
Very truly yours,

Roscoe P. Kandle, M.D.
State Commissioner of Health

INTERSTATE SANITATION COMMISSION
10 COLUMBUS CIRCLE ● NEW YORK 19, N.Y.

LOCATION OF CITY SEWERS
Adjacent to
INDUSTRIAL PLANTS
Bordering
ARTHUR KILL IN NEW JERSEY

LOCATION OF CITY SEWERS
Adjacent To
INDUSTRIAL PLANTS
Bordering
ARTHUR KILL IN NEW JERSEY



INTERSTATE SANITATION COMMISSION

FIG. I

January 5, 1965

MEMORANDUM

TO: G. T. Cowherd, Jr.

FROM: F. W. Gross

Re: Location of City sewer lines with relation to industrial plant sites in the area adjacent to the Arthur Kill on New Jersey shore.

A comprehensive study was conducted by the Interstate Sanitation Commission during the fall of 1964 to obtain certain information as to the exact locations of city sewers, their approximate size and the approximate volume of flow now being handled by these respective sewer lines. Emphasis was given to those sewer lines which are located in the immediate area adjacent to industrial plants which border on the New Jersey side of the Arthur Kill. The area inspected started at the north end of the Arthur Kill at the junction of Newark Bay and Elizabethport Reach and continuing south to Perth Amboy as indicated on map (Fig. 1). In order to facilitate this study sewer maps were obtained from the various municipalities. A few of these maps were accurate and up-to-date but unfortunately the greater part were old prints not showing new sewer lines or laterals. In instances like this, the inspector had to make various trips in the field to locate sewer lines by observing manholes in the adjacent city streets and making observations of size and estimated flows from the street level.

The following municipalities with industrial plants located within their jurisdiction and known to be discharging their waste material directly to the Arthur Kill were inspected. An individual report on each plant is included in this report.

UNION COUNTY

	Plant	City or Borough
1.	Archer-Daniels-Midland	Elizabeth, N.J.
2.	Borme Chemical	" "
3.	Copper Pigment Chemical Works	" "
4.	Phelps Dodge Company	" "
5.	Reichhold Chemical Company	" "
6.	Singer Company	" "
7.	Cities Service Company	Linden, N.J.
8.	E. I. DuPont De Nemours & Company	" "
9.	Nopco Chemical Company	" "

MIDDLESEX COUNTY

	Plant	City or Borough
1.	Agrico Chemical Company	Carteret, N.J.
2.	American Smelting & Refining Company	Barber, Perth Amboy, N.J.
3.	Armour Fertilizer Company	Carteret, N.J.
4.	California Oil Company	Perth Amboy, N.J.
5.	Foster Wheeler Company	Carteret, N.J.
6.	Hess Oil Company	Port Reading, N.J.

MIDDLESEX COUNTY continued

7.	Koppers Chemical Company	Port Reading, N.J.
8.	Koppers Company (Creosoting Plant)	Port Reading, N.J.
9.	U. S. Metals & Refining Company	Carteret, N.J.
10.	Westvaco Company (Food Machinery)	Carteret, N.J.
11.	General American Tank & Stor. Co.	Carteret, N.J.

FWG:k

UNION COUNTY

1.	Archer-Daniels-Midland	Elizabeth
2.	Borme Chemical Co.	Elizabeth
3.	Cities Service Co.	Linden
4.	Copper Pigment Chemical Works	Elizabeth
5.	E.I. Du Pont De Nemours & Co.	Linden
6.	Nopco Chemical Co.	Linden
7.	Phelps Dodge Co.	Elizabeth
8.	Reichhold Chemical Co.	Elizabeth
9.	Singer Co.	Elizabeth

PLANT: Archer-Daniels-Midland Company

LOCATION: East side of Front Street, approximately .05 miles north of Clifton Street, Elizabeth, N.J.

Directly in front of this plant on Front Street, the City of Elizabeth has a 12" non-intercepted combined sewer which flows north where it is connected to a 24" combined sewer. At present, this sewer discharges directly to the Arthur Kill at a point approximately 250 feet north of the southerly property line of Loizeaux Builders Supply Company. While this city sewer discharges raw sewage to the Arthur Kill, plans are being prepared by the City of Elizabeth to have this area's sewage diverted to the Elizabeth Joint Meeting Treatment Plant. At low water, a small flow can be observed discharging to the Kill, which indicates that the 12" and 24" combined sewers have ample capacity to serve this plant. This plant is reported to utilize approximately 100,000 gpd. of city water and 240,000 gpd of Arthur Kill water.

1/7/65
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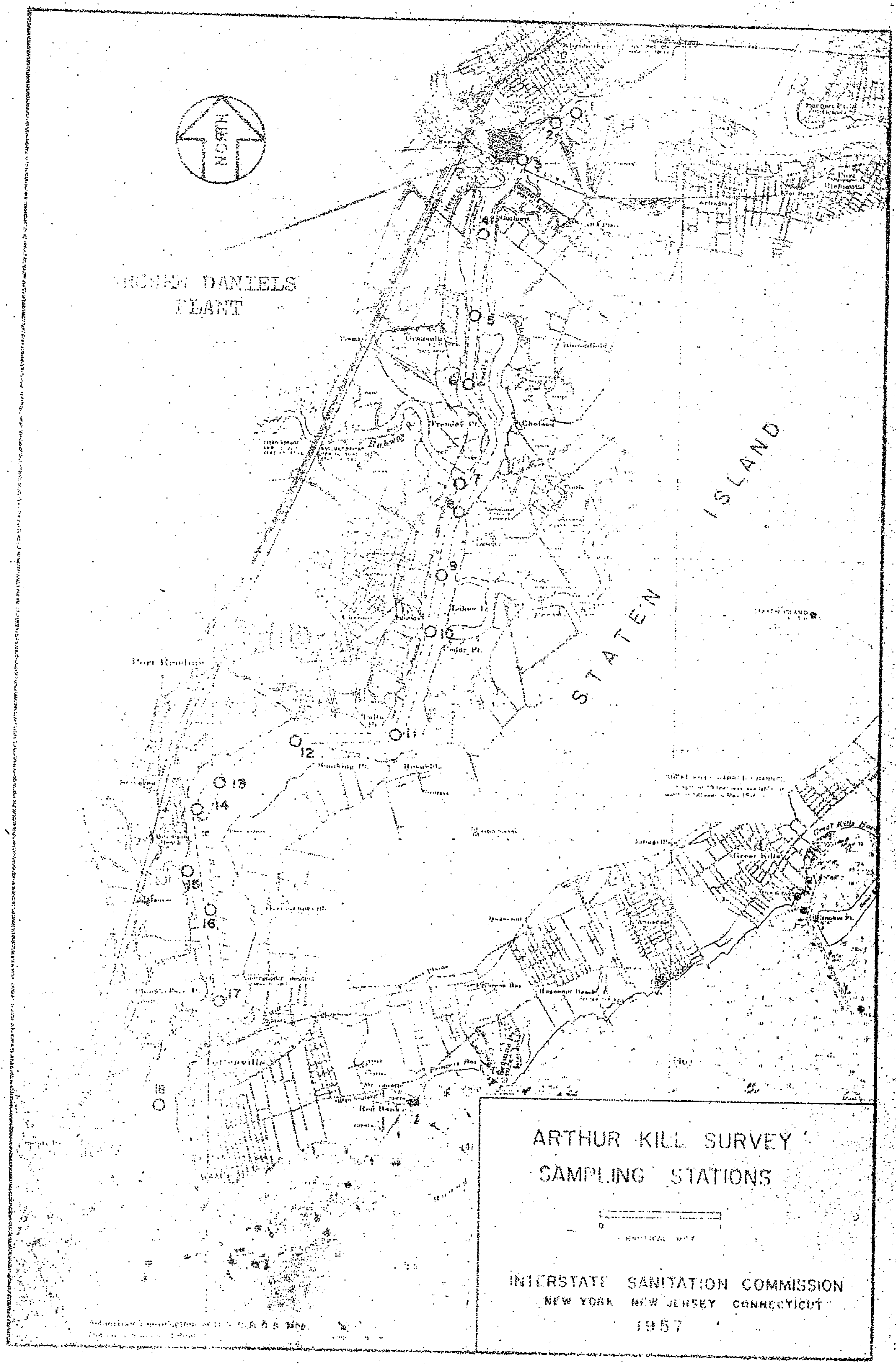
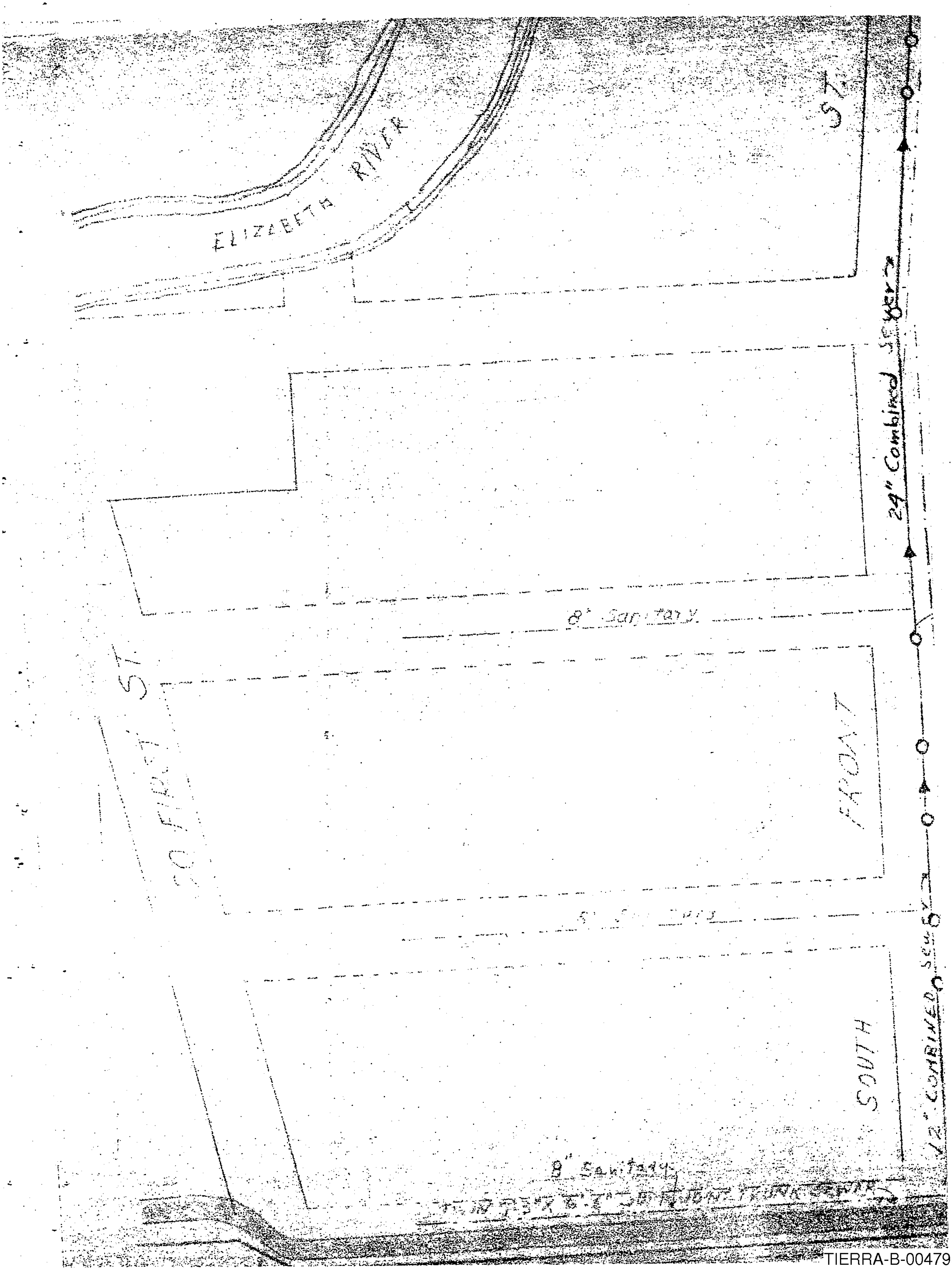
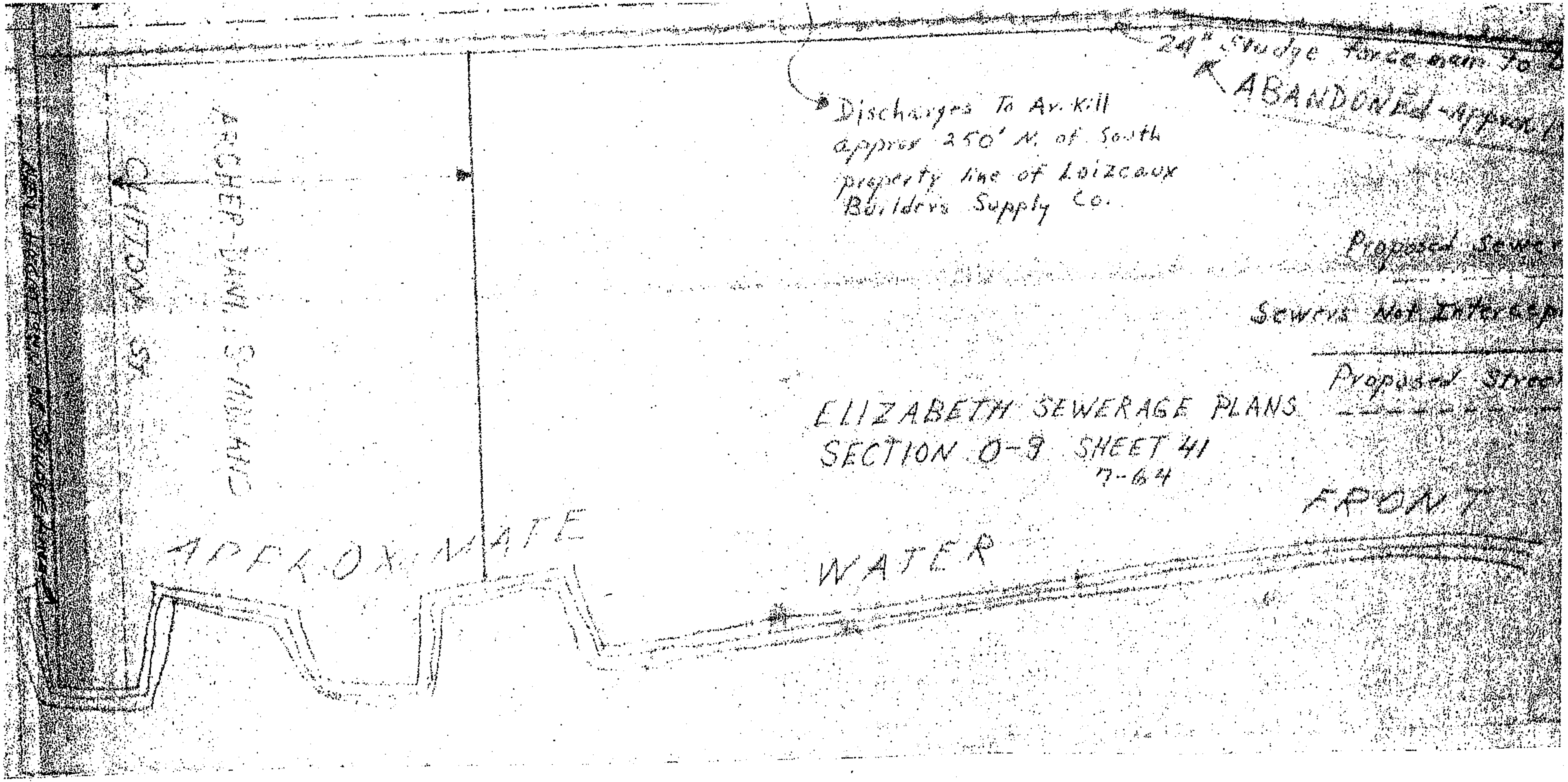


ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


ELIZABETH RIVER
ST.
24" Combined Sewer
8" Sanitary
30 FIRST ST
FRONT
8" Sanitary
SOUTH
12" COMBINED SEWER
8" Sanitary
JOINT TRUNK SEWER



ELIZABETH SEWERAGE PLANS
SECTION O-9 SHEET 41
7-64

PLANT: Borme Chemical Company, Inc.

LOCATION: 632-650 Front Street, Elizabeth, N.J.
East side of Front Street and approximately
.2 miles south of Clifton Street.

Starting at a point approximately 125 ft. to the south of the southerly property line of this plant, a 12" non-intercepted combined sewer starts to flow north along Front Street. Plans are being prepared by the City of Elizabeth to construct a new 8" sanitary sewer on Bayway Avenue which will be diverted to this 12" sewer main. The tentative plans call for the sewage in this sewer to be intercepted and diverted to the Elizabeth Joint Meeting Treatment Plant.

1/7/65
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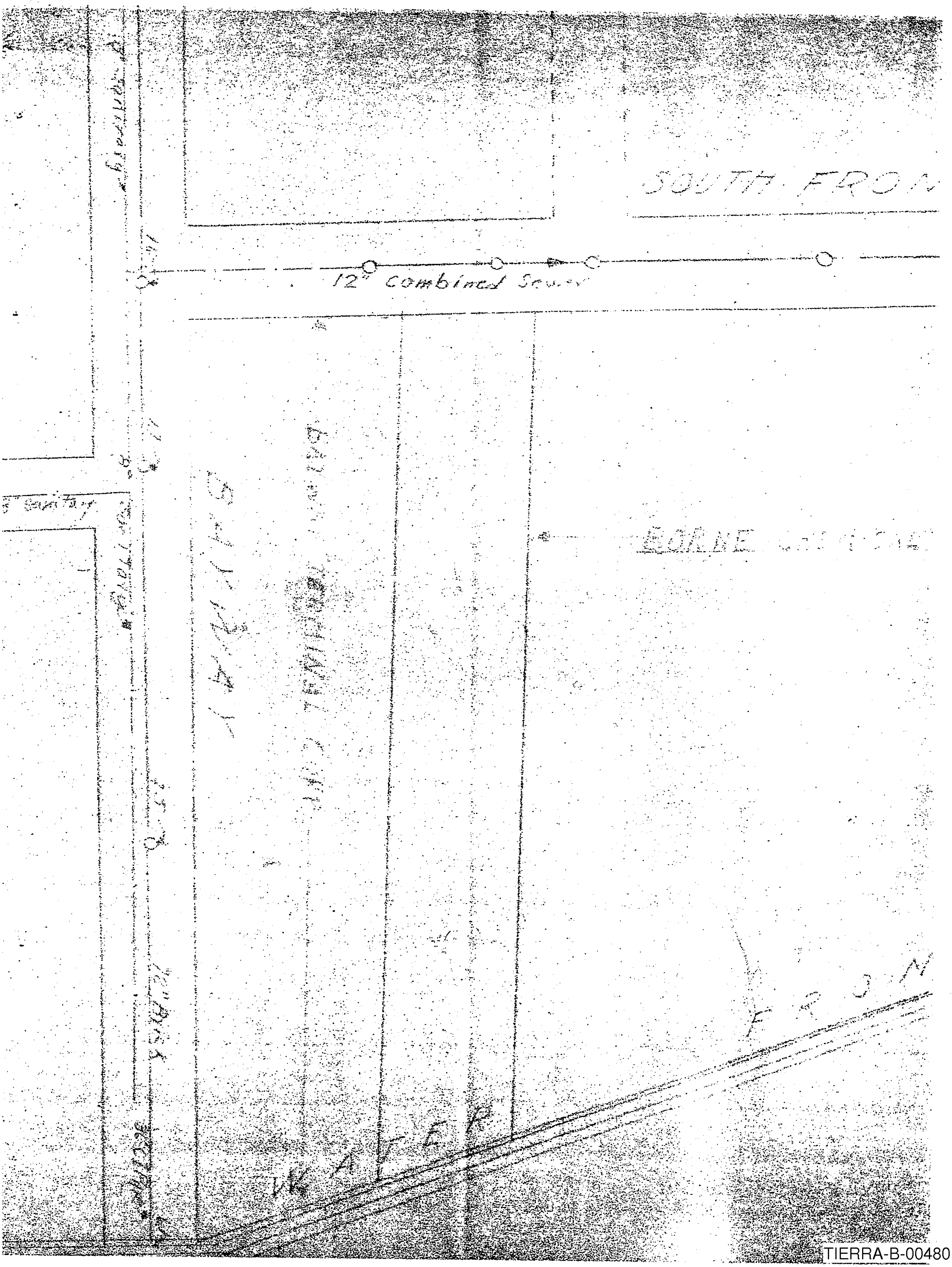
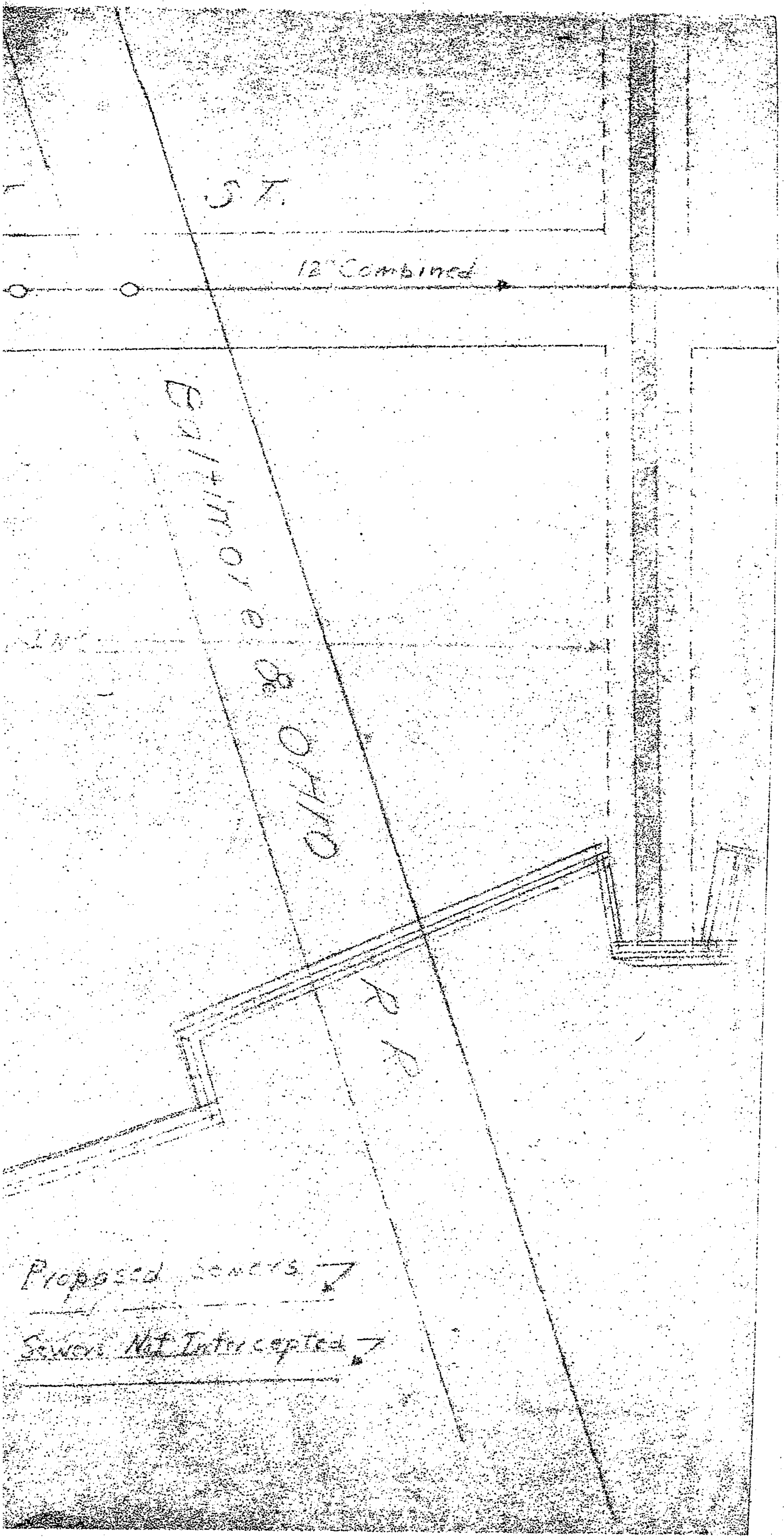
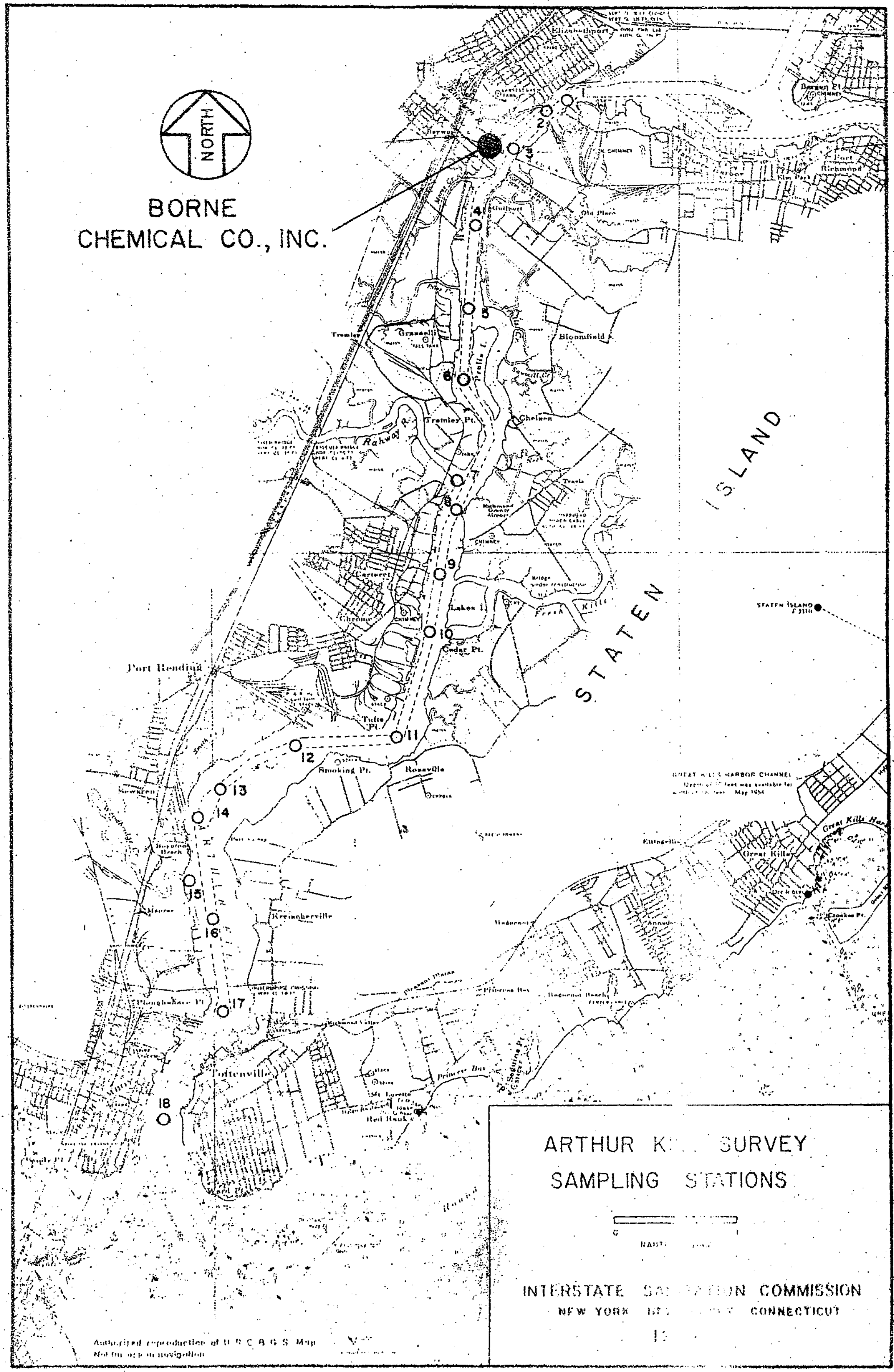

SOUTH FRON
12" combined Sewer
BORNE
BAYWAY
BAYWAY TERMINAL CORP
8" Sanitary
8" Sanitary
12" Brick
16
17
23
W A T E R
F R O N


ST.
12" Combined
Baltimore & Ohio
R R
Proposed Sewers
Sewers Not Intercepted



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT

PLANT: Cities Service Oil Company

LOCATION: East Side of South Wood Ave., Linden, N.J.

The main processing plant for Cities Service is located near the end of and on the east side of South Wood Ave. On the west side of South Wood Ave. a large tank storage field is located. This section of Linden does not have any City sewer mains which means that the waste from this plant would have to be pumped approximately 5600 ft. to the nearest City sewer. Our recent Industrial Waste Survey indicates that the discharge from the A.P.I. separator is approximately 7.2 mgd.

1/7/65
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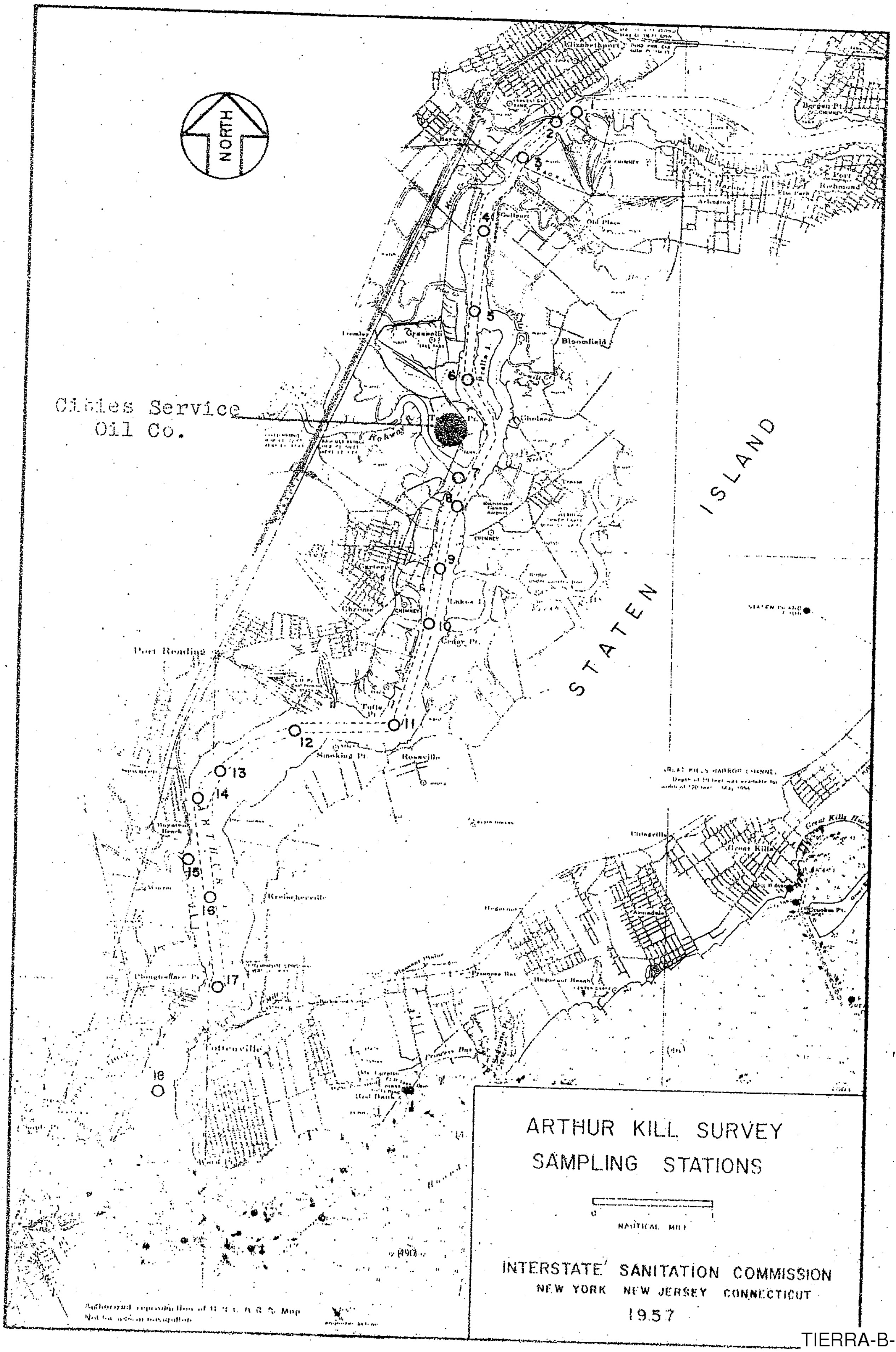
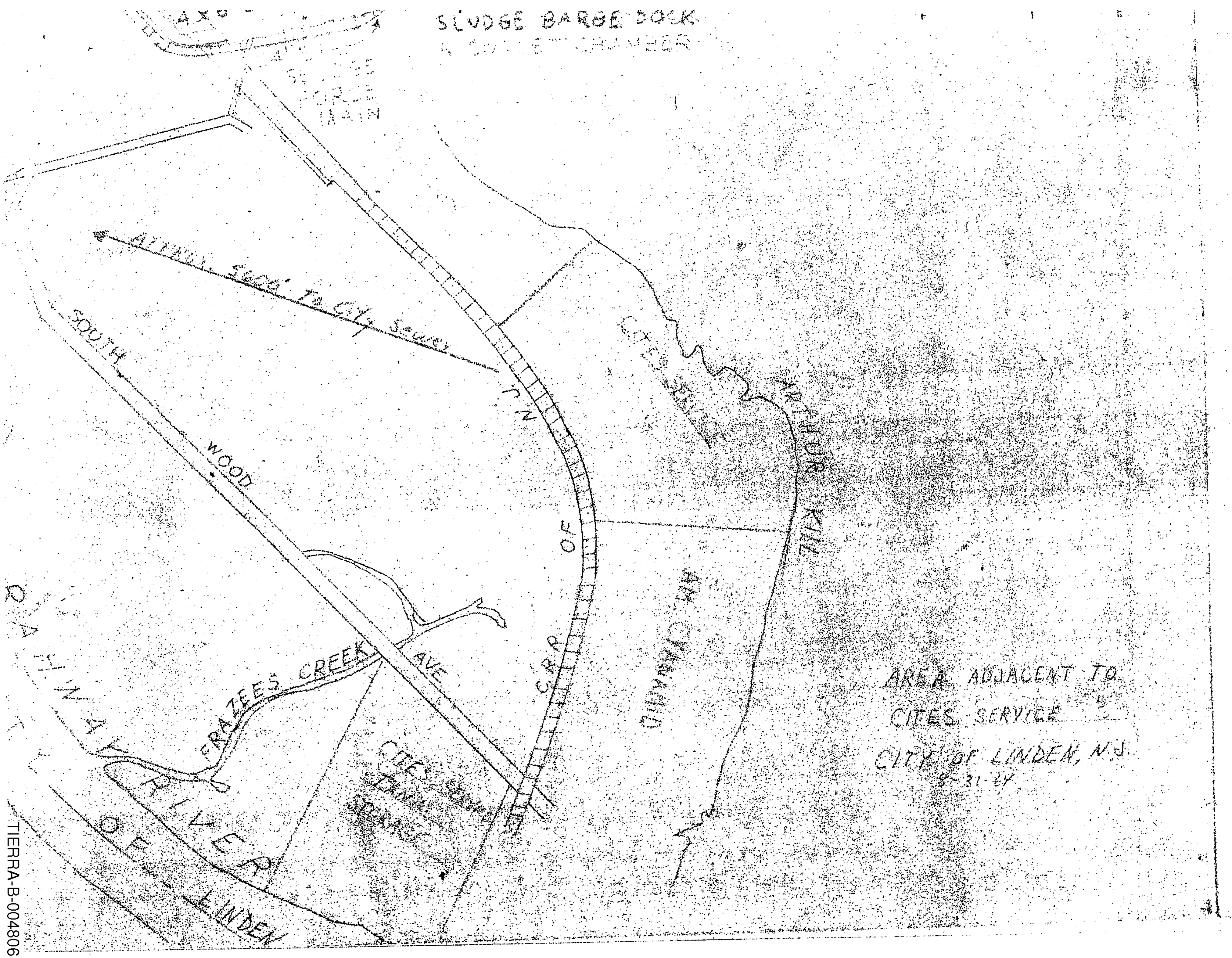


ARTHUR KILL SURVEY
SAMPLING STATIONS

0 NAUTICAL MILE 1

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



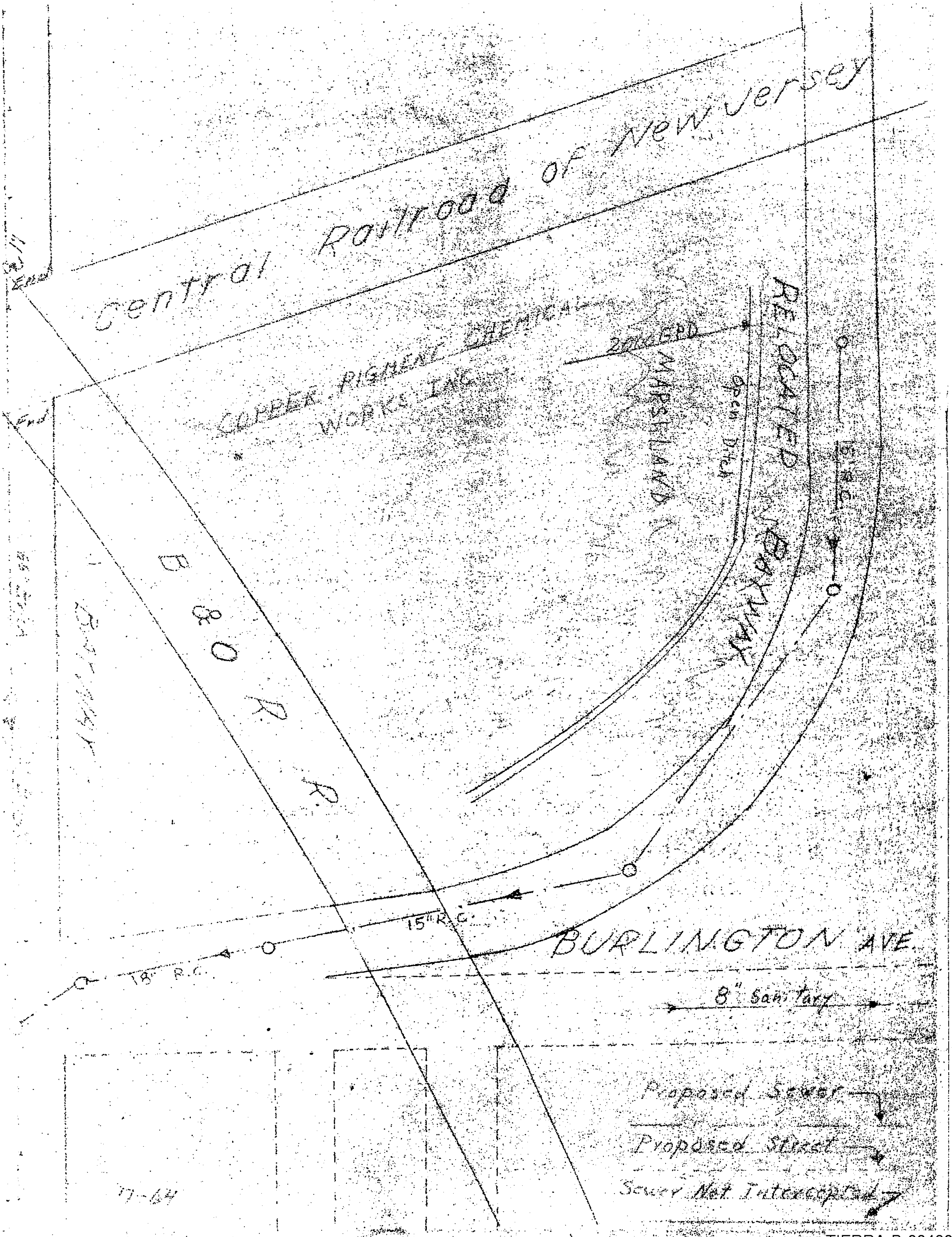
AREA ADJACENT TO
CITES SERVICE
CITY OF LINDEN, N.J.
8-31-64

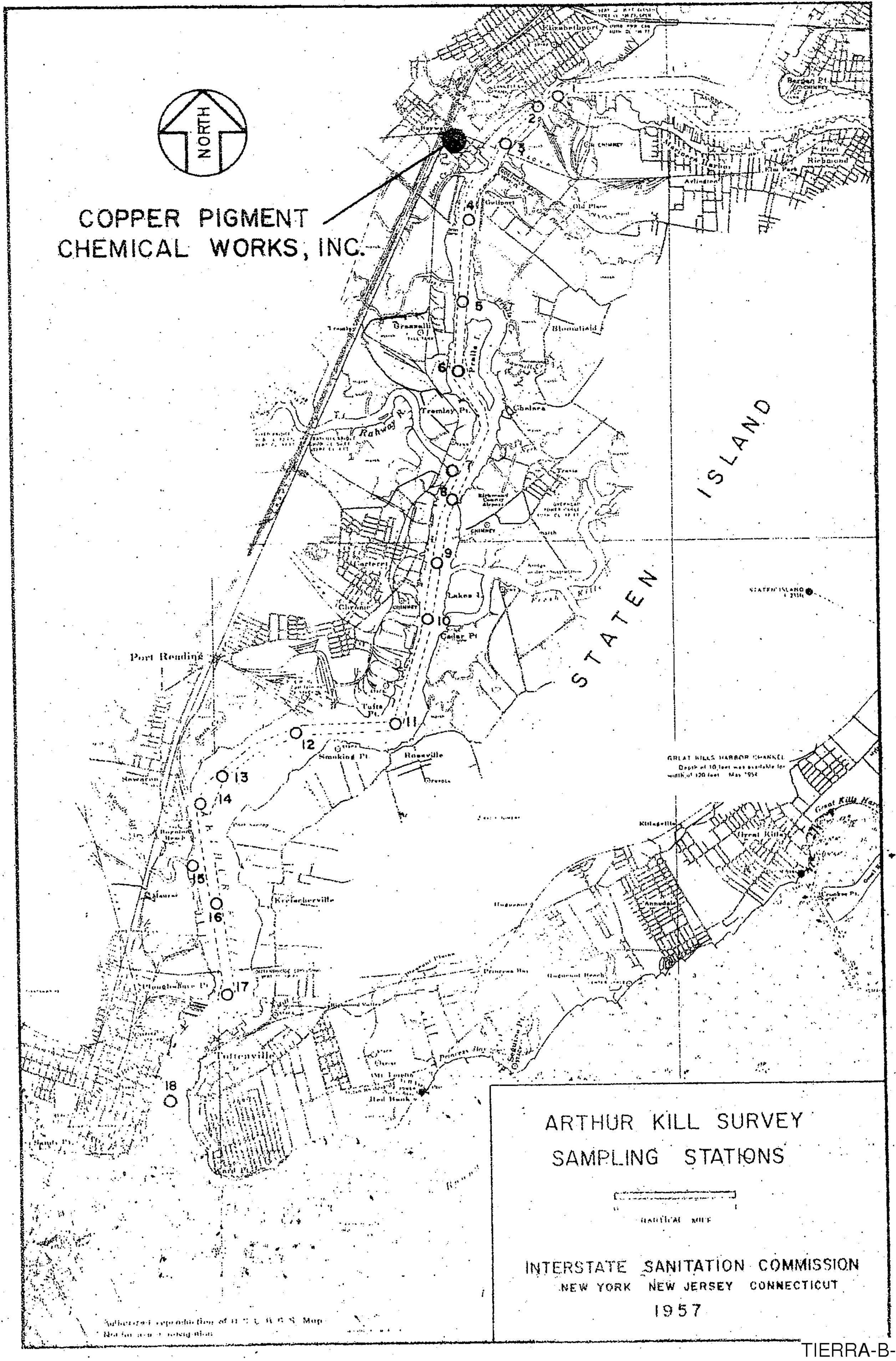
PLANT: Copper Pigment Chemical Works, Inc.

LOCATION: Bayway Ave., Elizabeth, N.J.
North side of Bayway Ave. bordered by
Replaced Bayway Ave., Bayway Ave. and
the N.J. Turnpike.

Located to the south of this plant on Bayway Ave. an old 66" brick non-intercepted sewer flows easterly to a 72" brick sewer which terminates at the foot of Bayway Ave. at the Arthur Kill. At present this plant discharges approximately 2000 gpd of filter wash water from their processing units. The discharge is to an open ditch which runs to the north side of their property. This discharge is trapped in this ditch due to the high embankment which forms the roadbed for Replaced Bayway Ave. All sanitary waste from this plant is connected to the 66" sewer on Bayway Ave. With very little effort the industrial waste discharge could be diverted to the Bayway Ave. sewer line. The final disposal of this waste depends on evaporation and ground absorption. Plans which are being prepared by the City of Elizabeth call for the construction of a new 8" intercepted sewer line which will divert all the flow to the Elizabeth Joint Meeting Treatment Plant.

1/7/65
FG:fd


Central Railroad of New Jersey
COPPER PIGMENT CHEMICAL WORKS INC
2000 GPD
MARSHLAND
Open Ditch
RELOCATED RAHWAY
18" R.C.
B & O R. R.
BAYWAY
15" R.C.
18" R.C.
BURLINGTON AVE.
8" Sanitary
Proposed Sewer
Proposed Street
Sewer Not Intercepted
11-64
End
End



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

PLANT: E.I. Du Pont De Nemours & Co.

LOCATION: North off the Grasselli Station Road, Linden, N.J.

This plant which is located adjacent to the Arthur Kill in the Grasselli Station section of Linden, N.J. has no available City sewers. Due to the absence of a City sewer in this area it would be necessary to pump the waste approximately 4800 ft. to the nearest sewer main. Our Industrial Waste Survey indicates that through their 7 outfall pipes and several outlets from septic tanks an approximate 6.4 mgd discharges directly to the Arthur Kill.

1/7/65
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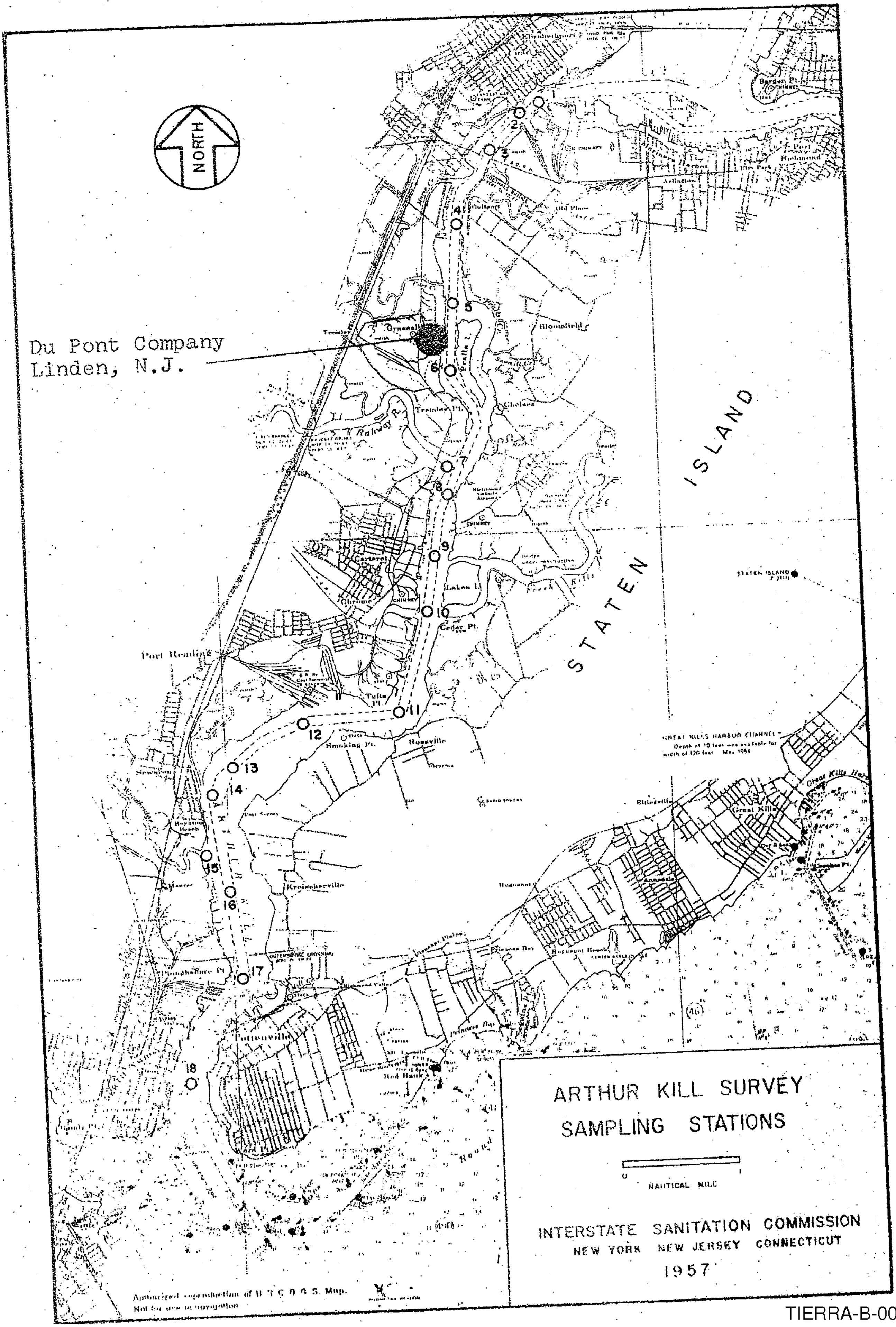
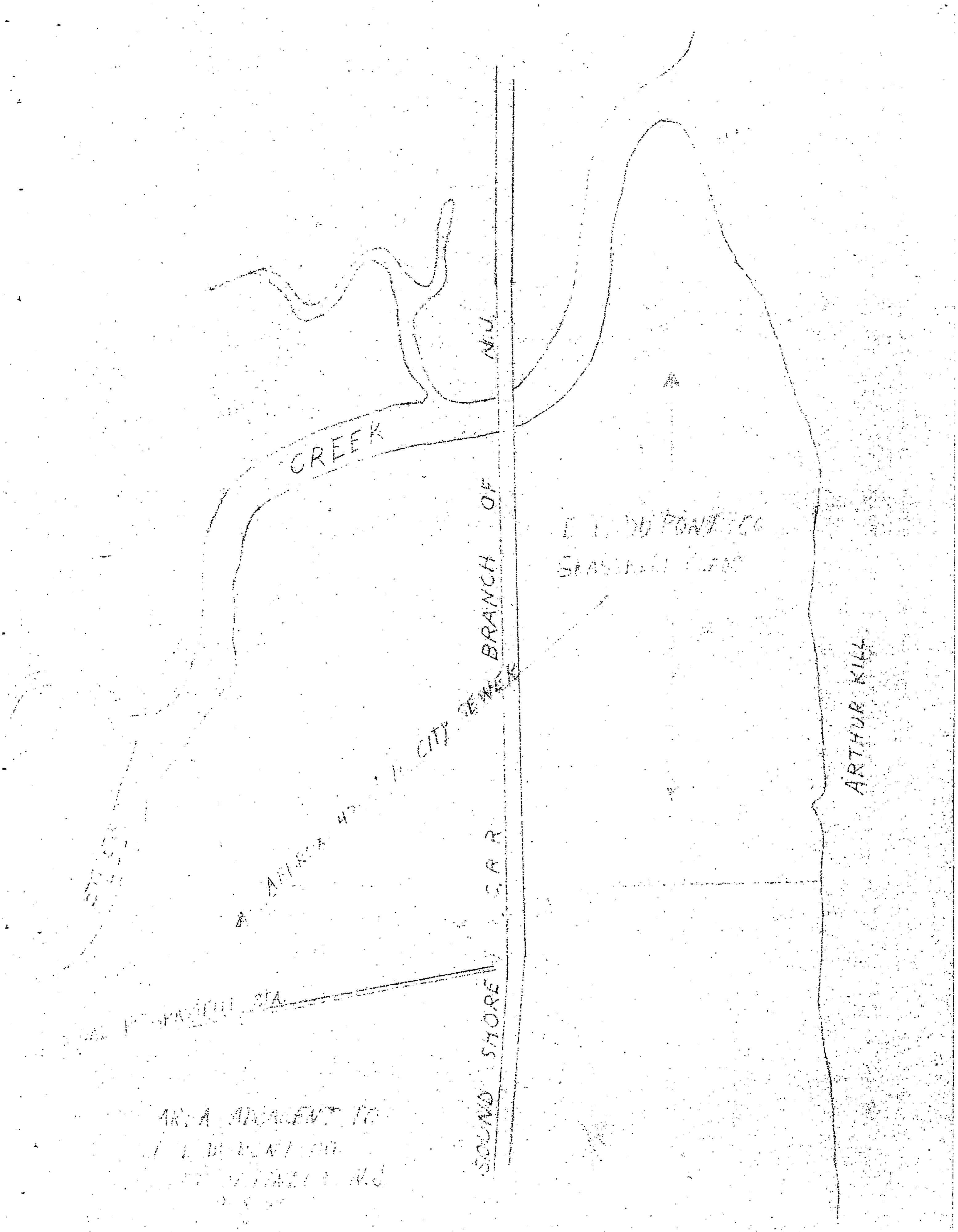


ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


CREEK
N.J.
BRANCH OF
SOUND SHORE
C.R.R.
CITY SEWER
STA.
DU PONT CO
ARTHUR KILL

PLANT: Nopco Chemical Company

LOCATION: Near the end of South Wood Ave., Linden, N.J.

This plant which is situated between General Aniline Co. and Sinclair Oil properties on the easterly side of South Wood Ave., Linden, N.J. is in an area which has no available City sewers. In order for the industrial waste discharge from this plant to be diverted to a City sewer the waste would have to be pumped approximately 4400 ft. to the nearest sewer line. Since our Industrial Waste Survey, Nopco has vacated the premises and the buildings are now vacant.

1/7/65
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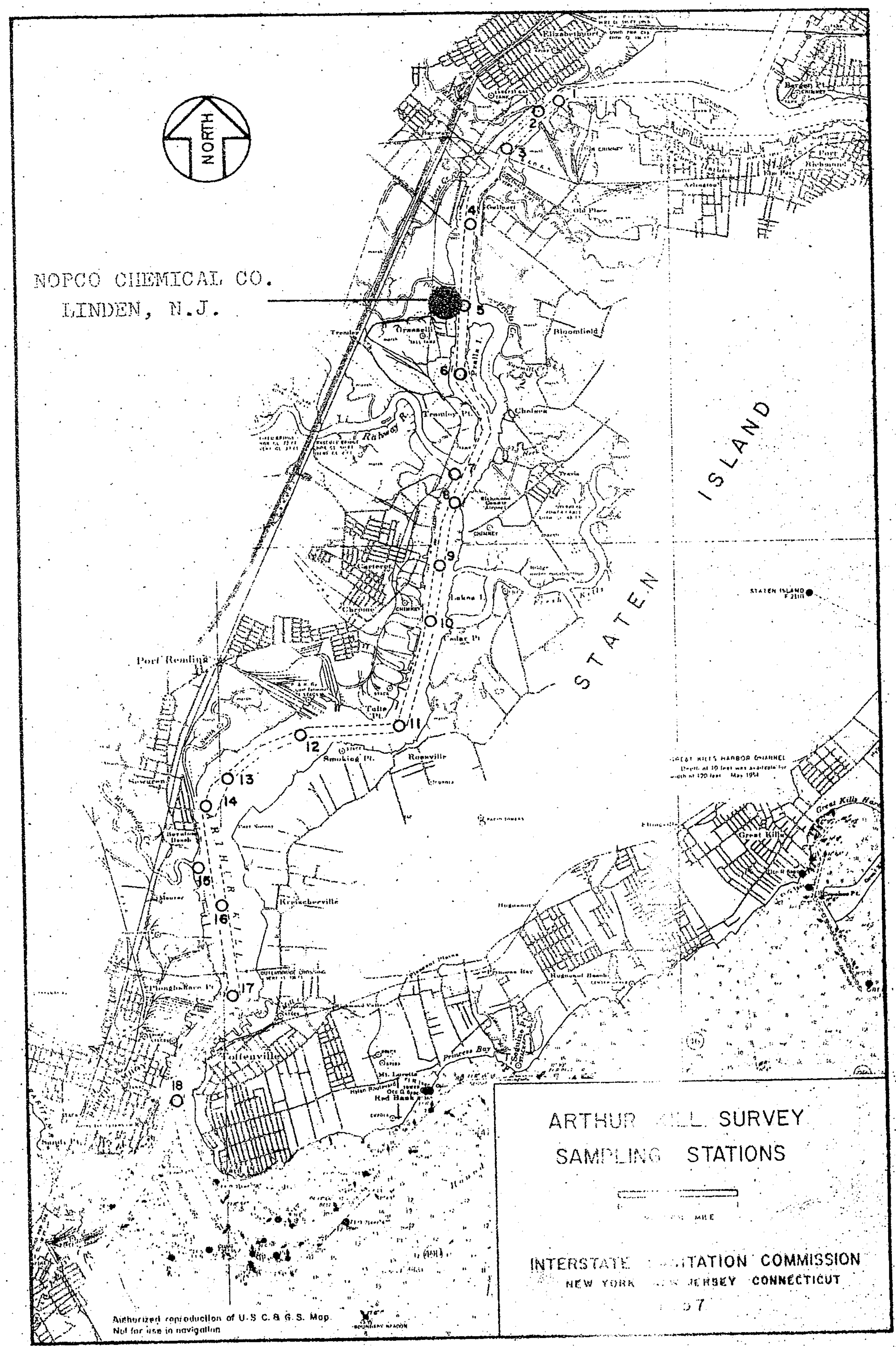


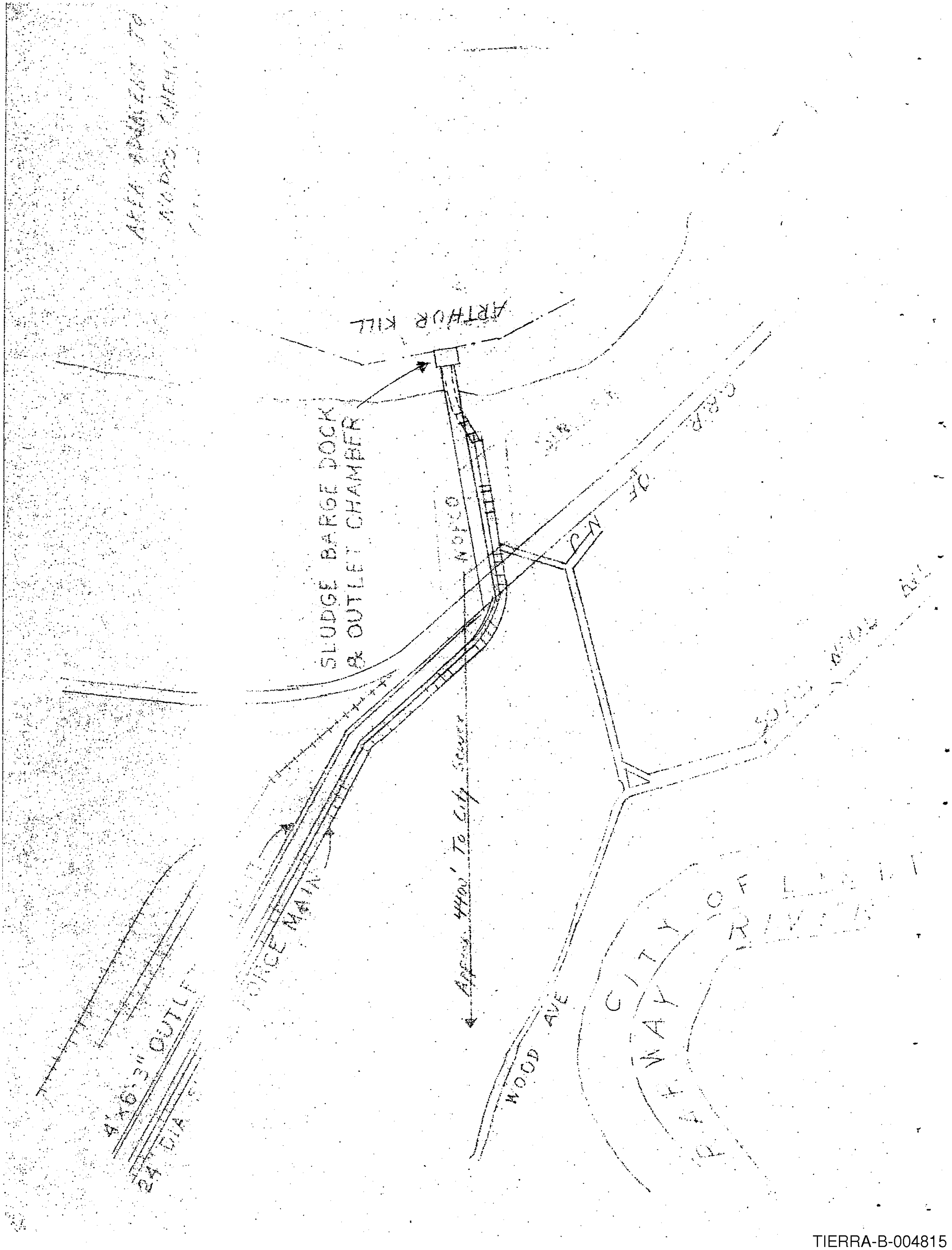
NOPCO CHEMICAL CO.
LINDEN, N.J.

ARTHUR KILL SURVEY
SAMPLING STATIONS

MILE

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

Authorized reproduction of U.S. C. & G. S. Map.
Not for use in navigation


ARTHUR KILL
SLUDGE BARGE DOCK & OUTLET CHAMBER
FORCE MAIN
Approx 4400' To City Sewer
WOOD AVE
CITY OF
4'x6'3" OUTLET
24" DIA

PLANT: Phelps Dodge Copper Products Corp.

LOCATION: Bayway, Elizabeth, N.J.

The numerous buildings which are operated by Phelps Dodge Copper Products Corp. are bordered on the north by Bayway Avenue, on the east by the Arthur Kill, on the south by the city line of Elizabeth and on the west by Amboy Avenue. This compound of buildings is divided by South Front Street and Myrtle Street which are improved city streets. Running in a northerly direction on Amboy Avenue from Myrtile to Bayway Avenue is a 12" sewer that discharges to the 72" brick sewer on Bayway Avenue. This sewer at present is not intercepted and discharges directly to the Arthur Kill at the foot of Bayway Avenue. The City of Elizabeth has plans for construction of a proposed 8" sanitary sewer on South Front Street and Bayway Avenue which will be intercepted and the entire flow diverted to the Elizabeth Joint Meeting Treatment Plant. Our Joint Industrial Waste Survey indicates that approximately 350,000 gpd of city water and 1.3 mgd of Arthur Kill water is used daily by this plant and is discharged directly to the Arthur Kill.

1/7/65
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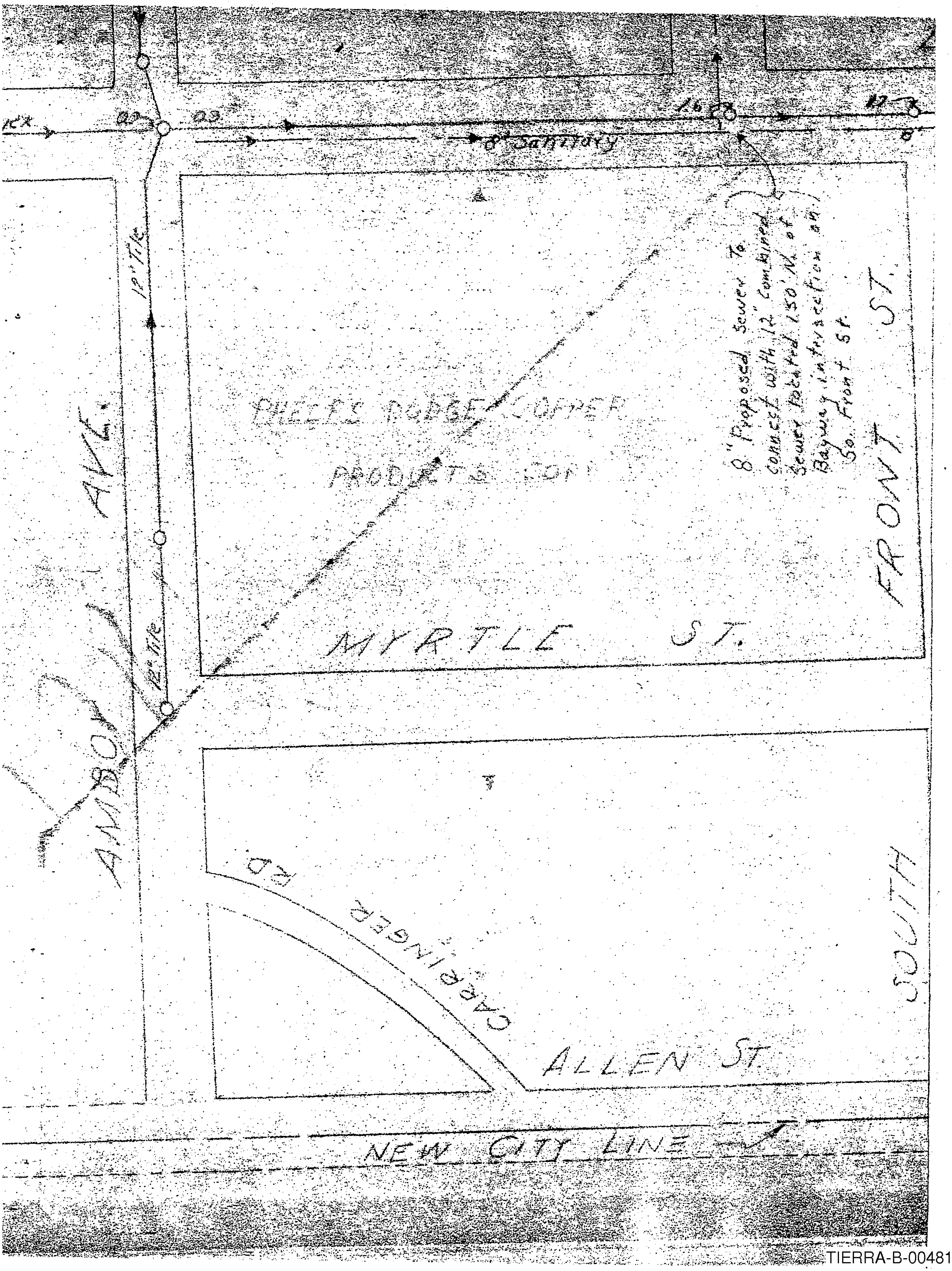
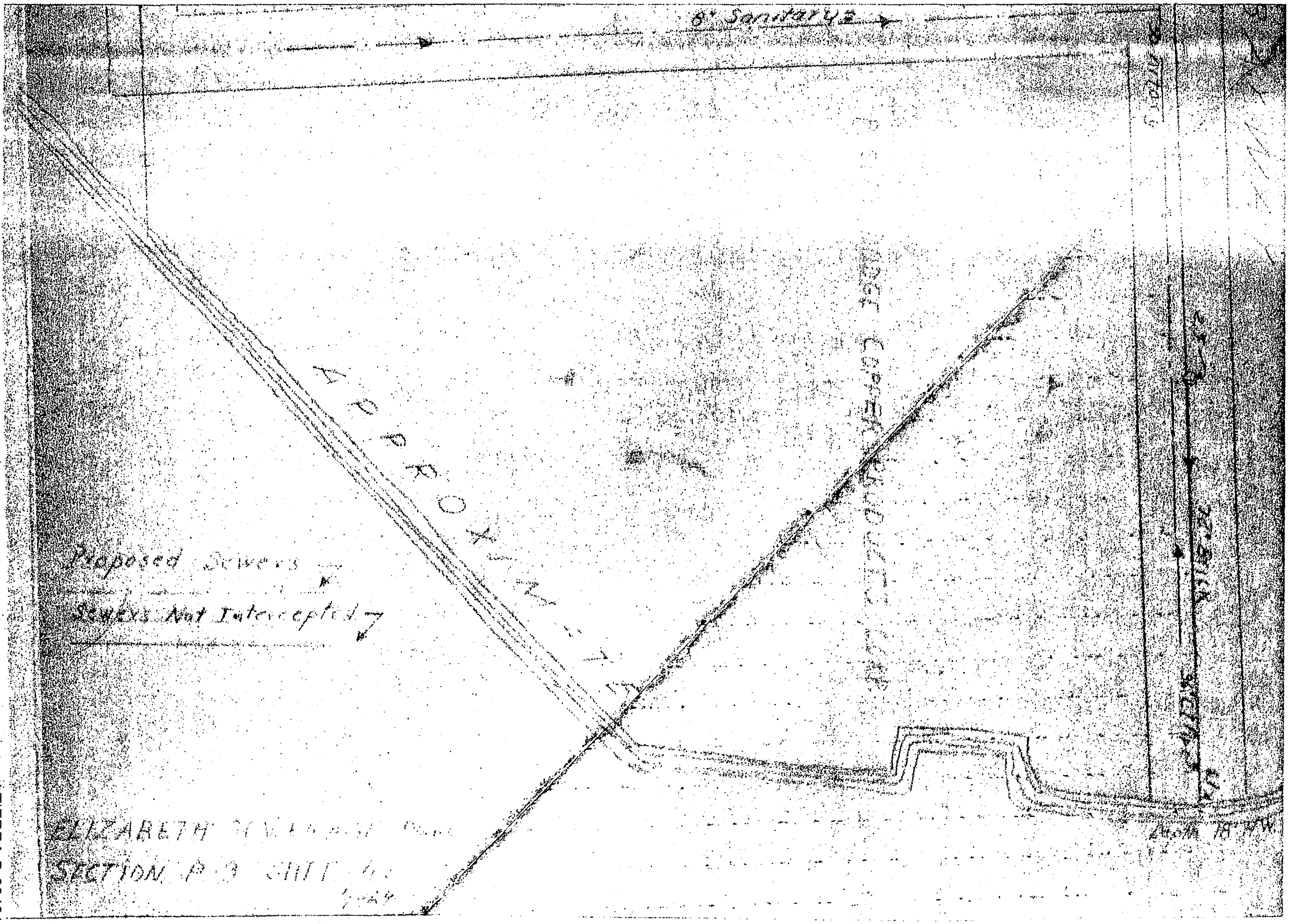
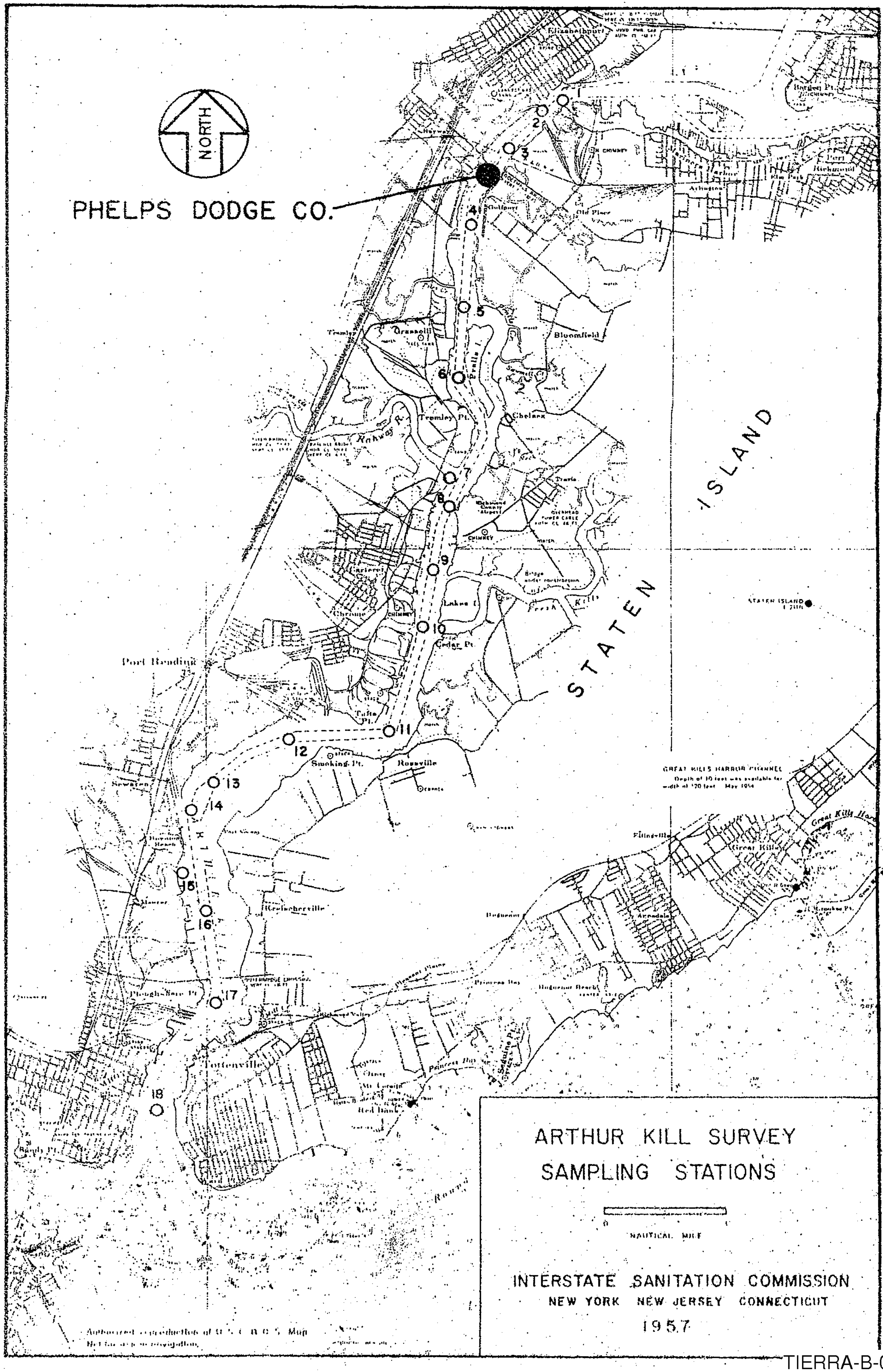


KX
03
03
16
17
8" Sanitary
8"
12" Tile
12" Tile
PHELPS DODGE COPPER PRODUCTS CORP
8" Proposed Sewer To connect with 12" combined sewer located 150' N. of Bayway intersection on So. Front St.
FRONT ST.
MYRTLE ST.
AMBOY AVE
CARLINGER RD
SOUTH
ALLEN ST.
NEW CITY LINE

6" Sanitary
22" Brick
Sanitary
DGE COPPER PRODUCTS CORP
APPROXIMATE
Proposed Sewers
Sewers Not Intercepted
ELIZABETH
SECTION P-3



ARTHUR KILL SURVEY
SAMPLING STATIONS

NAUTICAL MILE

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

PLANT: Reichhold Chemicals, Inc.

LOCATION: 726 Rockefeller Street, Elizabeth, N.J.

This plant is located in both the City of Elizabeth and the City of Linden, N.J. All buildings in this group are bordered on the North by Bayway Ave., on the East by Amboy Ave. and on the West by the Central Railroad of N.J. tracks in the City of Elizabeth. That section which is in the City of Linden has as its southerly perimeter a leg of Morses Creek. On Rockefeller St. which was a city street but now privately owned by Reichhold has a 15" and 8" City owned sewer which starts at the City Line of Elizabeth and runs northerly to Bayway Ave. where it connects with the 72" brick non-intercepted Bayway Ave. sewer whose outfall terminus is at the Arthur Kill. The 12" City sewer located on Amboy Ave., an improved City St. and the 72" brick sewer on Bayway Ave. can also be used for the collection of all of the waste discharges which now go directly to the small leg of Morses Creek. Plans are being prepared by the City of Elizabeth to construct a new 8" sewer in this area which will divert all the flow to the Elizabeth Joint Meeting Treatment Plant. At present our records indicate that approximately 465,000 gpd and 225,000 gpd discharge to Morses Creek.

1/7/65
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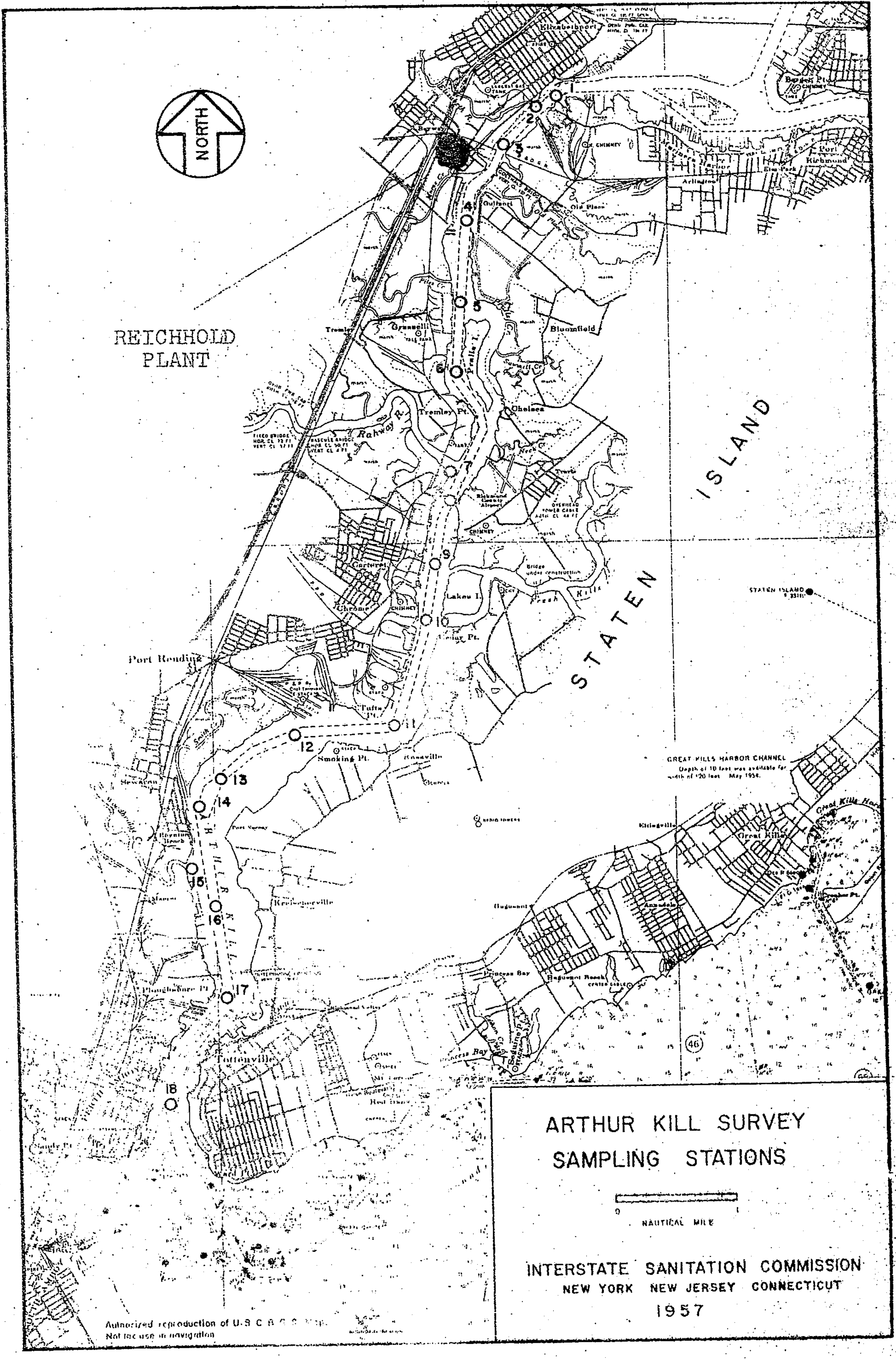

ARTHUR KILL SURVEY SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

Authorized reproduction of U.S.C.&G.S. Map.
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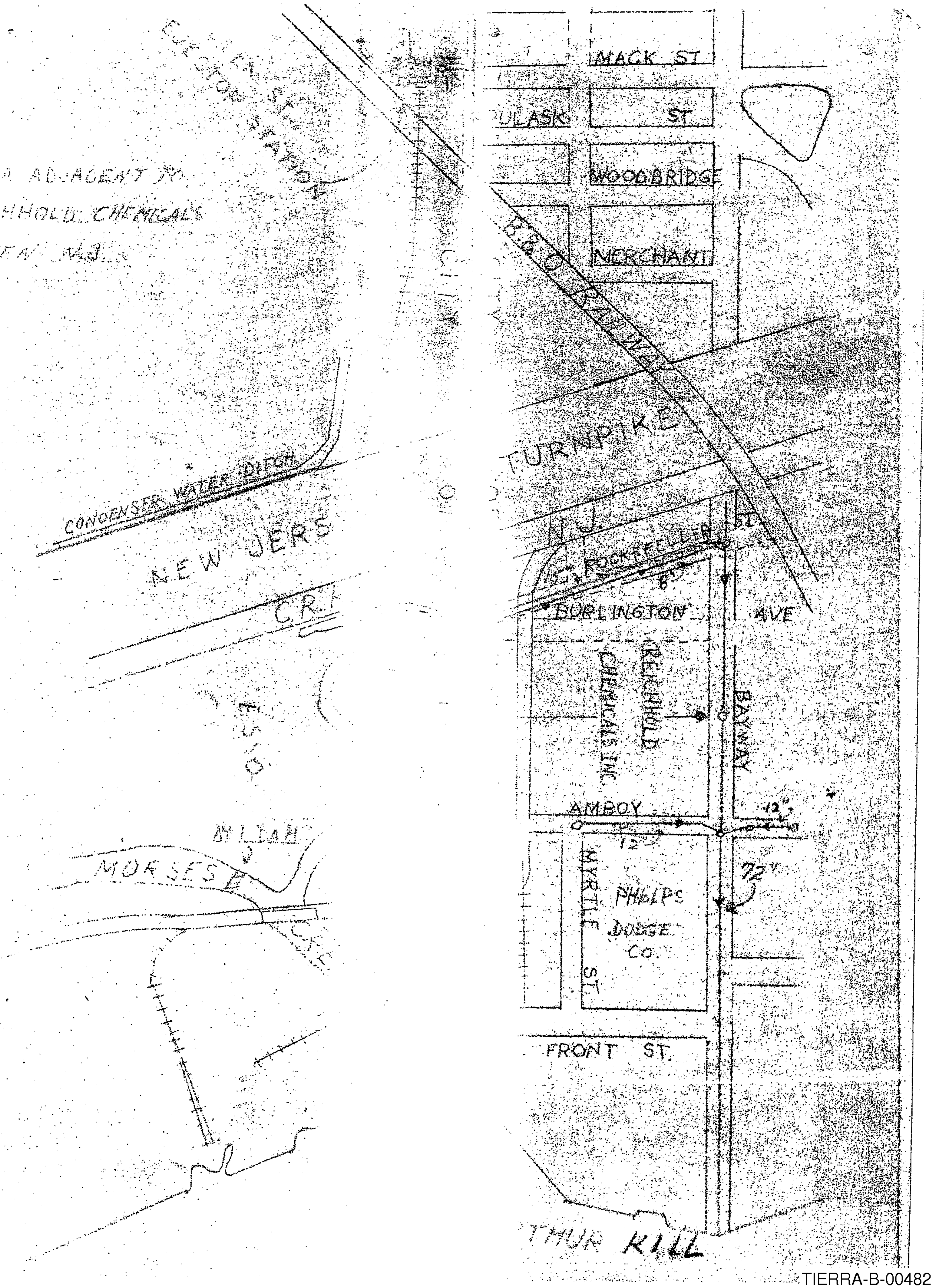

R A ADJACENT TO
EICHHOLD CHEMICALS
DEN N.J.

PLANT: Singer Company

LOCATION: Foot of Trumbull St., Elizabeth, N.J.

All buildings of this corporation are located in the City of Elizabeth and border on the north side of Trumbull Street and on the east side of First Street between Port Avenue and Trumbull Street. The six outfalls which now discharge directly to the Arthur Kill could be intercepted and by using a lift station the flow could be pumped directly to the 54" interceptor which crosses the parking field east of First Street and flows to the Elizabeth Joint Meeting Plant. This problem could also be resolved by using the existing city sewers on First Street and Trumbull Street, all of which are large enough to handle the flow. If this second alternative were used the 4' x 6' brick sewer on Trumbull Street would still have to be intercepted, as this sewer is not intercepted east of Second Street. Likewise, the laterals on Clark Place, Inslee Place, Ripley Place which flow to the First Street sewer that connects with the Trumbull Street sewer at the intersection of First and Trumbull Streets are not intercepted. At the present time, our Industrial Waste Survey indicates that approximately 1,548,950 gd discharge directly to the Arthur Kill.

1/7/65
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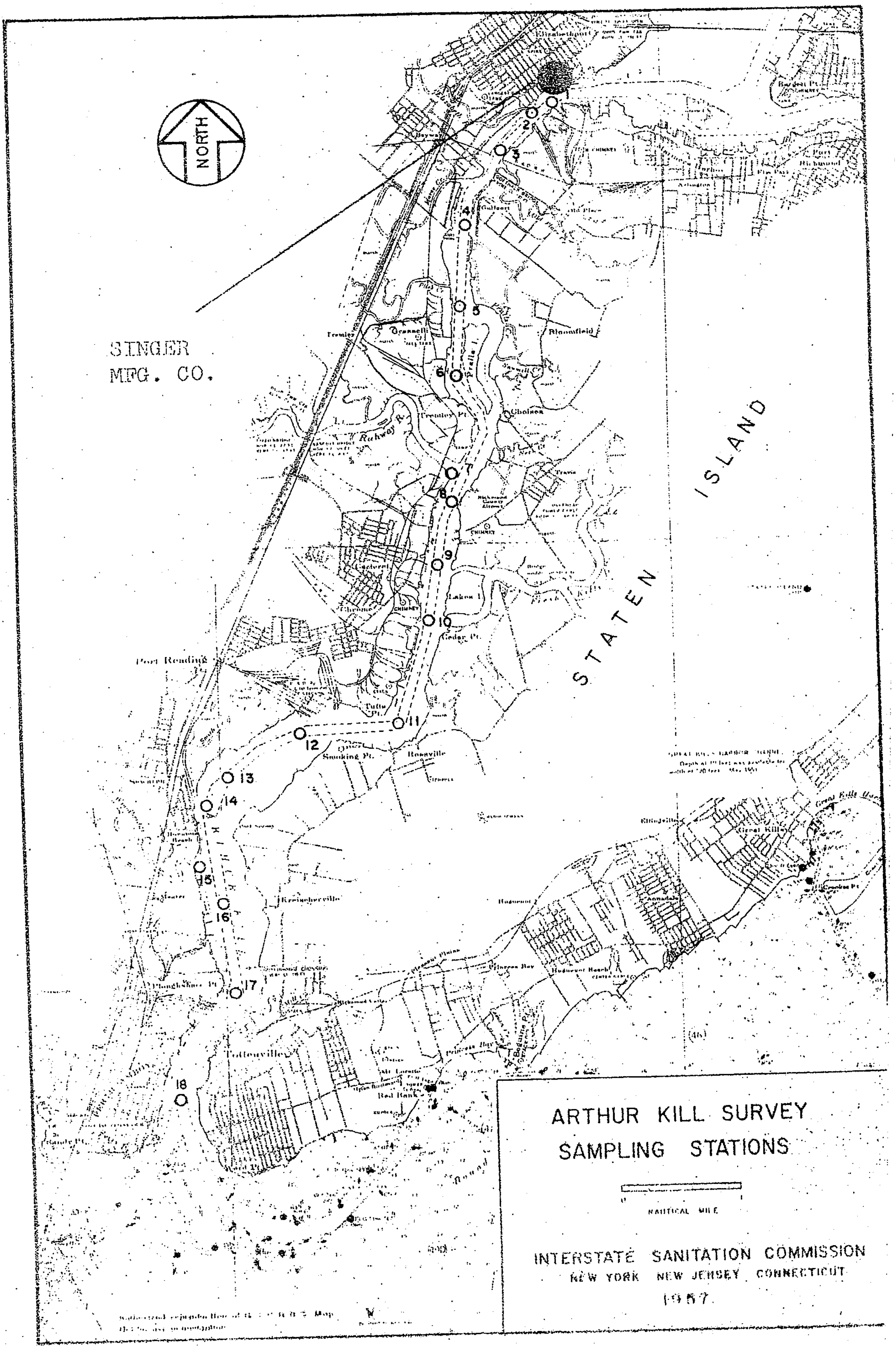
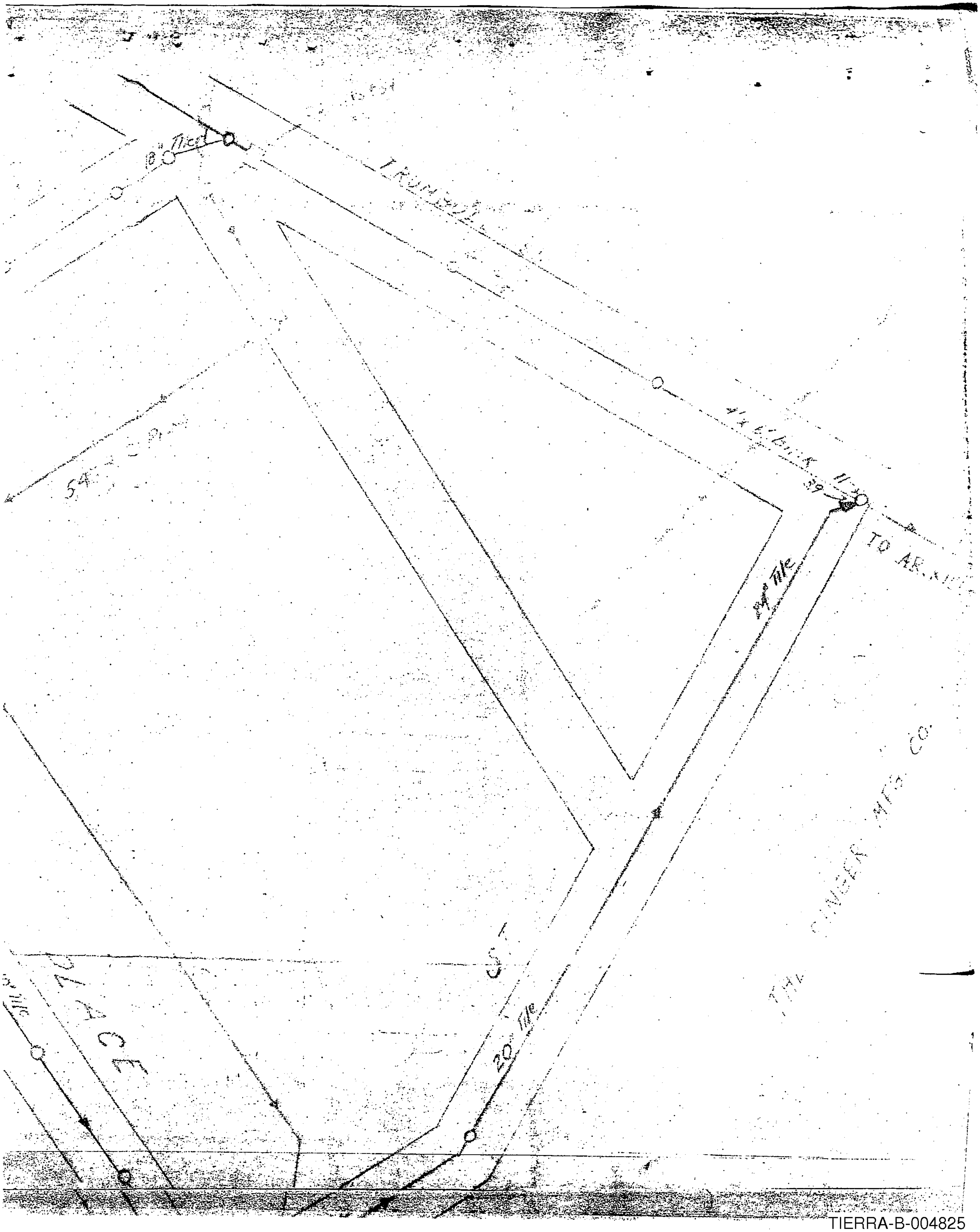
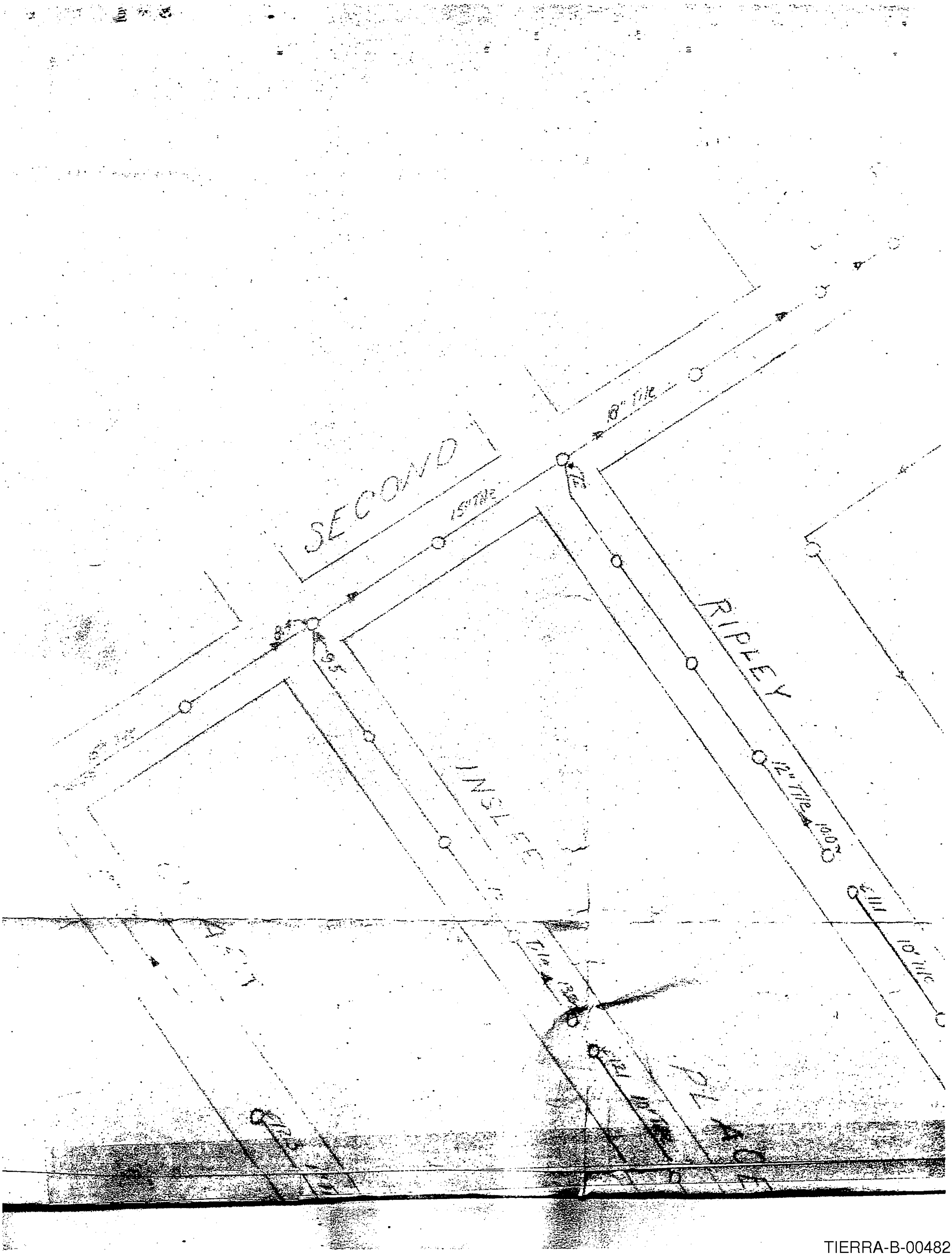
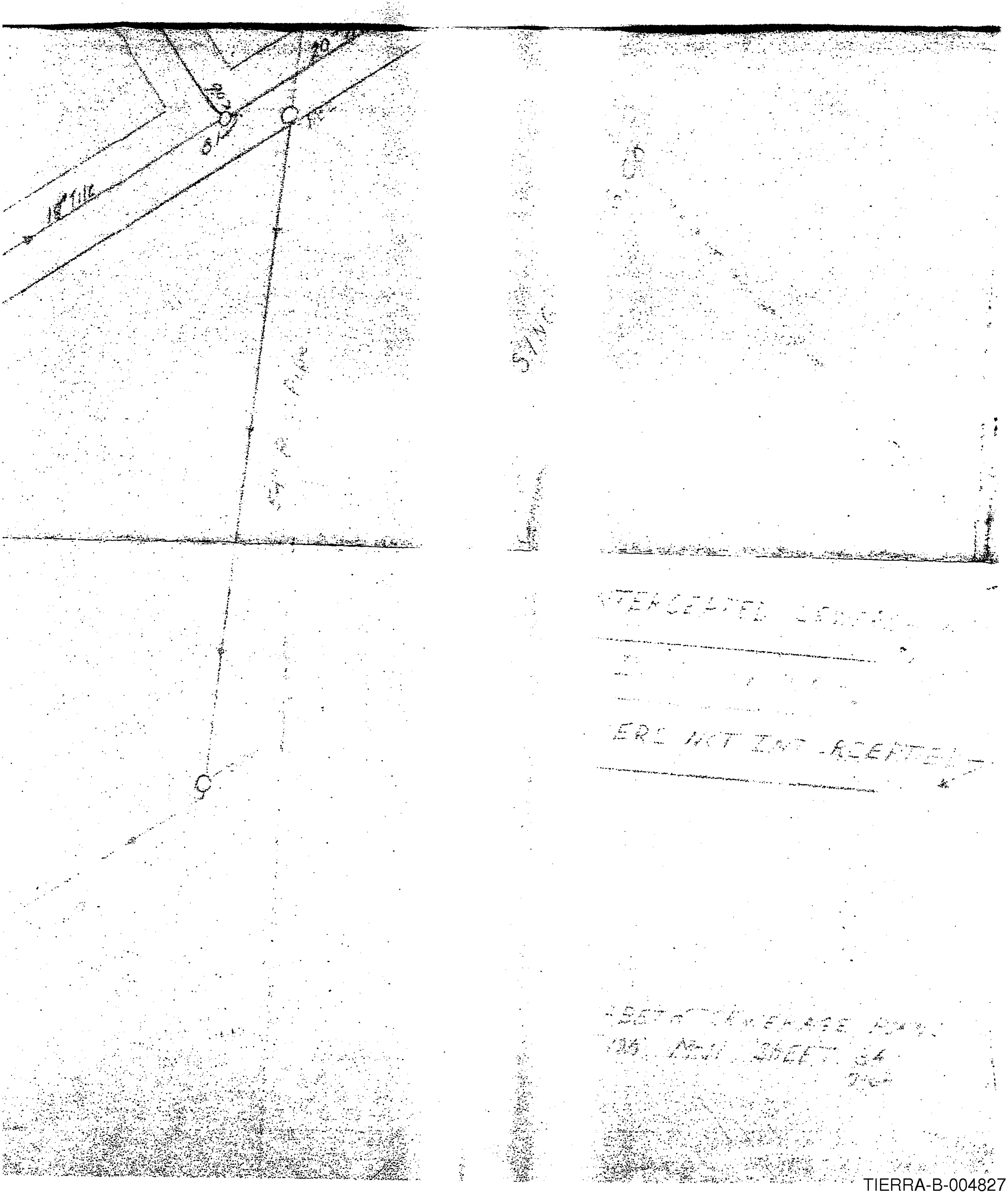


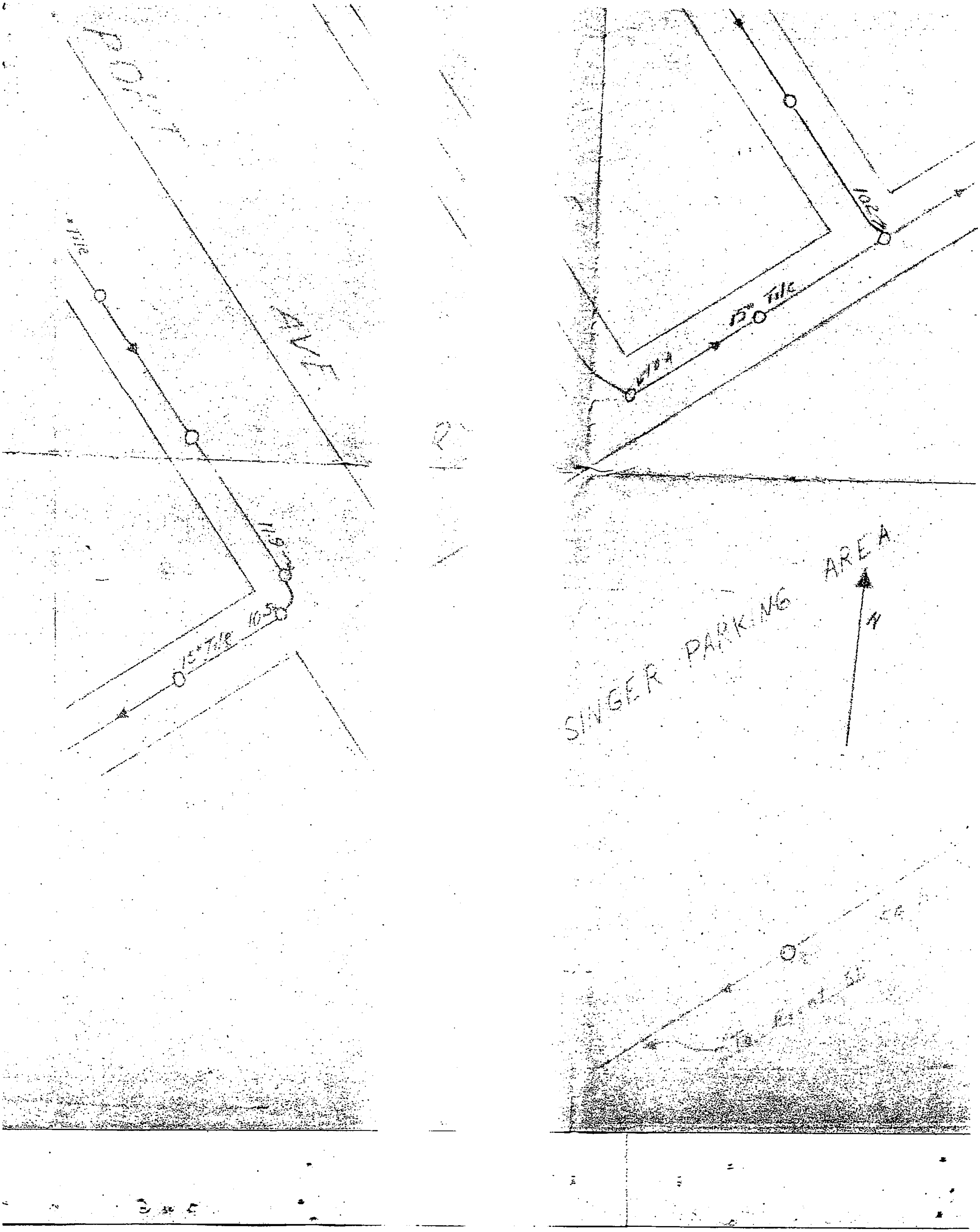
ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


18" Tile
TRUMBULL
4' x 6' Brick
11-39
24" Tile
TO AR
54
ST
PLACE
20" Tile
Tile
THE SINGER MFG CO


SECOND
RIPLEY
INSLEE
PLACE
8" Tile
15" Tile
12" Tile
10" Tile
84
95
100
121
111


18" TILE
SHEET 34


PORT
AVE
Tile
Tile
10.5
15" Tile
15" Tile
10.2
SINGER PARKING AREA
N

CONCLUSION:

After carefully reviewing the City of Elizabeth's sewer maps and verifying the sizes of the laterals and sewer mains with their present flows, it is reasonable to expect that this added flow would not over tax the present system. With the additional new sewer construction and interceptor which is being planned by the City of Elizabeth to eliminate the pollution from the Bayway Avenue section of Elizabeth, all direct discharges to the Arthur Kill in this area could be abated. All of this additional industrial waste would be diverted to the main pumping station which is operated by the City of Elizabeth. This station which is located on Atlantic Street, Elizabeth, New Jersey has a designed capacity of approximately 85.0 MGD. The past year's daily average flow which was pumped at this station was 14.86 MGD (June 1963 through May 1964). The Elizabeth Joint Meeting Treatment Plant has a designed capacity of 100.0 MGD with a yearly daily average for 1964 of 54.4 MGD. The Linden-Roselle Treatment Plant is designed for 12.5 MGD and this plant had a yearly daily average of 10.2 MGD.

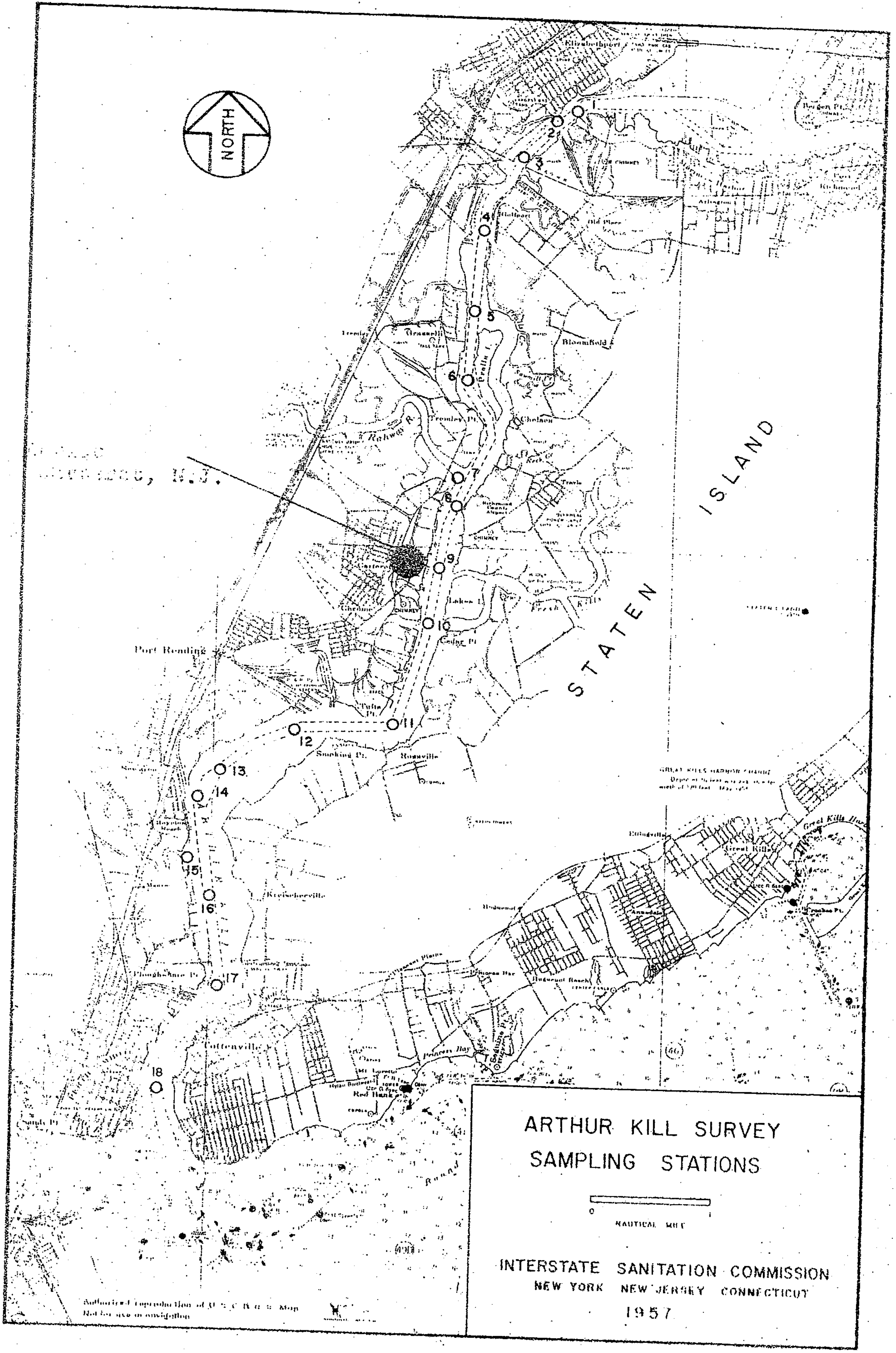
MIDDLESEX COUNTY

1.	Agrico Chemical Company	Carteret
2.	American Smelting & Refining Company,	Perth Amboy
3.	Armour Fertilizer Company	Carteret
4.	California Oil Company	Perth Amboy
5.	Foster Wheeler Company	Carteret
6.	General American Tank & Storage Co.,	Carteret
7.	Hess Oil Company	Perth Amboy
8.	Hess Oil Company	Port Reading
9.	Koppers Chemical Company	Port Reading
10.	Koppers Co. Creosoting Plant,	Port Reading
11.	Metal & Thermit Corp.	Carteret
12.	United States Metals & Refining Co.,	Carteret
13.	Westvaco Co. Food Machinery	Carteret

PLANT: American Agricultural Chemical Co.

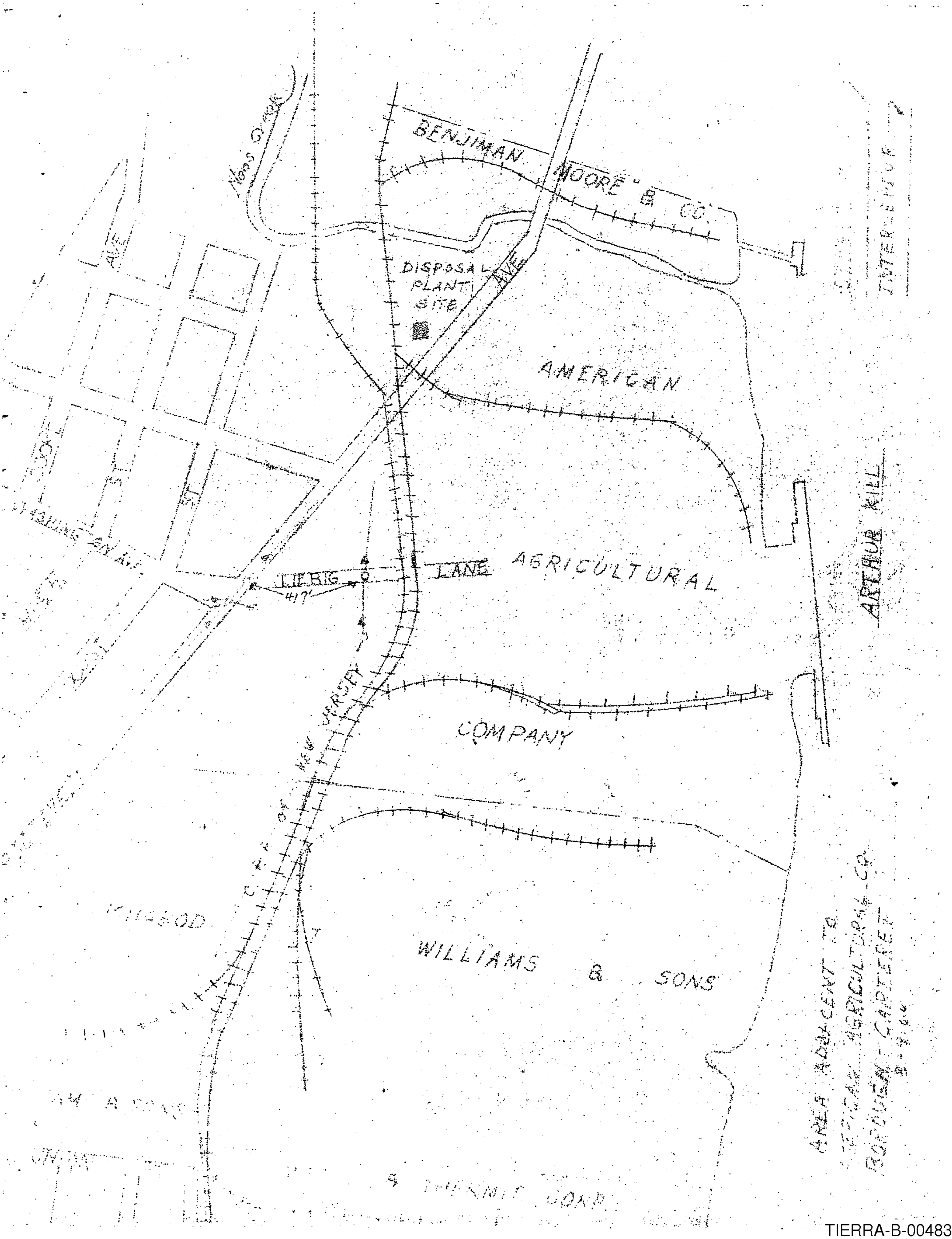
LOCATION: End of Liebig Lane, Carteret, N.J.

This plant which is situated on the Arthur Kill and with its front property line approximately 500 feet east of Roosevelt Avenue and only 60 feet to the east of the Carteret interceptor could discharge its waste to either of the above mentioned sewer lines. The sizes of these lines could not be determined at the Borough Engineer's Office and due to the elevation of both lines, they could not be measured in the field. However from observing the flow through manholes, it can be estimated that the Roosevelt Avenue sewer is at least an 8" sewer flowing approximately one quarter full. The interceptor is estimated at approximately 24" and flowing less than one half full. Our Industrial Waste Survey indicates that this plant utilizes a combined (City and salt water) water consumption of 1,208,040 gpd of which an estimated 50,000 gpd discharges directly to the Arthur Kill.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

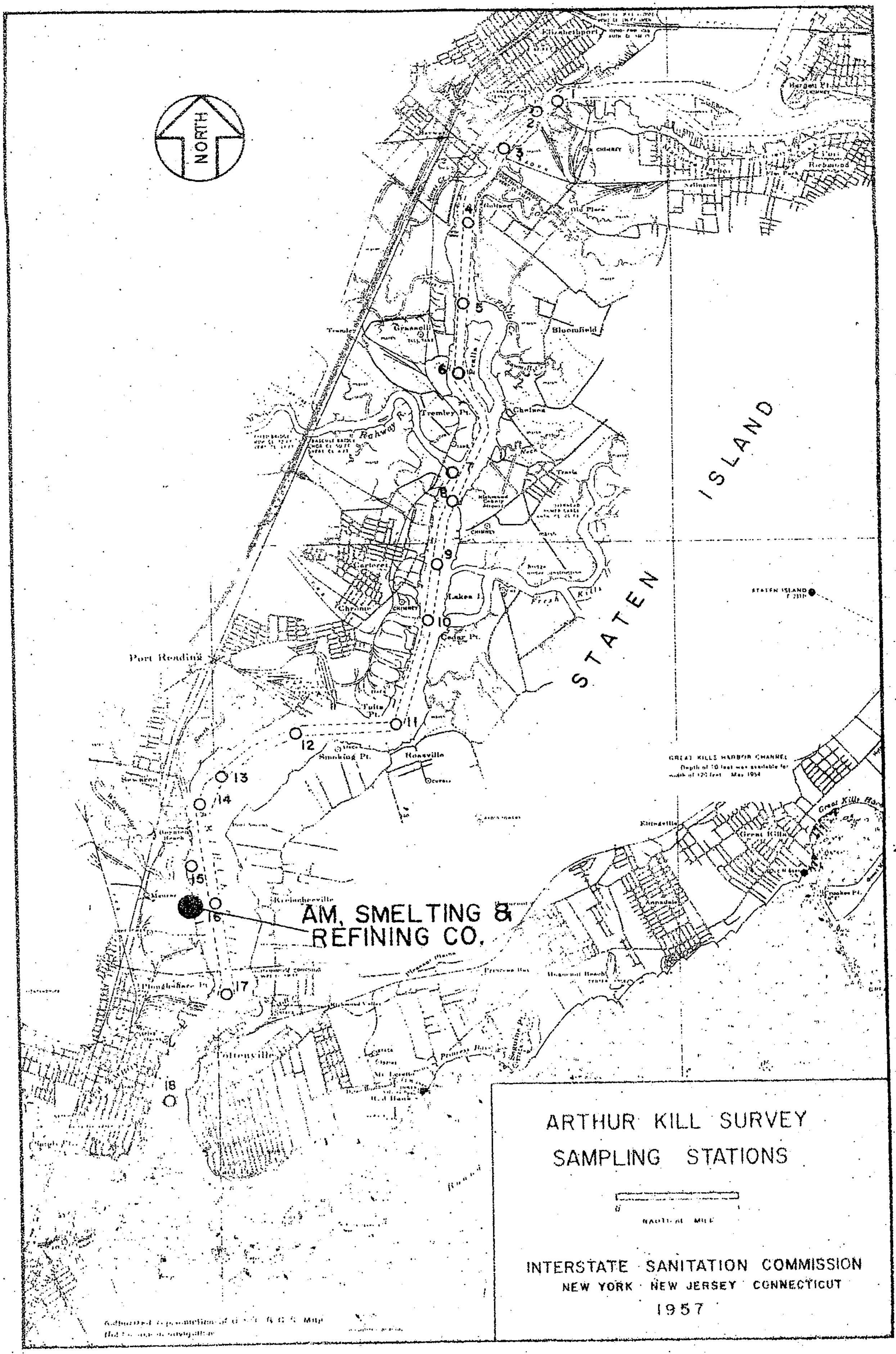


BENJIMAN MOORE & CO.
INTERSTATE
DISPOSAL PLANT SITE
AVE
AMERICAN
AGRICULTURAL
COMPANY
ARTHUR KILL
LIEBIG LANE
417'
WASHINGTON AV.
ST.
ST.
AVE
C. R. R. OF NEW JERSEY
WILLIAMS & SONS
THERMIT CORP.
AREA ADJACENT TO
AMERICAN AGRICULTURAL CO.
BOROUGH - CARTERET
3-9-44

PLANT: American Smelting & Refining Company

LOCATION: East Side of State Street, Barber Section,
Perth Amboy, N.J.

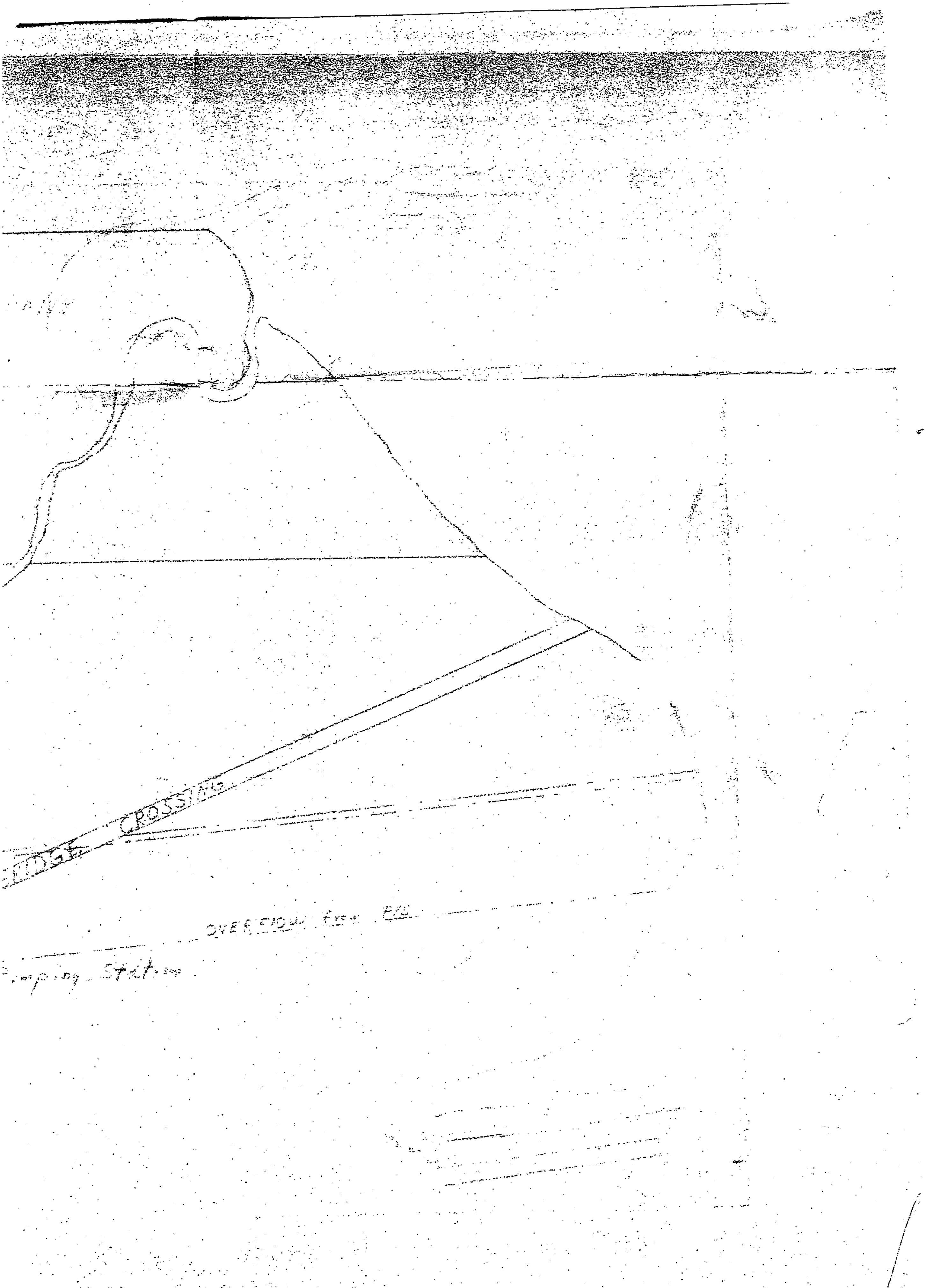
This plant which is situated on the Arthur Kill and bound on the north by California Oil Company and on the south by National Lead Company, has the alternative of discharging its waste material to the 48" interceptor sewer or a 12" sewer which connects with the 48" interceptor at the intersection of State Street and Garretsen Avenue. This plant fronts on State Street. No information is available as to the volume and nature of their discharge to the Arthur Kill.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK · NEW JERSEY · CONNECTICUT
1957

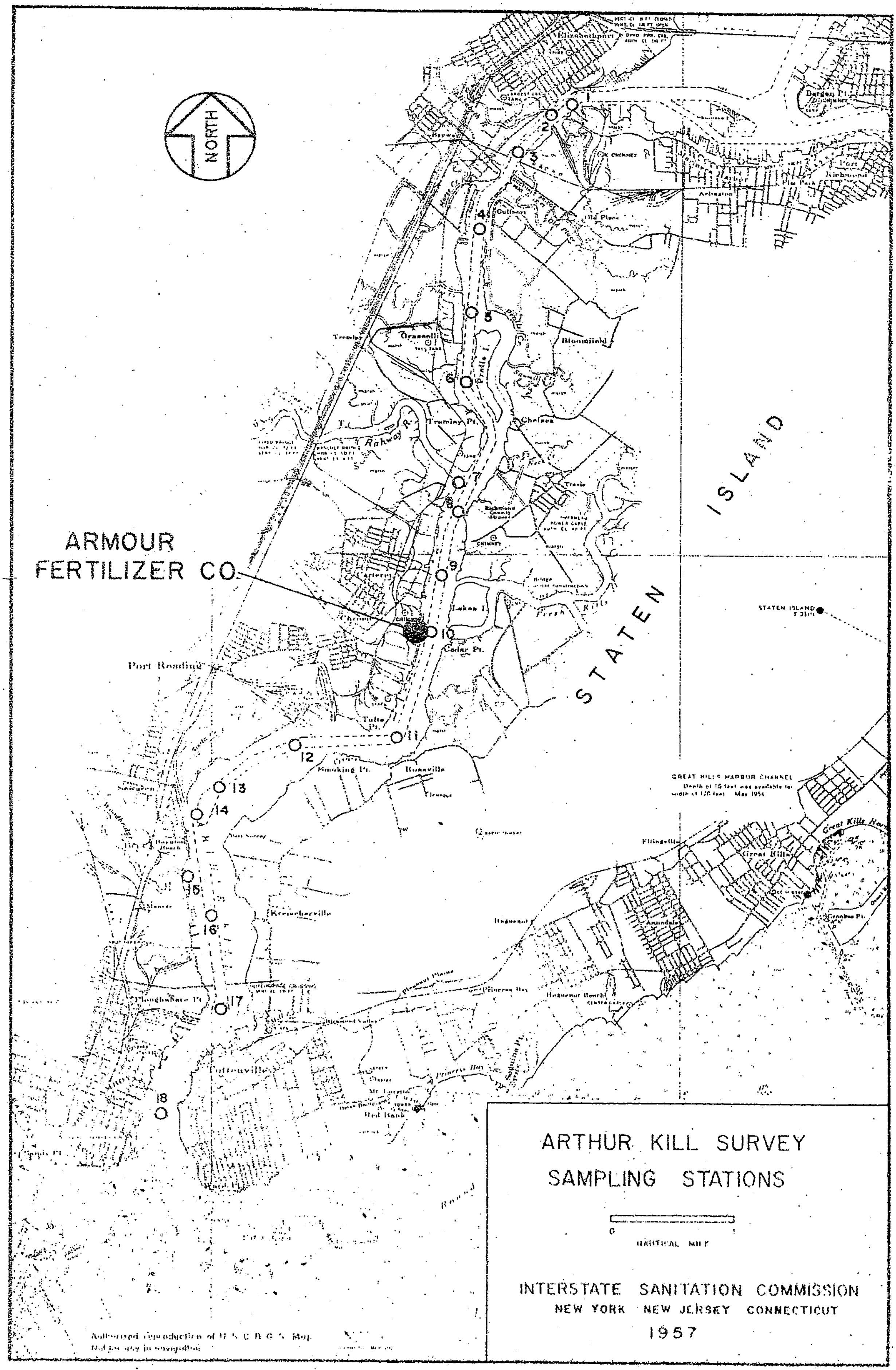

QUEENBRIDGE
CROSSI
STATE
KUTCHER AV
CALVIN AV
GARRETSEN AVE
Thomas St.
12"
Ashley St.
8"
Wagner St.
8"
Summit
ST.
10"
Leon
ST.
8"
Bruck
St.
8"
Lawrence
Gray
St.
Keena
St.
10"


IDGE CROSSING
OVERFLOW from P/S
mping Station

PLANT: Armour Fertilizer Company

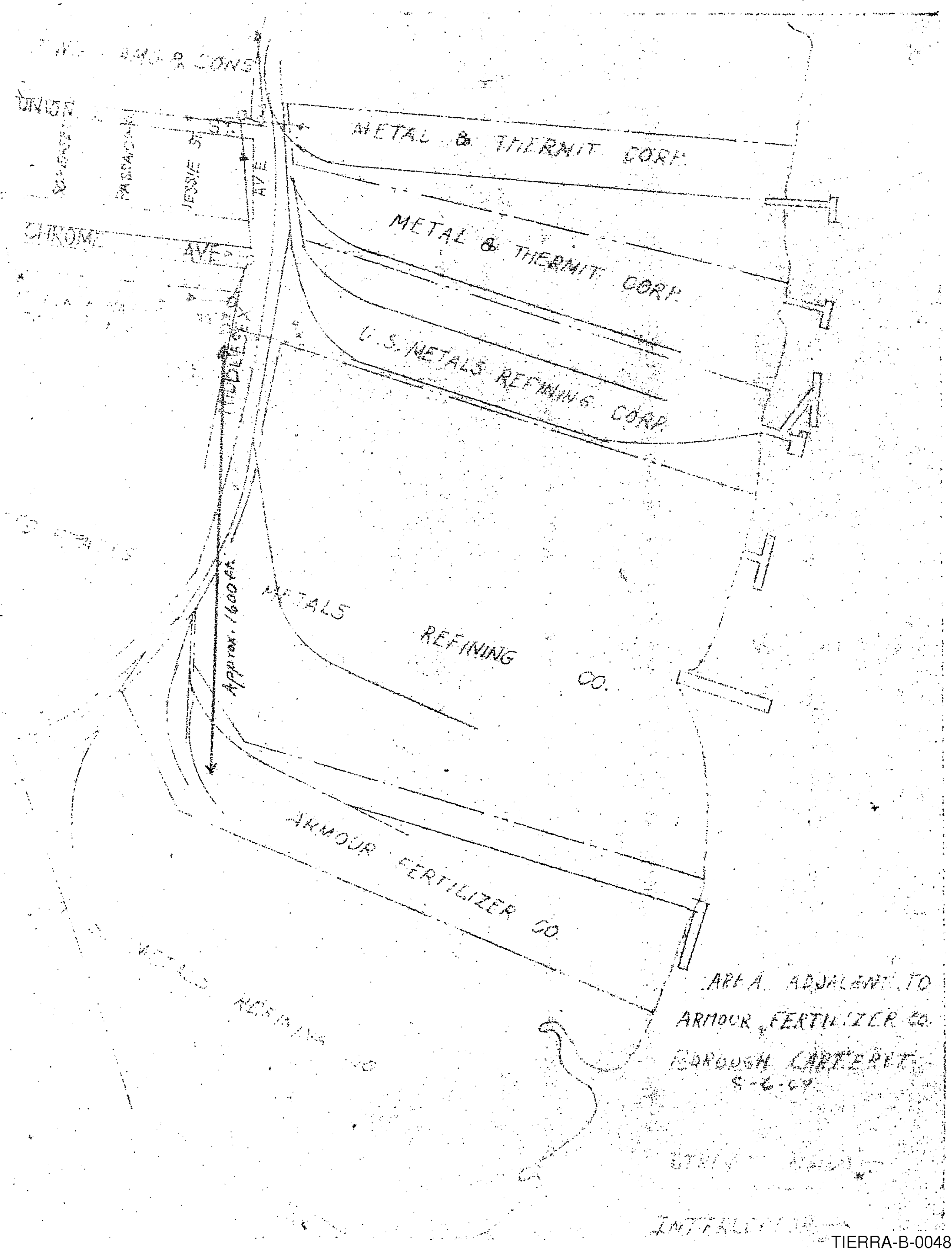
LOCATION: Foot of Middlesex Avenue, Carteret, N.J.

This plant which is located at the end of Middlesex Avenue, Carteret, N.J. is adjacent to the Arthur Kill and is bordered on the north and south by U.S. Metals. This entire area is not sewered. A 12" sewer which is located approximately 100 feet south of Chrome Avenue, is the nearest City sewer. From this point to the front of Armour's property it is approximately 1600 feet. This 12" sewer flows north where it connects with the 12" force main coming from the Edwin Street pumping station. From observations made through manholes on these lines it is estimated that the 12" gravity sewer is flowing approximtely 1" full and the 12" force main when in operation flows approximately one quarter full. No flow records are available at this time regarding the volume of discharge emanating from Armour & Company.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



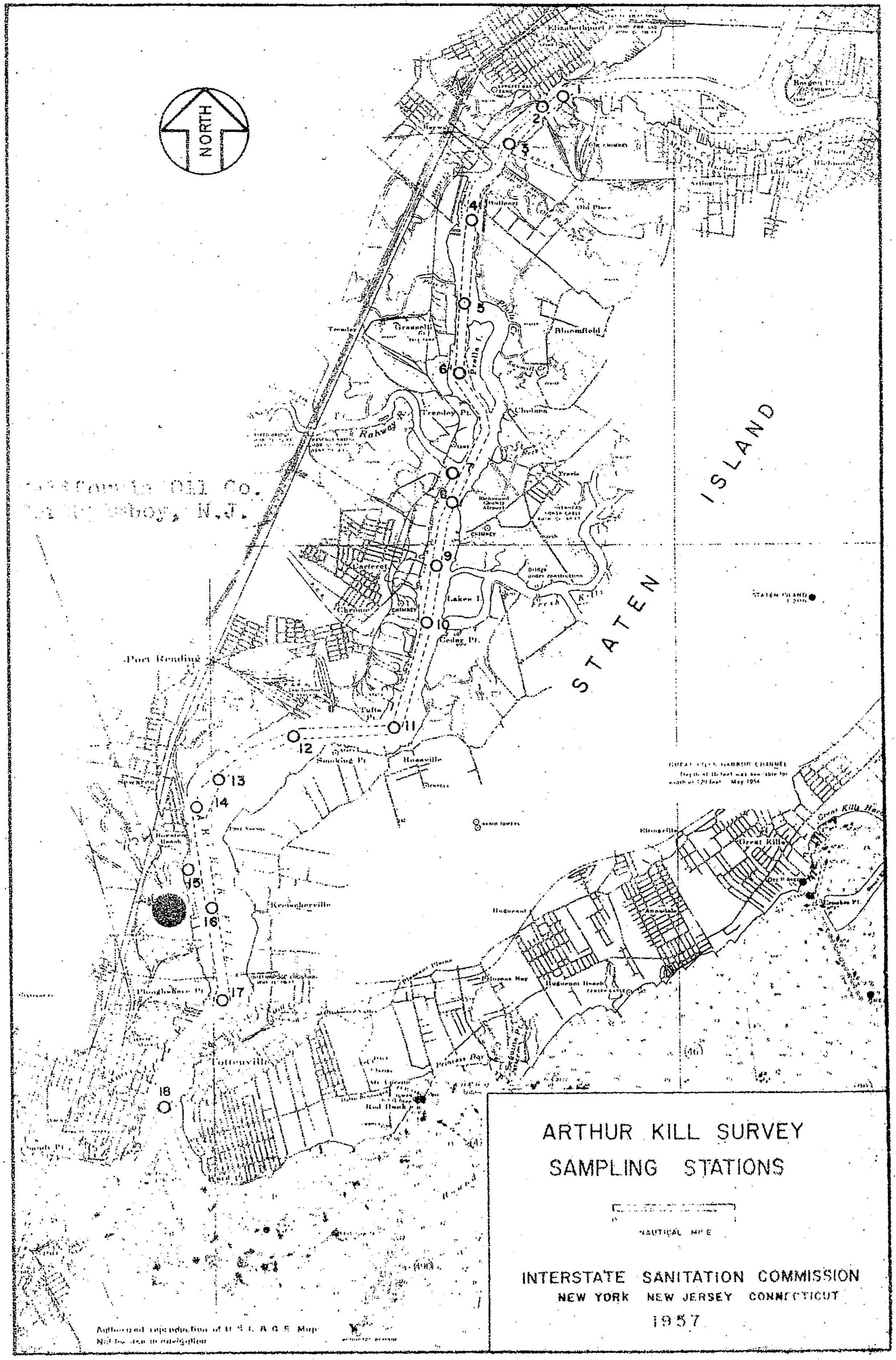
AREA ADJACENT TO
ARMOUR FERTILIZER CO.
BOROUGH CARTERET
5-6-67

PLANT - California Oil Company

LOCATION: State Street, Perth Amboy, N.J.

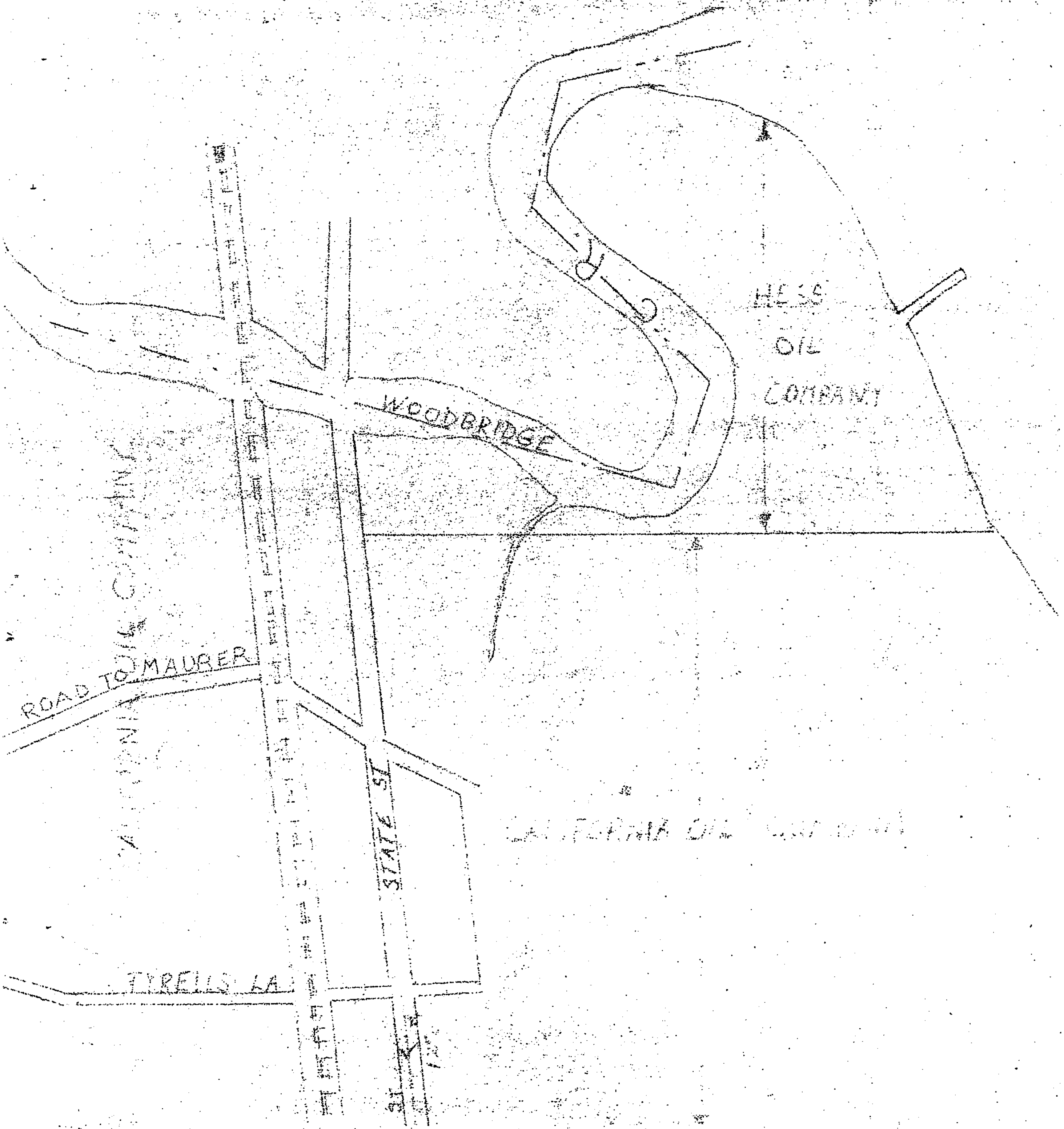
The California Oil Company has its installation divided by State Street, Perth Amboy, N.J. On the east side of State Street this portion of the plant is located directly on the Arthur Kill and is bordered on the north by Hess Oil Company, and on the south by the American Smelting & Refining Company. Their property, which is located on the west side of State Street, is bordered on the north by Woodbridge Creek and on the south by Tyrells Lane. Starting at Tyrells Lane and flowing in a southerly direction, a 12" city sewer is located on State Street. This sewer flows to the intersection of State Street and Garretsen Avenue where it discharges to the 48" interceptor which terminates at the State Street pumping station. Our records indicate that the East Yard Tank Farm Separator discharges to the Arthur Kill. This separator has a capacity of 2000 gpm. API Separators #1 and #2 and the settling basin (lagoon) discharge their effluent to Woodbridge Creek. All sanitary waste from this plant is discharged to the 12" sewer on State Street.

1/8/65
FG:k



ARTHUR KILL SURVEY
SAMPLING STATIONS

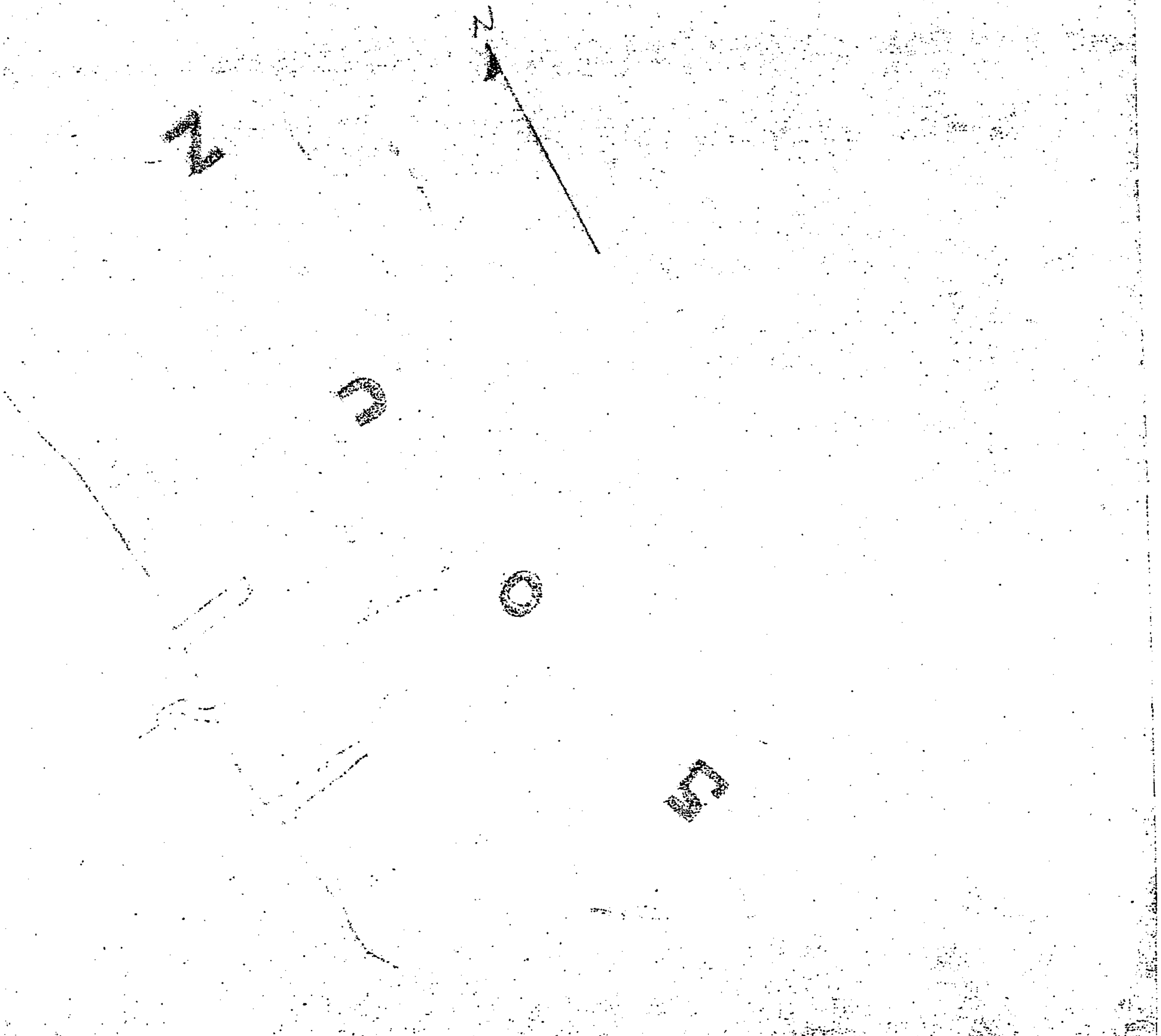
INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


HESS
OIL
COMPANY
WOODBRIDGE
CALIFORNIA OIL COMPANY
ROAD TO MAURER
CALIFORNIA OIL COMPANY
STATE ST
TYRELLS LA

GENERAL MAP
SEWERS & INTERCEPTOR
CITY of PERTH AMBOY

EXISTING SEWERS

INTERCEPTOR

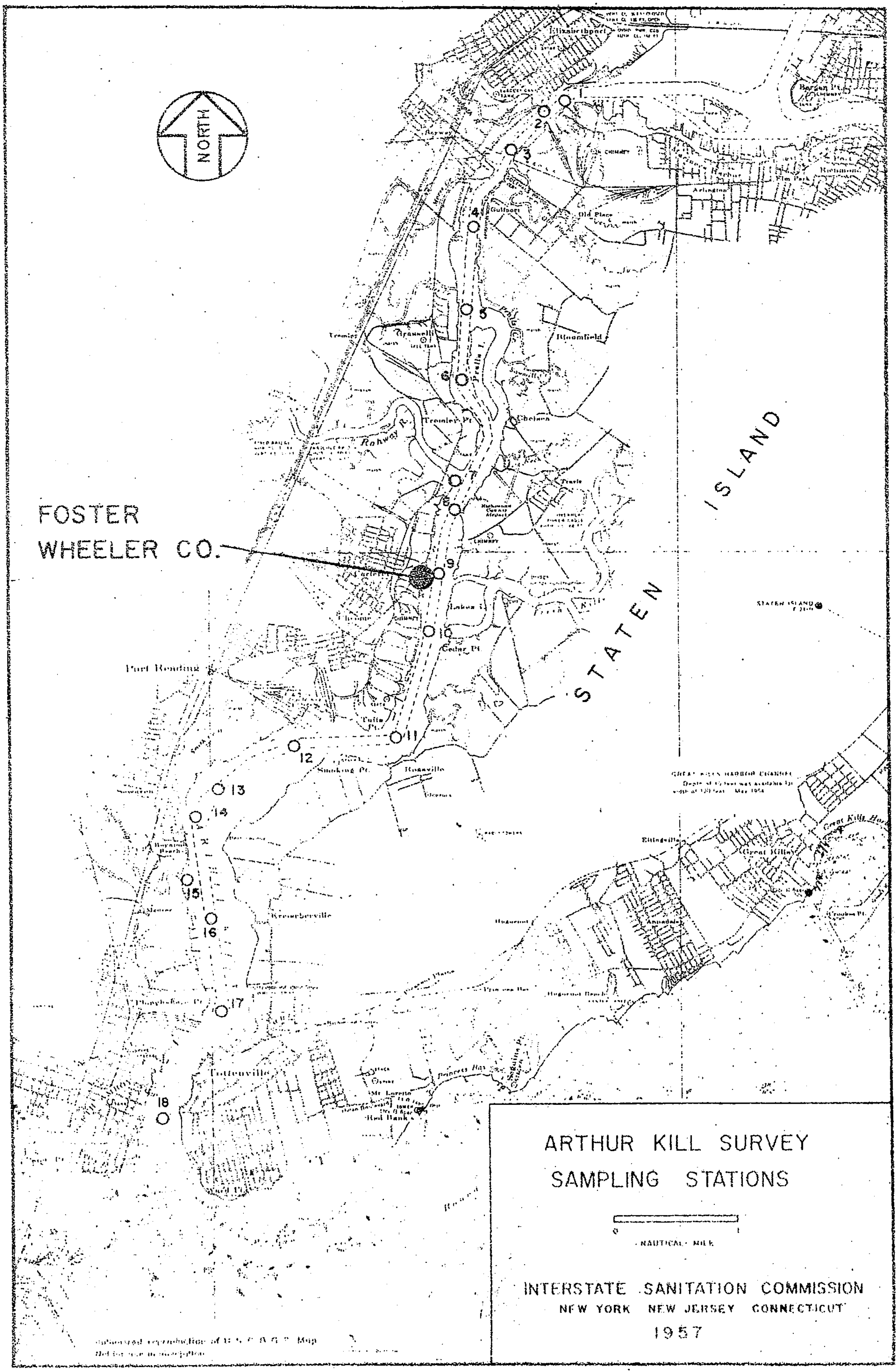


PLANT: Foster Wheeler Company

LOCATION: Roosevelt Avenue, Carteret, N.J.

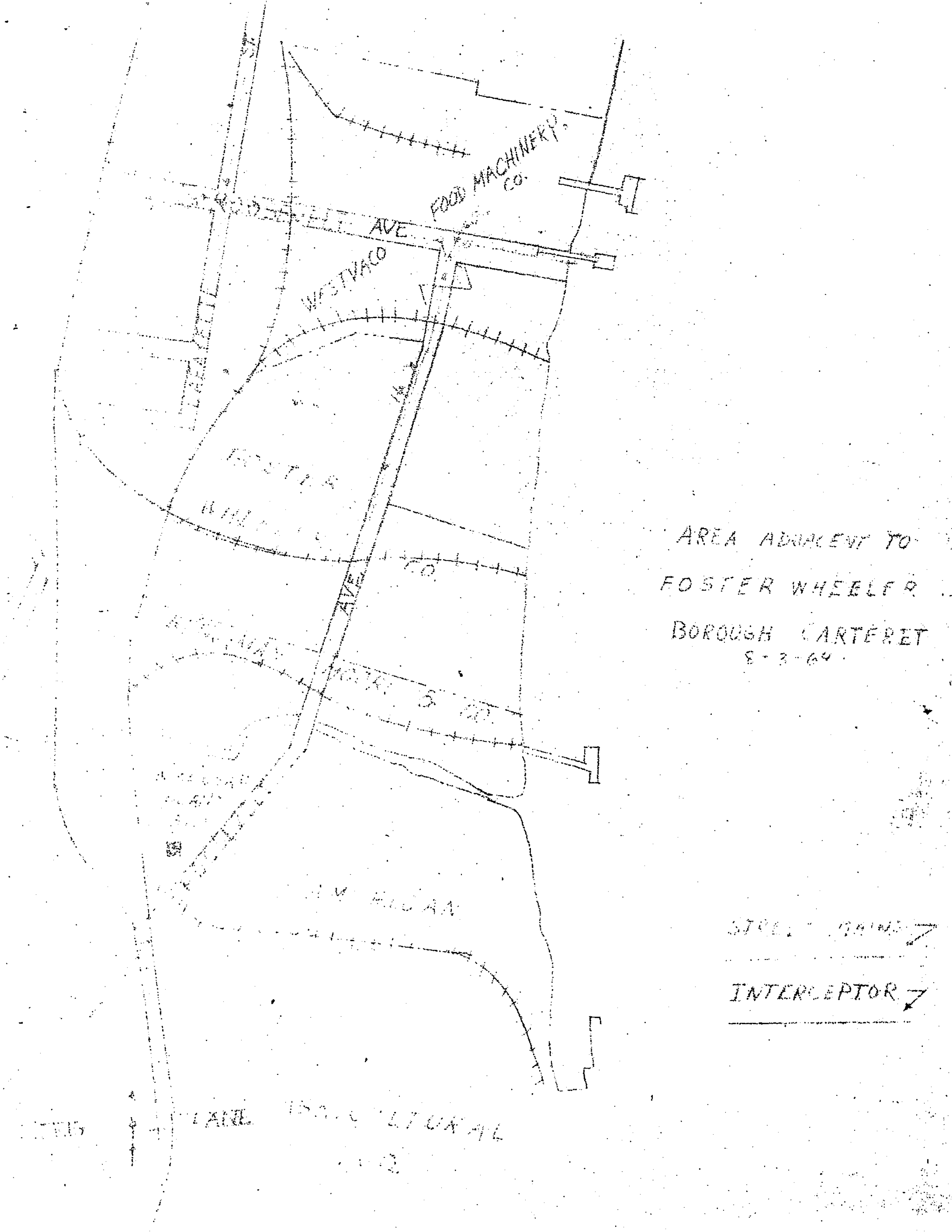
This plant is divided by Roosevelt Avenue. All buildings situated on the east side of the street are adjacent to the Arthur Kill.

A City sewer flows south on Roosevelt Avenue past all units of this plant. From observations made through a manhole at street level it is estimated that the size of the sewer is 16" and it was flowing less than one quarter full. This sewer terminates at the Carteret Sewage Disposal Plant.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



AREA ADJACENT TO

FOSTER WHEELER

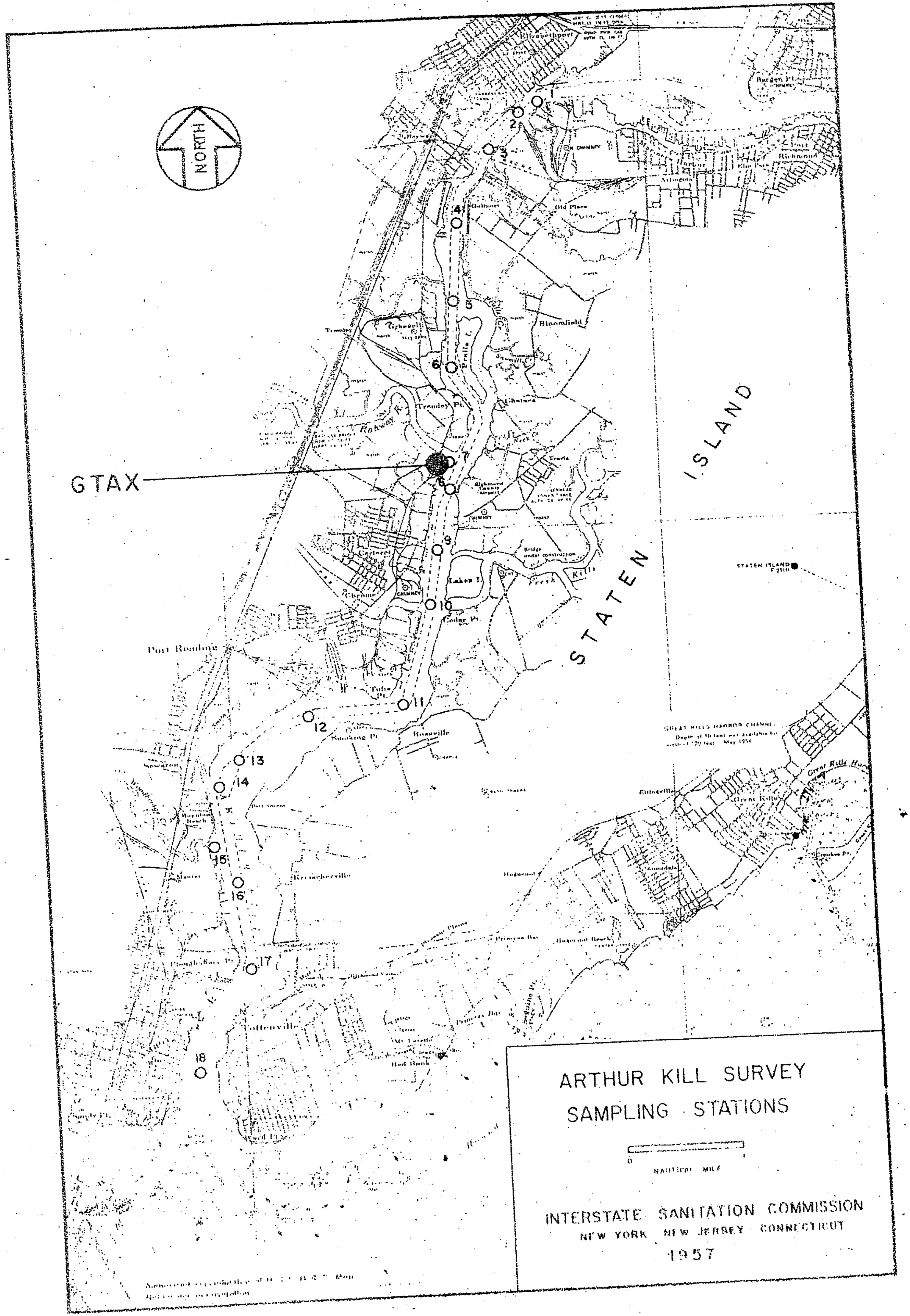
BOROUGH CARTERET

8-3-64

PLANT: General American Tank & Storage Company

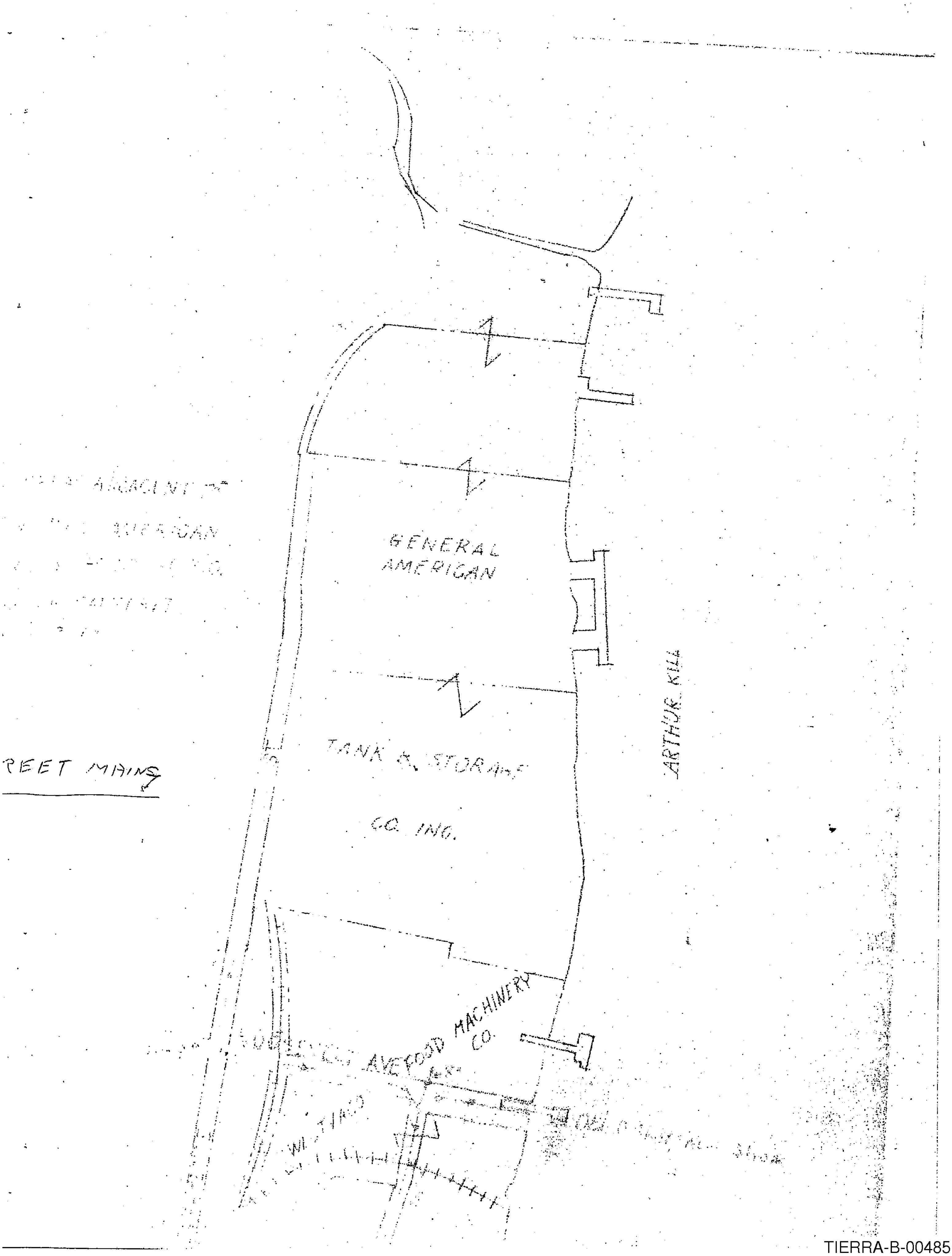
LOCATION: End of Lafayette Street, Carteret, N.J.

The General American Tank & Storage Company installations are located on the east side of Lafayette Street and adjacent to the Arthur Kill. This area has no available City sewers. The nearest City sewer line is approximately 1500 feet to the south. At this point a 6" line serving approximately three homes flows in a southerly direction to a 12" main sewer line on Roosevelt Avenue. From observations made through manholes at street level all sizes and flows are estimated. The flow in the 12" main was approximately one quarter full.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


ADJACENT TO
AMERICAN
CO.
REET MAINS
GENERAL AMERICAN
TANK & STORAGE
CO. INC.
ARTHUR KILL
FOOD MACHINERY CO.
AVE
WEST

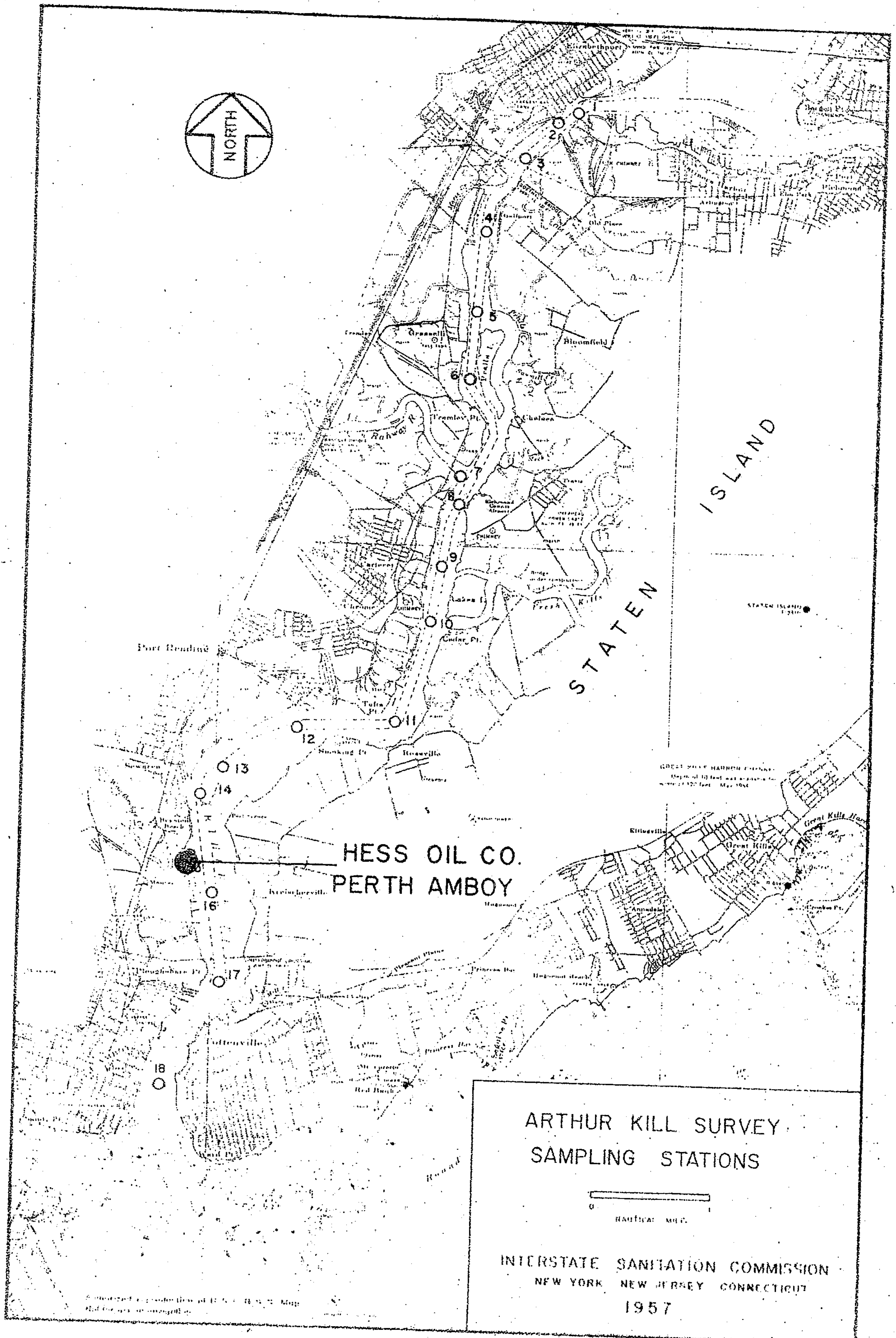
PLANT: Hess Oil Company

LOCATION: State Street, Perth Amboy, N.J.

This plant, which is located at the extreme northerly end of the City of Perth Amboy is situated on the east side of State Street and is bordered by the Arthur Kill and Woodbridge Creek.

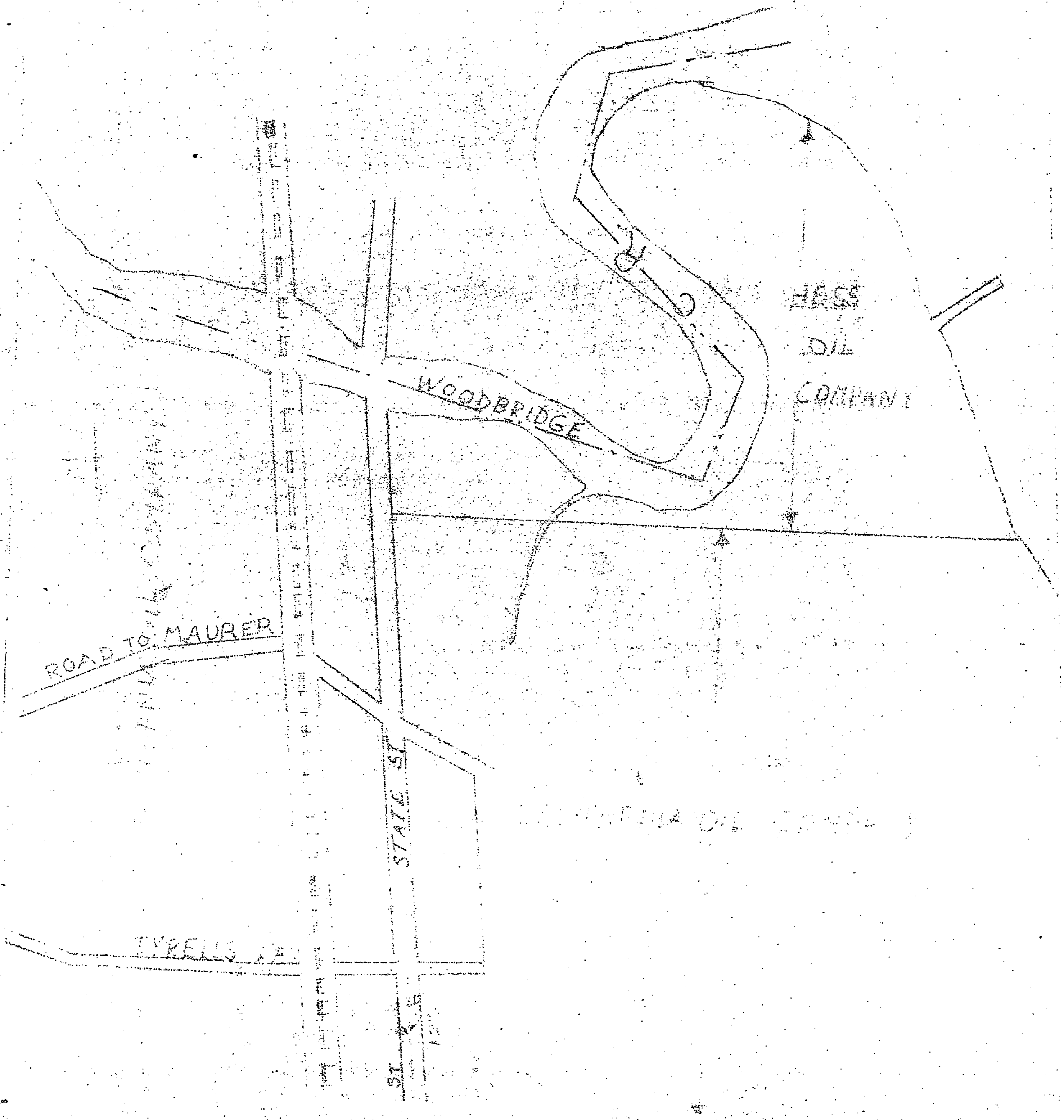
The nearest city sewer to this unit is approximately 1600 feet. This 12" sewer starts at Tyrell's Lane and State Street and flows in a southerly direction to the intersection of State Street and Garretsen Avenue where it is connected to the 48" interceptor which discharges its sewage at the State Street pumping station.

1/8/65
FG:k



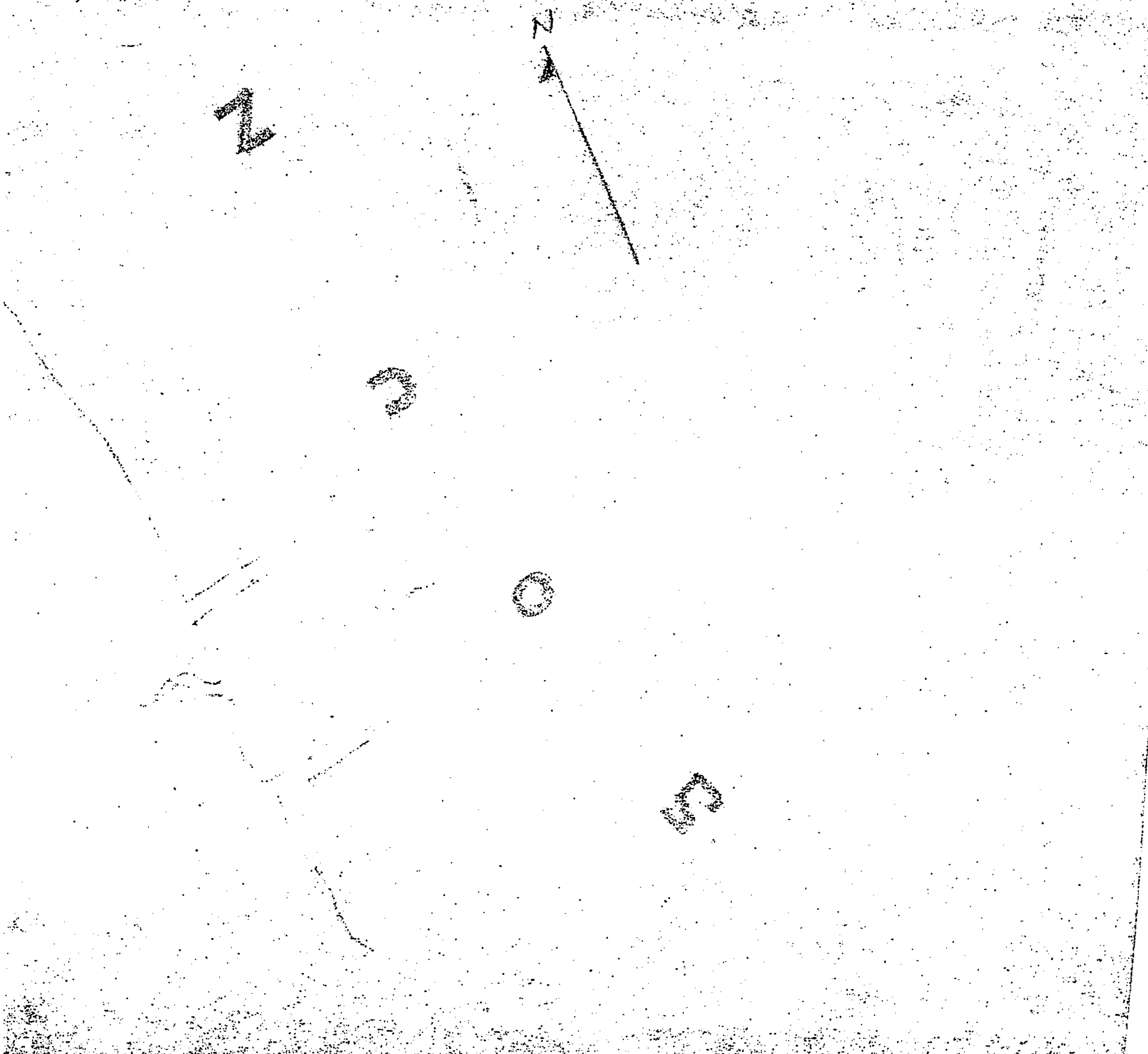
ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


HESS
OIL
COMPANY
WOODBRIDGE
ROAD TO MAURER
STATE ST
TYRELLS
ST
OIL

GENERAL MAP
SEWERS & INTERCEPTOR
CITY OF PERTH AMBOY

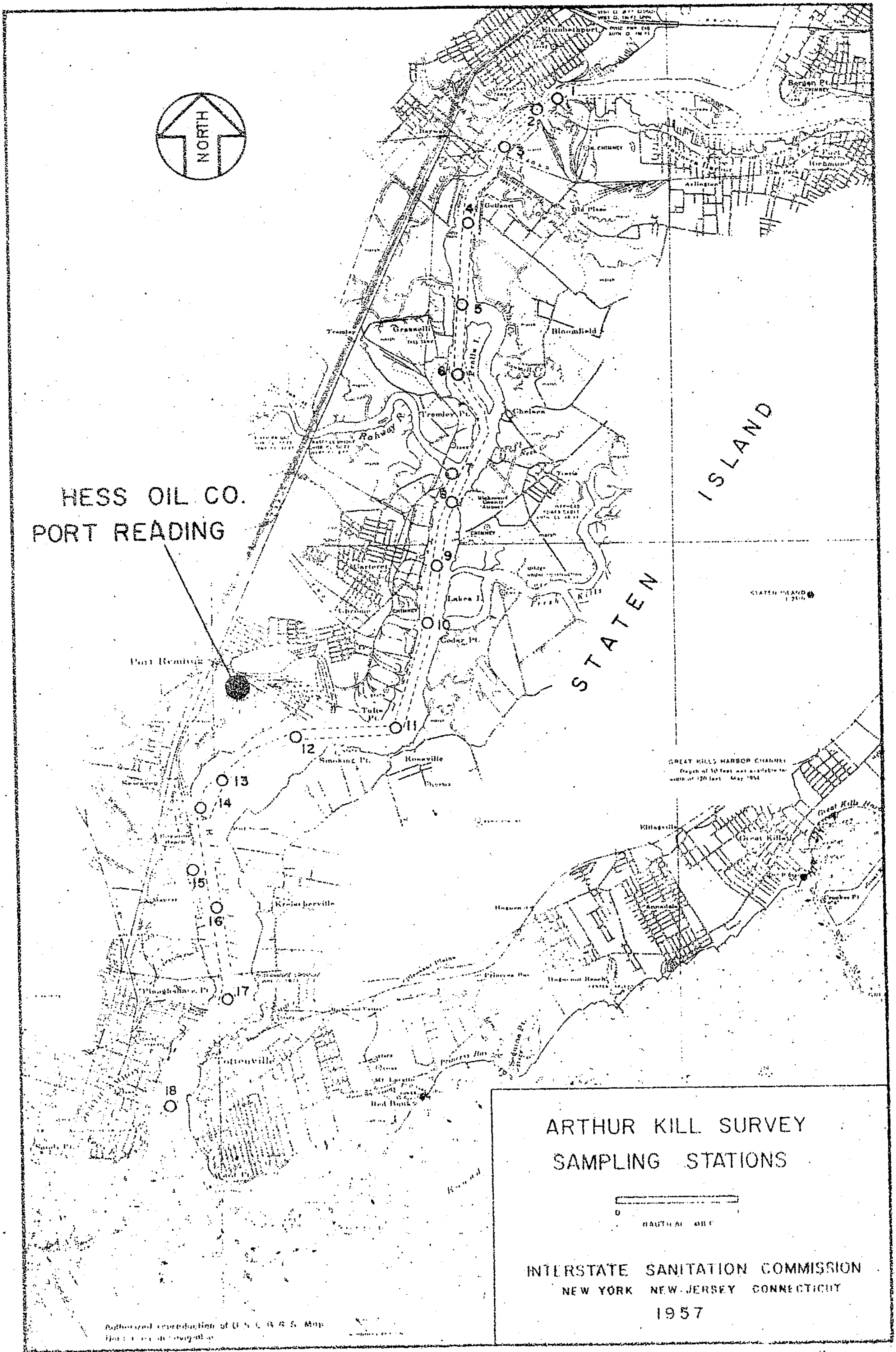
EXISTING SEWERS
– – – – – – –
INTERCEPTOR
————————



PLANT: Hess Oil Company

LOCATION: Cliff Road, Port Reading, N.J.

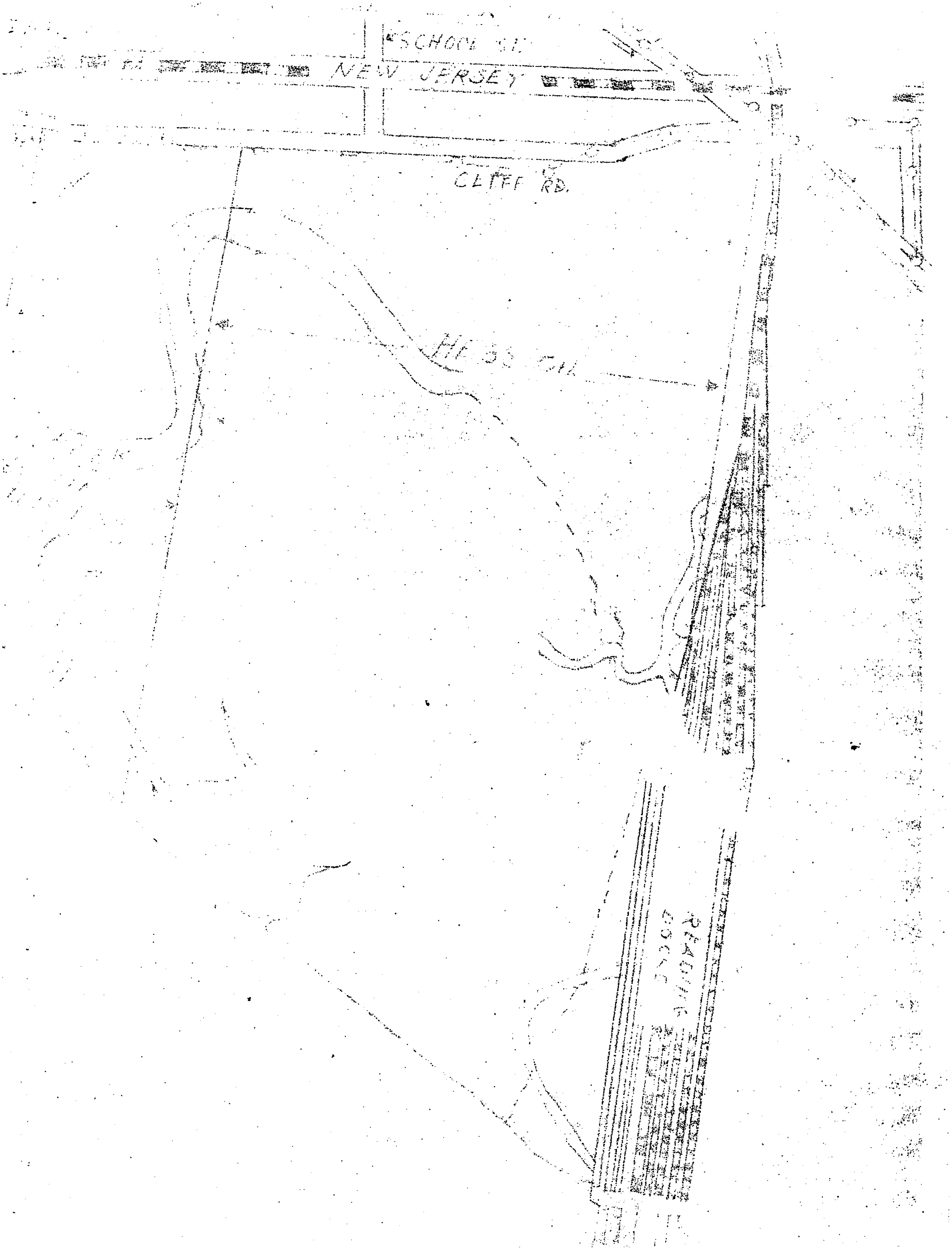
The Hess Oil Company refinery is located on the east side of Cliff Road, Port Reading, This unit is bordered on the north by the Reading Railroad Coal Dock Yards and on the south by the Sewaren Generating Station. Located on Cliff Road an 18" intercepting sewer flows in a southerly direction to the Woodbridge Treatment Plant. From observations made through a manhole at street level, it is estimated that this line was flowing less than one quarter full. Our Industrial Waste Survey indicates that 1400 gpm is discharged from this refinery.



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957

Authorized reproduction of U.S.C.&G.S. Map

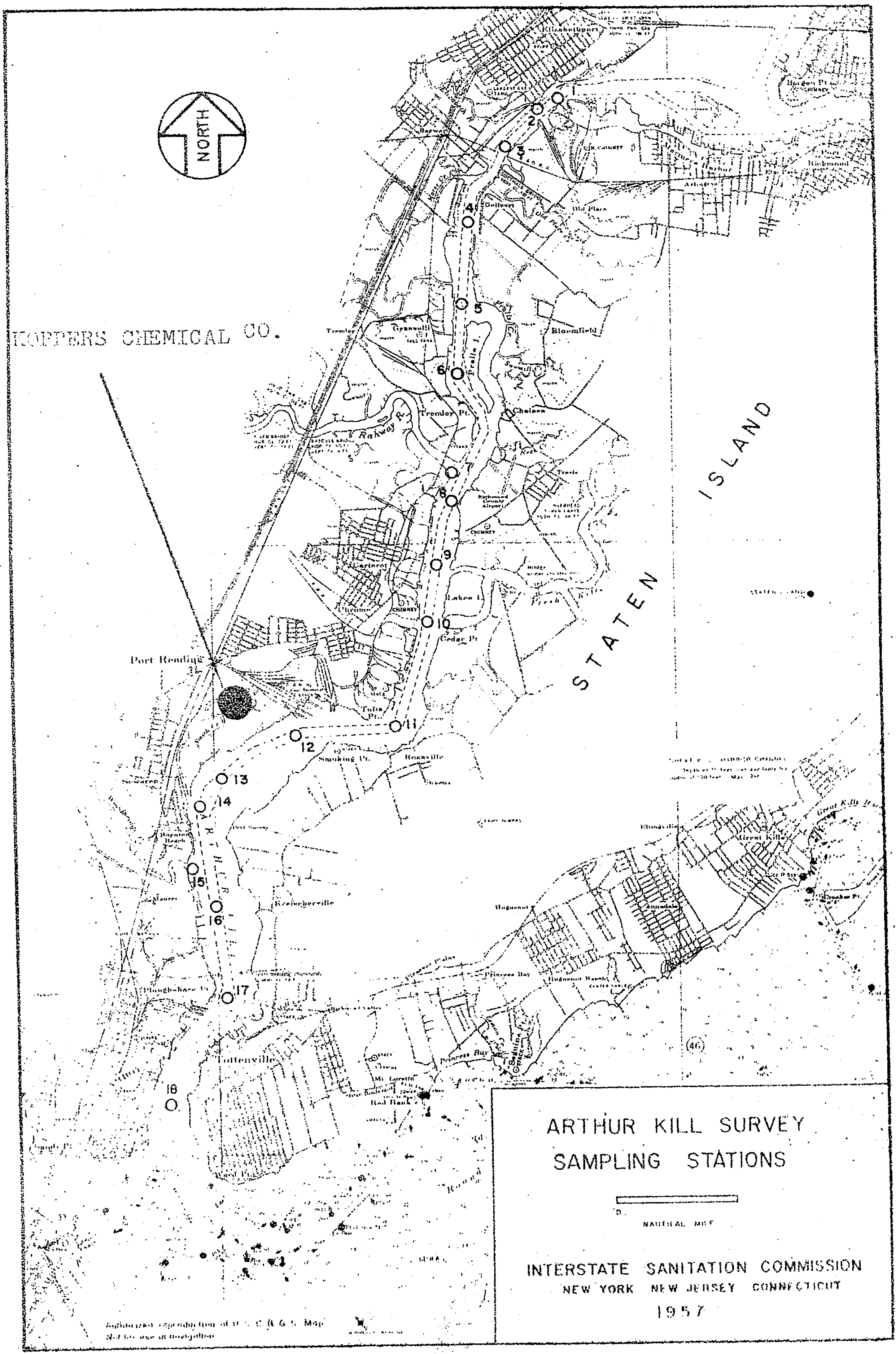

SCHOOL ST.
NEW JERSEY
CLIFF RD.
HESS OIL
READING
DOCKS

PLANT: Koppers Chemical & Plastics Division -
Koppers Wood Preserving Division

LOCATION: Carteret Road, Port Reading, N.J.
End of Edwin St., Carteret, N.J.

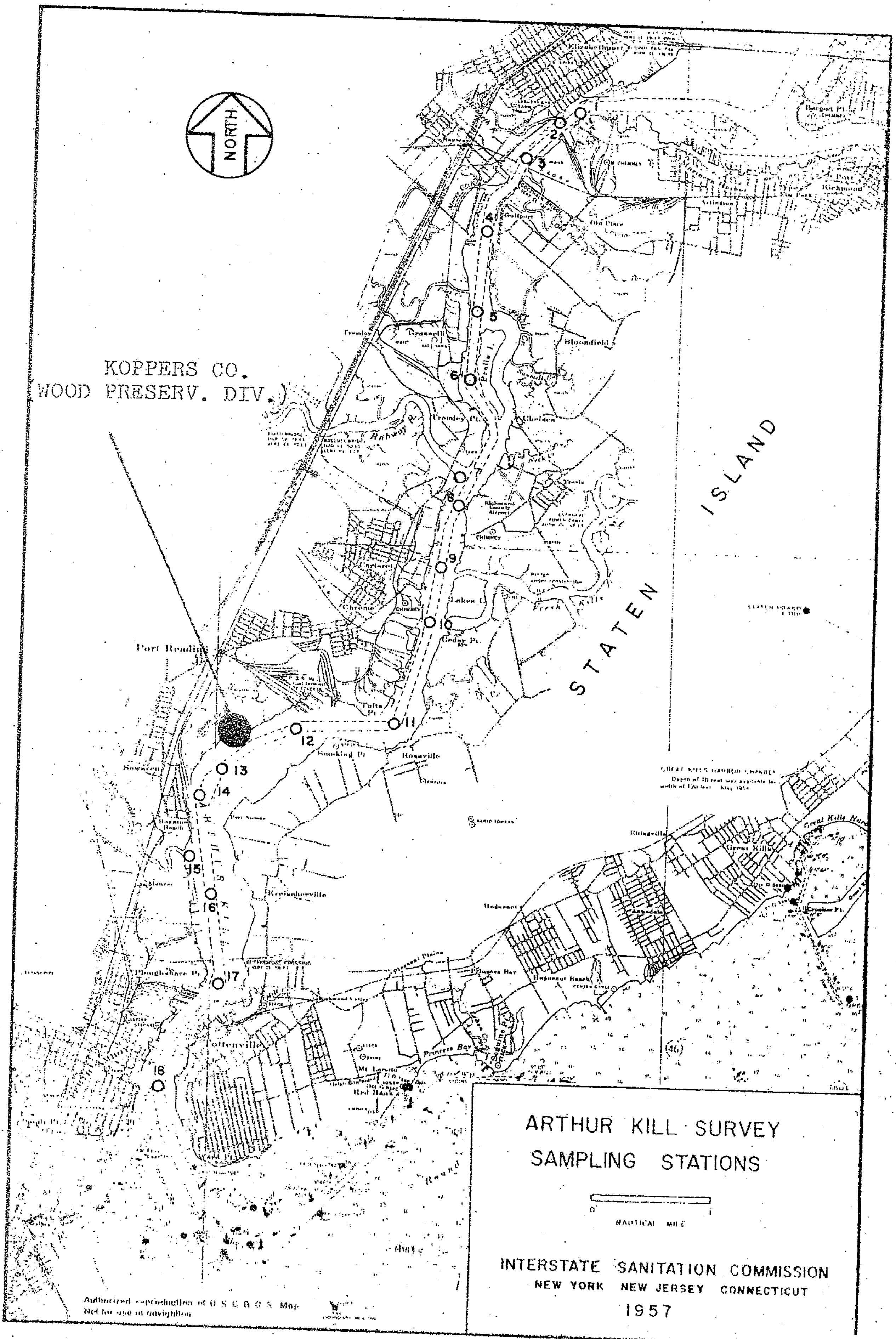
The Koppers Chemical and Plastics Division Plant is located between the Arthur Kill and Carteret Road. This section of Carteret Road which extends between the Borough of Carteret and Vernor Way is not sewered. However on all streets which run perpendicular to Carteret Road they have sewer lines. In this area the average size of the sewers is 12", all of which discharge to the 18" interceptor which starts at Carteret Road and Turner Street. From observations made through manholes at street level all lines appeared to be large enough to service the 530,000 gpd flow from this unit.

The Koppers Wood Preserving Division Plant is located at the foot of Edwin Street. Edwin Street is a city street owned by the Borough of Carteret but the plant mentioned is located in the Port Reading section of the Woodbridge Township. There are no city sewers available in this area, the nearest one being located in the Borough of Carteret at the intersection of Edwin Street and Bergen Street which is approximately 1200 feet away. At this point the Edwin Street pump station is located. All sewage entering this station is pumped to the Carteret Sewage Disposal Plant. This wood creosoting unit uses approximately 230,000 gallons of fresh water per year.



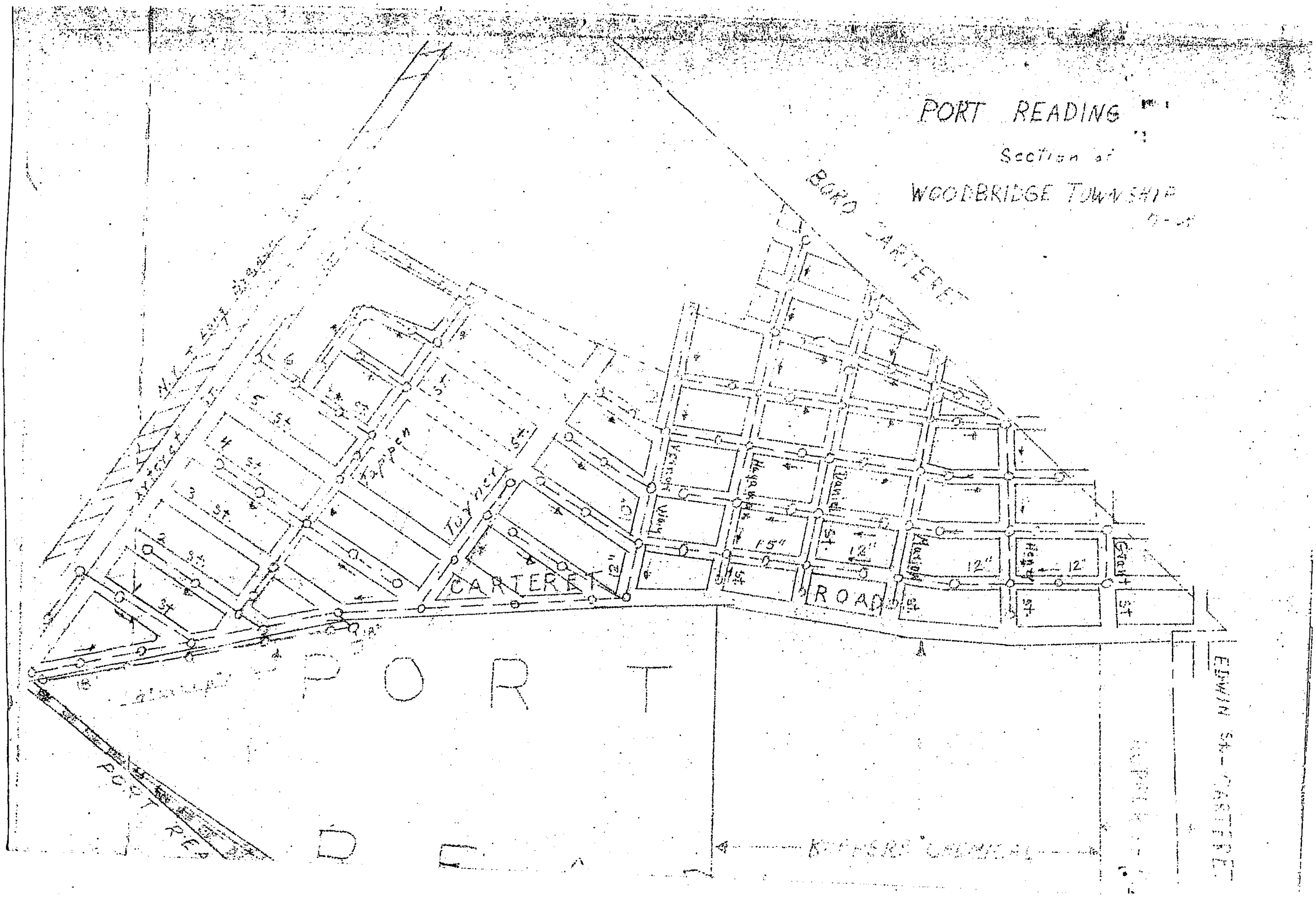
ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



PORT READING

Section of

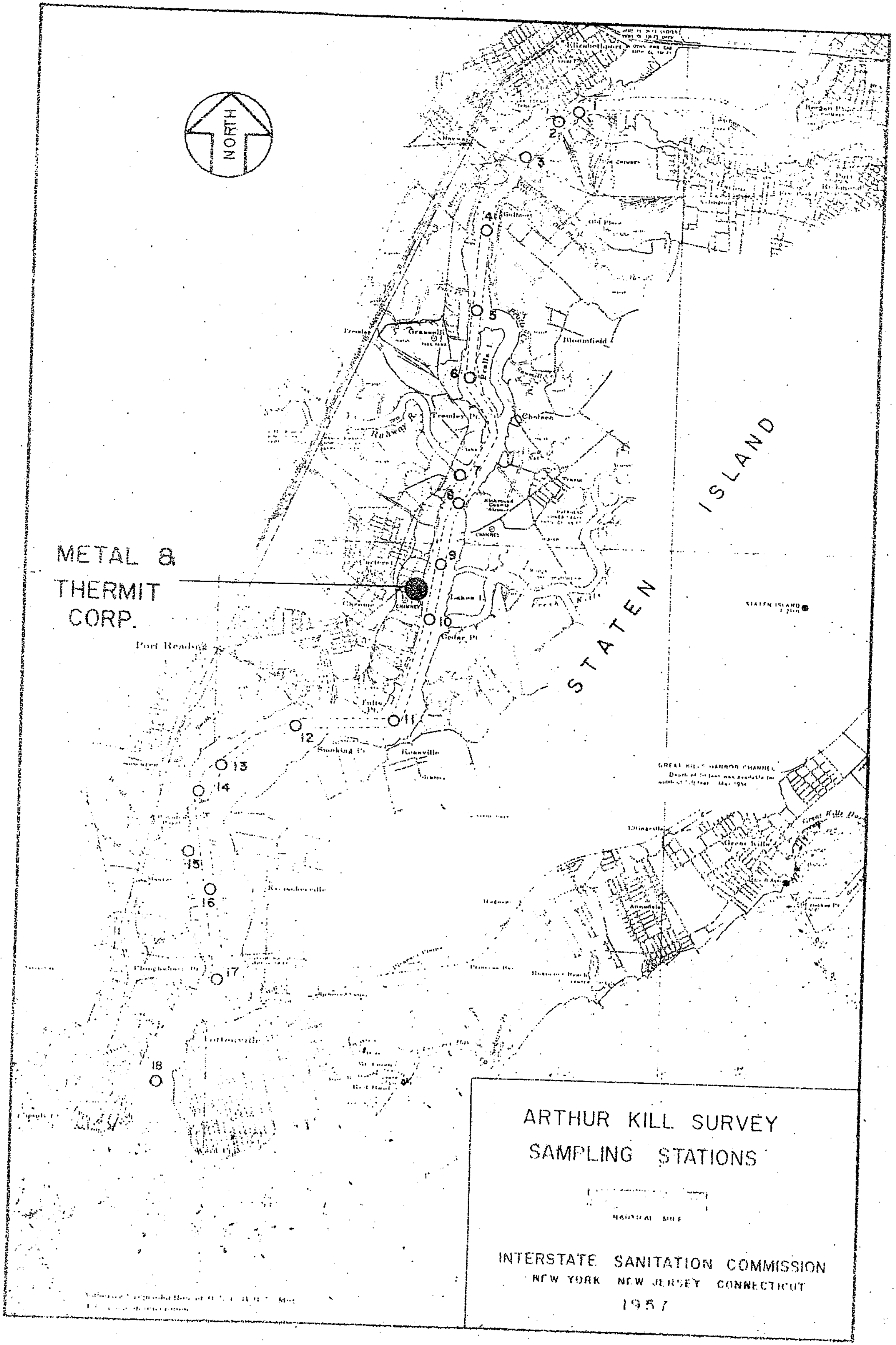
WOODBRIDGE TOWNSHIP


LANDING
PORT
COAL
DING R.R.
Koppers Wd
Preserving Div.

PLANT: Metal & Thermit Corporation

LOCATION: Foot of Union Street, Carteret, N.J.

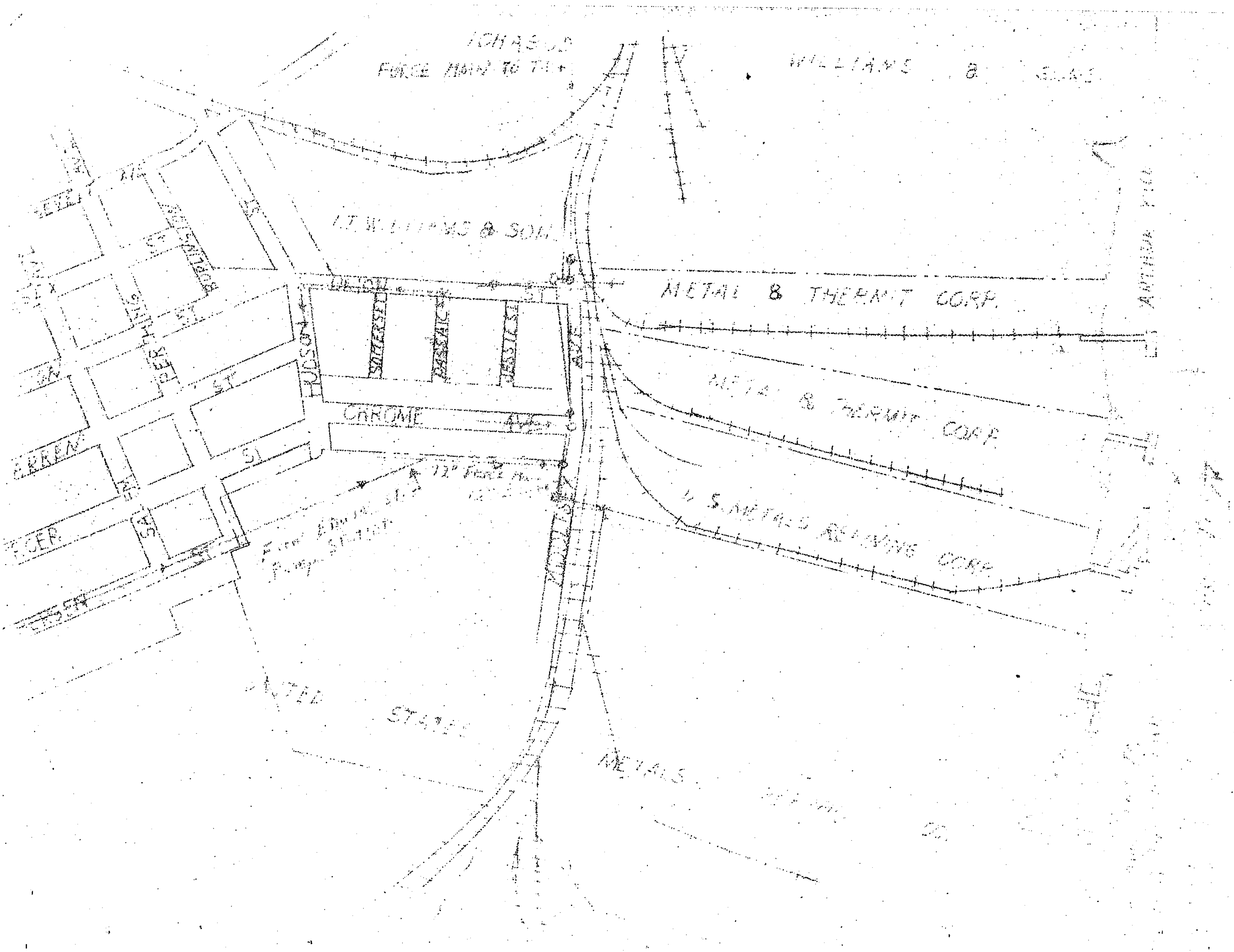
The Metal and Thermit Corporation is located between the Arthur Kill and the intersection of Middlesex Avenue and Union Street. Located directly in front of the main entrance to this plant and on the west side of the Central Railway of New Jersey tracks is the main interceptor which flows to the Carteret Treatment Plant. From observation through several manholes in this area a sewer line of undetermined size was seen discharging some waste from this plant.



METAL & THERMIT CORP.

ARTHUR KILL SURVEY
SAMPLING STATIONS

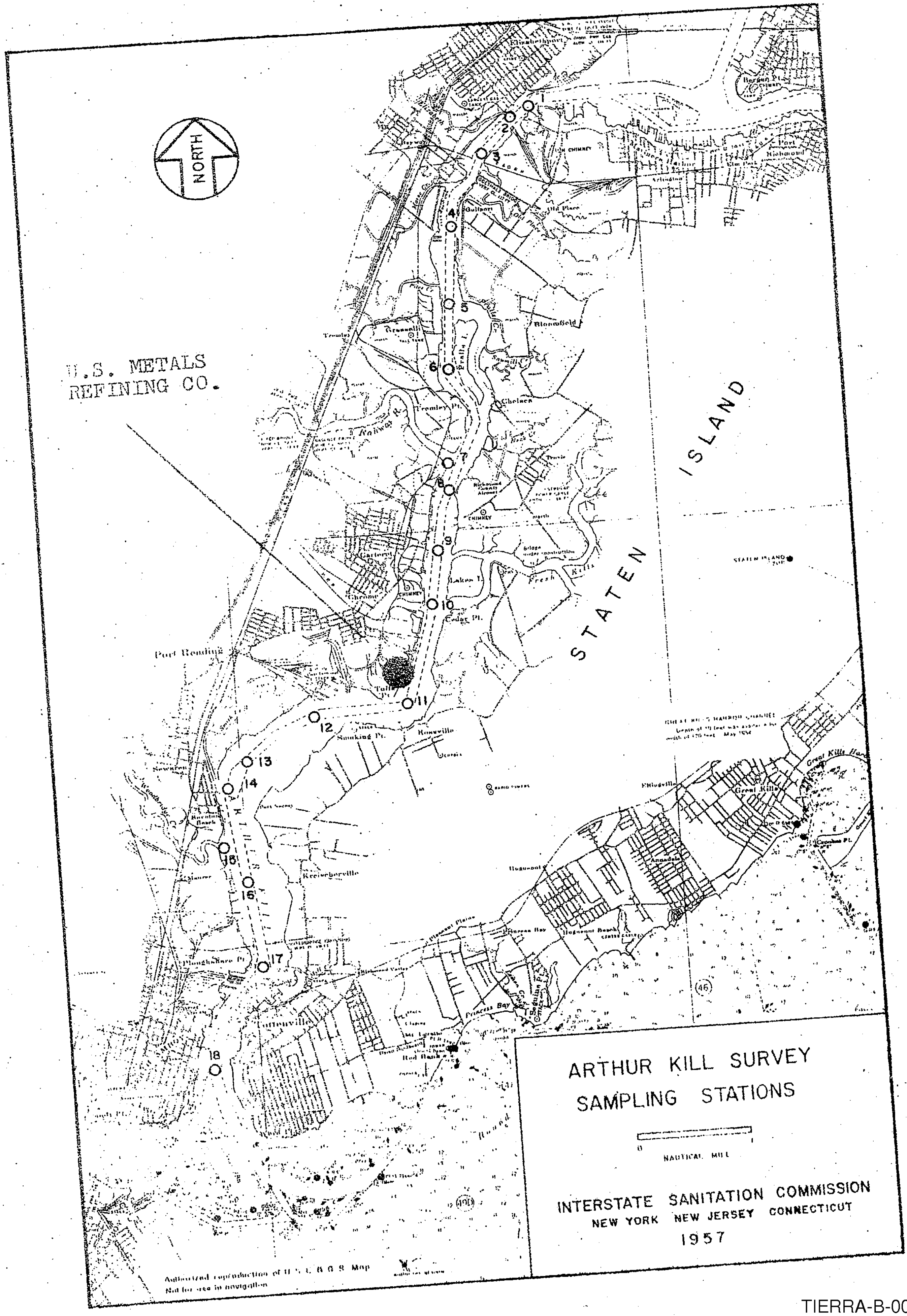
INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


FORCE MAIN TO T..
J.T. WILLIAMS & SON
WILLIAMS & SONS
METAL & THERMIT CORP.
METAL & THERMIT CORP.
U.S. METALS REFINING CORP.
UNITED STATES METALS REFINING CO.
ARTHUR KILL
HUDSON
UNION ST
SOMERSET
PASSAIC
ESSEX ST
CHROME AVE
MIDDLESEX
12" FORCE MAIN
From Edwin St. Pump Station
PERSHING ST
BURLINGTON
SALEM
WARREN
MERCER
ST
AVE

PLANT: United States Metals Refining Co.

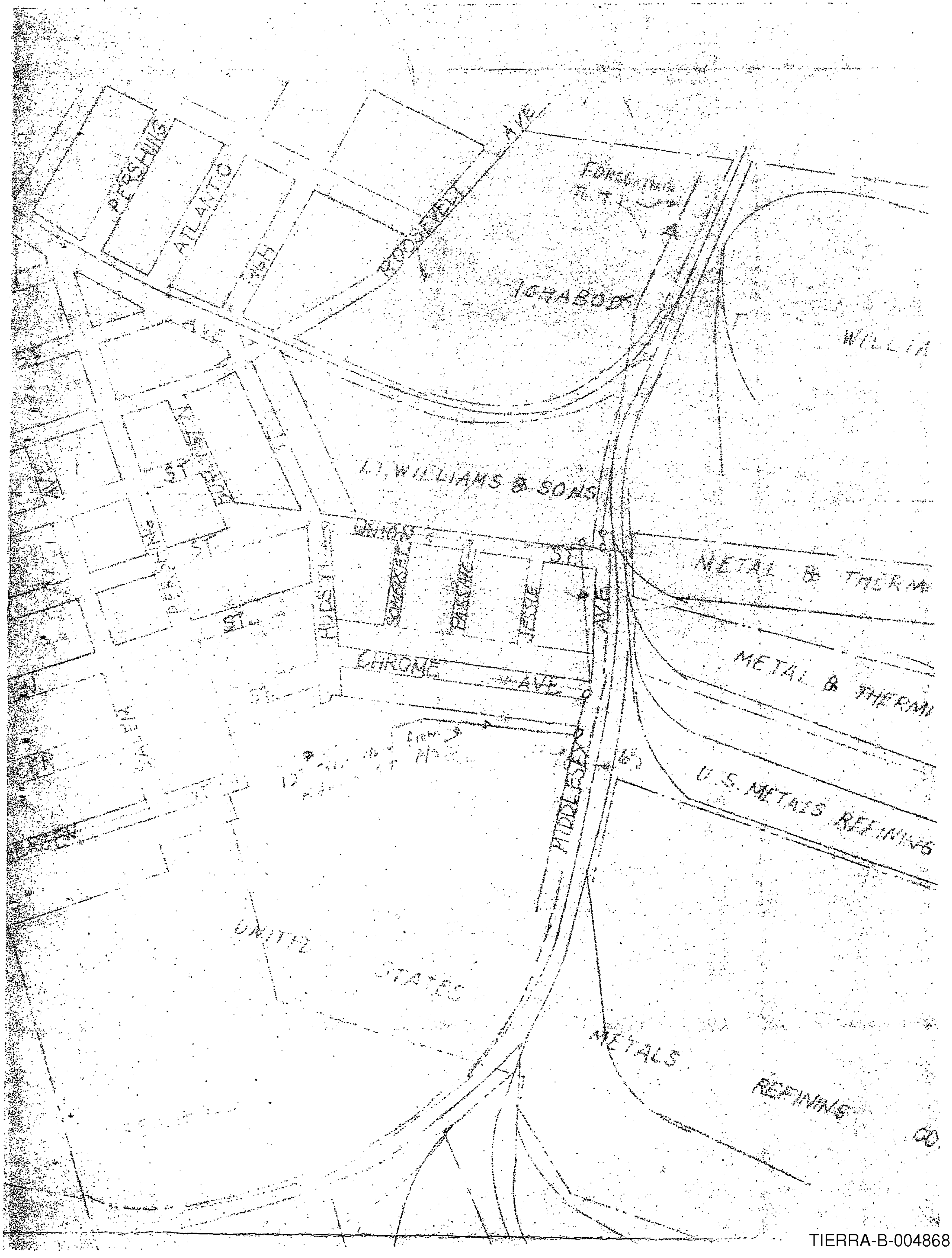
LOCATION: Middlesex Avenue, Carteret, N.J.

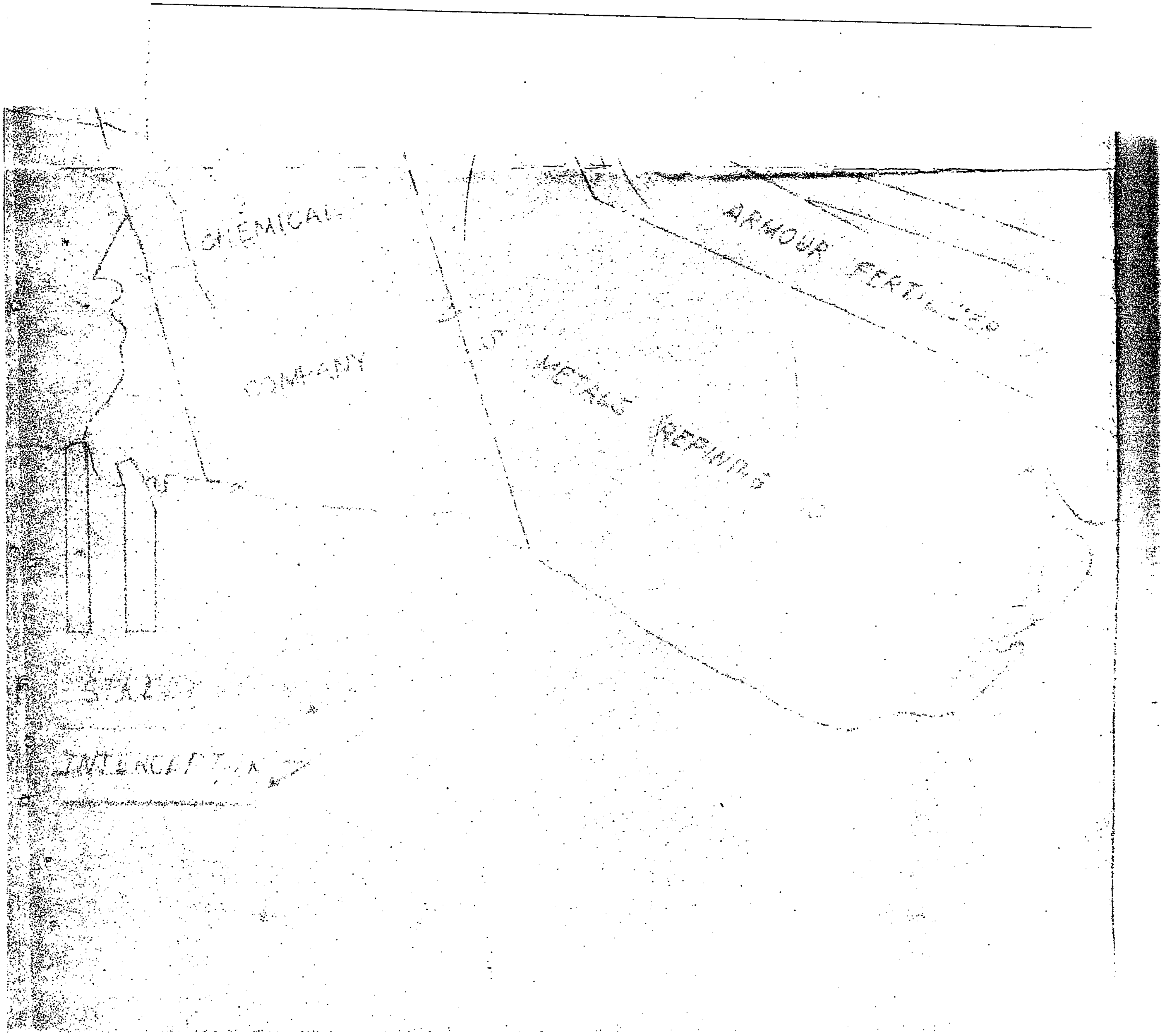
This metal refining plant is located between the Arthur Kill and Middlesex Avenue. Bordering the plant on the north is Metal & Thermit Corporation and on the south is the Armour Fertilizer Company. At the northern portion of their property a 6" private sewer was observed entering into a 12" city sewer. This 12" city sewer empties into the force main which is located approximately 200 feet to the north of this connection between the 6" and 12" sewer. This 6" private sewer seemed to originate from the U.S. Metals property. The flow during the time of inspection was very slight. From observations made through the manholes at street level it is estimated that the 12" line was flowing approximately 1" full. Our Industrial Waste Survey indicates that the approximate discharge from this refining unit is 36.0 mgd.

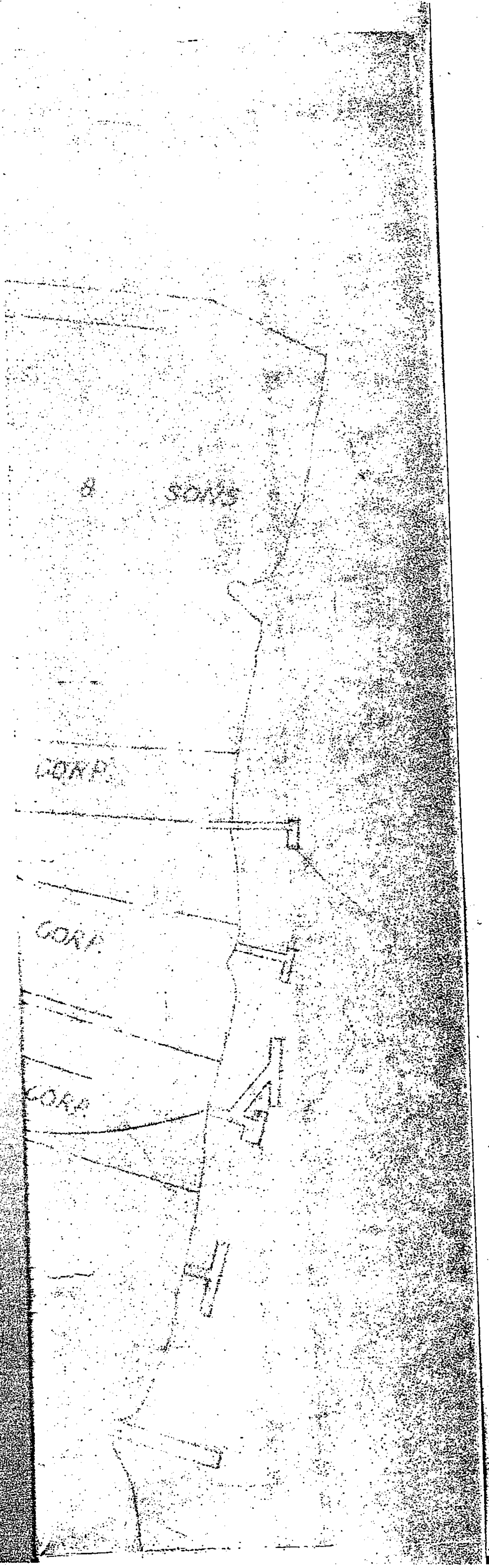


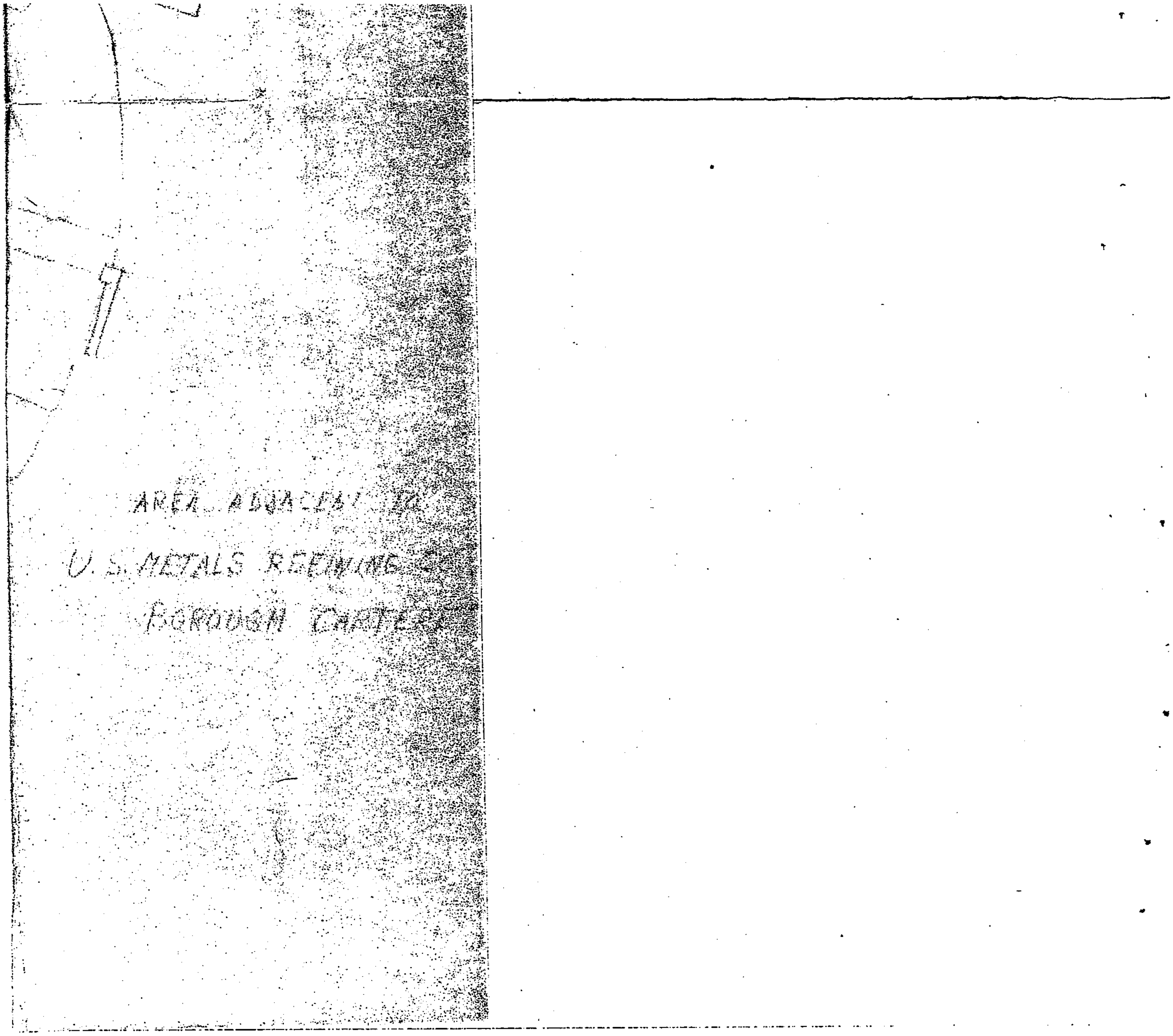
ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957


PERSHING
ATLANTO
3RD
ROOSEVELT
AVE
ICHABOD
WILLIA
AVE
ST
PERSHING
AVE
I.T. WILLIAMS & SONS
UNION ST
ST
PERSHING
ST
HUDSON ST
SOMERSET
PASSAIC
JESSE
ST
AVE
CHROME AVE
METAL & THERM
METAL & THERM
U.S. METALS REFINING
MIDDLESEX AVE
SALEM
UNITED STATES METALS REFINING CO.


CHEMICAL
COMPANY
ARMOUR FERTILIZER
METALS REFINING
STANLEY
INTERCEPTOR

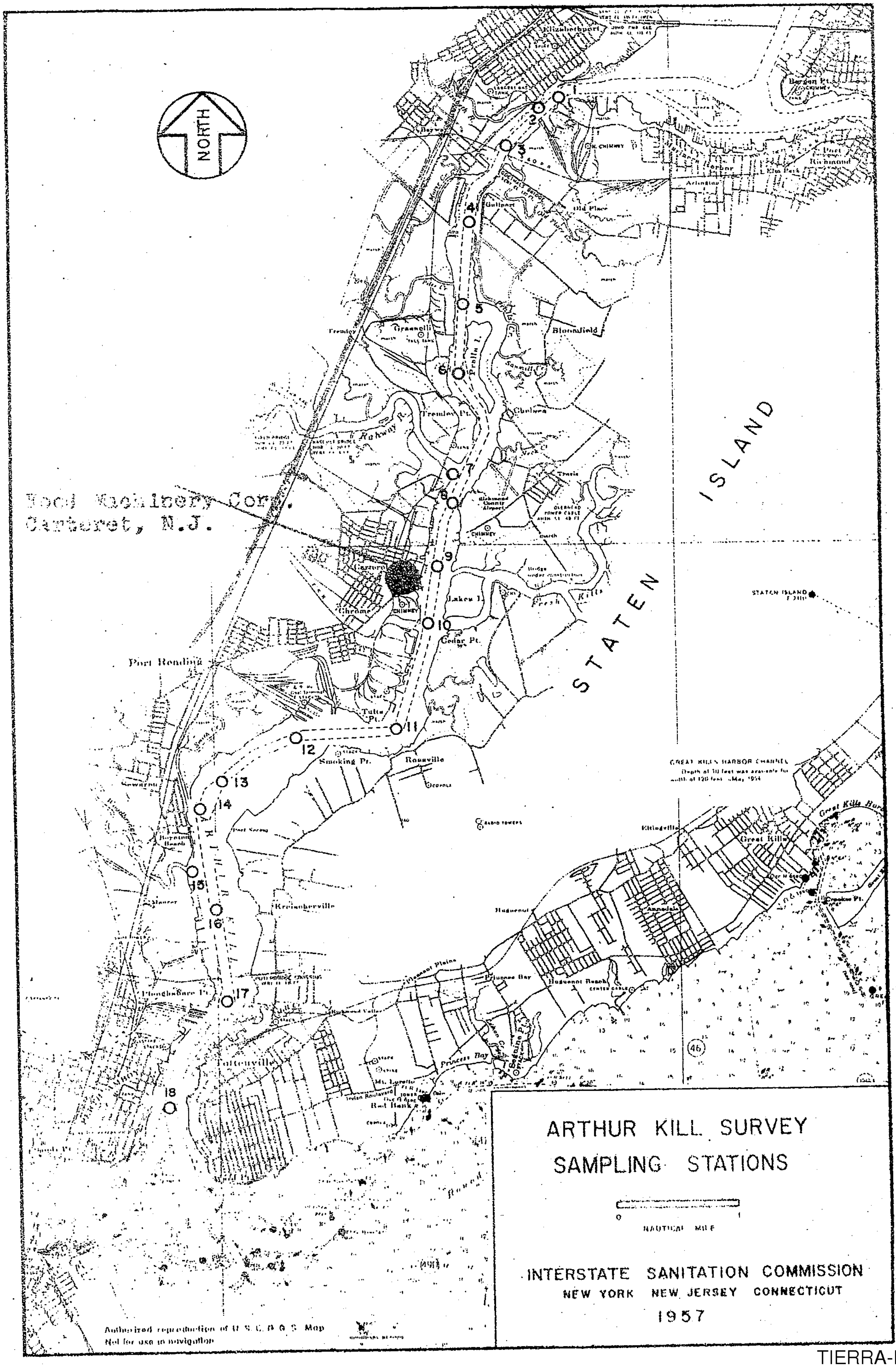

B SONS
CORP.
CORP.
CORP.


AREA ADJACENT TO
U.S. METALS REFINING CO.
BOROUGH CARTERET

PLANT: Westvaco - Food Machinery Corp.

LOCATION: Roosevelt Avenue, Carteret, N.J.

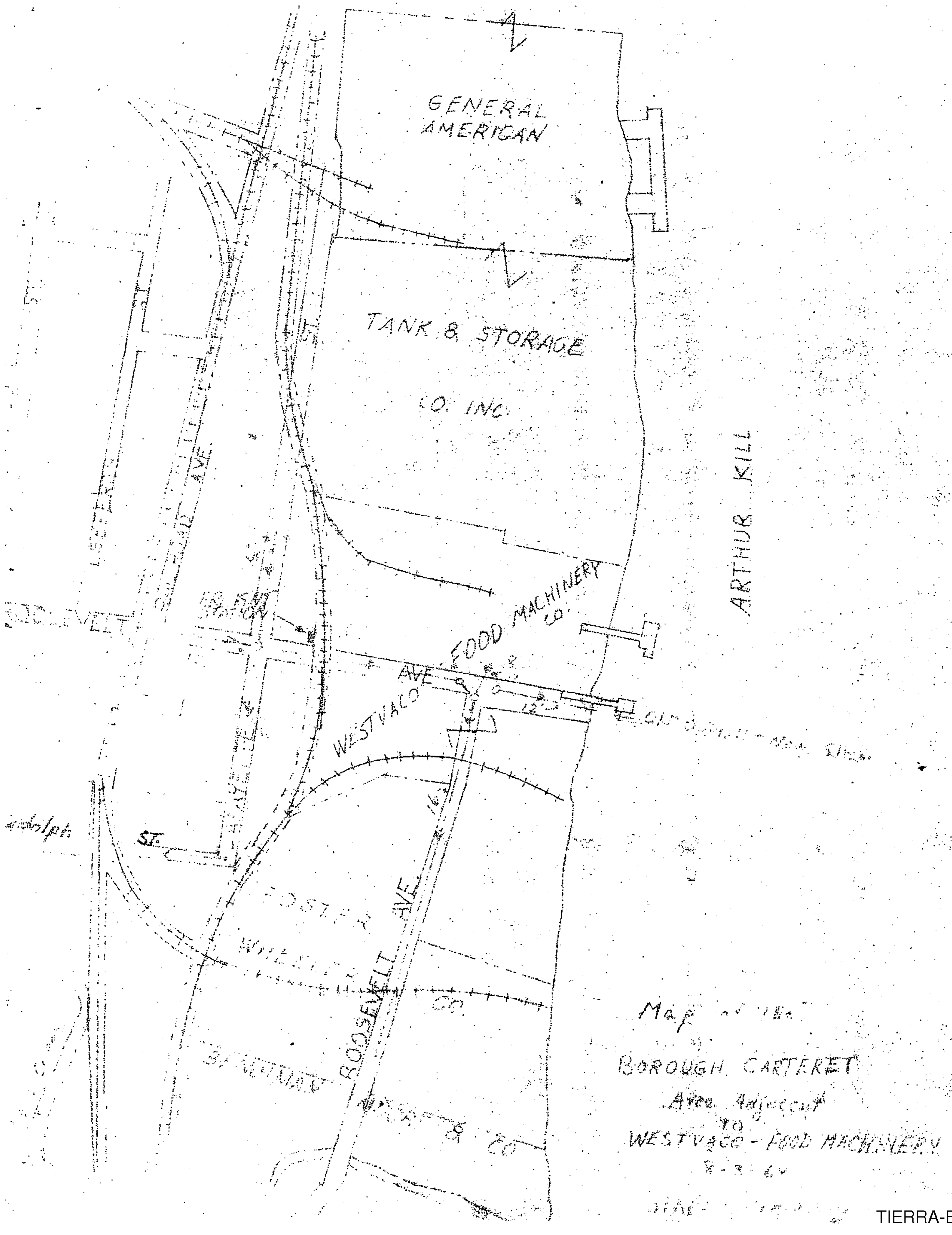
This plant is located on the north side of Roosevelt Avenue and also has buildings located between the west side of Roosevelt Avenue and the east side of Lafayette Street. All units which are located to the north of Roosevelt Avenue border on the Arthur Kill. City sewers are located on all streets which border this plant. From observations made through manholes at street level it was estimated the sizes of sewers and their approximate flow. The 12" and 16" sewers on Roosevelt Avenue were estimated to be flowing approximately one quarter full. The 8" sewer on Lafayette Street which starts at the south side of Roosevelt Avenue and flows southerly to Randolph Street had very little flow in it during the time of inspection. At the bend in Roosevelt Avenue an 8" stub with no flow was observed coming from the units located to the north of this Avenue. Our Industrial Waste Report indicates that all units north of Roosevelt Avenue discharge approximately 2560 gpm and the units located between Roosevelt Avenue and Lafayette Street discharge approximately 110 gpm. All discharges go directly to the Arthur Kill.



Food Machinery Corp.
Carteret, N.J.

ARTHUR KILL SURVEY
SAMPLING STATIONS

INTERSTATE SANITATION COMMISSION
NEW YORK NEW JERSEY CONNECTICUT
1957



Map of the
Borough Carteret
Area Adjacent
to
Westvaco - Food Machinery
8-3-64

CONCLUSION

After carefully reviewing the city sewer maps and from on the site observations in the following communities: Carteret, Perth Amboy and Port Reading in the Woodbridge Township, it is reasonable to assume that of the 13 industrial plants in question 8 of them could divert their waste discharges to the city sewer system.

The following plants located in the Borough of Carteret have city sewers which are adequate in size and within reasonable distance to their respective plants:

1. Agrico Chemical Company
2. Foster Wheeler Company
3. Metal & Thermit Corporation
4. Westvaco Company

However, it should be kept in mind that the designed flow of the Carteret Sewage Disposal Plant is 3.0 MGD. The average daily flow for the past year at this plant was reported as 2.9 MGD. While U. S. Metals already has a 6" sewer line connected to the 12" city sewer, their reported average discharge of 36.0 MGD would need further study. The problem arising with Armour Fertilizer Company and General American Tank & Storage Company is that they are situated over 1200 feet from the nearest city sewer.

In the Port Reading section of Woodbridge Township Hess Oil Company and Koppers Chemical Company would connect to the local sewer system. Their respective flows would be diverted to the Woodbridge Sewage Disposal Plant via the 18" gravity line which at the present time has sufficient capacity for this additional flow. The Woodbridge Treatment

Plant has a designed flow for 10.0 MGD and the daily average flow as reported for this plant was only 3.4 MGD. The only industrial plant in this area which would encounter some problems is the Creosoting Plant of Koppers Company.

In the Perth Amboy area, the following industrial plants could be served by the city sewer system: American Smelting & Refining Company and California Oil Company. The city sewer system and pumping stations have adequate capacity for this additional flow. The Perth Amboy Sewage Disposal Plant has a designed capacity of 10.0 MGD and last year their average daily flow was reported at 5.4 MGD. In this area some difficulties would be encountered at the Hess Oil Company due to the distance involved between their plant and the nearest city sewer.

FG:k
11165

140

SINGER-ELIZABETH DIVISION

SINGER

THE SINGER COMPANY
321 First Street, Elizabeth, New Jersey
Area Code 201 • EL 2-5200

JUL 2[illegible] 1972

July 18, 1972

Environmental Protection Agency
Region II Office
26 Federal Plaza
New York, New York 10007

ATTENTION: Mr. Robert E. Denham, Chief, Legal Section,
Enforcement Division

REF.: PROGRESS REPORT ON INDUSTRIAL WASTE WATER TREATMENT SYSTEM

Dear Mr. Denham:

BAC000015

Enclosed are two (2) copies of our Interim Report, Phase I, of the Industrial Waste Survey prepared for The Singer Company by Ecolotrol, Inc.

We have already issued a purchase order for Ecolotrol, Inc. to proceed with Phase II, Treatability Study, which they estimate will take six (6) to eight (8) weeks to complete.

Regarding the conclusions and recommendations of the enclosed Interim Report we generally agree and in fact will now proceed with item I. However, we do not necessarily concur with their conclusion and recommendation, item V, pertaining to the mixing of the two, presently separate, waste flows.

It is our feeling that it will be more desirable to handle the plating waste flow with a completely separate treatment system. We have been working along these lines with Schore Automation, Inc., the vendor that furnished and installed the major portion of our automated plating lines in 1968. Schore Automation is preparing a quotation for the design and installation of a plating waste treatment system, custom designed to meet our particular needs and comply with all local, state, interstate and federal codes.

We are also working with other vendors, and conducting our own feasability study, in regards to modifying and upgrading our sand settlement pit to obtain maximum utilization of this existing facility. Although not discussed in the Interim Report, the efficiency of solids separation in this

PROGRESS REPORT ON INDUSTRIAL WASTE WATER TREATMENT SYSTEM

7/18/72 - (CONTINUED)

pit could be considerably improved by the installation of a continuous sludge removal conveyor. Also, we would include a surface skimmer for removing unemulsified oils and other flaculated materials.

We expect to be able to furnish you with an estimated project time schedule sometime in September after completion of Phase II, Treatability Study, from which the project design, fabrication and installation times can be estimated.

Yours very truly,

J. E. DeVries

J. E. DeVries, Manager, Plant Engineering

JED/gam

Enclosure (1)

cc: Mr. Richard R. Delgado
Water Pollution Control Program
New Jersey State Department of Environmental Protection
P.O. Box 1390
Trenton, New Jersey 08625

✓ Mr. Thomas R. Glenn, Jr.
Director and Chief Engineer
Interstate Sanitation Commission
10 Columbus Circle
New York, New York 10019

Dr. Ernest A. Regna
Chief, Permits Branch
Environmental Protection Agency
Region II Office
26 Federal Plaza
New York, New York 10007

Mr. A. Romel, Director of Engineering, The Singer Company

Mr. K. Connolly, Manager, Industrial Relations, The Singer Co.

ECOLOTROL ENVIRONMENTAL LABORATORY
Division of Ecolotrol, Inc.

[illegible] 1972
ENVIRONMENTAL REPORT

THE SINGER COMPANY

Interim Report

Industrial Waste Survey

July 5, 1972

Presented by:

Ecolotrol, Inc.

OVERVIEW

Ecolotrol has been retained by the Singer Company to develop a process to treat an industrial waste which is presently being discharged from its Elizabeth Plant into Newark Bay. This waste stream has been designated as discharge 001 in the company's permit application to the Army Corps of Engineers; and for the purposes of consistency will be referred to as discharge 001 in this report. The purpose of this phase of our investigation was to determine the sources of pollution, the concentrations and frequency of discharge and to make possible recommendations for treatment.

Discharge line 001 is fed by two sources. One source contributes cooling water and storm run off. Laboratory testing has indicated that this stream is acceptable for discharge to Newark Bay. The other source is the effluent from a sand pit which collects the combined effluents from a number of processing areas. At present, the major portion of the plant's industrial waste load is being discharged through this sand pit. Other wastes are being discharged into waste lines 002 and 003, but the quantity is minimal in comparison to the loading on 001. There is one other discharge line (004) which empties into Newark Bay at the northeast corner of the plant. This waste is strictly bay water which is circulated through a closed loop system and sent back into the bay. Laboratory testing has verified that this stream is identical to the intake water.

DESCRIPTION OF WASTE LOAD TO SAND PIT

Building W-3

This section of the plant handles all of the burnishing and tumbling operations for both the industrial and commercial products divisions. The burnishing is carried out in both vibratory finishers and barrel tumblers which operate almost continuously during the working day. The discharge form these operations appears to be the major flow into the sand pit. Table I shows the compounds that are being discharged to the sand pit.

Laboratory analyses were performed on the effluent from this area and show that the waste contaminants were very similar to the previously reported results, which were submitted to the Army Corps of Engineers. The three major problem areas being : the excessive oil concentration, the high concentration of phosphates, and the high concentration of total solids.

Building V-4

There are five tanks in the basement (northeast corner) of the V-4 building each holding approximately 250 gallons. The contents of these tanks are discharged periodically and chemical components are made up at intermittent intervals as required. The most frequently dumped tank is the chromic acid tank which is dumped every second day. The concentration in this tank is fairly dilute, one quart of concentrated chromic acid is added to 250 gallons.

TABLE I

COMPOUND	CONTENTS
Kelite #235 Rust Stripper	caustic, glucamates
Kelite Supersolv	low alkaline, low PO_4, silicates
Kelite #25, Phosphating	phosphoric acid
Hobart PS - 20	caustic paint stripper
Oakite Q-9-L	caustic paint stripper
Oakite #96	solvent emulsion cleaner
Oakite #89	acid phosphate
Oakite #31	phosphoric acid
Oakite #198	solvent emulsion cleaner
Oakite #29	mixed alkaline salts, soda ash, silicates
Gumm 161-R	mild alkalai, soap, some phosphates
Gumm 165-B	same as above, with high phosphates
Gumm Burnishing 171-A	mild alkalai, abrasive, no phosphates
Gumm 158-A	mildest alkalai, heavy soap, organic
Gumm Cleaner 12-Z	highly caustic, some phosphate, complexing and wetting agents

This batch discharge empties into discharge stream 002. In comparison to the total waste flow of the plant the significance of this waste discharge and the other four tanks in this area, is inconsequential. Table II gives a description of the additives and their frequency of dumping.

TABLE II

Tank No.	Additive	Amount Used	Frequency of Dumping
1	rust stripper	350 pounds	5 - 6 weeks
2	solvent	50 pounds	4 weeks
3	phosphoric acid	25 pounds	1 week
4	ch romic	1 quart	2 days
5	paint stripper	110 gallons	52 weeks

Building V-3-2

This building houses a three stage washer which cleans the castings prior to painting. The waste flow from this operation is intermittent in nature. Tank No. 1 has an 880 gallon capacity which is filled up at the beginning of the week and discharged every Friday. About 535 pounds of cleaning agents are dumped at this time. Tank No. 2 has a 325 gallon capacity and is dumped once daily.

This contains any of the carryover from tank No. 1. Finally Tank No. 3 also has a capacity of 325 gallons, contains a small amount of phosphoric acid and is dumped once daily. Table III has a description of the additives.

TABLE III

Tank No.	Additive	Pounds of Additive	Frequency of Dumping
1	acid phosphate	325	1 week
	solvent emulsion cleaner	200	1 week
	phosphoric acid	10	1 week
2	carry over from Tank 1	--	daily
3	phosphoric acid	trace	daily

V-3 Building

There is a small paint stripping operation in this building. The tank is about 100 gallons capacity and discharges once a month. Assuming that there is no loss of compound during use, about 920 pounds of caustic paint stripper is discharged once monthly. Also in the northwest corner of the building is a Hoffman filter which cleans the oil compound used to lubricate the milling machines on the floor.

This filter is dumped once a week and discharges about 1,500 gallons of soluble oil products into stream 003.

There are some other small and intermittent discharges emptying into streams 002 and 003 but these will all be diverted into the sand pit.

RESULTS OF LAB TESTING

There are two flows contributing to the 001 discharge line. In order to determine the effect produced by these streams, a sampling program was set up and composites obtained over a four hour period on a normal working day. Sampling had to be stopped after four hours since at that time the tide came in and filled the dischage line with bay water.

Sampling station #2 is located about 20 ft. away from the northeastern corner of the W-5 building. This contains the waste flow from the sand pit. Visual observations at the site indicated that there was no difference in quality between this sample and samples grabbed from the discharge area at the sand pit. Sampling station #3 is located about 30 ft. from the northeastern corner of the W-3 building. This line contains only storm water runoff and some cooling water. Visual observations at the site indicated a fairly uncontaminated waste stream.

Only those key parameters as suggested by the EPA were tested for to determine if the streams were in excess of the allowable standards. These limits, as were suggested by the EPA are as shown in Table IV.

Also from this table it can be seen that Station 3 is well within the allowable limits for discharge to the bay; but Station 2, on the other hand is high in pH, suspended solids, oil and grease, COD, and total phosphorous. Also the color and turbidity values were quite high.

TABLE IV

Parameter	Limit	Station 2	Station 3
pH	6.5-8.5	9.6	7.0
Oil & Grease (mg/l)	5-15 mg/l	39.5	1.1
Zinc (mg/l)	1 mg/l 9 → .69	1	1
BOD (mg/l)	30 mg/l	-	-
COD (mg/l)	140 mg/l high	332	44
Total Phosphorous (mg/l)	1-2 mg/l	26.7	0.14
Suspended Solids (mg/l)	75 mg/l high 25.9	638	30
Total Solids (mg/l)	-	1486	120
MBAS (mg/l)	-	0.63	0.02
Alkalinity (mg/l)	-	543	24

Some preliminary treatability work was performed on the waste collected at Station 2, which removed essentially all of the color and turbidity. Also the oil and grease and the suspended solids were greatly reduced. However, it should be mentioned that this was only performed on a grab sample and no standard controls were used.

A composite sample was also collected at the neutralization pit which receives the effluent from the plating operations. This waste was composited using an automatic sampler over a four hour period. The flow appeared to be fairly consistent over this period of time. The flow over the effluent weir was approximately 180 gal/min. The results of the analyses are shown in Table V.

TABLE V

ANALYSIS OF PLATING WASTE

Copper (mg/l)	0.36	.2
Zinc (mg/l)	0.32	✓
Nickel (mg/l)	3.5	→ .1 or less
Chromium (mg/l)	2.8	→ .1-.2
Cyanide (mg/l)	0.26	→ 0
pH	9.0	6.5-8.5
Alkalinity (mg/l)	107	
Oil and Grease (mg/l)	5.1	→ 1

These results show high concentrations of nickel and chrome. If the federal EPA holds to the tentative limits for metal discharge at 1 mg/l, this waste will require pretreatment prior to acceptance into the local sewerage system.

CONCLUSION AND RECOMMENDATIONS

I All process waste waters should be diverted to the sand pit and then sent to a treatment system. This sand pit should be used as a surge tank, or a blending tank but not as the main treatment system.

II Based on some preliminary treatability work performed during Phase I, it apprears that the waste is amenable to physical chemical treatment. During Phase II we will investigate various additives such as, ferric chloride, alum, lime, and polymers. We will determine the optimum concentrations of chemical additives, pH range, and determine the approximate chemical cost involved.

III Other types of treatment will also be investigated, including the use of activated carbon and a system utilizing distillation. Estimates of the cost involved will aslo be prepared.

IV In light of the fact that a line already has been installed diverting the flow from the sand pit to a point adjacent to the southwest wall of building W-5, it is our opinion that a treatment process be installed in this area. It is also advantageous since the plating waste line is in this same area and one system could be used to treat both wastes.

V During our investigation into the plant operations which produce liquid effluents, it was brought to our attention that the plant has a plating waste flow which is presently discharging into the local municipal treatment plant. In light of the fact that the municipality will be placing tighter restrictions on industrial waste discharges we felt that it might be advisable to consider the possibility of treating this waste flow along with the waste flow already under investigation. The treating of these wastes concurrently may well prove to be more economical than to provide two separate waste treatment systems. There would most likely be a considerable savings in instrumentation, initial construction cost and process design work. We would recommend that simultaneously along with phase II of our investigation, Ecolotrol perform treatability studies on the plating waste.

VI Sufficient samples will be collected to perform treatability studies, both on the composite sample from the sand pit and also the individual discharge points which will eventually be hooked up to the sand pit.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 Federal Plaza
New York, New York 10007

RECEIVED
APR 27 1978
State of New Jersey
Dept. of Environmental Protection
Division of Water Resources

In the Matter

The Singer Company

NPDES Permit Number: NJ0001465

Proceedings under Section 309(a)(3) and (a)(4), Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. §1319)

FINDINGS OF VIOLATION
AND
ORDER TO SHOW CAUSE

EPA ORDER NUMBER NPDES-II-78-18

The following FINDINGS are made and ORDER issued pursuant to the authority vested in the Administrator of the Environmental Protection Agency (hereinafter EPA) by Section 309 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. §1319) (hereinafter "the Act") and by him duly delegated to the Regional Administrator of Region II which authority has been duly re-delegated to the (undersigned) Director, Enforcement Division, Region II.

FINDINGS OF VIOLATION

1. On January 17, 1974, the Regional Administrator of Regien II, EPA, pursuant to authority delegated to him by the Administrator, issued a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Act, (33 U.S.C. §1342) to the Singer Company, NACPG-U.S. Division Plant (hereinafter Singer), for the discharge of pollutants from its facility located at Elizabeth, New Jersey to Newark Bay. By its terms, this permit (No. NJ0001465) became effective on January 25, 1974 and expires on January 25, 1979.

2. In accordance with Conditions 10 and 11.c on pages 5 and 6 of the permit, Singer was required to terminate all discharges except uncontaminated surface runoff from outfalls numbered 001, 002, 003, and 004 by November 1, 1975.

3. On July 1, 1974, Singer notified EPA of the cessation of discharge 004. Likewise, on October 2, 1974, Singer notified EPA of the cessation of discharge from outfall 003.

4. On December 2, 1975, Singer notified EPA that the construction of its facilities was delayed. Singer estimated that the installation would be completed by January 1976.

5. On May 25, 1976, Singer was notified by Dr. Richard A. Baker, Chief of EPA's Status of Compliance Branch that the Attain Operation Level report as required in Condition 11.c was overdue and was requested to submit the report within 14 days. Singer responded by letter dated June 4, 1976, with the submittal of a progress report. This progress report estimated a completion date of September 1976.

6. On November 10, 1976, Singer again notified EPA that it had not terminated all discharges as required by said Condition 11.c. This report stated that outfalls 002, 003 and 004 had been eliminated. It estimated a completion date of March 1, 1977 for the cessation of discharge from outfall 001.

7. EPA responded to Singer's November 10, 1976 letter by modifying Condition 11.c of the permit on December 12, 1976 to require the termination of all discharges on March 1, 1977 rather than November 1, 1975.

8. On March 7, 1977, Singer notified EPA that its treatment system was not fully operational. It estimated a completion date of June 1977.

9. As of the date of this ORDER, Singer has failed to terminate all discharges as evidenced by the Discharge Monitoring Reports submitted by the permittee in accordance with permit Condition 12e. A table of the flow rates since March 1977 can be seen below.

Month	Average Flow in gpd
March 1977	127,962
April 1977	128,419
May 1977	127,958
June 1977	110,736
July 1977	150,934
August 1977	141,610
September 1977	129,600
October 1977	127,680
November 1977	98,458
December 1977	133,206
January 1978	131,395

10. It is therefore found that Singer is in violation of Condition 10 and Condition 11.c of its NPDES permit, number NJ 0001465, in that it has failed to terminate all discharges into the navigable waters of the United States by March 1, 1977.

ORDER TO SHOW CAUSE

Upon a thorough investigation of all relevant facts, including the seriousness of the violations involved, it is hereby ordered, pursuant to Section 309 of the Act (33 U.S.C. §1319) that the permittee shall at 10:30 a.m. on May 15, 1978, appear at the United States Environmental Protection Agency, Region II Office, Room 437E, 26 Federal Plaza, New York, New York 10007, to show cause before Meyer Scolnick, Director, Enforcement Division, or his designee, why EPA should not refer the permittee to the United States Department of Justice for imposition of civil and criminal penalties as provided by Section 309(b), (c) and (d) of the Act [33 U.S.C. §1319(b), (c) and (d)]. The permittee shall submit all written material relevant to the aforementioned issues on which it intends to rely in making its showing to the aforementioned Mr. Meyer Scolnick, at least five (5) days prior to the scheduled appearance.

Should the permittee have any questions concerning compliance with this ORDER, it should contact Charles E. Hoffmann, Attorney, Water Enforcement Branch, at the above address or at (212) 264-9897, or Mr. Clifford R. Lundin, Environmental Protection Specialist, Status of Compliance Branch at (212) 264-9883.

Dated this 14th day of
April, 1978

Meyer Scolnick
Meyer Scolnick, Director
Enforcement Division
U.S. Environmental Protection Agency
Region II

CDM
environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.
One Center Plaza
Boston, Massachusetts 02108
617 742-5151

November 30, 1983

Mr. Ronald E. Walsh
Assistant General Counsel
The Singer Company
P. O. Box 10151
8 Stamford Forum
Stamford, Connecticut 06904

Re: Environmental Liability
Assessment Report

Dear Mr. Walsh:

We are pleased to submit this final report of our Environmental Liability Assessment of the Singer property in Elizabeth, New Jersey. This report presents an assessment of an environmental investigation which was performed by others at the request of the New Jersey Economic Development Authority.

If you have any questions or require any additional information, please do not hesitate to contact us.

Very truly yours,

CAMP DRESSER & McKEE INC.

James T. O'Rourke, Ph.D., P. E.
Senior Vice President
Industrial Group

JTO:CTG:fam

ENVIRONMENTAL LIABILITY ASSESSMENT
SINGER PROPERTY, ELIZABETH, NEW JERSEY

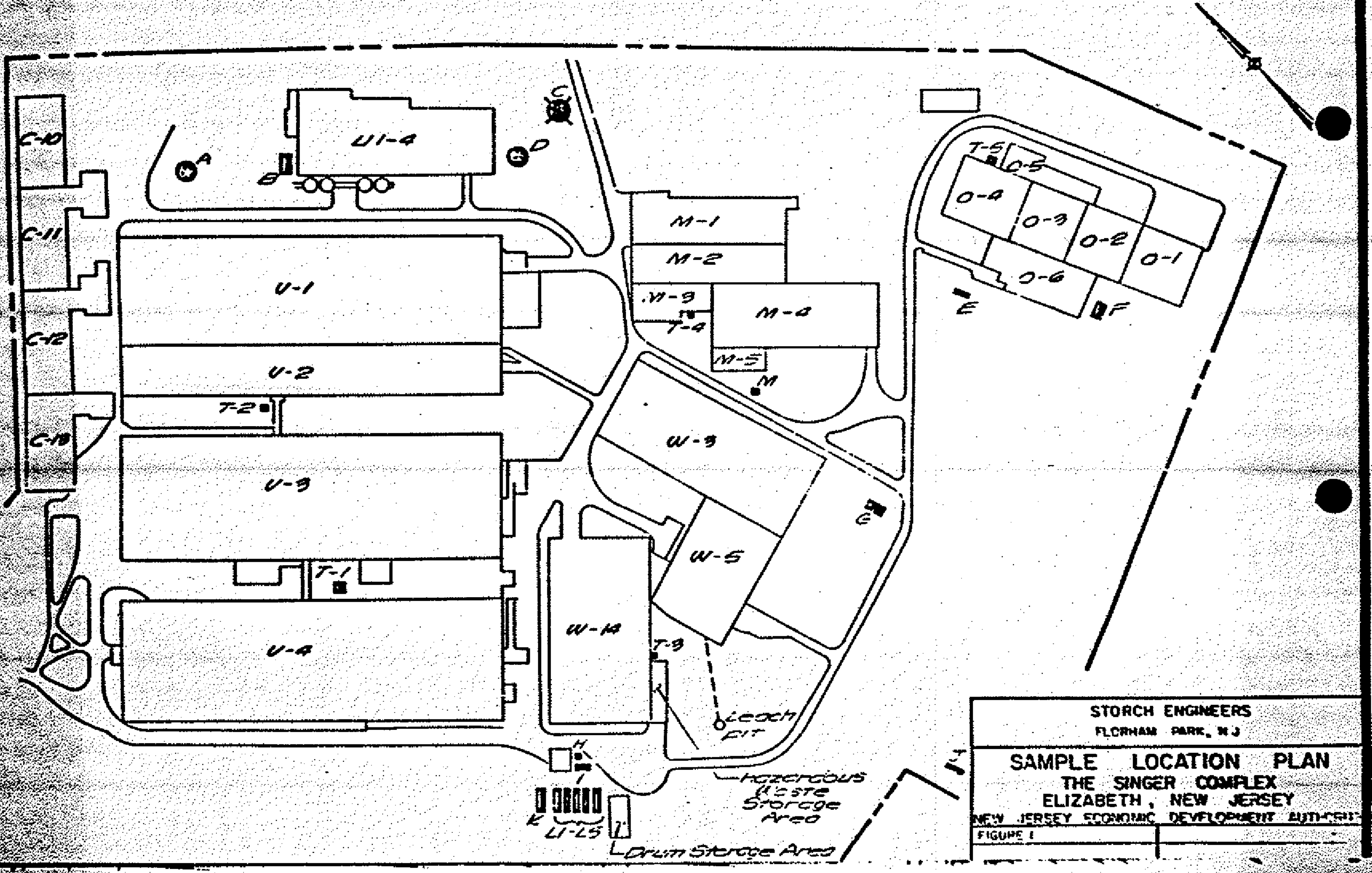
Prepared For

THE SINGER COMPANY

November 1983

APPENDIX I

PHASE I FIGURES AND ANALYTICAL RESULTS FROM STORCH REPORT
OCTOBER 19, 1983



STORCH ENGINEERS
FLORHAM PARK, N J

SAMPLE LOCATION PLAN
THE SINGER COMPLEX
ELIZABETH, NEW JERSEY
NEW JERSEY ECONOMIC DEVELOPMENT AUTHORITY

FIGURE 1

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Letter of Transmittal

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VI. TANK ASSESSMENT

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APPENDIX II: PHASE II FIGURES & ANALYTICAL RESULTS

EXECUTIVE SUMMARY

This report presents an assessment of environmental data collected at the Singer Company property in Elizabeth, New Jersey during September and October 1983. The data were generated by Storch Engineers, Inc., in a two-phased investigation, at the request of the New Jersey Economic Development Authority (NJEDA) and with the approval of the Singer Company. Phase I was targeted at suspected areas of environmental concern while Phase II was directed at quantifying the extent of these areas.

The two-phased investigation consisted of collecting and analyzing samples of soil and groundwater as well as residual materials in all major buildings and storage tanks.

Based on the analytical data, CDM has prepared an assessment of the areas that were included in the investigation. The assessment evaluates the significance of the analytical data, identifies areas of environmental concern, and describes appropriate remedial actions and associated costs where applicable. The key findings are as follows.

A. Soil and Groundwater Investigations

Essentially all of the soil samples collected were analyzed for PCB's and many were also analyzed for toxic metals and petroleum hydrocarbons. Groundwater, obtained by sampling an excavated test pit, was analyzed for the 129 EPA Priority Pollutants.

The results of the Phase I overview investigation indicate that few soil samples contained regulated levels of PCB's (TSCA, 50 ppm) or toxic metals above RCRA hazardous waste criteria. Groundwater contained several metals at concentrations higher than drinking water quality criteria but essentially no other priority pollutant compounds were detected. Since near surface groundwater is not used for potable water, the metals should not be a matter of concern.

Several soil locations on the site were identified as areas of concern, largely due to the presence of more than 50 ppm PCB's in the soil. If soils containing more than 50 ppm PCB's are moved from their present location, regulations (TSCA) require that they be disposed of in a chemical waste landfill. Soils containing more than 50 ppm PCB's could remain in place, however, provided that they are isolated by placement of a geotextile fabric and crushed stone surfacing (or asphalt paving).

B. Building Investigations

All of the major buildings on the site were sampled during the investigation. The majority of the building sampling consisted of scrapings of residues that remain on the floor from years of use. Generally, the samples were analyzed for PCB's, petroleum hydrocarbons, and toxic metals. Some samples were also analyzed for volatile organics and acid and base neutral extractable organics.

The analyses did not detect regulated levels of PCB's (TSCA, 50 ppm) or toxic metals above RCRA hazardous waste criteria or organics considered hazardous in the V, M and C Buildings. The presence of more than 50 ppm PCB's in floor residues in Buildings W-3, W-5, the north part of U, and W-14 require that these floors be physically cleaned and the residue material be disposed of in a chemical waste landfill. In addition, the floor in the W-14 Building will require solvent rinsing and paint sealing due to penetration of PCB's into the concrete floor slab. Floor residues in the O Building should be removed to preclude a slight possibility of inhalation of these materials.

C. Tank Investigations

All of the major tanks on the site were sampled during the investigation. The samples were analyzed for PCB's and petroleum hydrocarbons and some for volatile organics.

The analyses did not detect regulated levels of PCB's (TSCA, 50 ppm) in the contents of 10 of 12 tanks tested. If the contents were removed from the tanks, however, New Jersey regulations require that they be considered a hazardous waste for disposal purposes.

Two tanks, designated B and F by Storch, contain high levels of PCB's. The contents of these tanks should be removed and disposed of (incinerated) in accordance with applicable regulations (TSCA). In addition, the tanks should be decontaminated prior to disposal.

D. Cost for Remedial Action

From the data obtained by Phases I and II sampling, the estimated cost for remedial action on known environmental liabilities is approximately $375,000. Additional testing is required in certain locations to fully define the extent of problem areas. Costs for remedial action, therefore, are subject to change.

I. INTRODUCTION

1. General

This report presents the findings of an Environmental Assessment of the Singer Company, Inc. property in Elizabeth, New Jersey. The scope of the report is limited to a presentation of an assessment of a two-phased sampling and analysis program conducted at the site in September and October 1983. The data base for the Phase I work is presented in a separate report ENVIRONMENTAL ASSESSMENT, SINGER COMPLEX, ELIZABETH, NEW JERSEY, FOR THE NEW JERSEY ECONOMIC DEVELOPMENT AUTHORITY, OCTOBER 19, 1983, by Storch Engineers, Florham Park, New Jersey. It is assumed that readers of this CDM report to Singer have read the Storch report and will have it available as this document is read because cross-referencing will be required. The Storch report presents a description of the objectives and scope of the sampling and analysis program as well as descriptions of the site, sampling and analytical protocol, sample points and analytical results for Phase I. Sampling point locations and summaries of analytical results for Phase I and Phase II work are included in Appendices I and II, respectively.

2. Background

The Singer Complex consists of approximately 1,400,000 square feet of industrial and office floor space located on approximately 106 acres of land along Newark Bay in Elizabeth, New Jersey. Manufacturing ceased in 1982 after more than 100 years of operation. Essentially all machinery and equipment have been removed from the premises. At the request of the New Jersey Economic Development Authority (NJEDA), Storch Engineers undertook an environmental assessment to determine if contamination exists on the site. CDM personnel had the opportunity to review and discuss the Storch sampling and analysis plan with NJEDA, Singer, and Storch before sampling began.

During September 1983 Storch Engineers obtained samples (Phase I) for laboratory analysis from eight of nine major buildings on the site; from soil adjacent to all known PCB transformer locations on the site; from groundwater; from soil adjacent to: a drum storage area, a leaching pit, loading ramps, waste storage areas, open areas; and from all major storage tanks on the site. CDM personnel were onsite throughout the field sampling program and collected replicate samples for independent analysis.

Almost all samples were analyzed for PCB's. In addition, most of the soil and building samples were also analyzed for petroleum hydrocarbons and EP Toxicity/Metals. Selected samples were analyzed for the full 129 EPA priority pollutants, with some library searches for non-priority pollutant organic compounds also performed.

The results of the September 1983 Phase I effort by Storch are presented in their October 19, 1983 report. As a result of the analytical data generated, potential areas of concern were identified. Generally, areas of concern were those areas where PCB's above 50 ppm were detected. At a meeting on October 13, 1983, attended by all interested parties (NJEDA, Storch, Singer, CDM), an expanded sampling and analysis program for these areas was designed in order to verify and quantify the areas of concern.

In October 1983 the expanded sampling and analysis program, Phase II, was undertaken. The field sampling work was performed by Storch and CDM personnel working jointly. Overall responsibility for the management of the Phase II program, however, remained with Storch (i.e. chain-of-custody forms, coordinating laboratory work, etc.). Sampling locations and analytical results for the Phase II effort are presented in Appendix II of this report.

The sampling protocol for the Phase II work was generally the same as that for Phase I, which is described in the Storch report. The analytical results shown in Appendix II for Phase II were provided to CDM by Storch Engineers. Laboratory analysis was performed by U. S. Testing, Hoboken, New Jersey.

3. Duplicate Samples

In the first sampling effort (Phase I) CDM collected duplicates of all samples taken by Storch Engineers. The CDM samples were analyzed by ETC, Inc., Edison, New Jersey. The purpose of this effort was to assure that laboratory inaccuracies would not lead to incorrect conclusions. The overall comparison of data has revealed very few significant discrepancies. Some of these have been resolved by the Phase II results. Others would have little bearing on decisions about remedies because they involve substances (such as petroleum hydrocarbons in soil and floor scrapings) for which no standards or guidelines exist. Two significant discrepancies were identified, however, that would govern remedial action. In both cases, oil tanks were sampled and the PCB value reported by ETC/CDM was considerably higher than that reported by Mead/Storch. These results are discussed in Section VI, "Tank Assessment". Except for these two instances, the data base for this report is confined to the analytical data generated by Storch Engineers.

4. Objectives

The objectives of this Environmental Assessment are to:

a. Review all data generated as a result of the Phase I and Phase II investigations.

b. Evaluate the significance of the data with respect to identifying areas that are potential environmental or health concerns.

c. Describe the nature of the potential environmental concern and determine if remedial action may be appropriate.

d. Where necessary, develop quantity and cost estimates, to the extent made possible by the available data base, for any required remedial work.

5. Report Organization

Before beginning the data assessment, this report reviews applicable regulations governing PCB materials, particularly with respect to disposal requirements. Precedents for evaluating whether and to what extent remedies are required for contamination of the type found at this site are reviewed. Such a review of precedents is necessary because existing regulations provide little direction regarding the issues at this site. Based on these reviews, criteria for assessing the PCB materials found at the site are formulated. Criteria for addressing materials other than PCB's are also addressed.

The assessment is divided into three major subjects that correspond to the investigations performed at the site. These subjects are soils, buildings and tanks. Each major subject is addressed in general terms, and potential problem areas are identified. Each potential problem area is reviewed on a case-by-case basis. Each case-by-case review discusses the applicable data, evaluates its significance and recommends appropriate remedial action supported by cost estimates to the extent possible. Cost estimates are included as a separate section (VII) of this report.

In order to facilitate the reading of this report, figures showing the site layout and sample point locations, as well as summaries of the analytical data from the Storch report, have been included as Appendix I.

II. REGULATIONS AND PRECEDENTS FOR PCB'S

A. FEDERAL REGULATIONS

1. General Policy for PCB's

PCB disposal is primarily regulated under the Toxic Substances Control Act (TSCA). Under this bill, EPA has established bans and control mechanisms for PCB use. In addition, disposal criteria for PCB oils and other "PCB items" have been established.

EPA first proposed rules under TSCA in the May 24, 1977 Federal Register. This rule, regulating materials with a PCB concentration of 500 ppm or greater, was finalized by the Agency on February 17, 1978.

EPA published a new final rule on May 31, 1979 which reduced the lower limit of PCB regulation from 500 to 50 ppm. The rule also specified acceptable PCB uses and other regulations related to PCB disposal and distribution in commerce. Disposal criteria were established for three categories of material: transformer oils, other liquids, and solids. Similar to previous rules, specific high temperature hazardous waste incineration was mandated for all liquids with greater than 500 ppm PCB. Incineration under less stringent conditions was allowed under certain circumstances for liquids containing 50-500 ppm. If contaminated soils were excavated, their disposal in secure landfills was specified. In-place contaminated soils were, and are, not clearly regulated. Two passages from the May 31, 1979 Rules and Regulations are of interest:

1 - (pg. 31545) Subpart B - Disposal of PCB's and PCB Items

> Note. - This Subpart does not require removal of PCB's and PCB Items from service and disposal earlier than would normally be the case. However, when PCB's and PCB Items are removed from service and disposed of, disposal must be undertaken in accordance with these regulations. PCB's (including soils and debris) and PCB Items which have been placed in a disposal site are

considered to be "in service" for purposes of the applicability of this Subpart. This Subpart does not require PCB's and PCB Items landfilled prior to February 17, 1978 to be removed for disposal. However, if such PCB's or PCB Items are removed from the disposal site, they must be disposed of in accordance with this Subpart.

2 - (pg. 31547) (d. Spills) 1) Spills and other uncontrolled discharges of PCB's constitute the disposal of PCB's. (2) PCB's resulting from spill clean-up and removal operations shall be stored and disposed of in accordance with paragraph (a) of this section. In order to determine if a spill of PCB's has resulted in a contamination level that is 50 ppm of PCB's or greater in soil, gravel, sludge, fill, rubble, or other land based substances, the person who spills PCB's should consult with the appropriate EPA Regional Administrator to obtain information on sampling methods and analytical procedures for determining the PCB contamination level associated with the spill.

2. Policy for Recent PCB Spills

On April 22, 1982, a proposed rule was published, intended to amend the May 31, 1979 rules and regulations. Spill cleanup to pre-existing background levels would be mandated if the original spilled material actually represented disposal by dilution, an action prevented by the May 31, 1979 rule). Cleanup to background was required in all cases where there was a threat of contamination to water, food, feed, or humans (near water supplies, public areas, etc.). Although provisions were left for cleanup not achieving background conditions, cleanup to less than 50 ppm would be required in all cases.

On August 25, 1983, the April 22, 1982 proposed rules which would have defined the extent of cleanup of PCB spills were postponed. Nevertheless, pending final issuance of a specific regulation, most EPA regions have adopted the "clean-to-background" policy for new spills, primarily on the basis of the May 31, 1979 rules preventing disposal by dilution. At this time, therefore, regional PCB coordinators are deciding on a case-by-case basis what background conditions are applicable to determining cleanup requirements. A national policy on this issue is expected within the next year.

3. Policy on PCB Spills before 1978

PCB spills which occurred before February 17, 1978 come under a different set of rules than for recent spills discussed above. The "Note" quoted above from 44 FR 31545 can be construed as a "grandfather" clause stating that PCB items (including soils and debris) disposed of before 1978 are "in service" and thus do not require removal. Only upon removal from "service" (i.e. excavation) do these soils come under written, specified requirements under TSCA.

B. CLEANUP EXAMPLES

We have classified these precedents into three categories: large-scale remediation, EPA regulated spills, and locally regulated spills. Examples of each are discussed below. It should be noted at the outset, however, that the level of cleanup in many industrial situations is often negotiated between the responsible parties and the regulatory agencies.

1. Large-Scale Site Remediation

One example of a large-scale PCB cleanup can be found at the Lehigh Electric Site in Old Forge, Pennsylvania. This site, covering approximately 6.5 acres, was used as a storage and repair site for electrical equipment in the past and is currently fenced and abandoned. The area borders on both the Lackawanna River and a residential neighborhood.

The site is currently being cleaned up under specifications developed for EPA under CERCLA ("Superfund"). A site-specific investigation included a cost/benefit analysis. The PCB concentration threshold for excavation was determined from this analysis and the threshold was selected at the concentration at which the slope on a "cost versus concentration" plot increased. The change in slope appeared at the 50 ppm level, and that fact (<u>not</u> TSCA regulations) led to the selection of 50 ppm as the limit for soil removal/disposal.

A second example of a large-scale PCB cleanup occurred in Norwood, Massachusetts. Here, although the original contamination occurred prior to 1978 and thus cleanup was not required, the removal of contaminated soils was performed at the request of the State in response to citizen complaints. The area is surrounded by residences and was often used as a play area for neighborhood children. Soils containing greater than 50 ppm, a level chosen to conform to the lower concentration of the TSCA regulations, were removed by a contractor for EPA Region I. Soils excavated and transported offsite became subject to the PCB regulations, and thus were disposed of in a chemical waste landfill.

A small industry, not related to PCB handling, is currently operating in the middle of the contaminated ara. The work area is highly contaminated with PCB. EPA is now studying the problem to determine what, if any, action should be taken to protect worker safety.

2. EPA Regulated Spills

Region II of the EPA was specifically contacted to determine how they would handle a PCB spill in an industrial environment. The regional hazardous waste response personnel follow the "clean-to-background" policy for small-scale spills. However, case-by-case decisions are made to allow for "reasonableness" and cost effectiveness.

Region II's basic procedure for cleanup of small industrial spills on non-porous surfaces is as follows:

a. wash area with non-toxic degreasing solvent or trisodium phosphate soap

b. after soap or solvent removal, paint over the area with an epoxy based paint.

However, if the spill has occurred in an area where widespread floor or soil penetration may have occurred (e.g. a porous or badly cracked floor), EPA may require complete removal of the flooring.

EPA Region II reports that they have been involved with several industries which, upon EPA's direction, have followed the clean-and-paint method.

In some cases, concentrations of PCB's <u>in</u> the floor may be determined by taking, pulverizing, and extracting floor borings. EPA's primary concern in these cases is to protect worker safety for the present and when the flooring is eventually disposed. EPA is currently working with an industry which, on the basis of PCB levels determined in pulverized concrete floor samples, has been instructed to remove and dispose of the solid material in accordance with TSCA regulations. The actual level of where cleaning-and-painting is acceptable, as opposed to excavation and off-site disposal, is determined on a case-by-case basis.

3. Locally Regulated Spills

Electric utilities have considerable experience with cleanup of PCB spills from leaking transformers. A major northeastern utility company follows a standard procedure which has been accepted by the state regulatory agencies as well as by the regional office of the EPA. The procedure is similar to the Region II cleanup regimen and is as follows:

a. wash the surface with degreasing solvent

b. paint with an "enamel-based" paint.

Before painting, the levels of PCB's must be reduced to 100-200 ug/100 cm^2. Results are determined from wipe-test samples.

Different levels were established for areas that would be in close contact with the public. In one example, requirements for countertops at which food was to be prepared and eaten were established at 1 ug/100 cm^2.

III. CRITERIA FOR ASSESSMENT

1. Introduction

The basis for this assessment is the analytical data compiled by Storch Engineers and presented in their October 19, 1983 report and in Appendix II of this report.

All of the analytical data have been reviewed and evaluated to determine their significance with respect to health and environmental quality. The criteria used here are based on established standards, guidelines, or criteria or regulatory agencies, where applicable. In their absence, the evaluation is based on past precedent and judgment for interpreting the various materials identified in the investigation.

Section II presented the available regulations and precedents for PCB cleanup, and these do not always provide clear guidance for all circumstances. Judgment, therefore, has played an important part in CDM's application of pertinent regulations and precedents to the conditions present at the Singer property. Contacts were made with regulatory agencies to discuss the viability of various remedial approaches prior to final selection. Cost estimates for remedial actions proposed were verified on an approximate basis with specialty contractors experienced in the particular work.

Phase I analytical data generated by Storch Engineers for soil and building investigations are based, for the most part, on composite samples. These composite samples were often taken in an attempt to represent areas several hundred to several thousand square feet in extent. This wide area compositing facilitates detection of potential problem areas but offers little or no basis to estimate their extent. Where problem areas are based on parameters defined on the low part per million level, visual observations generally do not offer sufficient evidence to be able to supplement the quantification.

The Phase II analytical data generated by Storch Engineers is based on a combination of composite and single point samples taken from potential problem areas. Consequently, estimates of quantities and costs of remedial actions are possible for some of these problem areas. Limitations on the definition of the extent of some of the problem areas tend to limit remedial cost estimates to the level of engineering judgment, pending future samples.

2. Criteria for Evaluating PCB Materials

The review of regulations and precedents for PCB's has enabled CDM to establish a definitive criteria for evaluating the environmental liability of PCB materials at the site. The criteria can be summarized as follows:

a. Disposal of material that contains more than 50 ppm PCB's is subject to regulation (TSCA).

b. PCB spills (disposal) since February 17, 1978 are regulated on a case-by-case basis. The degree of spill cleanup required is dependent on the threat to public safety and health that the spill entails.

c. PCB's disposed of before 1978 (including those lost through spills and leaks) are not subject to regulation as long as they remain in place. If the PCB's are removed, however, they are subject to regulated disposal if their concentration exceeds 50 ppm.

d. Where a clear, demonstrable threat to public safety and health exists, PCB remediation should be performed regardless of the disposal date.

In that the above criteria have a firm basis in regulation and precedent, it is proposed that the PCB assessment at the site be made to these same criteria.

Since manufacturing operations at much of the site date back to the time when PCB's were first introduced, it is probable that spills and leaks at the site first occurred many years ago. Singer has informed CDM that the use of PCB fluids in die-cast machinery in the W-14 Building was discontinued in 1974. According to Singer, the W-14 Building was the only place on the site where PCB fluids were routinely handled on a large volume basis. Therefore, for the purpose of this assessment, it is assumed that PCB's found on the site have been in place since before 1978.

CDM wishes to emphasize that the concept of "grandfathering" is not invoked as a mere technicality, nor do we consider the exclusion of old spills to be a loophole in the regulations, for the following reasons:

a. The environmental and health effects of PCB's in the low ppm range were not well understood in 1979 and are not well understood now.

b. In promulgating a final rule that specifically excluded soils contaminated by pre-1978 spills, EPA was expressing its considered judgment that such exclusion was safe. Regulating only new spills is a valid technique to prevent such spills, not a statement that "new" spills are more damaging than "old" spills.

c. Research on the effects of PCB's continues, as does development of in-situ PCB destruction methods. Within, say, five years, the state of knowledge leading to decisions about managing PCB-contaminated soils will be vastly enhanced.

For these reasons, while removal of all materials containing over 50 ppm PCB's appears unnecessary, it is prudent to take some precautions for those materials containing more than 50 ppm PCB's. Such precautions are recommended in this report. Given those precautions, and the recognition by all involved parties that some further remedies may be required in the future, we strongly recommend that the PCB-contaminated materials at the Singer site be managed in accord with the above criteria.

3. Assessment of Volatile and Extractable Organic Scans

a. Introduction

In addition to analysis for petroleum hydrocarbons, EP metals, and PCB's, a few samples were submitted for a full priority pollutant analysis. This generates an identification and quantification of 129 substances chosen by the EPA as important environmental contaminants. For these compounds, EPA approved procedures and standards are available to facilitate reproducible laboratory results.

The laboratory which analyzed the Phase I samples was also requested by Storch Engineers to run a "library search" on some samples for either volatile organics or the acid and base neutral extractable fractions. This procedure compares the mass spectrum of unknown chromatogram peaks with the known spectra of thousands or organic compounds stored on tape in the GC/MS computer's data bank. The best match of spectra is chosen and the unknown peak is assigned that compound's structure. Next to the identification in the report is listed the "% purity" which is an evaluation of the agreement between the unknown and known spectra. Therefore, these compounds are only tentatively identified by this method. The "% purity" is an expression of relative confidence in the identification of the compound.

Since it is not practical for the laboratory to prepare and analyze standards of all the non-priority pollutant compounds tentatively identified in these samples, an approximate quantification is performed using internal standards of typical sensitivity.

The function of this "library search" procedure is to give some insight into organic chemicals other than priority pollutants that may be in the sample. Many of the results are not definitive enough on which to base any final conclusions. If confirmation is required, the sample can be reanalyzed for specific compounds of interest by an approved procedure and with certified standards. For this reason, the compounds listed in the library search were reviewed and critiqued according to the following rationale: for the volatile fraction any compound with greater than 60% purity and 10 ppb concentration was included in the assessment; for the extractable fraction, any compound with greater than 60% purity and 1 ppm concentration was evaluated. The basis for this decision was that the vast majority of compounds with less than 60% purity were of very low concentration, rarely identified, and of an obscure nature with very little, if any, physical or environmental data available.

Approximately 80 organic compounds from those identified in the library searches meet these criteria and are shown in Table II in Appendix II.

b. Pertinent Regulations and Standards

To judge the environmental impact and regulatory requirements of the organic compounds chosen by the aforementioned criteria for library searches, the following lists were consulted:

(1) Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment: American Conference of Governmental Industrial Hygienists (ACGIH) - 1982. This document lists chemicals which produce toxic effects in humans by inhalation or skin contact and the highest concentration that workers should be exposed to (TLV's). Some of these levels have been made enforceable in the work place environment by OSHA.

(2) Priority Pollutant List - 129 compounds chosen by EPA for analysis due to their common usage, widespread occurrence and possible environmental consequences.

(3) Federal Register Part 261.33(f) - "Commercial chemical products or intermediates that are identified as toxic wastes." If certain quantities of these chemicals in relatively pure form are discarded, they are designated hazardous wastes under RCRA.

(4) Federal Register Part 261 - Appendix III - Hazardous Constituents- If a waste contains one or more of these chemicals, the Administrator can list the waste as a hazardous waste after reviewing a number of factors such as concentration, location, threat to human health and environment, quantity, etc.

c. Regulated Compounds Identified by Library Searches

Of the 80 organics identified in Subsection a. (Table II, Appendix II) only the following nine substances were found on any of the four preceding lists (identified in Subsection b):

(1) Phenol (hydroxybenzene, carbolic acid). It is listed in RCRA Appendix III and has been given RCRA Number U188. It is analyzed on the priority pollutant list. ACGIH lists the TWA

(time weighed average) TLV (threshold limit value) as 5 ppm. The vapor pressure at 20°C is 0.2 mm.

(2) Cresol (2-methyl phenol). Similar properties to phenol. RCRA Number U052. ACGIH listed - TWATLV = 5 ppm. Vapor pressure at 20°C = 0.24 mm.

(3) Diethyl phthalate. Priority pollutant list. Appendix III. RCRA Number U088. ACGIH listed - TWATLV = 5 mg/m^3. Insignificant vapor pressure.

(4) Chlorobenzene. Priority pollutant list. Appendix III. RCRA Number U037. ACGIH listed TWATLV = 75 ppm. Vapor pressure = 8.8 mm at 20°C.

(5) Ethylbenzene. Priority pollutant list. ACGIH listed - TWATLV = 100 ppm. Vapor pressure = 7 mm at 20°C.

(6) Pyridine. Appendix III. RCRA Number U196. ACGIH listed - TWATLV = 100 ppm. Vapor pressure = 14 mm at 20°C.

(7) 4-Nitrophenol. Priority pollutant list. RCRA Number U170. Appendix III.

(8) Toluene. Priority pollutant list. Appendix III. RCRA Number U220. ACGIH listed - TWATLV = 100 ppm. Vapor pressure = 22 mm at 20°C.

(9) PNA. Priority pollutant list. Appendix III. Insignificant vapor pressures. PNA is an acronym for polynuclear aromatics, a group of organic molecules containing more than one aromatic ring. A synonymous term is PAH - polynuclear aromatic hydrocarbons.

The source of most of these compounds historically has been bituminous coal, though most of them are also found in various oil products. When coal is heated in the absence of air, coal tar is generated. When coal tar is distilled, coal tar pitch is generated. Depending on heat and distilling conditions, different products are produced that contain thousands of organic compounds. Through toxicological studies, some of these organics have been found to have toxic and carcinogenic effects. Most of the studies were not performed on specific chemicals, but on the entire group of compounds. Therefore, in 1967, the ACGIH adopted a TLV of 0.2 mg/cu m for CTPV, described as a "benzene-soluble" fraction, and listed certain carcinogenic components. CTPV is "coal tar pitch volatiles" - organics that are emitted into the air when coal tar, coal tar pitch, or their products are heated--this material may contain PNA's.

The TLV (threshold limit value) for CTPV was established to minimize exposure to the listed substances believed to be carcinogens (such as anthracene, benzo(a)pyrene, phenanthrene, acridine, chrysene, and pyrene). This TLV was promulgated by NIOSH as a federal standard under the Occupational Safety and Health Act of 1970 (29 CFR 1910.1000). Another NIOSH standard states that the PPOM, analyzed by the cyclohexane extractable fraction of particulates filtered from air, cannot exceed a TLV of 0.1 mg/cm^3. PPOM's are defined as particulate polycyclic organic material. This is a more inclusive term meaning condensed ring aromatic hydrocarbons that are released into the air as particulates during pyrolysis of various coal products. A partial list of the actual compounds of concern are: pyrene*, fluoranthene*, benz(a)anthracene*, chrysene*, benzo(e)pyrene, benzo(a)pyrene*, perylene, benzo(k)fluoranthene*, benzathracene, phenanthrene*, anthracene*, acenaphthene*, acenaphthalene*, 3,4-benzofluoranthene*, benzo(ghi)perylene*, dibenzo(a,h)anthracene*. The compounds with stars are listed on the priority pollutant list. Many of these are also listed in Appendix III and have RCRA numbers.

All of the PNA's identified by the library searches are solid at room temperature, with melting points of 80-200°C and boiling points of 270-350°C. According to chemical handbooks, they have no vapor pressure, and can enter the air only as particulates. Therefore, the PNA's on site can only be considered a problem if they become airborne and exceed the OSHA limit in a working environment.

4. Criteria for Evaluating Other Materials

Due to the broad spectrum of analyses conducted, a detailed review of regulation and precedent for each material analyzed would be unwieldy. Rather, the assessment for materials other than the aforementioned materials will be addressed on a case-by-case basis. Where appliable, existing regulations and guidelines will be applied to the analytical results. Where regulations and guidelines are non-existent, precedent and state-of-the-art practice will be used as the basis of the assessment.

5. Evaluating Air Sampling

The air sampling and detections reported in the Storch report were based on Draeger equipment. Storch reported that this sampling was performed in order to aid field personnel in selecting appropriate cartridges for respirators used during sample collection. Storch indicated that interferences caused by related substances to that tested for, precludes precise delineation and identification of specific substances. Storch also pointed out that the air emissions detected in the buildings are probably from residue remaining therein. CDM concurs with the Storch assessment of Draeger equipment results. Consequently, CDM has not attempted to assess air quality based on these data.

IV. SOIL ASSESSMENT

1. General

Phase I. Soils from 26 separate locations throughout the site were sampled and analyzed as part of the Phase I environmental assessment. Locations of sample points are shown on figures in Appendix 1. Seven samples were obtained from soil within a few feet of transformers that contain, or formerly contained, PCB dielectrics. Two of three test pit samples were obtained from soil within a few feet of a plant waste leaching pit, and its concrete pipe influent line. Soil samples from the remaining 18 locations included: two adjacent to a concrete drum storage area; two adjacent to a location where waste oil tanks were removed as part of a PCB cleanup; two from apparent oily stained soil areas; one from an oily area on asphalt paving; and one from soil immediately adjacent to a large dust collection bin outside the O Building.

The distribution of the sampling locations for Phase I as described above was obviously weighted toward areas of the site deemed most likely to be environmental threats. Clearly, it was not (nor was it intended to be) a random soil sampling.

Though the investigation was largely targeted toward areas of suspected contamination, relatively few problem areas were identified. The results of the PCB analysis are a case in point to illustrate this fact. Of the 26 separate soil locations from which samples were analyzed for PCB's, only 5 contained greater than 50 ppm PCB's. The majority of the samples analyzed showed less than 10 ppm PCB's.

Phase II. Soil from the potential problem areas identified in the Phase I work were sampled and analyzed as part of the Phase II effort. Generally, the problem areas investigated were those where PCB's above 50 ppm had been detected. At each of these locations, composite and individual point soil samples were obtained for laboratory analysis. The purpose of the Phase II work was to verify whether potential problem areas were in fact problems and to quantify the extent of the problems.

Toward this end 23 additional soil samples were obtained for laboratory analysis of PCB's. The results of the Phase II sampling as well as sampling locations are included in Appendix II.

2. Transformer Locations

Phase I. As shown on Table 5.3.1 of the Storch report, PCB's found in the soil adjacent to the transformers ranged from 0.3 ppm to a maximum of 53 ppm. Except for the soil adjacent to transformers T-3 and T-7, the maximum PCB concentration was 6.5 ppm. At the T-3 and T-7 transformer locations, the adjacent soil was found to have a PCB concentration of 50 ppm and 53 ppm, respectively.

Except for the soils adjacent to transformers T-3 and T-7, the analysis shows that PCB concentrations in the soils adjacent to transformers are significantly below 50 ppm and, therefore, are not PCB materials, even if excavated for future site development.

Although the soils adjacent to transformers T-3 and T-7 contain PCB's above the regulated limit, the soils would only be subject to regulation for ultimate disposal if excavated. If these soils are removed, current regulations would require secure landfill disposal. The T-3 and T-7 transformers are located in a remote part of the site with no leak or spill residues apparent. Since the adjacent soils do not appear to offer a threat to water supplies, food, or feed, major remedial actions are not required in order to continue use of the site as an industrial complex. Personnel performing earthwork adjacent to these transformers could be exposed to PCB materials above the regulated limit, however, and should use appropriate health and safety procedures in this area. As a precaution, for personnel traversing the area, a geotextile fabric covered by 6-inches of crushed stone should be placed to preclude contact with PCB materials near the soil surface.

<u>Phase II</u>. In order to determine the extent of PCB's in the soils adjacent to the T-3 and T-7 transformer, five additional composite samples were obtained for laboratory analysis. Sampling point locations are shown on Figure 1 in Appendix II. The methodology of the composite sampling was designed to determine PCB content with soil depth immediately adjacent to the transformers and approximately 13 feet to the south. Toward this end, composite samples from different locations immediately adjacent to the transformers and 13 feet south were collected over several depth intervals. The analytical results are shown on Table 1 in Appendix II.

Evaluation of the analytical results for the composite samples (Nos. 11 and 12, Table 1) immediately adjacent to the transformers shows that the PCB content of the soil is 33 ppm at the 8 to 12 inch depth interval and 38 ppm at the 16 to 20 inch depth interval. These results indicate that the depth of soils with a PCB content over 50 ppm is limited less than 8 inches.

Evaluation of the analytical results for the composite samples (Nos. 13, 14, and 15, Table 2) 13 feet south of the transformers shows that PCB's at the 50 ppm level are present in the 8 to 12 inch depth interval. The near surface composite sample (0 to 4 inches) and the deep composite sample (16 to 20 inches), however, contained PCB's at 10 ppm and 19 ppm, respectively. These results indicate that soils south of the transformers do not appear to be a major concern but that certain areas may contain PCB's near 50 ppm in the upper 12 inches.

The transformers are set on an elevated area, immediately south of the W-14 Building, separated from the open area to the south by a concrete retaining wall 2 feet in height. The exposed soil in this elevated area is approximately 850 square feet in extent. Based on an 8-inch depth of 50 ppm, PCB soils throughout the entire elevated area, 21 cubic yards of PCB materials are present. Additionally, an area extending further south may have soil with PCB's at 50 ppm to a depth of 12 inches. Further tests are required to definitely quantify this area. Assuming that area is 20 feet by 20 feet, however, an additional 15 cubic yards of PCB material may be present as well.

The selection of the appropriate remedial action is somewhat dependent on future use of this area. If no earthwork operations are planned here, then placement of the geotextile fabric-crushed stone would provide sufficient isolation for foot and vehicle traffic. On the other hand, if it is envisioned that earthmoving will be performed here for site development, then it would be prudent to remove these PCB materials prior to the development work.

3. Test Pits

Results of EPA Priority Pollutant Analysis for soil and groundwater samples from test pits are shown on Table 5.3.3 of the Storch report. Additional analysis for PCB's, petroleum hydrocarbons, and EP toxicity/metals for two soil samples from the test pits, 6C-1 and 6C-2, are shown on Table 5.3.4.1 of the Storch report. (Analytical results and test pit locations are shown in Appendix I.)

On an overall basis, the test pit results indicate that the soil quality adajcent to the leach pit and its concrete influent pipe are not significantly different from background soil quality.

The results of the EPA priority pollutant analysis on groundwater obtained from test pit 4 (sample 3-4) detected several metals (chromium, cadmium, and lead) at levels higher than drinking water quality standards. Since near surface groundwater is not used for potable water in the site area, the presence of the metals should not be a matter of concern. The volatile organics, acid/base-neutral extractables and pesticides/PCB's analyses for essentially all compounds were below detection limits.

The maximum PCB concentration detected in the test pit samples was 15 ppm. This value was detected in a sample taken immediately adjacent to the leach pit (6C-1) and in a background soil sample (3-1) taken 180 feet away from the leach pit. These levels are below the regulated limit for PCB materials even if the soils were excavated.

Comparison of metals analysis data between the background soil sample (3-1) and the samples near the leach pit (3-2 and 3-3) suggests that elevated levels of chromium, lead, and zinc appear attributable to the leaching pit. It should be stressed, however, that the sample taken near the leach pit was a gray-tan clay-like material scraped from the surface of the crushed stone backfill. Similar material was present in the influent pipe. As such, the sample is not representative of the soil mass surrounding the leach pit, but of undiluted waste material that occupies the voids of the stone. In any case, however, the results of the EP toxicity/metals analysis indicate that neither the background soil sample nor the gray-tan clay-like material is a hazardous waste according to RCRA criteria for metals.

Review of the analytical results of the base neutrals analyses indicate low levels (less than 2 ppm) of Polynuclear Aromatics (PNA's) in the test pit soils. The levels in the background soil sample had approximately the same values as that in the leach pit sample. This indicates that the PNA's are not attributable to the leach pit. PNA's are naturally occurring in coal and petroleum. Since the material observed in the test pits included cinders and slag, the PNA's detected are not surprising. While OSHA regulations limit the concentrations of airborne PNA's, their presence in the ground at these concentrations does not appear to be a cause for remedial action.

Although the leaching pit/influent pipe area does not appear to contain a hazardous waste or offer a threat to health or groundwater quality, Singer has agreed to remove the leaching pit, in correspondence from 1972. While the leaching pit, the crushed stone backfill, and the influent pipe do not appear to be health hazards, it would be prudent to dispose of these materials as hazardous waste to preclude potential liability claims.

4. Remaining Soil Samples

4.1 General

Analytical results for the 16 remaining soil samples taken during Phase I are shown in Table 5.3.4.1 of the Storch report. (Phase I analytical results and sample point locations are shown in Appendix I.) Parameters analyzed were PCB's, petroleum hydrocarbons, and EP toxicity/metals.

The analytical results from Phase I indicate that for the most part, the soils sampled should not be a matter of regulatory concern. Except for three areas where PCB's were detected at 72 ppm, 130 ppm, and 140 ppm, all other soil samples contained only very low levels of PCB (ranging from 0.2 ppm to 10 ppm). Only one soil sample was above the RCRA criteria for metals due to a 5.4 ppm lead level in the EP extract (the regulated level is 5.0 ppm). Except for a few visibly oil stained areas, the soil samples contained less than 0.1% petroleum hydrocarbons by weight. The significant exceptional areas are discussed and assessed here in greater detail and were further investigated during Phase II.

The Singer complex has been for a century, and will be for the foreseeable future, an industrial site. In the normal activities on such a site, potential pollutants such as oils are spilled, or leaked. In the specific case of oils, unless they carry high concentrations of PCB's or metals, or unless soils are oversaturated with oil, there is no threat to health or the environment and consequently no cause for remedial work.

4.2 Concrete Drum Storage Pad (Southwest of Building W-14)

Phase I (Samples 6B-1 and 6B-2). Sample 6B-1, taken from a single point in a heavily oil stained area, approximately 800 square feet in extent, adjacent to the concrete pad, had a PCB content of 130 ppm and petroleum hydrocarbons of 3,500 ppm. Another sample (6B-2), however, a composite from four locations immediately adjacent to the visibly oil stained area, contained only 7.0 ppm PCB's and less than 0.1% petroleum hydrocarbons by weight. Further analysis, as a result of Phase II sampling, was necessary in an attempt to resolve the actual extent of PCB's found in the soil and their significance.

As far as the petroleum hydrocarbons are concerned, however, it has been reported by Singer that the concrete pad was used as a storage facility for virgin lubricants, and hydraulic fluids, and empty drums used at the plant site. This explains why portions of the concrete pad and some adjacent soil areas appear to be visibly oil stained. The degree of visible staining, however, does not appear to be indicative of major disposal in the area. Rather, the visible oil staining would seem to be more indicative of minor spills and leaks over the years spread by runoff. Groundwater observed in Test Pit 1, apparently downgradient from the concrete pad, did not contain a visible oil film. In addition, the results of the EP toxicity/metals for these soil samples do not classify the soil as a RCRA hazardous material. (Part of the rationale for classification of waste oil as hazardous waste is that waste oils may contain toxic metals.)

Phase II. In order to verify the presence of PCB's and to determine the extent of any PCB content in the soil, eight additional sample points were analyzed. Sampling point locations are shown on Figure 1 in Appendix II. A shallow and a deep sample were obtained from within the stained area, and four composite samples were obtained from points located 5 feet and 10 feet away from its perimeter. Two additional samples were obtained 5 feet from the edge of the concrete slab. The analytical results are shown in Table 1 in Appendix II.

Evaluation of the analytical results (Nos. 3 and 4, Table 1) verifies that the oil stained area contains PCB's over 50 ppm and indicates they are present to at least a depth of 17 inches. The analytical results of composite samples (Nos. 5 and 6, Table 1) taken at points 5 feet from the perimeter of the stained area indicate PCB's over 50 ppm are present in the top four inches of the soil but not in a deeper sample (8 to 12 inches) where the PCB content is 14 ppm. The composite samples obtained (Nos. 7 and 8, Table 1) 10 feet from the perimeter of the oil stained area did not contain PCB's greater than 4 ppm in either the shallow or deep depth interval. These results indicate a clear gradient of decreasing PCB content in the soils with distance from the oil stained area.

Analytical results of two single point soil samples (Nos. 1 and 2, Table 1), one 5 feet south of the concrete slab and the other 5 feet east of the concrete slab, show that less than 2 ppm PCB's were detected.

In summary, the analytical results and visual observations indicate that an oil stained area approximately 800 square feet in extent contains over 50 ppm PCB's to a minimum depth of 17 inches. (Additional testing would be required to determine if PCB's are present any deeper.) In addition, an adjacent soil area, approximately 800 square feet in extent, contains over 50 ppm PCB's to a depth of approximately 6 inches. These areas contain a minimum of 60 cubic yards in volume. Other samples adjacent to these areas, however, did not contain PCB's over 50 ppm.

As explained in the T-3 and T-7 transformer area, these soils could be isolated from foot or vehicular traffic by a geotextile fabric and 6-inches of crushed stone. Only if they were excavated would secure landfill disposal as PCB materials be required.

Since the aforementioned 60 cubic yards of soil represents an unsightly area, due to the heavy oil staining, these soils should be removed from the site for aesthetic reasons. Secure landfill disposal as PCB materials is required, however. In addition, the adjacent concrete slab should be solvent rinsed to remove unsightly residues that are present.

4.3 Soil Area South of Building W-3

Phase I. Three composite soil samples were taken in the general area south of Building W-3 and W-5. The sample (5-6) immediately south of Building W-3 had a PCB content of 72 ppm while the sample (6C-5) approximately 200 feet west had a PCB content of 3.7 ppm; and the sample (5-7) approximately 300 feet south had a PCB content of 4.6 ppm. Petroleum hydrocarbons detected in these soils were below 0.1%. The soils were not hazardous according to the RCRA EP toxicity/metals criteria.

Inspection of the area from which the 72 ppm PCB soil sample (5-6) was obtained indicated no visible oil staining. In fact, the area looked much the same as the adjacent areas (6C-5 and 5-7) where low levels of PCB's were found.

Although the soils immediately behind Building W-3 (5-6) contain PCB's above the regulated limit, the soils would only be subject to regulation for ultimate disposal if excavated. If the soils are removed, current regulation would require secure landfill disposal. Since there are no leaks or spill residues apparent in the area and no threat to water supplies, food or feed, major remedial actions are not required to continue use of the site as an industrial complex. As noted in the T-3 and T-7 area, personnel engaged in earthwork operations could be exposed to PCB materials above regulated limits and should have appropriate safety and health procedures while working in this area. As a precaution, a geotextile fabric covered by 6-inches of crushed stone or an asphalt paving should be placed over the area to preclude PCB contact by foot traffic through the area.

Phase II. In order to determine the extent of PCB's in the soil, eight additional sample points were analyzed. Sample point locations are shown on Figure 1 of Appendix II. A shallow sample (0 to 4 inches in depth) and a deep sample (8 to 12 inches deep) were obtained from each of the four corners of the open area south of Building W-3, an area of approximately 6,300 square feet. The results of these analyses are shown on Table 1 in Appendix II.

The analytical results (Nos. 16 through 23, Table 1) show that PCB content of the soils from the 8 to 12 inch depth interval in all of the corners is significantly less than that found in the 0 to 4 inch depth interval. This gradient of decreasing PCB concentration with depth suggests that PCB's over 50 ppm in this area are confined to the near surface soils. Based on the analytical results, it would appear that PCB's over 50 ppm are confined to the western half of the area.

Based on these analytical data, it is estimated that approximately 3,200 square feet of soil, the western half of the area, contains PCB's above 50 ppm. The vertical depth of PCB's over 50 ppm is estimated to be 6-inches in the south portion and 18-inches in the north portion. (Additional tests would be required in the north portion for verification.) This quantity is approximately 120 cubic yards.

As in the T-3, T-7 transformer area, the selection of the appropriate remedial action is dependent on future use of the area. Placement of the geotextile fabric-crushed stone would be sufficient to provide isolation for vehicle and foot traffic if the area does not undergo development. Removal of the PCB materials would be prudent prior to any earthwork performed here for site development.

4.4 Soil Area at Building W-3 "Sand Pit"

Phase I. The results of the analysis for composite soil samples (5-2) obtained from the sand pit area at Building W-3 (and adjacent to Buildings W-5 and W-14) indicated that the soils contain PCB's at 140 ppm. This composite sample was obtained from white sand and brown silty sand beneath a 4-inch thick crushed stone surface. Neither the white sand nor the brown silty sand nor the crushed stone exhibited any visible oil staining.

The open area at the sand pit location is bounded by Buildings W-14, W-3, and W-5 on three sides. Concrete slabs and asphalt paving cover a large portion of the open area such that only 7,600 square feet of soil are exposed in the general sand pit area.

Although the soils in this open area contain PCB's above the regulated limit, the soils would only be subject to regulation for ultimate disposal if excavated. If the soils are removed, current regulation would require secure landfill disposal. There are no visible indications of leaks or spill residues in the area. Since no threat to water supplies, food or feed exists, no major remedial actions are necessary to continue to use the site as an industrial complex. Personnel performing earthwork operations in the area could be exposed to PCB materials above the regulated limit and should use appropriate health and safety procedures. Since the area is readily accessible to vehicular traffic, the exposed soil in the area should be paved with asphalt to preclude PCB contact by vehicles and/or foot traffic through the area. Approximately 7,600 square feet of asphalt paving would be required to pave all of the exposed soil, if that were necessary.

Phase II. In order to verify the PCB presence in the soil and define its extent, 9 additional sample points were analyzed. Sample point locations are shown in Figure 1 of Appendix II. A shallow sample (0-3 inches in depth) and a deep sample (9-12 inches in depth) were analyzed from four representative points in the 7,600 square feet of exposed soil. An additional sample located close to the corner of the W-3 and W-5 building was also analyzed. The results of these anayses are shown on Table 1 in Appendix II.

The analytical results (Nos. 26 through 34, Table 1) indicate that PCB's over 50 ppm are present in almost all of the samples obtained from soil adjacent to the sand pit. Three of the four sample locations where depth profiling was performed, however, had less PCB content in the deep sample point. This data suggest that PCB's over 50 ppm are confined to surficial soils in much of the area. The existing data base does not permit a precise delineation of the depth of soils with a PCB content over 50 ppm, however. Since the sample locations were generally within several feet of the "sand pit", the data base does not permit a precise delineation of the horizontal extent of PCB's over 50 ppm in the exposed soils. Consequently, additional testing in this area is required to improve estimates of the volume of soil over 50 ppm PCB's.

It is assumed, conservatively, that the entire 7,600 square feet of exposed soil may contain PCB's over 50 ppm. Since there is a suggestion of decreasing PCB content with depth, it is assumed that the depth of 50 ppm PCB soils is limited to the top 18 inches. With these assumptions, approximately 420 cubic yards of soil above 50 ppm PCB's may be present.

As indicated for other similar areas, the selection of the appropriate remedial action is dependent on intended use of the area. Asphalt paving would provide sufficient isolation for vehicles and foot traffic if the area does not undergo development. Removal of the PCB materials would be prudent, however, prior to any earthwork performed here for site development.

4.5 Soil Samples South of Buildings V-3 and V-4

Phase I. Two samples were collected for analysis south of Buildings V-3 and V-4.

One sample (5-4) was a composite obtained from a 3-foot wide soil strip separating the V-4 building from an asphalt parking area, and from sand inside the adjacent coolant recirculation room. The analytical results of the EP toxicity/metals showed lead at 5.4 ppm in the extract, which is above the RCRA criterion of 5.0 ppm. Petroleum hydrocarbon analysis indicated levels of 1,130 ppm in the soil. Portions of vehicles in the parking area would overhang the soil where the lead levels were detected. Consequently, drippings from drive train components and exhaust vapors would be expected to have entered the soil over the years of plant operation. These drippings and exhaust vapors could account for the lead detected. Visual observation of the area does not reveal oil staining, oil residues, or indications of waste disposal. Since this area would probably be used as a parking area in the future, no useful purpose would be gained by removing these soils. These soils do not affect food, feed, or water supplies, or threaten the health and safety of workers or the general public. As a precaution, several inches of crushed stone should be placed over the soils to preclude contact.

A sample (5-5) was obtained from an oily residue next to a metal separator by Building V-3. The oily residue encompasses an area approximately 10 feet by 8 feet in an otherwise clean asphalt paved area. Analysis indicates that the residue contains 26,000 ppm petroleum hydrocarbons. PCB's were not detected and the EP toxicity metals were below RCRA criteria. The oily residue should be scraped off the asphalt and disposed of for aesthetic purposes.

4.6 Soil Below Tank L-4

During the Phase I work soil below the five aboveground tanks, west of Building W-14 was not sampled. Due to the fact that PCB's above 50 ppm were detected in one of the tank sediments, a soil sample from within the diked area beneath the tanks was obtained for laboratory analysis during Phase II. The results of this analysis are presented in Table 1 in Appendix II.

The results of the laboratory analysis (No. 10, Table 1) indicate that the soil below Tank L-4 had a PCB content of 14 ppm. This level is below the regulated limit 50 ppm even if the soils were excavated.

V. BUILDING ASSESSMENT

1. Introduction

a. General

After the initial site inspection by Storch Engineers, the following buildings were chosen for inclusion in the sampling plan: W-14, W-3, W-5, V-1/V-2, V-3, V-4, M, C, and O. The October 19, 1983 report by Storch Engineers outlined the locations of each sampling area, the parameters, and the results. The analytical results of the building sampling are shown on Tables 5.3.5.1 through 5.3.5.5 of the Storch report. These data led to the decision to institute an additional round of sampling in Buildings U, W-14, W-3, W-5, M and O. These Phase II results are presented in Appendix II, Table 2.

As was expected, relatively high levels of petroleum hydrocarbons were reported in floor scrapings that consisted of decades of oily grime. The 23 building samples submitted for petroleum hydrocarbon analysis, which consisted almost entirely of floor scrapings, showed a range from less than 25 ppm to 26,000 ppm with a mean of 11,200 ppm. Since the oils in the floor residue are from typical lubricant manufacturing oils, samples that were not found to be contaminated with PCB's should not pose any significant environmental problems during removal, cleanup or disposal of the small amounts involved as part of normal housekeeping before reoccupancy.

Extraction procedure extracts of building samples that were analyzed for heavy metals showed results above the limits in a few specific locations that would be explained by past work practices. Of 23 samples submitted for EP extract metal analysis, two samples had levels of chromium higher than the standard, and three spots had cadmium levels slightly above the limit.

b. PCB'S

Most of the floor samples for Phase I were also analyzed for PCB's and here also contamination was quite localized. Building W-14 had high levels of PCB's in each floor scraping, while of the other 18 floor scrapings taken during Phase I, representing the other eight buildings, only two samples had greater than 50 ppm PCB.

As discussed in the earlier section on PCB regulations, any PCB contaminated oil that was spilled prior to February 17, 1978 is not required to be removed unless it is a threat to humans or the environment. However, during the renovation of the buildings, any material that is removed from the floor and contains greater than 50 ppm PCB's will have to be disposed of as a PCB-contaminated waste.

c. Library Search Organics

Some of the building samples were also submitted for analysis of other trace organic constituents. These included volatile organics and extractable organics, both acids and base-neutrals. Assessing the results of these analyses according to the rationale that was developed and explained in Section III. According to the RCRA regulations concerning the types of wastes that must be disposed as hazardous waste, floor scrapings from most of the buildings would not be included on the basis of library search findings. An exception, according to RCRA, would be if the EPA Administrator decided to list these floor scrapings as hazardous waste because of the toxic constituents of FR 261 Appendix III that they contain. However, considering the low concentration of these compounds in the floor residue and the small quantities of residues involved, designation is unlikely.

2. Building W-14

Phase I. Building W-14 was chosen for detailed analysis by Storch based on Singer's disclosure of the use of PCB oils in machinery formerly present in the building. Although the floor of the building had been cleaned by a contractor when the machinery was removed, there remained small amounts of waste material on the floor. It was this material that was sampled during Phase I by dividing up the floor area and making 5 areal composites. The analytical results are shown in Table 5.3.5.1 of Storch's report.

The results showed PCB's in the floor scrapings at an average 1,800 ppm (a range of 44 to 7,800 ppm), cadmium slightly over the EP extract limit in 3 of the 5 composites, petroleum hydrocarbons from 2 to 19 g/l (mean - 12.6 g/l), and a number of specific organics. These organics include the PNA's pyrene and fluoranthene at 8 and 11 ppm, a number of carboxylic acids (fatty acids), hydrocarbons in the hundreds of ppm, phenolic compounds at 36 - 140 ppm, and individual polychlorinated biphenyl (PCB) isomers. None of these findings are surprising considering the use of the building, which was fully disclosed by Singer to EPA. The PNA's and hydrocarbons would be expected in residues from heavy hydraulic petroleum oils, especially after being exposed to high temperatures. Phenols and organic acids are also found in oils and solvents, or could have been generated by oxidation or breakdowns of other oils.

Due to the high levels of PCB's in the floor residue, the floor should be physically cleaned prior to renovation. Since the material will likely have a concentration of PCB's over 500 ppm, it will be classified as a hazardous waste under TSCA (40 CFR 761) and need to be disposed of in a secure landfill as a PCB waste. The amount of material that would be generated by a physical cleaning of the 50,000 ft^2 of floor area is estimated at a maximum of 10 cubic yards. Proper personnel protection equipment, such as respirators, should be used during cleanup operations by workers.

Phase II. Further investigations were performed to assess possible contamination of the concrete floor in W-14 by infiltration of PCB oils into the matrix. To test this hypothesis, eight core samples were taken of the concrete floor in various areas of the building. Core locations are shown on Figure 1 in Appendix II. In order that PCB contaminated floor residues not be included in the core analysis, each area was scrubbed with a wire brush and swept clean prior to coring. To prevent cross-contamination, the drill bit was well cleaned with acetone between cores. Since concrete coring is not a surgically clean operation, however, the occurrence of cross-contamination with depth in a coring is always a possibility. At the lab, each core was sliced to produce a top 1/2-inch section and a 1/2 to 1-1/2 inch section and several were sliced to produce a 1-1/2 to 2-1/2 inch section. These sections were then pulverized to 20-40 mesh and extracted for PCB analysis.

To judge the effectiveness of an organic solvent cleaning to remove penetrated PCB oil, one area of concrete floor was cleaned thoroughly with acetone before coring. This core was analyzed only in the top 1/2-inch layer. The analytical results of the pulverized concrete core sections are shown on Table 1 in Appendix II.

The analytical results (Nos. C1 through C8, and C11, Table 1) show that seven of the nine samples from the top 1/2-inch depth have a PCB content over 50 ppm, including the sample area that was washed with acetone. Fifty percent of the samples (four of eight) taken from the 1/2 to 1-1/2 inch depth interval have a PCB content less than 50 ppm, however. Cores from three locations, C4, C5, and C6, had PCB contents of 1,600 ppm, 770 ppm, and 8,000 ppm in the 1 1/2 to 2 1/2 inch depth interval.

The analytical results indicate that PCB's have penetrated the concrete floor surface to varying degrees. Past precedents for remedial action in similar situations have included solvent rinsing of the floor surface followed by paint sealing prior to rehabitation. The purpose of the solvent rinse is to remove significant amounts of PCB's from the surface of the concrete. PCB's below the surface do not represent a hazard to building occupancy since contact with the PCB's would require penetration of the concrete. The only concern, with PCB's below the surface in the concrete, would arise if the floor slab were to be partly or completely removed (e.g. building demolition). The results of the core analysis indicate that PCB content at the 1-1/2 inch depth is less than 50 ppm for half of the coring locations. Since a concrete floor slab is an integral mass, the full thickness of the slab should be considered when applying the TSCA 50 ppm PCB content requirement for regulated disposal.

Additional testing of the floor is required in those locations, C4, C5, and C6, where high levels of PCB's are found to depths of 2 1/2 inches. The results of further testing will determine if the PCB content of the full thickness of the floor slab is less than 50 ppm. Additional testing should be deferred, however, until the floor has been solvent rinsed.

If significant areas of the floor slab contain over 50 ppm PCB over the full thickness, then those areas of the floor would be considered as PCB materials subject to regulated disposal. If the floor slab were removed, any part containing greater than 50 ppm PCB's would require secure landfill disposal as a PCB waste.

The actual number of solvent rinses required to reduce PCB's to acceptable levels for rehabilitation, on the surface of the floor, would be determined by pilot testing. Typically one to three rinses are required for most concrete slabs according to vendors familiar with the process.

In summary, before Building W-14 is reoccupied, the floor slab should be: physically cleaned, solvent rinsed, and sealed with an epoxy-based paint.

3. Building W-3

Phase I. Two floor scraping samples, a liquid sample of the contents of a pit, and a sample of the white powder contained in another pit were taken in Building W-3. The floor samples were found to contain PCB's at concentrations of 15 and 76 ppm, petroleum hydrocarbons at 7,000 and 11,800 ppm, and no metals above the detection limit. As in the other samples, these levels of petroleum hydrocarbons are typical in oily, grimy samples and will not interfere with floor cleanup or disposal.

One floor sample, analyzed for volatile organics, contained a small (120 ppb) amount of trichloroethylene.

The other floor sample, which was analyzed for acid and base-neutral extractables contained several hundred ppm of hydrocarbons, carboxylic acids, a phthalate ester, and a fluorocarbon. All of these compounds could be residues or transformation products of oily lubricants and cleaners used in the building. Since none of these extractable organics are listed on any of the hazardous or toxic waste lists, they would not cause the floor scrapings to be designated a hazardous waste.

According to the analysis performed, the liquid in the pits was found to contain less than 1 ppm of a few phthalate compounds, chlorodecane, and a number of hydrocarbons and organic acids. The disposal of this water should not cause any problems to a municipal wastewater treatment plant.

The white powder from W-3 also had 1 ppm or less of acid and base-neutral extractables. The compounds detected consisted of silicones, hydrocarbons, phthalates, hydrocarbons, and carboxylic acid. From these data, there is nothing to suggest that any environmental problems would arise from its disposal as a solid waste.

Two dust bins outside of Building W-3 were also sampled and analyzed for acid and base-neutral extractables. The results showed no compound to be higher in concentration than 10 ppm. The compounds were identified as hydrocarbons, carboxylic acids, and one phthalate ester. Again, these data do not point out any problems that would arise from disposing of this material as a solid waste.

Phase II. In order to double check the PCB concentration values in the scrapings and to locate the area and extent of contamination, Building W-3 was resampled during Phase II sampling by dividing the floor area into four quadrants and scheduling analysis for PCB's. Sampling locations are shown in Figure 1 in Appendix II. Analytical results are shown on Table 1 in Appendix II. The results (Nos. 39 through 42, Table 1) showed PCB's slightly above the 50 ppm level in 2 areas (72 and 74 ppm) and much lower in the other two areas (28 and 14 ppm). Although the data do not permit determination of the source of PCB's, it is necessary to clean the floors and dispose of the material in a secure landfill.

To investigate the possibility that PCB's penetrated the concrete floor, a core sample was taken and analyzed. The results (No. C9, Table 1) showed 2 ppm in the top half inch, and less than 1 ppm below. This indicates that remedial action for the concrete slab is unnecessary.

4. Building W-5

Phase I. Sampling in Building W-5 consisted of three composite floor scrapings around past process operations. The sample taken in the area of the filter press in the southwest extension of W-5 was analyzed for acid and base-neutral extractables. These scans found 1-20 ppm of hydrocarbons, carboxylic acids, and diisooctylphthalate, none of which would prevent the disposal of the residue as a non-hazardous solid waste.

Two samples were taken around pads that previously supported plating operations. Composites of residues in and around these pits showed relatively low levels of petroleum hydrocarbons but possibly significant concentrations of PCB's at 49 and 200 ppm. Extractable organic analysis identified 1-20 ppm levels of hydrocarbons, carboxylic acids, phthalate esters, one specific PCB isomer, and three priority pollutants (ethyl benzene - 7 ppm, phenol - 6 ppm, and p-nitrophenol - 2 ppm). Although ethyl benzene and phenol have measurable vapor pressures, it is highly unlikely that the recommended TWA-TLV's (ACGIH) of 10 ppm and 5 ppm, respectively, would be exceeded with such a small solid concentration. Ambient air sampling would be required to assess worker exposure during any cleanup. However, following cleanup, the source of these compounds (the floor residue) will be gone, and so will the possible source of air contamination.

In one of the samples, chromium was found in the EP extract at a concentration much above the limit. Any material with this property is designated as a hazardous waste and must be disposed of a such.

Phase II. In order to determine the extent of floor residues that are contaminated with chromium, two new samples were collected from larger areas, as shown on Figure 1 in Appendix II. The EP-metals results were 91 and 100 ppm chromium as shown in Table 1 (Nos. 36 and 37) in Appendix II. As this confirms the original findings, much of the floor residue will probably require disposal as hazardous waste. The amount of waste involved in W-5 is estimated at a maximum of 5 cubic yards (1/16 inch average thickness x 27,000 ft^2 building area).

These samples and two others (Nos. 35 and 38, Table 1) were also analyzed during Phase II for PCB's in order to further evaluate the degree of PCB contamination. The results showed that PCB's are present at levels of 50 to 200 ppm.

The floor residue material should be removed prior to building reoccupancy and disposed of in a secure landfill as a PCB waste.

To determine if PCB's pentrated the concrete floor, two cores were taken in Building W-5. One was sliced into two layers and analyzed (No. C10, Table 1) for PCB content. The top 1/2 inch contained 2 ppm PCB and the 1/2 to 1-1/2 inch layer less than 1 ppm indicating that the floor slab does not require remedial action.

5. V Buildings

a. V1/V2

Composite floor sample results from Building V1/V2 did not report any chemicals that would designate these wastes as hazardous. Volatiles consisted of ketones and aldehydes below 6 ppb, EP metals were all below limits, and PCB's were low--an average of 4.5 ppm. Petroleum hydrocarbons at 10-26 g/l were found as expected in the grimy material collected off the old wooden floors. Extractable organic searches found high (5-440 ppm) concentrations of various hydrocarbons, alcohols, and carboxylic acids--none of which are considered toxic or hazardous according to the lists discussed earlier.

b. V3

In a similar manner, three samples of floor residues from V3 were collected and analyzed. The results were similar to V1/V2 with PCB's ranging from 0.4 to 19 ppm, EP metals all below RCRA limits, and petroleum hydrocarbons around 20 g/l. Toluene was found at 46 ppb, and the typical hydrocarbons and carboxylic acids associated with oils and lubricants were analyzed in the hundreds of ppm. Although toluene is on the priority pollutant list, this low concentration should not warrant classifying this material as a hazardous waste.

c. V4

V4 sampling consisted of two floor scraping samples. The PCB analysis was ambiguous because the detection limit in one sample was 80 ppm. However, the Q.C. lab found it below a detection limit of 23 ppm. Together with the other sample at 13 ppm, we can safely conclude that the floor residue is not regulated with regard to PCB's (i.e. greater than 50 ppm). Petroleum hydrocarbons were typical of grimy residue at 13-17 g/l and all EP metals were below the limits. Volatile compounds identified were all below 16 ppb, while hydrocarbons and carboxylic acids ranged from 4 ppm to 1,100 ppm--again characteristic of oils and lubricants that would have been used here. From this information, we can conclude that these scrapings can be disposed of as solid waste.

6. Building M

Phase I. Building M sampling consisted of one sample in the small forging area (M-5) and another spread throughout the M-3 and M-4 storage area. Both floor scraping samples had similar levels of petroleum hydrocarbons (average 10 g/l) and below detection limits of EP metals. Volatile compounds were all below 10 ppb (including ethylbenzene at 7.5 ppb). As with other oily floor samples, the extractable scan identified 3-600 mg/l of hydrocarbons, carboxylic acids, aldehydes, and phthalate esters. The two PCB concentrations were less than 0.4 ppm and 42 ppm. Since 42 ppm is approaching the 50 ppm limit, and the sample (6F-13) was taken from such a large area, it was decided to resample for PCB's by dividing Building M-3 and M-4 into three separate samples.

Phase II. These three additional samples analyzed for PCB's were quantified at 37 ppm, less than 10 ppm and less than 20 ppm as shown on Table 1 in Appendix II. Because all the PCB analyses (Nos. 44, 45, and 46, Table 1) were less than 50 ppm and the average was less than 22 ppm, it can safely be concluded that the material on the building's floor is not regulated and can be cleaned up and disposed of as solid wastes.

7. Building C

Phase I. Phase I consisted of one sample composited on the fourth floor of Buildings C-10 and C-11. The results showed that PCB's less than the 0.4 ppm detection limit, EP metals were below toxic criteria, petroleum hydrocarbons were very low, and volatile organics were all below 10 ppb. A number of typical hydrocarbons and carboxylic acids were identified at a concentration of 36 to 1,600 ppm in the sample. Phenol was also quantified at 65 ppm.

Air monitoring would be required to determine if the phenols detected in the floor residues could result in unacceptable air quality conditions. Due to the low levels of parameters detected, the floor residues should not be considered a hazardous waste if they are removed from the floors, however.

8. Building O

Phase I. Building O, which housed Singer's foundry, was sampled by four composite floor scrapings. The PCB results for all four samples were less than the detection limit of 0.4 ppm. The metal concentrations in the EP extract were all less than the criteria concentration. Petroleum hydrocarbons were low in three of the samples (an average of 180 ppm) but higher (15,800 ppm) in one sample that contained residue from a large oily spot.

The volatile and extractable organic library searches reported a number of compounds, including hydrocarbons, two chlorinated hydrocarbons, carboxylic acids, phthalates, and silicones. The original sources of these compounds are probably the lubricants, oils, and cleaners that were used in the processes. A few phenolics were also quantified, the highest concentration being 38 ppm. Finally, three PNA compounds were identified in the floor samples (pyrene at 0.6 ppm, fluoranthene at 68 ppm, and phenanthrene at 12 ppm). These PNA's are probably residue from past coal or oil combustion processes, uses of coal tar or oil products, or mold release agents (e.g. lampblack). As discussed in Section III, for chemicals such as phenols and PNA's, NIOSH has chosen exposures in air that should not be exceeded by workers.

For these chemicals to be inhaled, they must be made airborne. The small, but measurable vapor pressure of phenol (0.2 mm) indicates that phenol will increase in the vapor phase very slowly. The worst case scenario would be to allow all the phenol to vaporize (sublime) into a completely closed Building O. The average phenolic concentration was 16 ppm and at a 50 lb/cubic foot density for the light foundry sand powder, the 67 cubic yards of estimated material contains 670 grams of phenol. It is estimated that all of this phenol distributed through the 1.3 million cubic feet of building air would add 18 mg/m^3. Although this is very close to the American Conference of Industrial Hygienist Threshold Limit Value of 19 mg/m^3, this level would have little likelihood of being attained. The building is not airtight and the phenol would not have as high vapor pressure when associated with oils in the floor residue.

For the PNA's to be inhaled, the particulates containing them would have to be suspended in the air, as they have insignificant vapor pressures. The highest concentration measured, 68 ppm fluoranthene, would require a particulate in air concentration of 3,000 mg/m^3 to reach the limit of 0.2 mg/m^3 PNA. This is an extremely high dust level that would physically prevent breathing.

However unrealistic the possibility of respiratory exposure in Building O to phenols, PNA's, and other compounds, any concerns could be allayed by removing the floor residue prior to reoccupancy. This remedial action to vacuum the floors and dispose of the 70 cubic yards of material should be performed to preclude any future liability claims.

Recently, there has been some discussion concerning the designation of foundry sand as a hazardous waste. A telephone conversation with a NJDEP official indicated that the designation decision would be made on data such as EP toxicity metals, reactivity, PCB content, past process practices; and PNA concentration. However, the official felt that PNA concentrations in 1,000's ppm (grams/kg) would be required to bring designation at the present time. The data in hand indicate that this material can be disposed of as solid waste.

Phase II. After discovery of PCB's in Tank F, the decision was made to sample floor scrapings around the transformers in Building O. The results showed a PCB concentration of less than 10 ppm, as shown on Table 1 (No. 43) of Appendix II. These data confirm that floor residues can be disposed of as solid waste.

9. Building U3/U4

The U Building was not sampled during Phase I investigations but was included for sampling in the Phase II work.

Phase II included collecting three composite samples of floor scrapings from three areas of Building U, the boiler house. Sampling locations are shown on Figure 1 in Appendix II and analytical results are shown on Table II in Appendix II. The results (Nos. 47, 48, and 49, Table 1) indicate PCB content over 50 ppm (70 ppm) in one region (the north end of U3), and below detection limit (10 ppm) in the remaining two areas (U4). These data suggest that PCB's over 50 ppm are confined to the north part of the building. The floor residues in this area should be removed by a physical cleaning and should be disposed of in a secure landfill as a PCB waste.

VI. TANK ASSESSMENT

1. Introduction

During the Phase I sampling program, twelve above and below-ground tanks were sampled and analyzed for a variety of chemical constituents. Several minor tanks, reported by Singer to contain gasoline or fuel oils, were not sampled. The description of each tank sampled, some of the liquid depths, and the analyses requested are shown in the October 19, 1983 Storch report. The results of the analysis of the tank samples are indicated on Tables 5.3.2 and 5.3.3 of the Storch report.

Most of the tanks contained oil overlying varying amounts of an aqueous layer. Some also had sludge on the bottom. Only two tanks, L-1 and F, had regulated concentrations (>50 ppm) of PCB in any of the phases. All water layers had less than the 25 ppb detection limit for PCB's. The course of action with regard to the tanks will depend on their plans for use or reuse.

Tank L-1 was resampled during Phase II. Tanks A and B were resampled by CDM in order to resolve discrepancies between the Storch and duplicate sampling data. THe results of the reanalyses are presented in Table 1, Appendix II.

a. Tank L-1

Phase I. Tank L-1 contained aqueous, oil, and sludge layers. While the water and oil layers were found to have less than 25 ppb of PCB's, the sludge phase was reported at 110 ppm. Since this sludge phase was an extremely small quantity of material, the total concentration of the material in the tank would be less than 50 ppm.

During sampling of the tanks, the depth of liquid was estimated at 0.5 inch. With tank dimensions of 9 feet in diameter and a length of 25 feet, it can be calculated that approximately 7 gallons of material remain in this tank.

Phase II. Sampling included resampling of Tank L-1 to confirm this assessment. This oil and water mixture was analyzed (No. 9, Table 1) at 4 ppm PCB.

This small amount of oil residue will not be an impediment to reuse of the tank for storing a similar material. If the tank is used for a different liquid and needs to be cleaned first, this residue can be disposed of as waste oil. However, NJDEP may classify this waste oil as a hazardous waste and require its disposal as such.

b. Tanks L-2, L-3, L-4, L-5

These tanks were all observed to contain small residues of fuel oils, and samples showed no evidence of PCB contamination. After checking their structural integrity, they could be reused.

c. Tank K

Tank K is an underground tank north of the L tanks that was reported to contain the solvent Varsol. Analysis for PCB's showed 29 ppm, therefore, according to TSCA, this oil is not contaminated and can be used for its original purposes. If the choice is made to dispose of this oil, the NJDEP may designate it a waste oil and require disposal of it as such.

d. Tank M

Tank M appeared to be a fuel oil, consistent with a high petroleum hydrocarbon result. The PCB analysis reported that the oil was uncontaminated at less than 25 ppm, the detection limit for PCB's in this matrix.

have to be disposed of in an approved incinerator and the tank would have to be decontaminated before reuse. After decontamination, the tank could be disposed of as a solid waste.

VII. SUMMARY OF COSTS FOR REMEDIAL ACTION

1. Soils	
a. T-3, T-7 Transformer Area (Place geotextile fabric/crushed stone)	$ 1,500
b. Leaching Pit (Remove and dispose of leaching pit/influent pipe and stone backfill)	10,000
c. Concrete Drum Storage Pad (Remove and dispose of PCB oil laden soil, and solvent rinse concrete pad)	20,000
d. South of Building W-3 (Place geotextile fabric/crushed stone)	3,500
e. Soil Adjacent to Sand Pit near W-3/W-5 (Place asphalt pavement)	10,000
f. South of V Buildings (Clean oil from pavement)	1,500
SUBTOTAL	$ 46,500
2. Buildings	
a. W-14 (Remove and dispose of PCB floor residue; and solvent rinse/paint floor slab)	$196,000
b. W-3 (Remove and dispose of PCB floor residue)	34,000
c. W-5 (Remove and dispose of PCB floor residue)	18,000
d. O (Remove and dispose of PNA floor residue)	15,000
e. U (Remove and dispose of PCB floor residue)	10,000
SUBTOTAL	$273,000
3. Tanks	
a. F (Remove and dispose of PCB residue; decontaminate, remove and dispose of tank)	$ 10,000
b. N-1 (Remove and treat electroplating water)	4,000
c. B (Incinerate PCB oil, decontaminate, remove and dispose of tank)	40,000
SUBTOTAL	$ 54,000
TOTAL	$373,500
Say	$375,000

VIII. SUMMARY OF FINDINGS

A summary of the key findings follows:

A. Soil Investigations

1. Soil investigations were generally targeted toward areas of the site suspected of being contaminated. Twenty-one of 26 soil samples obtained during the Phase I site overview investigation, however, did not show levels of PCB's above 50 ppm.

2. Except for the area around the transformers on the south side of the W-14 building, PCB's were not found above 50 ppm in the soils adjacent to site transformers that contained PCB fluids.

3. Neither PCB's above 50 ppm nor other EPA priority pollutant materials were found above levels requiring remedial action in test pit samples adjacent to a former leaching pit southwest of the W-14 building.

4. Neither PCB's above 50 ppm nor toxic metals above RCRA regulated levels were found during Phase I overview investigations in:

   - all three samples taken around the O building (foundry)
   - one of two samples taken adjacent to a oil storage area southwest of the W-14 building
   - two samples taken in the vicinity of the 150,000 gallon storage tank (Tank A) north of the U building
   - a sample taken west of the employee parking lot

- two of three samples taken south of the W-3 and W-5 buildings
- samples near the V and M buildings.

5. Several areas of concern were identified during the Phase I site overview investigation. Many of the areas of concern were further investigated during the follow-up Phase II investigation in order to define their extent. Based on extrapolation of the existing data base, it is assumed that the major areas of concern are as follows:

   a. Approximately 40 cubic yards of soil adjacent to Transformers T-3 and T-7 contain PCB's slightly over 50 ppm.

   b. Approximately 60 cubic yards of soil in and near an oil stained area adjacent to the concrete drum storage area contain PCB's above 50 ppm.

   c. Approximately 120 cubic yards of soil in an open area behind W-3 contain PCB's above 50 ppm.

   d. Approximately 420 cubic yards of soil adjacent to the "sand pit" area between W-3 and W-5 buildings contain PCB's above 50 ppm.

   Additional testing would be required in order to verify the actual extent of these areas.

6. Regulations (TSCA) do not require the removal of PCB soil materials that have been in place before 1978, which is the case at the Singer property. Regulations (TSCA) do require that any PCB soil materials that are moved be disposed of in special chemical waste landfills, however.

   The management of the PCB soil materials, therefore, is dependent on future use of these areas. If the PCB soil materials remain in place, placement of a geotextile fabric and crushed stone surfacing would be required to isolate them. If these soils were excavated for site development, however, they must be disposed of in a chemical waste landfill. It is CDM's judgment that excavation and removal of these soils is not required unless it occurs as part of routine site development or for aesthetic reasons.

7. Groundwater obtained from a test pit on the south end of the site was analyzed for the 129 EPA Priority Pollutants. The analyses showed that several metals were detected at levels above drinking water quality standards. Since the near surface groundwater is not used for potable water, the metals should not be a matter of concern. Except for the metals, essentially no other priority pollutant compounds were detected in the groundwater.

B. Buildings

In order to assess any environmental or health concerns with the future reuse of the Singer manufacturing facilities, ten buildings were inspected, samples were collected, and analysis results were evaluated.

The majority of the building samples in Phase I consisted of composites of residues that remain on the floor from years of use. These samples underwent analysis for PCB's, petroleum hydrocarbons, extraction procedure for toxic metals, volatile organic and acid and base neutral extractable organics. The results indicated that a few building areas had concentrations of regulated materials that are a matter of environmental concern. Phase II sampling efforts were undertaken to define the extent of PCB's and chromium, and included additional floor scrapings as well as concrete coring.

PCB's above 50 ppm were confined to the concrete floor as well as the floor scrapings in W-14, and to floor scrapings in three additional buildings (W-3, U, and W-5). Metal concentrations of a hazardous nature (according to RCRA-EP Toxicity) were detected in 5 of 26 samples and were localized to two buildings (W-14 and W-5). Due to the presence of these PCB's in U, W-14, W-3, and W-5, any solid waste that is generated during the cleanup of these buildings will require disposal as hazardous wastes. The petroleum hydrocarbon levels found in all the buildings were indicative of the oily nature of these floor scrapings and were to be expected after years of using various manufacturing oils and lubricants. These hydrocarbons were not present in large quantitites nor were they of a toxic nature to require that the wastes in the remaining buildings be designated hazardous. Individual building descriptions follow.

1. W-14

PCB's in the floor scrapings averaged 1,800 ppm while cadmium in the EP extract was slightly over the limit in 60% of the samples. Therefore, the approximately 10 cubic yards of residue that would be produced when the floor is physically cleaned for renovation will have to be disposed of in a secure landfill as a PCB waste. The core sampling and analysis investigation determined that PCB's over 50 ppm have penetrated the concrete over much of the floor area to a depth of 1/2-inch and sometimes deeper. Additional testing would be required to determine the full extent of the PCB penetration into the floor in certain areas. In order to render the floor suitable for reoccupancy, it should be solvent rinsed to remove absorbed PCB's from the surface. Following the solvent rinsing, the floor should be painted with an epoxy-based paint.

2. W-3

Sampling in W-3 showed some floor residues containing greater than 50 ppm PCB's. A core taken of the concrete floor indicated that PCB's had not contaminated the concrete. A physical cleaning of the floor is required to remove the residue prior to building reoccupancy. The residue material will have to be disposed of in a secure landfill as a PCB waste.

3. W-5

Floor scraping samples from Building W-5 contain PCB's over 50 ppm as well as chromium higher than the EP extract limit. The concrete core taken in

W-5 had less than the detection limit (2 ppm) of PCB's so it can be assumed to be uncontaminated. A physical cleaning of the floor is required to remove the residue prior to building occupancy. The residue material will have to be disposed of in a secure landfill as a PCB waste.

4. V1/V2, V3, and V4

Floor scrapings in V1/V2, V3, and V4 had typical levels of petroleum hydrocarbons and other organics and no constituents that would require any remedial actions other than ordinary housecleaning before reoccupancy.

5. M

Phase I sampling results of floor residues in Building M would not require classification of the residues as hazardous waste. Nevertheless, three additional samples were taken during Phase II. The results of the additional analyses confirmed the absence of PCB's over 50 ppm. No remedial actions, other than ordinary housekeeping, are required before reoccupancy.

6. O

Building O sampling results of floor residues showed PCB's less than detection limits, typical petroleum hydrocarbon levels, EP metals below detection limits and a number of extractable organics. Compounds such as phenol and PNA's were detected in the floor residues but at non-toxic concentrations relative to disposal of the material as a solid waste. In order that no potential for inhalation of this material remains, it is recommended that it be removed before occupancy.

7. U

Floor scrapings from the north part of the U Building contain PCB's over 50 ppm. A physical cleaning of the floor is required to remove the residue prior to building occupancy. The residue material will have to be disposed of in a secure landfill as a PCB waste.

8. C

Floor scrapings from the fourth floor contain phenols but at non-toxic concentrations relative to disposal of the material as a solid waste. Air monitoring would be required to determine if the presence of the phenols in the floor residues adversely affects air quality.

C. Tanks

Three of the thirteen tanks sampled will require remedial action. However, if other tanks are emptied, the contents will have to be disposed of as a hazardous waste under New Jersey regulations.

1. Tanks L, K, M, and E

All tanks were analyzed and found to contain less than 50 ppm PCB's. No remedial actions are required.

2. Tank F

Tank F residue contains high levels of PCB's. It is recommended that the small amount of residue be removed from the tank and be disposed of in an approved incinerator. The tank should be decontaminated and removed from service. After decontamination, the tank may be disposed of as a non-hazardous solid waste.

3. Tank N

Tank N-1 contains what appears to be electroplating wastewater containing 900 ppm nickel and a few other metals. The tank contents should be transported and disposed of at a metal wastewater treatment plant.

4. Tank A

Tank A analysis indicated two dissimilar PCB results: 1.5 ppm and 51 ppm. To confirm the actual concentration, an additional sample was analyzed at less than 5 ppm. No remedial action is required and the fuel oil can be used for its intended purpose.

5. Tank B

Samples from the small volume of oil remaining in this tank produced two analytical results: 0.3 ppm and 630 ppm. Resampling and re-analysis indicates that the PCB concentration is indeed greater than 500 ppm. The estimated 2,000 gallons will have to be disposed of in an approved incinerator. After decontamination, the tank may be disposed of as a non-hazardous solid waste.

D. Cost for Remedial Action

From the data obtained by Phases I and II sampling, the estimated cost for remedial action on known environmental liabilities is approximately $375,000. Additional testing is required in certain locations to fully define the extent of problem areas. Costs for remedial action, therefore, are subject to change.

TABLE 5.3.1
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS
PCB TRANSFORMERS

		SAMPLE I.D.							
CONSTITUENT	CRITERIA	1-T1	1-T2	1-T3	1-T4	1-T5	1-T6	1-T7	
PCB									
1260		0.300	1.300	14.000	2.500		4.500		
1248				39.000		3.400		25.000	
1254						2.800		25.000	
Total PCB's		0.300	1.300	53.000	2.500	6.200	4.500	50.000	

TABLE 5.3.2

ENVIRONMENTAL ASSESSMENT

LABORATORY ANALYSIS RESULTS

TANKS

		SAMPLE I.D.										
CONSTITUENT	CRITERIA	2-A	2B	2E	2F	2K	2L-1	2L-2	2L-3	2L-4	2L-5	M
PCB 1260												
entire sample		0.260	0.340		0.290	29.000		<0.002				
water layer							<0.025		<0.025	<0.01	<0.005	
oil layer				<0.025			<0.025		<0.025	<0.025	<0.025	<0.02
water/oil layer		1.200			12,000							
solid							110.0					
Total PCBs		1.46	0.34	<0.025	12,000	29.0	110.0	<0.002	<0.025	<0.01	<0.025	<0.025
Petroleum Hydrocarbons	NA			29,800	56		~20,000	160	~20,000	~20,000	32,500	
EP Toxic												
Arsenic	5.0				<0.5							
Barium	100.0				<10.0							
Cadmium	1.0				<0.1							
Chromium	5.0				<0.5							
Lead	5.0				<0.5							
Mercury	0.2				*							
Selenium	1.0				<0.5							
Silver	5.0				<0.5							

* Sample 2F - Solid in bottom of sample was extracted.
Insufficient sample for mercury analysis.

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	SAMPLE ID Laboratory Liquid Detection Limit (ppm)	Tank N
Metals (Total)		
Arsenic (As)	0.05	
Cadmium (Cd)	0.02	0.05
Chromium (Cr)	0.1	
Lead (Pb)	0.2	4.0
Mercury (Hg)	0.0002	0.00085
Selenium (Se)	0.05	
Silver (Ag)	0.06	
Antimony (Sb)	0.05	
Beryllium (Be)	0.02	
Copper (Cu)	0.1	0.28
Zinc (Zn)	0.02	29.0
Nickel (Ni)	0.1	900.0
Thallium (Tl)	0.5	
Volatiles	(ppb)	
Acrolein	100	
Acrylonitrile	100	
Benzene	10	
Bis (Chloromethyl) Ether	10	
Bromoform	10	
Carbon Tetrachloride	10	
Chlorobenzene	10	
Chlorodibromomethane	10	
Chloroethane	10	
2-Chloroethylvinyl Ether	10	
Chloroform	10	
Dichlorobromomethane	10	
Dichlorodifluoromethane	10	
1,1-Dichloroethane	10	
1,2-Dichloroethane	10	
1,1-Dichloroethylene	10	
1,2-Dichloropropane	10	

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	SAMPLE ID Laboratory Liquid Detection Limit (ppb)	Tank N
CIS1,3-Dichloropropene	10	
Trans-1,3-Dichloropropene	10	
Ethylbenzene	10	
Bromo Methane	10	
Chloro Methanee	10	
Methylene Chloride	10	
1,1,2,2-Tetrachloroethane	10	
Tetrachloroethylene	10	
Toluene	10	
1,2-Trans-Dichloroethylene	10	
1,1,1-Trichloroethane	10	
1,1,2-Trichloroethane	10	
Trichloroethylene	10	
Trichlorofluoromethane	10	
Vinyl Chloride	10	
Acid Extractables		
2-Chlorophenol	25	
2,4-Dichlorophenol	25	
2,4-Dimethylphenol	25	
4,6-Dinitro-O-Cresol	250	
2,4-Dintrophenol	250	
2-Nitrophenol	25	
4-Nitrophenol	25	
P-Chloro-M-Cresol	25	
Pentachlorophenol	25	
Phenol	25	
2,4,6-Trichlorophenol	25	

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	SAMPLE ID Laboratory Liquid Detection Limit (ppb)	Tank N
Base-Neutral Extractables		
Acenaphthene	10	
Acenaphthalene	10	
Anthracene	10	
Benzidine	10	
Benzo (a) Anthracene	10	
Benzo (a) Pyrene	10	
3,4-Benzofluoranthene	10	
Benzo (ghi) Perylene	25	
Benzo (k) Fluoranthene	10	
Bis (2-Chloroethoxy) Methane	10	
Bis (2-Chloroethyl) Ether	10	
Bis (2-Chloroisopropyl) Ether	10	
Bis (2-Ethylhexyl) Phthalate	10	120
4-Bromophenyl Phenyl Ether	10	
Butyl Benzyl Phthalate	10	
2-Chloronapthalene	10	
4-Chlorophenyl Phenyl Ether	10	
Chrysene	10	
Dibenzo (a,h) Anthracene	25	
1,2-Dichlorobenzene	10	
1,3-Dichlorobenzene	10	
1,4-Dichlorobenzene	10	
3,3-Dichlorobenzidine	10	
Diethyl Phthalate	10	
Dimethyl Phthalate	10	
Di-N-Butyl Phthalate	10	
2,4-Dinitrotoluene	10	
2,6-Dinitrotoleuene	10	
Di-N-Octyl Phthalate	10	
1,2-Diphenylhydrazine (as Azobenzene)	10	
Fluoranthene	10	

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	SAMPLE ID Laboratory Liquid Detection Limit (ppb)	Tank N
Fluorene	10	
Hexachlorobenzene	10	
Hexachlorobutadiene	10	
Hexachlorocyclopentadiene	10	
Hexachloroethane	10	
Indeno (1,2,3-cd) Pyrene	25	
Isophorone	10	
Naphthalene	10	
Nitrobenzene	10	
N-Nitrosodimethylamine	10	
N-Nitrosodi-n-Propylamine	10	
N-Nitrosodiphenylamine	10	
Phenanthrene	10	
Pyrene	10	
1,2,4-Trichlorobenzene	10	48
Pesticides		
Aldrin	10	
Alpha-BHC	10	
Beta-BHC	10	
Gamma-BHC	10	
Delta-BHC	10	
Chlordane	10	
4,4'-DDT	10	
4,4'-DDE	10	
4,4'-DDD	10	
Dieldrin	10	
Alpha-Endosulfan	10	
Beta-Endosulfan	10	
Endosulfan Sulfate	10	

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	SAMPLE ID Laboratory Liquid Detection Limit (ppb)	Tank N
Endrin	10	
Endrin Aldehyde	10	
Heptachlor	10	
Heptachlor Epoxide	10	
PCB-1242	10	
PCB-1254	10	
PCB-1221	10	
PCB-1232	10	
PCB-1248	10	240
PCB-1260	10	
PCB-1016	10	
Toxaphene	10	
Miscellaneous		
Cyanide (total)	0.01	0.01
Phenols (total)	0.01	0.02

Table 5.3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	Laboratory Soil Detection Limit (ppm)	SAMPLE ID 3-1 Test Pit 1 Soil	3-2 Test Pit 2 Soil	3-3 Test Pit 3 Soil	Laboratory Liquid Detection Limit (ppm)	3-4 Test Pit 4 Liquid
Metals (Total)						
Arsenic (As)	0.5				0.05	
Cadmium (Cd)	0.2	2.4	4.7	3.0	0.02	0.04
Chromium (Cr)	1.0	22	60	140	0.10	0.10
Lead (Pb)	2.0	130	150	1600	0.20	0.20
Mercury (Hg)	0.002	0.174	0.088	0.52	0.0002	
Selenium (Se)	0.5				0.05	
Silver (Ag)	0.6				0.06	
Antimony (Sb)	0.5				0.05	
Beryllium (Be)	0.2	0.33		1.3	0.02	
Copper (Cu)	1.0	2100	360	1100	0.1	
Zinc (Zn)	0.2	280	940	420	0.02	1.10
Nickel (Ni)	1.0	68	53	53	0.1	0.21
Thallium (Tl)	0.5				0.05	
Volatiles	(ppb)				(ppb)	
Acrolein	100				100	
Acrylonitrile	100				100	
Benzene	10				10	
Bis (Chloromethyl) Ether	10				10	
Bromoform	10				10	
Carbon Tetrachloride	10				10	
Chlorobenzene	10				10	
Chlorodibromomethane	10				10	
Chloroethane	10				10	
2-Chloroethylvinyl Ether	10				10	
Chloroform	10				10	
Dichlorobromomethane	10				10	
Dichlorodifluoromethane	10				10	
1,1-Dichloroethane	10				10	
1,2-Dichloroethane	10				10	
1,1-Dichloroethylene	10				10	
1,2-Dichloropropane	10				10	

Note: No result noted indicates below the detection limit

Table 3.[illegible]

PRIORITY POLLUTANT ANALYSIS

SAMPLE ID

CONSTITUENT	Laboratory Soil Detection Limit (ppb)	3-1 Test Pit 1 Soil	3-2 Test Pit 2 Soil	3-3 Test Pit 3 Soil	Laboratory Liquid Detection Limit (ppb)	3-4 Test Pit 4 Liquid
CIS1,3-Dichloropropene	10				10	
Trans-1,3-Dichloropropene	10				10	
Ethylbenzene	10				10	
Bromo Methane	10				10	
Chloro Methanee	10	*			10	*
Methylene Chloride	10				10	
1,1,2,2-Tetrachloroethane	10				10	
Tetrachloroethylene	10				10	
Toluene	10				10	
1,2-Trans-Dichloroethylene	10				10	
1,1,1-Trichloroethane	10				10	
1,1,2-Trichloroethane	10				10	
Trichloroethylene	10				10	
Trichlorofluoromethane	10				10	
Vinyl Chloride	10				10	
Acid Extractables						
2-Chlorophenol	500				25	
2,4-Dichlorophenol	500				25	
2,4-Dimethylphenol	500				25	
4,6-Dinitro-O-Cresol	5000				250	
2,4-Dintrophenol	5000				250	
2-Nitrophenol	500				25	
4-Nitrophenol	500				25	
P-Chloro-M-Cresol	500				25	
Pentachlorophenol	500				25	
Phenol	500				25	
2,4,6-Trichlorophenol	500					

* Minimal amounts of Methyl Chloride were detected. It is used as a cleaning agent for laboratory equipment, and Storch Engineers did not report the results

Table 3.3

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	Laboratory Soil Detection Limit (ppb)	3-1 Test Pit 1 Soil	3-2 Test Pit 2 Soil	3-3 Test Pit 3 Soil	Laboratory Liquid Detection Limit (ppb)	3-4 Test Pit 4 Liquid
	SAMPLE ID					
Base-Neutral Extractables						
Acenaphthene	200				10	
Acenaphthalene	200				10	
Anthracene	200	340		340	10	
Benzidine	200				10	
Benzo (a) Anthracene	200	780		920	10	
Benzo (a) Pyrene	200	600		680	10	
3,4-Benzofluoranthene	200	1200(1)		960(1)	10	
Benzo (ghi) Perylene	500				25	
Benzo (k) Fluoranthene	200	1200(1)		960(1)	10	
Bis (2-Chloroethoxy) Methane	200				10	
Bis (2-Chloroethyl) Ether	200				10	
Bis (2-Chloroisopropyl) Ether	200				10	
Bis (2-Ethylhexyl) Phthalate	200				10	
4-Bromophenyl Phenyl Ether	200				10	
Butyl Benzyl Phthalate	200		680		10	
2-Chloronapthalene	200				10	
4-Chlorophenyl Phenyl Ether	200				10	
Chrysene	200	820		920	10	
Dibenzo (a,h) Anthracene	500				25	
1,2-Dichlorobenzene	200				10	
1,3-Dichlorobenzene	200				10	
1,4-Dichlorobenzene	200				10	
3,3-Dichlorobenzidine	200				10	
Diethyl Phthalate	200				10	
Dimethyl Phthalate	200				10	
Di-N-Butyl Phthalate	200				10	
2,4-Dinitrotoluene	200				10	
2,6-Dinitrotoleuene	200				10	
Di-N-Octyl Phthalate	200				10	
1,2-Diphenylhydrazine (as Azobenzene)	200				10	
Fluoranthene	200	2100		1500	10	

(1) Indistinguishable Isomers

Table 5.3.[illegible]

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	Laboratory Soil Detection Limit (ppb)	3-1 Test Pit 1 Soil	3-2 Test Pit 2 Soil	3-3 Test Pit 3 Soil	Laboratory Liquid Detection Limit (ppb)	3-4 Test Pit 4 Liquid
		SAMPLE ID				
Fluorene	200				10	
Hexachlorobenzene	200				10	
Hexachlorobutadiene	200				10	
Hexachlorocyclopentadiene	200				10	
Hexachloroethane	200				10	
Indeno (1,2,3-cd) Pyrene	500				25	
Isophorone	200				10	
Naphthalene	200				10	
Nitrobenzene	200				10	
N-Nitrosodimethylamine	200				10	
N-Nitrosodi-n-Propylamine	200				10	
N-Nitrosodiphenylamine	200				10	
Phenanthrene	200	2000		1000	10	
Pyrene	200	1900		1400	10	
1,2,4-Trichlorobenzene	200				10	
Pesticides						
Aldrin	20	39	<40.0*	<40.0*	10	
Alpha-BHC	20		<40.0*	<40.0*	10	
Beta-BHC	20		<40.0*	<40.0*	10	
Gamma-BHC	20		<40.0*	<40.0*	10	
Delta-BHC	20		<40.0*	<40.0*	10	
Chlordane	20		<40.0*	<40.0*	10	
4,4'-DDT	20		<40.0*	<40.0*	10	
4,4'-DDE	20		<40.0*	<40.0*	10	
4,4'-DDD	20		<40.0*	<40.0*	10	
Dieldrin	20		<40.0*	<40.0*	10	
Alpha-Endosulfan	20		<40.0*	<40.0*	10	
Beta-Endosulfan	20		<40.0*	<40.0*	10	
Endosulfan Sulfate	20		<40.0*	<40.0*	10	

* Detection limits based on processing 50g of as-received sample. Additionally, sample analyzed using a 20:1 dilution to properly evaluate the GC chromatogram, thus the higher than normal detection limits

Table 5.3.5

PRIORITY POLLUTANT ANALYSIS

CONSTITUENT	Laboratory Soil Detection Limit (ppb)	SAMPLE ID 3-1 Test Pit 1 Soil	3-2 Test Pit 2 Soil	3-3 Test Pit 3 Soil	Laboratory Liquid Detection Limit (ppb)	3-4 Test Pit 4 Liquid
Endrin	20		<40.0*	<40.0*	10	
Endrin Aldehyde	20		<40.0*	<40.0*	10	
Heptachlor	20		<40.0*	<40.0*	10	
Heptachlor Epoxide	20		<40.0*	<40.0*	10	
PCB-1242	200		<400.0*	<400.0*	10	
PCB-1254	200		<400.0*	<400.0*	10	
PCB-1221	200		<400.0*	<400.0*	10	
PCB-1232	200		<400.0*	<400.0*	10	
PCB-1248	200		15000	3300	10	
PCB-1260	200		<400.0*	<400.0*	10	
PCB-1016	200		<400.0*	<400.0*	10	
Toxaphene	200		<400.0	<400.0	10	
Miscellaneous						
Cyanide (total)					0.01	
Phenols (total)				0.05	0.01	
Chlorinated Dioxins						

* Detection limits based on processing 50g of as-received sample. Additionally, sample analyzed using a 20:1 dilution to properly evaluate the GC chromatogram, thus the higher than normal detection limits.

TABLE 5.3.4.1
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS
SOIL AREAS

		SAMPLE I.D.									
CONSTITUENT	CRITERIA	5-1	5-3	5-2	5-4	5-5	5-6	5-7	5-8	5-9	5-10
PCB											
1254		2.900			<0.200	<0.400					<0.200
1248		6.600	1.500	140.000			72.000	2.900	0.400	10.000	<0.200
1221								1.700			<0.200
Total PCBs		9.500	1.500	140.000	<0.200	<0.400	72.000	4.600	0.400	10.000	<0.200
Petroleum Hydrocarbons	NA	50	<25	770	Coolant [illegible] 1,130	[illegible] 26,000	260	110	<25	56	<25
EP Toxic											
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	100.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Cadmium	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	5.0	<0.5	<0.5	<0.5	5.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Mercury	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 5.3.4.1
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS
SOIL AREAS

		LEACH PIT				CONCRETE PAD			
CONSTITUENT	CRITERIA	6C-1	6C-2	6-3	6-4	6C-5	6B-1	6B-2	6B-3
PCB									
1254		3.900		0.840		2.200		7.100	0.400
1260				0.630					
1248		11.000				1.500	130.000		
Total PCBs		14.900		1.470		3.700	130.000	7.100	0.400
Petroleum Hydrocarbons	NA	84	25	1180	130	100	3500	530	25
EP Toxic									
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	100.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Cadmium	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Mercury	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 5.3.5.1
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS
BUILDING W-14

		SAMPLE I.D.				
CONSTITUENT	CRITERIA	4-1	4-2	4-3	4-4	4-5
PCB						
1248		7800.000		950.000		52.000
1242			44.000		120.000	
1254						43.000
Total PCBs		7800.000	44.000	950.000	120.000	95.000
Petroleum Hydrocarbons	NA	15,700	18,800	16,500	10,000	2,100
EP Toxic						
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	100.0	<10.0	<10.0	<10.0	<10.0	<10.0
Cadmium	1.0	2.1	1.4	0.1	1.1	0.14
Chromium	5.0	<0.5	<0.5	<0.5	0.7	<0.5
Lead	5.0	<0.5	<0.5	<0.5	2.2	<0.5
Mercury	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	5.0	<0.5	<0.5	<0.5	<0.5	<0.5

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-1
COMPUCHEM SAMPLE NUMBER: 12762

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	60	Methane,Chloro-	VOA	98	1.4
2	227	Methane,Dichloro-	VOA	97	6.0
3	244	2-Propanone	VOA	92	2.5
4	292	Propane,2-Chloro-	VOA	93	1.0
5	400	2-Butanone	VOA	93	1.1
6	706	Ethene,Tetrachlcoro-	VOA	74	5.0

Toluene, which coelutes with the internal standard, d_8-Toluene, has been verified t
be present in this sample at a level of 3.0 ug/kg. The library search is not inclu

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	16	12.5	128
d_8-Toluene	11	12.5	88

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-2
COMPUCHEM SAMPLE NUMBER: 12750

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	660	Phenol	ACID	84	430000
2	842	Octanoicacid	ACID	74	120000
3	871	Phenol, 2-(1-Methylethyl)-	ACID	79	140000
4	897	Phenol, 4-(1-Methylethyl)-	ACID	79	96000
5	1006	Decanoicacid	ACID	76	51000
6	1045	Phenol, 2, 6-Bis(1-Methylethyl)-	ACID	73	36000
7	1160	Dodecanoicacid	ACID	78	240000
8	1294	Tetradecanoicacid	ACID	72	69000
9	1355	1,2-Benzenedicarboxylicacid, Bis(2-Ethylbutyl Ester	ACID	19	9500
10	1446	1,3-Propanediol, 2-Methyl-2-Phenyl-	ACID	30	990000
11	1456	9-Octadecenal	ACID	29	1400000
12	1464	Benzene, (1-Methylethenyl)-	ACID	40	1400000
13	1507	Hexadecanoicacid, 2-Oxo-, Methylester	ACID	44	1100000
14	1553	Benzene, 1-(1-Methylethenyl)-3-(1-Methylethyl)-	ACID	49	25000
15	1559	Benzene, 1-(1-Methylethenyl)-4-(1-Methylethyl)-	ACID	43	150000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	50:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	--*

*Because of dilution, recovery data not available

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-2
COMPUCHEM SAMPLE NUMBER: 12750

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	1206	Eicosane	BN	74	720000
2	1284	1,1'-Biphenyl,2,2",5-Trichloro-	BN	73	120000
3	1384	1,1'-Biphenyl,Tetrachloro-	BN	63	190000
4	1431	1,1'-Biphenyl,2,2',4,5'-Tetrachloro-	BN	62	200000
5	1507	1,1'-Biphenyl,2,2',4,5,5'-Pentachloro-	BN	40	180000
6	1647	Phosphoricacid,Octydiphenylester	BN	65	1500000
7	1772	Benzene,(1-Methylethenyl)	BN	45	1100000
8	1926	Benzene,1-Ethenyl-3-Methyl-	BN	43	1400000
9	2006	Benzene,1-(1-Methylethenyl)-4-(1-Methylethyl)-	BN	59	300000
10	2114	Ether,3-Phenylpropylpropyl	BN	40	1300000
11	1257	Eicosane	BN	73	92000
12	2132	Benzene,(1-Methylethenyl)-	BN	29	600000
13	2219	Naphthalene 1,2,3,4-Tetrahydro-2,7-Dimethyl-	BN	44	760000
14	2362	Benzenemethanol,2,5-Dimethyl-	BN	27	500000
15	2475	Naphthalene, 1,2,3,4-Tetrahydro-2,7-Dimethyl-	BN	43	1100000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	200:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	-- *

*Because of dilution, recovery data not available

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-3
COMPUCHEM SAMPLE NUMBER: 12751

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	924	Pentadecane	BN	86	52000
2	959	Dodecanoicacid	BN	85	380000
3	977	Hexadecane	BN	84	60000
4	1027	Octadecane	BN	86	100000
5	1057	Tetradecanoicacid	BN	78	220000
6	1074	Octadecane	BN	87	78000
7	1150	Hexadecanoicacid	BN	75	260000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	200:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-3
COMPUCHEM SAMPLE NUMBER: 12751

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	910	Octanoicacid	ACID	65	24000
2	1239	Dodecanoicacid	ACID	76	99000
3	1379	Tetradecanoicacid	ACID	73	67000
4	1469	Hexadecane,2-Methyl-	ACID	52	28000
5	720	Phenol	ACID	92	46000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	100:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	--*

*Because of dilution, recovery data not available

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-4
COMPUCHEM SAMPLE NUMBER: 32763

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	224	Methane,Dichloro-	VOA	99	4.9
2	704	Ethene,Tetrachloro-	VOA	77	3.4
3	793	Benzene,Chloro-	VOA	77	1.5
4	886	Benzene,Ethyl-	VOA	75	3.2

Toluene, which coelutes with the internal standard, d_8-Toluene, has been verified to be present in this sample at a level of 3.5 ug/kg. The library search is not include

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	15	12.5	120
d_8-Toluene	9	12.5	72

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-5
COMPUCHEM SAMPLE NUMBER: 12735

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	540	L-Histidine,1-Methyl-	ACID	71	140
2	725	1-Decanol	ACID	71	220
3	822	2H-Pyrrol-2-One,1,5-Dihydro-1-Methyl-	ACID	48	340
4	838	Undecane	ACID	64	60
5	861	2-Furanmethanol	ACID	52	400
6	1061	1,2-Benzenedicarboxylicacid	ACID	94	960
7	1125	Phenol,2,4-Bis(1-Methylethyl)-	ACID	50	72
8	1188	1-Hexadecene	ACID	73	180
9	1220	1,2-Benzenedicarboxylicacid,3(OR5)- Acetyloxy)-5(OR3)-Methyl-,Dimethyl	ACID	37	30
10	1266	1-Pentanol,2-Ethyl-4-Methyl-	ACID	43	500
11	1500	2-Propenamide,N- (4-Chlorophenyl)-3-Phenyl-	ACID	29	2400
12	1538	1,1'-Biphenyl,2,2',4,5'-Tetrachloro-	ACID	49	180
13	1546	6H-Dibenzo(B,D)Pyran-1-Ol, 6,6,9-Trimethyl-3-Pentyl-	ACID	24	220

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	4200	5000	84
d_6-Phenol	4400	5000	88
Pentafluorophenol	4200	5000	88

Table 5.3.5.1

Building W-14

SAMPLE IDENTIFIER: 4-5
COMPUCHEM SAMPLE NUMBER: 12735

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	1268	Fluoranthene	BN	71	11000
2	1295	Pyrene	BN	70	8000
3	1595	Benzene,(1-Methylethenyl)	BN	45	12000
4	1715	Benzene,(1-Methylethenyl)-	BN	42	22000
5	1883	Benzene,1-(2-Butenyl)-2,3-Dimethyl-	BN	44	12000
6	1946	Naphthalene,1,2,3,4-Tetrahydro-2,7-Dimethyl-	BN	49	24000
7	2036	Benzene,1-(1-Methylethenyl)-4-(1-Methylethyl)-	BN	37	11000
8	2165	1,3-Propanediol,2-Methyl-2-Phenyl-	BN	25	14000
9	2237	Benzene,1-(1-Methylethenyl)-3-(1-Methylethyl)-	BN	49	15000
10	2378	Anthracene,9-Dodecyltetradecahydro-	BN	35	14000
11	1786	Benzene,1-(1-Methylethenyl)-3-(1-Methylethyl)-	BN	47	19000
12	2470	Benzene,1-(1-Methylethenyl)-4-(1-Methylethyl)-	BN	29	3300

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	1200	5000	24
Fluorobiphenyl	1900	5000	38
d_8-Naphthalene	1900	5000	38

TABLE 5.3.5.2
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS

SAMPLE I.D.

		BUILDING W-5			BUILDING W-3				
CONSTITUENT	CRITERIA	6F-1	6F-2	6D-1	6F-3	6F-4	6E-1	6E-2	6A-1
PCB									
1254		49.000	200.000		5.900	32.000			
1248					9.000	44.000			
Total PCBs		49.000	200.000		14.900	76.000			
Petroleum Hydrocarbons	NA	180	8400		7000	11,800			48
EP Toxic									
Arsenic	5.0	<0.5	<0.5		<0.5	<0.5			<0.5
Barium	100.0	<10.0	<10.0		<10.0	<10.0			<10.0
Cadmium	1.0	<0.1	<0.1		<0.1	<0.1			<0.1
Chromium	5.0	<0.5	94.		<0.5	<0.5			<0.5
Lead	5.0	<0.5	<0.5		<0.5	<0.5			<0.5
Mercury	0.2	<0.02	<0.02*		<0.02*	<0.02*			<0.02
Selenium	1.0	<0.5	<0.5		<0.5	<0.5			<0.5
Silver	5.0	<0.5	<0.5		<0.5	<0.5			<0.5

* Mercury was detected on Samples 6F-2 & 6F-3 at about 0.002mg/1 and on Sample 6F-4 at about 0.003 mg/L

Table 5.3.5.2

Building W-5

SAMPLE IDENTIFIER: 6F-1
COMPUCHEM SAMPLE NUMBER: 12757

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg
1	225	Methane,Dichloro-	VOA	99	10

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	12	12.5	96
d_8-Toluene	12	12.5	96

Table 5.3.5.2

Building W-5

SAMPLE IDENTIFIER: 6F-2
COMPUCHEM SAMPLE NUMBER: 12737

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/
1	520	Benzene,Ethyl-	ACID	91	6800
2	549	Benzene,Ethyl-	ACID	91	3000
3	656	Phenol	ACID	76	6200
4	752	Hexanoicacid	ACID	69	2000
5	812	Phenol,4-Nitro-	ACID	73	2400
6	842	Octanoicacid	ACID	87	4400
7	927	Nonanoicacid	ACID	80	5000
8	1175	Benzenesulfonamide	ACID	62	4400
9	1261	Carbonicacid,Sec-Butylphenylester	ACID	52	8000
10	1378	Hexatriacontane	ACID	66	8800
11	1419	Hexadecanoicacid	ACID	73	13000
12	1438	Octadecane	ACID	70	11000
13	1451	Pentalene,Octahydro-1-(2-Octyldecyl)-	ACID	56	5800
14	1480	Heptadecane,2,6,10,14-Tetramethyl-	ACID	51	10000
15	1495	Heptadecane,2,6,10,14-Tetramethyl-	ACID	74	4000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	10:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.2

Building W-5

SAMPLE IDENTIFIER: 6F-2
COMPUCHEM SAMPLE NUMBER: 12737

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/KG)
1	1186	Eicosane	BN	86	9800
2	1229	Eicosane	BN	88	11000
3	1246	Tridecane,5-Propyl-	BN	68	4200
4	1261	Pentacosane	BN	80	2500
5	1286	Tridecane,6-Propyl-	BN	65	9100
6	1298	1,1'-Biphenyl,Pentachloro-	BN	56	15000
7	1325	Octadecane	BN	82	22000
8	1361	Eicosane,10-Methyl-	BN	74	18000
9	1384	Octadecane,1-(Ethenyloxy)-	BN	76	13000
10	1406	1-Eicosanol	BN	66	12000
11	1431	Hexatriacontane	BN	73	21000
12	1440	Dodecane,1,2-Dibromo-	BN	29	35000
13	1521	1,2-Benzenedicarboxylicacid, Dipentylester	BN	82	14000
14	1584	1,2-Benzenedicarboxylicacid, Diisooctylester	BN	50	7200
15	1635	1,2-Benzenedicarboxylicacid, Dipentylester	BN	79	9600

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	20:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.2

Building W-5

SAMPLE IDENTIFIER: 6D-1
COMPUCHEM SAMPLE NUMBER: 12736

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	737	Decane	ACID	85	4300
2	842	Undecane	ACID	82	5900
3	912	Octanoicacid	ACID	75	9900
4	939	Dodecane	ACID	76	3000
5	1001	Nonanoicacid	ACID	74	9900
6	1064	1,2-Benzenedicarboxylicacid	ACID	92	4000
7	1269	Hexadecane	ACID	69	3200
8	1339	Heptadecane	ACID	81	15000
9	1343	Pentadecane,2,6,10,14-Tetramethyl-	ACID	69	5000
10	1380	Tetradecanoicacid	ACID	63	21000
11	1464	1-Docosanol	ACID	58	13000
12	1510	Hexadecanoicacid	ACID	68	22000
13	1541	1,2-Benzenedicraboxylicacid, Diisooctyleser	ACID	70	43000
14	1569	Cyclohexane,1-(1,5-Dimethylhexyl)-4-(4-Methylpentyl)-	ACID	50	27000
15	1585	Cyclopropane,1-(1,2-Dimethylpropyl)-1-Methyl-2-Nonyl-	ACID	53	14000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	10:1 dilution	5000	---*
d6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.2

Building W-5

SAMPLE IDENTIFIER: 6D-1
COMPUCHEM SAMPLE NUMBER: 12736

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg)
1	655	Decane	BN	93	2000
2	869	Hexadecane	BN	86	1900
3	988	Octadecane	BN	86	2000
4	1042	Hexadecane	BN	89	3700
5	1096	Heptadecane,2,6,10,14-Tetramethyl-	BN	88	9100
6	1146	Eicosane	BN	89	5300
7	1186	Eicosane	BN	87	11000
8	1221	Phenanthrene, Tetradecahydro-4,5-Dimethyl-	BN	45	9900
9	1262	Octadecane	BN	85	6000
10	1271	Heneicosane	BN	86	3300
11	1325	Octadecane	BN	88	5000
12	1372	Tetracontane,3,5,24-Trimethyl-	BN	58	2700
13	1408	Hydroxylamine,O-Decyl-	BN	58	3900
14	1445	1,2-Benzenedicarboxylicacid, Diisooctylester	BN	71	8300
15	1471	Hexatriacontane	BN	66	3800

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d5-Nitrobenzene	2900	5000	58
Fluorobiphenyl	3500	5000	70
d8-Naphthalene	3200	5000	64

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: [illegible] 6F-3
COMPUCHEM SAMPLE NUMBER: 12738

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	910	Octanoicacid	ACID	49	83000
2	998	Nonanoicacid	ACID	74	100000
3	1059	1,2-Benzenedicarboxylicacid	ACID	94	130000
4	1238	Dodecanoicacid	ACID	75	96000
5	1342	Heptadecane,2,6,10,15-Tetramethyl-	ACID	62	300000
6	1380	Tetradecanoicacid	ACID	72	220000
7	1427	1-Hexadecanol,2-Methyl-	ACID	55	360000
8	1497	Tricosane	ACID	76	530000
9	1512	Hexadecanoicacid	ACID	71	600000
10	1534	Cyclodecanone	ACID	42	430000
11	1555	1-Hexadecanol,2-Methyl-	ACID	57	310000
12	1572	1-Hentetracontanol	ACID	61	130000
13	1593	Pentatriacontane	ACID	69	660000
14	716	Hexanoicacid	ACID	46	46000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	100:1 dilution	5000	---*
d6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: [redacted] 6F-3
COMPUCHEM SAMPLE NUMBER: 12738

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	940	Hexane,Tetradecafluoro-	BN	49	81000
2	1142	Eicosane	BN	84	53000
3	1187	Eicosane	BN	85	110000
4	1230	Eicosane	BN	89	120000
5	1272	Pentacosane	BN	83	110000
6	1311	Pentacosane	BN	86	180000
7	1335	Tetracontane,3,5,24-Trimethyl-	BN	59	98000
8	1349	Pentacosane	BN	82	130000
9	1364	4-Heptanone,2-Methyl-	BN	56	77000
10	1385	Pentacosane	BN	81	240000
11	1396	Cyclohexane, 1-Methyl-4-(1-Methylbutyl)-	BN	49	130000
12	1420	Pentacosane	BN	80	220000
13	1444	1,2-Benzenedicarboxylicacid, Diisooctylester	BN	75	170000
14	1468	Hexatriacontane	BN	66	56000
15	1636	10-Undecenoicacid,Octylester	BN	17	37000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	200:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	-- *

*Because of dilution, recovery data not available

Table 5.3.5.5

Dust Bin - Building O

SAMPLE IDENTIFIER: 6D-2
COMPUCHEM SAMPLE NUMBER: 12749

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	334	Pyridine	BN	99	1300
2	423	Pyridine, 2-Methyl-	BN	93	2300
3	471	Pyridine, 3-Methyl-	BN	95	2100
4	536	Pyridine, 4-Ethyl-	BN	87	1000
5	772	Isoquinoline	BN	87	3300
6	839	Pyridine, 3- (1-Methyl-2-Pyrrolidinyl)-, (S)-	BN	79	3200
7	1399	Hexatriacontane	BN	84	840
8	1080	Phenanthrene	BN	85	4200
9	1112	Eicosane	BN	79	780
10	1133	Phenanthrene, 9-Methyl-	BN	83	560
11	1170	9,10-Anthracenedione	BN	78	640
12	1210	Fluoranthene	BN	92	930
13	1236	Pyrene	BN	83	640
14	1449	Hexatriacontane	BN	82	1000
15	1508	Hexatriacontane	BN	81	580

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d5-Nitrobenzene	1200	5000	24
Fluorobiphenyl	1100	5000	22
d8-Naphthalene	1300	5000	27

Table 5.3.5.5

Dust Bin - Building O

SAMPLE IDENTIFIER: 6D-2
COMPUCHEM SAMPLE NUMBER: 12749

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg
1	727	Phenol	ACID	59	4600
2	826	Phenol,2-Methyl-	ACID	80	1200
3	923	Octanoicacid	ACID	84	1700
4	931	Benzoicacid	ACID	93	1000
5	944	Phenol,3,4,5-Trimethyl-	ACID	63	1400
6	1007	Nonanoicacid	ACID	68	1000
7	1194	1,3-Benzoidioxole-5-Carboxaldehyde	ACID	71	2000
8	1159	Benzaldehyde,3-Methoxy-	ACID	58	1300
9	1239	Dibenzofuran	ACID	82	1100
10	1408	Benzo(C)Cinnoline	ACID	72	660
11	1441	Phenanthrene	ACID	88	4000
12	1460	Octadecane	ACID	59	78
13	1478	1H,3H-Naphtho(1,8-CD)Pyran-1,3-Dione	ACID	32	110
14	1534	Eicosane,10-Methyl-	ACID	34	2000
15	1565	9,10-Anthracenedione	ACID	75	820

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	2900	5000	57
d_6-Phenol	2900	5000	58
Pentafluorophenol	2500	5000	50

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: 6F-4
COMPUCHEM SAMPLE NUMBER: 12764

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/l)
1	156	Methane,Dichloro-	VOA	95	4.2
2	448	Ethene,Trichloro-	VOA	96	120

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	25	20	125
d_8-Toluene	23	20	115

Table 5.2.5.2

Building W-3

SAMPLE IDENTIFIER: 6E-1
COMPUCHEM SAMPLE NUMBER: 12747

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	444	Cyclotrisiloxane,Hexamethyl-	BN	86	1000
2	590	Cyclotetrasiloxane,Octamethyl-	BN	89	400
3	708	Benzoicacid,2,5-Bis (Trimethylsiloxy)-,Trimethylsilylester	BN	54	340
4	824	Aceticacid,(Bis)(Trimethylsilyl)Oxy) Phosphinyl)-,Trimethylsilylester	BN	44	150
5	1094	Eicosane,2-Methyl-	BN	62	360
6	1150	1-Nonane,4,6,8-Trimethyl-	BN	48	92
7	1170	Heptadecane,9-Octyl-	BN	62	120
8	1182	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	74	600
9	1229	Heneicosane	BN	79	400
10	1270	Pentacosane	BN	65	440
11	1286	Pentacosane	BN	72	800

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	4400	5000	88
Fluorobiphenyl	5700	5000	111
d_8-Naphthalene	4800	5000	96

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: 6E-1
COMPUCHEM SAMPLE NUMBER: 12747

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	1071	1,2-Benzenedicarboxylicacid	ACID	93	220
2	1183	Dodecane,1-Chloro-	ACID	70	150
3	1352	Pentadecane,2,6,10,14-Tetramethyl-	ACID	49	86
4	1361	Cyclopentane,Decyl-	ACID	31	150
5	1390	Tetradecanoicacid	ACID	62	300
6	1411	Aniline,N-(3,3'-Diphenylspiro) Fluorene-9,2'-Oxetan)-4'-Ylidene)-	ACID	32	1000
7	1416	Dodecane,2,6,11-Trimethyl-	ACID	75	320
8	1469	1-Docosanol	ACID	59	1000
9	1475	4H-1-Benzopyran-4-One,. 5,6,7-Trimethoxy-2-(4-Methoxyphenyl)-	ACID	29	340
10	1511	Ethanol,2-(9-Octadecenyloxy)-,(Z)-	ACID	42	2400
11	1521	Hexadecanoicacid	ACID	64	520
12	1542	Eicosane	ACID	52	740
13	1548	1-Hentetracontanol	ACID	28	760
14	1554	1-Hentetracontanol	ACID	45	720
15	1579	Docosane,11-Decyl-	ACID	47	620

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	2500	5000	50
d_6-Phenol	2400	5000	47
Pentafluorophenol	1600	5000	33

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: 6E-2
COMPUCHEM SAMPLE NUMBER: 12748

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/l)
1	927	Decane,1-Chloro-	BN	80	150
2	1419	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	70	160
3	1462	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	72	340
4	1551	1,2-Benzenedicarboxylicacid, Dipentylester	BN	69	200
5	1560	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	69	150
6	1621	1,2-Benzenedicraboxylicacid, Butyl2-Methylpropyleser	BN	71	690
7	1746	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	65	300
8	1857	1,2-Benzenedicarboxylicacid, Butyl2-Methylpropylester	BN	66	810
9	2197	10-Undecenoicacid,Octylester	BN	21	370

Surrogates:

	Concentration (ug/l)	Spike Added (ug/l)	% Recovery
d_5-Nitrobenzene	10:1 dilution	100	--- *
Fluorobiphenyl	"	100	--- *
d_8-Naphthalene	"	100	--- *

*Because of dilution, recovery data not available

Table 5.3.5.2

Building W-3

SAMPLE IDENTIFIER: 6E-2
COMPUCHEM SAMPLE NUMBER: 12748

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/l)
1	840	2(3H)-Furanone, 5-Butyldihydro-4-Methyl-,Cis-	ACID	63	22
2	862	Octanoicacid	ACID	46	82
3	871	Octanoicacid	ACID	47	81
4	878	Cyclohexanecarboxylicacid, 4-Methyl-,Methylester	ACID	38	35
5	892	2H-Pyran-2-One,Tetrahydro-3,6-Dimethyl-	ACID	64	21
6	961	1,1'-Bicycloheptyl	ACID	65	69
7	1015	1,1'-Bicycloheptyl	ACID	68	100
8	1080	Benzoicacid,2,6-Dimethyl-	ACID	74	29
9	1090	1(3H)-Isobenzofuranone	ACID	62	51
10	1138	1,2-Benzenedicarboxylicacid,4-Methyl-	ACID	48	16
11	1166	1,2-Benzenedicarboxylicacid,4-Methyl-	ACID	42	29
12	1198	Benzoicacid,4- (1-Methylethyl)-,Methylester	ACID	44	43
13	1239	1,3-Isobenzofurandione,4,7-Dimethyl-	ACID	47	30
14	1290	Benzene,1-(1,1-Dimethylethyl)-4-Ethoxy-	ACID	60	30
15	1343	1H-Benzimidazole,2-(1,1-Dimethylethyl)-	ACID	35	19

Surrogates:

	Concentration (ug/l)	Spike Added (ug/l)	% Recovery
Fluorophenol	2	100	2
d_5-Phenol	32	100	32
Pentafluorophenol	18	100	18

Table 5.3.5.2

Dust Bins Building W-3

SAMPLE IDENTIFIER: 6A-1
COMPUCHEM SAMPLE NUMBER: 12746

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	605	Nonanal	BN	64	1200
2	901	1,2-Benzenedicarboxylicacid, Diethylester	BN	75	300
3	977	Tetradecanoicacid	BN	74	3400
4	1052	Heneicosanoicacid,Methylester	BN	76	1300
5	1062	Oxacyclotetradecan-2-One	BN	61	1900
6	1156	Octadecanoicacid	BN	76	9600
7	1207	2,4-Hexanedione,1,1,1-Trifluoro-	BN	30	350
8	1285	Octadecane	BN	55	1600
9	1380	Eicosane	BN	61	1100
10	1473	2,6,10-Dodecatriene-1-Ol, 3,7,11-Trimethyl-,(Z,E)-	BN	67	5800
11	1520	Heptadecane,2,6,10,15-Tetramethyl-	BN	63	720
12	1616	Octane,2,5-Dimethyl-	BN	55	460
13	1737	Octatriacontane,3,5-Dimethyl-	BN	64	1000
14	1822	1,4-Cyclohexadiene, 1-Methyl-4-)1-Methylethyl)-	BN	22	250
15	2085	Boranamine,N,N-Dimethyl-	BN	37	210

NOTE: Estimated concentrations determined by an external standard technique since an incorrect amount of internal standard was added.

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	1100	5000	22
Fluorobiphenyl	3400	5000	68
d_8-Naphthalene	3600	5000	72

Table 5.3.5.2

Dust Bins - Building W-3

SAMPLE IDENTIFIER: 6A-1
COMPUCHEM SAMPLE NUMBER: 12746

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	850	Heptanoicacid	ACID	72	170
2	945	Octanoicacid	ACID	82	350
3	1034	Nonanoicacid	ACID	72	250
4	1095	1,2-Benzenedicarboxylicacid	ACID	92	260
5	1279	Dodecanoicacid	ACID	75	1000
6	1339	Pentatriacontane	ACID	70	440
7	1367	Nonanedioicacid	ACID	50	1100
8	1402	Octadecane	ACID	62	1800
9	1428	Tetradecanoicacid	ACID	72	2500
10	1473	Tetratetracontane	ACID	59	650
11	1492	Pentadecanoicacid	ACID	60	1200
12	1527	Pentadecanoicacid, 14-Methyl-,Methylester	ACID	52	2200
13	1565	Hexadecanoicacid	ACID	67	5300
14	1577	Tetracosane,2,6,10,15,19,23-Hexamethyl-	ACID	43	620
15	1119	Decanoicacid	ACID	69	160

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	3600	5000	72
d_6-Phenol	3600	5000	72
Pentafluorophenol	3500	5000	70

TABLE 5.3.5.3
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS

		SAMPLE I.D.						
		BUILDING V-4		BUILDING V-3			BUILDING V-1/V-2	
CONSTITUENT	CRITERIA	6F-5	6F-6	6F-7	6F-8	6F-9	6F-10	6F-11
PCB								
1254		80.000	13.000		4.000	0.400		0.400
1248				19.000			8.600	
Total PCBs		80.000	13.000	19.000	4.000	0.400	8.600	0.400
Petroleum Hydrocarbons	NA	13,000	17,500	19,000	21,000	23,500	26,000	10,000
EP Toxic								
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	100.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Cadmium	1.0	<0.1	0.25	0.3	<0.1	0.25	0.15	0.69
Chromium	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Mercury	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	1.0	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	5.0	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5

Table 5.3.5.3

Building V-4

SAMPLE IDENTIFIER: 6F-6
COMPUCHEM SAMPLE NUMBER: 12758

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/k
1	53	Propane	VOA	95	16
2	155	Methane,Dichloro-	VOA	91	16
3	170	Butane	VOA	85	9.0
4	310	Butanal	VOA	95	6.0
5	321	2-Butanone	VOA	91	3.0
6	426	2-Furanmethanol,TEtrahydro-	VOA	73	3.0
7	466	Pentanal	VOA	85	7.0
8	559	Butane,1-(Ethenyloxy)-	VOA	63	2.0
9	575	1-Hexene,4-Methyl-	VOA	86	2.0
10	610	Cyclobutanol,2-Ethyl-	VOA	69	12.0
11	747	Heptanal	VOA	76	3.0
12	737	Lup-20(29)-Ene-3,21,28-Triol, 28-Acetate,(3.Beta.,21.Beta.)-	VOA	26	1.5

Toluene, which coelutes with the internal standard, d_8-Toluene, has been verified t be present in this sample at a level of 4.0 ug/kg. The library search is not incl

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	15.4	12.5	123
d_8-Toluene	11	12.5	88

TABLE 5.3.5.3
BUILDING V-4

SAMPLE IDENTIFIER: 6F-5
COMPUCHEM SAMPLE NUMBER: 12739

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg)
1	840	.Alpha,-L-Galactopyranoiside,Methyl6-Deoxy-	ACID	62	6400
2	912	Benzoicacid	ACID	58	8000
3	1000	Nonanoicacid	ACID	75	10000
4	1064	1,2-Benzenedicarboxylicacid	ACID	94	7200
5	1115	Carbonochloridicacid,Phenylester	ACID	49	10000
6	1241	Dodecanoicacid	ACID	73	5200
7	1383	Tetradecanoicacid	ACID	70	5600
8	1409	Octadecane	ACID	77	4400
9	1417	Eicosane,3-Methyl-	ACID	48	4800
10	1474	Pentacosane	ACID	75	10000
11	1515	Hexadecanoicacid	ACID	71	22000
12	1526	1,2-Benzenedicarboxylicacid, Diisooctylester	ACID	49	4400
13	1535	Eicosane	ACID	79	6000
14	1581	Pentadecane,2,6,10,14-Tetramethyl-	ACID	74	5200
15	1594	Heneicosane	ACID	78	4800

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	20:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

TABLE 5.3.5.3
BUILDING V-4

SAMPLE IDENTIFIER: 6F-5
COMPUCHEM SAMPLE NUMBER: 12739

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	1022	Octadecane	BN	83	410000
2	1071	Octadecane	BN	87	370000
3	1076	Heptadecane,2,6,10,15-Tetramethyl-	BN	83	220000
4	1119	Octadecane	BN	79	500000
5	1164	Eicosane	BN	83	330000
6	1199	Eicosane	BN	57	480000
7	1209	Heptadecane,2,6,10,15-Tetramethyl-	BN	58	240000
8	1223	Pentadecane,2,6,10,14-Tetramethyl-	BN	59	400000
9	1268	Pentatriacontane	BN	74	830000
10	1332	1-Azabicylclo(3.1.0)Hexane	BN	50	600000
11	1358	1-Hexadecene	BN	62	690000
12	1374	Heptadecane,2,6,10,15-Tetramethyl-	BN	74	1100000
13	1401	Tridecane,5-Propyl-	BN	51	470000
14	1456	Cyclopentane,1,1'-(3-(2-Cyclopentylethyl)-1,5-Pentanediyl)Bis-	BN	46	400000
15	1498	Heptadecane,9-Octyl-	BN	52	850000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	20:1 dilution	5000	---
Fluorobiphenyl	"	5000	---
d_8-Naphthalene	"	5000	---

*Because of dilution, recovery data not available. Additionally, the sample extract could not be concentrated to 1.0 ml. This additional factor has contributed to the high concentration of the library search compounds.

Table 5.3.5.3

Building V-3

SAMPLE IDENTIFIER: 6F-7
COMPUCHEM SAMPLE NUMBER: 12740

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	1065	1,2-Benzenedicarboxylicacid	ACID	95	65000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	250:1 dilution	5000	——*
d_6-Phenol	"	5000	——*
Pentafluorophenol	"	5000	——*

*Because of dilution, recovery data not available

Table 5.3.5.3

Building V-3

SAMPLE IDENTIFIER: 6F-7
COMPUCHEM SAMPLE NUMBER: 12740

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kc
1	1096	Heptadecane, 2,6,10,14-Tetramethyl-	BN	85	320000
2	1141	Eicosane	BN	86	280000
3	1145	Eicosane	BN	83	210000
4	1186	Eicosane	BN	81	290000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	500:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	-- *

*Because of dilution, recovery data not available

Table 5.3.5.3

Building V-3

SAMPLE IDENTIFIER: 6F-B
COMPUCHEM SAMPLE NUMBER: 12741

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTI CONC. (
1	924	Octadecane	BN	85	4200
2	978	Hexadecane	BN	87	19000
3	1002	Undecane,2,5-Dimethyl-	BN	86	15000
4	1028	Eicosane	BN	83	80000
5	1049	Octadecane	BN	82	20000
6	1058	Heptadecane,2-Methyl-	BN	68	18000
7	1076	Octadecane	BN	85	96000
8	1121	Eicosane	BN	84	64000
9	1165	Octadecane	BN	89	1900
10	1183	1-Octanol,2-Butyl-	BN	71	580
11	1198	Eicosane	BN	77	1300
12	1208	Octadecane	BN	82	820
13	1280	Quinoline,6-Methyl-2-Phenyl-	BN	18	50
14	1350	1-Eicosanol	BN	64	800
15	1404	1,3-Dioxolane,4-Ethyl-5-Pentyl-2,2-Bis(Trifluoromethyl)-,Trans-	BN	16	120

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d5-Nitrobenzene	200:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	--- *

*Because of dilution, recovery data not available

Table 5.3.5.3

Building V-3

SAMPLE IDENTIFIER: 6F-B
COMPUCHEM SAMPLE NUMBER: 12741

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg
1	1335	Heptadecane	ACID	82	89000
2	1340	Pentadecane,2,6,10,14-Tetramethyl-	ACID	81	41000
3	1404	Octadecane	ACID	82	140000
4	1411	Hexadecane,2,6,10,14-Tetramethyl-	ACID	80	53000
5	1468	Pentacosane	ACID	80	100000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	100:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.3

Building V-3

SAMPLE IDENTIFIER: 6F-9
COMPUCHEM SAMPLE NUMBER: 12759

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	224	Methane,Dichloro-	VOA	98	14
2	241	Butane	VOA	93	4.4
3	283	Methane,Trichlorofluoro-	VOA	96	1.3
4	398	2-Butanone	VOA	94	1.4
5	704	Hexanal	VOA	49	4.4
6	749	Benzene,Methyl-	VOA	95	46
7	852	1,3,6-Octatriene,3,7-Dimethyl-,(E)-	VOA	68	2.6
8	888	Benzene,Ethyl-	VOA	68	4.1

Toluene, which coelutes with the internal standard, d_8-Toluene, has been verified t be present in this sample at a level of 26 ug/kg. The library search is not incluc

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	15	12.5	120
d_8-Toluene	11	12.5	88

Table 5.3.5.3
Building V-1
SAMPLE IDENTIFIER: 6F-10
COMPUCHEM SAMPLE NUMBER: 12742

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg
1	361	1,3,2-Dioxarsenane,2-Butyl-	BN	38	25000
2	995	Hexadecane	BN	80	37000
3	1051	Pentadecane,2,6,10,14-Tetramethyl-	BN	80	150000
4	1097	Eicosane	BN	70	88000
5	1103	Pentacosane	BN	81	100000
6	1144	Pentacosane	BN	76	230000
7	1150	Methanone,(Dimethylphenyl)Phenyl-	BN	33	43000
8	1189	Eicosane	BN	84	140000
9	1198	Tetracotane,3,5,24-Trimethyl-	BN	58	33000
10	1235	9H-Xanthen-9-One,1-Hydroxy-	BN	22	20000
11	1288	Pentacosane	BN	72	410000
12	1332	1-Octanol,2-Butyl-	BN	64	230000
13	1419	Octadecane	BN	68	280000
14	1511	Hexatriacontane	BN	60	340000
15	1597	Eicosane,10-Methyl-	BN	42	56000

NOTE: Estimated concentrations determined by an external standard technique since an incorrect amount of internal standard was added.

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d5-Nitrobenzene	500:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d8-Naphthalene	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.3

Building V-1

SAMPLE IDENTIFIER: 6F-10
COMPUCHEM SAMPLE NUMBER: 12742

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	953	Benzenecarbothioicacid,S-Methylester	ACID	46	20000
2	1034	Nonanoicacid	ACID	58	44000
3	1090	1,2-Benzenedicarboxylicacid	ACID	91	17000
4	1119	Decanoicacid	ACID	56	8000
5	1219	Pentadecane	ACID	83	3000
6	1276	Dodecanicacid	ACID	73	17000
7	1296	Hexadecane	ACID	78	6000
8	1349	Nonanedioicacid	ACID	60	30000
9	1369	Heptadecane	ACID	82	30000
10	1422	Tetradecanoicacid	ACID	75	24000
11	1439	Hexatriacontane	ACID	64	38000
12	1447	Hexadecane,2,6,10,14-Tetramethyl-	ACID	80	14000
13	1505	Octadecane	ACID	71	22000
14	1550	Hexadecanoicacid	ACID	38	130000
15	1568	Eicosane	ACID	63	5000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	2500	5000	50
d_6-Phenol	3100	5000	62
Pentafluorophenol	4100	5000	83

TABLE 5.3.5.4
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS

		SAMPLE I.D.		
		BUILDING M		BUILDING C
CONSTITUENT	CRITERIA	6F-12	6F-13	6F-18
PCB 1248		<0.400	42.000	<0.400
Total PCBs		<0.400	42.000	<0.400
Petroleum Hydrocarbons	NA	11,300	8,800	160
EP Toxic				
Arsenic	5.0	<0.5	<0.5	<0.5
Barium	100.0	<10.0	<10.0	<10.0
Cadmium	1.0	<0.1	<0.1	<0.1
Chromium	5.0	<0.5	<0.5	<0.5
Lead	5.0	<0.5	<0.5	1.3
Mercury	0.2	<0.02*	<0.02	<0.02
Selenium	1.0	<0.5	<0.5	<0.5
Silver	5.0	<0.5	<0.5	<0.5

* Mercury was detected on Sample 6F-12 at about 0.002 mg/L.

Table 5.3.5.3

Building V-1

SAMPLE IDENTIFIER: 6F-11
COMPUCHEM SAMPLE NUMBER: 12760

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	87	Propane	VOA	94	3.4
2	224	Methane,Dichloro-	VOA	92	5.0
3	240	2-Propanone	VOA	90	3.6
4	388	Butanal	VOA	98	2.7
5	398	2-Butanone	VOA	95	2.1
6	551	Pentanal	VOA	85	2.2
7	704	Hexanal	VOA	82	6.0

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	10	12.5	80
d_8-Toluene	7	12.5	56

Table 5.3.5.4

Building M-4

SAMPLE IDENTIFIER: 6F-12
COMPUCHEM SAMPLE NUMBER: 12761

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	53	Oxirane	VOA	86	1.8
2	155	Methane,Dichloro-	VOA	90	6.5
3	170	2-Propanone	VOA	91	3.4
4	209	Methane,Trichlorofluoro-	VOA	93	1.7
5	310	Propanal,2-Methyl-	VOA	80	1.1
6	321	2-Butanone	VOA	90	1.6
7	559	2-Pentanone,4-Methyl-	VOA	76	1.0
8	611	Hexanal	VOA	49	14
9	738	Benzene,Ethyl-	VOA	60	7.5
10	746	Cyanicacid,Sec-Butylester	VOA	54	4.0

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	13	12.5	104
d_8-Toluene	9	12.5	72

Table 5.3.5.4

Building M-4

SAMPLE IDENTIFIER: 6F-13
COMPUCHEM SAMPLE NUMBER: 12744

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMAT CONC.(ug
1	1155	Hexadecanoicacid	BN	80	600000
2	1178	Sulfone,Butylisopropyl	BN	34	16000
3	1185	Pentadecane	BN	63	26000
4	1236	9-Octadecenal,(Z)-	BN	58	170000
5	1257	Isoxazole,5-Benzyl-3-Phenyl-	BN	29	4300
6	1279	Tetracontane,3,5,24-Trimethyl-	BN	69	66000
7	1337	Butane,2-Iodo-2-Methyl-	BN	45	78000
8	1347	Decane,3-Bromo-	BN	55	64000
9	1351	4-Hexen-1-Ol,5-Methyl-2-(1-Methylethenyl)-,(R)-	BN	29	43000
10	1400	1,2-Benzenedicarboxylicacid, Diisooctylester	BN	74	230000
11	1434	Octane,2,7-Dimethyl-	BN	56	37000
12	1565	3,7,11-Tridecatrienenitrile, 4,8,12-Trimethyl-	BN	68	130000
13	1842	Anthracene,9-Dodecyltetradecahydro-	BN	36	14000
14	1918	13A,3A-(Epoxyethano)-1H-Indolizino (8,1-CD)Carbazol-7-Ol,6-Acetyl-2,3,4	BN	30	5400
15	2100	2-Butane,1,4-Dibromo-	BN	27	2400

NOTE: Estimated concentrations determined by an external standard technique since incorrect amount of internal standard was added.

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	200:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.4

Building M-4

SAMPLE IDENTIFIER: 6F-13
COMPUCHEM SAMPLE NUMBER: 12744

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	515	Hexanal	ACID	83	2600
2	761	Octanal	ACID	74	4200
3	964	Octanoicacid	ACID	74	13000
4	1050	Nonanoicacid	ACID	75	14000
5	1092	1,2-Benzenedicarboxylicacid	ACID	94	7000
6	1127	Octanoicacid	ACID	36	3400
7	1207	Cyclopentane,1,1'-(4-(3-Cyclopentylpropyl)-1,7-Heptanediyl)Bis-	ACID	44	6200
8	1290	6-Tridecanol,3,9-Diethyl-	ACID	37	7400
9	1391	Hexacosane,9-Octyl-	ACID	30	540
10	1415	Cyclohexane,1,3-Didecyl-	ACID	42	20000
11	1441	Tetradecanoicacid	ACID	49	20000
12	1471	Hexacosane	ACID	72	5200
13	1489	Hexacosane	ACID	69	7600
14	1506	Cyclotetracosane	ACID	41	8400
15	1547	Cyclotetracosane	ACID	37	20000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	2000	5000	40
d_6-Phenol	2600	5000	52
Pentafluorophenol	2100	5000	42

Table 5.3.5.4

Building C-10

SAMPLE IDENTIFIER: 6F-18
COMPUCHEM SAMPLE NUMBER: 12756

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	55	1-Propene	VOA	90	4.0
2	157	Methane,Dichloro-	VOA	94	22
3	172	Butane	VOA	77	6.0
4	310	Butanal	VOA	88	2.8
5	561	Pentanal,2,4-Dimethyl-	VOA	41	1.2
6	574	Pentane,3-Methyl-	VOA	79	1.0
7	610	Hexanal	VOA	66	10
8	737	Hexane,1-Chloro-	VOA	37	1.4
9	746	Vinylamine,N-Methyl-N-Nitroso-	VOA	42	2.8

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	17	12.5	136
d_8-Toluene	10	12.5	80

Table 5.3.5.4

Building C-10

SAMPLE IDENTIFIER: 6F-18
COMPUCHEM SAMPLE NUMBER: 12734

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	654	Phenol	ACID	80	65000
2	981	1,2-Benzenedicarboxylicacid	ACID	86	36000
3	1247	Hexadecane	ACID	75	100000
4	1251	Heptadecane,2,6,10,14-Tetramethyl-	ACID	79	71000
5	1313	Heptadecane,2,6,10,14-Tetramethyl-	ACID	78	79000
6	1319	Heneicosane	ACID	73	58000
7	1416	Hexadecanoicacid	ACID	69	140000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	250:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.4

Building C-10

SAMPLE IDENTIFIER: 6F-18
COMPUCHEM SAMPLE NUMBER: 12734

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg)
1	1005	Heptadecane,2,6,10,14-Tetramethyl-	BN	86	240000
2	1033	Tridecane,5-Propyl-	BN	84	1600000
3	1078	Octadecane	BN	88	950000
4	1062	Eicosane	BN	84	620000
5	1123	Hexatriacontane	BN	82	800000
6	1167	Heptadecane,2,6,10,14-Tetramethyl-	BN	82	320000
7	1365	2-Heptadecanol	BN	22	640000
8	980	Octadecane	BN	87	240000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	1000:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	--- *

*Because of dilution, recovery data not available

TABLE 5.3.5.5
ENVIRONMENTAL ASSESSMENT
LABORATORY ANALYSIS RESULTS

SAMPLE I.D.

BUILDING O

CONSTITUENT	CRITERIA	6F-14	6F-15	6F-16	6F-17	6D-2
PCB		<0.400	<0.400	<0.400	<0.400	
Total PCBs(1)		<0.400	<0.400	<0.400	<0.400	
Petroleum Hydrocarbons	NA	<25	150	360	15,800	
EP Toxic						
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	
Barium	100.0	<10.0	<10.0	<10.0	<10.0	
Cadmium	1.0	<0.1	<0.1	<0.1	<0.1	
Chromium	5.0	<0.5	<0.5	<0.5	<0.5	
Lead	5.0	<0.5	<0.5	3.1	<0.5	
Mercury	0.2	<0.02	<0.02	<0.02	<0.02	
Selenium	1.0	<0.5	<0.5	<0.5	<0.5	
Silver	5.0	<0.5	<0.5	<0.5	<0.5	

Table 5.3.5.5.

Building O-3

SAMPLE IDENTIFIER: 6F-14
COMPUCHEM SAMPLE NUMBER: 12743

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg)
1	1562	2,6,10-Dodecatriene-1-Ol,3,7,11-Trimethyl-,(Z,E)-	BN	65	11000
2	1580	2H-Pyran,2-[[(3.Beta.,5.Alpha.)-Androstan-3-Yl(Oxy)]Tetrahydro-	BN	31	6700

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	2400	5000	47
Fluorobiphenyl	1500	5000	30
d_8-Naphthalene	1900	5000	38

Table 5.3.5.5

Building 0-3

SAMPLE IDENTIFIER: 6F-14
COMPUCHEM SAMPLE NUMBER: 12743

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	769	Benzene,Ethylphenoxy-	ACID	49	1000
2	825	Phenol,2-Methyl-	ACID	89	380
3	845	Benzenemethanol	ACID	50	260
4	1094	1,2-Benzenedicarboxylicacid	ACID	94	220

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	3000	5000	61
d_6-Phenol	3000	5000	59
Pentafluorophenol	1100	5000	22

Table 5.3.5.5

Building 0-3

SAMPLE IDENTIFIER: 6F-15
COMPUCHEM SAMPLE NUMBER: 12755

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	223	Methane,Dichloro	VOA	99	18

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_6-Benzene	14	12.5	112
d_8-Toluene	14	12.5	112

Table 5.3.5.5

Building 0-1

SAMPLE IDENTIFIER: 6F-16
COMPUCHEM SAMPLE NUMBER: 12745

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	718	Phenol	ACID	90	38000
2	794	Benzaldehyde,2-Hydroxy-	ACID	92	6600
3	1093	Benzaldehyde,3-Hydroxy-	ACID	93	6600
4	1383	Tetradecanoicacid	ACID	72	6600

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	20:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

Table 5.3.5.5

Building O-1

SAMPLE IDENTIFIER: 6F-16
COMPUCHEM SAMPLE NUMBER: 12745

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/k
1	440	Cyclotrisiloxane,Hexamethyl-	BN	92	6000
2	503	Cyclohexane,Chloro-	BN	91	7000
3	706	Benzeneaceticacid,Alpha.,3,4-Tris) (Trimethylsilyl)Oxy)-,Trimethylsily	BN	67	3200
4	816	Naphthalene,2-Methyl-	BN	33	3500
5	907	Decane,1-Chloro-	BN	71	1800
6	979	1,2-Benzenedicarboxylicacid, Diethylester	BN	89	2200
7	1147	Hexadecanoicacid	BN	77	44000
8	1233	Octadecanoicacid	BN	68	35000
9	1246	Hexadecane,2-Methyl-	BN	49	7500
10	1275	2-Phenanthrylamine, 9,10-Dihydro-3-Nitro-	BN	45	26000
11	1286	Heptane,2,2,3,3,5,6,6-Heptamethyl-	BN	47	9500
12	1300	Eicosane,7-Hexyl-	BN	53	16000
13	1362	Heptadecane,2,6,10,15-Tetramethyl-	BN	62	31000
14	1389	1,2-Benzenedicarboxylicacid, Diisooctylester	BN	62	35000
15	1495	Pentanoicacid, 2-MEthylcyclohexylester,Cis-	BN	27	14000

(1) Estimated concentrations determined by an external standard technique since an incorrect amount of internal standard was added.

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d_5-Nitrobenzene	50:1 dilution	5000	--- *
Fluorobiphenyl	"	5000	--- *
d_8-Naphthalene	"	5000	-- *

*Because of dilution, recovery data not available

Table 5.3.5.5

Building O-4

SAMPLE IDENTIFIER: [redacted] 6F-17
COMPUCHEM SAMPLE NUMBER: 12732

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC. (ug/kg
1	1048	Heptadecane	BN	80	20000
2	1145	Pentacosane	BN	75	26000
3	1189	Eicosane	BN	82	23000
4	1232	Pentacosane	BN	69	19000
5	1261	Fluoranthene	BN	73	68000
6	1273	Heneicosane	BN	68	10000
7	1284	Hexadecanoicacid	BN	35	65000
8	2183	Azuleno(4,5-B)Furan-2(3H)-One, Decahydro-8,9-Dihydroxy-6,9A-Dimethyl-3	BN	49	12000

Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
d5-Nitrobenzene	20:1 dilution	5000	---*
Fluorobiphenyl	"	5000	---*
d8-Naphthalene	"	5000	---*

(1)Because of dilution, recovery data not available.

Table 5.3.5.5

Building 0-4

SAMPLE IDENTIFIER: [redacted] 6F-17
COMPUCHEM SAMPLE NUMBER: 12732

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ITEM	SCAN NUMBER	COMPOUND NAME	FRACTION	% PURITY	ESTIMATE CONC.(ug/kg
1	718	Phenol	ACID	94	9400
2	994	Isoquinoline	ACID	90	3000
3	1236	Dodecanoicacid	ACID	44	2200
4	1266	Hexadecane	ACID	73	3400
5	1338	Heptadecane	ACID	66	5600
6	1405	Eicosane	ACID	65	15000
7	1436	Phenanthrene	ACID	91	12000
8	1470	Eicosane	ACID	58	30000
9	1508	Anthracene,9-Dodecyltetradecahydro-	ACID	32	30000
10	1531	Eicosane	ACID	49	20000
11	1549	Phenanthrene,9-Dodecyltetradecahydro-	ACID	49	22000
12	1578	Azuleno(4,5-B)Furan-2(3H)-One, Decahydro-8,9-Dihydroxy-6,9A-Dimethyl-3	ACID	44	66000

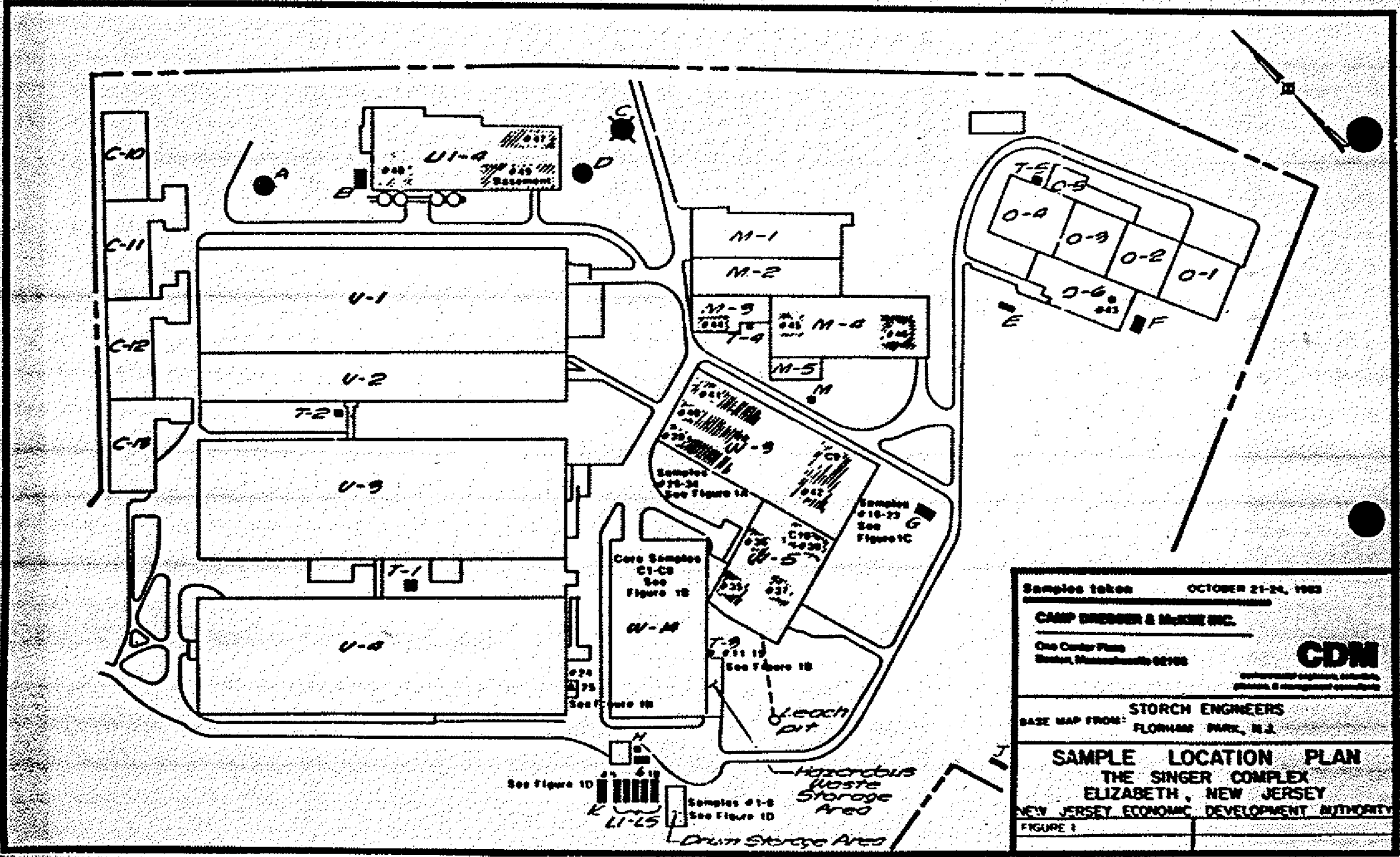
Surrogates:

	Concentration (ug/kg)	Spike Added (ug/kg)	% Recovery
Fluorophenol	20:1 dilution	5000	---*
d_6-Phenol	"	5000	---*
Pentafluorophenol	"	5000	---*

*Because of dilution, recovery data not available

APPENDIX II

PHASE II FIGURES AND ANALYTICAL RESULTS



Samples taken OCTOBER 21-24, 1983

CAMP DRESSER & McKEE INC.

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CDM
environmental engineers, scientists,
planners & management consultants

BASE MAP FROM: STORCH ENGINEERS
FLORHAM PARK, N.J.

SAMPLE LOCATION PLAN
THE SINGER COMPLEX
ELIZABETH, NEW JERSEY
NEW JERSEY ECONOMIC DEVELOPMENT AUTHORITY

FIGURE 1