METHANE GAS INVESTIGATION
FOR
ROSE HILL LANDFILL
SOUTH KINGSTOWN, RHODE ISLAND

Prepared For:

U.S. Environmental Protection Agency
Region I
60 Westview Street
Lexington, MA 02173

CONTRACT NO. 68-W0-0036

TAT-01-N-00956

TDD NO. 01-9111-08

Prepared By:

ROY F. WESTON, INC.
Technical Assistance Team
Region I

December 1991

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 Introduction

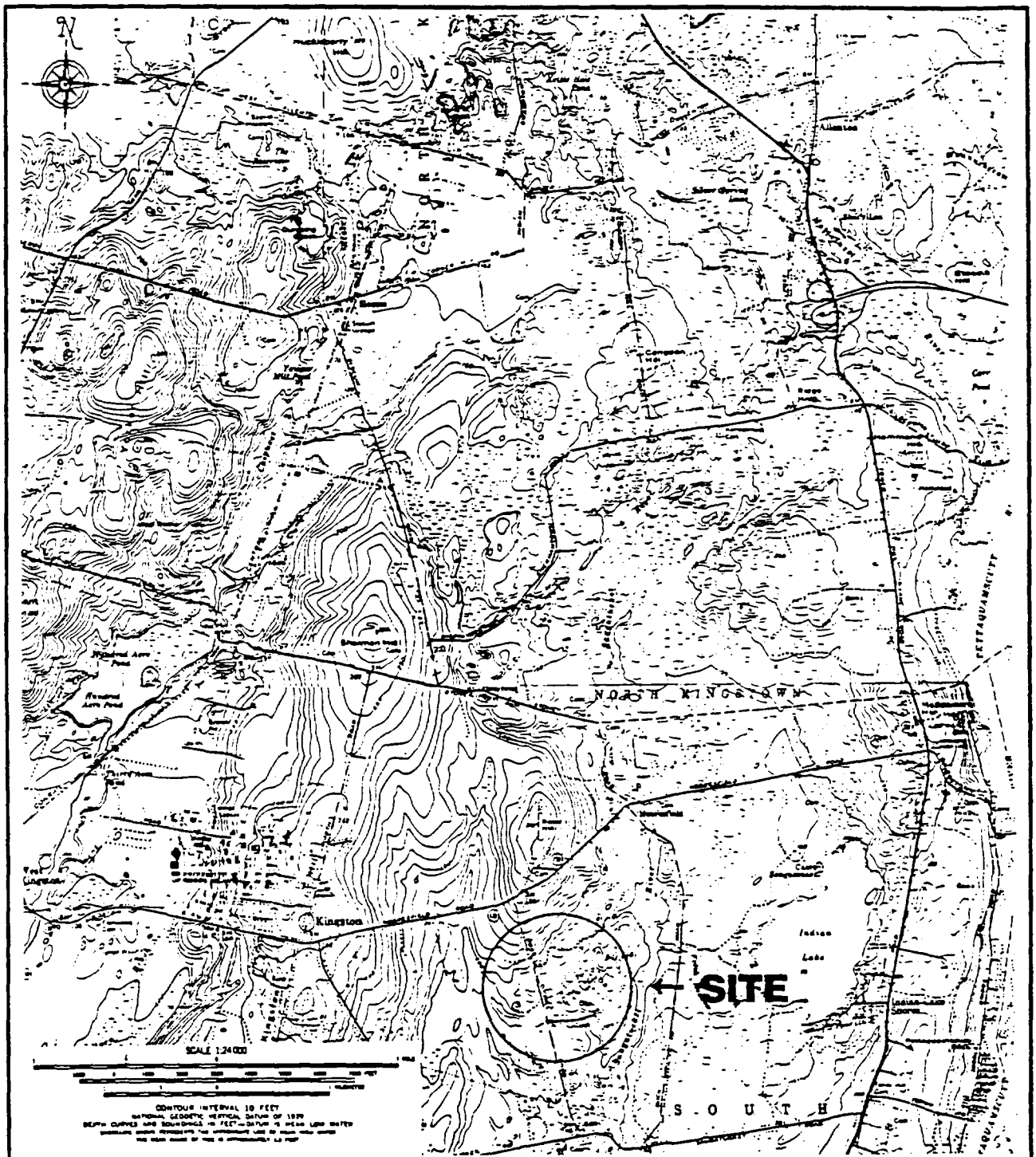
On November 1, 1991, a request was made by the U.S. Environmental Protection Agency (EPA) Waste Management Division (WMD) for Environmental Services Division (ESD) assistance in an assessment to determine the presence of combustible gasses (methane) within residential properties adjacent to the Rose Hill Regional Landfill (Site Location Map - Figure 1), and to provide recommendations for further action regarding potential migration of methane and other volatile organic compounds (VOCs).

The Rose Hill Regional Landfill site is a municipal landfill situated on approximately 70 acres in South Kingstown, RI (Site Diagram - Figure 2). Prior to its use as a landfill, the site was a sand and gravel operation. There are three disposal areas on the site including a solid waste landfill, a bulky waste disposal area, and a sewage sludge landfill, which were used for domestic and industrial wastes beginning in 1967. In 1983, all three areas were closed, covered with sandy soil, and graded. The town of South Kingstown currently operates a transfer station for municipal refuse on a portion of the site.

The landfill is bordered by Rose Hill Road, the Saugatucket River and residential areas. Mitchel Brook flows through the site into the river. Saugatucket Pond is located approximately 2,000 feet downstream, and is used for recreation. East and south portions of the site are bordered by freshwater wetlands.

Relatively high concentrations of methane and VOCs appear to be migrating laterally to the north, west and south of the landfill, as observed in June and July, 1991 by Metcalf & Eddy, Inc., the contractor conducting the remedial investigation/feasibility study (RI/FS). This observation was made during soil gas monitoring from permanent soil gas sampling points located on adjacent private land around the perimeter of the landfill and over the top of the landfill. Results obtained in September 1991 from the soil gas sampling points provided similar results. The relative methane concentrations were high to the west of the landfill. Metcalf & Eddy, Inc. personnel surmised that methane gas could potentially seep into the basements of the adjacent residences, creating an explosive atmosphere. Methane has a lower explosive limit (LEL) of 5% and an upper explosive limit (UEL) of 15%. The WMD, Metcalf & Eddy, Inc., EPA Air Division, Superfund Risk Assessor and the Agency for Toxic Substances and Disease Registry (ATSDR) are in agreement that the fire and explosion threat to local residences in proximity to the landfill is of concern, especially during winter and spring months.

On November 15, 1991, personnel from the EPA Emergency Planning and Response Branch (EPRB), Roy F. Weston Technical Assistance Team (TAT), WMD, and South Kingstown Fire Department monitored the basements of 12 residential dwellings adjacent to the landfill for the presence of combustible gasses (methane). A safety plan was prepared prior to the investigation and is included as Appendix A.

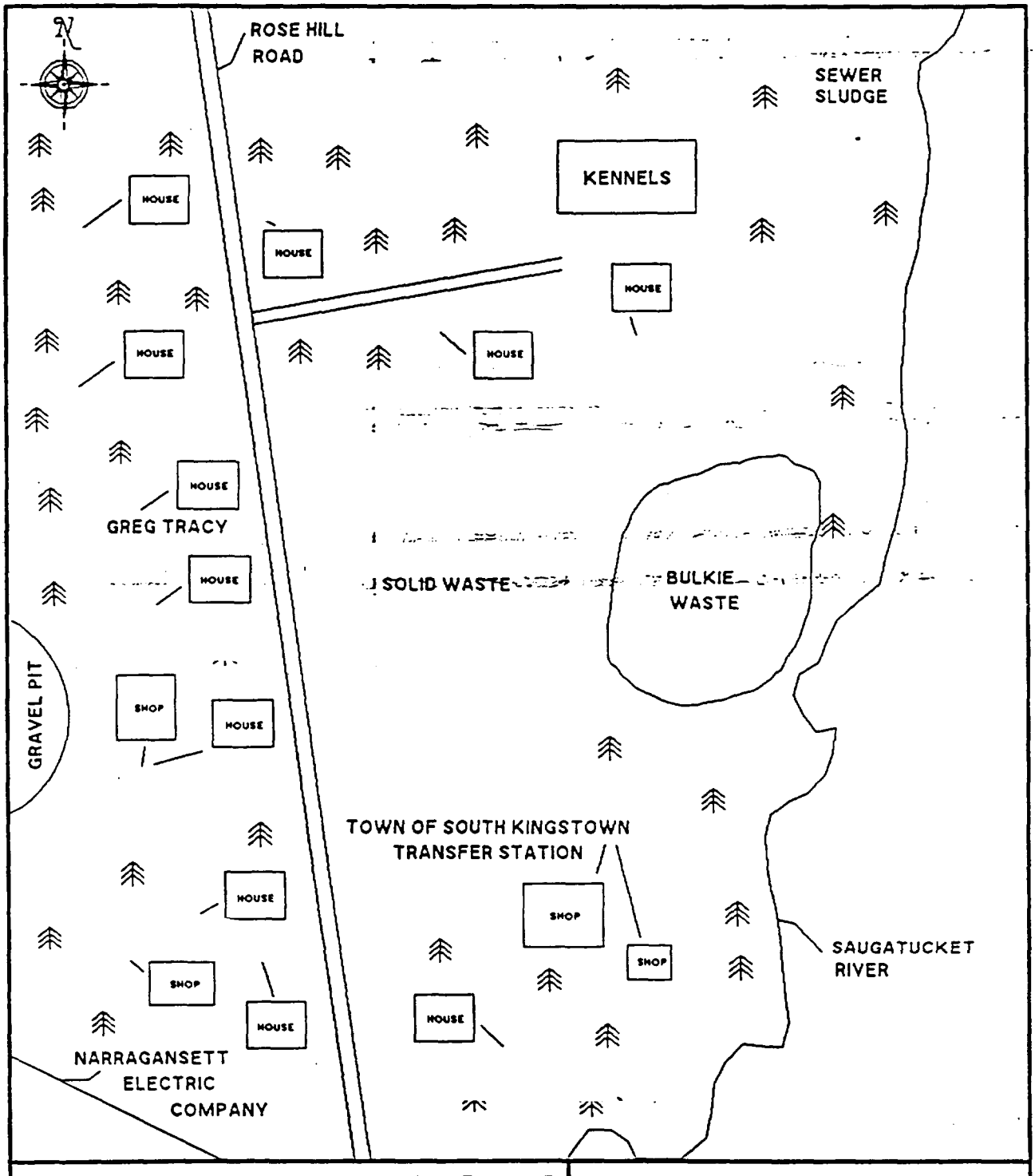


NOT TO SCALE

FIGURE 1
SITE LOCATION MAP
ROSE HILL LANDFILL
SOUTH KINGSTOWN, RI

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN: SHAW	DATE: 11/91	PCS #: 1553
APPROVED:	DATE: 12/4	TDD #: 01-9111-08



NOT TO SCALE

FIGURE 2
SITE DIAGRAM
ROSE HILL LANDFILL
SOUTH KINGSTOWN, RI

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS #
SHAW	11/91	1553
APPROVED	DATE	TDD #
	11/91	01-9111-08

2.0 Procedure

The air monitoring and inspection of the basements were conducted at each residence along the perimeter of the basement walls. Noted in each basement was the location of utility entrances such as electric and water which were potential points of entry into the basement for methane.

The equipment used for monitoring was a hand-held Industrial Scientific (model CMX-271) lower explosive limit (LEL) meter carried by On-Scene Coordinator (OSC) Dean Tagliaferro, a MSA (model 260) Combustible Gas Indicator/Oxygen Meter (CGI) carried by TAT member Margaret Shaw, and a GAS-TRAC (model NGX-6) device carried by Chief David Hall of the South Kingstown Fire Department (Union Fire District). The GAS-TRAC device is used by the fire department as a rapid detection device for numerous gasses. However, the device will not read out in percent LEL.

Slight audio signal deflections were noted on the GAS-TRAC device at some locations during the inspection, but were well below the precautionary level and were not considered significant by the response team. The cause of the slight audio deflections was unknown. No readings were detected to indicate the presence of combustible gasses on either the LEL or CGI at these locations nor at any other time during the inspection.

3.0 Chronological Summary

November 15, 1991
Weather: Clear, 45°F

1330 hrs: OSC Tagliaferro, TAT member Shaw, RPM Newton and Chief Hall (response team) arrived at the residence at 121 Rose Hill Road. The basement consisted of a cement and dirt floor and fieldstone walls and was entered through an outside entrance. All of the walls, with the exception of the entry, were below ground. No readings above background were observed on any of the instruments. A public water supply was utilized in the home and entered the building from the north.

1345 hrs: The response team arrived at the residence at 320 Rose Hill Road. The basement consisted of a cement and dirt floor, fieldstone walls, and brick columns and was entered from inside the house. All of the walls were below ground. No readings above background were observed on any of the instruments. Water was supplied by a private well located northwest of the house.

1355 hrs: The response team arrived at the residence at 278 Rose Hill Road. The basement consisted of a cement floor and cement walls and was entered from the west through an outside entrance. No readings above background were observed on any of the instruments. A public water supply was utilized in the home and entered the building from the south.

1405 hrs: The response team arrived at the municipal transfer station. The RPM met with Operations Manager Butch Jenks. The building consisted of a poured concrete slab, aluminum roof and walls and several loading dock entry ways on three sides. The inspection was terminated without air monitoring since a basement did not exist in the building. A public water supply was utilized in the building.

1420 hrs: The response team arrived at the residence at 110 Rose Hill Road, which was a rental property . The basement consisted of a cement floor and cement walls and was entered from inside the house and all of the walls were below ground. The public water service line was located at the southwest corner with 1-inch copper pipe entering through 6-inch uncapped polyvinyl chloride (PVC) pipe. The GAS-TRAC device produced a change in audio signal when the probe was inserted into the PVC pipe. The percent oxygen was 18.5% within the pipe, as detected on the LEL and CGI. No readings above background were observed on the LEL or CGI at this location or anywhere else in the basement on any of the instruments.

1440 hrs: The response team arrived at the residence at 349 Rose Hill Road. The basement consisted of a cement floor and cement walls and was entered from the east through an outside entrance. No readings above background were observed on any of the instruments. A public water supply was utilized in the home and entered the building from the south.

1450 hrs: The response team arrived at the residence . The basement consisted of a cement floor and cement walls and was entered through a bulkhead on the west side. All of the walls were below ground. Abandoned water supply equipment (sand filter or holding tank) from a private well was located at the southeast corner of basement. The GAS-TRAC device produced a slight audio deflection in the vicinity of the abandoned well equipment. No readings above background were observed on the LEL or CGI at this location or anywhere else in the basement by any of the instruments. A public water supply was utilized in the home and entered the building from the north.

1455 hrs: The response team arrived at the residence . The basement consisted of a cement floor and cement walls and was entered through the inside of the house. All of the walls were below ground. No readings above background were observed on any of the instruments. A public water supply was utilized in the home and entered the building from the west.

1505 hrs: The response team arrived at at 110 Rose Hill Road. The basement was a modified crawl space consisting of a dirt floor, approximately one quarter of which was dug out at a level 1 foot lower than the rest, and cement walls. The height of the crawl space was approximately 6 feet at the highest point. All of the walls were below ground with the exception of the staired outside entrance on the northwest corner fo the house. No readings above background were observed on any of the instruments. A private well, which was located 300 feet west of the house

supplied water to the shop, as well as the house. According to the water is tested by the state every year.

1520 hrs: The response team arrived at the residence at 220 Rose Hill Road. The residence consisted of a quonset hut on a cinder block foundation. The basement consisted of a dirt floor with all of the walls below ground with exception of the walk-in entry. All of the walls, with exception of the entry, were below ground. The GAS-TRAC device deflected slightly in the proximity of a small uncapped pipe protruding from the south wall. No readings above background were observed on the LEL or CGI in the vicinity of the pipe or anywhere else in the basement on any of the instruments. A public water supply is utilized by the home and entered the building from the north.

1530 hrs: The response team arrived at the residence at 364 Rose Hill Road. The basement consisted of a cement floor and cement walls and was entered from inside the house. All of the walls were below ground. No readings above background were observed on any of the instruments. Water is supplied by a private well.

1540 hrs: The response team arrived at the residence at 294 Rose Hill Road, which was a rental property occupied by Jim Nayman. The basement consisted of a cement floor and cement walls and was entered from the south through an outside entrance. A slight odor was detected by the response team upon entering the basement. Chief Hall detected a small propane gas leak at the heating unit with the GAS-TRAC. No readings above background were observed by the LEL and CGI in the vicinity of the heating unit of anywhere else in the basement on any of the instruments. A public water supply is utilized by the home.

3.0 Conclusions

OSC Tagliaferro and RPM Newton resolved that Metcalf & Eddy, Inc. will install additional permanent soil gas sampling locations adjacent to residential dwellings that are in close proximity to the locations where high levels of methane were detected. Also, the EPA removal program will conduct monthly sampling in the basements of these residences through March 1992. The sampling results will be evaluated to determine if additional removal activities are required.

APPENDIX A

Health and Safety Plan

WESTON MAJOR PROGRAMS DIVISION
HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE / SITE INVESTIGATION

TDD No. 01-9111-08 **Site Name:** Rose Hill Landfill

Site Address: Street No. Rose Hill Road

City South Kingstown

County/State Washington County, RI

Site Contact / Phone No.: David Newton, EPA Waste Management Div. (617) 573-9612

Directions to Site:(Att.Map) Take 95S → 4S which becomes Rt. 1. Take right onto 138. Rose Hill Landfill is on left.

Historical/Current Site Information:

Site is a landfill which operated from 1967-1983. Industrial, municipal and sewage sludge wastes have been disposed at the landfill. methane gas is suspected in surrounding basements of surrounding residential houses.

Incident Type:
- ( ) Air Release - _____
- ( ) Spill - _____
- ( ) Fire - _____
- (X) HW Site - potential

Location Class : ( ) Industrial ( ) Commercial (X) Urban/Residential ( ) Rural

USEPA Contact: D. Tanliaferro **Date of Initial Site Activities:** 11/8/91

Original HASP: Yes ✓ **Modification Number:** _____

Lead TAT: P. Shaw **Site Health & Safety Coordinator:** D. Shaw

Response Activities/Duration (fill in as applicable)

Emergency Response:	( ) Perimeter Recon.	
	( ) Site Entry	N/A
	( ) Visual Documentation:	
	( ) Multi-media Sampling:	N/A
	( ) Decontamination:	N/A
Assessment:	(X) Perimeter Recon.	2 hrs
	(X) Site Entry	2 hrs
	(X) Visual Documentation:	2 hrs.
	( ) Multi-media Sampling:	N/A
	( ) Decontamination:	N/A

Physical Safety Hazards to Personnel

( ) Heat ( ) Cold ( ) Precipitation (X) Confined Space ( ) Terrain
(X) Walking/Working Surfaces ( ) Fire & Explosion (X) Oxygen Deficiency
( ) Underground Utilities ( ) Overhead Utilities ( ) Heavy Equipment
( ) Unknowns in Drums, Tanks, Containers ( ) Ponds, Lagoons, Impoundments
( ) Rivers, Streams ( ) Pressurized Containers, Systems ( ) Noise
( ) Illumination ( ) Nonionizing Radiation ( ) Ionizing Radiation

Biological Hazards to Personnel

( ) Infectious/Medical/Hospital Waste ( ) Non-domesticated Animals ( ) Insects
( ) Poisonous Plants/Vegetation ( ) Raw Sewage

Training Requirements

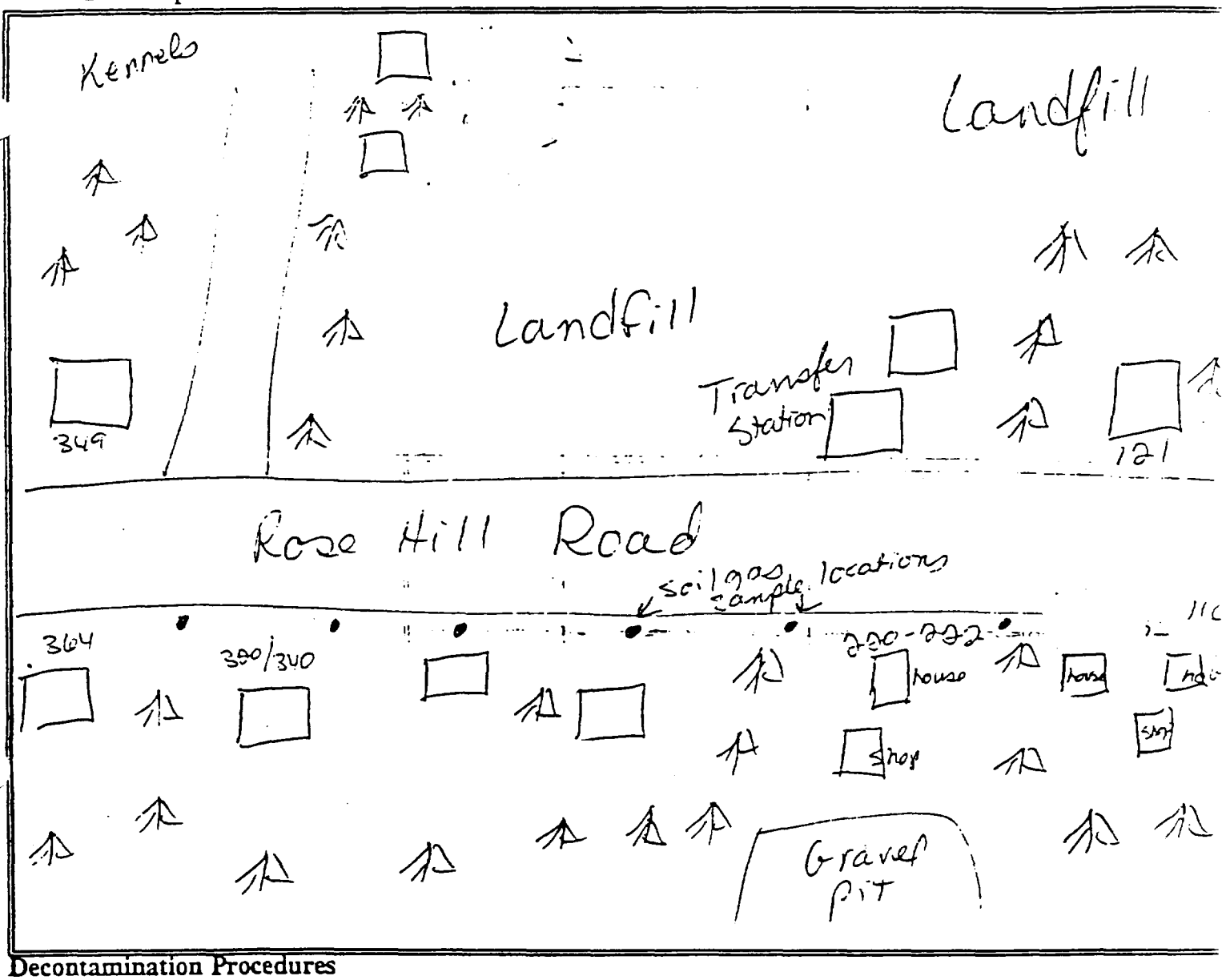
(X) 40 Hour General Site Worker Course with three days supervised experience.
( ) 24 Hour Course for limited, specific tasks with one day supervised experience.
( ) 24 Hour Course for Level D Site with one day supervised experience.
(X) 8 Hour Annual Refresher Health and Safety Training.
(X) 8 Hour Management/Supervisor Training in addition to basic training course.
( ) Site Specific Health and Safety Training.
( ) Pre-entry training for emergency response skilled support personnel.

Medical Surveillance Requirements

(X) Baseline initial physical examination with physician certification.
(X) Annual medical examination with physician certification.
( ) Site Specific medical monitoring protocol (Radiation, Pesticide, PCB, Metals).
( ) Asbestos Worker medical protocol.
( ) Exempt from medical surveillance:_____.
(X) Examination required in event of chemical exposure or trauma.

Physical Parameters	Chemical Contaminant	Chemical Contaminant	Chemical Contaminant	Chemical Contaminant
	Methane			
Exposure Limits IDLH Level	___ ppm ___ mg/m³ PEL ___ ppm ___ mg/m³ TLV ___ ppm ___ mg/m³ IDLH N/A	___ ppm ___ mg/m³ PEL ___ ppm ___ mg/m³ TLV ___ ppm ___ mg/m³ IDLH	___ ppm ___ mg/m³ PEL ___ ppm ___ mg/m³ TLV ___ ppm ___ mg/m³ IDLH	___ ppm ___ mg/m³ PEL ___ ppm ___ mg/m³ TLV ___ ppm ___ mg/m³ IDLH
Physical Form Sol.Liq.Gas Color	___ Solid ___ Liquid X Gas ___ Color colorless	___ Solid ___ Liquid ___ Gas ___ Color	___ Solid ___ Liquid ___ Gas ___ Color	___ Solid ___ Liquid ___ Gas ___ Color
Odor	weak odor			
Flash Point Flammable limits	___ Degrees F or C 15 % UEL 5 % LEL	___ Degrees F or C ___ % UEL ___ % LEL	___ Degrees F or C ___ % UEL ___ % LEL	___ Degrees F or C ___ % UEL ___ % LEL
Vapor Press. Vapor Dens.	45.44 mm/Hg 0.55 Air = 1	___ mm/Hg ___ Air = 1	___ mm/Hg ___ Air = 1	___ mm/Hg ___ Air = 1
Specific Gravity	0.422 Water = 1	___ Water = 1	___ Water = 1	___ Water = 1
Solubility	NA			
Incompatible Materials	NA (explosive)			
Route of Exposure	X Inh ___ Abs ___ Con ___ Ing	___ Inh ___ Abs ___ Con ___ Ing	___ Inh ___ Abs ___ Con ___ Ing	___ Inh ___ Abs ___ Con ___ Ing
Symptoms of Acute Exposure	dizziness, difficult breathing, unconcious, asphyxiation			
First Aid Treatment	Breath: art. resp.			
Ion Potential	N/A eV	___ eV	___ eV	___ eV
Instruments For Detection	___ PID w/___ Probe ___ FID X CGI ___ RAD ___ Det Tube ___ Ph Other___	___ PID w/___ Probe ___ FID ___ CGI ___ RAD ___ Det Tube ___ Ph Other___	___ PID w/___ Probe ___ FID ___ CGI ___ RAD ___ Det Tube ___ Ph Other___	___ PID w/___ Probe ___ FID ___ CGI ___ RAD ___ Det Tube ___ Ph Other___

Site Map with work zones:



Decontamination Procedures

( ) Wet Decontamination - using: _____
(X) Dry Decontamination

Description of Site Specific Decontamination Plan: dry decontamination to be utilized.

Adequacy of decontamination determined by: visual

Personal Protective Equipment

TASK TO BE PERFORMED/AIR MONITORING REQUIRED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE OUTER GLOVE BOOT COVER	TYPE OF APR CARTRIDGE OR CANISTER
walk through/ documentation/ air monitoring 1, 4	Level D	—	—	—

Frequency and Types of Air Monitoring: (X) **Continuous** ( ) **Routine -**_____ ( ) **Periodic -** _____

DIRECT READING INSTRUMENTS	COMBUSTIBLE GAS/OXYGEN METER (1)	RADIATION SURVEY METER/PROBE (2)	PHOTOIONIZATION DETECTOR/PROBE (3)	FLAME IONIZATION DETECTOR (4)	CHEM. DETECTOR TUBE (5)
ID NUMBER	TAT #2	N/A	N/A	N/A	N/A
CAL. DATE	11/8/91				
TAT MEMBER	Shaw				
ACTION LEVEL	≥ 20%LEL ≤19.5%, ≥23% O_2 - LEAVE	3X BACKGRND - CAUTION; 1 MR/HR-LEAVE	UNKNOWNS 0-5 UNITS:"C" 5-500:"B"	UNKNOWNS 0-5 UNITS:"C" 5-500:"B"	PEL/TLV COMPARE W/PF

Emergency Contact	Location	Phone Number	Notified
South County Hospital	Wakefield	(401) 782-5000	N
Ambulance	S. Kingston	(401) 783-3341	N
Police	S. Kingston	(401) 783-3341	N
Fire Dept.	S. Kingston	(401) 783-2422	N Y

Chemical Trauma Capability? (X) Yes ( ) No If no, closest backup:_____ Phone:_____

Directions to Hospital (attach map) - Route verified by:_____ Date: __/__/__

Proceed south on Rose Hill Rd, turn left onto Saugatucket Rd, turn right onto Rt. 1 South, take "South County Hospital" exit, take first left, follow ½ mile. Hospital is on left.

Additional Emergency Phone Contacts

Contact	Phone Number
WESTON 24 hr. Hotline	215-524-1925 215-524-1926
WESTON Medical Emergency Service	513-421-3063
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-942-5969

HASP prepared by: Penny Shaw Date: 11/8/91

Pre-Response/Entry Approval by: Peter Vernon Date: 11/8/91

Verbal Approval/Modification to Original HASP by:_____ Date: __/__/__

Size of Site: UNK Terrain Flat/wooded Weather Clear

Distance to Nearest: Residence 100yds. School UNK Hospital 5 mile

Public Building UNK Other _____

Evacuation: ( ) Yes (X) No - By Whom: _____

Nearest Waterway: Saugahatchee River Distance from Site: adjacent to landfill

Condition	Observed	Potential	None	Comments/Observations
Surface Water Contamination		X		Historic data has shown that landfill contaminants may pose a threat to adjacent residences
Ground Water Contamination		X		
Drinking Water Contamination		X		
Air Release		X		
Soil Contamination		X		
Stressed Vegetation		X		
Dead Animal Species		X		

Actions Taken On-Site:

Perimeter Monitoring: (X) Yes ( ) No

Site Entry by TAT: (X) Yes ( ) No

Tasks Conducted	Level of Protection/Specific PPE Used
walk through / documentation / air monitoring	Level D

Date: 11/8/91
Data Collected by: Shaili

Data to be summarized by a "Range of readings,i.e.,- Low to High" and/or "Average" by location.

Station/Location	CGI/O_2 Meter	Radiation Meter	PID/Probe	FID/OVA	Detector Tube
Background	0.00/20.8 (O2)				
residence		NA	NA	NA	NA
	✓	✓	✓	✓	✓

Summary/Comments: No readings above background were observed in any of the basements monitored

Off Site: ( ) Yes (X) No
On Site: ( ) Yes (X) No

Describe types of samples and methods used to obtain samples: N/A

Was Laboratory notified of Potential Hazard Level Of Samples? ( ) Yes ( ) No

Note: The nature of the work assignment may require the use of the following procedures/programs which will b included as Attachments to this HASP as applicable: Emergency Response Plan, Confined Space Entry Procedures, Spill Containment Program.

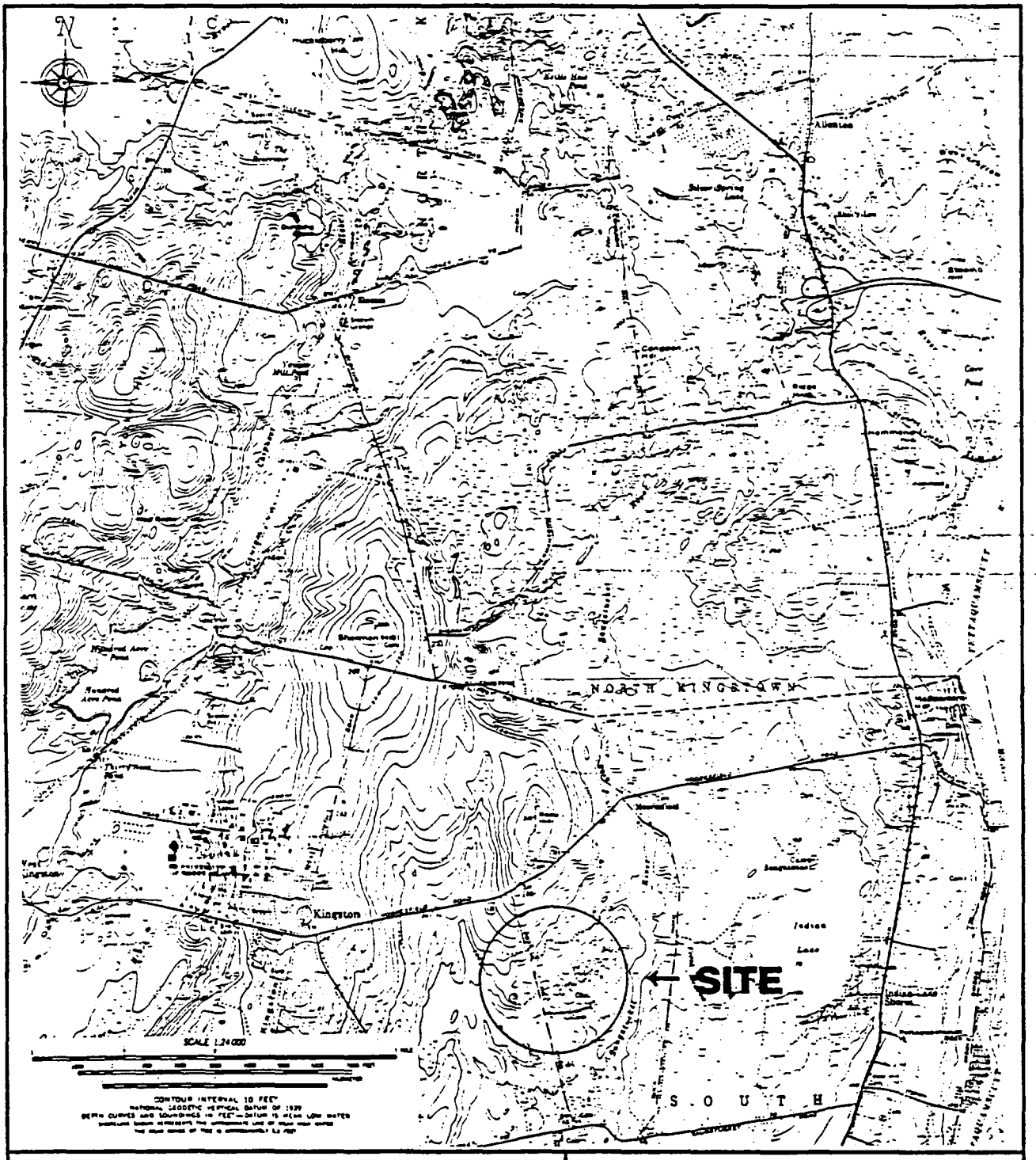
Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the Technical Assistance Team (TAT) Contract 68-WO-0036 for Zone I. Use of this HASP by WESTON and its subcontracto is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
Margaret Shaw	Margaret Shaw	Roy F. Weston	11/8/91
Dean Taglieferro	Dean Taglieferro	USEPA	11/8/91

Final Submission of HASP by:	Margaret A. Shaw	Date 12/11/91
Post Response Review by:		
Post Response Approval by:	Vernon	12/5/91
TAT HSO Review by:		

COMMENTS/FOLLOWUP



NOT TO SCALE

FIGURE 1
SITE LOCATION MAP
ROSE HILL LANDFILL
SOUTH KINGSTOWN, RI

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS #
SHAW	11/91	1553
APPROVED	DATE	TDD #
[signature]	12/4	01-9111-08

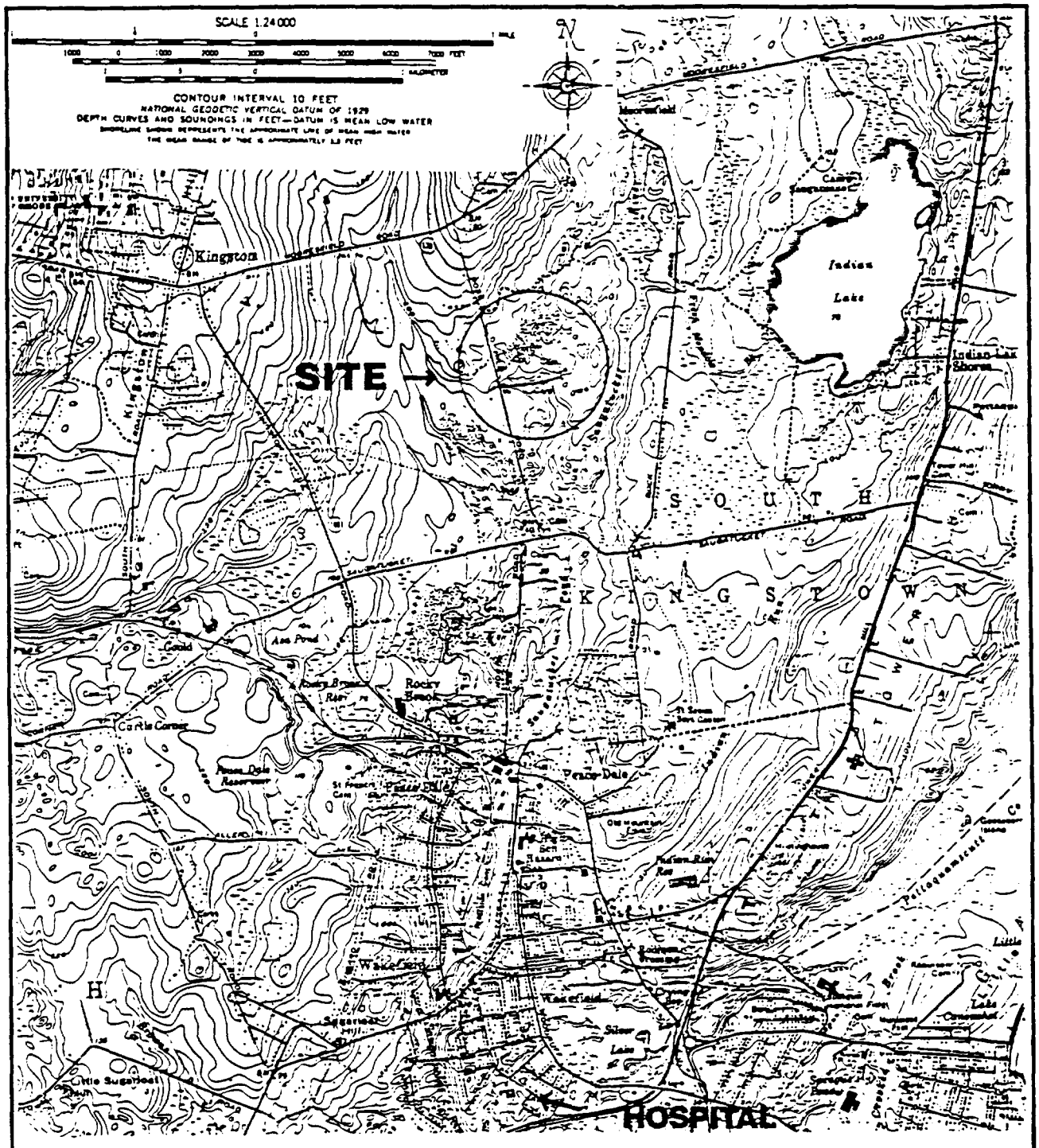


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FIGURE 2
DIRECTIONS TO HOSPITAL
ROSE HILL LANDFILL
SOUTH KINGSTOWN, RI

WESTON
REGION I TECHNICAL ASSISTANCE TEAM

DRAWN	DATE	PCS #
SHAW	11/91	1553
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