PROPOSAL

LAND APPLICATION OF

PETROLEUM CONTAMINATED SOILS

AT

THE NUWAY COOPERATIVE PROPERTY

SHERBURN, MINNESOTA

PREPARED FOR:

NUWAY COOPERATIVES

TRIMONT & DUNNELL, MINNESOTA

PREPARED BY:

LAND O' LAKES, INC.

4001 LEXINGTON AVENUE NORTH

ARDEN HILLS, MINNESOTA 55126

This report was prepared by me or under my direct supervision.

Larry A. Berndt, P.M.
Hydrogeologist

David J. Watterson
Geologist

STATE OF MINNESOTA - Office Memorandum

DEPARTMENT: Minnesota Pollution Control Agency

PHONE: 643-3460

DATE: February 28, 1991

TO: Project Managers LUST/Spills
Tanks and Spills Section
Hazardous Waste Division

FROM: Ann Bidwell
Tanks and Spills Section
Hazardous Waste Division

CC: Becky Lofgren

SUBJECT: Single Site Land App Applications

Several Single Site Land App applications were on George Johnson's desk when I went through the pile to determine what was what and find any landspreading facility permit applications that have been submitted. Apparently George had offered to help people out with (and actually solicited) processing of these single site applications although that was not officially his responsibility. He was being helpful. Many of the applications were received as long ago as last summer. My gut feeling is that the majority of these applications have received approval letters as of this time. Otherwise, I'm sure you'd have heard from the RP/Consultant by now!

Becky Lofgren agreed that these should be returned to the appropriate project manager for further action. You'll find applications corresponding to your leaksite numbers attached. If George did get the site approved, the site application form should be filed along with a copy of the approval letter in the project managers leaksite file. Another copy of the approval letter should be on file in the Soil Treatment Log. If the application has not been processed to date, the application should be sent out to the regional staff for processing and approval. (I believe that's the current agreement!)

I regret that I'm not in the position at this time to follow through with processing and approval of these single site applications. I will try, however, to answer any soil landfarming related questions you might have. And, although I can't speak for Ron, Chris, and Pat, I bet they would also be available to answer specific questions on landfarming site suitability. Thanks for your understanding in this matter.

Land O'Lakes, Inc.
4001 LEXINGTON AVE. N., ARDEN HILLS, MINNESOTA
Mailing address: P.O. Box 116, Minneapolis, MN 55440
Telephone: (612) 481-2222

September 11, 1990

Mr. George Johnson
Minnesota Pollution Control Agency
Tanks and Spill Section
520 Lafayette Road
St. Paul, MN 55155

Re: Trimont/Dunnel NuWay Co-op, Leak #'s 00001607 and 00001421 respectively. Soil disposal application.

MARK KOPLITZ

Dear George:

Enclosed, Please find an application for disposal of petroleum contaminated soil for the above referenced sites. As indicated in the May 17, 1990 letter from Mr. Mark Koplitz of the MPCA to Mr. Jim Lorentz of the NuWay Cooperative, one application has been prepared for both sites.

Since the time of soil excavation and stockpiling at the Trimont site, the property in which the soil is stockpiled has changed ownership. Do to the extended time frame in locating a disposal site, the new property owner has taken legal action against the NuWay co-op.

The NuWay co-op would very much appreciate an expideted review and approval of their application to allow them to remove the soil from the property. Any help you may have with this situation is greatly apprcciated.

Sincerely,

Larry A. Berndt

Bruce A. Liesch Associates, Inc.
Under Contract of Land O Lakes, Inc.

LAB/ljs

TABLE OF CONTENTS

FIGURES (Following Text)

ATTACHMENTS (Following Figures)

1.0 INTRODUCTION

NuWay Cooperatives (NuWay) located in the Cities of Trimont and Dunnell propose to landspread petroleum contaminated soils for land application at the NuWay property in the City of Sherburn, Martin County, Minnesota. The legal description of the property is presented as Attachment 1. This application includes the following:

2.0 Background Information
3.0 Site and Soil Characteristics
4.0 Procedures for Land Application
5.0 Proposed Monitoring of Applied Soils

This land application of petroleum contaminated soils is designed to comply with and meet the requirements set forth by the MPCA Guidance Document "Land Application of Petroleum Contaminated Soils: Single Application Sites - April 25, 1990".

2.0 BACKGROUND INFORMATION

2.1 Disposal Site Location

The petroleum contaminated soils will be landspread on property owned by NuWay. This site is located in the NW 1/4 of the SW 1/4 of Section 6, Township 102 North, Range 32 West in the City of Sherburn, Martin County. This site location map is shown on Figure 1. A detailed site plan of the proposed landspreading area is shown on Figure 2.

2.2 Landowner Information

Name: NuWay Cooperative
Address: Box Q
Trimont, Minnesota 56176
Phone: 1-800-445-4118

2.3 Notification of Local Officials

Documents indicating notification of the appropriate local officials are provided as Attachment 2.

2.4 Topographic and Soil Maps

Site topography is included in Figure 1 (Site Location Map). The soils survey map for the proposed land application area is shown on Figure 3. See Section 3.4, Groundwater and Geologic Information, for soil classifications.

2.5 Volume of Soil to be Landspread

A total of approximately 2,200 cubic yards of petroleum contaminated soil will be landspread at the site. Attachment 3 of this application characterizes the contaminated soils.

2.6 Projected Date of Landspreading

It is anticipated that land application of the soils will occur immediately following the approval of this application by the MPCA. NuWay will notify the MPCA prior to landspreading if the MPCA so desires.

2.7 Site and Soil Characteristics

See Section 3.

2.8 Proposed Land Application Procedures

See Section 4.

2.9 Proposed Sampling, Tillage, and Reporting Schedule

See Section 5.

2.10 Previous Disposal Activities at Site

None.

3.0 SITE AND SOIL CHARACTERISTICS

3.1 Site Slope

Soils located within the site area range in slope from 0 to 2 percent as indicated by soil classification. See Figure 3 (Soil Survey Map) and Section 3.4, Groundwater and Geologic Information, for soil location and expected soil type. In addition, information acquired from the Sherburn quadrangle indicates that site slope on the proposed site area will vary depending on the line drawn but is generally flat in the area proposed for landspreading. See Figure 1 (Site Location Map) for contours.

3.2 Distance to Surface Water

The proposed landspreading site is located approximately 1,200 feet southwest of an unnamed marsh area south of Fox Lake. See Figure 1 (Site Location Map) for locations of surface water areas.

3.3 Distance to Other Structures

The proposed landspreading area is located adjacent to County State Aid Highway No. 28 to the north, Minnesota Trunk Highway No. 4 to the west and Interstate Highway No. 90

3.3 Distance to Other Structures

The proposed landspreading area is located adjacent to County State Aid Highway No. 28 to the north, Minnesota Trunk Highway No. 4 to the west and Interstate Highway No. 90 to the south. The nearest residence and well is located approximately 300 feet northwest of the proposed site. The location of each of these structures is shown on Figure 1.

3.4 Groundwater and Geologic Information

The following information regarding minimum depth to seasonal high water tables was obtained from the "detailed soil map units" section in the Soil Conservation Service (SCS) Soil Survey of Martin County, Minnesota.

Soil Type Encountered In Landspread Area	Minimum Depth To Seasonal High Water Table	Permeability In/Hr.
956 - Canisteo-Glencoe Clay Loams	1 to 3 feet	.6 to 2.0

Minimum depth to seasonal high water table at the proposed site is expected to exceed three feet. Two hand auger soil borings were advanced at the proposed site following MPCA recommendations to determine the depth to the water table. Ground water was not encountered in the borings which were completed to a depth of five feet. The approximate locations of the soil borings are shown on Figure 2 and logs of the borings are included as Attachment 4.

3.5 Soil Characteristics

Five random, native soil samples have undergone standard fertilizer test analysis including testing for extractable phosphorus (Olsen method), organic matter, pH, calcium, magnesium, potassium and soluble salts. Test analyses indicating soil characteristics of

3.6 Application Rate

The location of the landspreading of petroleum contaminated soil has been selected based on the volume of concentrations of petroleum hydrocarbons in the soil as well as the proposed application thickness.

Assume:
1. 2,200 cubic yards (c.y.) of contaminated soil
2. Landspread soils at a thickness of four-inches
3. 530 cubic yards/acre at four-inch spreading thickness

Calculations:
(2,200 c.y. soil)/530 c.y. soil per acre at four-inch thickness) = 4.1 acres
(4.1 acres) x (43,560 ft^2/acre) = 178,596 ft^2 required for landspreading.
Dimensions of Application Area: 279 x 640 feet.

4.0 PROCEDURES FOR LAND APPLICATION

This proposed approval is for a single application of contaminated soil only. The initial activity associated with land application of petroleum contaminated soil was the staking of the site area. Stakes were placed in each corner of the area proposed to be landspread at the dimensions previously described. The site area was determined based on a six-inch spreading thickness and the volume of contaminated soil to be incorporated into the top soil. Staking the site area will allow for clear identification of the land application area and for the sampling events to correlate with monitoring results.

Upon approval of the landspreading application, the contaminated soil which is stockpiled at the NuWay Coop site in Dunnell, Minnesota is to be delivered to the landspread area along with the contaminated soil which will be excavated at the NuWay Coop site in Trimont, Minnesota, and dumped on a designated segment of the site area. Soils will then be landspread and incorporated into the native soil within 48 hours after dumping. To

minimize stockpiling at the excavation and landspreading site, this procedure will be continuous. The contaminated soil will be excavated, hauled to the site, and dumped by a location contracting firm. Soils will be spread by this same contracting firm or by an area farmer. The specific equipment used will be dependent on the contractor selected. In addition to the procedure described above, the landspreading area will also be disked on a monthly basis and initially, nutrients should be applied to the landspread area in accordance with MPCA guidelines which include the addition of 60 pounds per acre of nitrogen, 40 pounds per acre of sulfur and 80 pounds per acre of phosphorus.

5.0 PROPOSED MONITORING OF APPLIED SOILS

A. The soils to be managed at the NuWay property were tested by Centrol Laboratories as part of the initial site assessment conducted by Liesch. A total of six samples were collected in June of 1990 and are reported on the attached Laboratory Report (Attachment 4).

A map showing the anticipated extent of impacted soils along with the related borehole locations at the NuWay site in Dunnell is provided in Attachment 6.

The test results and map were obtained from the "Underground Storage Tank Remedial Investigation for NuWay Cooperatives, Trimont and Dunnell, Minnesota", prepared for NuWay Cooperative, February 1990, prepared by Land O' Lakes, Inc. These reports were previously submitted to the MPCA.

B. Five composite soil samples, determined per Section 4.1 of the MPCA "Land Application of Petroleum Contaminated Soil", will be randomly collected and analyzed in June, August and October. A sample of the upper four to six-inches of soil will be collected with a small hand trowel at each sample site. The samples will be analyzed for total petroleum hydrocarbons. Sample results will be reported

in accordance with the MPCA "Soil Monitoring Results for Land - Applied Petroleum Contaminated Soil - April 25, 1990".

mas:loldunnell

APPLICATION TO LAND APPLY PETROLEUM CONTAMINATED SOIL

Minnesota Pollution Control Agency
Tanks and Spills Section
April 25, 1990

Refer to the Minnesota Pollution Control Agency (MPCA) document "Land Application of Petroleum Contaminated Soil: Single Application Sites" for specific information on acceptable soil and site criteria.

I. BACKGROUND INFORMATION

A. Tank owner/operator mailing address: contaminated

Contact: Jim Lorentz
Company name: NuWay Cooperative
Street/Box: Box Q
City, Zip: Trimont, Minnesota
Telephone: 1-800-445-4110

B. Site from which soil originated:

Company name: See Attached sheet
Street:
City, Zip:
County:

C. Address or legal descripton of land spreading site:

Contact: Legal description attached.
Street:
City, Zip:
Telephone:

MN 1/4 of SW 1/4 of Section 6,
Township 102N, Range 32W Township Name _____

D. Consultant (or other) preparing this form:

Contact: Jim Hestad
Company name: Land O' Lakes, Inc.
Street/Box: 4001 Lexington Ave. N
City, Zip: Arden Hills, MN 55126
Telephone: (612) 481-2222

E. MPCA Site ID#: LEAK0000 1421 and Leak 00001670 1607
F. Volume of soil to be land applied (cubic yards): 2200
G. Projected date of application of soil: September 5, 1990
H. Have there been past waste disposal activities at the proposed site?
No X Yes ___ , please explain.

II. SITE AND SOIL CHARACTERISTICS

A. Site slope (percent): 0-2%
B. Distance to surface water (feet or miles): 1200 Feet
C. Distance to nearest building or residence (feet): 300
D. Depth to seasonal high water table (feet): 1-3'
Depth to field tile lines (feet): Unknown
If bedrock exists at 8 feet or less, indicate depth (feet): NA
E. Area of land to be used (square feet or acres): 4.1
F. Spreading thickness (inches): 4

III. SOIL SAMPLING RESULTS

A. If soil nutrient tests were conducted, list the results below:

Sample Number	Organic Matter, Percent	Extractable Phosphorus, ppm	Total Phosphorus (Olson)
A-1	1.6	-	148 LB/ACRE
A-4	3.1	-	74 LB/ACRE
B-4	3.2	-	86 LB/ACRE

If fertilizers will be applied, provide application rates:
60 lbs. nitrogen/acre, 40 lbs. P205/acre, 80 lbs. sulfur/acre

B. Circle the type(s) of petroleum contamination: unleaded gas, (regular gas) diesel fuel, (No. 2 fuel oil) waste oil, other (please specify _____.

List the appropriate soil sample analytical results from the excavated contaminated soil (refer to the MPCA document "Soil and Ground Water Analysis at Petroleum Release Sites"). If the petroleum was not gasoline or fuel oil attach a separate table. See Attachment 5

Sample Number	THC as gas or FO ppm	Benzene ppm	Ethyl-benzene ppm	Toluene ppm	Xylene ppm	MTBE ppm	Lead ppm

NOTE: ATTACH COPIES OF LABORATORY RESULTS AND CHAIN OF CUSTODY FORMS

IV. FIGURES

Include the following figures:

A. Copy of county soil survey map (if the county has been mapped) with copies of the interpretation tables or interpretation sheets.
B. Site location map with exact application location marked (scale should be approximately one inch = 50 feet)

****

Signature and Title of MPCA Staff Inspector (or other authorized inspector):

_____ Date Inspected : _____

Signature and Title of County Official: _____

Signature and Title of City/Township Official: _____

****

Mail to:

Minnesota Pollution Control Agency
Attention: (Project Manager)
Hazardous Waste Division
Tanks and Spills Section
520 Lafayette Road
St. Paul, Minnesota 55155

I. BACKGROUND INFORMATION

B. Sites from which soil originated

Company Name:	NuWay Cooperative
Street:	Main Street
City, Zip:	Dunnell, Minnesota 56127
County:	Martin

Company Name:	NuWay Cooperative
Street:	Main Street and Highway 4
City, Zip:	Trimont, Minnesota 56176
County:	Martin

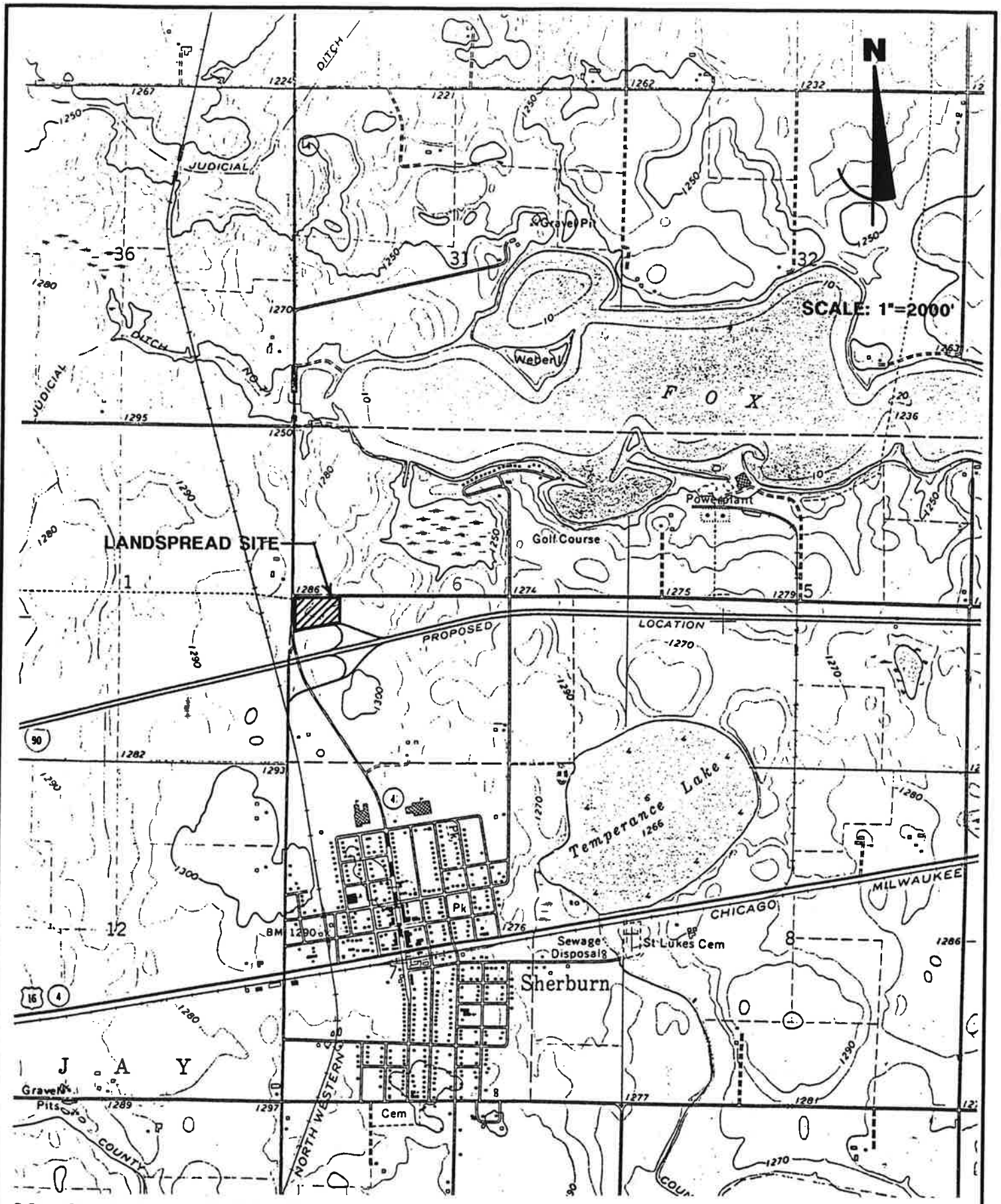
III. SOIL SAMPLING RESULTS

A. Soil nutrient tests

SAMPLE NUMBER	ORGANIC MATTER, PERCENT	TOTAL PHOSPHORUS (OLSON)
C-3	1.6	106 LB/ACRE
D-5	3.3	80 LB/ACRE
E-1	1.5	60 LB/ACRE

mas:go9-12

FIGURES

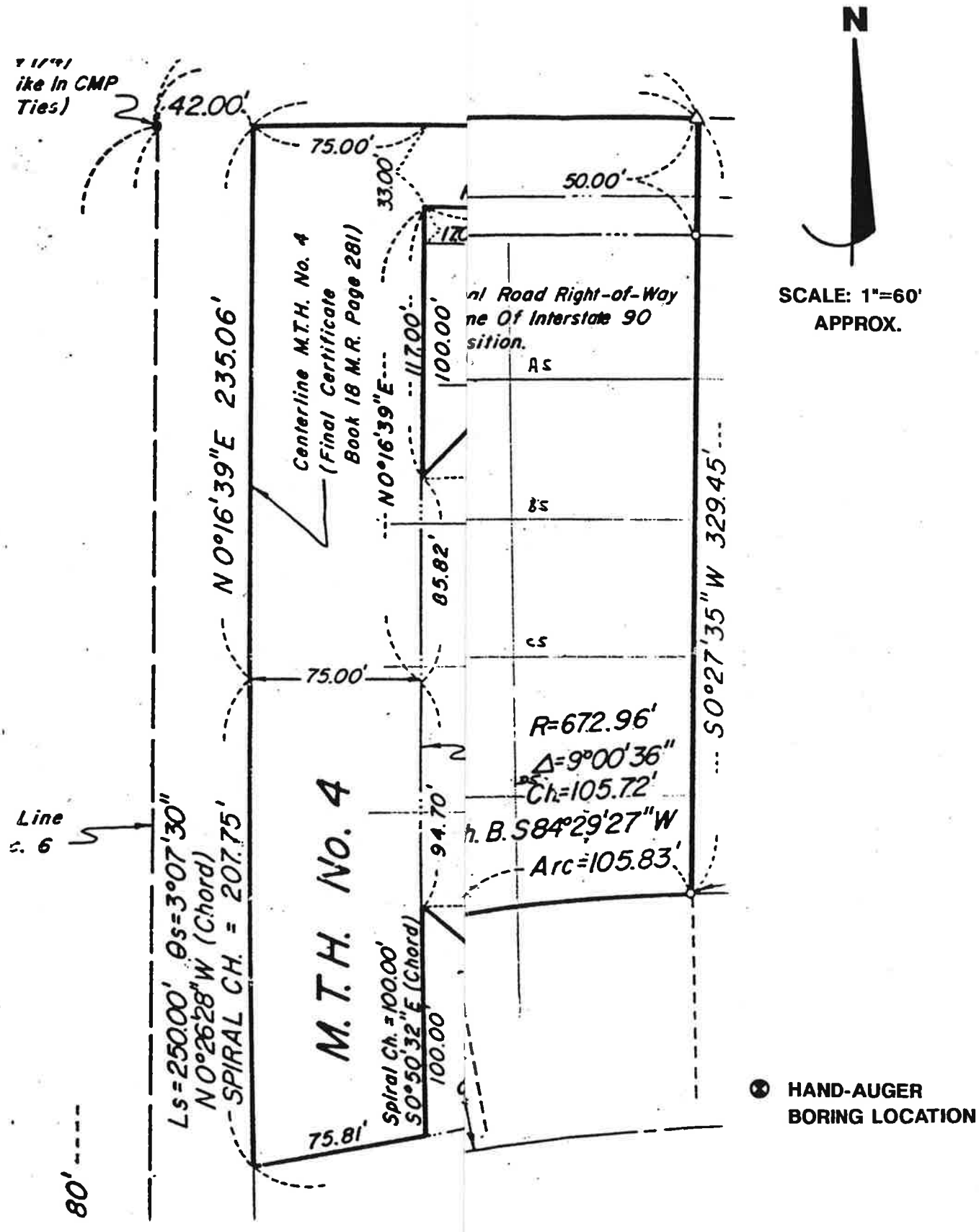


SOURCE: USGS 7.5 MINUTE QUADRANGLE SERIES FOR SHERBURN, MINNESOTA

LAND O' LAKES ENGINEERING
4001 LEXINGTON AVENUE NORTH
ARDEN HILLS, MINNESOTA 55216
TELEPHONE: (612) 481-2740

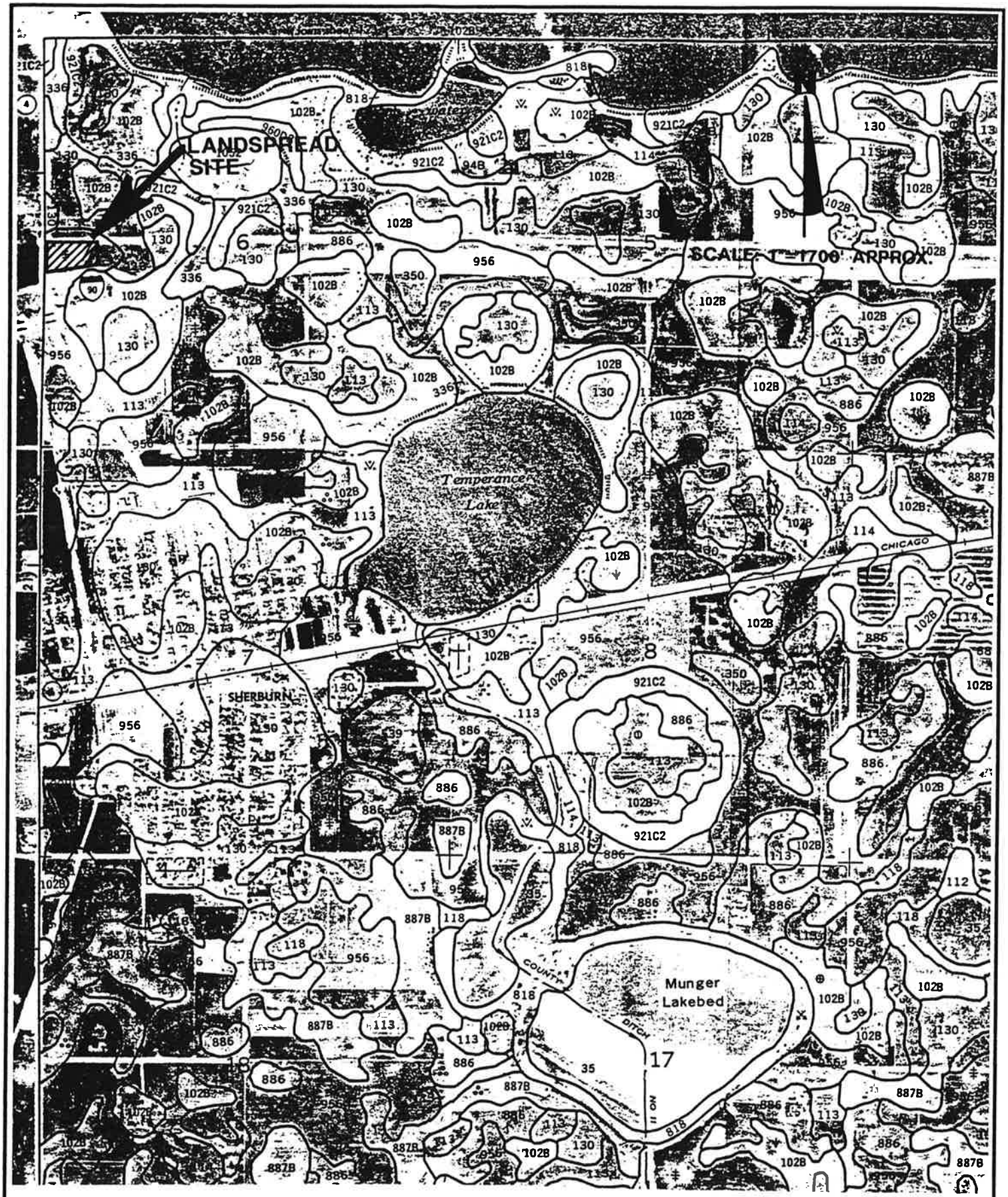
NUWAY COOPERATIVE	AUG 90
SITE LOCATION MAP	FIG. 1

531033



SOURCE: MARTIN COUNTY

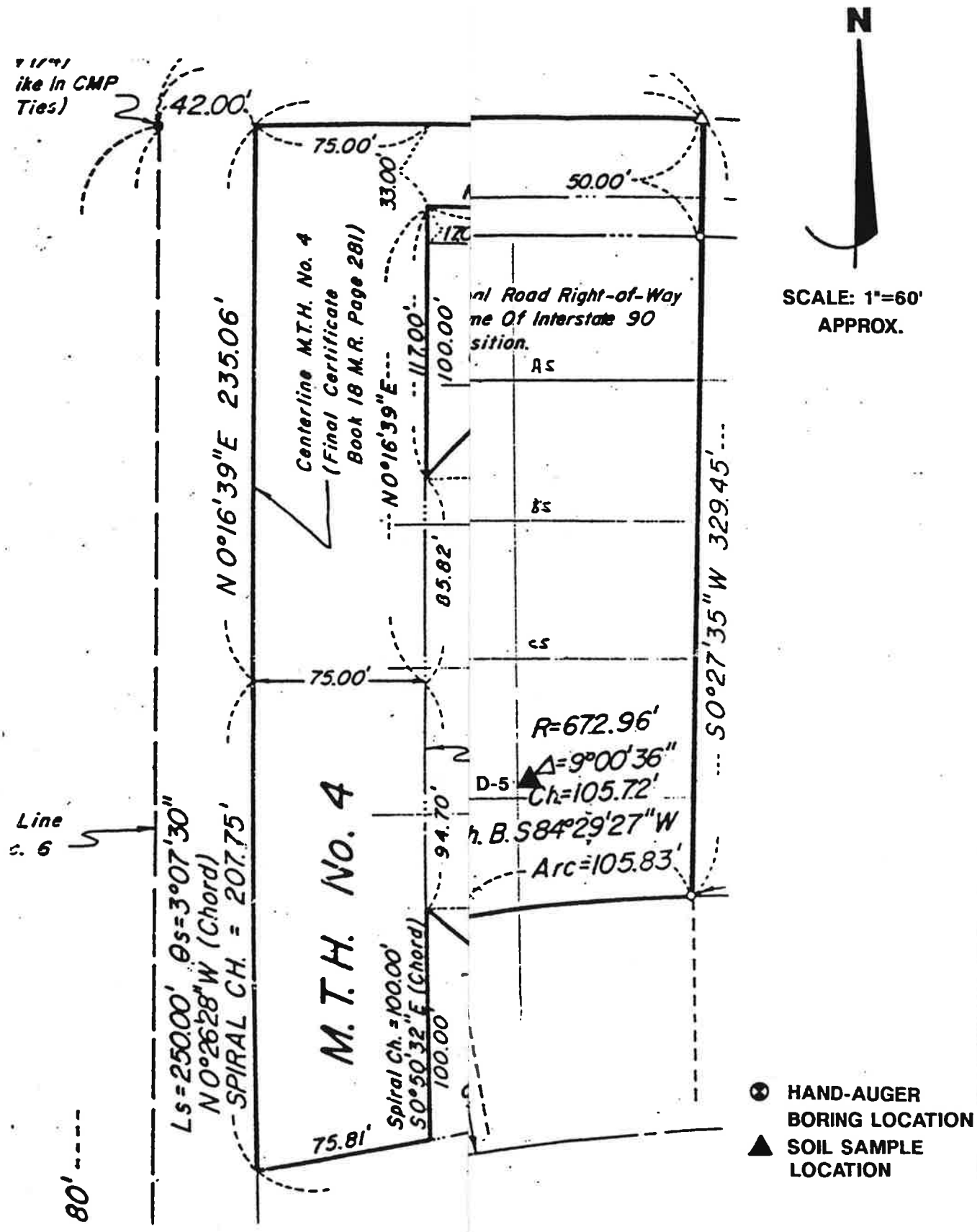
NUWAY COOPERATIVE	AUG 90
SITE MAP	FIG. 2



SOURCE: SOIL SURVEY OF MARTIN COUNTY

LAND O' LAKES ENGINEERING 4001 LEXINGTON AVENUE NORTH ARDEN HILLS, MINNESOTA 55216 TELEPHONE: (612) 481-2740	**NUWAY COOPERATIVE**	**AUG 90**
	SOIL SURVEY MAP	**FIG. 3**

531033



SOURCE: MARTIN COUNTY

NUWAY COOPERATIVE	AUG 90
OIL SAMPLE LOCATION MAP	FIG. 4

ATTACHMENT 1

PROPERTY DESCRIPTION

A tract of land in the Northwest Quarter of the Southwest Quarter of Section 6, Township 102 North, Range 32 West in the City of Sherburn, Martin County, Minnesota described as follows:

Commencing at the Northwest corner of the Southwest Quarter of Section 6, Township 102 North, Range 32 West in Martin County, Minnesota; thence North 89 degrees 41 minutes 28 seconds East (assumed bearing) along the North line of the Southwest Quarter a distance of 42.00 feet to the centerline of Minnesota Trunk Highway No. 4 and point of beginning; thence continuing North 89 degrees 41 minutes 28 seconds East along the North line of the Southwest Quarter a distance of 714.65 feet; thence South 0 degrees 27 minutes 35 seconds West parallel with the West line of the Southwest Quarter a distance of 329.45 feet to the northerly right-of-way line of Interstate Highway No. 90 as recorded and described in the office of the Martin County Recorder in Book 43 of Miscellaneous Records, page 246 (Parcel 23A), said right-of-way line being a non-tangential circular curve, concave southerly, having a radius of 672.96 feet and a center of radius which bears South 1 degree 00 minutes 15 seconds East; thence westerly along said northerly right-of-way line and circular curve through a central angle of 9 degrees 00 minutes 36 seconds an arc distance of 105.83 feet; thence tangentially South 79 degrees 59 minutes 09 seconds West along said northerly right-of-way line a distance of 439.85 feet; thence North 50 degrees 25 minutes 35 seconds West along said northerly right-of-way line a distance of 129.66 feet to the easterly right-of-way line of Minnesota Trunk Highway No. 4, said easterly right-of-way line being a non-tangential spiral curve lying parallel with and 75.00 feet easterly (measured at right angles and radially) of the centerline of Minnesota Trunk Highway No. 4 (centerline spiral angle = 3 degrees 07 minutes 30 seconds, spiral length = 250.00 feet); thence southerly along said easterly right-of-way line and spiral curve a chord distance of 100.00 feet (chord bearing South 0 degrees 50 minutes 32 seconds East) to the northerly right-of-way line of Interstate Highway No. 90; thence South 79 degrees 59 minutes 09 seconds West along said northerly right-of-way line a distance of 75.01 feet to the centerline of Minnesota Trunk Highway No. 4 and non-tangential spiral curve (centerline spiral angle = 3 degrees 07 minutes 30 seconds, spiral length = 250.00 feet); thence northerly along said centerline and spiral curve a chord distance of 207.75 feet (chord bearing North 0 degrees 26 minutes 28 seconds West); thence North 0 degrees 16 minutes 39 seconds East along said centerline and on the tangent to said spiral curve a distance of 235.06 feet to the point of beginning. Subject to easements for public roadway right-of-way for Minnesota Trunk Highway No. 4 along the westerly line of the herein described tract and County State Aid Highway No. 28 along the North line of the Southwest Quarter of Section 6.

Said tract contains 6.15 acres more or less including the aforementioned easements.

Excepting therefrom the following described tract containing 0.15 acres and acquired for highway purposes:

Commencing at the Northwest corner of the Southwest Quarter of Section 6, Township 102 North, Range 32 West in Martin County, Minnesota; thence North 89 degrees 41 minutes 28 seconds East (assumed bearing) along the North line of the Southwest Quarter a distance of 117.00 feet to the easterly right-of-way line of Minnesota Trunk Highway No. 4; thence South 0 degrees 16 minutes 39 seconds West along the easterly right-of-way line of Minnesota Trunk Highway No. 4 a distance of 33.00 feet to the point of beginning; thence North 89 degrees 41 minutes 28 seconds East parallel with the North line of the Southwest Quarter a distance of 100.00 feet; thence South 0 degrees 16 minutes 39 seconds West parallel with said easterly right-of-way line a distance of 17.00 feet; thence South 44 degrees 59 minutes 09 seconds West a distance of 142.15 feet to a point on said easterly right-of-way line 150.00 feet south of the North line of the Southwest Quarter; thence North 0 degrees 16 minutes 39 seconds East along said easterly right-of-way line a distance of 117.00 feet to the point of beginning.

ATTACHMENT 2

BRUCE A. LIESCH ASSOCIATES, INC.
HYDROGEOLOGISTS • ENGINEERS • ENVIRONMENTAL SCIENTISTS

13400 15th Avenue No. • Plymouth, MN 55441 • 612-559-1423 • FAX No: 559-2202

August 27, 1990

Ms. Pam Schock
Martin County Zoning Office
Martin County Courthouse, Room 102
Fairmont, MN 56031

RE: Disposal of Petroleum Contaminated Soils

Dear Ms. Schock:

As required by the Minnesota Pollution Control Agency (MPCA), the NuWay Co-op has been required to dispose of petroleum contaminated soil associated with petroleum releases at the Co-op facilities located in Trimont and Dunnel, Minnesota.

Approximately 2,200 cubic yards of soil will be landspread on the NuWay Co-op property located at:

> City of Sherburn; Township 102 North, Range 32 West, Northwest 1/4 of the Southwest 1/4 of Section 6, Martin County, Minnesota.

The disposal of these soils will be completed in compliance with all existing MPCA regulations and recommendations.

If you feel that any other person or persons should be contacted regarding this disposal procedure, please contact them and let us know the results.

Soil excavation is scheduled to begin on Wednesday, September 5, 1990. If you have any further questions or comments concerning this matter, please contact me immediately at 612/559-1423. Thank you for your cooperation regarding this matter.

Sincerely,

David O Watterson For

Larry A. Berndt
Bruce A. Liesch Associates, Inc.

cc: Mr. Jim Lorentz - NuWay Co-op
Mr. Jim Hestad - Land O' Lakes, Inc.
mas:lolltr8-27

ATTACHMENT 3

NUWAY COOPERATIVE - DUNNELL, MINNESOTA
SUMMARY OF STOCKPILES SOIL ANALYSIS
(Collected by TCT During Phase 1 Investigation)

Parameter	Excavated Soil	MDL (ug/kg)
Total Hydrocarbons as Gasoline	*1,400,000 ppb	100
Benzene	10,000 ppb	100
Toluene	15,000 ppb	100
Xylene	59,000 ppb	100
Ethyl Benzene	16,000 ppb	100
#2 Fuel Oil	2,200,000 ppb	1,000

All values are in ug/kg. ug/kg is equal to parts-per-billion.

ND - Not Detected

MDL - Method Detection Limit

*Higher boiling point hydrocarbons present, non-typical of gasoline.

mas:duntbl

NUWAY COOPERATIVE - TRIMONT, MINNESOTA
SUMMARY OF TCT SOIL SAMPLE ANALYTICAL RESULTS
(Results Presented in parts per million)

	S-1/1 @ 12'	S-2/1 @ 6'	S-3/1 @ 9'	S-4/1 *
Benzene	9.1	40.0	ND	0.8
Ethyl Benzene	8.2	65.0	ND	0.042
Toluene	11.0	93.0	ND	0.15
Xylene	36.0	330.0	ND	0.27
THC	510.0	4000.0	ND	7.3
MTBE	86.0	NA	ND	NA
Lead	NA	NA	23.0	20.0

NA	Not Analyzed
ND	Not Detected
*	No Indication of Sample Depth
THC	Total Hydrocarbons as Gasoline
MTBE	Methyl-tert-butyl-ether

mas:duntbl

ATTACHMENT 4

BRUCE A. LESCH ASSOCIATES, INC.
GEOLOGISTS · GEOLOGISTS · ENVIRONMENTAL SCIENTISTS
2720 HOOD LANE · MINNEAPOLIS, MN 55441 · 612 559-1423

JOB NAME: NuWay Cooperative

SOIL BORING NO. B-1
SHEET 1 OF 1

DRILLING METHOD: 4" Hand Auger
TYPE OF RIG:
FOREMAN:
ASSISTANT:
GEOL./ENG'R:
LOG BY: TK

WATER LEVEL READINGS

DATE	TIME	DEPTH	
		dry	W.L.
			L.C.R.
			HOL. A.U.
			HOL. A.U.

GROUND SURFACE ELEV.:
DATE START:
DATE COMPLETE:
DATE ABANDONED:
COORDINATES:
NORTH:
EAST:

DEPTH TO CHANGES IN STRATA	DEPTH IN FEET	SAMPLING DATA: NO.	T	A	R	PENETRATION (on CYLINDER)	USCS	SOIL DESCRIPTION	O V M HEAD SPACE	O V M SPLIT SPOON
							SC	Brown clayey sand, dry		
1.2							CL	Brown clay, dry		
	2.5									
3.2							CL	Brown clay, with sand seams, dry		
4.2							CL	Brown clay, with sand, trace mottling		
4.7							CL	Same, moist		
	5.0							End of boring at 5'. Backfilled with native cuttings		

NOTES

Borehole dry while drilling

BRUCE A. UESCH ASSOCIATES, INC.
HYDROLOGISTS · GEOLOGISTS · ENVIRONMENTAL SCIENTISTS
3220 HOOD LANE · MINNEAPOLIS, MN 55441 · 612 559-1423

JOB NAME: Nu Way Cooperative

SOIL BORING NO. B-2

SHEET 1 OF 1

DRILLING METHOD: 4" Hand Auger
TYPE OF RIG:
FOREMAN:
ASSISTANT:
GEOL./ENG'R:
LOG BY: TIS

WATER LEVEL READINGS

DATE	TIME	DEPTH	
		dry	W.C.
			A.C.R.
			HSA w.l.
			HSA w.l.

GROUND SURFACE ELEV.:
DATE START:
DATE COMPLETE:
DATE ABANDONED:
COORDINATES:
NORTH:
EAST:

DEPTH TO CHANGES IN STRATA	DEPTH IN FEET	SAMPLING DATA NO.	T	A	R	PENETRATION 1ST 6 INCHES	USCS	SOIL DESCRIPTION	O V M HEAD SPACE	O V M SPLIT SPOON
								Topsoil		
1.0							SC	Light brown clayey sand		
2.0							CL	Brown sandy clay, damp		
	2.5									
3.0							CL	Brown clay, more mottling, moist		
	5							End of boring at 5' Backfilled with native cuttings		

NOTES

ATTACHMENT 5

CENTROL®
A FARM MANAGEMENT COOPERATIVE
POST OFFICE BOX 64089, ST. PAUL, MINNESOTA 55164-0089
TELEPHONE: (612)451-5149

July 19, 1990

Larry Berndt
Bruce A. Liesch Associates, Inc.
3020 Harbor Lane
Minneapolis, Minnesota 55447

RE: Study No. 51869
B.A. Liesch Project No. 91036.05 - Trimont/Dunnel

Dear Larry:

Enclosed is our report for five (5) soil samples analyzed for soil characterization (Basic Option 2). Also enclosed is a copy of the Chain of Custody Record.

If there are any questions, please feel free to call at (402) 475-5968, ext. 255.

Sincerely,

Raymond Szytenchelm
Technical Coordinator

RS:dw
Encl.

Soil Test Report

TRIMONT MN
56176

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435292

Sample ID	A-1 13923		
Field ID	51889	Acres	0
Previous Crop			
Township		Section	
County			

CENTROL LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)			
								YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL	
Soil Texture											
Soil pH	7.8	MILDLY BASIC									
CEC											
Sodium % of CEC											
Soluble Salts	0.3 mmho	NON-SALINE									
Organic Matter	1.6 %	LOW									
		Very Low	Low	Medium	High	Very High					
Nitrogen											
TOTAL							N				
Phosphorus OLSEN	148 LB/A	*****	*****	*****	*****	*****	P_2O_5				
Potassium	376 LB/A	*****	*****	*****	*****		K_2O				
Calcium	8250 LB/A	*****	*****	*****	*****		Ca				
Magnesium	738 LB/A	*****	*****	*****	**		Mg				
Sulfur											
TOTAL							S				
Boron							B				
Zinc							Zn				
Manganese							Mn				
Copper							Cu				
Iron							Fe				

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

Comments:

THE TEXTURE OF THIS SOIL SAMPLE IS CALCULATED USING CATION EXCHANGE CAPACITY. DUE TO FREE CALCIUM CARBONATE IN THE SAMPLE, THE CEC IS ABNORMALLY HIGH. FOR AN ACCURATE TEXTURE, A PARTICLE SIZE ANALYSIS SHOULD BE REQUESTED.

ORIGINAL-TO GROWER

******* THIS IS A REPRINT OF AN EARLIER REPORT *******

Soil Test Report

Submitted By	NUWAY CO-OP TRIMONT MN 56176

Grower	SELF

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435297

Sample ID	A-4 13924	
Field ID	51869	Acres
Previous Crop		
Township		Section
County		

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)		
								YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL
Soil Texture										
Soil pH	8.1	MODERATELY BASIC								
CEC										
Sodium % of CEC										
Soluble Salts	0.3 mmho	NON-SALINE								
Organic Matter	3.1 %	MEDIUM								
		Very Low	Low	Medium	High	Very High				
Nitrogen										
TOTAL							N			
Phosphorus OLSEN	74 LB/A	*****	*****	*****	*****	*****	P_2O_5			
Potassium	238 LB/A	*****	*****	*****			K_2O			
Calcium	10626 LB/A	*****	*****	*****	*****		Ca			
Magnesium	1184 LB/A	*****	*****	*****	*****		Mg			
Sulfur										
TOTAL							S			
Boron							B			
Zinc							Zn			
Manganese							Mn			
Copper							Cu			
Iron							Fe			

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

THE TEXTURE OF THIS SOIL SAMPLE IS CALCULATED USING CATION EXCHANGE CAPACITY. DUE TO FREE CALCIUM CARBONATE IN THE SAMPLE, THE CEC IS ABNORMALLY HIGH. FOR AN ACCURATE TEXTURE, A PARTICLE SIZE ANALYSIS SHOULD BE REQUESTED.

ORIGINAL-TO GROWER

Soil Test Report

Submitted By	NUWAY CO-OP TRIMONT MN 56176

Grower	SELF

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435294

Sample ID	B-4 13925		
Field ID	1869	Acres	0
Previous Crop			
Township		Section	
County			

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)		
								YEAR	YEAR	YEAR
Soil Texture								CROP	CROP	CROP
Soil pH	8.1	MODERATELY BASIC						YIELD GOAL	YIELD GOAL	YIELD GOAL
CEC										
Sodium % of CEC										
Soluble Salts	0.3 mmho	NON-SALINE								
Organic Matter	3.2 %	MEDIUM								
		Very Low	Low	Medium	High	Very High				
Nitrogen										
TOTAL							N			
Phosphorus OLSEN	86 LB/A	*****	*****	*****	*****	*****	P_2O_5			
Potassium	392 LB/A	****	*****	*****	****		K_2O			
Calcium	10866 LB/A	*****	*****	*****	*****	**	Ca			
Magnesium	1200 LB/A	****	*****	*****	****		Mg			
Sulfur										
TOTAL							S			
Iron							B			
Zinc							Zn			
Manganese							Mn			
Copper							Cu			
Iron							Fe			

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

THE TEXTURE OF THIS SOIL SAMPLE IS CALCULATED USING CATION EXCHANGE CAPACITY. DUE TO FREE CALCIUM CARBONATE IN THE SAMPLE, THE CEC IS ABNORMALLY HIGH. FOR AN ACCURATE TEXTURE, A PARTICLE SIZE ANALYSIS SHOULD BE REQUESTED.

ORIGINAL-TO GROWER

Soil Test Report

Submitted By	Grower
NUWAY CO-OP TRIMONT MN 56176	SELF

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435295

Sample ID	C-3 13926		
Field ID	51869	Acres	
Previous Crop			
Township		Section	
County			

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)		
Soil Texture										
Soil pH	8.1	MODERATELY BASIC								
CEC										
Sodium % of CEC										
Soluble Salts	0.2 mmho	NON-SALINE								
Organic Matter	1.6 %	LOW								
		Very Low	Low	Medium	High	Very High				
Nitrogen										
TOTAL							N			
Phosphorus OLSEN	106 LB/A	*****	*****	*****	*****	*****	P_2O_5			
Potassium	350 LB/A	*****	*****	*****	*****		K_2O			
Calcium	8718 LB/A	*****	*****	*****	*****		Ca			
Magnesium	718 LB/A	*****	*****	*****	**		Mg			
Sulfur										
TOTAL							S			
Boron							B			
Zinc							Zn			
Manganese							Mn			
Copper							Cu			
Iron							Fe			

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

THE TEXTURE OF THIS SOIL SAMPLE IS CALCULATED USING CATION EXCHANGE CAPACITY. DUE TO FREE CALCIUM CARBONATE IN THE SAMPLE, THE CEC IS ABNORMALLY HIGH. FOR AN ACCURATE TEXTURE, A PARTICLE SIZE ANALYSIS SHOULD BE REQUESTED.

ORIGINAL-TO GROWER

Soil Test Report

Submitted By	NUWAY CO-OP TRIMONT MN 56176

Grower	SELF

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435296

Sample ID	0-5 13927		
Field ID	51869	Acres	0
Previous Crop			
Township		Section	
County			

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)		
								YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL
Soil Texture		FINE								
Soil pH	7.4	MILDLY BASIC								
CEC	27.4									
Sodium % of CEC	0.7 %	NO SODIUM HAZARD								
Soluble Salts	0.3 mmho	NON-SALINE								
Organic Matter	3.3 %	MEDIUM								
		Very Low	Low	Medium	High	Very High				
Nitrogen										
TOTAL							N			
Phosphorus OLSEN	80 LB/A	*****	*****	*****	*****	*****	P_2O_5			
Potassium	296 LB/A	*****	*****	*****	**		K_2O			
Calcium	8480 LB/A	*****	*****	*****	*****		Ca			
Magnesium	1342 LB/A	*****	*****	*****	*****		Mg			
Sulfur										
TOTAL							S			
Boron							B			
Zinc							Zn			
Manganese							Mn			
Copper							Cu			
Iron							Fe			

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

% BASE SATURATION

NA	K	MG	CA	H
0.7	1.4	20.4	77.4	0.0

ORIGINAL-TO GROWER

Soil Test Report

Submitted By	NUMAR CO-OP TRIMONT MN 56176

Grower	SELF

Date Sampled	28-Jun-90
Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435297

Sample ID	P-1 13928		
Field ID	51869	Acres	0
Previous Crop			
Township		Section	
County			

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)			
								YEAR CROP YIELD GOAL	YEAR CROP YIELD GOAL		
Soil Texture											
Soil pH	8.1	MODERATELY BASIC									
CEC											
Sodium % of CEC											
Soluble Salts	0.2 mmho	NON-SALINE									
Organic Matter	1.5 %	LOW									
		Very Low	Low	Medium	High	Very High					
Nitrogen											
TOTAL							N				
Phosphorus OLSEN	60 LB/A	*****	*****	*****	*****	*****	P_2O_5				
Potassium	270 LB/A	*****	*****	*****	**		K_2O				
Calcium	9344 LB/A	*****	*****	*****	*****		Ca				
Magnesium	664 LB/A	*****	*****	*****			Mg				
Sulfur											
TOTAL							S				
Iron							B				
Zinc							Zn				
Manganese							Mn				
Copper							Cu				
Iron							Fe				

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

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Date Received	28-Jun-90
Date Reported	17-Jul-90
Lab Sample Number	435297

Sample ID	S-1 13928	
Field ID	51869	Acres
Previous Crop		
Township		Section
County		

CENTROL® LABORATORIES

NW 1/4	NE 1/4
SW 1/4	SE 1/4

	Test Results	Interpretation						Guidelines Pounds Per Acre (Broadcast Rate)		
								YEAR	YEAR	YEAR
Soil Texture								CROP	CROP	CROP
Soil pH	8.1	MODERATELY BASIC						YIELD	YIELD	YIELD
CEC								GOAL	GOAL	GOAL
Sodium % of CEC										
Soluble Salts	0.2 mmho	NON-SALINE								
Organic Matter	1.5 %	LOW								
		Very Low	Low	Medium	High	Very High				
Nitrogen										
TOTAL							N			
Phosphorus OLSEN	60 LB/A	*****	*****	*****	*****	*****	P_2O_5			
Potassium	270 LB/A	*****	*****	*****	**		K_2O			
Calcium	9344 LB/A	*****	*****	*****	*****		Ca			
Magnesium	664 LB/A	*****	*****	*****			Mg			
Sulfur										
TOTAL							S			
Iron							B			
Zinc							Zn			
Manganese							Mn			
Copper							Cu			
Iron							Fe			

CENTROL LABORATORIES THANKS YOU FOR YOUR PATRONAGE

EXPECTED CROP NUTRIENT REMOVAL N-P_2O_5-K_2O - #/ACRE

Comments:

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CENTROL LABORATORIES • 624 Peach Street • P.O. Box 80837 • Lincoln, Nebraska 68501 • Telephone (612) 451-4300
For Laboratory Information and Supplies, Telephone (402) 476-1467

BRUCE A. LIESCH ASSOCIATES, INC.

3020 Harbor Lane Minneapolis, MN 55447 · 612-559-1423

CHAIN OF CUSTODY RECORD

FIELD COORDINATOR: Larry Bernot

PROJ. NO.: 91036.05

PROJECT NAME: Trimont / Dunnel

SAMPLERS (Signature):

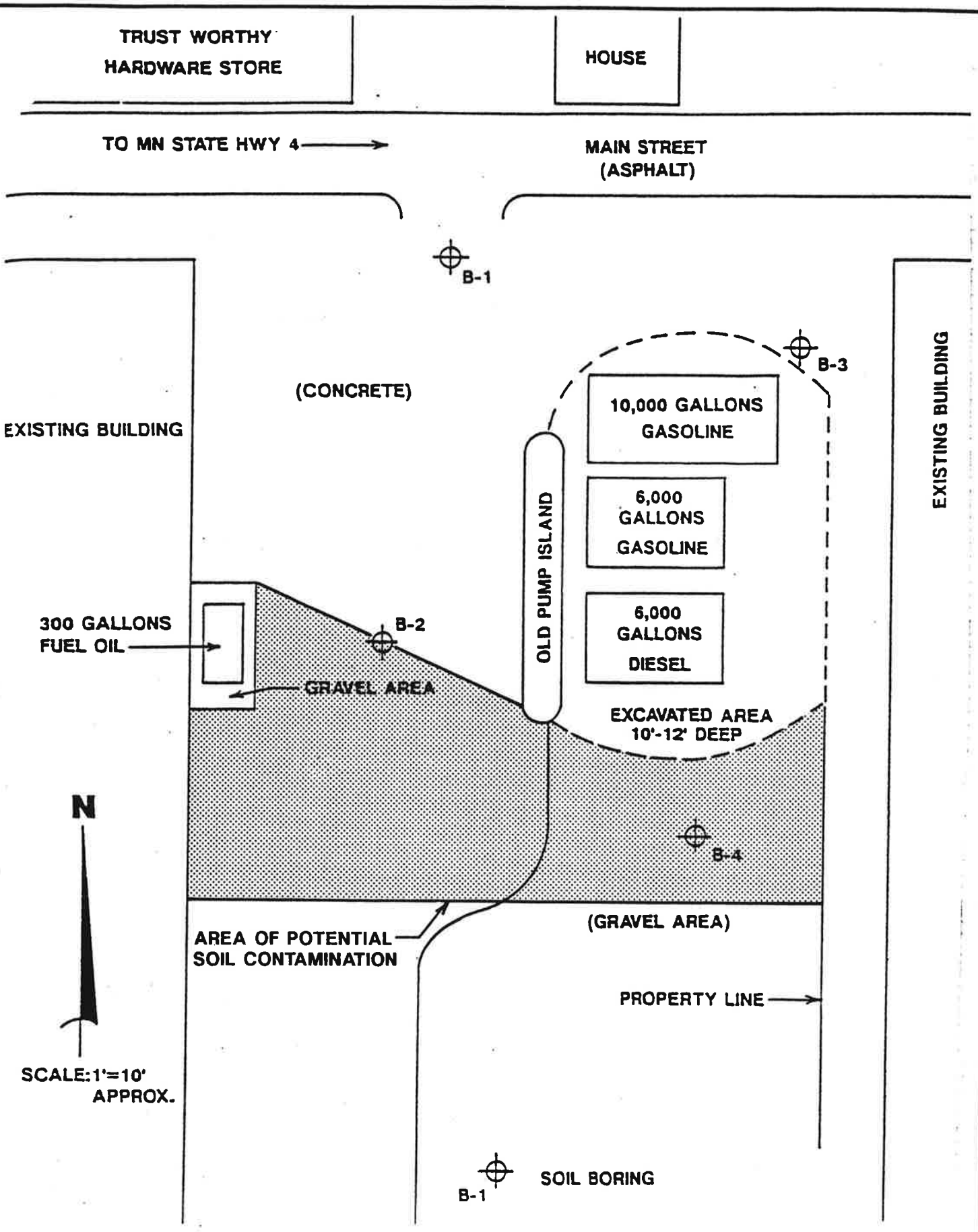
STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NUMBER OF CONTAINERS	REMARKS
A1	6/23			✓	NuWay Co-op site	1	Run Basic Option 2 for Soils
A4				✓		1	
B4				✓		1	
C3				✓		1	
D5				✓		1	
E1				✓		1	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	6/25						
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks	
			Peggy J Sherry	6/26/91	1000	INVOICE NuWay Co-op Trimont, MN Box Q 56176	RESULTS TO LARRY BERNOT at BRUCE A LIESCH ASSOC.

DISTRIBUTION: Original Accompany Shipment Copy to Coordinator Files

ATTACHMENT 6



LAND O' LAKES ENGINEERING 4001 LEXINGTON AVENUE NORTH ARDEN HILLS, MINNESOTA 55216 TELEPHONE: (612) 481-2740	DUNNEL NU WAY CO-OP	AUG 90
	EXTENT OF SOIL CONTAMINATION	ATT. 6

531033