SEAWAY LANDFILL
TONAWANDA, NEW YORK

Formerly Utilized Sites Remedial Action Program (FUSRAP)

US Army Topographic Engineering Center
Operations Division
Hydrologic & Environmental Analysis Branch
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August 2006 Final Report

Prepared for the US Army Corps of Engineers, Buffalo District, Buffalo, New York

TABLE OF CONTENTS

EXECUTIVE SUMMARY, METHODOLOGY, SUMMARY OF FINDINGS

EXECUTIVE SUMMARY

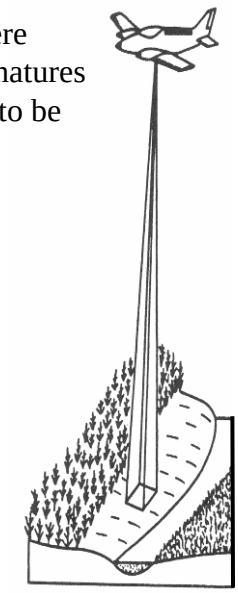
The Hydrologic and Environmental Analysis Branch of the Operations Division, within the U.S. Army Corps of Engineers, Engineer Research and Development Center's Topographic Engineering Center (TEC), was tasked to examine historical aerial, and other photographs, dated 1935 to present, over the Seaway Landfill area, Tonawanda, Erie County, New York. The objective was to identify the significant features related to ground disturbance at the site. Features of concern or interest, such as ground scars and disturbed ground, were identified and delineated in graphic form.

METHODOLOGY

Photographic analysis of historical aerial photography was the primary method of TEC identifying man-made and natural occurring features in the Seaway Landfill area, city of Tonawanda in Erie County, New York.

Both single-optical and stereoscopic viewing, at various magnifications, were performed on TEC's collection of historical aerial photographs. Visible signatures such as size, scale, shape, shadow, tone, texture, and pattern allow features to be recognized on the aerial photography.

Stereo-paired images viewed through a stereoscopic microscope allows for a three-dimensional view of the terrain.

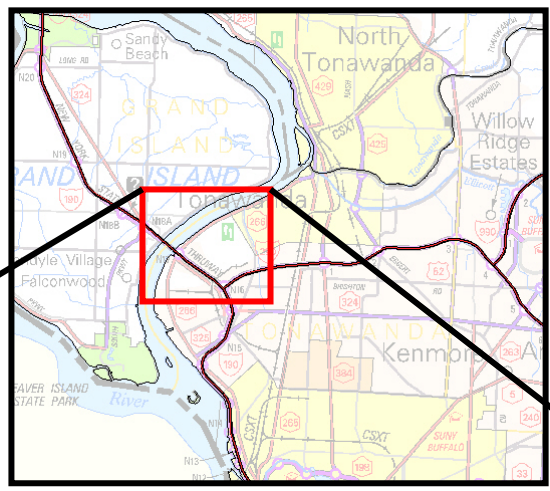


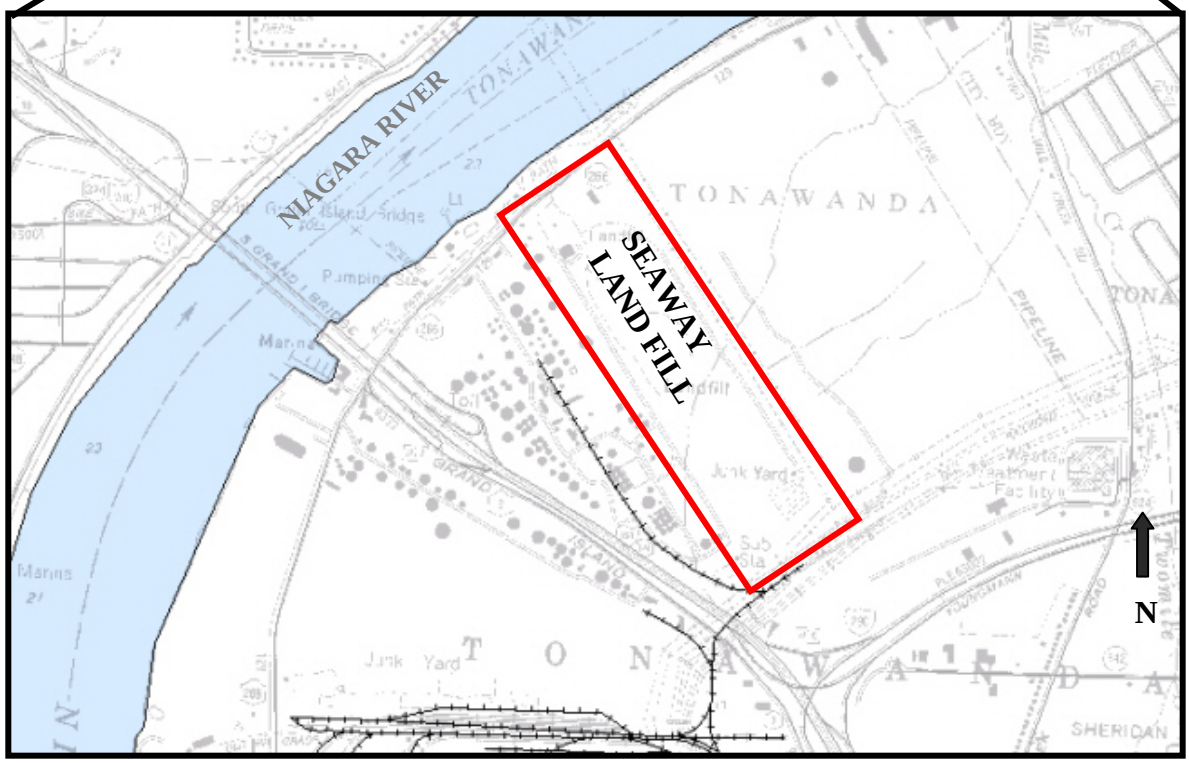
SUMMARY OF FINDINGS

Examination of aerial photography flown for various years from 1927 to 1995 revealed changes of material deposited and excavations completed in the landfill. In 1960 deposits increased and changed the landscape slightly. A significant change occurred in the 1970s when the area was excavated near River Road and deposits were placed in the southeast area of the landfill. The aerial photo record clearly shows numerous site changes over its history.

Map projection for the study: UTM; Spheroid: GRS 1980; Datum: NAD83; Zone 17, units are in meters.

PROJECT AREA LOCATION





PHOTOGRAPHIC SOURCES

AERIAL PHOTOGRAPHY COLLECTED

DATE	SCALE	DESCRIPTION	PHOTO TYPE
1927 Jun	Index	http://www.erie.gov/aerials/1920s/atlases/book8/html/b8_f27.html	B&W
1938 Aug	1:20,000	Courtesy of Buffalo District, Corps of Engineers	B&W
1951 Sep	1:20,000	Courtesy of Buffalo District, Corps of Engineers	B&W
1951 Nov	1:48,000	National Archives & Records Administration, College Park, Maryland	B&W
1960 Jul	1:15,000	National Archives & Records Administration, College Park, Maryland	B&W
1962 May	1:20,000	National Archives & Records Administration, College Park, Maryland	B&W
1962 Nov	1:20,000	National Archives & Records Administration, College Park, Maryland	B&W
1963 May	1:20,000	National Archives & Records Administration, College Park, Maryland	B&W
1970 Jun	1:20,000	National Archives & Records Administration, College Park, Maryland	Color
1970 Jun	1:20,000	National Archives & Records Administration, College Park, Maryland	CIR
1972 May	1:20,000	National Archives & Records Administration, College Park, Maryland	B&W
1972 Sep	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1974 Apr	1:20,000	National Archives & Records Administration, College Park, Maryland	B&W
1976 May	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1978 Apr	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1978 Jun	1:20,000	NOAA/NGS, Silver Spring, Maryland	Color
1978 Jun	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1978 Aug	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1978 Oct		http://ublib.buffalo.edu/libraries/asl/maps/aerial/36029-176-166-1978-oct-31.jpg	B&W
1980 Jun	1:30,000	NOAA/NGS, Silver Spring, Maryland	B&W
1980 Sep	1:30,000	NOAA/NGS, Silver Spring, Maryland	Color
1985 May	1:20,000	National Archives & Records Administration, College Park, Maryland	CIR
1995 Mar	1:20,000	National Archives & Records Administration, College Park, Maryland	CIR
2002		http://www.nysgis.state.ny.us/gateway/mg/2002/erie/	

HISTORY OF SITE

The Manhattan Engineer District (MED), a predecessor of the U.S. Department of Energy, hired the former Linde Air Products Division of Union Carbide to process uranium from 1942 to 1946. [1]

In 1943, MED leased a 10-acre tract known as the Haist property, presently called Ashland 1, to serve as a storage site for the uranium ore processing residues. Residues were deposited at Ashland 1 and Seaway Area D from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. (Area D and Ashland 1 were included in the Record of Decision , dated April 1998, and are being remediated along with Ashland 2 in a separate action.) [2] A radiological survey of the former Haist Property was conducted in October, 1957. The survey report, dated September 1958, stated that from a "health and safety viewpoint, the disposal of the property with residue thereon appears to present no significant problems". [3]

In 1960, the property was transferred to the Ashland Oil Company and has been used as part of this company's oil refinery activities since that time. In 1974 Ashland Oil Company constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. The majority of the soil removed during construction of the bermed area and drainage ditch was transported by Ashland Oil Company to the Seaway landfill and Ashland 2 sites for disposal. Approximately 6,000 cubic yards of low-grade uranium tailings were deposited on Seaway Areas A, B, & C. [2]

In August 1976, a radiological survey was conducted at the site by the Oak Ridge National Laboratories. This survey indicated that the site was contaminated by residues and radiation levels were in excess of those criteria used for declaring the site acceptable for unrestricted use under the Formerly Utilized Sites Remedial Action Program (FUSRAP).[3]

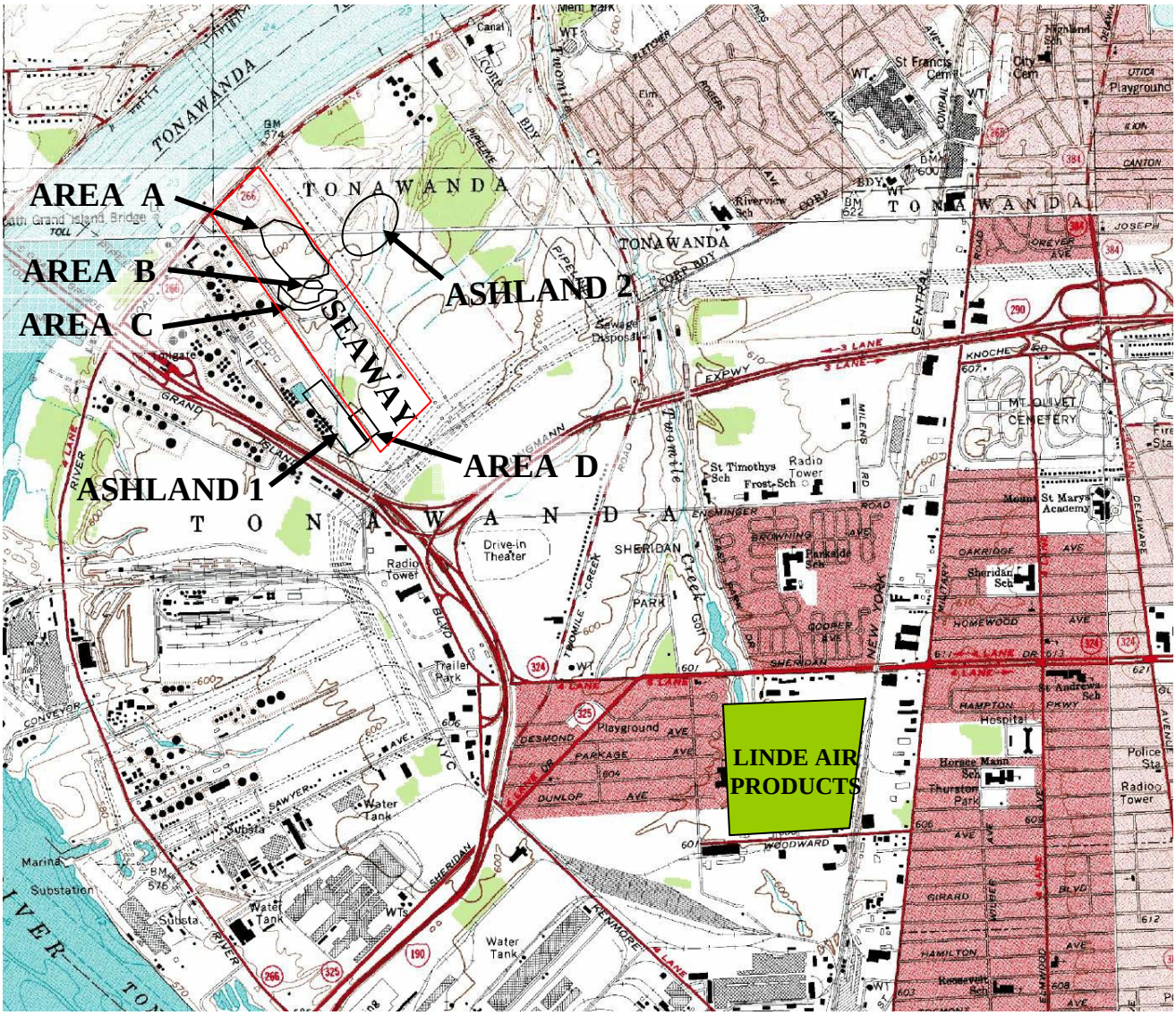
Drainage from Ashland 1 travels under the Seaway property through an underground concrete conduit. [2]

1 (U.S. Army Corps of Engineers, Buffalo District, News Release, FUSRAP Release #01-42; August 7, 2001)

2 (Explanation of Significant Differences for the Rattlesnake Creek Portion of the Ashland Sites; September 20, 2004; FUSRAP; U.S. Army Corps of Engineers, Buffalo District Office; page 2)

3 "Authority Review for the Seaway Industrial Park in Tonawanda, New York", U. S. Department of Energy; (http://nuclear.bfn.org/auth-rev.htm) page 1.

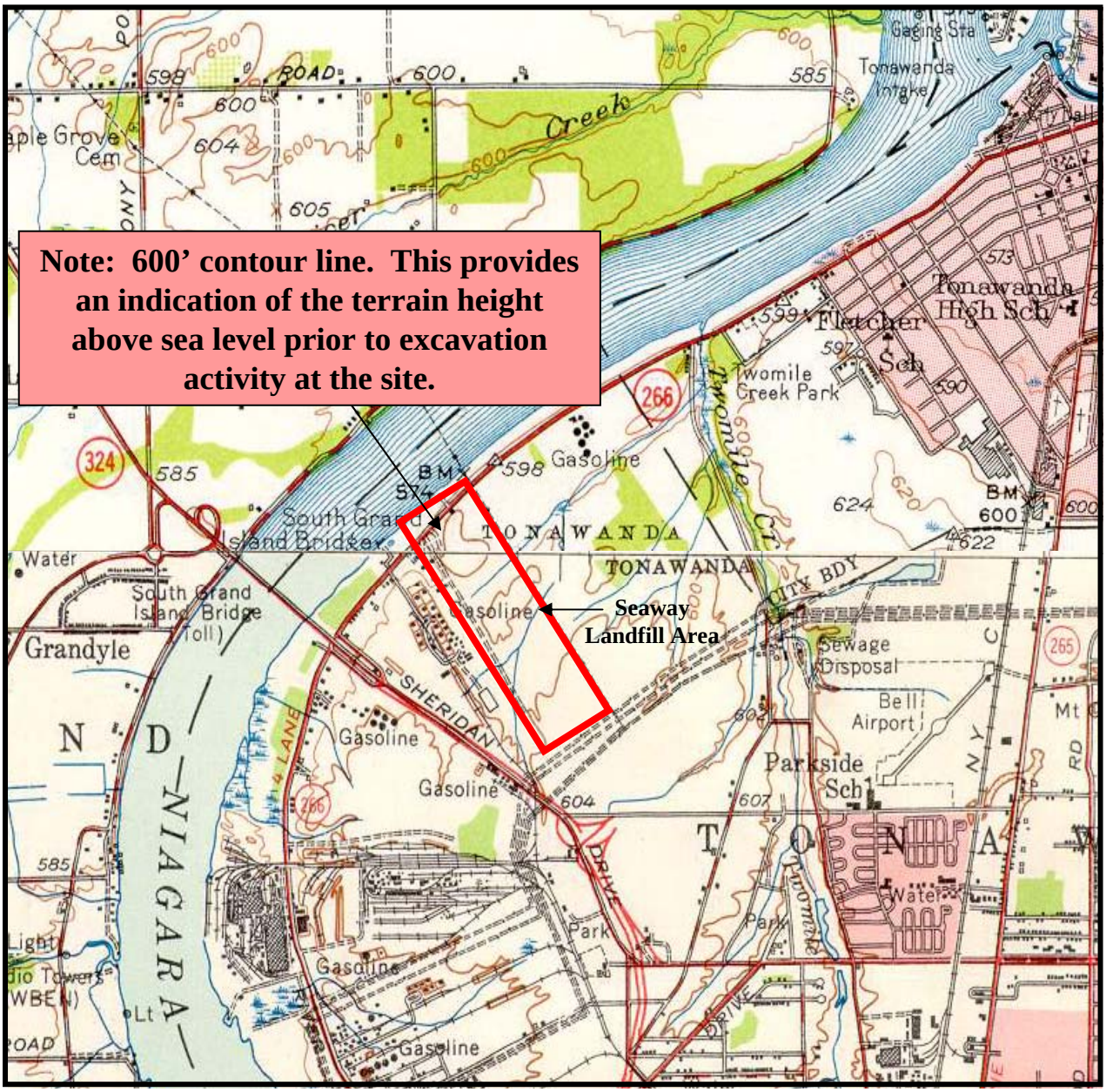
CHRONOLOGICAL HIGHLIGHTS



- Linde Air Products processed uranium from 1942 to 1946.
- Residues received from Linde uranium processing were stored on Ashland 1 and Area D of Seaway. (1944-1946)
- Areas A, B, & C of the Seaway site were contaminated during transfer of soils from Ashland 1. (1974 -1982)
- Ashland 1 and Seaway Area D were remediated and completed. (2002)
- Feasibility study for the clean up of Seaway site Areas A, B, & C is in process. (2006)

TOPOGRAPHIC MAP

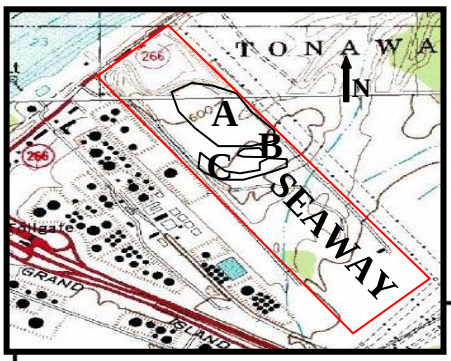
1948 USGS Topographic Map of the Area



1948 Edition **Tonawanda, NY**, 15 min quad: contour interval 20 feet; Culture and drainage in part compiled by Corps of Eng, Dept of the Army, from aerial photographs taken 1942. Topography by plane-table methods 1948.

1948 Edition **Buffalo, NY,** 15 min quad: contour interval 20 feet; Culture and drainage in part compiled by Corps of Eng, Dept of the Army, from aerial photographs taken 1942. Topography by plane-table methods 1948.

LOCATION SKETCH OF SEAWAY LANDFILL SITE (AREAS A, B, & C)



LOCATION DETAILS

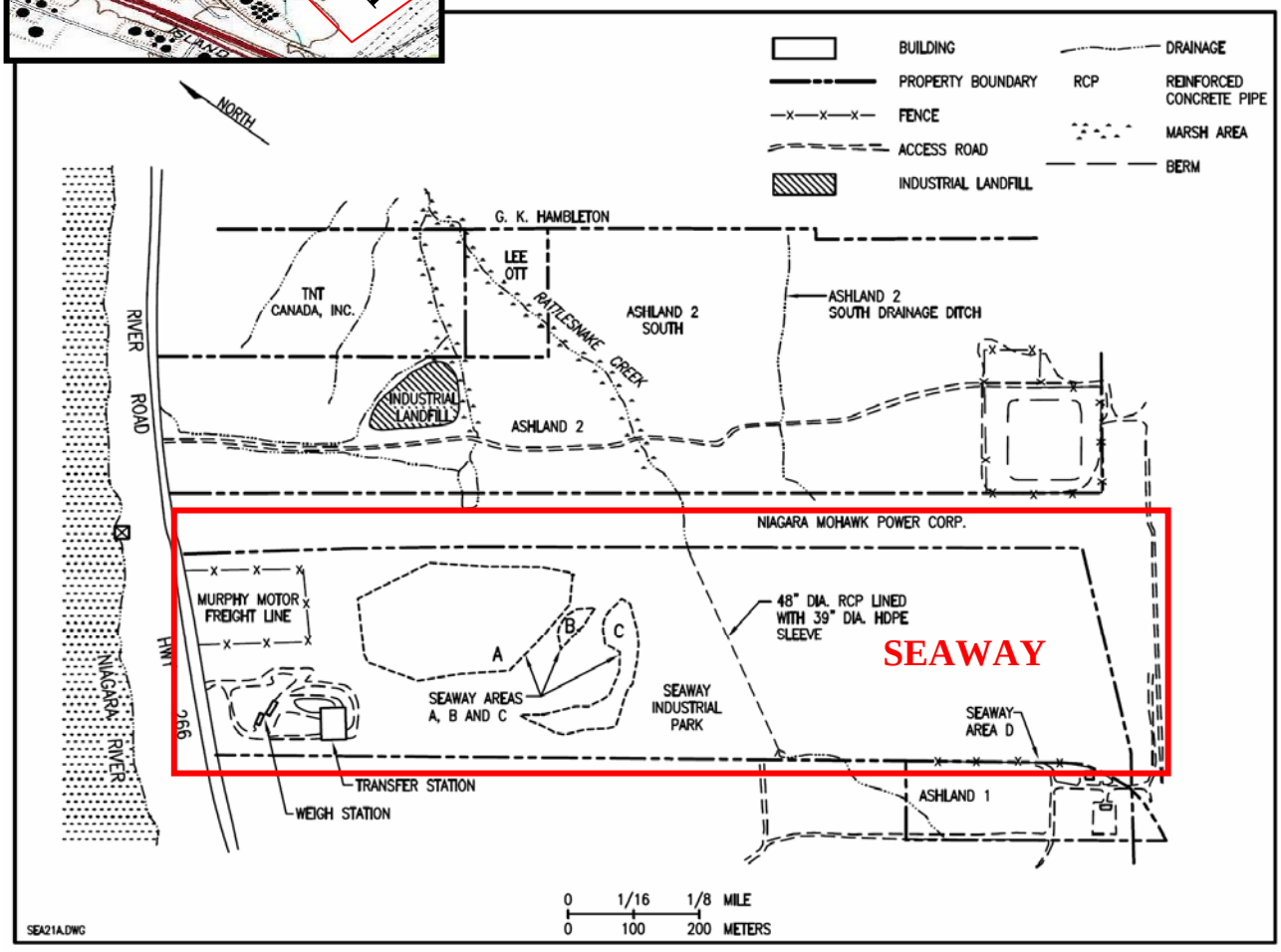
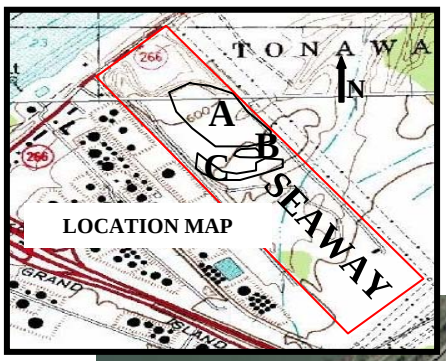


FIGURE A

The location of sites A, B, & C from this sketch are superimposed on the overview map graphic used throughout the report and on select photos.

Location Details Of The Seaway Property As Presented By Bechtel National, Inc., Courtesy US Army Corps Of Engineers, Buffalo District.

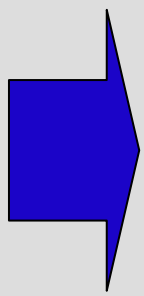
AREAS A, B, & C - ATOP 2002 PHOTO



Locations Based on Figure A Sketch

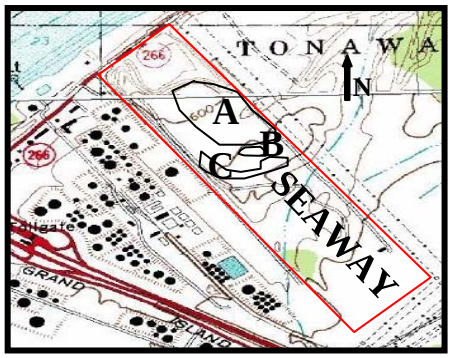
Interpretation of Historical Aerial Photography

With Anaglyphs

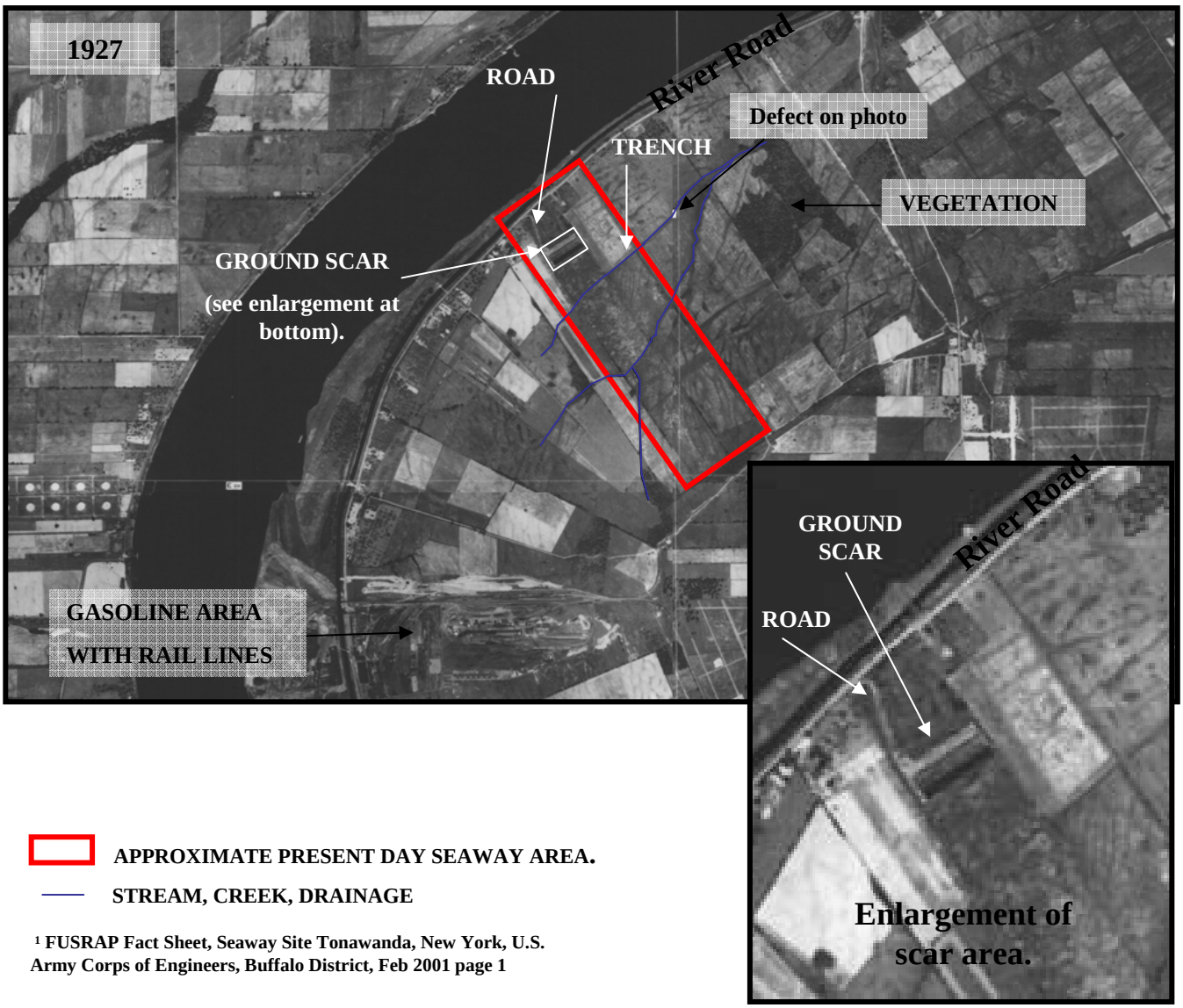


HISTORIC PHOTOGRAPHIC ANALYSIS

1927



A 1927 image was the earliest aerial photo obtained for this report, but no stereo pair was available. Evident in the area (present day Seaway) is a road leading to a ground scar—indicating the site was disturbed at this time (but it is not known if it was a landfill during this time). FUSRAP Fact Sheet, February 2001, indicates Browning Ferris Industries operated a landfill here between 1930 and 1995.[1]

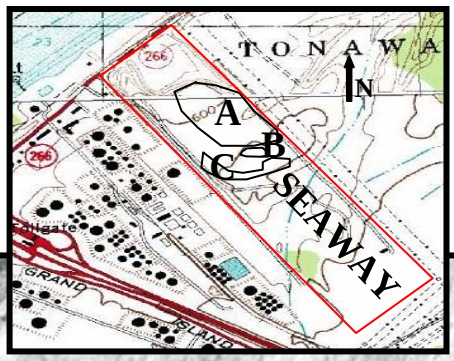


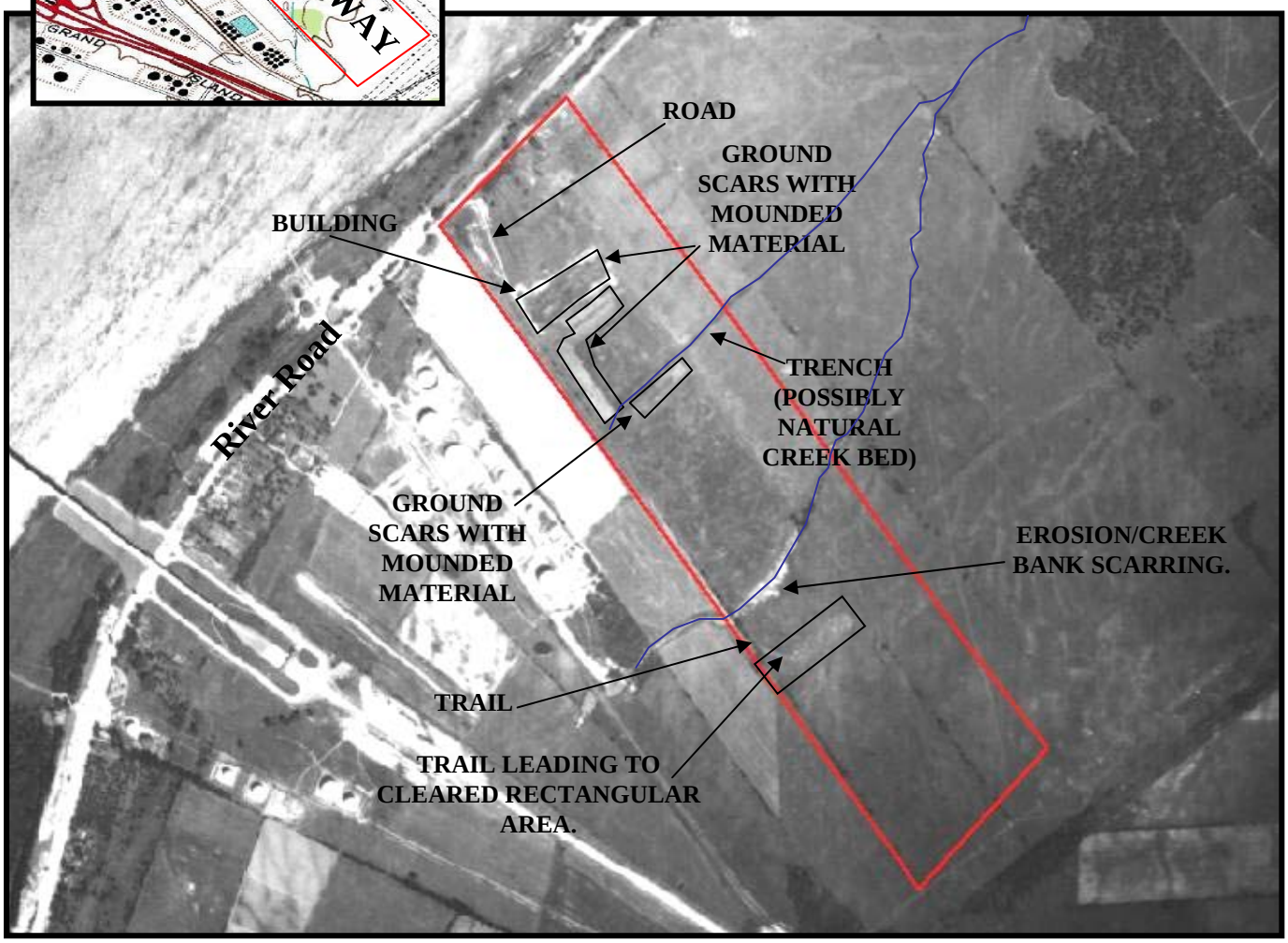
APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001 page 1

HISTORIC PHOTOGRAPHIC ANALYSIS 1938





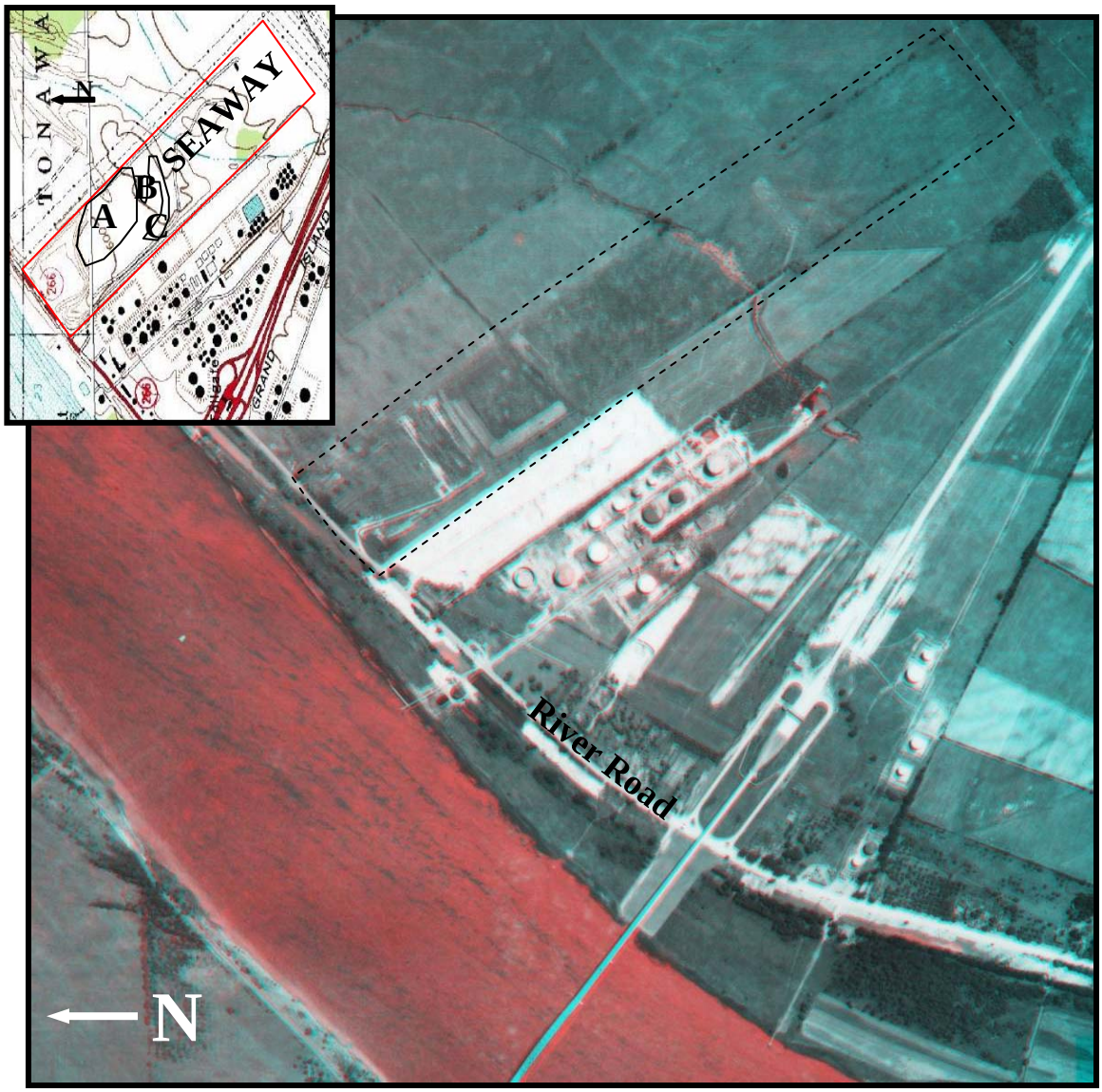
Ground scars are seen on the 1938 images. FUSRAP Fact Sheet, February 2001, indicates Browning Ferris Industries operated a landfill here between 1930 and 1995.[1]

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

[1] **FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001 page 1**

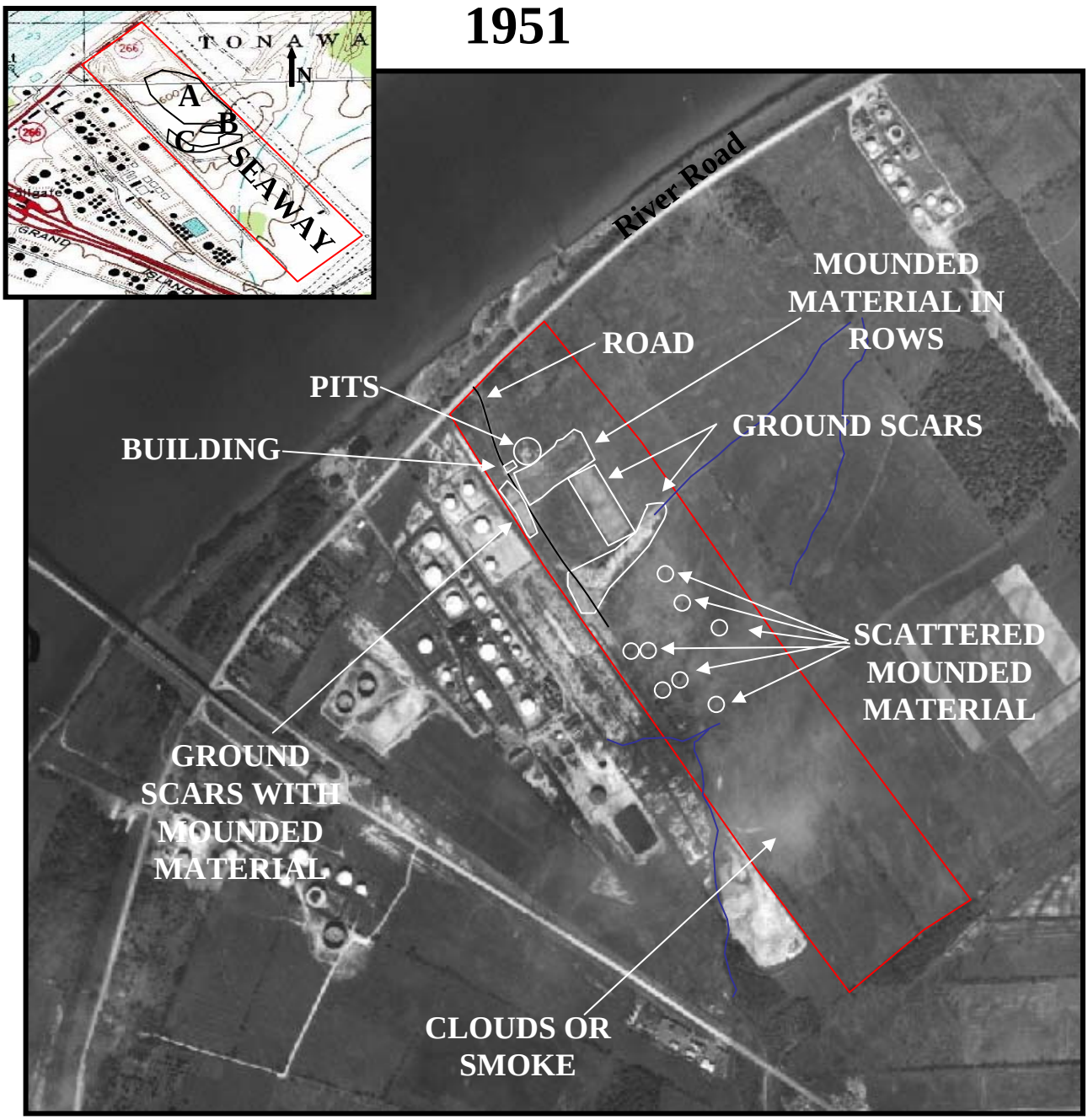
HISTORICAL PHOTOGRAPHIC ANALYSIS
1938 ANAGLYPH



In order to make the 1938 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

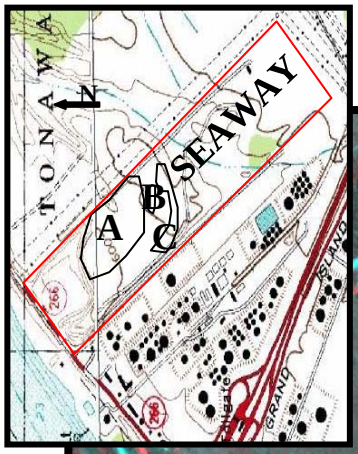
Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1951



APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

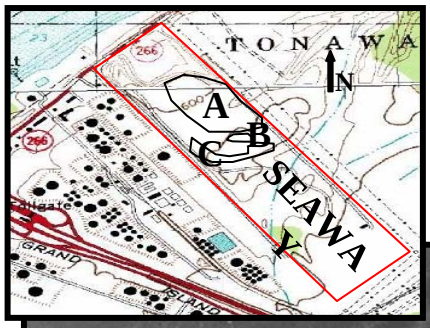
HISTORICAL PHOTOGRAPHIC ANALYSIS
1951 ANAGLYPH

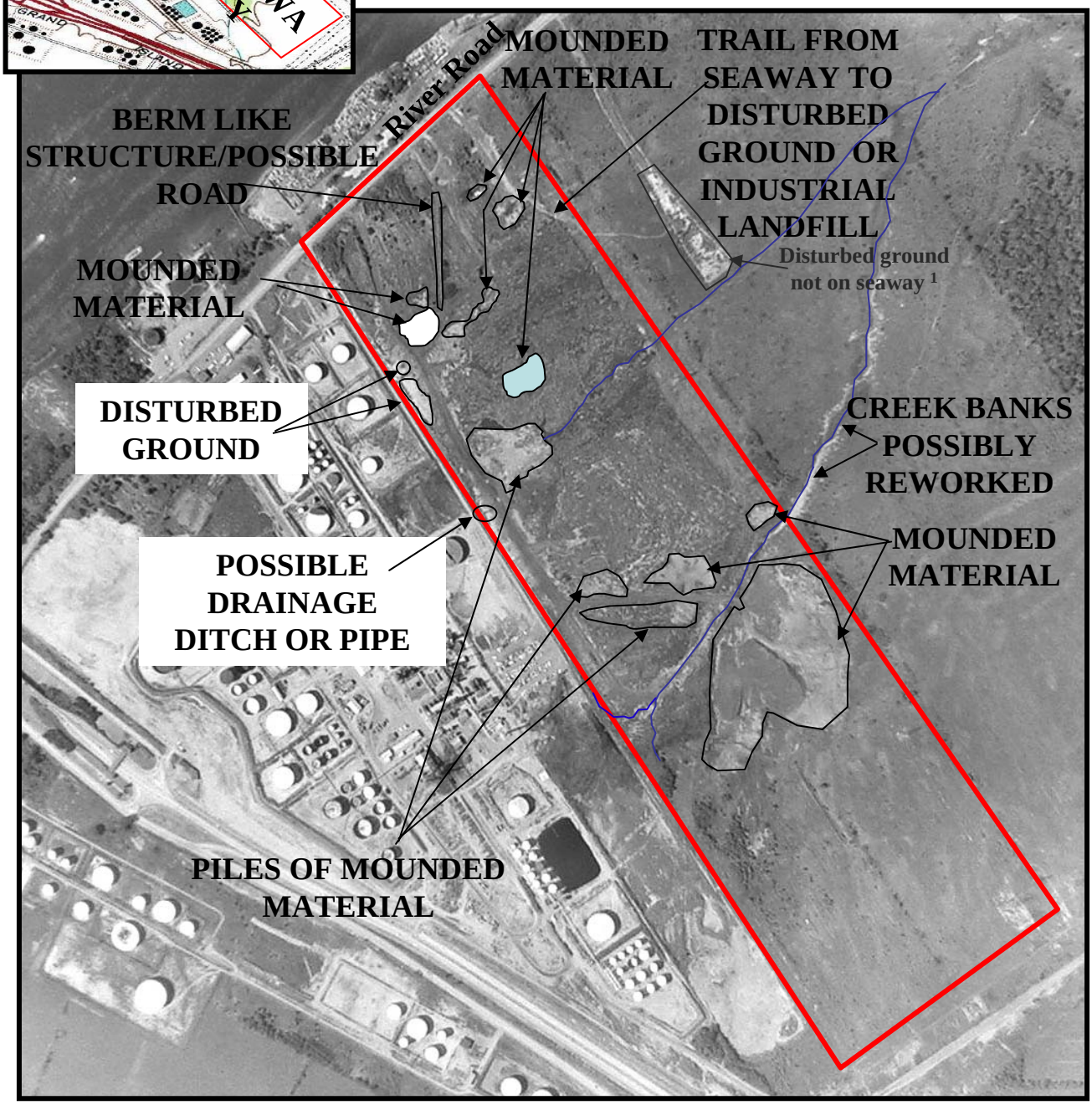


In order to make the 1951 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1960

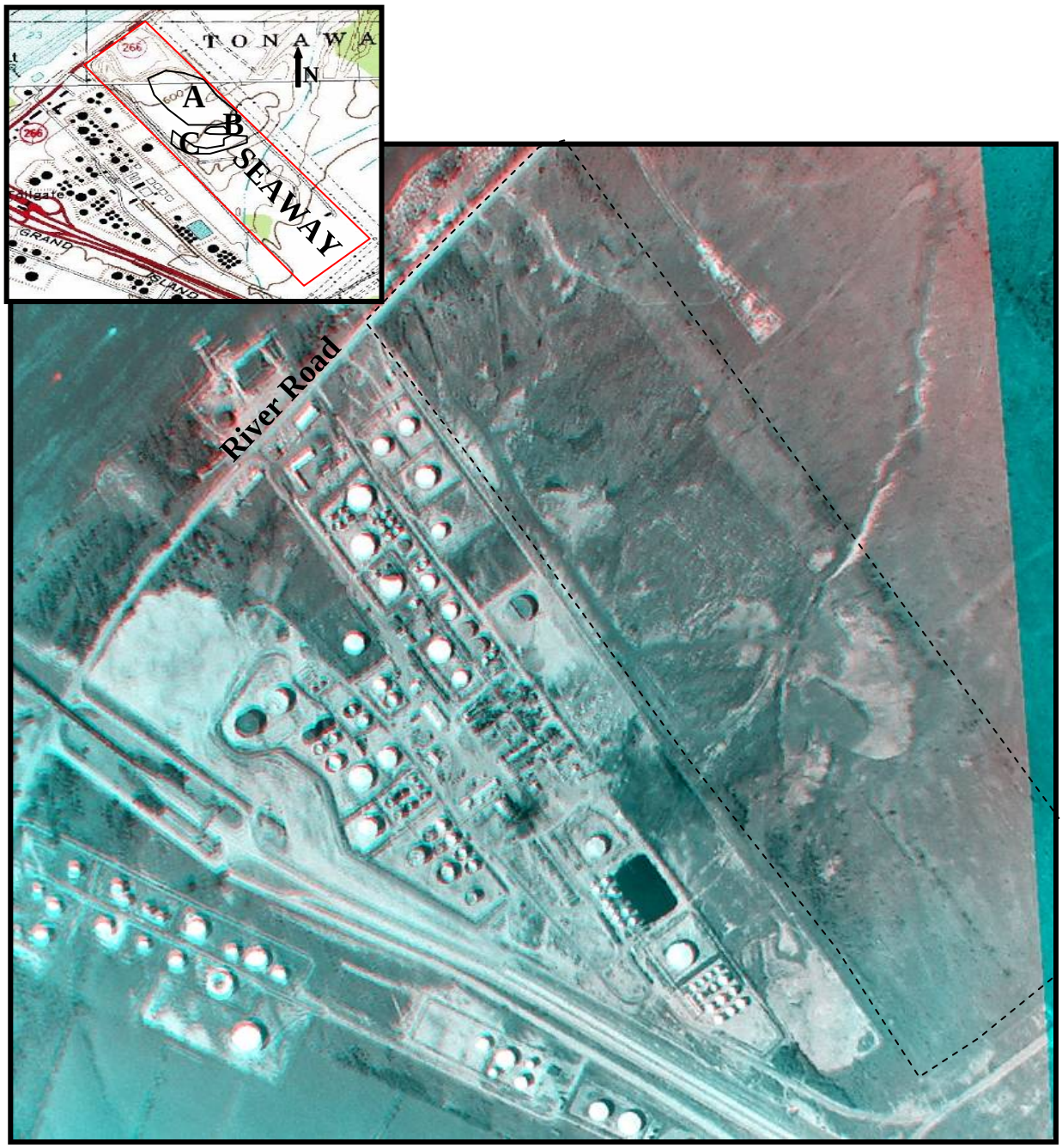




APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

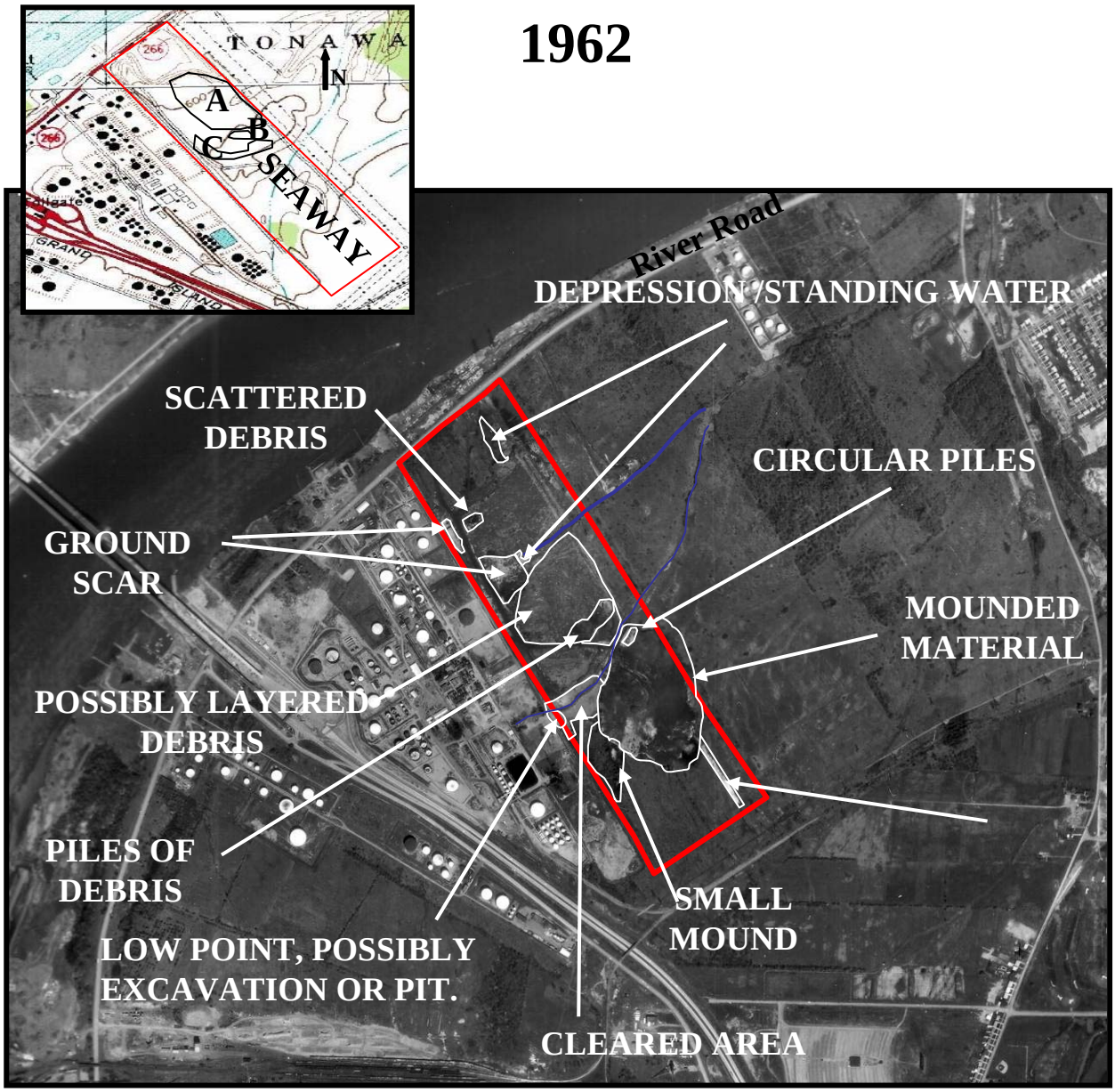
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001 page 1

HISTORICAL PHOTOGRAPHIC ANALYSIS
1960 ANAGLYPH



Dashed line defines the approximate Seaway site area. Line may also distort image giving the appearance of a deep trench around the site where none exist.

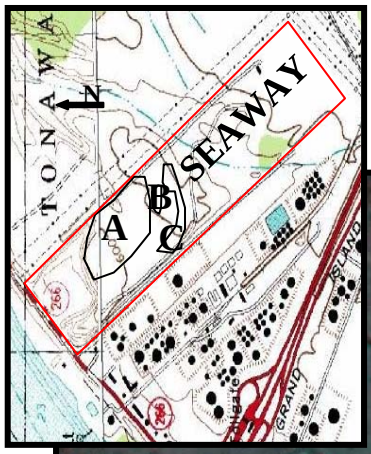
HISTORICAL PHOTOGRAPHIC ANALYSIS 1962



The Seaway site is higher in elevation than the adjacent Ashland site. Varying hill heights are apparent on the Seaway property.

APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

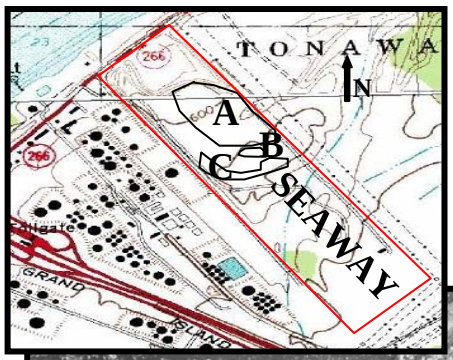
HISTORICAL PHOTOGRAPHIC ANALYSIS
1962 ANAGLYPH



In order to make the 1962 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

Dashed line defines the approximate Seaway site area. Line may also distort image giving the appearance of a deep trench around the site where none exist.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1963



GROUND SCARS

DISTURBED GROUND WITH MOUNDED MATERIAL

Disturbed ground not on Seaway

PIT/DEPRESSION

River Road

GROUND SCAR

ROAD

MOUNDED MATERIAL

SCATTERED PILES OF MOUNDED MATERIAL

GROUND SCAR

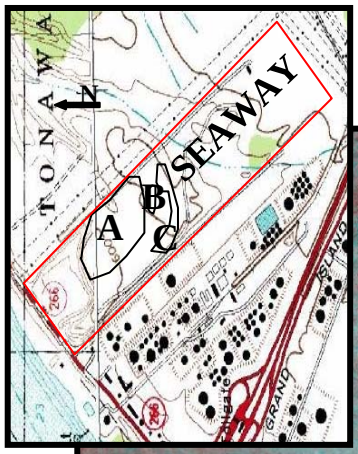
PONDING (WATER)

DISTURBED AREA

APPROXIMATE PRESENT DAY SEAWAY AREA.

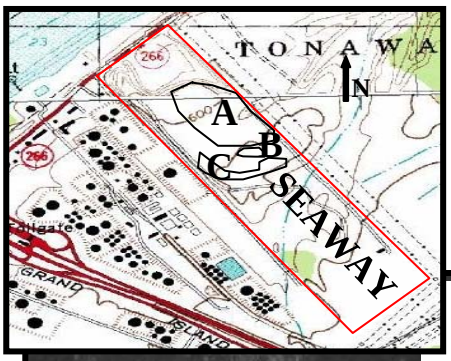
STREAM, CREEK, DRAINAGE

HISTORICAL PHOTOGRAPHIC ANALYSIS
1963 ANAGLYPH



In order to make the 1963 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.
Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1966



INCINERATOR LOCATION IS: 4762708.1 E; 669544.2 N UTM
LAT: 42 59 53.3 N; LON: 78 55 12.0 W

TRAIL FROM SEAWAY TO INDUSTRIAL LANDFILL FIRST SEEN IN 1960

DISTURBED GROUND

MOUNDED MATERIAL

Industrial landfill

GROUND SCAR

River Road

INCINERATOR

DISTURBED GROUND

DISTURBED GROUND WITH SMALL PILES OF MOUNDED MATERIAL

MOUNDED MATERIAL

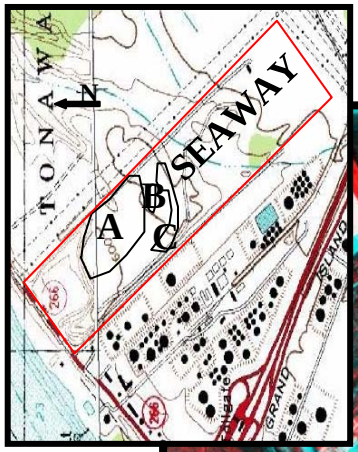
BUILDING

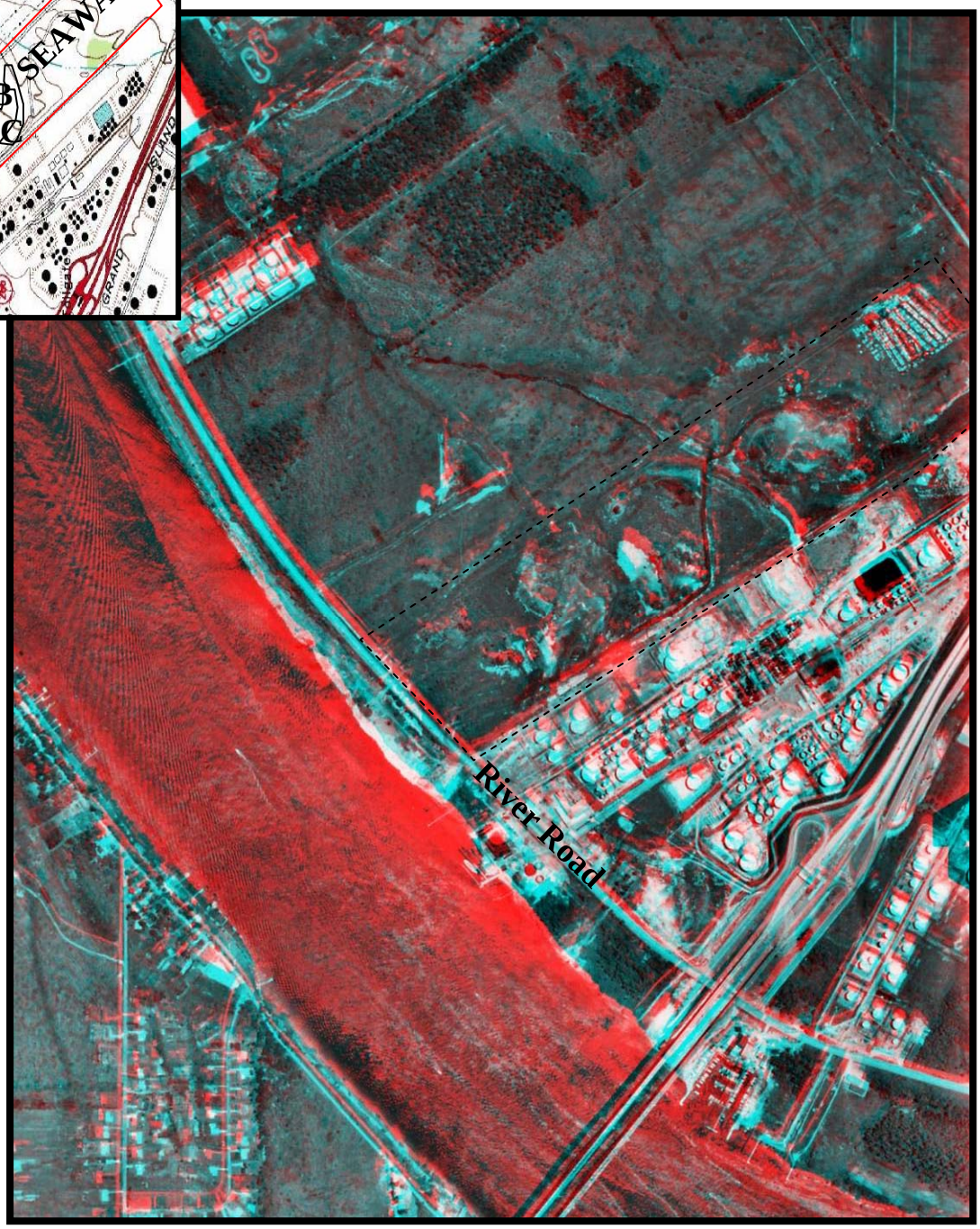
SALVAGE YARD

APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

[1] **FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001**

HISTORICAL PHOTOGRAPHIC ANALYSIS
1966 ANAGLYPH

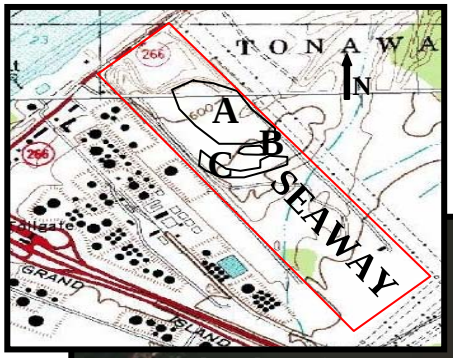




In order to make the 1966 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1970



TRAIL FROM SEAWAY TO DISTURBED GROUND (INDUSTRIAL LANDFILL) IS FIRST SEEN IN 1960 PHOTO.

MOUNDED MATERIAL

EACH AREA SLIGHTLY HIGHER THAN THE BASE, WITH VEHICLES OR TRUCKS SEEN ATOP THE HIGHEST MOUND.

EXCAVATION

(IN 1966 THIS AREA WAS ABOUT 600' ABOVE SEA LEVEL. IN 1970 IT IS ABOUT 575' ABOVE SEA LEVEL, AS PER U. S. G. S. TOPOGRAPHIC MAPS)

Disturbed ground on industrial landfill

ASHLAND 2 AREA

INCINERATOR

River Road

MOUNDED MATERIAL

BUILDING

SALVAGE YARD

PIT

POSSIBLE TANK IN EXCAVATED AREA AT CREEK HEAD

STANDING WATER

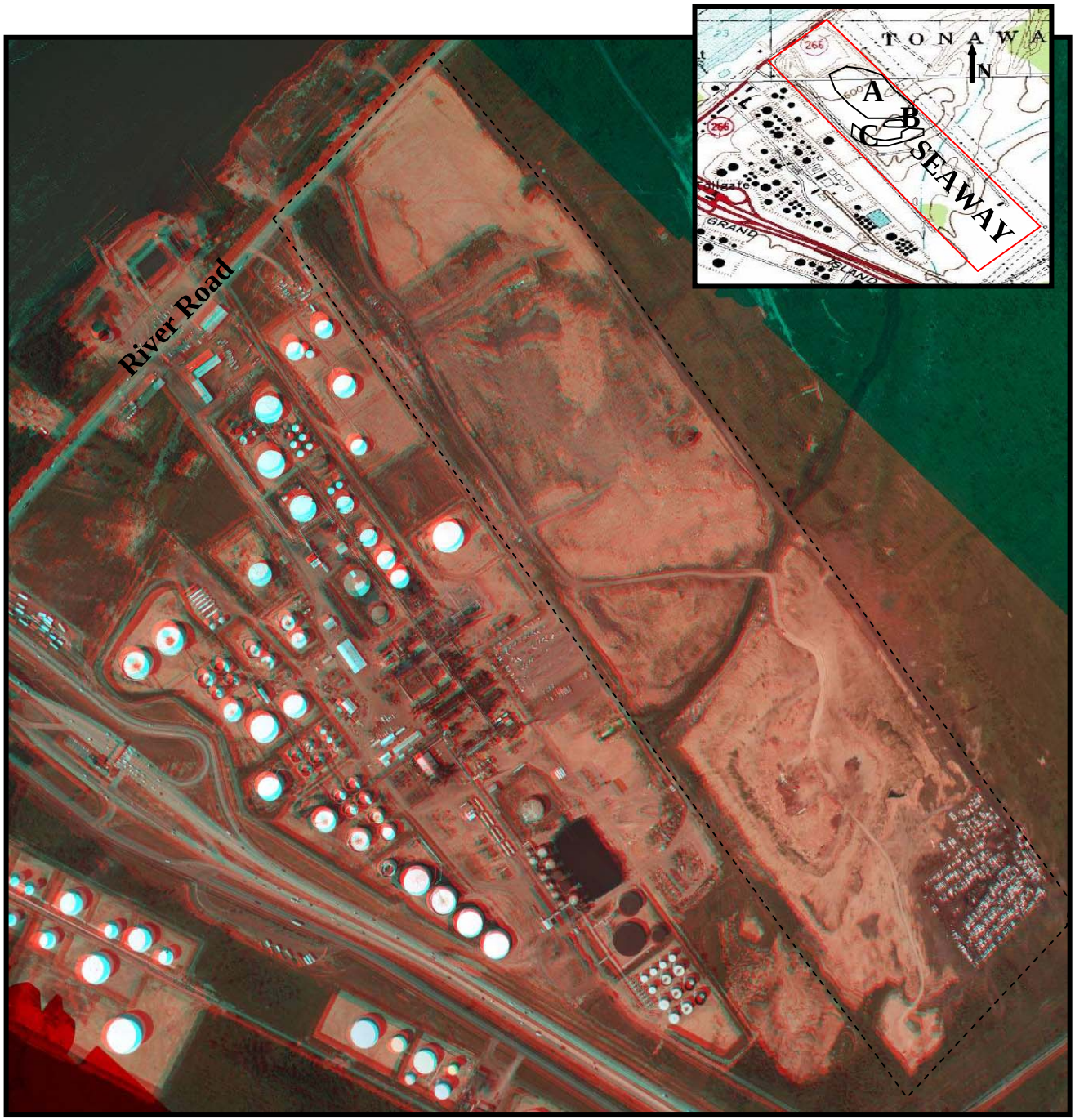
SMALL EXCAVATION

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

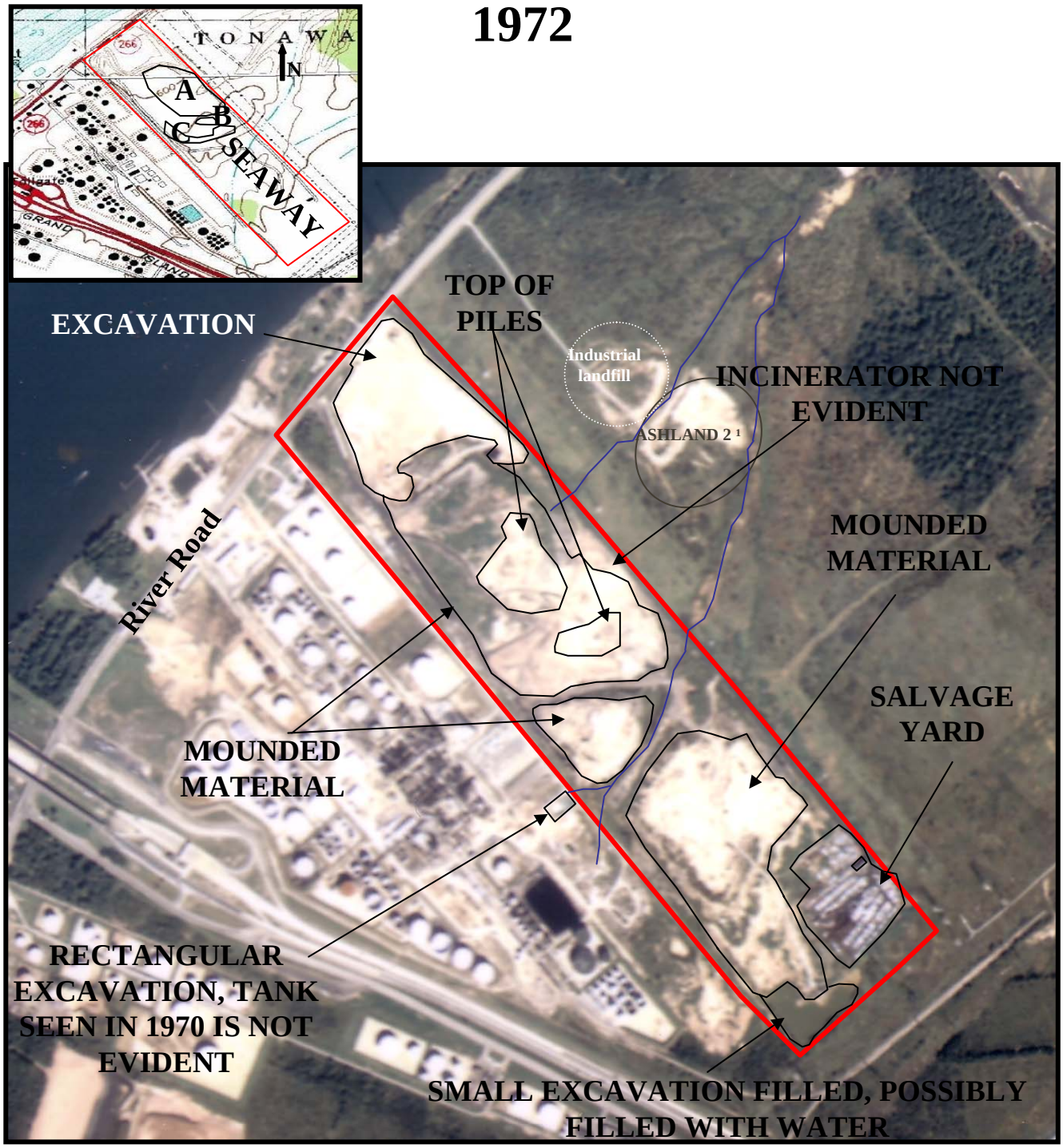
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1970 ANAGLYPH



Dashed line defines the approximate Seaway site area.

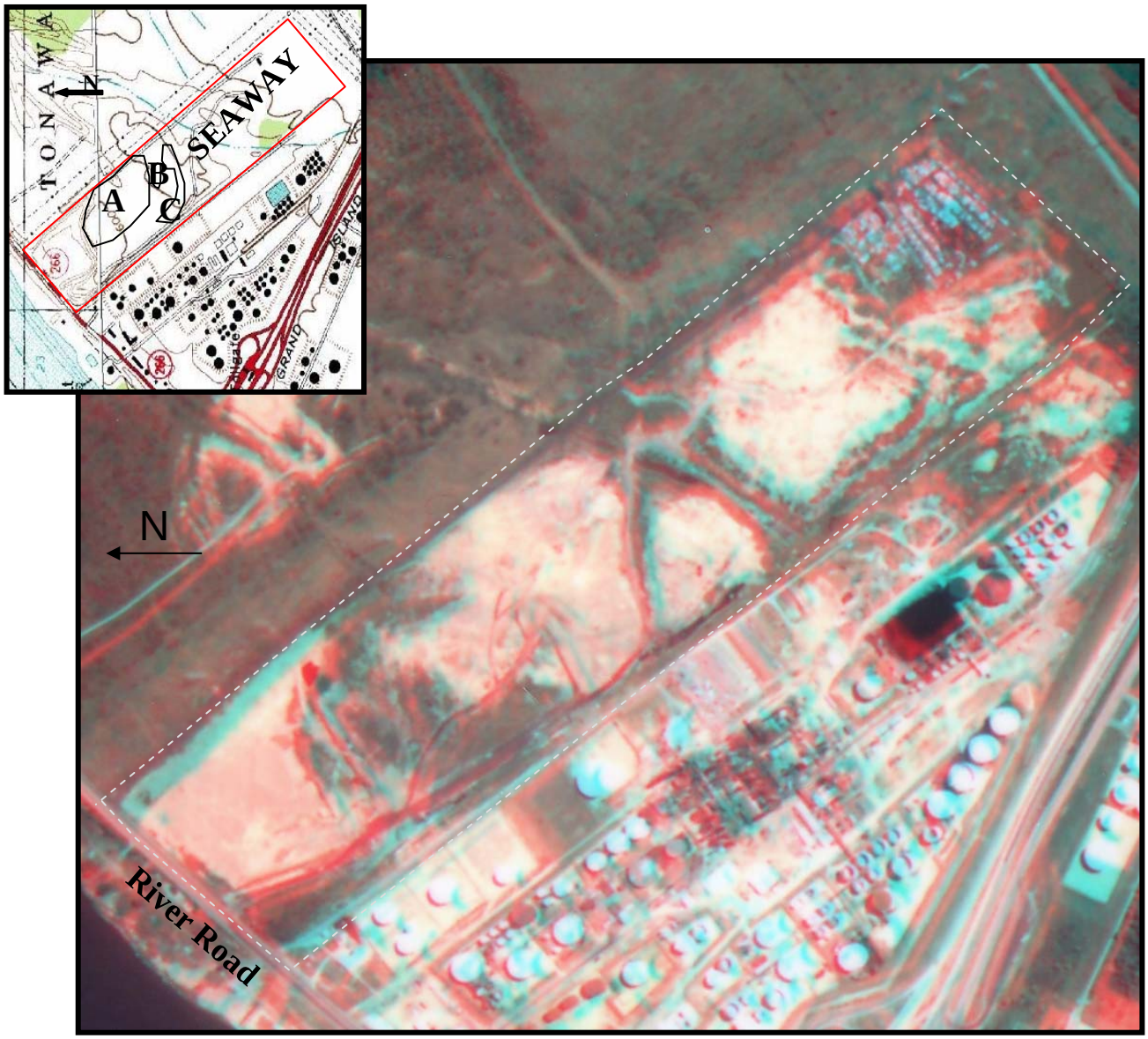
HISTORICAL PHOTOGRAPHIC ANALYSIS 1972



APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

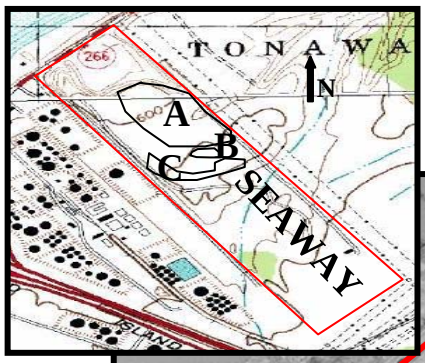
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS 1972 ANAGLYPH



In order to make the 1972 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left. Dashed line defines the approximate Seaway site area. Line may also distort image giving the appearance of a deep trench around the site where none exist.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1974



FACILITY OR STRUCTURE IN THE FORMER EXCAVATED AREA.

River Road

Industrial landfill

ASHLAND 2 [1]

MOUNDED MATERIAL

SALVAGE YARD

BUILDINGS WHERE POSSIBLE TANK WAS SEEN IN 1970 PHOTOS

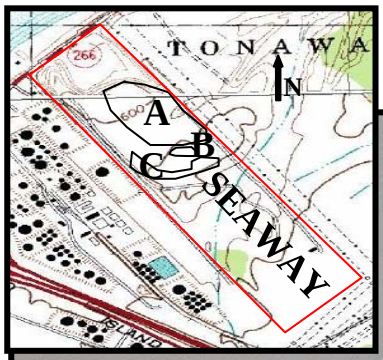
WATER

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

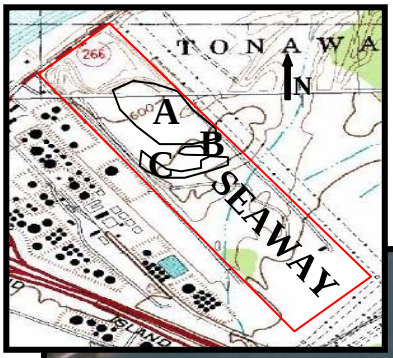
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1974 ANAGLYPH



Dashed line defines the approximate Seaway site area. Note – on this image the dashed line may distort your view of the image giving the appearance of a deep trench around the site where none exist.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1976



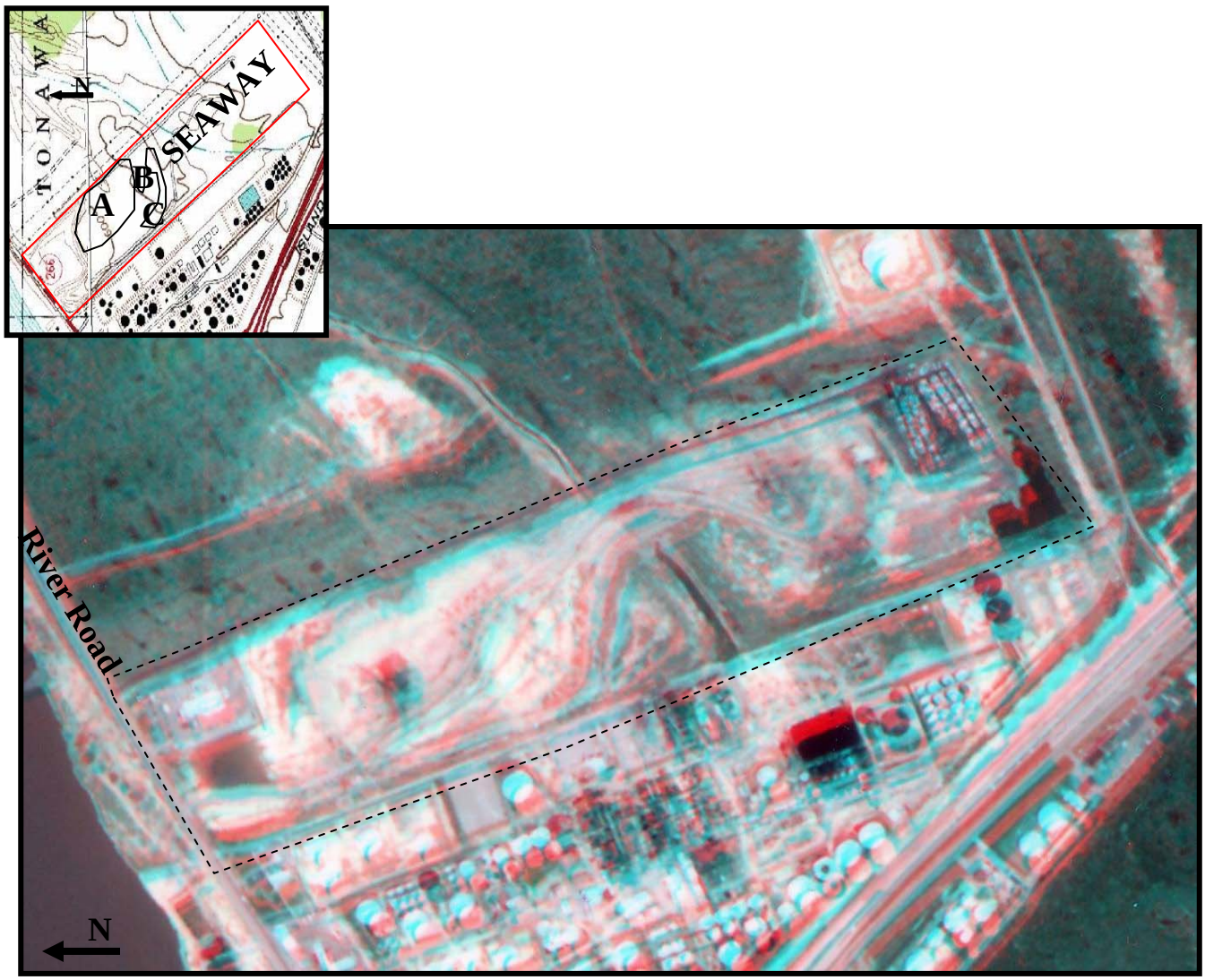
POLE POSSIBLY AIR SAMPLING LOCATION. [1]
LOCATION OF POLE: UTM X: 669485; Y: 4762840 METERS
LAT 42 59 57 N; LON 78 55 14 W

BUILDING & PARKING LOT
POLE
River Road
ASHLAND 2 [1]
DARK MATERIAL
VEHICLES
MOUNDED MATERIAL
SALVAGE YARD
GROUND SCAR
WATER

APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

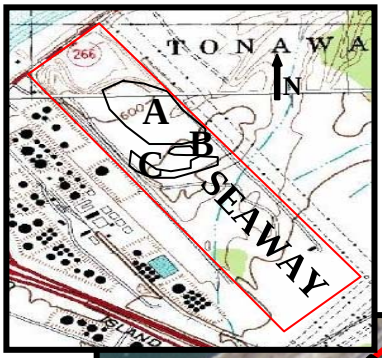
HISTORICAL PHOTOGRAPHIC ANALYSIS
1976 ANAGLYPH



In order to make the 1976 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1978



POLE POSSIBLE AIR QUALITY SAMPLING LOCATION. [1]
LOCATION OF POLE: UTM X: 669485; Y: 4762840 METERS
LAT 42 59 57 N; LON 78 55 14 W

BUILDING AND PARKING LOT

STRUCTURES AND/OR PILES OF DEBRIS

River Road

POLE

ASHLAND 2 [1]

MOUNDED MATERIAL

TERRACED AREA

STRUCTURES OR VEHICLES

DARK COLOR MATERIAL/DEBRIS

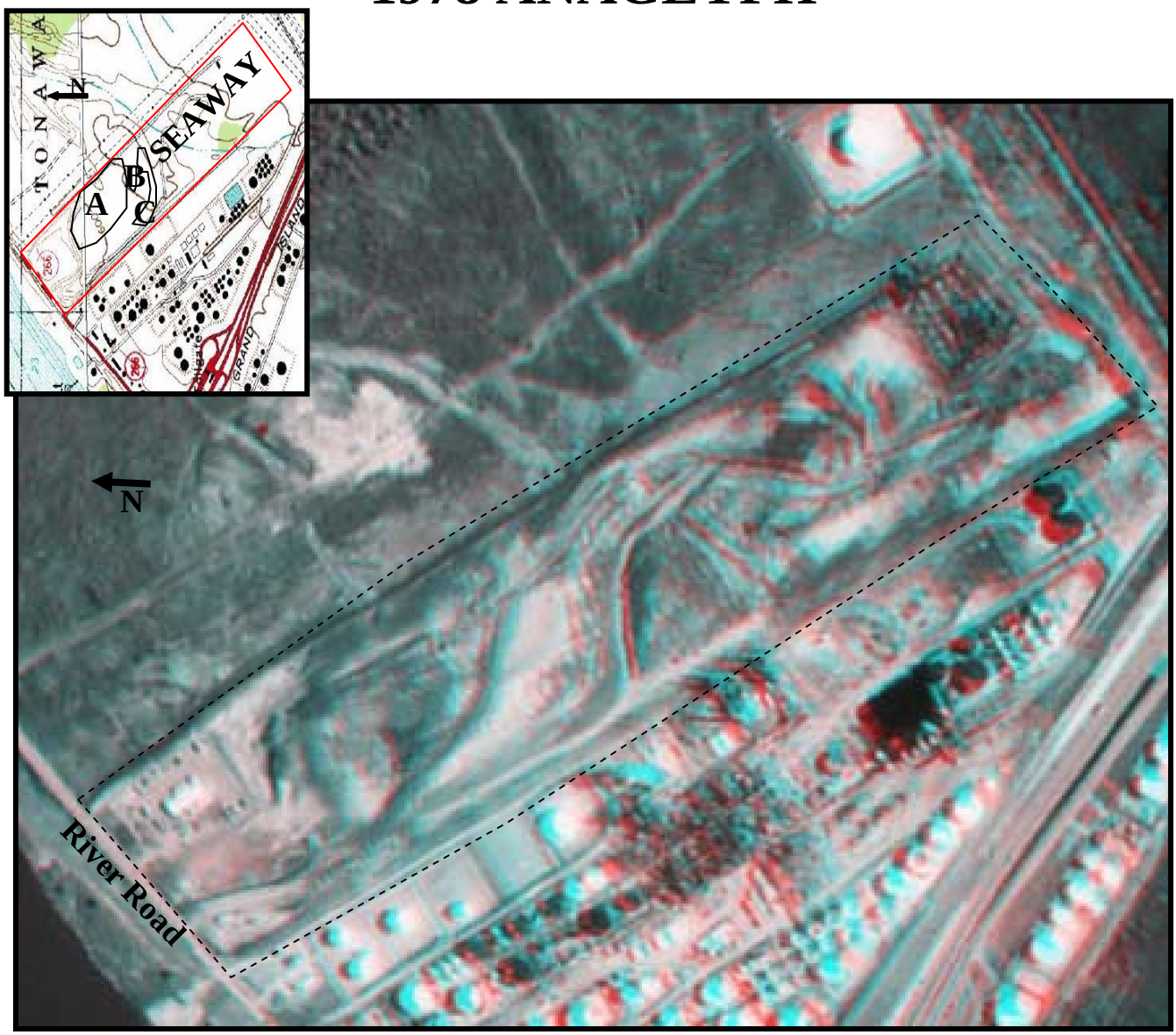
SALVAGE YARD

WATER (POND) SEEN IN 1976 HAS BEEN FILLED IN WITH MATERIAL.

APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

[1] **FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001**

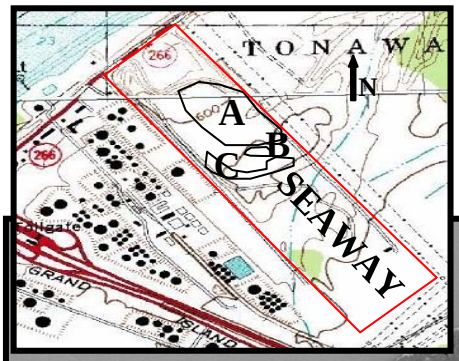
HISTORICAL PHOTOGRAPHIC ANALYSIS
1978 ANAGLYPH



In order to make the 1978 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left.

Dashed line defines the approximate Seaway site area. Line may also distort image giving the appearance of a deep trench around the site where none exist.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1980



River Road

BUILDING & PARKING LOT

NEW EXCAVATION

PREVIOUS EXCAVATION WITH SCATTERED GROUND SCARS NOT SEEN IN 1978

VEHICLES

STRUCTURE OR PILES OF DEBRIS

ASHLAND 2

POSSIBLY VEHICLES

MOUNDED MATERIAL

STRUCTURE

SMALL TOWER OR POLE

TRENCHES OR PIPES

PILES OF LIGHT AND DARK DEBRIS SEEN IN JUNE PHOTOS BUT NOT SEPTEMBER PHOTOS

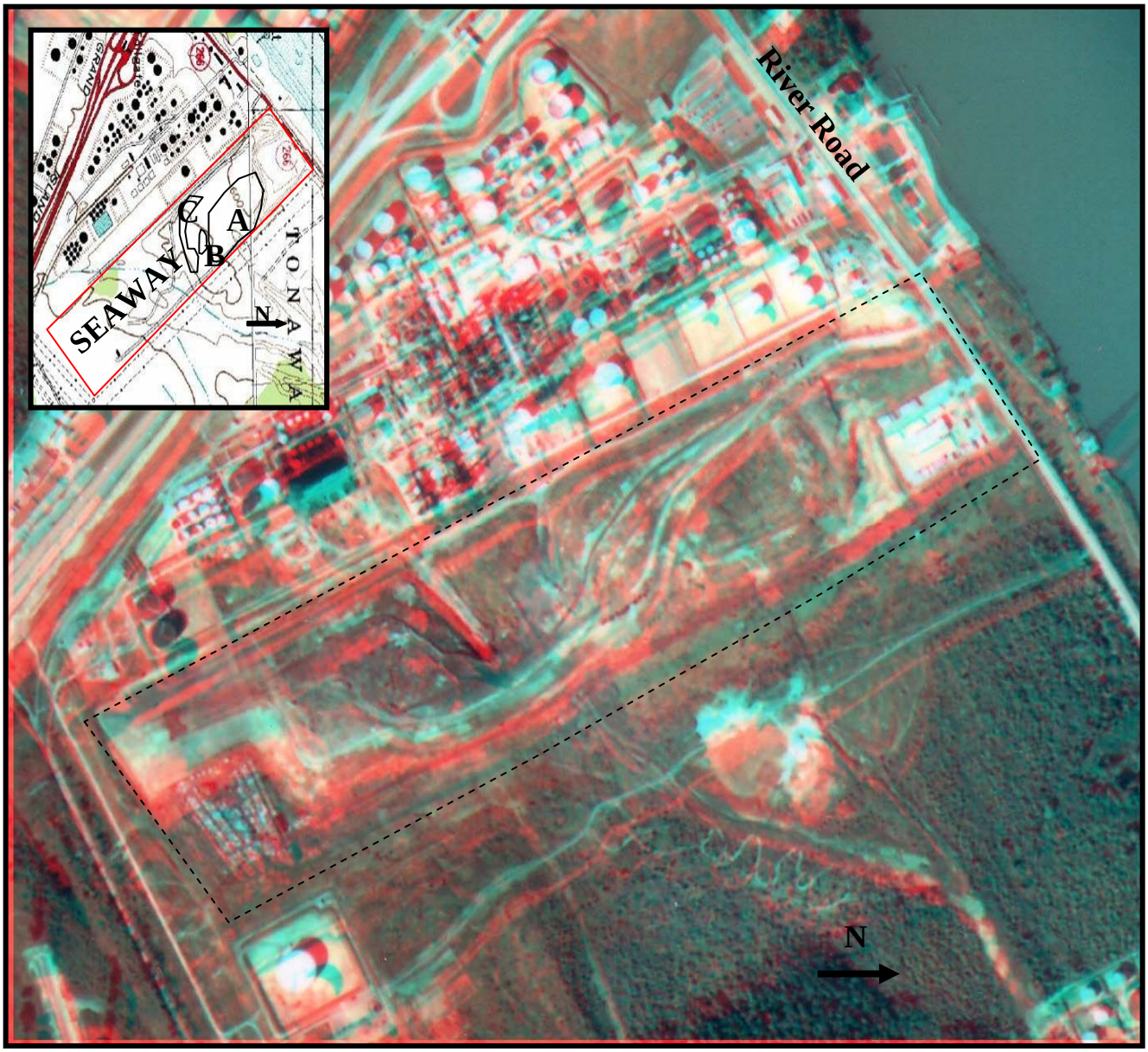
SALVAGE YARD

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

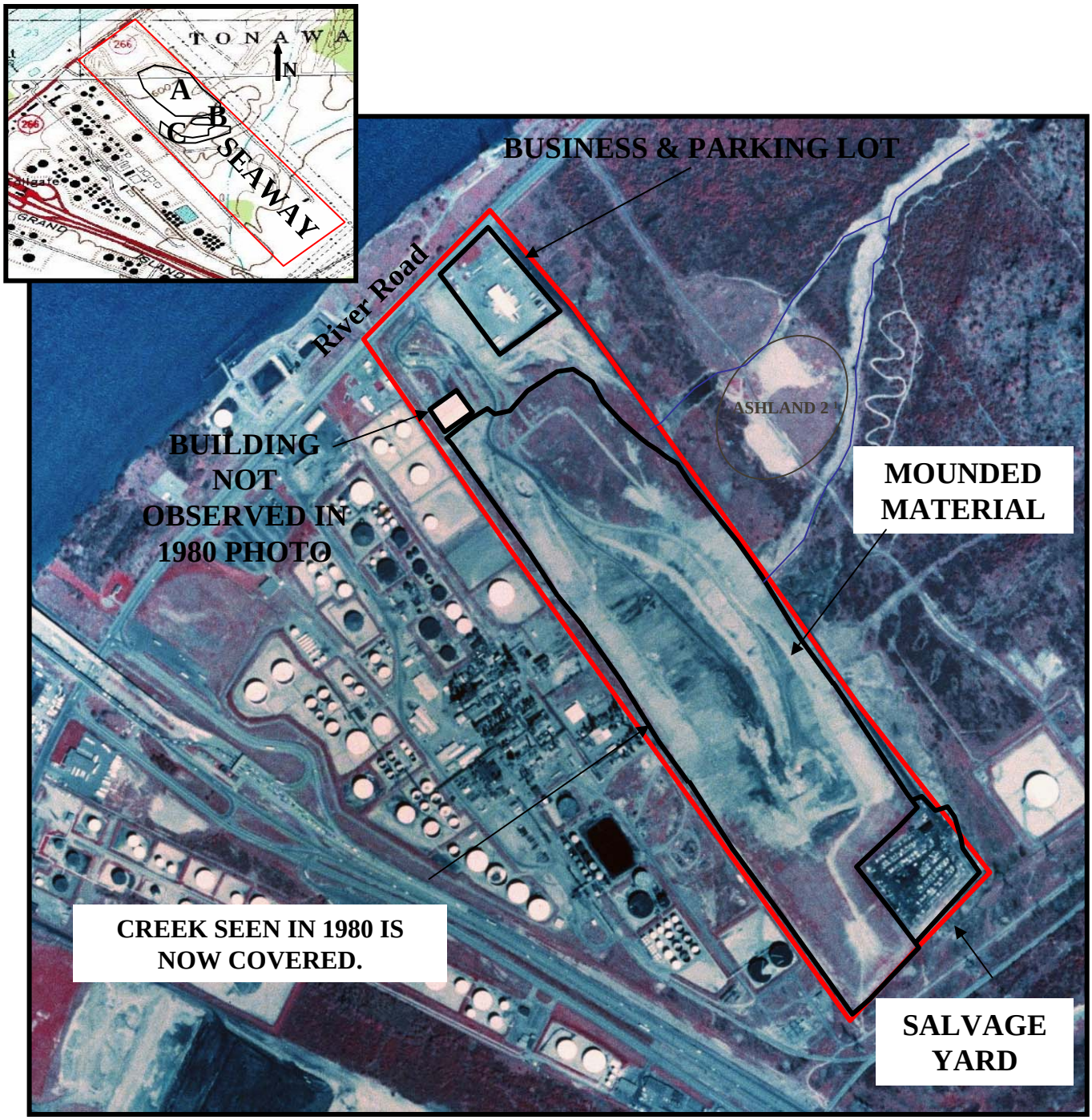
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1980 ANAGLYPH



In order to make the 1980 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the right. Dashed line defines the approximate Seaway site area.

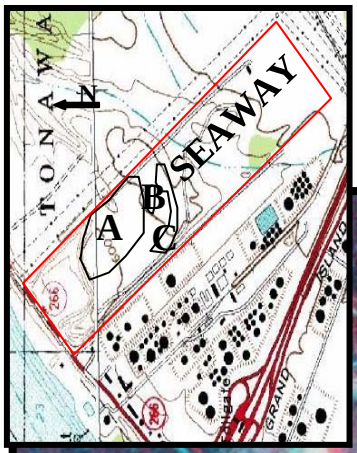
HISTORICAL PHOTOGRAPHIC ANALYSIS 1985



APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

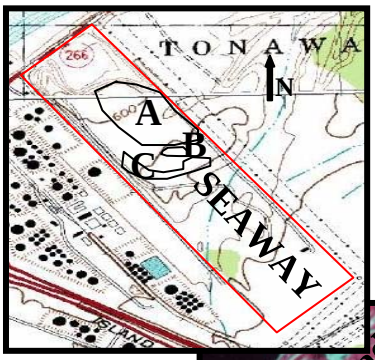
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1985 ANAGLYPH



In order to make the 1985 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left. Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1990



BUSINESS & PARKING LOT

REMAINS OF 1970 EXCAVATION

River Road

POSSIBLE STRESSED VEGETATION

ASHLAND 2 [1]

BUILDING

MOUNDED MATERIAL

PROBABLE CULVERT

CONE SHAPED MOUND

POSSIBLE BUILDING OR TOWER

VEHICLES

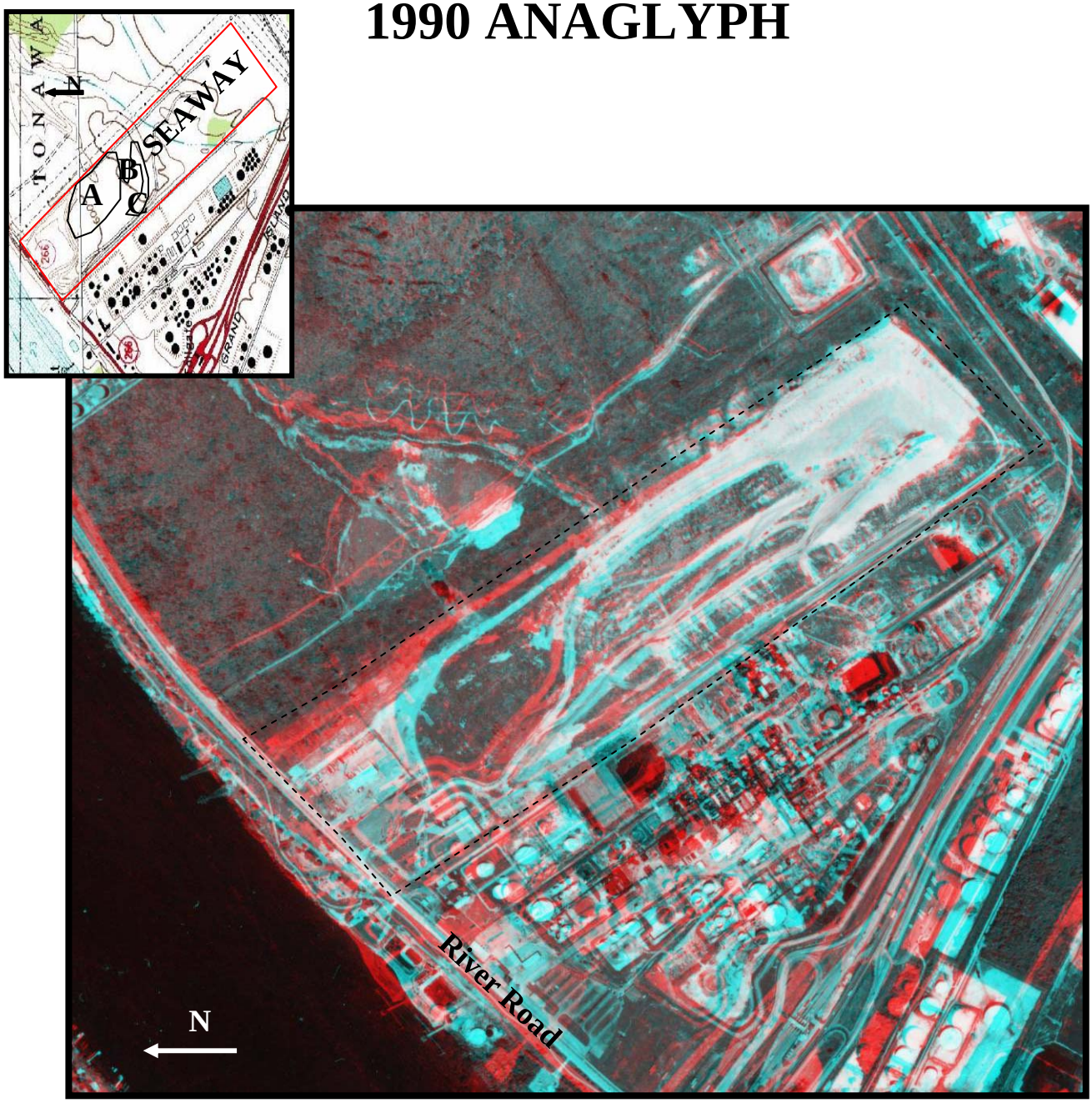
SALVAGE YARD IS GONE. AREA IS PART OF MOUND.

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

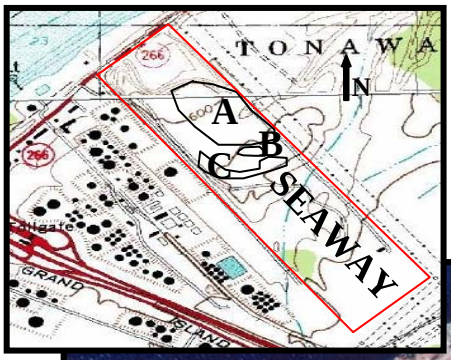
[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1990 ANAGLYPH



In order to make the 1990 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left. Dashed line defines the approximate Seaway site area.

HISTORICAL PHOTOGRAPHIC ANALYSIS 1995



DISTURBED GROUND OR REWORKED MATERIAL

Industrial landfill

ASHLAND 2

River Road

MOUNDED MATERIAL

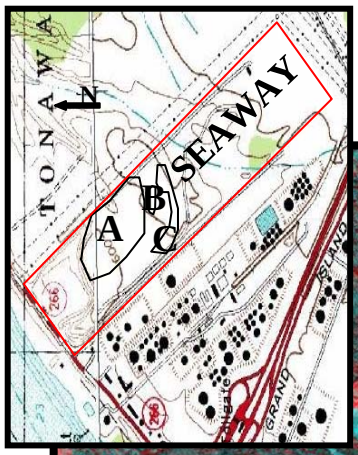
MOUNDED MATERIAL

APPROXIMATE PRESENT DAY SEAWAY AREA.

STREAM, CREEK, DRAINAGE

[1] FUSRAP Fact Sheet, Seaway Site Tonawanda, New York, U.S. Army Corps of Engineers, Buffalo District, Feb 2001

HISTORICAL PHOTOGRAPHIC ANALYSIS
1995 ANAGLYPH



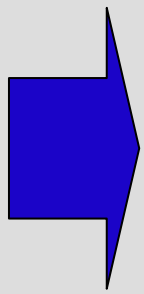
In order to make the 1995 anaglyph, the direction of the photos had to be oriented to their stereo viewing position. North is to the left. Dashed line defines the approximate Seaway site area.

2002 Aerial Photo

APPROXIMATE PRESENT DAY SEAWAY AREA.
STREAM, CREEK, DRAINAGE

New York State Plane , Western Zone , NAD 83, US Survey Feet
Orthoimagery Type: 12 - inch Resolution Natural Color

Summary Of Significant Findings

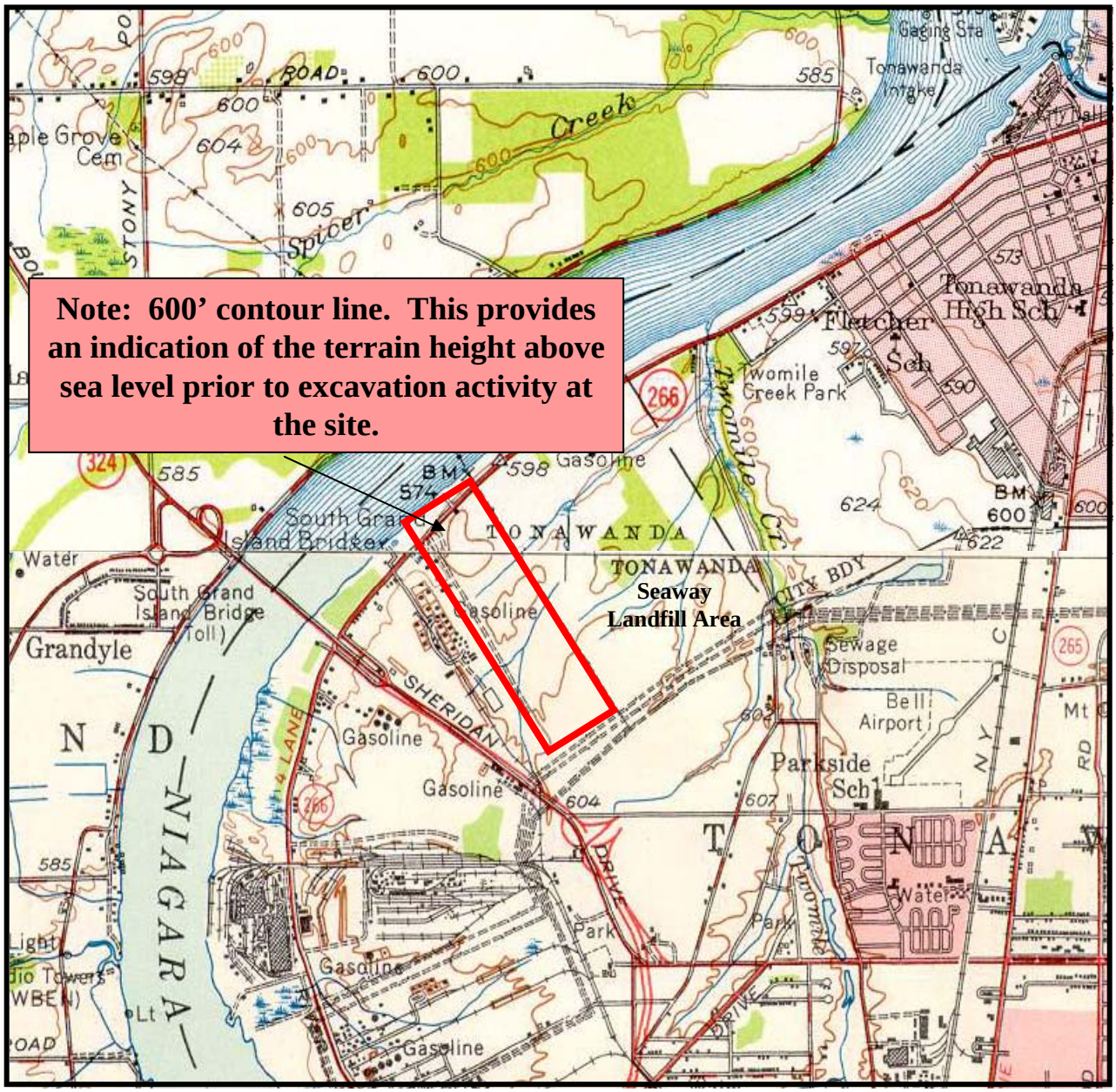


SUMMARY - LOCATIONS

REFERENCE LOCATION OF MAJOR POINTS OF SUMMARY

SUMMARY – TOPOGRAPHIC MAP

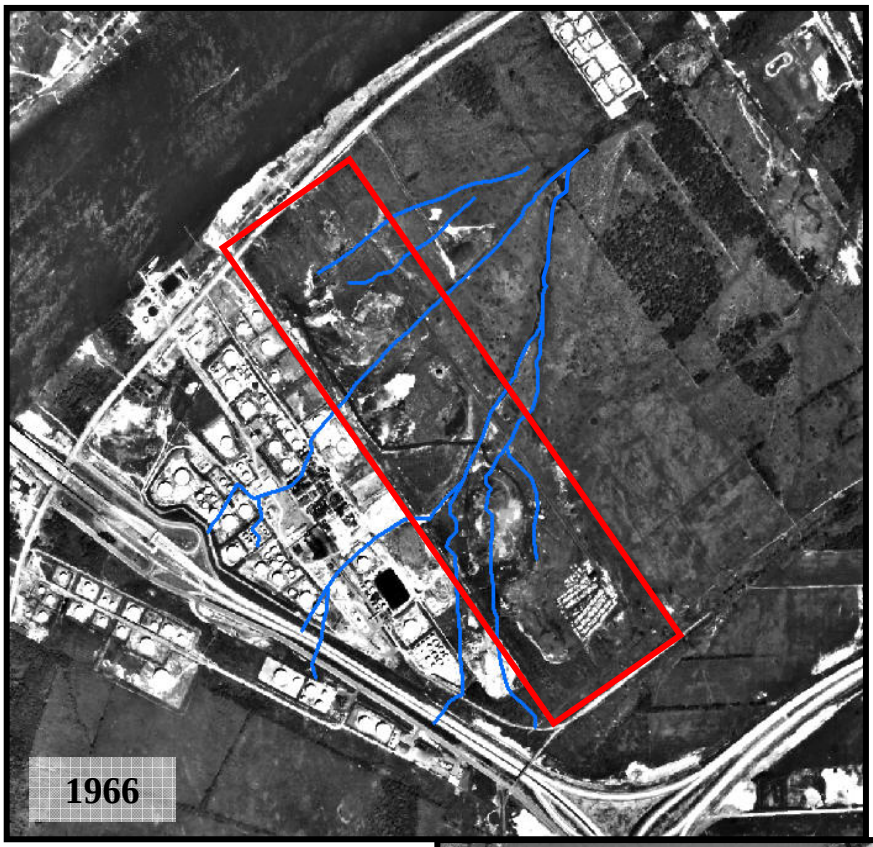
1948 USGS Topographic Maps of the Area



1948 Edition **Tonawanda, NY**, 15 min quad: contour interval 20 feet; Culture and drainage in part compiled by Corps of Eng, Dept of the Army, from aerial photographs taken 1942. Topography by plane-table methods 1948.

1948 Edition **Buffalo, NY**, 15 min quad: contour interval 20 feet; Culture and drainage in part compiled by Corps of Eng, Dept of the Army, from aerial photographs taken 1942. Topography by plane-table methods 1948.

SUMMARY – SURFACE DRAINAGE



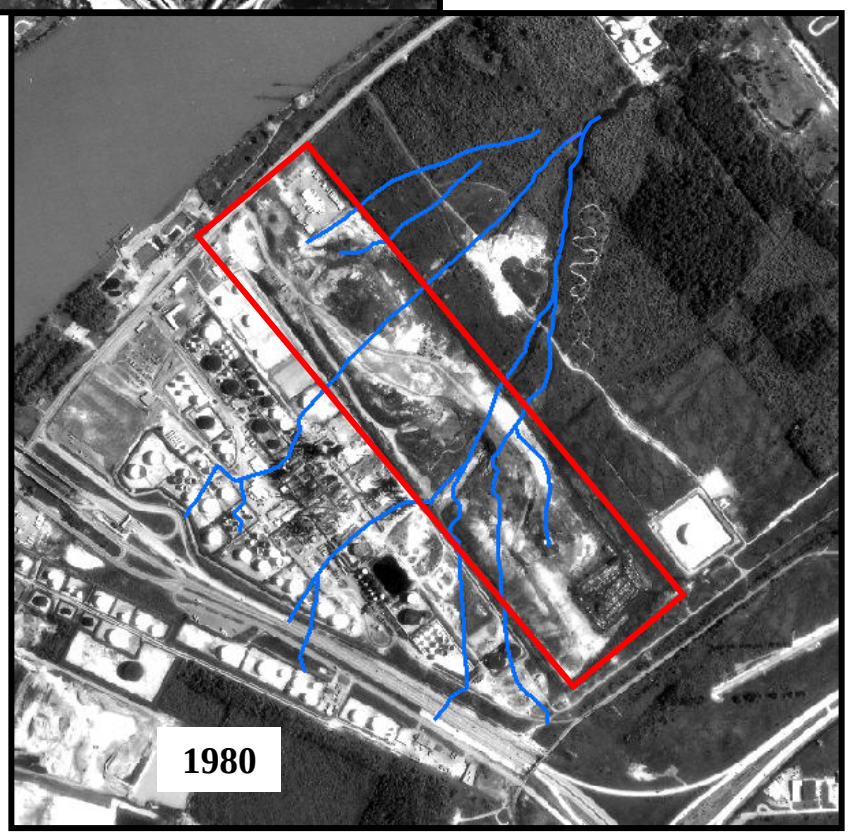
From 1927 to 1980 the drainage in the area changed. In 1985 photos it is evident the creek is channelized and travels under the mound on Seaway property through a concrete conduit. [1] Historical drainage is important because creeks often represent fracture traces, important when addressing aquifer contamination. Creeks may represent conduits for groundwater flows and may provide possible subsurface contaminant pathways.

1966 photo (above) and 1980 photo (right) are used as bases for the 1927 drainage network shown atop the photos.

NOTE: Vegetation signatures were used to map drainage for the 1927 photos. Stereo pairs were not available for 1927.

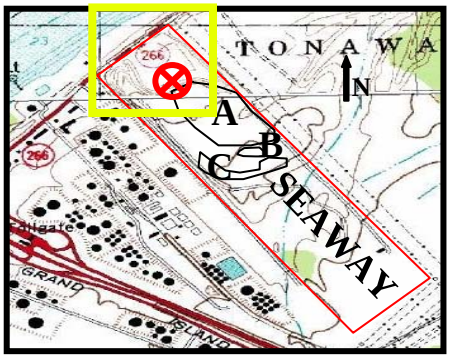
1927 DRAINAGE

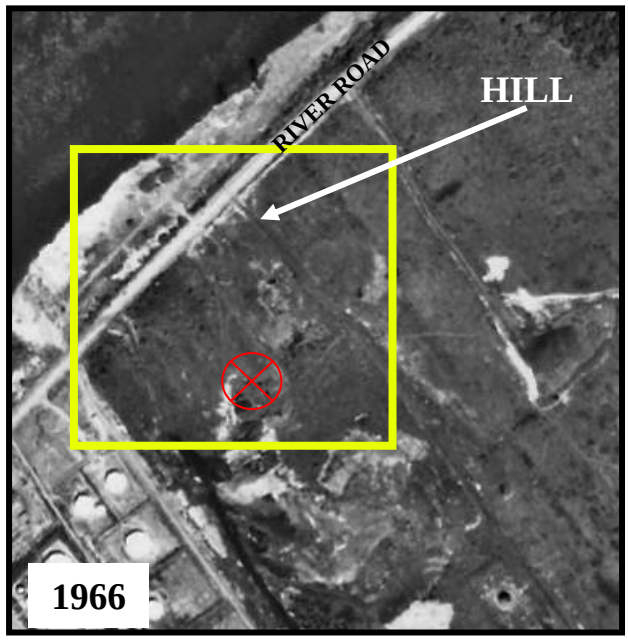
Approximate present day Seaway area



[1] Explanation of Significant Differences for the Rattlesnake Creek Portion of the Ashland Sites; September 20, 2004; FUSRAP; U.S. Army Corps of Engineers, Buffalo District Office; page 2)

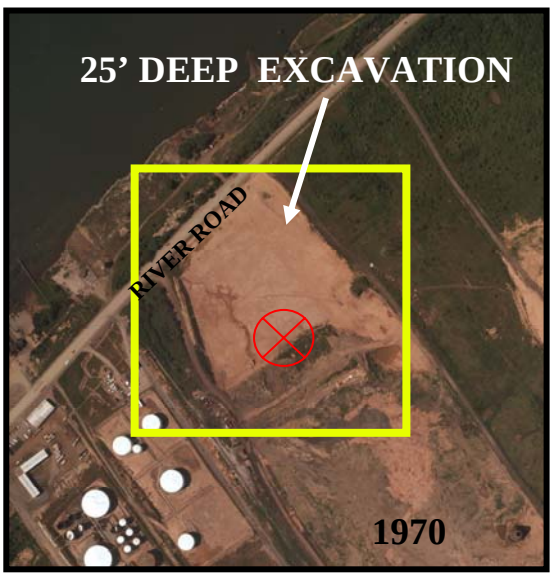
SUMMARY – HILL BESIDE ROAD

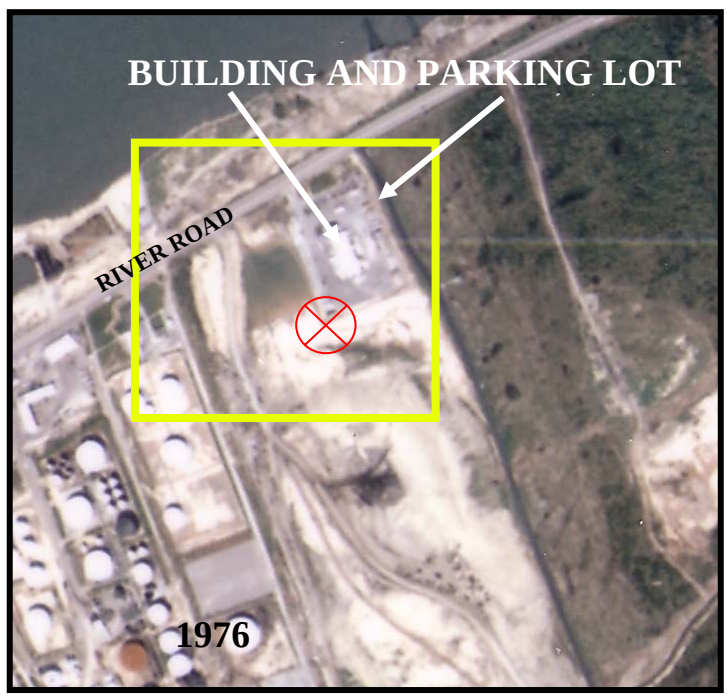




UTM X: 669230; Y:4762973 METERS

LAT 43 00 02 N; LON 78 55 25 W

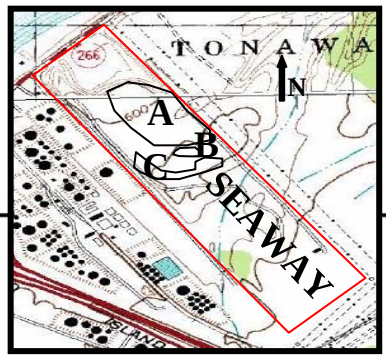




In 1966 and earlier photos, the land along River Road is a hill, with an elevation of about 600' above sea level. In the 1970 photo an excavation about 25 feet deep (575' elevation) is evident. In 1976 a building and parking lot is seen in the Northeast side of the excavation.

Topographic measurements are taken from the U.S.G.S. 15 Minute and 7.5 Minute Topographic maps.

Location Sketch of Seaway Landfill Site (Areas A, B, & C)



LOCATION DETAILS

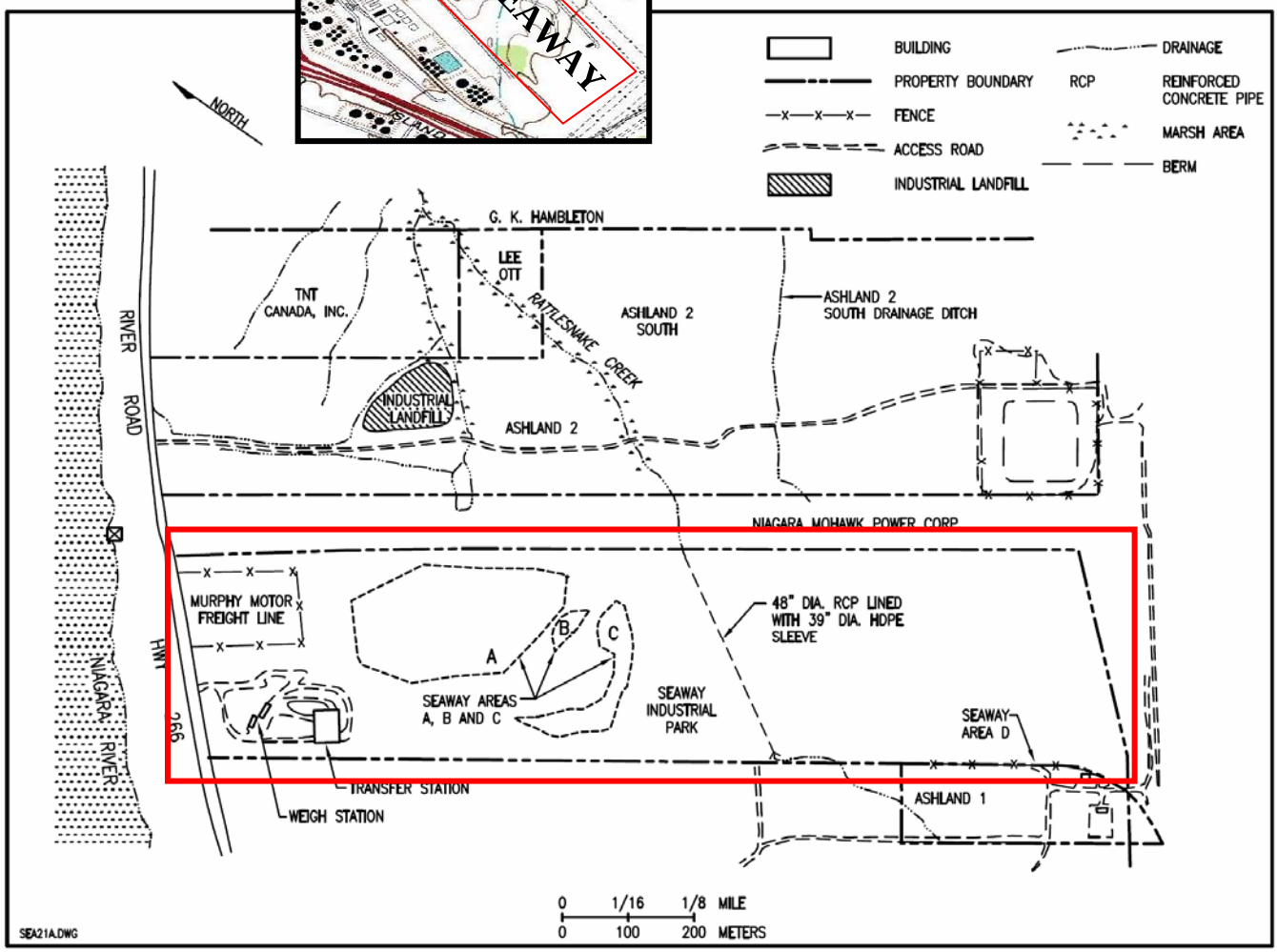


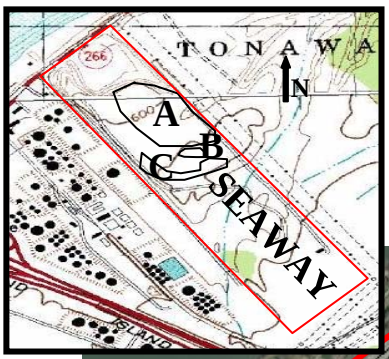
FIGURE A

The location of sites A, B, & C from this sketch are superimposed on the overview map graphic used throughout the report and on select photos.

Location Details Of The Seaway Property As Presented By Bechtel National, Inc., Courtesy US Army Corps Of Engineers, Buffalo District.

= approximate present day Seaway area.

AREAS A, B, & C ATOP 2002 PHOTO

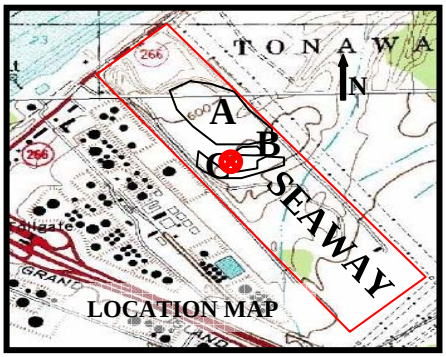


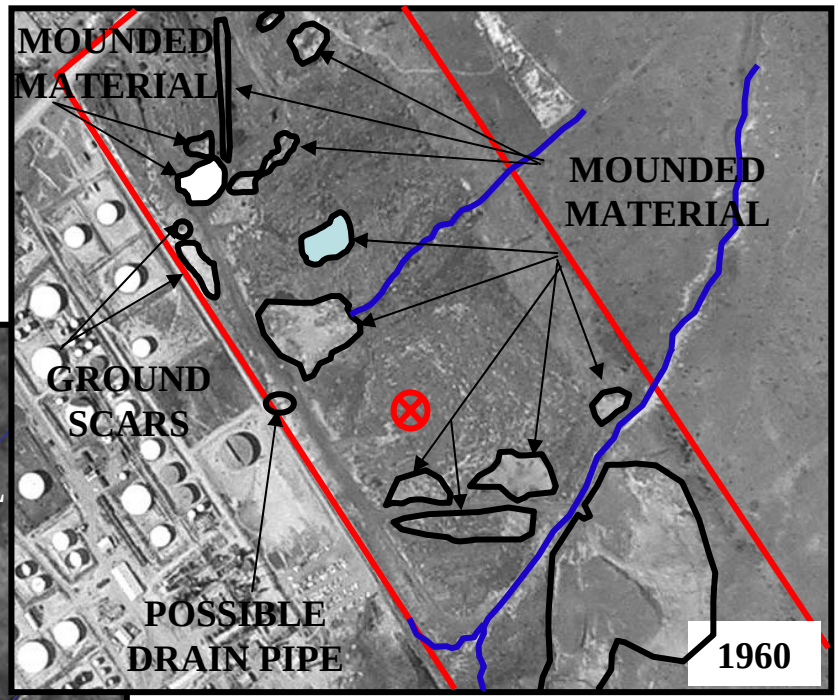
Locations Based on Figure A Sketch

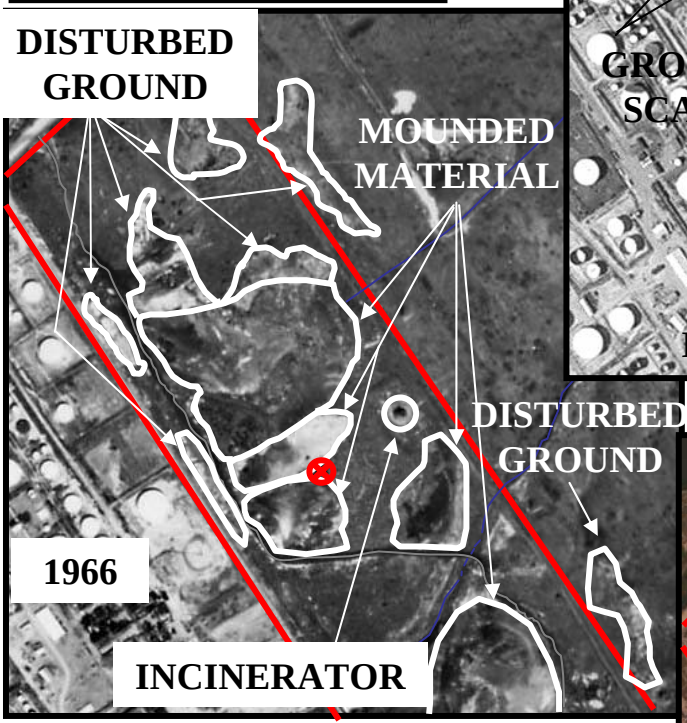
APPROXIMATE PRESENT DAY SEAWAY AREA.

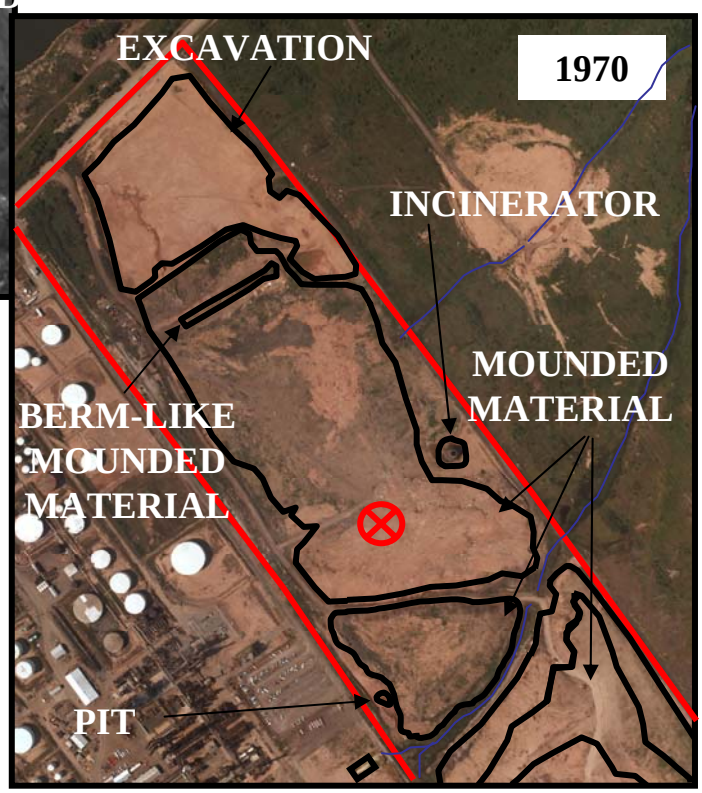
SUMMARY

Features seen in the area of sites A, B, & C, 1960-1970









These photos show the increase in activity at the landfill between 1960 and 1970. The depth of deposits seen in these photos are from a few feet deep in the 1960 photos to tens of feet deep in the 1970 photos.

X: 669461; Y: 4762613 METERS

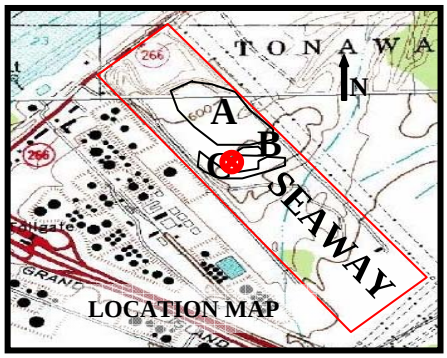
LAT 42 59 50 N; LON 78 55 16 W

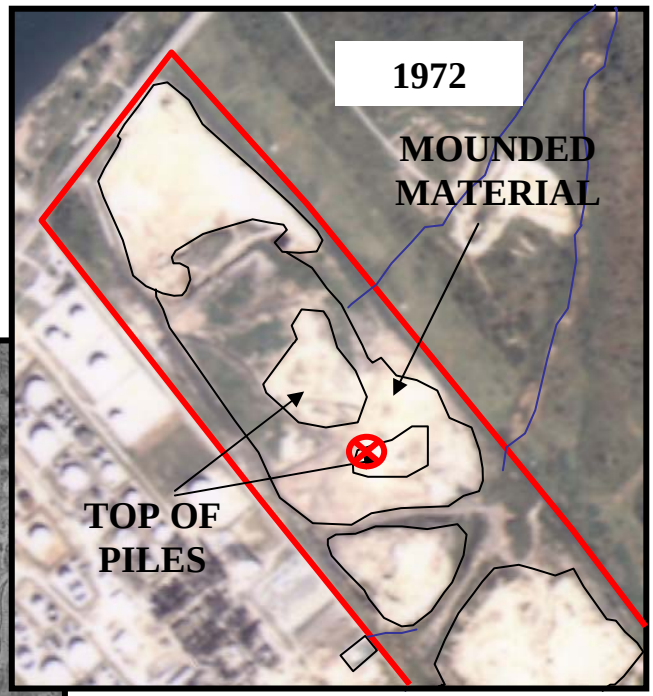
APPROXIMATE PRESENT DAY SEAWAY AREA.

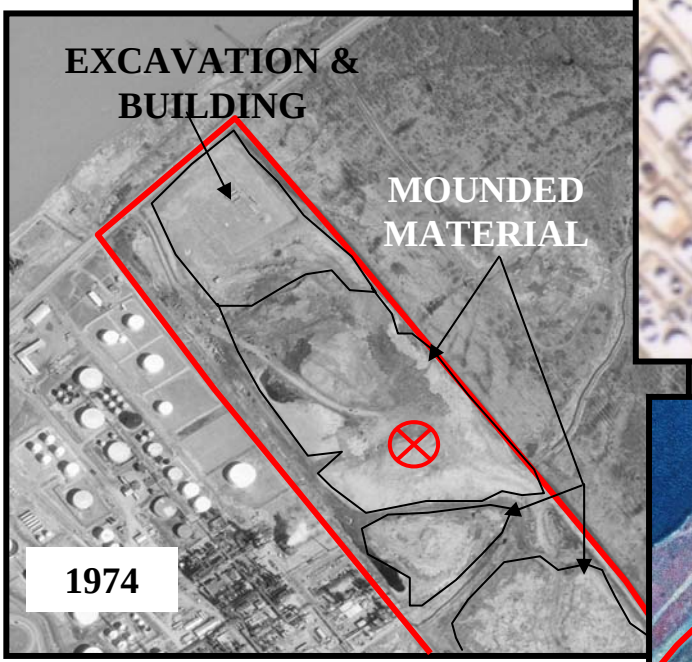
STREAM, CREEK, DRAINAGE

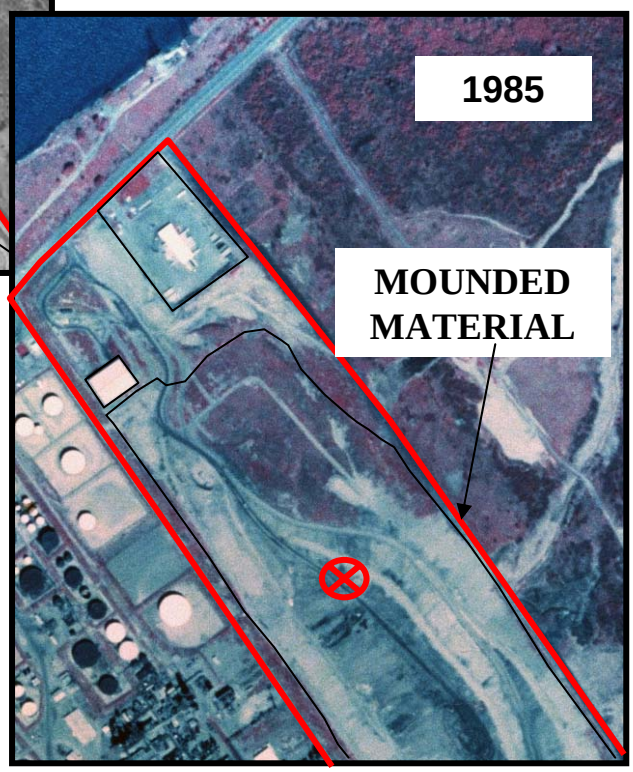
SUMMARY

Features seen in the area of sites A, B, & C, 1972-1985









1972 to 1985 shows continued changes in mounds, activity and site topography. Material is deposited in tens of feet in these photos. In 1972 there were separate piles. In 1985 the debris covered most of the area as one pile.

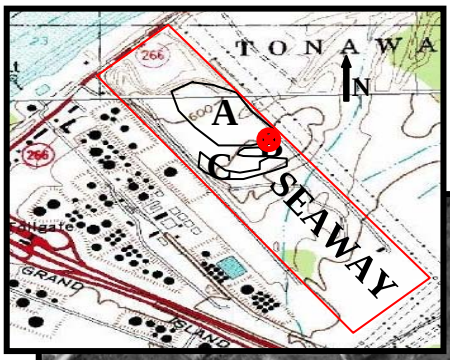
⊗ X: 669461; Y: 4762613 METERS

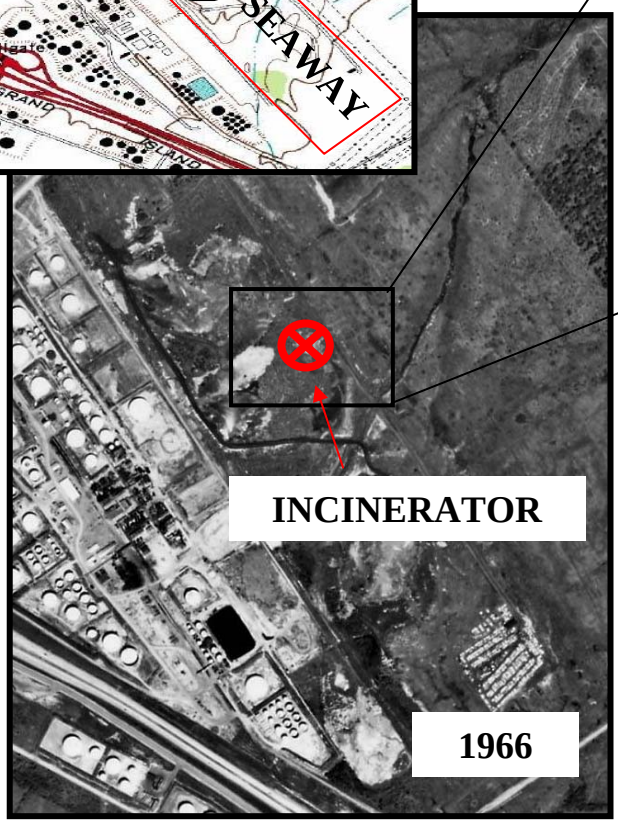
LAT 42 59 50 N; LON 78 55 16 W

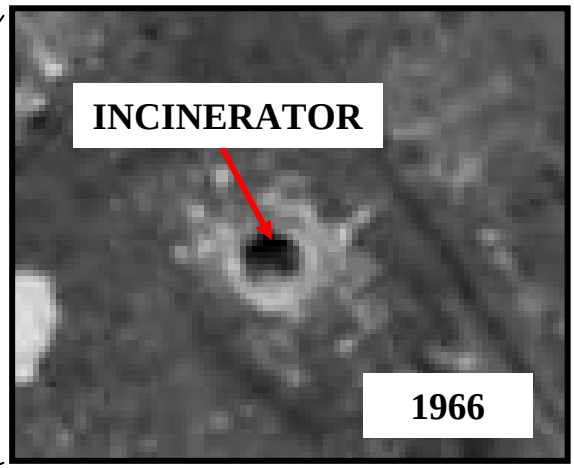
▭ APPROXIMATE PRESENT DAY SEAWAY AREA.

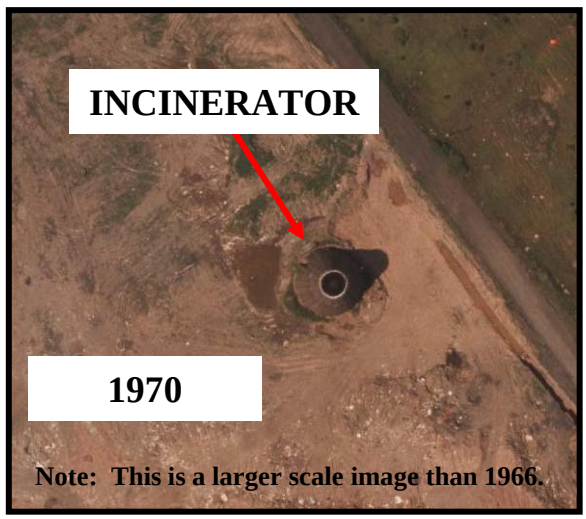
— STREAM, CREEK, DRAINAGE

SUMMARY – INCINERATOR IN AREA A, B, & C

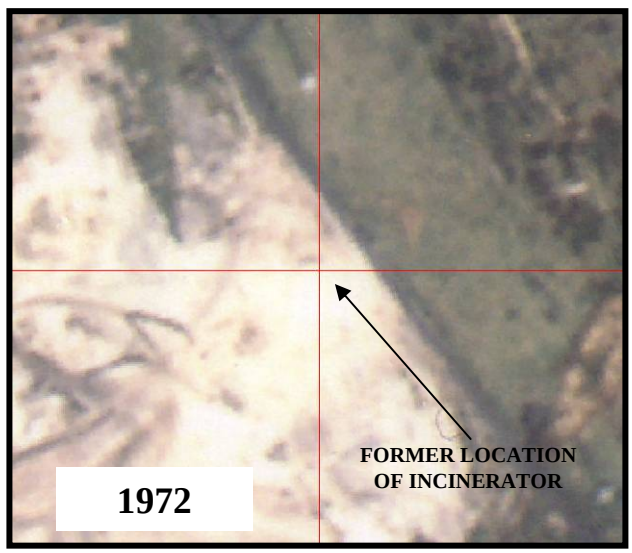








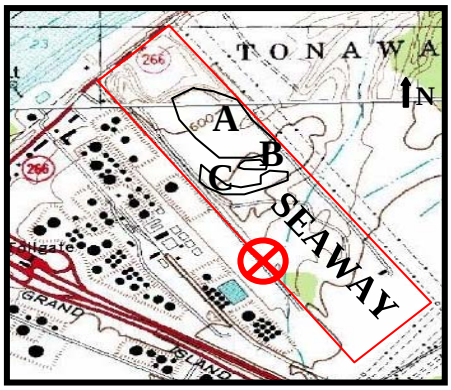
The incinerator is seen in the 1966 and 1970 photos. It is not evident in earlier years (such as 1963) nor is it evident after 1970.

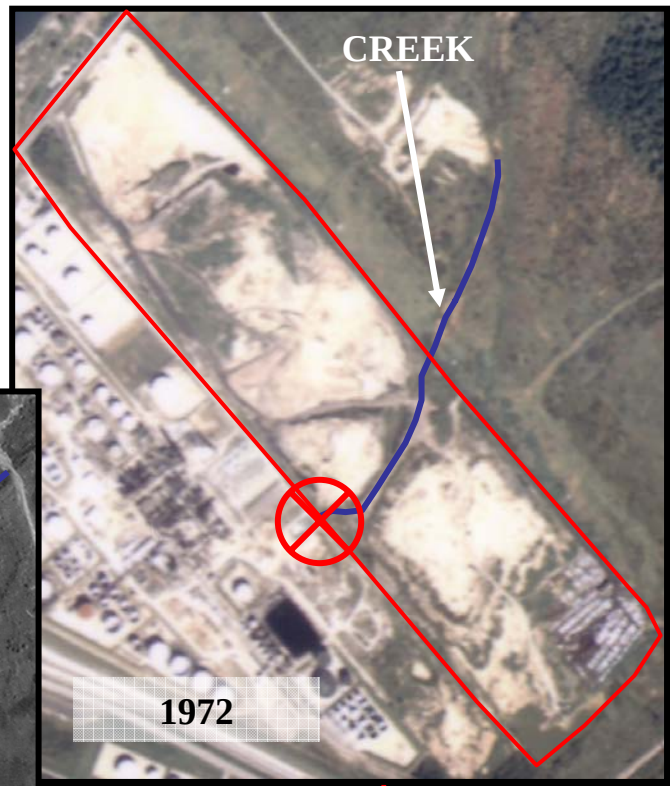


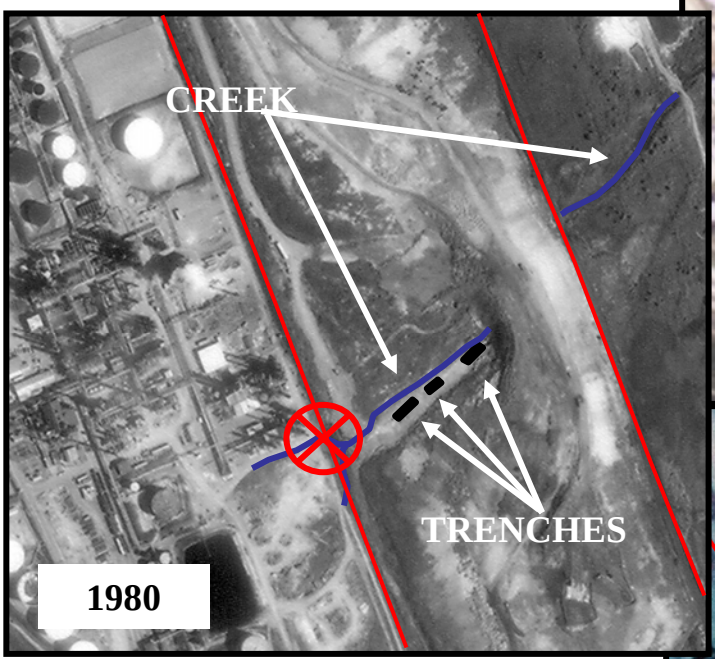
UTM X: 669546; Y: 4762711 METERS

LAT: 42 59 53N; 78 55 12 W

SUMMARY –DRAINAGE THROUGH CULVERT







In 1980 photo, creek or ditch leads to point at which it goes under the road leading to the southern section of the land fill. In 1985 photo the creek is no longer visible. An underground conduit for drainage may exist in this area. [1]

UTM X: 669501; Y: 4762314 METERS

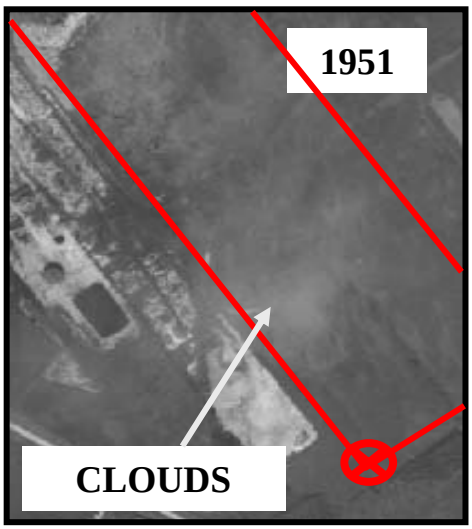
LAT 42 59 40 N; LON 78 55 14 W

APPROXIMATE PRESENT DAY SEAWAY AREA.

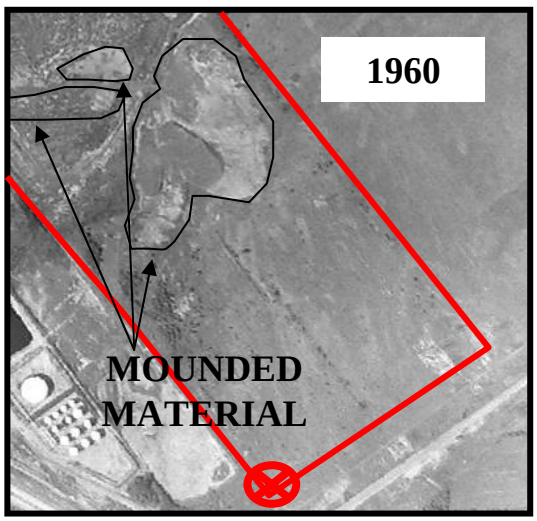
STREAM, CREEK, DRAINAGE

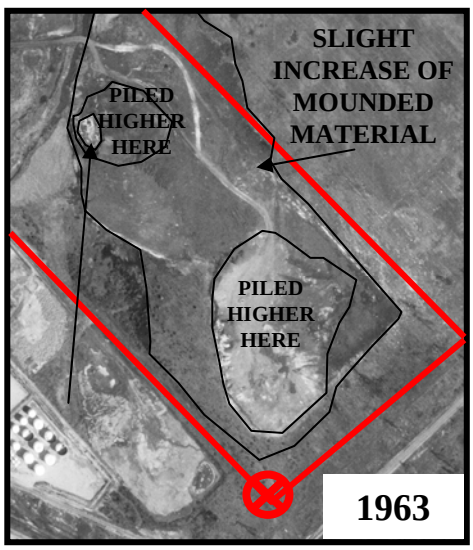
1 (Explanation of Significant Differences for the Rattlesnake Creek Portion of the Ashland Sites; September 20, 2004; FUSRAP; U.S. Army Corps of Engineers, Buffalo District Office; page 2)

SUMMARY – SOUTHERN SECTION: PART 1

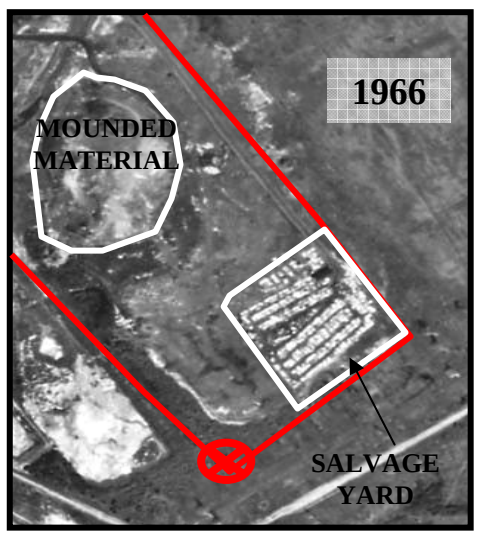


No activity in the southern half of the landfill is noted on the 1951 photos.





Debris in this area is first seen in 1960 photos. The amount of debris is seen to increase slightly through the year 1966.



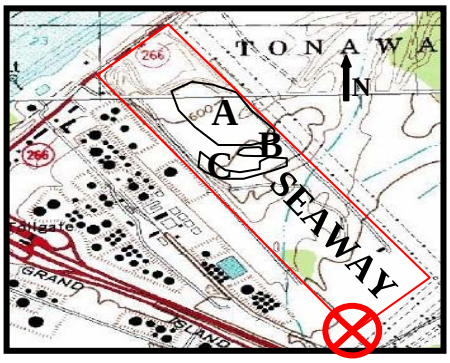
THE SALVAGE YARD IS FIRST SEEN IN 1966 PHOTOS

⊗ UTM X: 669836.8; Y:4761880.8 METERS

LAT: 42 59 26 N; LON: 78 55 00W

= approximate present day Seaway area.

SUMMARY - SOUTHERN SECTION: PART II



Excavation is seen in 1970 and water has filled the excavation site in 1976 – an artificial lake.

The excavation, water , and salvage yard are gone in 1990 photos, replaced by large pile of mounded material or debris.

DEBRIS PILES OR MOUNDED MATERIAL

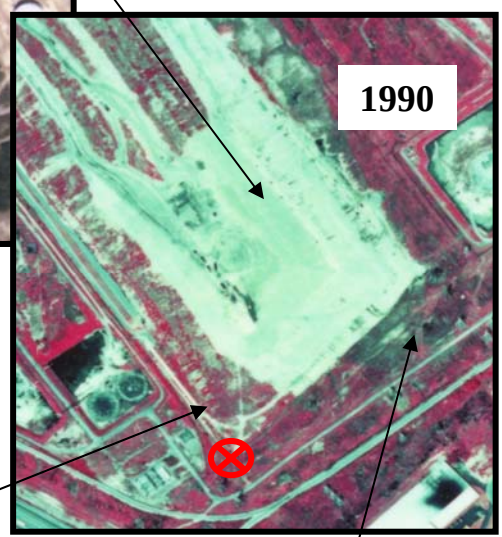
UTM X: 669836.8; Y:4761880.8 METERS

LAT: 42 59 26 N; LON: 78 55 00W

EXCAVATION

SALVAGE YARD

WATER



MOUNDED MATERIAL REPLACED WATER

SALVAGE YARD GONE

GLOSSARY

Term	Definitions
BERM	Man-made ridge or embankment, constructed of natural or man-made materials.
BUILDING/STRUCTURE	Usually box-like, rectangel, roofed, man-made.
DEBRIS	The scattered remains of anything broken or destroyed.
DEPRESSION	An area sunken below the surrounding surface.
DISTURBED GROUND	Rough ground surface that has been cleared, overturned, dug up, filled and/or changed from the surrounding area. This differs from a ground scar, which generally have a more uniform appearance.
DITCH	A long narrow trench or furrow dug in the ground, as for drainage or irrigation.
EXCAVATION	A cavity in the earth formed by digging or scooping out materials.
GRADED AREA	Area where the ground surface has been shaped, usually leveled to a smooth horizontal or sloping surface
GROUND SCAR	Ground surface, vegetated or not, where marks from a previous activity or feature, or from a subterranean feature are visible. Ground scars can result from many things and therefore can vary greatly in appearance (such as buried waste disposal pits, fill
INCINERATOR	Incinerators typically consist of a furnace and stack unit used for a veriety of disposal activities, including the incineration of medical waste or of an installation's dunnage. These units very in size and may be either freestanding or part of other ope
LANDFILL	Landfill sites typically are areas formerly used for disposing of both domestic and industrial waste.
MOUNDED MATERIALS	Material that has been placed in piles or mounds.
PIT	Relatively deep, steep sided hole in the ground surface.
STRUCTURE	Buildings or other man-made geometric features, which project above the ground surface.
TONES, LIGHT/MEDIUM/DARK	A general, and somewhat subjective, classification of the wide range of tones/shades visible on panchromatic photography. Classification indicates a change from surrounding area.
TOWER	Elevated structure, such as a water tank, guard tower, or observation tower.
TRENCH	An excavation, usually elongated and linear, having steep-sided walls.

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U.S. Geological Survey, 1980 Edition Tonawanda West, NY, 7.5 min quad; 1927 North American datum 10,000 foot grid based on NY coordinate system, west zone.