Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Republic Steel Site
(LTV/Marilla Street Landfill)
Buffalo, Erie County
Site Number 915047

March 1997

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* *JOHN CAHILL, Acting Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

REPUBLIC STEEL
Inactive Hazardous Waste Site
Buffalo, Erie County, New York
Site No. 915047

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Republic Steel inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40 CFR 300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Republic Steel Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Site Investigations and Feasibility Study for the Republic Steel site and the criteria identified for evaluation of alternatives, the NYSDEC has selected a remedy consisting of the removal of contaminated sediments from the site wetlands and their restoration. The components of the selected remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the site investigations and Feasibility Study would be resolved.
- Dewatering of wetlands.
- Excavation of sediments exceeding Remedial Action Objectives (from hot spots) in South Pond and covering of excavated areas with clean fine grained soil and loamy soil.

- Construction of a clay barrier wall along the South Pond/landfill interface.
- Excavation of sediments from hot spots in the Northeast and Northwest ponds and covering all of the bottoms of these ponds with clean fine grained soil and loamy soil.
- Cleaning, regrading, and covering the West and North ditches with clay and loamy soil.
- Disposal of excavated sediment and other debris underneath the site landfill cap followed by repair of the landfill cap.
- Restoration of wetland vegetation in the remediated ponds and ditches.
- Upland enhancement to increase wildlife habitat diversity.
- Continued maintenance and monitoring of the landfill cap and wetlands.
- Groundwater monitoring.
- LTV to provide financial surety.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

3/27/97
Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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FIGURES

RECORD OF DECISION
Republic Steel
Buffalo, Erie County, New York
Site No. 915047
March 1997

SECTION 1: SITE LOCATION AND DESCRIPTION

The Republic Steel site, which is also known as the Marilla Street Landfill, is approximately 110 acres in size and consists of an 80 acre landfill, three ponds, and two ditches. The landfill has already been capped. The remediation of contaminated ponds and ditches is addressed in this document. The site is located in an industrial area at Marilla and Hopkins Streets (Fig. 1). The site borders on the north and east by the Baltimore and Ohio railroad tracks, on the west by the Penn Central railroad tracks, and on the south by South Park Recreational Facility and Botanical Garden operated by Erie County. On the north of the tracks there are two listed Inactive Hazardous Waste Disposal sites, namely Alltift Landfill(Site #915054) and Ramco Steel (Site # 915046B).

The site ponds are on the National Wetlands Inventory compiled by the US Fish & Wildlife Service (Fig. 2) and are considered important habitats for fish and wildlife. Approximately 30 acres of the site is comprised of open water and wetland, which is part of NYSDEC regulated wetland BU-1 (Fig 3). BU-1 is considered one of the three largest wetlands in the City of Buffalo. This wetland is near several other ponds and provides valuable habitat for wildlife. The site is within half a mile of Lake Erie.

The site geology in the landfill area consists of waste/fill from approximately 3 to 49 feet followed by glaciolacustrine, glacial till and bedrock. The bedrock varies approximately from 14 feet to 60 feet below ground surface and consists of a sequence of shale and limestones. In general, shallow ground water flows towards nearby surface water bodies. The ditch on the north flows into the north ponds. A ditch on the west side of the landfill connects the south and north ponds. The thickness of the ponds sediment varies from approximately 2 to 5.5 feet.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

The Buffalo plant of Republic Steel operated several unit processes in the production of iron and steel products including blast furnace iron making, basic oxygen furnace (BOF) steel making, primary rolling and hot forming, and sulfuric acid pickling. From 1930 to 1981, Republic Steel used the listed site area for the disposal of slag, blast furnace dust, basic oxygen furnace dust, clarifier sludge, precipitator dust, railroad ties, checker bricks, construction debris, waste oils and acids. Prior to the enactment of the Resource Conservation and Recovery Act (RCRA), the wastes produced from the steel making operations were not segregated. From 1980 until steel making operations ceased in 1981, the BOF dust was classified as characteristic hazardous waste and was placed in a separate cell (Fig. 4). In 1984, LTV Steel Company acquired Republic Steel.

2.2: Remedial History

Initially the site was listed in the registry of Inactive Hazardous Waste Disposal Sites in New York State as a Class 2a (temporary classification used until preliminary investigations are completed). Based upon the findings of high pH (up to 12.78) in some groundwater wells and environmental studies which determined the adjacent wetlands were being impacted, the site was reclassified to Class 2 in 1995. The classification 2 means that site is considered a significant threat to the human health and/or environment and an action is required.

In 1990, the BOF dust area was capped under RCRA corrective action requirements (6 NYCRR Part 373). The remaining landfill areas were capped with clay between 1989 and 1993 under the Solid Waste program (6 NYCRR Part 360). A Part 360 interim monitoring and maintenance program for the entire capped area is currently being conducted while the long-term program is being developed.

SECTION 3: CURRENT STATUS

3.1: Summary of the Site Investigations

To determine the nature and extent of environmental problems at this site, the following investigations were conducted:

June 1989 - NYSDEC - Phase I Investigation:

To collect preliminary information on this site, a State funded Phase I Investigation was conducted. No field work was done during this investigation.

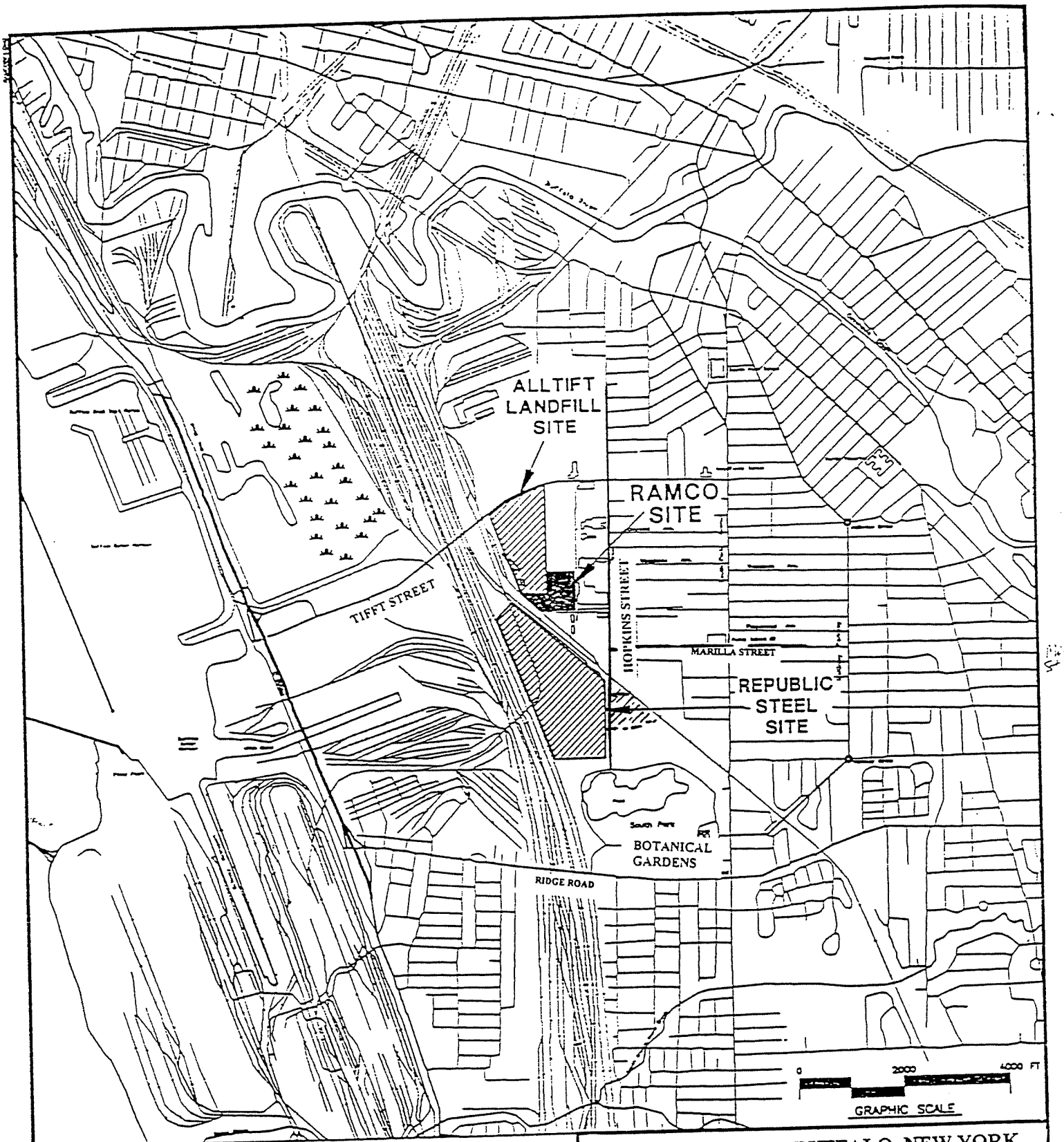
October 1993 - Malcolm Pirnie -Solid Waste Management Facility Investigation :

Malcolm Pirnie was retained by LTV to undertake this investigation. The investigation consisted of the following activities:

- Testing of waste/fill from four borings advanced in different waste areas in the landfill. Ten samples from these borings were tested for Target Compound List (TCL) and Toxicity Characteristic Leaching Procedure (TCLP) parameters.
- Testing of 23 previously installed groundwater monitoring wells for TCL and site specific parameters.
- Testing of four seep, seven surface water, and seven sediment samples from the Republic Steel ponds.
- Analysis of soils and groundwater as well as physical properties of soil and hydro geologic conditions.

August 1995 - Malcolm Pirnie - Supplemental Solid Waste Management Facility Investigation

The Republic Steel ponds or wetlands were further investigated during this phase of investigation. The following activities took place during this investigation:



NEW YORK

N

SOURCE:
USGS 7.5 MIN. QUADRANGLE
BUFFALO SE, NEW YORK 1965.

SCALE AS NOTED

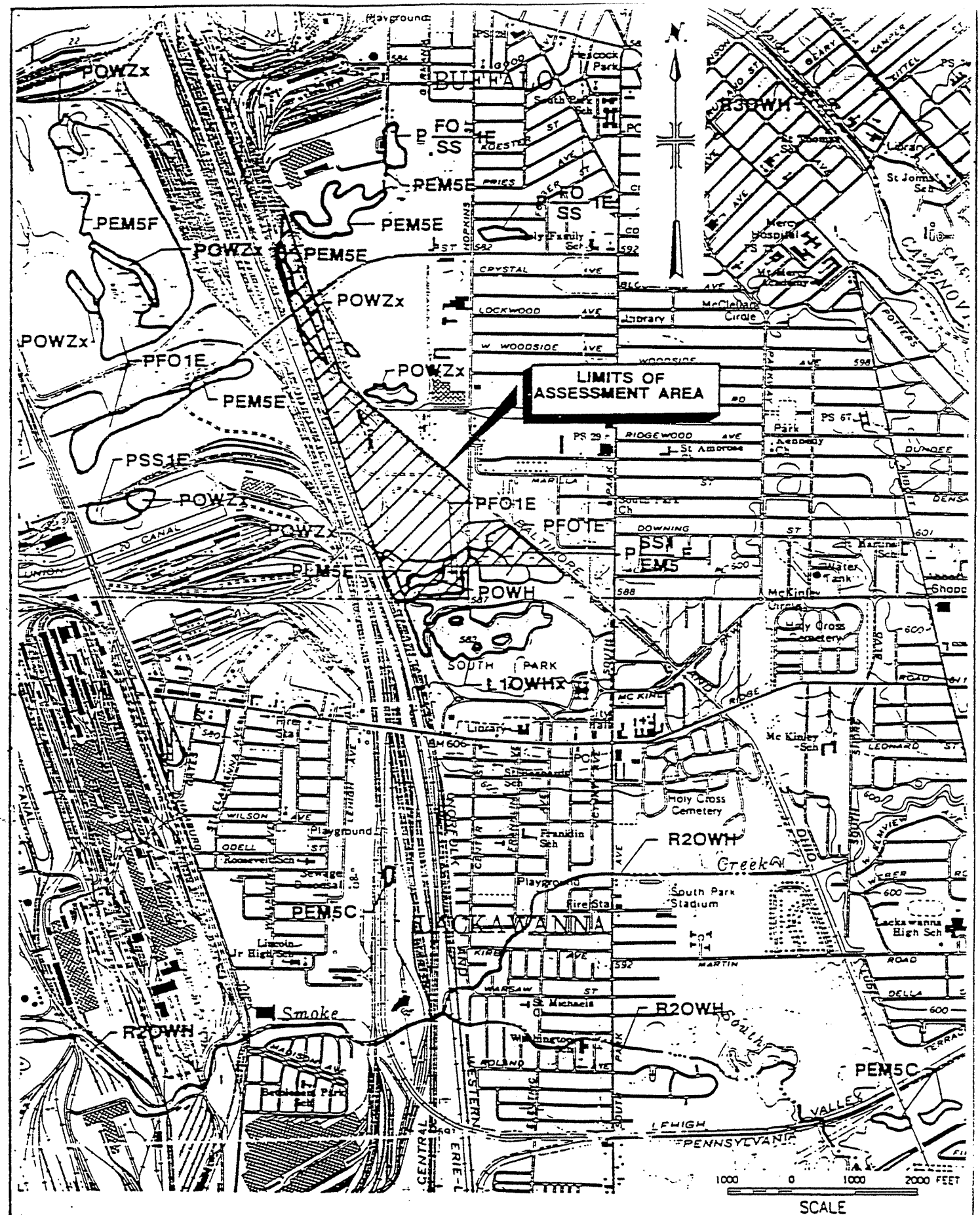
REPUBLIC STEEL, BUFFALO, NEW YORK
NYSDEC Site No. 915047

FIGURE 1

SITE LOCATION MAP

DAMES & MOORE

JOB No.: 25848-001-152



SOURCE: U.S.G.S. BUFFALO SE, NY QUADRANGLE, 1965

MALCOLM PIRNIE

REPUBLIC STEEL

NATIONAL WETLANDS INVENTORY MAP

MALCOLM PIRNIE, INC

FIGURE 2

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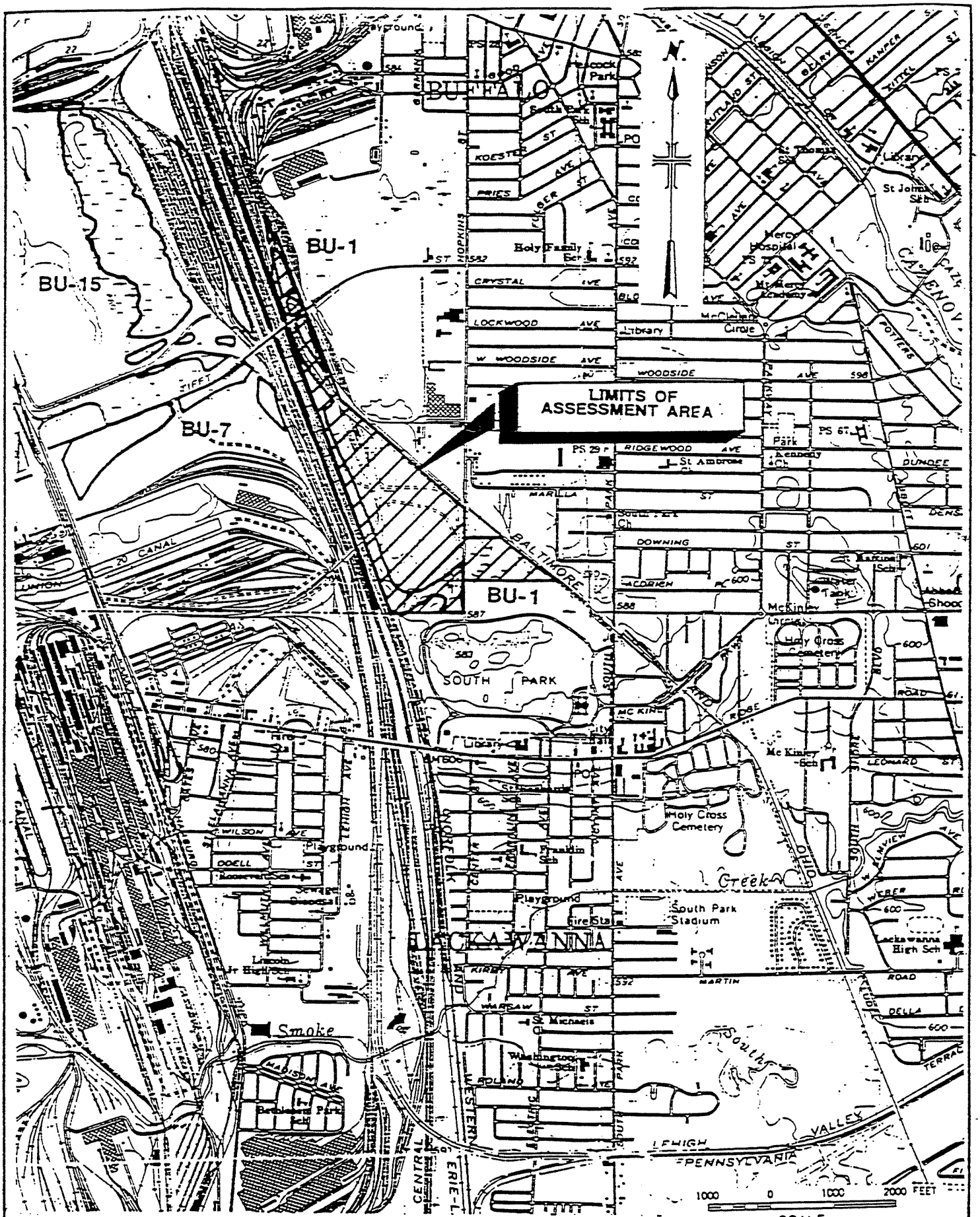


SOURCE: U.S.G.S. BUFFALO SE, NY QUADRANGLE, 1965

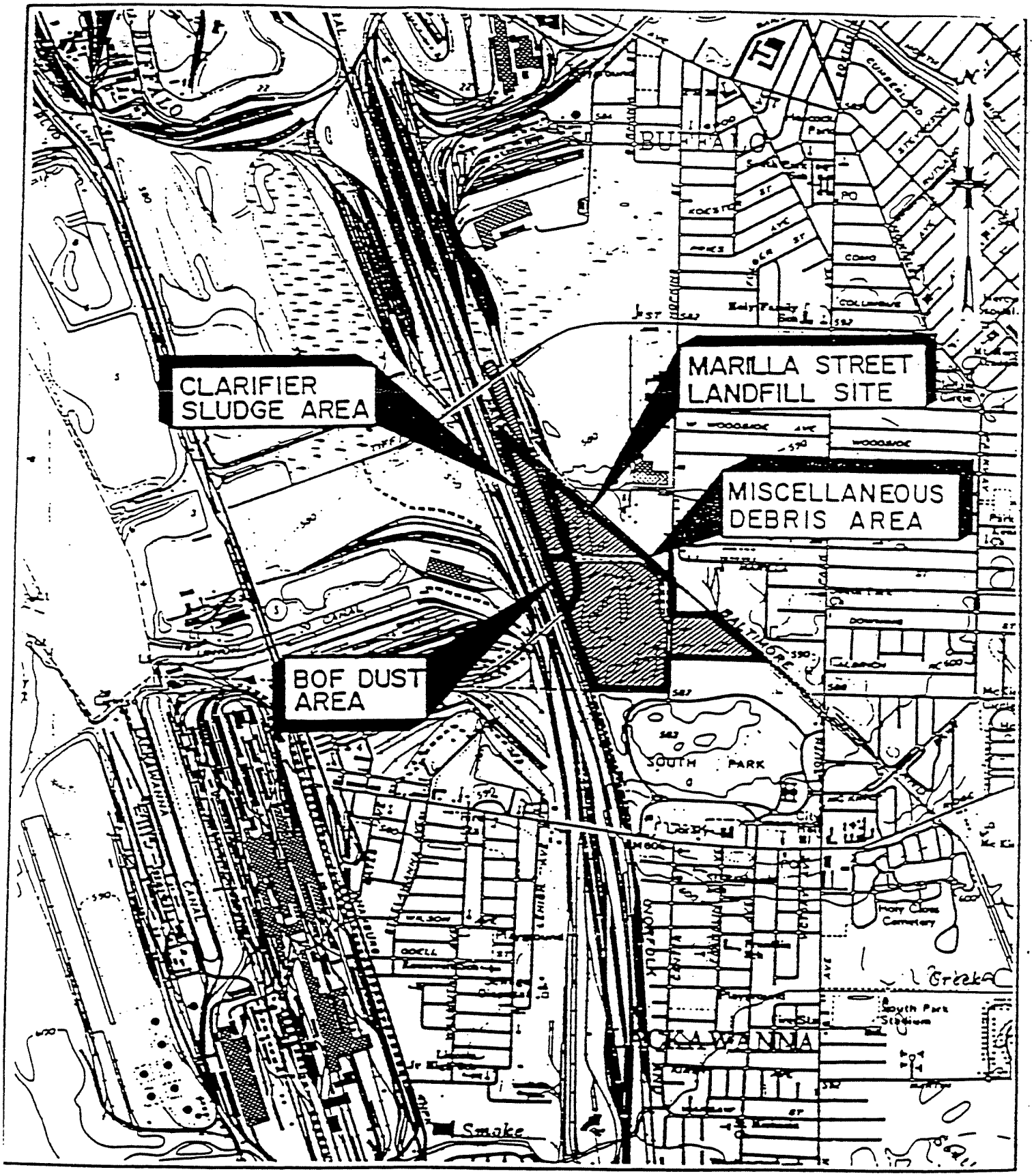
MALCOLM PIRNIE

REPUBLIC STEEL

NEW YORK STATE WETLANDS MAP

MALCOLM PIRNIE, INC.

FIGURE 3



NOTE: TOPOGRAPHY TAKEN FROM 1965 BUFFALO S.E., N.Y. U.S.G.S. QUADRANGLE 7.5 MIN. SERIES.

FIGURE 4

DISPOSAL AREAS

LTV/REPUBLIC STEEL/ MARILLA STREET LANDFILL

MALCOLM PIRNIE

- Wetland delineation.
- Wetland Evaluation Technique Assessment to identify existing wetland functions and values.
- Testing of twenty six sediment samples from the South Pond, West Ditch, North Ditch, Northwest Pond, and Northeast Pond (Fig. 5).
- pH determination from 12 monitoring wells and 7 well points.

October 1996 - Malcolm Pirnie - Sediment Sampling

In order to delineate areas in wetlands/ponds where concentrations of contaminants exceeded the NYSDEC sediment criteria, 21 additional sediment core samples were collected from the South, Northeast, and Northwest ponds (Fig. 6).

Nature and Extent of Contamination

Substantial data were collected during site investigations to determine impacts of waste materials in the landfill on groundwater and the nearby wetlands. These investigations concluded that site ponds/wetlands have been impacted by the presence of waste materials and to some degree by the shallow groundwater discharge and are contaminated with chemical parameters related to the site.

An evaluation of the media tested during site investigations is as follows:

Sediment

Sediment samples collected from the ponds and ditches surrounding the landfill during investigations were tested for TCL Organics (Volatiles and Semivolatiles) and Target Analyte List (TAL) metals. As summarized in Table 1, elevated levels of metals were found in sediments in all the subject ponds and ditches. The Northeast and Northwest ponds, which are near the clarifier sludge disposal area, showed much higher contamination especially with iron, lead and mercury as compared to the South pond and the West ditch. Most of the metals were found well above the NYSDEC Sediment Criteria. The Remedial Action Objectives (RAOs) selected are the average values of the low effect and severe effect levels of sediment contaminants. The elevated levels of metals in sediment are toxic to the benthic (bottom) organisms and prevent the establishment of aquatic plant communities, which are vital for the productivity of wetlands. Among organics, some Polycyclic Aromatic Hydrocarbons (PAHs) were detected in sediment samples, however, they are not considered major contaminants of concern.

TABLE 1

ANALYTICAL DATA
SEDIMENTS

South Pond			
Parameter	**Concentration Range (ppm)**	**Remedial Action Objectives (RAOs)**	**Frequency Exceeding RAOs**
Arsenic	2.6 - 18.4	18	1 of 13

South Pond			
Cadmium	1.3 - 6.4	1.8	2 of 13
Iron	0.3 - 3.5%	3%	3 of 13
Lead	9.3 - 265	70	8 of 13
Manganese	83.9 - 2440	780	5 of 13
Nickel	10.3 - 47.7	33	3 of 13
Zinc	30.2 - 968	195	7 of 13
West Ditch			
Copper	3.9 - 57.7	48	1 of 10
Iron	0.39 - 4.9 %	3%	5 of 10
Lead	6.9 - 371	70	3 of 10
Manganese	61.2 - 2120	780	1 of 10
Nickel	9.1 - 43.1	33	2 of 10

Note: All concentrations in ppm except for Iron
ppm - parts per million

Northwest Pond			
Parameter	**Concentration Range (ppm)**	**RAOs**	**Frequency Exceeding RAOs**
Arsenic	4.5 - 67.3	18	13 of 15
Cadmium	1.8 - 14.3	1.8	13 of 15
Chromium	18.4 - 355	78	12 of 15
Copper	25.2 - 201	48	11 of 15
Iron	5.6 - 48.6%	3%	15 of 15
Lead	44.6 - 383	70	14 of 15
Manganese	151 - 2060	780	10 of 15
Mercury	0.1 - 53.7	0.20	4 of 15
Nickel	6.4 - 96.5	33	6 of 15
Zinc	69.6 - 357	195	11 of 15

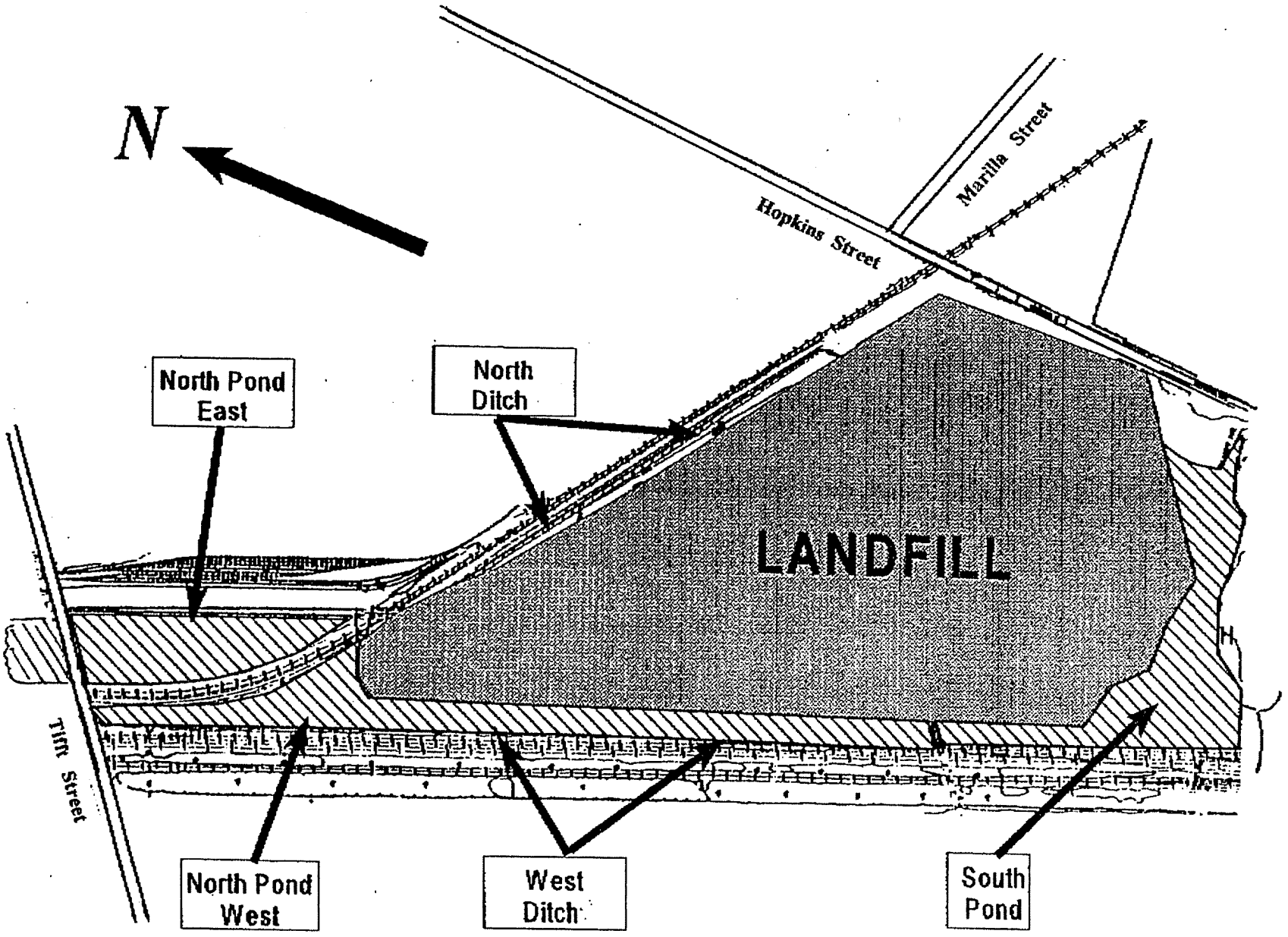
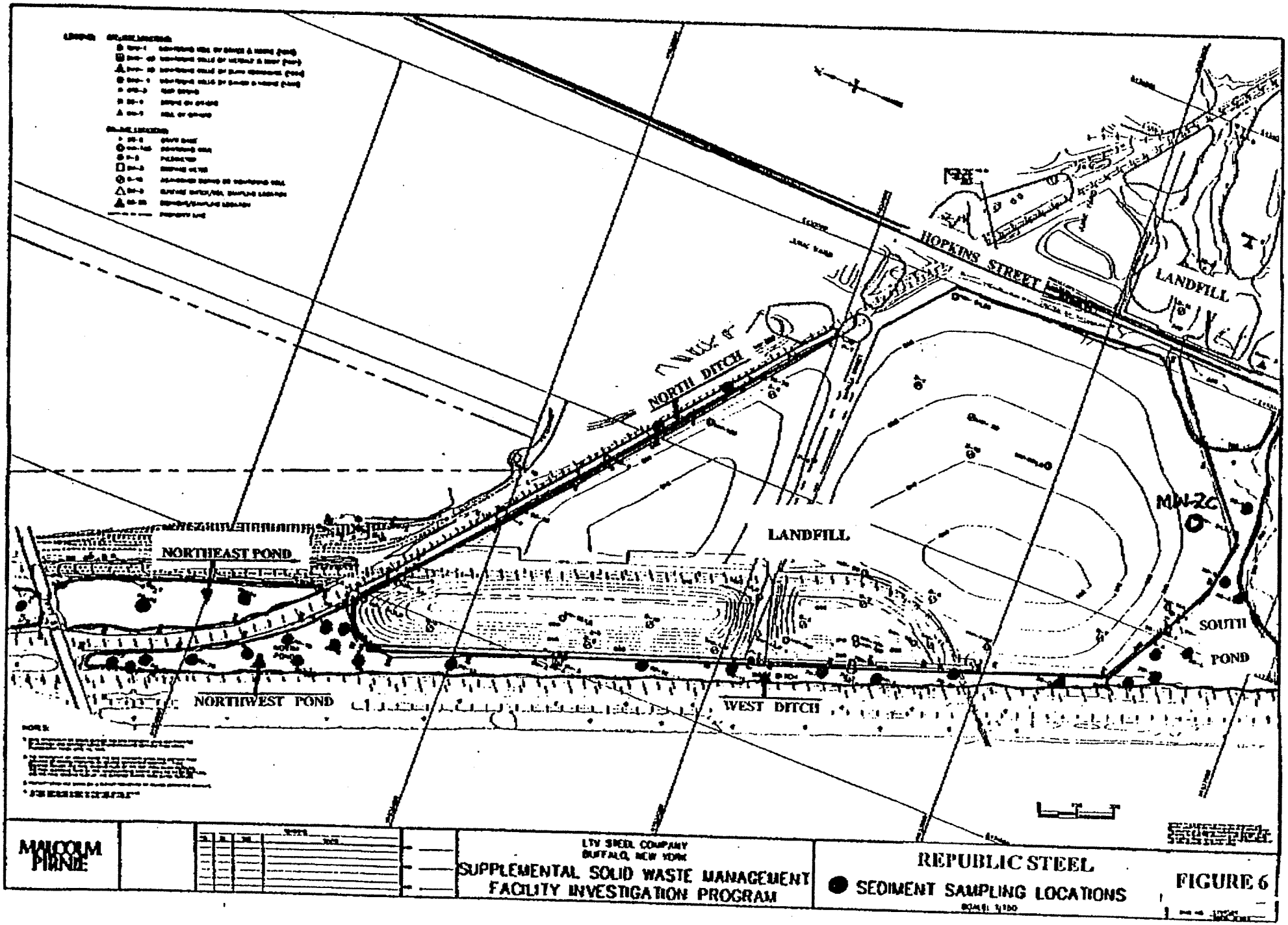


FIGURE 5: Republic Steel Wetlands


HOPKINS STREET
LANDFILL
NORTH DITCH
MW-2C
LANDFILL
NORTHEAST POND
SOUTH POND
NORTHWEST POND
WEST DITCH
MALCOLM PIRNIE
LTV STEEL COMPANY
BUFFALO, NEW YORK
SUPPLEMENTAL SOLID WASTE MANAGEMENT FACILITY INVESTIGATION PROGRAM
REPUBLIC STEEL
SEDIMENT SAMPLING LOCATIONS
FIGURE 6

Northeast Pond			
Arsenic	4.7 - 57	18	4 of 8
Cadmium	1 - 14.1	1.8	2 of 8
Chromium	8 - 317	78	3 of 8
Copper	6.2 - 63.1	48	3 of 8
Iron	0.7 - 46.6 %	3 %	6 of 8
Lead	4.9 - 505	70	5 of 8
Manganese	75.6 - 2690	780	4 of 8
Mercury	0.1 - 0.47	0.20	3 of 8
Nickel	9.6 - 172	33	3 of 8
Zinc	41.1 - 464	195	3 of 8

To determine which media (sediment, groundwater, etc.) contained contamination at levels of concern, the investigations data were compared to environmental Standards, Criteria, and Guidance (SCGs). Groundwater, drinking water and surface water SCGs identified for the Republic Steel site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. Site specific factors are combined with the Divison of Fish and Wildlife Technical Guidance for Screening Contaminated Sediments for evaluating wetlands sediments.

Based upon the results of the remedial investigation in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the Site Investigation Reports. The following presents the media which were investigated and a summary of the findings of the investigations.

Surface Water

Among 8 surface water samples tested, traces of trichloroethene (4 ppb) - a VOC, were found only in one sample. Several inorganics such as barium (24-128 ppb), chromium (ND-13.8 ppb), copper (ND-23.1 ppb), iron (376-18,200 ppb), mercury (ND-0.20 ppb), zinc (8.4-97 ppb), and cyanide (ND-50 ppb) were detected in surface water samples from the ponds. The Class "D" surface water standards were exceeded for cyanide at two locations, while for iron it was exceeded at seven sampling locations.

Seepage

Samples were collected from the sediment-water interface. Traces of organics and inorganics were detected at slightly higher concentrations in these samples than in surface water and shallow ground water. This confirmed that contaminants in sediment are leaching into surface water.

Groundwater

The field measurements of groundwater in general showed the shallow/fill overburden wells to exhibit pH greater than 12.5, which is the regulatory threshold for classification as a corrosive hazardous waste as per 6 NYCRR Part 371. The groundwater in deep overburden wells was almost neutral, while groundwater from the bedrock wells was slightly acidic. The elevated pH in shallow/fill wells is due to highly alkaline slag landfilled at the site.

During the site investigation of 1993, 12 shallow/fill overburden wells, 9 deep overburden wells, and 4 bedrock groundwater monitoring wells were tested .

Several organics such as ketones, chloroethenes, phenols, and PAHs were detected in shallow wells. The highest organics concentrations (e.g. trichloroethene-200 ppb, acetone-690 ppb, phenol-1700 ppb) were found in the BOF dust and Clarifier Sludge area (Fig4). Groundwater quality standards were exceeded in several shallow monitoring wells for iron, lead, antimony, and cyanide. The flow of shallow groundwater that is impacted by waste/fill constituents is intercepted by a discharge zone in the wetland directly contiguous to the landfill. However, shallow groundwater discharge is presently minimized by the landfill cover system which has reduced hydraulic gradients along the groundwater flow path. Estimated groundwater discharge to the wetland is minor compared to runoff from the landfill surface and off-site flows from the South Park ponds. The shallow groundwater has the potential to enter the adjacent site ponds and ditches, endangering the wildlife in those wetlands.

The deep overburden wells showed traces of contaminants such as acetone, benzene, toluene, xylenes, and phenols. Among inorganics, only iron exceeded the groundwater quality standards.

The bedrock wells showed traces of some organics such as benzene, toluene, xylenes, and ethyl benzene. The natural gas encountered in the bedrock is also suspected to be a contributing factor to these contaminants. One bedrock well (MW-2C) showed contaminants such as tetrachloroethylene (270 ppb) and phenols (8 ppb) which are above the ground water quality standards. Groundwater standards/guidance values were also exceeded for inorganic elements such as antimony (216 ppb), barium (4470 ppb), and cadmium (32 ppb).

3.2 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways which are known to or may exist at the site include:

- Ingestion of contaminated sediments by trespassers or on-site workers.
- Dermal contact with contaminated sediment or surface water by trespassers and on-site workers.

- Ingestion of contaminated groundwater through the use and consumption of water from the groundwater wells. [Note: Currently, there is no indication that groundwater is being used as a source of potable water; all local residents are served by public water.]

3.3 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The following pathways for environmental exposure have been identified:

- Migratory birds which may use the ponds at the site as rest or feeding locations.

- Aquatic life (benthic organisms) in the site ponds and ditches which would be in direct contact with contaminated sediments.

- Plants growing in the uncovered portion of the the site may uptake contamination and incorporate it into the plant material; higher fauna may then be exposed to contamination through the ingestion of plant matter.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Party (PRP) for the site is LTV Steel Company. The NYSDEC and LTV entered into consent order on the date shown below to close the landfill under Part 360, implement a Part 360 post-closure maintenance and monitoring plan, and investigate the site.

The following is the enforcement history of this site.

Date	Index	Subject
10/19/92	**R9-2808-89-05**	**Landfill Closure & Site Investigation**

Upon issuance of the Record of Decision the NYSDEC will approach the PRP to implement the selected remedy under an Order on Consent.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria, and Guidance (SCGs) and be protective of human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Reduce, control, or eliminate to the extent practicable the contamination present in the ditches and ponds.

- Eliminate the potential for direct human or animal contact with the contaminated sediment and soils on site.

- Prevent, to the extent possible, migration of contaminants in the landfill to groundwater.

- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC), to the extent practicable.

- Restore the wetlands to conditions which are beneficial to wildlife.

- Mitigate any wetlands lost during remediation.

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Republic Steel site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the Feasibility Study and its addendum reports dated February and November, 1996.

A summary of the detailed analysis follows. As used in the following text, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

Nine alternatives were screened in the Feasibility Study reports. Alternatives 2 to 4 were eliminated during first screening. Alterative 2 would enhance vegetation on the landfill and in the wetlands but would not include remediating the chemical contamination problem. Alternative 3 would involve filling the wetlands and creating wetlands somewhere else. This would be a lengthy process because it would require purchasing suitable property, environmental impact analysis, and requiring regulatory approvals and permits. The wetland sediment would be dredged , disposed in the on-site landfill, and wetlands would be restored in alternative 4. Because of the difficulty of dredging large materials such as railroad ties, steel scrap, and construction debris and stabilizing large volume of dredged slurry for disposal, alternative 4 would be difficult to implement.

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated sediments in the site ponds and ditches. The landfill area was previously capped under RCRA and Part 360 of the Solid Waste programs which require a maintenance and monitoring program and was not considered in the evaluation of these alternatives. This monitoring program should be considered in addition to the alternatives discussed below.

In addition, as part of each alternative is the agreement with LTV that a conceptual use plan will be developed in conjunction with planners from the City of Buffalo. The conceptual use plan will look at public use opportunities such as green way trails etc. on the landfill area.

Alternative 1: No Action

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative would not require any remediation but would consider environmental monitoring. Under this alternative, the site would remain in its present condition and would not provide any additional protection to human health or the environment.

Present Worth: $ 469,600
Capital Cost: $ 0
Annual Cost: $ 41,713

Alternative 5: Sediment Excavation and On-Site Disposal; Wetland Restoration

In this alternative, the wetland area would be drained and the sediment would be allowed to dry to the maximum extent possible. The dried contaminated sediments would be excavated using a backhoe or dragline and the excavated sediments would be placed onto the site landfill and capped. The excavated wetland areas would be lined with geocomposite liners to provide a barrier for contaminated groundwater entering into wetlands. The liners would be covered with 6 inches of clean soil for vegetation to grow.

Present Worth: $8,382,761
Capital Cost: $7,783,700
Annual Cost: $53,213
Time to Construct: Two Years

Alternative 6: In-situ Solidification /Stabilization; Wetland Restoration and Off-Site Mitigation

The wetland areas would be drained and sediments would be stabilized by mechanically mixing with the stabilizing agents and cement based solidification agents. To restore the wetland, the stabilized sediment would be covered with six inches of loam type soil for the re-establishment of vegetation. The loss of wetland would be compensated by off-site mitigation.

Present worth: $8,597,541
Capital Cost: $7,998,480
Annual Cost: $53,213
Time to Construct: Two Years

Alternative 7: Sediment Capping with Soil/Bentonite: Wetland restoration

The wetland areas would be drained and then covered with 12 inches of soil and bentonite mixture. This would be followed by a 6 inches layer of loam type soil for the establishment of wetland vegetation.

Present Worth: $3,572,061
Capital Cost: $2,975,000
Annual Cost: $53,213
Time to Construct: One Year

Alternative 8: Sediment Capping with Geocomposite: Wetland Restoration

After draining the ponds, the sediments would be allowed to dry, and then covered with low permeability geocomposite cover consisting of two layers of filter fabric with a sodium bentonite layer between them. The geocomposite cover would be covered with soil to establish wetlands vegetation.
Present Worth: $2,799,261
Capital Cost: $2,200,200
Annual Cost: $53,213
Time to Construct: One Year

Alternative 9: Sediment Hot Spot Excavation: Wetland Restoration

In Alternative 9, the wetland areas (Fig. 5) would be drained. The sediments would be allowed to dry to the maximum extent possible. The sediment exceeding the selected clean up levels would be considered hot spots and would be excavated. All contaminated sediment would be disposed of in the on-site landfill in the miscellaneous debris area (Fig. 4) beneath the existing cover. If required, the sediment would be stabilized prior to placing in the landfill. The disposal area would be covered to conform to the existing Part 360 cover design.

A two-foot wide recompacted clay barrier wall, which would be keyed into the underlying silty-clay soils, would be constructed along the South pond/landfill interface to mitigate possible migration of groundwater contamination from the landfill to the pond. This wall would be extended across the West Ditch. The contaminated sediment would be excavated from the open water area. The excavated areas in the South Pond would be restored by covering with 12 inches of clean soil overlain by three to six inches of loamy soil material. Any lost wetland vegetation would be replanted. The cover for the ponds and ditches would overlap the existing landfill cover reducing migration of contaminated water from the landfill containing high pH and elevated levels of metals into the remediated wetlands.

The West Ditch would be reshaped to act as an open channel between the South and Northwest ponds. The ditch would be lined with a 12 inch clay-type soil followed by six inches of loamy soil to support vegetation. The North Ditch would be cleaned, regraded and covered in the same manner as the West Ditch.

The hot spots would also be excavated from the Northeast and Northwest ponds. The bottom of the ponds would be contoured to support habitat including a cover of 12-inch clean soil followed by three inches of loamy topsoil. Islands of emergent vegetation would be created in these ponds to compensate for the lost wetland area during shaping of the West Ditch.

No groundwater remediation is considered necessary at this time, however, the combination of the existing landfill cap along with the proposed covering of sediments containing low level contamination, and the clay barrier wall along the South Pond/landfill interface would minimize the flow of contaminated groundwater entering into the wetlands. Any recontamination problems of wetlands encountered during long term monitoring would be corrected.

Upon completion of sediment remediation, the wetland areas would be restored. The wetland restoration would involve restoration and enhancement of selected vegetation such as cattails, grasses, wildflowers, and shrubs. In addition to the wetland restoration, the upland or the landfill area would also be enhanced by placing nesting boxes, rock or brush piles to increase wildlife. To increase habitat diversity, the

landfill cap would be mowed once annually during late fall to allow ground-nesting species to nest and raise youngsters.

Present Worth: $4,520,900
Capital Cost: $3,851,000
Annual Cost: $54,560
Time to Construct: One Year

6.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs)

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. The most significant SCGs for this site are as follows:

- 6 NYCRR Part 360 - Solid Waste Management Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Regulations directing the investigation/cleanup of inactive hazardous waste sites.
- 6 NYCRR Parts 700-705 - Water Quality Regulations for surface water and groundwater.
- Technical Guidance for Screening Contaminated Sediments - July, 1994.
- Fish & Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA).
- ECL Article 24 & Article 71, Title 23 - Freshwater Wetlands Act.
- TAGM HWR-89-4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

In Alternative 1, no action would be taken to alter current conditions at the site. The contaminated sediment and groundwater which exceed SCGs would not be addressed, hence the No Action alternative would not comply with this criterion.

Alternative 5 would meet SCGs as the contaminated sediments would be removed from the site ponds and the wetlands would be restored.

In alternative 6 the contaminants in sediments would be rendered much less leachable. Testing would be required to determine the effectiveness of stabilized sediment to ascertain whether or not ground water SCGs could be met.

In alternatives 7 and 8, the groundwater and sediments SCGs would not be met since the elevated levels of contaminants in sediments would remain under the cover. The restored wetlands may become recontaminated.

In alternative 9, the SCGs for sediments would be achieved by removing hot spots of contaminants above RAOs and covering the low level contamination. The cover would reduce the shallow groundwater flow from the landfill to wetlands. The barrier wall along the south side of the landfill would minimize seepage of contaminated shallow groundwater into the South Pond. The existing landfill cover has substantially eliminated the potential for future contaminated surface water run-off from entering into the wetlands. The cover has also greatly reduced the infiltration into the landfill which would substantially reduce leaching the landfill contaminants into groundwater.

2. Protection of Human Health, Wildlife, and the Environment.

This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Alternative 1 would not be protective of Human health, wildlife, and the environment. It would contain no actions to alter current conditions at the site, therefore, all current risks would remain.

Alternative 5 would be protective of human health, wildlife, and environment as contaminated sediments would be removed. The removal of sediments would eliminate concerns due to exposure to contaminants and their impact on the wetlands.

Stabilizing sediments in Alternative 6 would provide protection of human health, wildlife and environment by substantially reducing mobility and leaching of contaminants into wetlands.

Capping sediments in Alternatives 7 and 8 would reduce the flow of contaminated shallow water by providing low permeability barriers. In case of a breach in the barrier layer, wetlands may get recontaminated again. Therefore these two alternatives would be less protective of human health, wildlife, and environment as compared to alternatives 5,6, and 9.

Alternative 9 would be protective of human health, wildlife, and environment as most contaminated sediments would be removed and low level contaminants would be covered. The flow of shallow groundwater into wetlands would be minimized.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness.

The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternative 5 presents higher short-term impacts as compared to other alternatives due to the longer construction duration. There would be loss of wildlife habitat during construction for each of the alternatives. The truck traffic to haul soil to and from the site would increase. There would be an increase in dust and noise during construction for all the alternatives. The problems due to noise, dust and exposure to contaminated sediments and water would be mitigated through the use of engineering controls, personnel protective equipment, and trained personnel. The dust monitoring and dust controls would be done according to the Health and Safety Plan to protect the workers and the public.

4. Long-term Effectiveness and Permanence.

This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would not provide a permanent reduction of environment risk nor long-term control of human health risks.

Alternative 5 would provide permanent reduction of environmental risk by removing contaminated sediment and covering the excavated wetlands with a geocomposite liner.

Alternatives 6, 7, and 8 would provide less long-term effectiveness as compared to alternative 5 because the contaminated sediment would not be removed but its leachability and impact on wetlands would be reduced by stabilization or covering.

By removing hot spots of contamination and covering the less contaminated sediments in place, Alternative 9 would provide long-term effectiveness and permanence. Covering of low contaminated sediments with clay/clean fill would create a barrier and would significantly reduce the discharge of contaminants from sediments into the wetlands. The clay cutoff wall would greatly reduce groundwater discharge from the landfill into the South Pond. The restoration of wetland would provide long term benefits to wildlife.

5. Reduction of Toxicity, Mobility or Volume.

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Contaminated sediments would be removed in Alternative 5. This would result in permanent reduction of volume, toxicity, and mobility of contaminants in the wetlands.

In Alternative 6, the release of contaminants to wetland would be significantly reduced by stabilizing sediments and this would result in reduction in toxicity and mobility of contaminants to the wetland. There would not be any reduction in volume of contaminants in sediments.

In Alternatives 7 and 8, there would be reduction in mobility from the sediment to the wetland. There would not be any reduction in volume of contamination on site and the mobility of contaminants flowing through groundwater underneath the liners would not be reduced.

In Alternative 9, there would be considerable reduction in the volume of contaminated sediment due to removal of hot spots. The reduction in sediment volume and covering would greatly reduce toxicity

effects on the wetland. The mobility of contaminants to the wetlands would also be reduced as a result of clean soil covers and the clay barriers.

6. Implementability.

The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternative 1, No Action would not require any effort to implement.

Alternative 5 would be difficult to implement because excavations near the landfill would destabilize the slopes. Special construction procedures would be required to stabilize landfill slopes.

Any debris present in sediment would make implementation of Alternative 6 difficult. Implementation of this alternative would also be difficult due to the fact this alternative would require off-site wetland mitigation.

Alternatives 7, 8, and 9 would not require any special construction techniques. Therefore, these alternatives can be readily implemented.

7. Cost.

Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in the following Table.

Alternative	Present Worth	Capital	O & M
No Action	$469,600	$0	$41,713
5	8,382,761	7,783,700	53,213
6	8,597,541	7,998,480	53,213
7	3,572,061	2,975,000	53,213
8	2,799,261	2,200,200	53,213
9	4,520,900	3,851,000	54,560

O & M - Annual Operation and Maintenance
Note: Calculations are based upon
8% interest over 30 years.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It was focused upon after public comments on the Proposed Remedial Action Plan were received.

8. **Community Acceptance**

Concerns of the community regarding the site investigations and feasibility study reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" has been prepared that describes public comments received and how the Department will address the concerns raised. The final selected remedy is same as proposed in the PRAP.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the site investigations and feasibility study, and the evaluation presented in Section 6, the NYSDEC is selecting Alternative 9 as the remedy for this site.

This selection is based upon the conclusion that remedy selected in Alternative 9 would meet all the remedial goals for this site and would best achieve the threshold and balancing criteria described in Section 6.2.

Alternative 1 - No Action, would not meet SCGs and would not be protective of human health, wildlife, and the environment. SCGs would be met in alternatives 5 and 9 but not in alternatives 7 and 8. SCGs may not be met in Alternative 6. Alternatives 5, 6, and 9 would be more protective of human health, wildlife, and the environment in long term as compared to alternatives 7 and 8. Because of difficulty to implement, more short term impacts, longer time to complete the project, and higher cost, Alternative 5 was not selected. Alternative 6 was eliminated because of uncertainty of meeting SCGs, longer time to complete the project, and highest cost. Although Alternatives 7 and 8 would cost less than the selected Alternative 9, they were rejected because volume of contaminated sediments would not have been reduced and these alternatives may not be effective over a long-term.

The estimated present worth cost to implement the remedy is $4,520,900. The cost to construct the remedy is estimated to be $3,851,000 and the estimated average annual operation and maintenance cost for 30 years is $54,560.

The elements of the selected remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the site investigations and Feasibility Study would be resolved.

- Dewatering of wetlands.

- Excavation of sediments exceeding Remedial Action Objectives (from hot spots) in South Pond and covering of excavated areas with clean fine grained soil and loamy soil.

- Construction of a clay barrier wall along South Pond/landfill interface.

- Excavation of sediments from hot spots in the Northeast and Northwest ponds and covering the entire ponds with clean fine grained soil and loamy soil.

- Cleaning, regrading, and covering the West and North ditches with clay and loamy soil.

- Disposal of excavated sediment and other debris underneath the site landfill cap followed by repair of the landfill cap.

- Restoration of wetland vegetation in the remediated ponds and ditches.

- Upland enhancement to increase wildlife habitat diversity.

- Continued maintenance and monitoring of the landfill cap and wetlands. Groundwater monitoring.

- Financial Surety

Since the remedy results in untreated hazardous waste remaining at the site, a long-term monitoring program will be instituted. This program will allow the effectiveness of the selected remedy to be monitored and will be a component of operation and maintenance for the site.

SECTION 8: HIGHLIGHTS OF CITIZEN PARTICIPATION

Citizen Participation (CP) Activities were implemented to provide concerned citizens and organizations with opportunities to learn about and comment upon the investigations and studies pertaining to the Republic Steel site. All reports were available for public review in the document repository. A public contact list was developed and used to distribute fact sheets and meeting announcements.

A public meeting was held on March 4, 1997 at the South Park Community Center, Buffalo, New York to describe the Proposed Remedial Action Plan (PRAP). Prior to the meeting, a meeting notice and fact sheet were mailed on February 18, 1997 to those persons on the contact list. The public comment period extended from February 20, 1997 until March 20, 1997. Comments received regarding the PRAP have been addressed and are documented in the Responsiveness Summary (Appendix A).

APPENDIX A

RESPONSIVENESS SUMMARY

REPUBLIC STEEL
Buffalo, Erie County
Site No. 915047

This responsiveness summary contains questions and comments received by the New York State Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public meeting was held on March 4, 1997 at the South Park Community Center, Buffalo, NY. The public comment period on the PRAP lasted from February 20, 1997 to March 20, 1997. The information below summarizes a description of the selected remedy, questions received from the public, and the Department's responses to the questions.

Description of the Selected Remedy

The selected remedy (Alternative 9 in the Feasibility Study dated February 1997) is the same as was proposed in the PRAP. The major elements of the selected remedy include:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program.

2. Dewatering of wetlands.

3. Excavation of sediments exceeding Remedial Action Objectives (from "Hot Spots") in South Pond and covering of excavated areas with clean fine grained soil and loamy soil.

4. Construction of a clay barrier wall along South Pond/landfill interface.

5. Excavation of sediments from "Hot Spots" in the Northeast and Northwest ponds and covering the entire ponds with clean fine grained soil and loamy soil.

6. Cleaning, regrading, and covering the West and North ditches with clay and loamy soil.

7. Disposal of excavated sediment and other debris underneath the site landfill cap followed by repair of the landfill cap.

8. Restoration of wetland vegetation in the remediated ponds and ditches.

9. Upland enhancement to increase wildlife habitat diversity.

10. Continued maintenance and monitoring of the landfill cap and the wetlands.

11. Groundwater Monitoring.

12. LTV to provide financial surety

Responses to Public Comments and Concerns:

The questions raised during the public meeting and the responses are given below. No written comments from the public were received during the comment period.

A. **NYSDEC RESPONSES:**

Q1. Was South Park Lake checked for contamination ?
A. Water from South Park Lake flows towards the site wetlands. In other words the South Park Lake is "upstream" of the contaminated areas. Therefore it is unlikely that South Park Lake could have been contaminated from the site and it was not tested.

Q2. How high was the pH at the site ?
A. The shallow groundwater in some monitoring wells showed high pH. The highest pH was recorded as 12.78 S.U.

Q3. Has the source of ditch discoloration been leached out and drained away ?
A. The West Ditch discoloration seen in the historic aerial photographs was prior to capping the landfill. Since the surface water in this ditch flows from south to north, it is believed that some contamination has migrated from this ditch to the Northwest Pond and some contamination still remains in the ditch. Since the landfill was "capped" i.e. covered with clean soil, the contaminated water runoff has ceased.

Q4. The people who contaminated the land, are they or the taxpayer going to pay for the cleanup?
A. LTV Steel-the current owner of the property-has taken the responsibility to clean up the wetlands and institute a Maintenance and Monitoring program. The taxpayers will not be paying for this cleanup.

Q5. Are there any air contamination releases ?
A. Most of the waste buried in the landfill area is of a non-volatile nature. Since the landfill cover is in place, air releases do not pose an environmental problem.

Q6. Would the proposed walkways have to be constructed as above ground walkways ?
A. As stated in this document, the conceptual use plan will look at green way trails for public use on the landfill area. With consideration of protection of the landfill cover, determination of type of construction for the walkways will be decided during the design phase.

Q7. When you place the sediments on the landfill, will it increase the height of the landfill ?
A. There will be a minor increase in the height of the landfill.

Q8. When they drain the wetlands, where will the water that is pumped out go ? What happens to water that drains off the sediments ?
A. The drained water will be tested prior to discharge. If necessary, the drained water will be treated before discharging. Every precaution will be taken to ascertain that the pumped out water does not flow towards the residential areas.

Q9. Was there sampling done near the residences on the east side of Hopkins Street ?
A. As part of investigations for the Hopkins Street Landfill and Republic Steel sites, soil, surface water, sediment and groundwater (from monitoring wells) samples were collected west of the Railroad

tracks and in between Hopkins Street and the RR tracks. These samples confirmed that surface water and groundwater flow towards the south or west i.e. away from the residential area. Based upon this information, it was concluded that contaminants are not moving towards the residential area and no further sampling was done in the residential area.

Q10. When will the project be completed ?
A. It is anticipated that construction will begin in 1997 and completed in 1998.

Q11. What is the Long Term Operation and Maintenance (O & M)?
A. The Long Term O & M for this site will consist of regular 1) Inspection and maintenance of the landfill cover; 2) Testing of selected groundwater monitoring wells to determine the effectiveness of the landfill cover; 3) Testing of wetland sediments and surface water to ascertain that wetlands are not being recontaminated; and 4) Maintenance of the remediated wetlands. The 30 year O & M plan will be re-evaluated periodically and may be extended after that time period.

B.NYSDOH RESPONSE

Q 12. What is the landfill's current potential to impact public health ?
A. In order for hazardous waste in the landfill to have the potential to cause illness, people must be exposed to (come into contact with) the waste. It is unlikely that people are exposed to waste at the Republic Steel site. Local residents do not drink contaminated groundwater because homes are served by public water obtained from a distant source. The existing landfill cover prevents contact with buried waste and contaminated soil on-site. Although there are few signs of trespassing on-site, it is possible for people wading in the ponds and trenches around the landfill to come into contact with contaminated surface water and sediments. However, contaminant concentrations in these media are not likely to cause health effects in people who only occasional visit the site. The proposed remedy will further reduce the potential for exposure to contaminants in sediment and surface water.

APPENDIX B
ADMINISTRATIVE RECORD
REPUBLIC STEEL
Site No. 915047

1. Record of Decision . . . . . March, 1997
2. Proposed Remedial Action Plan . . . . . February, 1997
3. Focused Feasibility Study Report - Addendum . . . . . February, 1997
4. Focused Feasibility Study . . . . . February, 1996
5. Supplemental Solid Waste Management Facility Investigation Program . . . . August, 1995
6. LTV's Response to NYSDEC Comments . . . . . February, 1994
7. Solid Waste Management Facility Investigation Program (SWMFIP) . . . . . October, 1993
8. Preliminary Water Quality Characterization Sampling Report . . . . . March, 1993
9. SWMFIP Work Plan . . . . . October, 1992
10. Phase I Investigation Report . . . . . June, 1989
11. Marilla Street Landfill Conceptual Site Closure Plan . . . . . September, 1985
12. Consent Order: Landfill Closure & Site Investigation (R9-2808-89-05) . . . October, 1992
13. Relevant Correspondence:

    G. A. Carlson to M. J. O'Toole, NYSDOH concurrence letter for Record of Decision, 3/97.

    G.A. Carlson to M.J. O'Toole, NYSDOH concurrence letter for Proposed Remedial Action Plan, 2/97.

    J. W. Etchison (LTV) to J.S.Walia (NYSDEC), response to comments on Feasibility Study (FS), 1/17/97.

    J.S.Walia to J.W. Etchison, comments on FS, 12/27/96.

    J.W. Etchison to J.S. Walia, response to comments on FS, 8/12/96.

    M.L. Doster (NYSDEC) to J.W. Etchison, meeting agreements, 9/17/96.

    J.S. Walia to J.W. Etchison, comments on FS, 7/24/96.

    J.W. Etchison to J.S. Walia, response to comments on FS 6/7/96.

    J.S. Walia to J.W. Etchison, comments on FS, 4/24/96.