

2021 Hazardous Waste Scanning Project

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Report_HW_932020_1991-05-01_Cost_Analysis_Report.pdf

E.C.JORDAN CO. ENGINEERS &
SCIENTISTS

**NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
SUPERFUND STANDBY CONTRACT**

LOVE CANAL EDA 2 AND 3
Niagara Falls
Niagara County, New York
WORK ASSIGNMENT NO. D002472-8

COST ANALYSIS REPORT

MAY 1991

NYSDEC SUPERFUND STANDBY CONTRACT
LOVE CANAL EDA 2 AND 3
WORK ASSIGNMENT NO. D002472-8

Submitted to:

DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 WOLF ROAD
ALBANY, NEW YORK 12233-7010

By:

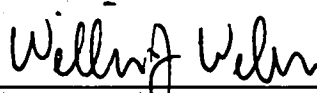
E.C. JORDAN CO.
261 COMMERCIAL STREET
PORTLAND, MAINE 04101

COST ANALYSIS REPORT

MAY 1991



Charles H. Horstmann, P.E.
Project Manager
E.C. Jordan Co.



William J. Weber
NSSC Program Manager
E.C. Jordan Co.

LOVE CANAL EDA 2 AND 3
COST ANALYSIS REPORT

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COST ANALYSIS REPORT

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1.0 INTRODUCTION

E.C. Jordan Co. (Jordan) is submitting this Cost Analysis Report (CAR) for remediation of soils in Love Canal Emergency Declaration Areas (EDA) 2 and 3 at the Love Canal Site, Niagara County, New York. This CAR has been prepared in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) Superfund Standby Contract (NSSC) and the February 1991 Work Plan for Work Assignment No. D002472-8.

This CAR consists of 5 sections. Section 1.0 describes the site history and scope of the CAR. Section 2.0 presents the remedial scenarios considered in the CAR, and Section 3.0 evaluates various excavation and disposal options to implement the remedial scenarios. The remedial scenarios are evaluated in Section 4.0, including cost estimates to implement the CAR's conceptual designs and cost estimates to develop remedial designs for the Love Canal EDA 2 and 3. The CAR is summarized in Section 5.0.

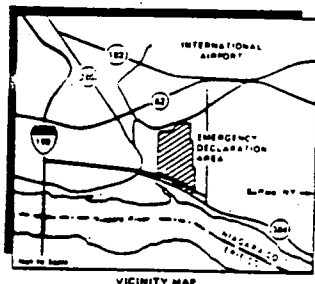
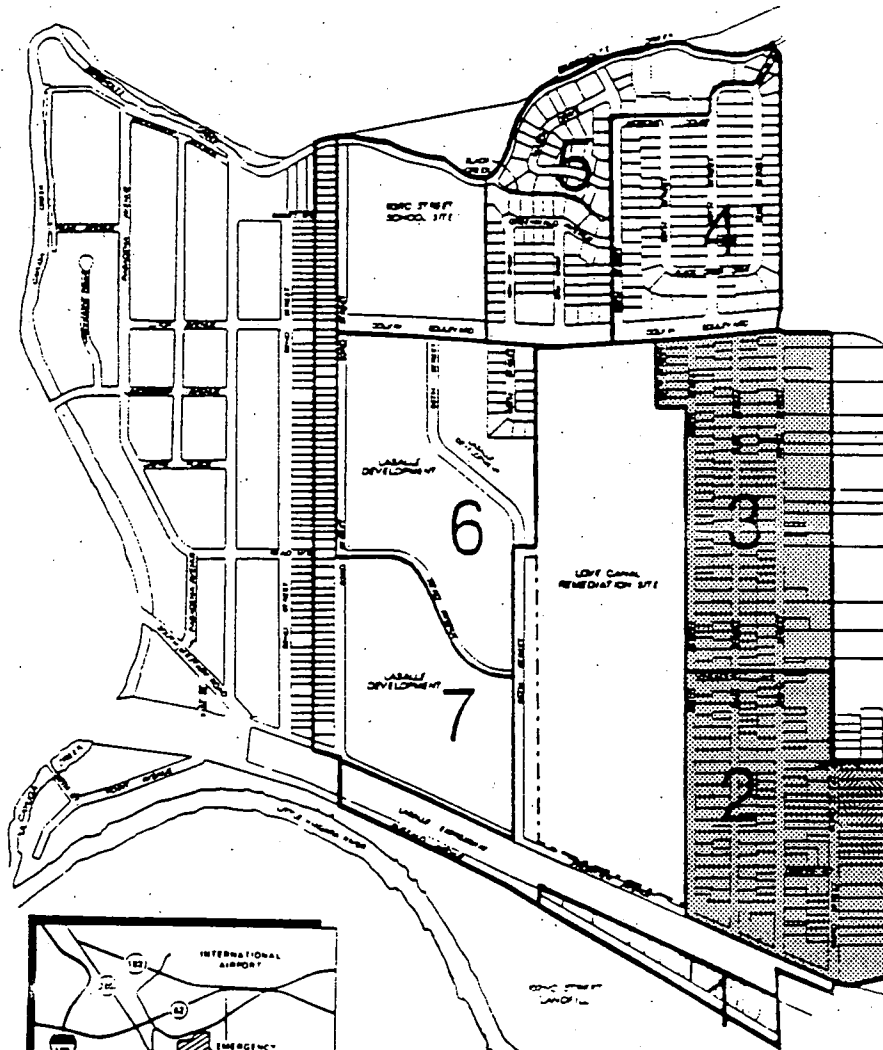
1.1 PURPOSE

In 1980, the Love Canal Revitalization Agency (LCARA) was established and charged with revitalization of the Love Canal EDA. In May 1990, LCARA adopted a Final Generic Environmental Impact Statement (FGEIS) for a Master Plan. LCARA adopted the Master Plan to guide the future use and redevelopment of the EDA. Concerning EDA 2 and 3, the Master Plan advocated development for commercial purposes rather than residential use.

Pursuant to the State Environmental Quality Review Act, the New York State Disaster Preparedness Commission (DPC), issued a Findings Statement for the Love Canal Master Plan. In the Findings Statement, the DPC declined to approve the expenditures of funds by LCARA necessary to promote commercial development of EDA 2 and 3. In part, the DPC found that LCARA's Master Plan did not adequately address the economic feasibility of remediating EDA 2 and 3 to allow for residential development. The purpose of this CAR is to provide LCARA and the DPC with information on the cost of remediating EDA 2 and 3 in response to DPC's request for an economic feasibility analysis.

1.2 SITE LOCATION AND DESCRIPTION

The Love Canal Site is located in the City of Niagara Falls, Niagara County, New York. This CAR addresses the Love Canal EDA 2 and 3 (Figure 1-1), which are the residential areas east of the Love Canal. The eastern boundary of the CAR study area is 140 feet east of 102nd and 103rd streets. There are 180 homes within EDA 2 and 3, of which 32 homes were occupied as of January 1991 (Figure 1-2); six of the occupied homes are expected to be vacant within one year.



Scale: 1"=1000'

LOVE CANAL EMERGENCY DECLARATION AREA

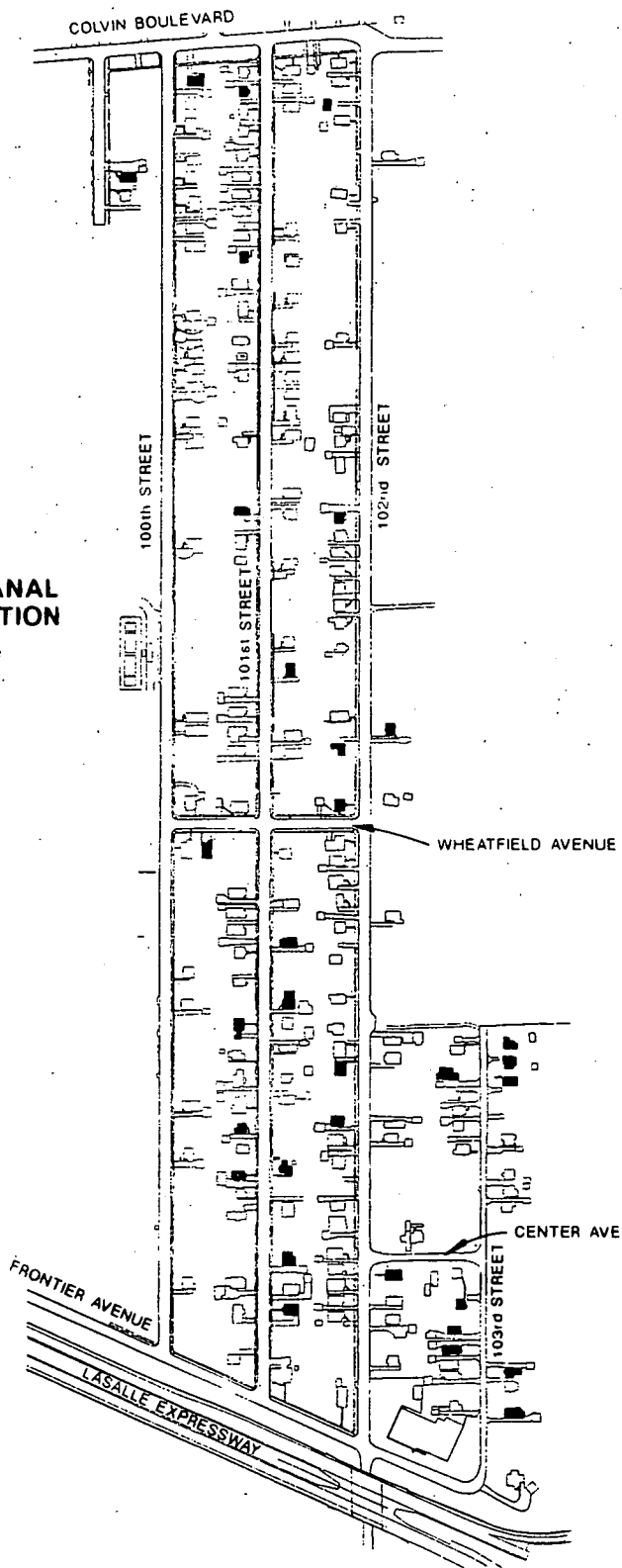
SOURCE: MODIFIED FROM HABITABILITY STUDY REPORT, V.3 (CH2M HILL, 1988)

**FIGURE 1-1
SITE LOCATION MAP
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT**

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LOVE CANAL
REMEDIATION
SITE



LEGEND

- OCCUPIED HOUSE
- UNOCCUPIED HOUSE



FIGURE 1-2
SITE MAP
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
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1.3 SITE HISTORY

In September 1988, the New York State Commissioner of Health issued the Decision on Habitability for the Love Canal EDA (NYSDOH, 1988). In part, the Decision stated that EDA 2 and 3 exceed the comparison criteria for habitability and are not suitable for normal residential use without remediation of the contaminated soils. Remediation may render these areas as habitable as other neighborhoods in Niagara Falls, however, they may be used for other purposes (e.g. commercial, industrial) without remediation.

EDA 2 and 3 were determined to be unsuitable for normal residential use based upon a statistical difference between the concentration of Love Canal Indicator Chemicals (LCICs) in soil (to 12 inches deep) from EDA 2 and 3 as compared to the LCIC concentrations in soils from other residential areas. The LCICs consist of various chlorobenzenes, chloronaphthalene, and isomers of hexachlorocyclohexanes (BHCs). The differences in low-level soil contamination (primarily concentrations less than 2 ppb range), and the median levels of contamination (2.6 ppb for combined chlorobenzenes and 0.64 ppb for total BHCs) are only slightly higher than those found in other residential Niagara Falls neighborhoods.

This contamination of EDA 2 and 3 soil with LCICs may be the consequence of airborne transport and deposition/precipitation of chemicals from the Love Canal prior to remediation actions at the site. This could have occurred during the period of active dumping 1942-1953. Small amounts of Love Canal soil may have been used to fill depressions; however, extensive contamination from this activity is not evident.

Initially, remediation of EDA 2 and 3 to permit residential use required that the concentration of LCICs in the top 12 inches of soil within EDA 2 and 3 be reduced to conform with the habitability criteria, i.e. the concentration of LCICs in the top 12 inches of soil within EDA 2 and 3 should be less than or equal to the concentration of LCICs in the top 12 inches of soil from the Niagara Falls comparison neighborhoods. Three alternative approaches were considered: placing 12 inches of clean fill over the entire surface of EDA 2 and 3, treating the top 12 inches of soil, and excavating the top 12 inches of soil and replacing it with clean fill. Soil treatment alternatives were not considered feasible because the concentration of contaminants in the soil are too low for effective treatment. The alternative of placing 12 inches of soil over the entire surface of the area was rejected because of difficulties in grading the soil near roads, sidewalks, houses and large trees. Excavation and replacement of soil remained the only feasible alternative.

Recognizing the expense of this solution and the possibility that only a portion of the surface soil was actually contaminated, the New York State Department of Health (NYSDOH) and NYSDEC initiated a sampling and analysis program within EDA 2 and 3. The EDA 2 and 3 Remediation Study consisted of the collection of some 82 soil borings and the analysis of 246 samples in December 1989 (NYSDOH and NYSDEC, 1990). The cores were sampled at depths of 0-3, 3-6, and 6-12 inches and analyzed for the chlorobenzenes and BHC isomers on the LCIC list. Considering the available data, the report determined that the removal of six inches of soil

would satisfy the habitability criteria and render EDA 2 and 3 suitable for unrestricted residential use.

1.4 SCOPE OF THE CAR

The NYSDEC selected the three scenarios presented in Section 2.0 for evaluation in the CAR to address the range of remedial approaches which could be employed to render EDA 2 and 3 habitable. This approach was selected because the plans for any residential development of EDA 2 and 3 are undefined at this time. The scenarios are not intended to represent all possible scenarios. Rather, they are presented for use by LCARA in responding to DPC's request for an economic feasibility evaluation of the residential use of EDA 2 and 3. The remedial scenarios have been evaluated only in terms of technical implementability and cost.

2.0 IDENTIFICATION OF REMEDIAL SCENARIOS

This CAR evaluates the three remedial scenarios specified by NYSDEC to address the remedial objectives of removing six inches of soil in EDA 2 and 3. Each scenario is divided into Option A and Option B for either of two disposal options. There are several constant conditions which will be identical for each scenario. The constants, disposal options and scenarios are described below, and are discussed in more detail in Section 3.0.

Constants

Each of the following conditions are constant for all scenarios evaluated.

1. Six inches of soil would be removed from all areas of EDA 2 and 3. The entire area would be regraded with six inches of fill and reseeded.
2. All unoccupied houses, other structures, pavement, sidewalks and undesirable vegetation would be removed from the properties on 100th Street to the back of the property lines. These properties which face the Love Canal containment area would remain as a buffer zone as depicted on Figure 16B of the Love Canal Area Master Plan (The Saratoga Associates, 1990).
3. Desirable vegetation would remain where possible. Desirable vegetation shall generally be considered as large, healthy trees, with a specific density of trees left in place. The desirable vegetation criteria for evaluating existing vegetation are presented in Section 3.1. Ornamental vegetation on the property of occupied houses is considered desirable, while ornamental vegetation on the property of unoccupied houses will be considered "undesirable" due to its overgrown state.
4. Undesirable vegetation would be removed from all areas to aid in the excavation of soil. Undesirable vegetation shall generally be considered as brush, shrubs, young or overcrowded trees, old or unhealthy trees, and overgrown ornamental shrubs on unoccupied properties. The CAR assumes that undesirable vegetation would be landfilled although use of this material for fuel or landscaping may be possible.

Disposal Options

All waste materials removed from the EDA 2 and 3 would be non-hazardous solid waste. For each scenario, two disposal options were evaluated. Option A considers the disposal of all material from EDA 2 and 3 at the 102nd Street Landfill Site assuming the concurrence of the site owners, Occidental Chemical Corporation and the Olin Chemical Corporation. Option B considers off-site disposal at a permitted solid waste management facility. Disposal activities associated with Option A would be materials handling within the EDA prior to

transportation, transportation to the 102nd Street Landfill Site, and dumping at the 102nd Street Landfill Site. Cost estimates for Option A do not include materials handling at the 102nd Street Landfill. The analysis of Option B includes all activities necessary for disposal at a permitted off-site solid waste management facility, based upon estimated lowest total costs for disposal at a facility or facilities willing and capable of accepting the material.

Remedial Scenarios

The CAR develops preliminary cost analyses for both disposal options for each of the following three scenarios. A matrix of the three scenarios is presented in Figure 2-1. The analyses consider the constant conditions discussed above and present total costs for each disposal option. The level of detail of each analysis is conceptual and used primarily for comparison purposes. Cost estimates to prepare the remedial design for each scenario are also presented in this CAR. The following scenarios are intended to encompass the major conditions likely to impact the cost of the remedial approach.

2.1 SCENARIO 1

In this scenario, the entire EDA 2 and 3 would be left in its existing condition except for removal of the homes and structures from 100th Street (described in Constant No. 2). All improvements (i.e., fences, garages, driveways, and sidewalks) in residential areas would remain in their present condition or be replaced. Only undesirable vegetation which might hinder soil removal would be removed from occupied lots with the permission of the owner and/or renter. In all areas, houses, garages, sheds, other structures, sidewalks, driveways, and other paved areas, would remain as is. All fences on occupied lots would be reset or replaced as necessary. Fences on unoccupied lots would be removed and a fence along the rear of all unoccupied lots would be installed. Brush, overgrown ornamental vegetation, and other undesirable vegetation would be removed from unoccupied lots.

2.2 SCENARIO 2

In this scenario, only the occupied house lots would be remediated as described above. For the other areas, only houses, large trees, sidewalks, and driveways would remain. Garages, sheds, fences, ornamental vegetation and undesirable vegetation would be removed.

2.3 SCENARIO 3

This scenario is identical to Scenario 2 except that houses, sidewalks, and driveways would be removed at unoccupied lots as well. Only large trees at a predetermined density would remain.

	SURFACE SOIL	HOUSES	GARAGES, SHEDS, etc.	DRIVEWAYS, SIDEWALKS	FENCES	DESIRABLE VEGETATION
OCCUPIED LOTS ALL SCENARIOS	●	○	○	○	*	○
UNOCCUPIED LOTS SCENARIO 1	●	○	○	○	*	○
SCENARIO 2	●	○	●	○	●	○
SCENARIO 3	●	●	●	●	●	○

<u>LEGEND</u>	
○	REMAIN AS IS
●	REMOVE
*	REPAIR, REPLACE

NOTE:
THERE ARE TWO SOIL AND DEBRIS DISPOSAL OPTIONS FOR EACH SCENARIO: THE 102nd STREET LANDFILL AND AN OFF-SITE SOLID WASTE DISPOSAL FACILITY.

**FIGURE 2-1
MATRIX OF SCENARIOS
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT**

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3.0 EVALUATION OF EXCAVATION AND DISPOSAL OPTIONS

The components of the remedial scenarios are described and evaluated for technical implementability in this section. Assumptions for each component are provided in this section and form the basis for the remedial cost estimates presented in Section 4.0.

3.1 TYPICAL LOT

The CAR scope did not permit analyses of individual properties in the Love Canal EDA 2 and 3. Instead, a typical lot was established to develop the basis for cost estimation presented in this CAR. The following four typical lots were developed to describe the EDA 2 and 3: occupied house, unoccupied house, vacant, and wooded. Vacant lots refer to properties within the residential area without a house, and wooded lots refer to properties east of 102nd and 103rd Streets without a house (see Figure 1-2).

Figure 3-1 shows the dimensions and layout of the typical house lot. Table 3-1 lists the quantities determined for development of the typical lot concept. This information was compiled from aerial photographs, 50-foot scale EDA 2 and 3 maps derived from the aerial photographs, and a site visit. These four typical lots are described in this subsection in terms of the dimensions of several remediation components:

- lot
- house
- garage
- driveway
- sidewalk
- fencing
- vegetation

The following subsections present the assumptions and methods used to estimate the quantities of parameters listed above.

3.1.1 Average Lot Size

The average lot size represents the sum of randomly chosen areas from EDA 2 and 3 divided by the associated number of house lots and vacant lots which make up those areas. A house lot consists of the property area on which a house sits. Houses include occupied and unoccupied houses. Vacant lots may or may not have had houses on them in the past. Because many vacant lots are interspersed among the house lots, the number of vacant lots was estimated from aerial photographs and 50-foot scale maps. The entire EDA 2 and 3, including occupied house, unoccupied house, vacant, and wooded properties, was divided into lots of equal dimensions. This method yielded an average lot size of 65 feet wide by 111 feet long, or 7,200 square feet (sf) (see Figure 3-1 and Table 3-1). The EDA 2 and 3 is comprised of the following types of lots:

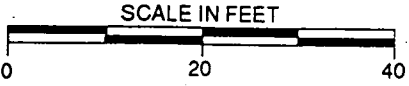
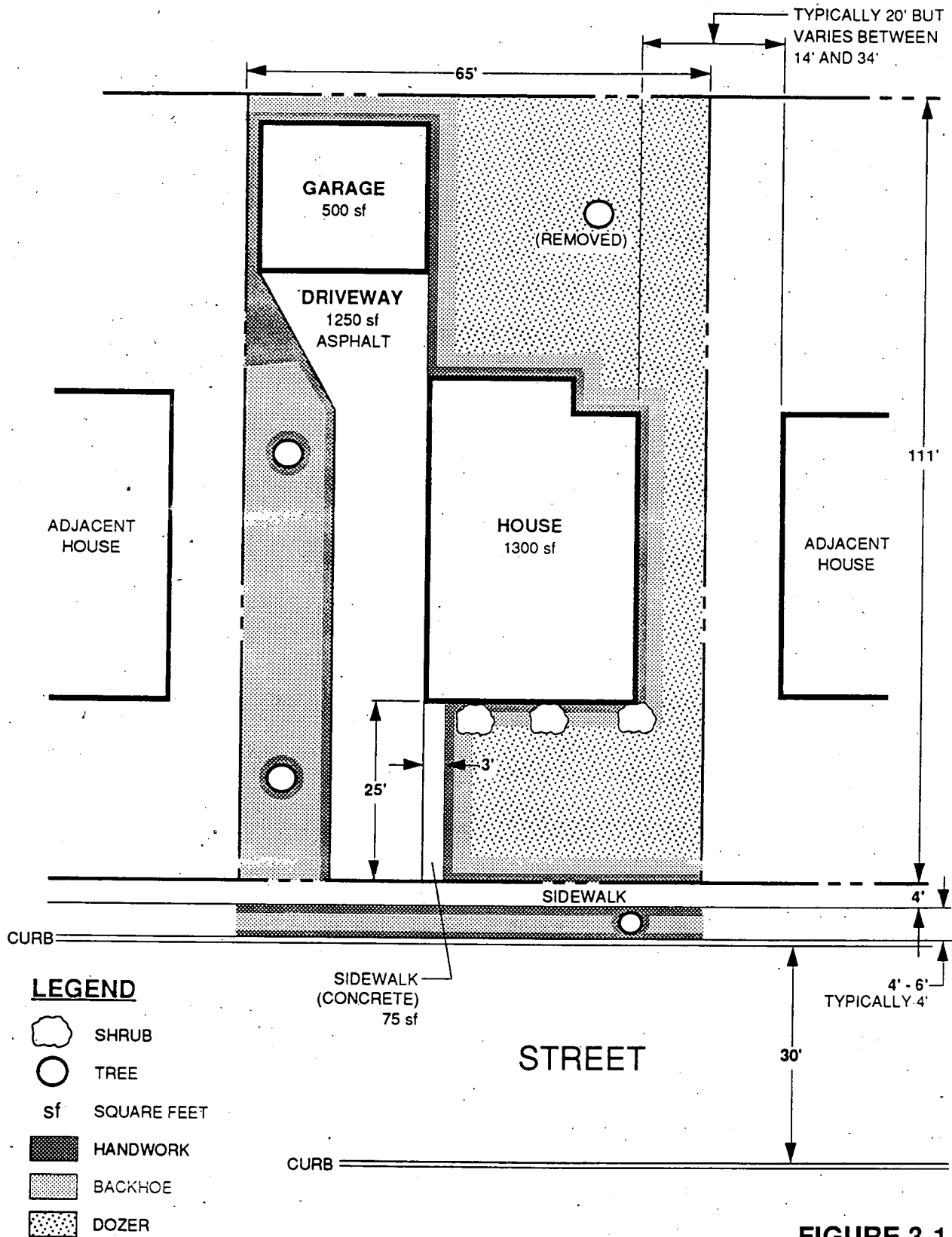


FIGURE 3-1
TYPICAL HOUSE LOT
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

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9103077D

TABLE 3-1
PARAMETERS FOR THE TYPICAL HOUSE LOT

LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

PARAMETER	AVERAGE QUANTITY	COMMENTS/ASSUMPTIONS
Average Lot Size	7200 sf	Includes all lots, with and without houses, approximately 65 ft by 110 ft
House Size	1300 sf	Varies between 800 and 3200 sf
Garage Size (1)	500 sf	Typically 25ft by 20ft
Driveway Size (2)	1250 sf	Assumed to be asphalt
Sidewalk size (3)	75 sf	Assumed to be concrete, typically 25ft by 3ft
Setback from sidewalk	25 ft	Same as sidewalk length as sidewalk goes from street sidewalk to house but varies between 17 and 40 ft
Distance between adjacent houses	20 ft	Typically 20ft, but varies between 14ft and 34ft
Number of trees	4 per lot	1 of these 4 is on the strip between curb and sidewalk 1 of the remaining 3 trees would be removed
Number of shrubs	3 per lot	All 3 will be removed from unoccupied lots
Linear feet of fencing	53 ft	Averaged for all 180 houses in EDA 2 and 3
Soil to Excavate	82-109 cy	In place volume, varies with scenarios

Notes:

ft = feet
sf = square feet
cy = cubic yards

1. 51% of houses have garages
2. 89% of houses have driveways
3. 60% of houses have sidewalks

<u>Typical Lot</u>	<u>Number of Lots</u>
Occupied House	32
Unoccupied house	148
Vacant	114
Wooded	<u>61</u>
TOTAL	355

The separation between adjacent houses was determined by taking the average of a number of separations chosen at random scaled from the 50 scale maps. This calculation estimated that the typical distance between houses is 20 ft, but varies between 14 and 34 ft. A similar method was used to determine average setback from the sidewalk. Typically, houses are set back 25 ft from the sidewalk, but this distance varies between 17 and 40 ft. The length of the typical sidewalk was determined to be the same as the typical setback, as the sidewalk typically connects the house to the street (see Figure 3-1 and Table 3-1).

3.1.2 Average House, Garage, Driveway, and Sidewalk Size

To determine the average house area, 15 houses were chosen at random from EDA 2 and 3. The areas of the houses were determined by planimeter from maps. These calculations yielded an average house area of 1300 sf. A similar method was used to determine the average garage size. These calculations yielded an average of 500 sf for the typical garage. However, only approximately 51% of the houses have garages.

The average dimension of sidewalks (sidewalk leading from the street to the house) and driveways were determined using a similar method. These quantities are, respectively, 75 sf (3 ft by 25 ft) and 1250 sf. Approximately 60% of the houses have sidewalks and 89% have driveways.

3.1.3 Fencing

A fence would be installed along the back property line of the entire length of 100th Street in each scenario. For Scenario 1, in addition to the fencing installed along 100th Street, fencing would be installed along the back property line between 101st and 102nd Streets. This fencing is generally intended to replace existing fencing, some of which is in disrepair and some of which may be removed or damaged during soil excavation. Quantities of fencing required are presented in the Appendix.

3.1.4 Vegetation

The most difficult parameter to define was vegetation density. Estimates were derived from aerial photographs, maps, and a site visit. The assumptions used to determine tree and shrub densities and removal frequency apply to each of the three scenarios, as vegetation would be treated the same, regardless of

the scenario. Section 3.2 discusses vegetation removal criteria in further detail.

House Lots. An average of 3 trees per house lot was determined by reviewing the aerial photographs. However, due to uncertainties in the counting methods and lack of sufficient detail, a factor of safety was applied to this number to obtain an estimate of 4 trees per lot (or approximately 24 trees per acre). This number includes one tree on the strip of grass between the sidewalk and the street and three trees on the property itself. Review of site photographs provided sufficient information for an estimate of 3 shrubs per house lot.

To increase soil excavation efficiency (see Constant No. 4 in Section 2.0), an average of 1 tree per lot was assumed to be removed from occupied and unoccupied house lots for all scenarios. However, it is assumed that the tree shown in Figure 3-1 to be located on the strip of grass between the sidewalk and the street would not be removed in most cases for purposes of preserving the aesthetic quality of the area. Shrubs would be removed from unoccupied lots to increase soil removal efficiency and would remain on the occupied lots in each scenario.

Vacant Lots. A similar method as described previously for house lots was used to determine tree removal rates from vacant lots. However, due to the overgrown state of many of these vacant lots, a higher tree density was used. It was assumed that twice as many trees exist on these lots, or approximately 50 trees per acre. Fifty per cent of these trees were assumed to require removal in order to facilitate excavation. These assumptions yield a tree removal of 4 of 8 trees per vacant lot.

Wooded Lots. A tree density of 100 trees per acre and a removal rate of 75% was used for the 140-foot strip east of 102nd and 103rd streets (Area III). These densities and removal percentages were increased relative to the vacant lot assumptions because much of this area is wooded. Calculations based on these assumptions (75% removal, 100 trees per acre, and 7200 sf lot) determine that 12 of 16 trees would be removed from wooded lots. These assumptions apply to the wooded lots only and not to the houses interspersed among the forested areas.

3.2 DESIRABLE VEGETATION CRITERIA

The purpose of this section is to define criteria for the identification of desirable and undesirable vegetation. These criteria will provide for thinning of vegetation to facilitate soil removal while preserving desirable specimens to provide an aesthetically acceptable post-remediation area. These criteria are separated into desirable and undesirable characteristics.

Development of these criteria was requested by the NYSDEC to provide information on the appearance of the remediated areas. The criteria presented in Subsections 3.2.1 and 3.2.2 are beyond the level of detail necessary for this CAR. The CAR will use several less detailed assumptions concerning vegetation removal rates which are presented in Subsection 3.2.3.

3.2.1 Desirable Vegetation Characteristics

Desirable vegetation in residential areas generally consists of large, healthy trees and well maintained ornamental vegetation. Based on this definition and the remedial constants and scenarios defined in Section 2.0, desirable vegetation was assumed to include:

- vegetation associated with occupied residences
- trees located between sidewalks and streets to provide buffers
- healthy, full canopied tree specimens
- trees with no significant physical damage such as limb or top breakage
- trees with minimal visible insect damage
- deciduous trees greater than 8 inches in diameter at breast height (DBH)
- coniferous trees greater than 6 inches DBH, to balance vegetational diversity (the site currently appears to be dominated by deciduous species)
- healthy trees containing bird nests or evidence of habitation by other forms of wildlife, regardless of tree size.

3.2.2 Undesirable Vegetation Characteristics

Undesirable vegetation in residential areas is generally considered as brush, shrubs, young or overcrowded trees, old or unhealthy trees, and overgrown ornamental shrubs on unoccupied properties. Criteria to identify undesirable specimens for removal include:

- trees showing visual evidence of poor health, as is apparent from disease, insect predation, or stress
- trees suffering from crowding as shown by stunted growth in dense clumps and stands; in these cases, the strongest individuals would be saved to encourage growth
- trees with significant limb or top breakage
- all shrubs and ornamentals on unoccupied parcels, since they are generally poorly maintained
- all trees in close proximity to buildings identified for demolition
- all trees that interfere with overhead power lines

- deciduous trees less than 8 inches DBH
- coniferous trees less than 6 inches DBH

These criteria were chosen to provide a relatively mature, healthy stand of trees after remediation is completed. The criteria are based on specimen health and aesthetic quality and not spatial distribution. Therefore, on-site modification of these criteria may be necessary to provide for desirable densities and distributions.

3.2.3 Application

The following assumptions concerning vegetation in EDA 2 and 3 were made for each lot type in the CAR.

<u>Vegetation</u>	<u>Occupied Lot</u>	<u>Unoccupied Lot</u>	<u>Vacant Lot</u>	<u>Wooded Lot</u>
Ornamental	Remain	Remove	Not Present	Not Present
Brush	Not Present	Not Present	Not Present	Remove
Buffer trees between curb and sidewalk	Remain	Remain	Remain	Remain
Other trees on lot	Remove 1 of 3	Remove 1 of 3	Remove 4 of 8	Remove 12 of 16

3.3 EXCAVATION

Excavation consists of removing six inches of soil from the site to satisfy the habitability criteria and render EDA 2 and 3 suitable for unrestricted residential use.

Soil removal rates were developed for a typical house lot of 7,200 square feet (see Figure 3-1). Soil volumes removed vary with each scenario. In each scenario, soil is removed by conventional excavation equipment. The soil excavation crew (per lot) would consist of two equipment operators, three truck drivers, and one laborer. Each soil excavation crew would use one backhoe/loader, one small dozer, two dump trucks, and one water truck. The crew for disposal option B (off-site disposal) would use one less dump truck and driver, because waste soil would be loaded directly into off-site transport trucks.

A small rubber-tired tractor backhoe with frontend loader would be used for loading trucks and scraping soil close to structures. The tractor backhoe is versatile and light, capable of working in close quarters yet not heavy enough to break up pavement and sidewalks that will be encountered while moving around the lot. A small dozer would be utilized for stripping open yard areas and pushing piles of soil to areas for loading. Sensitive areas such as around tree roots would be excavated by hand to protect the roots. Hand-excavated soil would be collected by mechanical earth moving equipment. A water truck would moisten soil during excavation to minimize dust emissions.

Soil removal rates were dependent upon the number of obstacles equipment operators must maneuver around to excavate. In the first and second scenarios, excavating equipment must operate close to and around houses, trees, driveways, and sidewalks. This would inhibit the removal efficiency of the equipment and require hand work to remove soil (see Figure 3-1). The excavation rate was estimated to be 9 cubic yards per hour (cy/hr), translating to roughly 8 hours required to remove six inches of surface soil from a typical lot. In the third scenario obstacles (i.e., garages, driveways, sidewalks) from the typical lot are demolished prior to soil removal, thus allowing higher soil removal efficiency. Removal rates for Scenario 3 were estimated to be 12 cy/hr. However, soil beneath removed items creates a greater area to excavate.

Staging operations would utilize the aforementioned crew. Soil would be pushed into piles for loading by the excavation crew. The front end loader would load the soil pile into hauling trucks which would transport the soil to the designated landfill, dump its load, and return to the site. A brush-type street cleaner would remove loose dirt from EDA 2 and 3 streets following soil excavation activities. The following volumes of soil would be excavated:

<u>Scenario</u>	<u>In-place Soil Volume (cy)</u>
1	38,832
2	39,425
3	42,023

Ten percent soil expansion of in-place volume was assumed in cost estimates.

3.4 BUILDING DEMOLITION

Prior to any demolition, all utilities would be disconnected. Water lines would be disconnected at the main in the street and sewer lines would be cut and capped at the street curb. Power would be disconnected by the electric company at the nearest utility pole.

House demolition would be performed with a medium sized hydraulic excavator. Excavators are commonly used because of their strength, reach, and maneuverability. The excavator can load the debris into trucks which would transport the debris to a landfill. Once the above-ground structure is removed, the basement floor would be broken up and left in place. Hand held jack hammers, in combination with the excavator, would break up the basement floor. The foundation walls would be pushed in to a minimum of 18 inches below existing grade. The foundation walls, garage slab, and sidewalk pieces would be placed in the basement as backfill. Masonry material, brick, stone, and earth compacted in 18-inch lifts may also be used. The top 18 inches would be earth material with the top six inches consisting of clean topsoil.

3.5 DEBRIS HANDLING

Asphalt driveways would be stripped with a bulldozer and the pavement separated from the other debris. For the purpose of this study, it is assumed

that the pavement would be hauled to a landfill for disposal. An alternative to disposal is to recycle the pavement grinding it up and reusing it for asphalt subbase.

Trees will be felled with chainsaws. It is assumed that felled trees will be disposed in a landfill. However, alternate uses of the trees (i.e., chipping for fuel or landscaping) are possible.

Fences would be removed by the demolition crew and hauled away with other demolition debris. New fences would be installed for occupied homes in each scenario. For unoccupied homes and vacant lots, a new fence will be installed along the backside of each lot in Scenario 1. In each scenario, a new fence would be installed between homes on 101st Street and the 100th Street buffer zone.

3.6 WASTE TRANSPORTATION AND DISPOSAL

Disposal Option A specifies disposal of all debris and excavated soil at the 102nd Street Landfill which is approximately one-half mile from the center of the EDA 2 and 3. Waste material would be loaded directly at the remediation area into 12 cy dump trucks. The trucks would be covered and decontaminated prior to delivering wastes to the 102nd Street Landfill. Materials handling at the landfill was not addressed in this CAR, and no disposal fee was assumed.

For off-site Disposal Option B, waste materials from remediation activities were separated into two categories: debris, including house demolition materials, fences, and vegetation, and excavated soil. Both debris and excavated soil were assumed to be non-hazardous. Wastes would be loaded directly into 30 cy box trailers which would be covered and decontaminated prior to transport off-site. Debris would be disposed at a demolition debris landfill and excavated soil would be disposed at a sanitary landfill. Eleven local and regional (including Pennsylvania and Quebec) off-site disposal facilities for waste debris and soil were identified. Four and six of the identified disposal facilities were capable and willing to accept the waste soil and debris, respectively. Cost estimates, satisfactory NYSDEC enforcement status, availability of landfill capacity, and willingness to accept material from the Love Canal Site were determined in March and April 1991, and are subject to change according to market and other conditions. Off-site disposal has become more difficult with recent land disposal regulations, and disposal options and costs are likely to change between the CAR and remedial construction phases.

The CAR used the following lowest identified transportation and disposal cost estimates for debris and soil wastes.

<u>Waste</u>	<u>Cost (\$/cy)</u>		
	<u>Transportation</u>	<u>Disposal</u>	<u>Total</u>
Debris	30	8	38
Soil	35	45	80

Note that cost estimates for soil disposal at other identified off-site facilities were significantly higher than costs presented above and would likely increase remediation costs which include off-site disposal.

3.7 FILL REQUIREMENTS

Clean fill would be required for the replacement of topsoil and filling of basement areas. At the direction of the NYSDEC, only physical specifications for the fill material were considered in the CAR; no chemical specifications or analytical testing program were considered. Fill requirements and availability presented in this section was supplied by various contractors in the Niagara Falls/ Buffalo area and the NYSDEC. Ten percent compaction of fill material was assumed in cost estimates. In all scenarios, grass seed and mulch would be applied to the topsoil.

3.7.1 Topsoil

At the direction of the NYSDEC, topsoil used to replace the six inches of material removed from EDA 2 and 3 should meet the requirements stated in New York State Department of Transportation specification number 713-01.

Fill meeting these requirements is generally available in the western New York region. However, for the given volume of fill required (approximately 40,000 cy) more than one source of fill material would be required. As of March, 1991, four sources of suitable fill material were located within 40 miles of Niagara Falls in New York State. At the time of remediation, it is unlikely that all of these sites will still be available to supply the material. However, it is equally likely that other sources of fill will have been secured for use by contractors. Trucks would haul the topsoil from an approved site identified by the contractor to individual lots where it would be spread roughly by a bulldozer and raked by hand to final grade.

Costs were estimated based on information supplied by contractors to Jordan as of March, 1991. These unit prices could be higher if the fill source is located at a greater distance from Niagara Falls than the source used for this estimate (the farthest site was located approximately 40 miles from Niagara Falls).

3.7.2 Basement Fill

Basements of demolished unoccupied houses would be filled with a suitable material. The NYSDEC specification for this structural fill requires inorganic material with a particle size of less than 4 inches and a moisture content of less than 55 percent. A six-inch layer of topsoil would then be placed on top of the structural fill.

Trucks would haul the material from an approved site to individual lots where it would be dumped in basements. The fill would be compacted and brought to roughly six inches below final grade by bulldozer. Topsoil will then be

placed above the basement fill as described previously and brought to final grade.

3.8 AIR MONITORING

Air monitoring will be conducted during each of the three potential remedial scenarios to monitor the level of exposure via the air pathway for workers on the site and sensitive off-site receptors and to minimize the air quality impacts of the remedial activity.

As each of the remedial scenarios involves the excavation of soils, the air monitoring program described in this section will be applicable to each or any of the three scenarios. Air monitoring will be conducted throughout the entire excavation period; the primary difference between the three remedial scenarios will be the length of time of the air monitoring program.

For each of the remedial scenarios, the objective of the air monitoring program will be to:

- Monitor the level of exposure of on-site workers to the selected target chemicals and ensure that workers are not exposed in excess of allowable limits without using the proper levels of personal protection.
- Monitor the level of exposure for sensitive off-site receptors (in particular, the residents of homes on or adjacent to the excavation areas) during the excavation activities and ensure that they are not exposed to unsafe levels of target chemicals during the remedial activity.
- Monitor the site perimeter during remedial excavation for target chemicals to enable site workers to either cease work or implement mitigation measures during the excavation to minimize the off-site migration of air contaminants when the pre-determined site perimeter action levels are exceeded.

A detailed Health and Safety Plan will be prepared in consultation the NYSDEC and NYSDOH if remediation work is carried out.

4.0 EVALUATION OF REMEDIAL SCENARIOS

Remedial costs for the EDA 2 and 3 were estimated based on the four typical lots defined in Section 3.0. Remediation for each scenario was estimated to be completed in six months, during one construction season, and assumed one eight hour shift per day. To accomplish this schedule, 8, 10, and 14 soil excavation crews would be required for Scenarios 1, 2, and 3, respectively (crews described in Subsection 3.3). This activity would require about two excavation crews per city block in the EDA 2 and 3.

This section presents cost summary tables for Disposal Options A and B for each of the three remedial scenarios. Remediation costs provided for each lot type include excavation, demolition, debris handling, waste transportation and disposal, replacing topsoil, and seeding according to the scenario definitions. Remediation of the 100th Street buffer zone was a constant presented for each scenario. Construction management costs include office, storage, and decon trailers, utilities, office equipment, portable toilets, water, and contractor supervisors. Mobilization/demobilization and construction management costs are generally lower for Disposal Option B because waste hauling trucks and drivers were not included in these items. Off-site waste transportation and disposal costs were included in remediation costs for each of the four typical lots. Temporary relocation of EDA 2 and 3 residents was not included in cost estimates. Cost estimation details are presented in the Appendix.

A contingency of 30 percent was added to construction costs to account for undeveloped design details which could arise when the CAR's conceptual, typical lot designs are developed into detailed remedial designs and for refinements of quantities and unit rates. The cost summary tables estimate costs to develop remedial designs for each scenario and provide engineering services during construction.

4.1 SCENARIO ONE

Table 4-1 presents the cost summary for Scenario 1. Total construction cost estimates for Scenario 1 were \$7,500,000 and \$11,538,000 for Disposal Options A and B, respectively.

4.2 SCENARIO TWO

Table 4-2 presents the cost summary for Scenario 2. Total construction cost estimates for Scenario 2 were \$7,896,000 and \$12,419,000 for Disposal Options A and B, respectively.

4.3 SCENARIO THREE

Table 4-3 presents the cost summary for Scenario 3. Total construction cost estimates for Scenario 3 were \$11,149,000 and \$17,138,000 for Disposal Options A and B, respectively.

TABLE 4-1
 COST SUMMARY - SCENARIO 1

LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

COST COMPONENT (1)	REMEDIAL COSTS	
	Disposal Option A 102nd Street Landfill	Disposal Option B Off-site Landfill
Mobilization/Demobilization	\$55,000	\$51,000
100th Street Buffer Zone	\$1,972,000	\$3,298,000
Occupied Houses	\$319,000	\$551,000
Unoccupied Houses	\$1,353,000	\$2,337,000
Vacant Lots	\$1,020,000	\$1,800,000
Wooded Lots	\$2,074,000	\$2,806,000
Construction Management	\$282,000	\$270,000
Air Monitoring	\$425,000	\$425,000
TOTAL CONSTRUCTION COSTS (2)	\$7,500,000	\$11,538,000
Remedial Design and Engineering Services During Construction	\$1,500,000	\$1,500,000

Notes:

1. A contingency of 30% is included in each cost component.
2. Costs are based on a six month construction project.

TABLE 4-2
 COST SUMMARY - SCENARIO 2

LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

COST COMPONENT (1)	REMEDIAL COSTS	
	Disposal Option A 102nd Street Landfill	Disposal Option B Off-site Landfill
Mobilization/Demobilization	\$64,000	\$59,000
100th Street Buffer Zone	\$1,972,000	\$3,298,000
Occupied Houses	\$319,000	\$551,000
Unoccupied Houses	\$1,722,000	\$3,198,000
Vacant Lots	\$1,020,000	\$1,800,000
Wooded Lots	\$2,074,000	\$2,806,000
Construction Management	\$300,000	\$282,000
Air Monitoring	\$425,000	\$425,000
TOTAL CONSTRUCTION COSTS (2)	\$7,896,000	\$12,419,000
Remedial Design and Engineering Services During Construction	\$1,579,000	\$1,579,000

Notes:

1. A contingency of 30% is included in each cost component.
2. Costs are based on a six month construction project.

TABLE 4-3
 COST SUMMARY - SCENARIO 3

LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

COST COMPONENT (1)	REMEDIAL COSTS	
	Disposal Option A 102nd Street Landfill	Disposal Option B Off-site Landfill
Mobilization/Demobilization	\$83,000	\$74,000
100th Street Buffer Zone	\$1,972,000	\$3,298,000
Occupied Houses	\$319,000	\$551,000
Unoccupied Houses	\$4,920,000	\$7,872,000
Vacant Lots	\$1,020,000	\$1,800,000
Wooded Lots	\$2,074,000	\$2,806,000
Construction Management	\$336,000	\$312,000
Air Monitoring	\$425,000	\$425,000
TOTAL CONSTRUCTION COSTS (2)	\$11,149,000	\$17,138,000
Remedial Design and Engineering Services During Construction	\$2,230,000	\$2,230,000

Notes:

1. A contingency of 30% is included in each cost component.
2. Costs are based on a six month construction project.

5.0 SUMMARY

Table 5-1 presents a summary of estimated remedial costs for each remedial scenario. In all three remedial scenarios, off-site disposal (Option B) of debris and soil increased remedial costs by over 50 percent compared to disposal Option A. Due to changing disposal fees and landfill capacities, off-site disposal costs are dependent on when remediation occurs and would likely increase over time.

Remedial costs for Scenario 2 are slightly higher than Scenario 1 costs due to greater disposal volumes related to demolition of garages and fences. Scenario 3 remedial costs reflect the addition of house, driveway, and sidewalk demolition, removal, waste disposal, and replacement of clean topsoil. In general, removal efficiencies improve between Scenarios 1, 2, and 3 when excavation obstacles are reduced; however, the increased volume of waste disposal and replacement of clean topsoil was responsible for increasing remedial costs among these scenarios.

TABLE 5-1
 COST SUMMARY - ALL SCENARIOS
 LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

REMEDIAL ALTERNATIVE	REMEDIAL COST	
	Disposal Option A 102nd Street Landfill	Disposal Option B Off-site Landfill
Scenario 1	\$7,500,000	\$11,538,000
Scenario 2	\$7,896,000	\$12,419,000
Scenario 3	\$11,149,000	\$17,138,000

Notes:

1. A contingency of 30% is included in each remedial cost.
2. Remedial costs are estimated based on a six month construction project.

REFERENCES

CH2M Hill Southeast, Inc., 1988. "Love Canal Emergency Declaration Area Habitability Study, Vol. 3;" prepared for U.S. EPA Region II; Reston, Virginia; May 1988.

New York State Department of Health (NYSDOH), 1988. "Love Canal Emergency Declaration Area Decision on Habitability;" Albany, New York; September, 1988.

New York State Department of Health (NYSDOH) and New York State Department of Environmental Conservation (NYSDEC), 1990. "Love Canal Emergency Declaration Area, Remediation of EDA 2 and 3 Draft Study Report;" Albany, New York; November, 1990.

The Saratoga Associates, 1990. "Love Canal Area Master Plan;" prepared for the Love Canal Area Revitalization Agency; Buffalo, New York; June, 1990.

APPENDIX

SUPPORT DATA FOR CONCEPTUAL DESIGNS
AND COST ESTIMATES

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

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SUMMARY SHEET - SCENARIO 1
DISPOSAL OPTION A - 102nd STREET LANDFILL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	11000.00	\$33,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	40000.00	1,000,000
WORK AT VACANT LOTS	54	EA	17000.00	918,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	11000.00	319,000
UNOCCUPIED HOUSES PER SC-1	123	EA	11000.00	1,353,000
VACANT LOTS	60	EA	17000.00	1,020,000
WOODED LOTS	61	EA	34000.00	2,074,000
MOB/DEMOB COSTS				55,000
MONTHLY OVERHEAD COST	6	MON	47000.00	282,000
TOTAL CONSTRUCTION COST SCENARIO 1				\$7,075,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

JOB # 6654-20

LOCATION: NIAGARA FALLS, NEW YORK

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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SUMMARY SHEET - SCENARIO 2

DISPOSAL OPTION A - 102nd STREET LANDFILL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	11000.00	\$33,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	40000.00	1,000,000
WORK AT VACANT LOTS	54	EA	17000.00	918,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	11000.00	319,000
UNOCCUPIED HOUSES PER SC-2	123	EA	14000.00	1,722,000
VACANT LOTS	60	EA	17000.00	1,020,000
WOODED LOTS	61	EA	34000.00	2,074,000
MOB/DEMOB COSTS				64,000
MONTHLY OVERHEAD COST	6	MON	50000.00	300,000
TOTAL CONSTRUCTION COST SCENARIO 2				\$7,471,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

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SUMMARY SHEET - SCENARIO 3
DISPOSAL OPTION A - 102nd STREET LANDFILL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
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100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	11000.00	\$33,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	40000.00	1,000,000
WORK AT VACANT LOTS	54	EA	17000.00	918,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	11000.00	319,000
UNOCCUPIED HOUSES PER SC-3	123	EA	40000.00	4,920,000
VACANT LOTS	60	EA	17000.00	1,020,000
WOODED LOTS	61	EA	34000.00	2,074,000
MOB/DEMOB COSTS				83,000
MONTHLY OVERHEAD COST	6	MON	56000.00	336,000
TOTAL CONSTRUCTION COST SCENARIO 3				\$10,724,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

JOB # 6654-20

LOCATION: NIAGARA FALLS, NEW YORK

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

OCCUPIED LOTS

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION QTY UNIT UNIT COST TOTAL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	82	LF	1.50	\$123
HAUL FENCE - INCLUDED IN CREW COST				
DISPOSE OF FENCE - INCLUDED IN CREW COST				
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE - INCLUDED IN CREW COST				
DISPOSE OF TREE - INCLUDED IN CREW COST				
REMOVE SOIL - CREW COST	8	HR	428.00	3,424
HAUL SOIL - INCLUDED IN CREW COST	90	CY		
DISPOSE OF SOIL - INCL IN CREW COST	90	CY		
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	90	CY	8.50	765
PLACE SOIL - CREW COST	6	HR	428.00	2,568
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK - INCLUDED IN CREW COST	4	CY		
DISPOSE OF SIDEWALK-INCL IN CREW COST	4	CY		
SEED, MULCH, FERTILIZE	4428	SF	0.10	443
REPLACE FENCE - 4' CHAIN LINK	82	LF	6.00	492
CONTINGENCY ~30%				2,483
TOTAL COST OCCUPIED LOT				\$11,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

VACANT LOTS				
DISPOSAL OPTION A - 102nd STREET LANDFILL				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE TREE - CUT FLUSH TO GND & CHIP	4	EA	150.00	\$600
HAUL TREE - INCLUDED IN CREW COST				
DISPOSE OF TREE - INCLUDED IN CREW COST				
REMOVE SOIL - CREW COST	14	HR	428.00	5,992
HAUL SOIL - INCLUDED IN CREW COST	146	CY		
DISPOSE OF SOIL - INCL IN CREW COST	146	CY		
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	11	HR	428.00	4,708
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				3,739
TOTAL COST VACANT LOT				<hr/> \$17,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

WOODED LOTS				
DISPOSAL OPTION A - 102nd STREET LANDFILL				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE TREE - CUT FLUSH TO GND & CHIP	12	EA	150.00	\$1,800
HAUL TREE - INCLUDED IN CREW COST	24	CY		
DISPOSE OF TREE - INCL IN CREW COST	24	CY		
REMOVE SHRUBS & GRUB	7200	SF	0.10	720
HAUL SHRUBS - INCLUDED IN CREW COST	12	CY		
DISPOSE OF SHRUBS - INCL IN CREW COST	12	CY		
REMOVE SOIL - CREW COST	28	HR	428.00	11,984
HAUL SOIL - INCLUDED IN CREW COST	146	CY		
DISPOSE OF SOIL - INCL IN CREW COST	146	CY		
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	22	HR	428.00	9,416
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				8,119
TOTAL COST WOODED LOT				<u>\$34,000</u>

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

UNOCCUPIED LOTS SC-1				
DISPOSAL OPTION A - 102nd STREET LANDFILL	QTY	UNIT	UNIT COST	TOTAL
DESCRIPTION				
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE - INCLUDED IN CREW COST				
DISPOSE OF FENCE - INCLUDED IN CREW COST				
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE - INCLUDED IN CREW COST				
DISPOSE OF TREE - INCLUDED IN CREW COST				
REMOVE SHRUBS-CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL SHRUBS - INCLUDED IN CREW COST				
DISPOSE OF SHRUBS - INCLUDED IN CREW COST				
REMOVE SOIL - CREW COST	8	HR	428.00	3,424
HAUL SOIL - INCLUDED IN CREW COST	91	CY		
DISPOSE OF SOIL - INCL IN CREW COST	91	CY		
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK - INCLUDED IN CREW COST	4	CY		
DISPOSE OF SIDEWALK-INCL IN CREW COST	4	CY		
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	91	CY	8.50	774
PLACE SOIL - CREW COST	6	HR	428.00	2,568
SEED, MULCH, FERTILIZE	4482	SF	0.10	448
REPLACE FENCE - 4' CHAIN LINK	47	LF	6.00	282
CONTINGENCY ~30%				2,582
TOTAL COST UNOCCUPIED LOT - SC-1				\$11,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

UNOCCUPIED LOTS SC-2

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE - INCLUDED IN CREW COST				
DISPOSE OF FENCE - INCLUDED IN CREW COST				
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE - INCLUDED IN CREW COST				
DISPOSE OF TREE - INCLUDED IN CREW COST				
REMOVE SHRUBS-CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL SHRUBS - INCLUDED IN CREW COST				
DISPOSE OF SHRUBS - INCLUDED IN CREW COST				
REMOVE GARAGE (INCL FOUNDATION)	4	HR	479.00	1,916
HAUL GARAGE (INCL FOUNDATION) - INCL IN CREW COST				
DISPOSE OF GARAGE & FOUNDATION - INCL IN CREW COST				
REMOVE SOIL - CREW COST	8	HR	428.00	3,424
HAUL SOIL - INCLUDED IN CREW COST	97	CY		
DISPOSE OF SOIL - INCL IN CREW COST	97	CY		
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK - INCLUDED IN CREW COST	4	CY		
DISPOSE OF SIDEWALK-INCL IN CREW COST	4	CY		
REPLACEMENT SOIL (INCL COVER OF GARAGE AREA & -10% SWELL FACTOR)	97	CY	8.50	825
PLACE SOIL - CREW COST	8	HR	428.00	3,424
SEED, MULCH, FERTILIZE	4752	SF	0.10	475
CONTINGENCY -30%				3,014
TOTAL COST UNOCCUPIED LOT - SC-2				\$14,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

UNOCCUPIED LOTS SC-3

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION QTY UNIT UNIT COST TOTAL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE - INCLUDED IN CREW COST				
DISPOSE OF FENCE - INCLUDED IN CREW COST				
PLUG SEWER	1	LS	700.00	700
SHUT OFF & CAP WATER SERVICE	1	LS	350.00	350
DISCONNECT ELECTRICAL SERVICE	1	LS	150.00	150
MISCELLANEOUS UTILITY DISCONNECTIONS	1	LS	150.00	150
REMOVE GARAGE & FOUNDATION	4	HR	479.00	1,916
HAUL GARAGE & FOUNDATION - INCL IN CREW COST (FDN GOES IN HOUSE FOUNDATION)				
DISPOSE OF GARAGE & FOUNDATION - INCL IN CREW COST				
REMOVE HOUSE, TOP FOUNDATION WALLS, BREAK UP FLOOR, BACKFILL FOUNDATION	28	HR	479.00	13,412
HAUL HOUSE - INCL IN CREW COST				
DISPOSE OF HOUSE - INCL IN CREW COST				
BACKFILL FOUNDATION SOIL	400	CY	8.50	3,400
REMOVE ASPHALT DRIVEWAY	1.5	HR	479.00	719
HAUL ASPHALT - INCL IN CREW COST				
DISPOSE OF ASPHALT - INCL IN CREW COST				
REMOVE CONCRETE SIDEWALK	0.5	HR	479.00	240
HAUL SIDEWALK - INCL IN CREW COST				
DISPOSE OF SIDEWALK - IN HOUSE FOUNDATION AT NO COST				
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE - INCLUDED IN CREW COST				
DISPOSE OF TREE - INCLUDED IN CREW COST				
REMOVE SHRUBS-CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL SHRUBS - INCLUDED IN CREW COST				
DISPOSE OF SHRUBS - INCLUDED IN CREW COST				

SUBTOTAL \$21,407

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

UNOCCUPIED LOTS SC-3				
DISPOSAL OPTION A - 102nd STREET LANDFILL	QTY	UNIT	UNIT COST	TOTAL
DESCRIPTION				
TOTAL PREVIOUS SHEET				\$21,407
REMOVE SOIL - CREW COST	9	HR	428.00	3,852
HAUL SOIL - INCLUDED IN CREW COST	120	CY		
DISPOSE OF SOIL - INCLUDED IN CREW COST	120	CY		
REPLACEMENT SOIL (INCL COVER OF GARAGE & HOUSE AREA & ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	9	HR	428.00	3,852
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				8,929
TOTAL COST UNOCCUPIED LOT - SC-3				\$40,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

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SUMMARY SHEET - SCENARIO 1
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	19000.00	\$57,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	64000.00	1,600,000
WORK AT VACANT LOTS	54	EA	30000.00	1,620,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	19000.00	551,000
UNOCCUPIED HOUSES PER SC-1	123	EA	19000.00	2,337,000
VACANT LOTS	60	EA	30000.00	1,800,000
WOODED LOTS	61	EA	46000.00	2,806,000
MOB/DEMOB COSTS				51,000
MONTHLY OVERHEAD COST	6	MON	45000.00	270,000
TOTAL CONSTRUCTION COST SCENARIO 1				\$11,113,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

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SUMMARY SHEET - SCENARIO 2
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	19000.00	\$57,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	64000.00	1,600,000
WORK AT VACANT LOTS	54	EA	30000.00	1,620,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	19000.00	551,000
UNOCCUPIED HOUSES PER SC-2	123	EA	26000.00	3,198,000
VACANT LOTS	60	EA	30000.00	1,800,000
WOODED LOTS	61	EA	46000.00	2,806,000
MOB/DEMOB COSTS				59,000
MONTHLY OVERHEAD COST	6	MON	47000.00	282,000
TOTAL CONSTRUCTION COST SCENARIO 2				----- \$11,994,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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SUMMARY SHEET - SCENARIO 3
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
100th STREET WORK				
WORK AT OCCUPIED HOUSES	3	EA	19000.00	\$57,000
WORK AT UNOCCUPIED HOUSES PER SC-3	25	EA	64000.00	1,600,000
WORK AT VACANT LOTS	54	EA	30000.00	1,620,000
NEW FENCE	3500	LF	6.00	21,000
OCCUPIED HOUSES	29	EA	19000.00	551,000
UNOCCUPIED HOUSES PER SC-3	123	EA	64000.00	7,872,000
VACANT LOTS	60	EA	30000.00	1,800,000
WOODED LOTS	61	EA	46000.00	2,806,000
MOB/DEMOB COSTS				74,000
MONTHLY OVERHEAD COST	6	MON	52000.00	312,000
TOTAL CONSTRUCTION COST SCENARIO 3				\$16,713,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

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OCCUPIED LOTS
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
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REMOVE FENCE	82	LF	1.50	\$123
HAUL FENCE TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF FENCE IN DEMO DEB LANDFILL	1	CY	8.00	8
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE TO DEMO DEBRIS LANDFILL	2	CY	30.00	60
DISPOSE OF TREE IN DEMO DEB LANDFILL	2	CY	8.00	16
REMOVE SOIL - CREW COST	8	HR	352.00	2,816
HAUL SOIL TO SANITARY LANDFILL	90	CY	35.00	3,150
DISPOSE OF SOIL IN SANITARY LANDFILL	90	CY	45.00	4,050
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK	4	CY	30.00	120
DISPOSE OF SIDEWALK	4	CY	8.00	32
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	90	CY	8.50	765
PLACE SOIL - CREW COST	6	HR	352.00	2,112
SEED, MULCH, FERTILIZE	4428	SF	0.10	443
REPLACE FENCE - 4' CHAIN LINK	82	LF	6.00	492
CONTINGENCY ~30%				4,081
TOTAL COST OCCUPIED LOT				----- \$19,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

VACANT LOTS				
DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE TREE - CUT FLUSH TO GND & CHIP	4	EA	150.00	\$600
HAUL TREE TO DEMO DEBRIS LANDFILL	8	CY	30.00	240
DISPOSE OF TREE IN DEMO DEB LANDFILL	8	CY	8.00	64
REMOVE SOIL - CREW COST	14	HR	352.00	4,928
HAUL SOIL TO SANITARY LANDFILL	146	CY	35.00	5,110
DISPOSE OF SOIL IN SANITARY LANDFILL	146	CY	45.00	6,570
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	11	HR	352.00	3,872
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				6,655
TOTAL COST VACANT LOT				\$30,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

WOODED LOTS				
DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE TREE - CUT FLUSH TO GND & CHIP	12	EA	150.00	\$1,800
HAUL TREE TO DEMO DEBRIS LANDFILL	24	CY	30.00	720
DISPOSE OF TREE IN DEMO DEB LANDFILL	24	CY	8.00	192
REMOVE SHRUBS & GRUB	7200	SF	0.10	720
HAUL SHRUBS	12	CY	30.00	360
DISPOSE OF SHRUBS	12	CY	8.00	96
REMOVE SOIL - CREW COST	28	HR	352.00	9,856
HAUL SOIL TO SANITARY LANDFILL	146	CY	35.00	5,110
DISPOSE OF SOIL IN SANITARY LANDFILL	146	CY	45.00	6,570
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	22	HR	352.00	7,744
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				10,871
TOTAL COST WOODED LOT				<hr/> \$46,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

JOB # 6654-20

LOCATION: NIAGARA FALLS, NEW YORK

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

UNOCCUPIED LOTS SC-1				
DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF FENCE IN DEMO DEB LANDFILL	1	CY	8.00	8
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE TO DEMO DEBRIS LANDFILL	2	CY	30.00	60
DISPOSE OF TREE IN DEMO DEB LANDFILL	2	CY	8.00	16
REMOVE SHRUBS-CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL SHRUBS TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF SHRUBS IN DEMO DEB LANDFILL	1	CY	8.00	8
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK	4	CY	30.00	120
DISPOSE OF SIDEWALK	4	CY	8.00	32
REMOVE SOIL - CREW COST	8	HR	352.00	2,816
HAUL SOIL TO SANITARY LANDFILL	91	CY	35.00	3,185
DISPOSE OF SOIL IN SANITARY LANDFILL	91	CY	45.00	4,095
REPLACEMENT SOIL (INCL ~10% SWELL FACTOR)	91	CY	8.50	774
PLACE SOIL - CREW COST	6	HR	352.00	2,112
SEED, MULCH, FERTILIZE	4482	SF	0.10	448
REPLACE FENCE - 4' CHAIN LINK	47	LF	6.00	282
CONTINGENCY ~30%				4,062
TOTAL COST UNOCCUPIED LOT - SC-1				\$19,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

UNOCCUPIED LOTS SC-2				
DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF FENCE IN DEMO DEB LANDFILL	1	CY	8.00	8
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE TO DEMO DEBRIS LANDFILL	2	CY	30.00	60
DISPOSE OF TREE IN DEMO DEB LANDFILL	2	CY	8.00	16
REMOVE SHRUBS-CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL SHRUBS TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF SHRUBS IN DEMO DEB LANDFILL	1	CY	8.00	8
REMOVE GARAGE AND FOUNDATION	4	HR	403.00	1,612
HAUL GAR AND FDN TO DEMO DEBRIS LDFL	70	CY	30.00	2,100
DISP OF GAR AND FDN IN DEMO DEB LDFL	70	CY	8.00	560
REMOVE & REPLACE DAMAGED SIDEWALK	46	LF	12.00	552
HAUL SIDEWALK	4	CY	30.00	120
DISPOSE OF SIDEWALK	4	CY	8.00	32
REMOVE SOIL - CREW COST	8	HR	352.00	2,816
HAUL SOIL TO SANITARY LANDFILL	97	CY	35.00	3,395
DISPOSE OF SOIL IN SANITARY LANDFILL	97	CY	45.00	4,365
REPLACEMENT SOIL (INCL COVER OF GARAGE AREA & ~10% SWELL FACTOR)	97	CY	8.50	825
PLACE SOIL - CREW COST	8	HR	352.00	2,816
SEED, MULCH, FERTILIZE	4752	SF	0.10	475
CONTINGENCY ~30%				5,810
TOTAL COST UNOCCUPIED LOT - SC-2				\$26,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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UNOCCUPIED LOTS SC-3
 DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE FENCE	47	LF	1.50	\$71
HAUL FENCE TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF FENCE IN DEMO DEB LANDFILL	1	CY	8.00	8
PLUG SEWER	1	LS	700.00	700
SHUT OFF & CAP WATER SERVICE	1	LS	350.00	350
DISCONNECT ELECTRICAL SERVICE	1	LS	150.00	150
MISCELLANEOUS UTILITY DISCONNECTIONS	1	LS	150.00	150
REMOVE GARAGE & FOUNDATION	4	HR	403.00	1,612
HAUL FOUNDATION - INCL IN CREW COST (FDN GOES IN HOUSE FOUNDATION)				
DISPOSE OF FOUNDATION - INCL IN CREW COST (FDN GOES IN HOUSE FOUNDATION)				
HAUL GARAGE TO DEMO DEBRIS LANDFILL	50	CY	30.00	1,500
DISPOSE OF GARAGE IN DEMO DEBRIS LDFL	50	CY	8.00	400
REMOVE HOUSE, TOP FOUNDATION WALLS, BREAK UP FLOOR, BACKFILL FOUNDATION	28	HR	403.00	11,284
HAUL HOUSE TO DEMO DEBRIS LANDFILL	250	CY	30.00	7,500
DISPOSE OF HOUSE IN DEMO DEBRIS LDFL	250	CY	8.00	2,000
BACKFILL FOUNDATION SOIL	440	CY	8.50	3,740
REMOVE ASPHALT DRIVEWAY	1.5	HR	403.00	605
HAUL ASPHALT TO DEMO DEBRIS LANDFILL	12	CY	30.00	360
DISPOSE OF ASPHALT IN DEMO DEBRIS LDFL	12	CY	8.00	96
REMOVE CONCRETE SIDEWALK	0.5	HR	403.00	202
HAUL SIDEWALK - INCL IN CREW COST				
DISPOSE OF SIDEWALK - IN HOUSE FOUNDATION AT NO COST				
REMOVE TREE - CUT FLUSH TO GND & CHIP	1	EA	150.00	150
HAUL TREE TO DEMO DEBRIS LANDFILL	2	CY	30.00	60
DISPOSE OF TREE IN DEMO DEB LANDFILL	2	CY	8.00	16
REMOVE SHRUBS - CUT FLUSH TO GND & CHP	1	EA	150.00	150
HAUL SHRUBS TO DEMO DEBRIS LANDFILL	1	CY	30.00	30
DISPOSE OF SHRUBS IN DEMO DEB LANDFILL	1	CY	8.00	8

SUBTOTAL \$31,171

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

UNOCCUPIED LOTS SC-3				
DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TOTAL PREVIOUS SHEET				\$31,171
REMOVE SOIL - CREW COST	9	HR	352.00	3,168
HAUL SOIL TO SANITARY LANDFILL	120	CY	35.00	4,200
DISPOSE OF SOIL IN SANITARY LANDFILL	120	CY	45.00	5,400
REPLACEMENT SOIL (INCL COVER OF GARAGE & HOUSE AREA & ~10% SWELL FACTOR)	146	CY	8.50	1,241
PLACE SOIL - CREW COST	9	HR	352.00	3,168
SEED, MULCH, FERTILIZE	7200	SF	0.10	720
CONTINGENCY ~30%				14,933
TOTAL COST UNOCCUPIED LOT - SC-3				\$64,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

SITE MOB & DEMOB SC-1 DISPOSAL OPTION A - 102nd STREET LANDFILL				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	7	EA	500.00	3,500
DOZER, 105 HP	7	EA	500.00	3,500
12 CY DUMP TRUC	14	EA	250.00	3,500
WATER TRUCK	7	EA	250.00	1,750
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	7	EA	500.00	3,500
DOZER, 105 HP	7	EA	500.00	3,500
12 CY DUMP TRUC	14	EA	250.00	3,500
WATER TRUCK	7	EA	250.00	1,750
CONTINGENCY ~30%				12,500
TOTAL MOB/DEMOB SC-1 DISPOSAL OPTION A				\$55,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

SITE MOB & DEMOB SC-2 DISPOSAL OPTION A - 102nd STREET LANDFILL				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	9	EA	500.00	4,500
DOZER, 105 HP	9	EA	500.00	4,500
12 CY DUMP TRUC	18	EA	250.00	4,500
WATER TRUCK	9	EA	250.00	2,250
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	9	EA	500.00	4,500
DOZER, 105 HP	9	EA	500.00	4,500
12 CY DUMP TRUC	18	EA	250.00	4,500
WATER TRUCK	9	EA	250.00	2,250
CONTINGENCY ~30%				14,500
TOTAL MOB/DEMOB SC-2 DISPOSAL OPTION A				\$64,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK
 ENGINEER: E. C. JORDAN, CO.
 ESTIMATOR: P. R. MARTIN

JOB # 6654-20

SITE MOB & DEMOB SC-3 DISPOSAL OPTION A - 102nd STREET LANDFILL				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	13	EA	500.00	6,500
DOZER, 105 HP	13	EA	500.00	6,500
12 CY DUMP TRUC	26	EA	250.00	6,500
WATER TRUCK	13	EA	250.00	3,250
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	13	EA	500.00	6,500
DOZER, 105 HP	13	EA	500.00	6,500
12 CY DUMP TRUC	26	EA	250.00	6,500
WATER TRUCK	13	EA	250.00	3,250
CONTINGENCY ~30%				19,500
TOTAL MOB/DEMOB SC-3 DISPOSAL OPTION A				\$83,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

SITE MOB & DEMOB SC-1 DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	7	EA	500.00	3,500
DOZER, 105 HP	7	EA	500.00	3,500
12 CY DUMP TRUC	7	EA	250.00	1,750
WATER TRUCK	7	EA	250.00	1,750
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	7	EA	500.00	3,500
DOZER, 105 HP	7	EA	500.00	3,500
12 CY DUMP TRUC	7	EA	250.00	1,750
WATER TRUCK	7	EA	250.00	1,750
CONTINGENCY ~30%				12,000
TOTAL MOB/DEMOB SC-1 DISPOSAL OPTION B				\$51,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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SITE MOB & DEMOB SC-2
 DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	9	EA	500.00	4,500
DOZER, 105 HP	9	EA	500.00	4,500
12 CY DUMP TRUC	9	EA	250.00	2,250
WATER TRUCK	9	EA	250.00	2,250
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	9	EA	500.00	4,500
DOZER, 105 HP	9	EA	500.00	4,500
12 CY DUMP TRUC	9	EA	250.00	2,250
WATER TRUCK	9	EA	250.00	2,250
CONTINGENCY ~30%				14,000
TOTAL MOB/DEMOB SC-2 DISPOSAL OPTION B				\$59,000

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT
 LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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SITE MOB & DEMOB SC-3
 DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE, MOB/DEMOB	2	EA	2000.00	\$4,000
SETUP	2	EA	500.00	1,000
STORAGE, MOB/DEMOB	1	EA	500.00	500
SETUP	1	EA	250.00	250
DECON, MOB/DEMOB	2	EA	1000.00	2,000
SETUP	2	EA	500.00	1,000
UTILITY CONNECTIONS	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
DECON MATERIALS & EQUIPMENT - SPRAYERS, WASHERS, SUPPLIES	1	LS	2500.00	2,500
EQUIPMENT MOBILIZATION				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	13	EA	500.00	6,500
DOZER, 105 HP	13	EA	500.00	6,500
12 CY DUMP TRUC	13	EA	250.00	3,250
WATER TRUCK	13	EA	250.00	3,250
EQUIPMENT DEMOB				
DEMO CREW - BACKHOE, 2 CY	1	EA	1000.00	1,000
DOZER, 105 HP	1	EA	500.00	500
12 CY DUMP TRUCK	2	EA	250.00	500
SOIL CREWS - BACKHOE/LOADER	13	EA	500.00	6,500
DOZER, 105 HP	13	EA	500.00	6,500
12 CY DUMP TRUC	13	EA	250.00	3,250
WATER TRUCK	13	EA	250.00	3,250
CONTINGENCY ~30%				17,000
TOTAL MOB/DEMOB SC-3 DISPOSAL OPTION B				\$74,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

MONTHLY OVERHEAD COSTS SC-1

DISPOSAL OPTION A - 102nd STREET LANDFILL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	2500	GAL	1.50	3,750
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (52 MEN/DAY)	1	LS	5460.00	5,460
DECON SUPPLIES	1	LS	1000.00	1,000
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500
CONTINGENCY ~30%				11,190
TOTAL MONTHLY COST FOR SC-1 DISPOSAL OPTION A				\$47,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

MONTHLY OVERHEAD COSTS SC-2

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION QTY UNIT UNIT COST TOTAL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	3000	GAL	1.50	4,500
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (64 MEN/DAY)	1	LS	6720.00	6,720
DECON SUPPLIES	1	LS	1500.00	1,500
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500

CONTINGENCY ~30% 11,680

TOTAL MONTHLY COST FOR SC-2 \$50,000
DISPOSAL OPTION A

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

MONTHLY OVERHEAD COSTS SC-3

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION QTY UNIT UNIT COST TOTAL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	4200	GAL	1.50	6,300
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (88 MEN/DAY)	1	LS	9240.00	9,240
DECON SUPPLIES	1	LS	2000.00	2,000
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500
CONTINGENCY ~30%				12,860

TOTAL MONTHLY COST FOR SC-3
DISPOSAL OPTION A

\$56,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

MONTHLY OVERHEAD COSTS SC-1
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	2100	GAL	1.50	3,150
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (44 MEN/DAY)	1	LS	4620.00	4,620
DECON SUPPLIES	1	LS	1000.00	1,000
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500
CONTINGENCY ~30%				10,630

TOTAL MONTHLY COST FOR SC-1
DISPOSAL OPTION B

\$45,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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MONTHLY OVERHEAD COSTS SC-2
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
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TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	2500	GAL	1.50	3,750
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (54 MEN/DAY)	1	LS	5670.00	5,670
DECON SUPPLIES	1	LS	1200.00	1,200
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500
CONTINGENCY ~30%				10,780
TOTAL MONTHLY COST FOR SC-2 DISPOSAL OPTION B				\$47,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

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MONTHLY OVERHEAD COSTS SC-3
DISPOSAL OPTION B - OFF SITE LANDFILLS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRAILER - OFFICE	2	EA	200.00	\$400
STORAGE	1	EA	150.00	150
DECON	2	EA	500.00	1,000
UTILITIES	1	LS	1000.00	1,000
OFFICE EQUIPMENT	2	EA	500.00	1,000
PORTABLE TOILETS	4	EA	100.00	400
WATER COOLERS	4	EA	100.00	400
WATER	3500	GAL	1.50	5,250
PICKUP	2	EA	500.00	1,000
UNIFORMS FOR WORKING CREWS (74 MEN/DAY)	1	LS	7770.00	7,770
DECON SUPPLIES	1	LS	1700.00	1,700
OFFICE SUPPLIES	1	LS	1250.00	1,250
OFFICE STAFF				
SITE SUPERINTENDANT	1	EA	5000.00	5,000
SITE ENGINEER	2	EA	2500.00	5,000
ADMIN CLERK	1	EA	1500.00	1,500
LABORER	3	EA	2500.00	7,500
CONTINGENCY ~30%				11,680
TOTAL MONTHLY COST FOR SC-3 DISPOSAL OPTION B				\$52,000

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

JOB # 6654-20

LOCATION: NIAGARA FALLS, NEW YORK

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

DEMOLITION CREW

DISPOSAL OPTION A - 102nd STREET LANDFILL
DESCRIPTION QTY UNIT UNIT COST TOTAL

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
EQUIPMENT OPERATOR	16	HR	43.50	\$696
TRUCK DRIVER	16	HR	28.00	448
LABORER	16	HR	29.50	472
BACKHOE - 2 CY	1	DAY	1020.00	1,020
DOZER - 105 HP	1	DAY	432.00	432
DUMP TRUCK - 12 CY	2	DAY	381.00	762

DAILY CREW COST
DISPOSAL OPTION A

\$3,830
x 1/8

HOURLY CREW COST
DISPOSAL OPTION A

\$479

DATE:17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK

JOB # 6654-20

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

DIRT WORK CREW				
DISPOSAL OPTION A - 102nd STREET LANDFILL	QTY	UNIT	UNIT COST	TOTAL
DESCRIPTION				
EQUIPMENT OPERATOR	16	HR	43.50	\$696
TRUCK DRIVER	24	HR	28.00	672
LABORER	8	HR	29.50	236
BACKHOE/LOADER	1	DAY	365.00	365
DOZER - 105 HP	1	DAY	432.00	432
DUMP TRUCK - 12 CY	2	DAY	381.00	762
WATER TRUCK	1	DAY	260.00	260

DAILY CREW COST
DISPOSAL OPTION A

\$3,423
x 1\8

HOURLY CREW COST
DISPOSAL OPTION A

\$428

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

JOB # 6654-20

LOCATION: NIAGARA FALLS, NEW YORK

ENGINEER: E. C. JORDAN, CO.

ESTIMATOR: P. R. MARTIN

DEMOLITION CREW				
DISPOSAL OPTION B - OFF SITE LANDFILLS	QTY	UNIT	UNIT COST	TOTAL
DESCRIPTION				
EQUIPMENT OPERATOR	16	HR	43.50	\$696
TRUCK DRIVER	8	HR	28.00	224
LABORER	16	HR	29.50	472
BACKHOE - 2 CY	1	DAY	1020.00	1,020
DOZER - 105 HP	1	DAY	432.00	432
DUMP TRUCK - 12 CY	1	DAY	381.00	381

DAILY CREW COST
DISPOSAL OPTION B

HOURLY CREW COST
DISPOSAL OPTION B

\$3,225
x 1\8

\$403

DATE: 17-Apr-91

UNIT COST ESTIMATING WORKSHEET

PROJECT: LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT
LOCATION: NIAGARA FALLS, NEW YORK
ENGINEER: E. C. JORDAN, CO.
ESTIMATOR: P. R. MARTIN

JOB # 6654-20

DIRT WORK CREW DISPOSAL OPTION B - OFF SITE LANDFILLS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
EQUIPMENT OPERATOR	16	HR	43.50	\$696
TRUCK DRIVER	16	HR	28.00	448
LABORER	8	HR	29.50	236
BACKHOE/LOADER	1	DAY	365.00	365
DOZER - 105 HP	1	DAY	432.00	432
DUMP TRUCK - 12 CY	1	DAY	381.00	381
WATER TRUCK	1	DAY	260.00	260

DAILY CREW COST	\$2,818
DISPOSAL OPTION B	x 1/8
HOURLY CREW COST	\$352
DISPOSAL OPTION B	

BREAKDOWN OF LOT TYPES

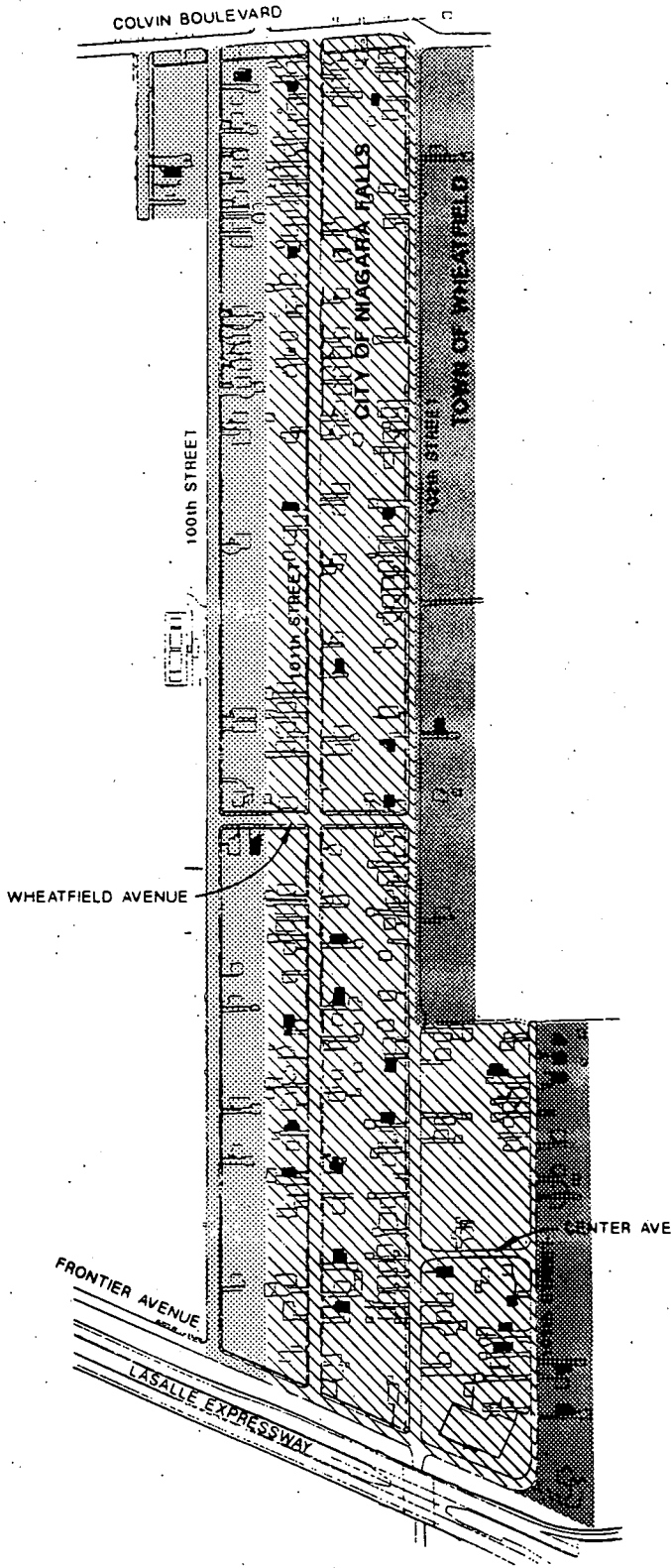
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

LOT TYPE	AREA GROUPING				Total
	I	II	III	II & III	
<u>All Lots, House and Vacant</u>					
Total Area (sf)	589,000	1,414,900	547,300	1,962,200	2,551,200
Total Number of Lots	82	197	76	273	355
<u>House Lots</u>					
Total Area of House Lots (sf)	201,600	986,400	108,000	1,094,400	1,296,000
Total Number of House Lots	28	137	15	152	180
<u>Vacant Lots</u>					
Total Area of Vacant Lots (sf)	387,400	428,500	439,300	867,800	1,255,200
Number of Vacant Lots	54	60	61	121	175



LEGEND

- OCCUPIED HOUSE
- UNOCCUPIED HOUSE
- ▨ AREA I
- ▧ AREA II
- ▩ AREA III



**FIGURE A-1
SCHEME OF AREAS I, II, AND III
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT**

EC.JORDANCO

NUMBER OF HOUSES AND SIZES OF AREAS

LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

Area Description	Area Grouping	Area (sf)	Area (acres)
Total Area in EDA 2 and 3	I, II, & III	2,551,165	58.6
Area in Buffer Zone	I	589,020	13.5
Area Along 102nd and 103rd streets	III	547,260	12.6
Area Not in Buffer Zone	II & III	1,962,145	45.0
Area Not in Buffer Zone or Area III	II	1,414,885	32.5

House Type	Grouping of Area					Percent
	I	II	III	II & III	I, II, & III	
Occupied Houses	3	23	6	29	32	---
# of Garages	1	12	5	17	18	56.3%
# of Driveways	3	22	5	27	30	93.8%
# of Sidewalks	3	14	2	16	19	59.4%
Unoccupied Houses	25	114	9	123	148	---
# of Garages	10	57	7	64	74	50.0%
# of Driveways	22	101	7	108	130	87.8%
# of Sidewalks	18	69	2	71	89	60.1%
Occupied and Unoccupied Houses	28	137	15	152	180	---
# of Garages	11	69	12	81	92	51.1%
# of Driveways	25	123	12	135	160	88.9%
# of Sidewalks	21	83	4	87	108	60.0%

LINEAR FEET OF FENCING
LOVE CANAL EDA 2 AND 3
NYSDEC SUPERFUND STANDBY CONTRACT

Linear feet of Fencing, Entire EDA 2 and 3

Type of lot/fence	Front and Sides	Back	Total	If per lot
Occupied	2182	449	2631	82
Unoccupied	5536	1462	6998	47
Total	7718	1911	9629	53
Per Lot Basis	43	11	53	—

Linear Feet of Fencing, Buffer Zone along 100th Street

Type of lot/fence	Front and Sides	Back	Total	If per lot
Occupied	260	280	540	180
Unoccupied	391	1053	1444	58
Total	651	1333	1984	71
Per Lot Basis	23	48	71	—

Linear Feet of Fencing to Be Replaced

Scenario	If of back fence
Scenario 1	8098 (1)
Scenario 2	3472 (2)
Scenario 3	3472 (2)

Notes:

All units are in linear feet (lf).

1. Includes fencing along back of properties in Areas I and II.
2. 3472 lf of fence to be replaced in Buffer Zone, Area I in each scenario.

CALCULATION OF QUANTITIES

LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

Parameter / Area #	I	II	III	II & III	Total
<u>Total volume of soil to be removed (cy) (1)</u>					
Scenario 1 (2)	10,150	19,302	9,380	28,682	38,832
Scenario 2 (3)	10,150	19,830	9,444	29,275	39,425
Scenario 3	10,150	22,264	9,609	31,873	42,023
<u>Volume of Soil From Vacant Lots (cy) (4)</u>					
All Scenarios	7,200	8,000	8,133	16,133	23,200
All Scenarios, Per Lot Basis	133	133	133	133	133
<u>Volume of Soil From House Lots (5)</u>					
Scenario 1	2,950	11,302	1,246	12,549	15,632
Scenario 2	2,950	11,830	1,311	13,141	16,225
Scenario 3	2,950	14,264	1,476	15,740	18,823
<u>Volume of Soil From Occupied House Lots (6)</u>					
All Scenarios	245	1,873	491	2,364	2,609
All Scenarios, Per Lot Basis	82	81	82	82	82
<u>Volume of Soil From Unoccupied House Lots (cy) (7)</u>					
Scenario 1	2,705	9,429	756	10,185	12,890
Scenario 1, Per Lot Basis	108	83	84	83	87
Scenario 2	2,705	9,957	820	10,777	13,482
Scenario 2, Per Lot Basis	108	87	91	88	91
Scenario 3	2,705	12,391	985	13,376	16,081
Scenario 3, Per Lot Basis	108	109	109	109	109
<u>Miscellaneous Items</u>					
Replacement of Fences (8)	3,472	4,626	0	4,626	8,098
Linear feet of Sidewalk	4,569	11,417	0	11,417	15,986

CALCULATION OF QUANTITIES

LOVE CANAL EDA 2 AND 3 NYSDEC SUPERFUND STANDBY CONTRACT

Notes:

1. Volumes of soil to be removed from Area I, the "Buffer Zone", are the same for each scenario as this area will be treated the same in any scenario.
2. The volumes contributed by Areas II and III for scenario 1 account for the areas occupied by houses, garages, sidewalks, and driveways because structures would not be removed.
3. The volumes contributed by Areas II and III for scenario 2 account for the area occupied by houses, sidewalks, and driveways because these items would not be removed. The volume of soil beneath the garage is included in this calculation.
4. In Area III vacant lots are considered wooded lots for cost estimation purposes of tree removal.
5. Calculated by subtracting the volume from vacant lots from the total volume.
6. Calculated by subtracting out the total amount of area occupied by houses, garages, driveways, and sidewalks for the 7200 sf lot.
7. Calculated by subtracting the volume of soil from occupied house lots from the volume of soil from house lots (sum of occupied and unoccupied).
8. Linear feet of fence to be replaced will be the same in all scenarios for Area I. For Areas II and III, fences will be replaced only in Scenario 1.

CALCULATION OF FILL VOLUMES
 LOVE CANAL EDA 2 AND 3
 NYSDEC SUPERFUND STANDBY CONTRACT

Parameter	Grouping of Areas				
	I	II	III	II & III	I, II, & III
<u>Unoccupied House Lots</u>					
Scenario 1	3,333	9,494	754	10,248	13,581
Scenario 1, Per Lot Basis	133	83	84	83	92
Scenario 2	3,333	10,022	819	10,840	14,174
Scenario 2, Per Lot Basis	133	88	91	88	96
Scenario 3	3,333	15,200	1,200	16,400	19,733
Scenario 3, Per Lot Basis	133	133	133	133	133
<u>Occupied House Lots</u>					
All Scenarios	245	1,873	491	2,364	2,609
All Scenarios, Per Lot Basis	82	81	82	82	82
<u>Volume of Fill For House Lots</u>					
Scenario 1	3,578	11,367	1,244	12,612	16,190
Scenario 2	3,578	11,895	1,309	13,204	16,782
Scenario 3	3,578	17,073	1,691	18,764	22,342
<u>Volume of Fill For Vacant Lots</u>					
All Scenarios	7,200	8,000	8,133	16,133	23,200
All Scenarios, Per Lot Basis	133	133	133	133	133
<u>Total Volume of Fill Required</u>					
Scenario 1	10,800	19,400	9,400	28,800	39,400
Scenario 2	10,800	19,900	9,400	29,300	40,000
Scenario 3	10,800	25,100	9,800	34,900	45,500

CALCULATION OF FILL VOLUMES

LOVE CANAL EDA 2 AND 3 NYSDEC SUPERFUND STANDBY CONTRACT

Notes:

1. For Occupied lots, volume of fill accounts for all remaining structures.
2. The same amount of fill would be required for wooded and vacant lots.
3. Fill calculations for Unoccupied house lots in Area I are the same for each of the three scenarios. All structures will be removed from unoccupied house lots in the "Buffer Zone."
4. For Areas II and III, fill calculations are different for each of the three scenarios. For scenario 1, calculations account for the fact that no structures would be removed from the lots. Calculations for scenario 2 account for the area of the removed garage requiring fill. Calculations for scenario 3 account for the fact that all structures would be removed from the lots.

PROJECT Love Canal EDA 2, 3 CAR	COMP. BY ID	JOB NO. 6654-20
	CHK. BY	DATE 3/20/91

TREES:

Estimate of number of trees to be removed:

461 trees to 1068 trees
 lower estimate → upper estimate

461 ⇒ assumes 25% of trees on house lots & vacant lots to be removed (4 trees/lot) plus 50% of trees on wooded areas of 102nd and 103rd St.

4 trees/lot ≈ 24 trees/acre, wooded area ≈ 50 trees/acre

$235 + 226 = 461$

1068 ⇒ assumes 25% removal of trees on lots with houses (24 trees/acre) plus 50% removal on vacant lots (50 trees/acre) plus 75% removal in wooded areas along 102nd and 103rd St to 140 ft east of street (100 trees/acre)

$180 + 183 + 705 = 1068$

Fences:

the following chart gives the linear ft broken down by occupied, unoccupied, sides and front, and back categories

	Front & Sides	Back	Total
Occupied	2182	449	2631
Unoccupied	5536	1462	6998
Total	7718	1911	9629

PROJECT
Love Canal EDA 2 of 3

COMP. BY
TD
CHK. BY

JOB NO.
6654-20
DATE
3/20/91

Number of Houses:

Total number of houses = 180

Total occupied houses = 32
(as supplied by LCARA)

Total unoccupied houses = 148

PROJECT Love Canal EOA 2 & 3 Air Monitoring Cost Estimate	COMP. BY EP	JOB NO. 6654-20
	CHK. BY	DATE 3-25-91

I. Project Scoping and Mobilization (one-time charge)

Scoping and Methods Development	8 hr P3	
Equip Prep + procurement	16 hr P2	
Pt. Mgt	8 hr P3	
Sr Review	2 hr P4	
Purchasing	4 hr T3	= 2,500
Calibrator kit (purchase)	400	TOTAL \$4,750
Sampling equip (purchase)	1,500	
MISC. OOC	250	= 2250

II. Baseline Air Monitoring (one-time charge)

<u>labor</u>	
Prep	8 hr P2
Pt. Mgt	8 hr P3
Travel (RT)	24 hr P2
On-site (4 days)	42 hr P2
Data Red.	12 hr P2
Report Prep	8 hr P3
	8 hr P2
	8 hr P3
Sr Review	4 hr P4
Chemical	8 hr C
	<hr/>
	= 28,000

<u>OOC:</u>	Mix-C	\$500
	PC clean	600
	Shipping	800
	Computer	500
	MISC.	200
	Aust monitor	350 /wk = 350
	PS-7 samplers	3 @ 275/wk = 825
	Puf media	\$30
	Filter media	25
	Nel station	600

Analysis : 10 Puf @ 250 = 2,500

Total OOC = 6,650
+ Anal.

Total Baseline
= 14,650

PROJECT
Love Canal cont'd

COMP. BY
SP
CHK. BY

JOB NO.
6654-20
DATE
3-25-91

* III. Excavation Air Monitoring

A. Mobilization / De-mobilization (one time charges)

P.M. 8 hr P3	OOB:	
Prep 12 hr P2	Shipping - \$1,550	
Travel (RT) 24 hr P2	Misc. 250	
Site set-up 12 hr P2	Mileage 500	
Site De-Mob 12 hr P2		1,750
Final Report 16 hr P2		
Sr Renew 4 hr P4		
Clerical 8 hr C		
=		~ 7,000
		Total = \$ 8,750

B. Weekly Monitoring (per week)

on-site 50 hr P2	
P.M. + Data Review 8 hr P3	
	= ~ 3,500

OOB:
Analysis - 10 P.M. @ 250 = 2,500 / wk
10 Badges @ 225 = 2,225 / wk

P.M. media \$30/wk	
filter media - 25/wk	
Badges - 30/wk	
PS-1 samplers 3 x 275/wk = 825	
NET station 600/wk	
Dust monitor 350/wk	
Shipping 150/wk	
Computer 400/wk	
cell diam 550/wk	
Car rental 200/wk	
Misc. 250/wk	
	Total OOB = 8,000
	Total / wk = \$ 11,500

* Note - This cost does not include employees returning home for the weekend - or the cost of their per diem for weekends.

PROJECT Love Canal - Air Monitoring Cost Summary	COMP. BY JP	JOB NO. 6654-20
	CHK. BY	DATE 3-25-91

I. Project Setup + Mobilization

labor \$2,550
O&C 2,250
 Total \$4,750

II. Baseline Air Monitoring

labor 8,000
O&C 6,650
 Total 14,650

III. Excavation Air Monitoring

A. Mob / De Mob (one time)

labor 7,000
O&C 1,750
 Total 8,750

B. Weekly Monitoring (per week)

labor \$3,500
O&C 8,050

Total \$11,500 /wk (6 month construction project = 26 weeks)

Assumptions/Notes:

- 1) weekend travel/per diem not included
- 2) assumed power available at the site
- 3) weekly monitoring assumes 3/wk PAH sampling and 5/wk worker monitoring
- 4) Extended program may justify equip. purchase rather than the quoted rental rates
- 5) This is a budgetary guide.