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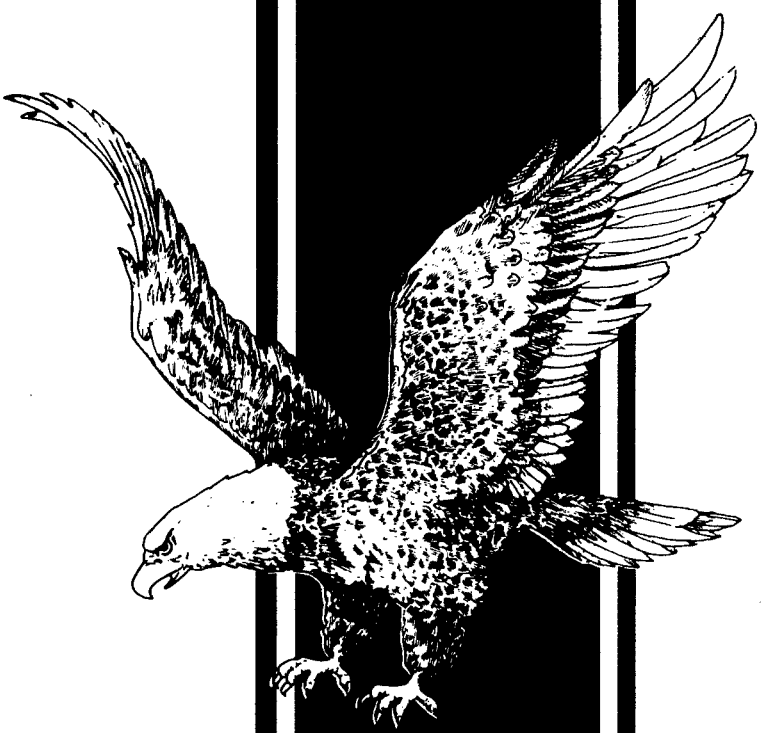

USAEC

U.S. Army Environmental Center

Jefferson Proving Ground

Final Addendum to the Remedial Investigation/Feasibility Study Technical Plan

Volume I

June 1993

Prepared for
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland 21010-5401

Prepared by
Rust Environment and Infrastructure
(formerly SEC Donohue, Inc.)
Grand Junction, Colorado 81506
Under Contract No. DAAA15-90-D-0007

Jefferson Proving Ground
South of the Firing Line

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Acronyms and Abbreviations

AEHA	Army Environmental Hygiene Agency
ARARs	applicable or relevant and appropriate requirements
AREEs	areas requiring environmental evaluation
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
DRMO	Defense Reutilization and Marketing Office
EO	explosive ordnance
EPA	Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
IDEM	Indiana Department of Environmental Management
JPG	Jefferson Proving Ground
MCL	maximum contaminant level
MEP	Master Environmental Plan
NEIC	National Enforcement Investigations Center
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
PCBs	polychlorinated biphenyls
POL	petroleum, oils, and lubricant
ppm	parts per million
QA/QC	quality assurance/quality control
RI/FS	remedial investigation/feasibility study
SARA	Superfund Amendments and Reauthorization Act
semi-VOC	semi-volatile organic compound
SWMUs	solid waste management units
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
USAEC	U.S. Army Environmental Center
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compound

1.0 INTRODUCTION

This Addendum to the Remedial Investigation/Feasibility Study (RI/FS) Technical Plan outlines the overall approach and defines the activities required to provide a comprehensive study of previously identified sites at the U.S. Army Jefferson Proving Ground (JPG) in Madison, Indiana. The original Work Plans covering the first 21 sites were developed and provided to the U.S. Army Environmental Center (USAEC) under Contract No. DAAA15-90-D-0007, Task Order 0002. The final Work Plans were submitted in September of 1992. The RI/FS is being performed in support of USAEC under Contract No. DAAA15-90-D-0007, Task Order 0005. A modification to Task Order 0005 was issued, calling for the investigation of an additional 29 sites. Thus, addenda to the final Work Plans were required. The sites to be characterized under these plans generally represent those sites located in the area south of the firing line requiring additional studies to satisfy the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA 1986); the National Contingency Plan (40 CFR Part 300); and the National Environmental Policy Act (NEPA). The RI/FS to be conducted is required to:

- Define extent and magnitude of environmental contamination at JPG in the area south of the firing line,
- Assess human health and environmental risk associated with contamination at the identified sites at JPG,
- Determine needs for remedial action at JPG, and
- Develop and evaluate remedial-action alternatives.

This report is an Addendum to the Remedial Investigation/Feasibility Study (RI/FS) Technical Plan Volume I. In addition to this plan, the following supporting documents have also been prepared:

- Addendum to the RI/FS Sampling Design Plan (Volume II)
- Addendum to the RI/FS Health and Safety Plan (Volume IV)

The draft plans were reviewed by USAEC, EPA Region V, and Indiana Department of Environmental Protection personnel. The final plans have been revised based on these comments. No changes to the Final Quality Control Plan were required by the addition of 29 sites; thus, no addendum to Volume III was prepared. Although there have been previous environmental investigations performed at JPG, little to no site characterization work has been conducted and data concerning the presence and extent of contamination are lacking. This Work Plan addendum provides the rationale for and a description of the work tasks necessary to provide site-characterization information to support the completion of an assessment of risk to human health and the environment, to complete an FS of remedial-action alternatives, and to ensure JPG compliance with applicable federal and state laws and regulations. Information on the general site background and environmental setting is contained in the Final RI/FS Technical Plan dated September 1992 and will not be repeated in this addendum.

1.1 PLAN ORGANIZATION

This plan, designated Volume I, *Final Addendum to the Remedial Investigation/Feasibility Study Technical Plan*, provides the overall plan for conducting an RI/FS for 29 sites in the south portion of JPG. Details of sampling and analysis, and health and safety procedures are presented in the accompanying documents (Volumes II and IV, respectively). The Technical Plan is organized as follows:

Section 1.0 Introduction
Section 2.0 Site Background and Environmental Setting
Section 3.0 Conceptual Site Models
Section 4.0 Data Needs, Data Quality Objectives, and Technical Approach
Section 5.0 RI Work Tasks
Section 6.0 Project Schedule
Section 7.0 References

1.2 SCOPE OF WORK

For the purposes of the Task Order 0005 Modification, the proposed field investigations will be considered as Phase II RI, because the Task Order 0005 work was slated as Phase I RI. However, it is proposed that both time and money can be saved by concurrently performing the tasks set forth in the original Task Order 0005 and the Task Order 0005 Modification. The schedule assumes that the tasks will be performed concurrently.

1.2.1 List of Sites From Task Order 0005

As previously stated, the scope of the RI/FS at JPG is limited to those sites identified in the area south of the firing line that are known or suspected to contain contaminants with the potential for affecting human health or the environment. These sites include the areas requiring environmental evaluation (AREEs) identified in the Master Environmental Plan (MEP) as shown in Table 1.

Table 1. AREEs South of the Firing Line at Jefferson Proving Ground Under Task Order 0005

Task Order Site No.	MEP Site No.	EPA Site No.	Site Name
1	1	O1	Building 185, Incinerator (old)
NA	2	C13	Water Quality Laboratory
2	3	S1	Building 177, Sewage Treatment Plant

Table 1. AREEs South of the Firing Line at Jefferson Proving Ground Under Task Order 0005 (continued)

Task Order Site No.	MEP Site No.	EPA Site No.	Site Name
3	4	L9	Explosive Burning Area
4	5	L18	Landfill
5	7	L19	Wood Storage Pile
6	8	L7	Wood Burning Area
7	9	O9	Red Lead Disposal Area
NA	10	O15	Photographic Laboratory
NA	11	O2	Building 333 Incinerator (new)
8	12	NA	Small arms indoor range
9	14	L10	Burning Ground (South of Gate 19 Landfill)
10	15	L3	Gate 19 Landfill
11	2	L1	Burning Area for Explosive Residue
12	27	L5	Building 602, Solvent Pit
12	28	L5	Building 617, Solvent Pit
12	29	L5	Building 279, Solvent Pit
13	30	L22	Old Fire Training Pit
14	NA	L21	Yellow Sulfur Disposal Area
15	NA	NA	Burn Area South of New Incinerator
16	NA	L25	Potential Ammo Dump Site
17	NA	NA	Asbestos Containing Materials
18	NA	A0C2	Underground Storage Tanks
19	NA	NA	Off-Site Water Supply Wells

Table 1. AREEs South of the Firing Line at Jefferson Proving Ground Under Task Order 0005 (continued)

Task Order Site No.	MEP Site No.	EPA Site No.	Site Name
20	NA	C14	Building 279, Temporary Waste Storage
20	36	C9	Building 305, Temporary Waste Storage
21	31	C12	Building 105, Temporary Storage
21	35	C5, C6 & C7	Building 186, Temporary Storage
21	NA	C1	Building 204, Temporary Storage
21	NA	C7	Building 211, Temporary Storage
21	34	C10	Building 227, Temporary Storage

Note.—Task Order 0005 listed Site 2 as the Water Quality Laboratory; however, because it is located at the Sewage Treatment Plant, the investigative tasks recommended for the site were included with the Sewage Treatment Plant tasks. NA is the abbreviation for "not applicable"; MEP is Master Environmental Plan.

The numbers in the left-hand column correspond to the site numbers shown in Task Order 0005 and will be used in place of the MEP site numbers. There were nine other previously identified Solid Waste Management Units (SWMUs) located north of the firing line that are not included in the current RI/FS for JPG.

Additional sites not listed in the MEP that were added to the RI/FS under Task Order 0005 based on initial environmental studies or facility-wide investigations are also shown in Table 1.

1.2.2 List of Sites From Task Order 0005 Modification

The modification to Task Order 0005 addresses the additional areas requiring environmental evaluation (AREEs) as shown in Table 2.

Table 2. AREEs Under Task Order 0005 Modification

Task Order Site Number	EPA Site Number	Site Name
22	L6	Building 216, Locomotive Maintenance Pit
23	73	Building 216, Potential Solvent Disposal Pit
24	L14	Building 602, Soil Staging Area
25	L16	Paper Mill Road Disposal Area
26	L17	DRMO Storage Area
27	L23	Sewage Sludge Application Areas
28	L26	Gator Z Mine Open Burn Area
29	L27	Gator Z Mine Scrap Disposal Area
30	C1	Building 204, Pesticide Storage Area
31	C11	Building 227, Former Storage Pad
32	AOC6	Building 105, Locomotive Maintenance Pit
33	O2	Building 333, New Incinerator
34	O11	Building 136, Sandblasting Area
35	AOC1	Building 602, Former Leaking Underground Storage Tank (UST)
36	AOC3	No. 2 Oil Spill at Building 103
37	AOC4	Gasoline Station, Building 118
38	AOC7	Northwest-Southeast Runway Test Area
39	AOC12	Gator Z Mine Test Area
40	NA[a]	Discharge/Fill Pipe at Building 259
41	NA	Building 281, Fuel Oil from Former UST
42	NA	Building 281, Indoor Range

Table 2. AREEs Under Task Order 0005 Modification (continued)

Task Order Site Number	EPA Site Number	Site Name
43	NA	Possible USTs or Wells at Artillery and Infantry Roads
44	NA	Underground Concrete Vault Near Airport Railroad Tracks
45	NA	Possible Unexploded Ordnance at Airport
46	NA	Old Flare Test Sites (2) at South End of Airport
47	NA	Wooded Area South of Airport (possible test area)
48	NA	Ammunition Storage Igloos South of the Firing Line
49	NA	Explosive Ordnance South of the Firing Line
50	O4 and O14	Building 186, Wash Rack and Oil/Water Separator

[a]NA=not applicable.

The locations for these sites are shown in Figure 1. The sites specified in Task Order 0005 Modification differ from the sites discussed in the final work plans. Thus, addenda to the work plans were prepared to include only the sites covered by the task order modification. There is some overlap of the sites addressed in Task Order 0005 and Task Order 0005 Modification. Sites mentioned in both task orders include:

- Building 602, Soil Staging Area (Site 12, Task Order 0005; Site 24, Task Order 0005 Modification)
- Building 204, Pesticide Storage Area (Site 21, Task Order 0005; Site 30, Task Order 0005 Modification)
- Building 227, Former Storage Pad (Site 21, Task Order 0005; Site 31, Task order 0005 Modification)
- Building 105, Locomotive Maintenance Pit (Site 21, Task Order 0005; Site 32, Task Order 0005 Modification)
- Building 602, Former Leaking Underground Storage Tank (Site 12, Task Order 0005; Site 35, Task Order 0005 Modification)

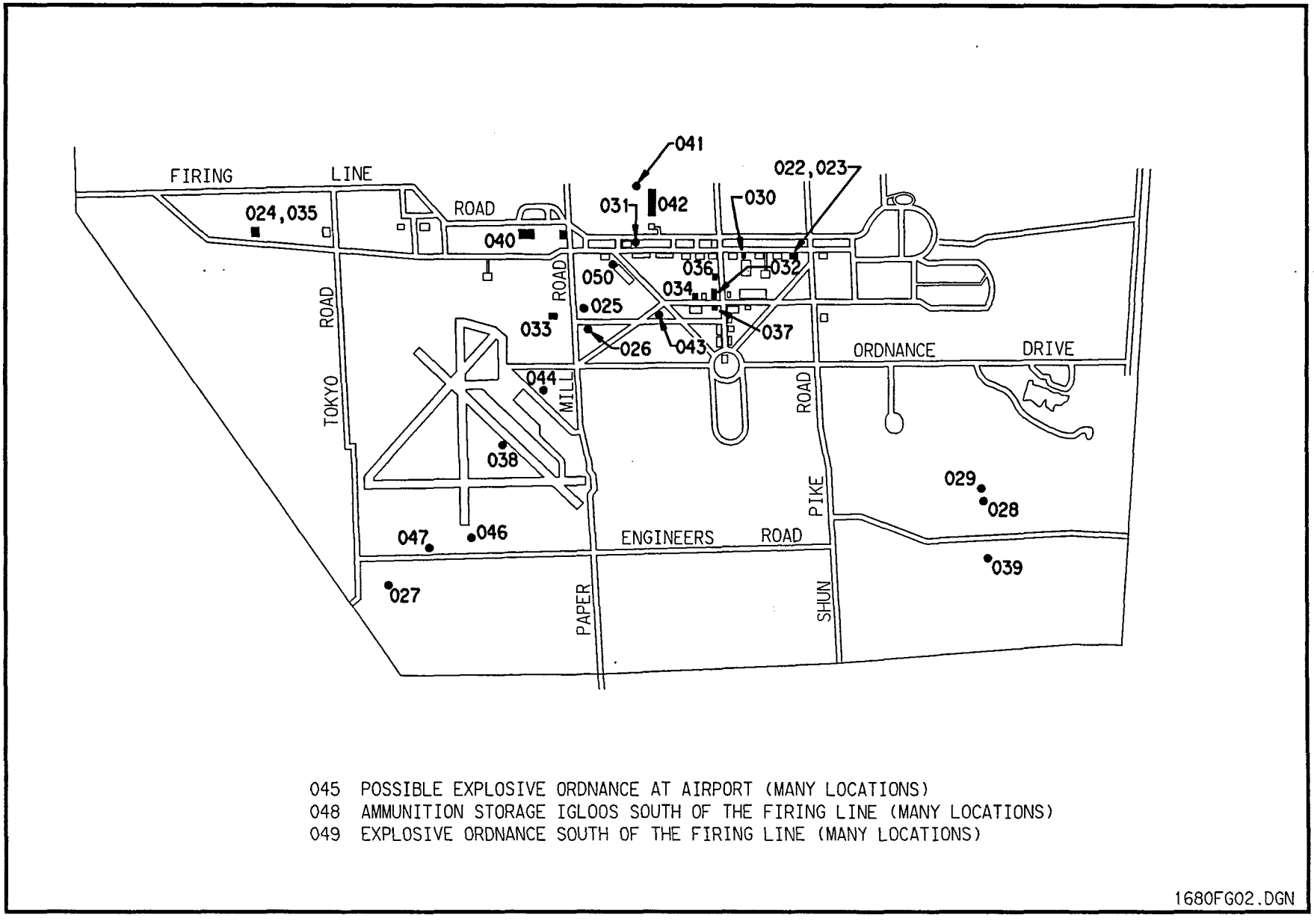

Figure 1. Location of Sites from Task Order 0005 Modification

Much of the information that was utilized in developing addenda to the work plans is contained in documents related to previous investigations; these are listed in Section 7.0, *References*. Also listed in Section 7.0 are the applicable guidance documents as specified in the task order.

The work described in this plan addendum and the accompanying plan addenda is based on an initial evaluation of the results of previous investigations, wherein data gaps were identified. Individual work tasks are described in this document with respect to specific rationale, objectives, and technical approach to be used to fill these data gaps. All work tasks will be designed to provide information that will satisfy any standard requirements, criteria, or limitations promulgated under federal or State of Indiana environmental laws that apply to JPG. These include, but are not limited to:

- The Safe Drinking Water Act [42 U.S.C. 30 et seq]
- The Toxic Substances Control Act [15 U.S.C. 2601 et seq]
- The Clean Air Act [42 U.S.C. 7401 et seq]
- The Clean Water Act [33 U.S.C. 1251 et seq]
- The Solid Waste Disposal Act [42 U.S.C. 6901 et seq]
- Endangered Species Act [16 U.S.C 1531 et seq]
- State laws that are more stringent than the equivalent federal standard

A more comprehensive list of potentially applicable or relevant and appropriate requirements (ARARs) is presented in Section 3.0 of the final RI/FS Technical Plan.

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The site background and environmental setting for JPG is described in Section 2.0 of the final RI/FS Technical Plan, dated September 1992.

3.0 CONCEPTUAL SITE MODELS

On the basis of all presently available data, the following conceptual site models have been developed to provide a preliminary understanding of the sources of contamination in the area south of the firing line at JPG, and the contaminant migration pathways at each site. The potential for contamination is discussed in terms of low, moderate, and high, which may also be defined as unlikely, possible, and probable. These models are used to assess the adequacy of present information and the need for further investigations to provide data necessary for proper remedial-action decisions. Where data gaps exist, the types, quality, and quantity of data to be collected are determined and the uses for the data are described. These additional data needs are described in Section 4.0, *Data Needs, Data Quality Objectives, and Technical Approach,* of this plan. The following contains a preliminary assessment of the contaminant pathways at each site. A more detailed evaluation of contaminant fate and transport as related to potential receptors will be conducted as one of the RI/FS work tasks as described in Section 5.0 of this plan. Table 3 is a summary of the rationale for the proposed investigative approach for each site.

Table 3. Sampling Rationale

Site Name	Determine Existence of Contamination based on site history and identify type of contamination	Determine if visual observations are related to contamination and identify type	Determine extent of known or likely contamination in specific media			
			SF[a]	SO[b]	GW[c]	SW[d]
Building 216, Locomotive Maintenance Pit	X					
Building 216, Potential Solvent Disposal Pit		X			?[e]	
Building 602, Soil Staging Area	X					
Paper Mill Road Disposal Area			X	X		
DRMO Storage Area	X					
Sewage Sludge Application Areas		X	X			
Gator Z Mine Open Burn Area			X			
Gator Z Mine Scrap Disposal Area		X				
Building 204, Pesticide Storage	X					
Building 227, Former Storage Pad	X					
Building 105, Locomotive Maintenance Pit	X					
Building 333, New Incinerator	X					
Building 136, Sandblasting Area		X				
Building 602, Former Leaking UST			X			
No. 2 Oil Spill at Building 103			X	X	?	
Gasoline Station, Building 118			X	X	X	
Northwest-Southeast Runway Test Area	X					
Gator Z Mine Test Area	X					
Discharge/Fill Pipe at Building 259		X				
Building 281, Fuel Oil From Former UST				X	?	
Building 281, Indoor Range			X			
Possible USTs or Wells at Artillery and Infantry Roads	X					
Underground Concrete Vault Near Airport Railroad Tracks			X	X	?	
Possible Unexploded Ordnance at Airport	X					
Old Flare Test Sites (2) at the South End of Airport	X					

Table 3. Sampling Rationale (continued)

Site Name	Determine Existence of Contamination based on site history and identify type of contamination	Determine if visual observations are related to contamination and identify type	Determine extent of known or likely contamination in specific media			
			SF[a]	SO[b]	GW[c]	SW[d]
Wooded Area South of Airport	X					
Ammunition Storage Igloos South of the Firing Line	X					
Explosive Ordnance South of Firing Line	X					
Building 186, Wash Rack	X					

[a]SF=surface soil.
[b]SO=subsurface soil.
[c]GW=groundwater.
[d]SW=surface water.
[e]?=wells are optional based on results of soil sampling.

3.1 BUILDING 216, LOCOMOTIVE MAINTENANCE PIT (SITE 22)

3.1.1 Potential Contaminant Sources

Building 216 is located on Woodfill Road just west of Shun Pike Road (Figure 2). The building was used for locomotive maintenance when JPG operated its own railroad. There is a pit in the floor of the building that may have been used as part of this maintenance operation. The pit is approximately 180 square feet and is covered with wooden railroad ties. It appears to be constructed of concrete with a sump in the east end. The sump may have a drain to the sewer. Because the pit has not been inspected, it is not known if any material has leaked from the pit into the surrounding soil. Although no information exists concerning possible substances present in the pit, it is likely that it received fluids that leaked or spilled from the locomotives during maintenance. Thus, given the type of operations performed in the building, oil, grease, and possibly solvents are the most likely contaminants. Since traction motors and transformers on diesel-electric locomotives could have contained PCB dielectric fluid, PCBs may also be a concern. It appears that the pit may still receive small amounts of used oil from vehicle maintenance.

3.1.2 Evaluation of Contaminant Pathways

If leakage from the pit has occurred, contaminants would be present in the subsurface soils. The potential for downward migration of the contaminants is low because of the apparent concrete construction of the pit.

3.1.3 Evaluation of Existing Data

This site was first identified in 1989 during an environmental audit by the National Enforcement Investigations Center (NEIC). The pit was covered by wooden beams; therefore, only a limited inspection was performed. No information exists concerning the contents of the pit or the presence of possible leaks from the pit. Also, there are no records to determine whether the pit was cleaned out after locomotive maintenance ceased.

3.2 BUILDING 216, POTENTIAL SOLVENT DISPOSAL PIT (SITE 23)

3.2.1 Potential Contaminant Sources

Building 216 (Figure 2) was used for locomotive maintenance when JPG operated its own railroad. A break in the concrete next to the north side of the building reveals a rock-covered area resembling the solvent pits at Buildings 602, 617, and 279 (Site 12). There is also evidence that a drain may have formerly exited the wall at a point just above the potential pit. The other pits consist of 3-foot-diameter by 3-foot-deep crushed rock-filled pits. They were used to dispose of waste solvents/degreasers, including trichloroethylene (TCE). If the potential pit at Building 216 was used in a similar manner, volatile organic compounds (VOCs) and metals contamination of the surrounding soils is likely. When questioned, personnel at Building 216 had no knowledge of the former existence of a solvent pit at this facility.

3.2.2 Evaluation of Contaminant Pathways

If solvents and degreasers were disposed of in a rock-lined pit, the contamination would be present in subsurface soils with the potential for downward migration of VOCs to the groundwater pathway. The potential for soil and groundwater contamination is considered moderate. It is possible that volatilization of the VOCs could result in contamination of the air pathway. However, given the rapid dissipation of VOCs and the significant length of time since the last possible use of the pit, air-pathway contamination is considered to be nonexistent.

3.2.3 Evaluation of Existing Data

No data currently exist for this site. In fact, it is not certain whether the site was actually used for solvent disposal.

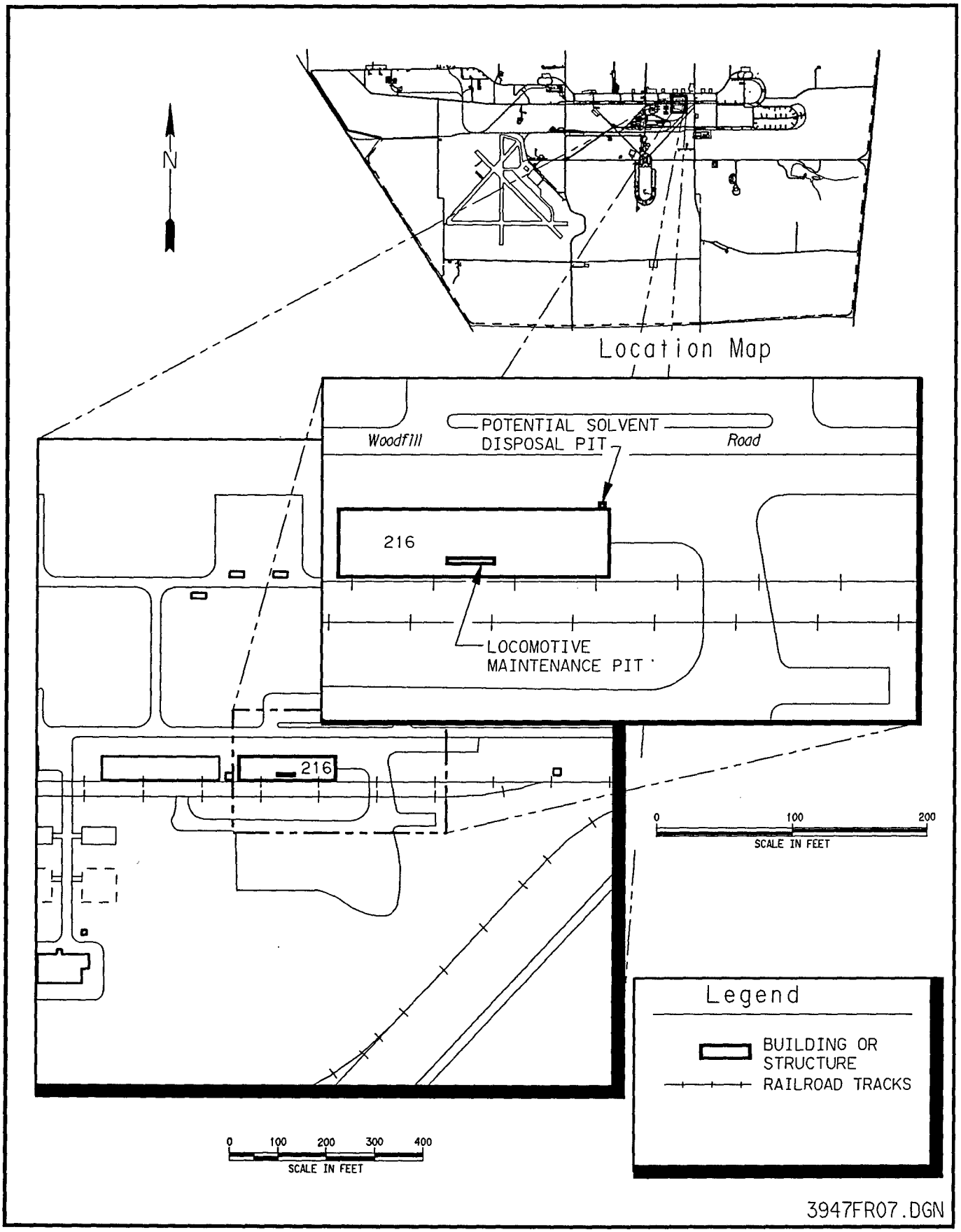

Figure 2. *Location Map of Building 216, Locomotive Maintenance Pit and Potential Solvent Disposal Pit*

3.3 BUILDING 602, SOIL STAGING AREA (SITE 24)

3.3.1 Potential Contaminant Sources

Building 602 is located just north of Woodfill Road about one-third of a mile west of Tokyo Road (Figure 3). Contaminated soil was excavated in 1988 during the removal of a leaking underground storage tank at Building 602 and was stockpiled on plastic sheeting in the parking lot east of the building. The soil was deposited in five piles, each approximately 10 feet in diameter and 6 feet high. The soil was contaminated with No. 2 Fuel Oil, which had leaked from the tank. The contaminated soil was later disposed of off-site as a special waste. A sample of the soil revealed TPH at 146 milligrams per kilogram (mg/kg).

3.3.2 Evaluation of Contaminant Pathways

There is a ditch south of Building 602, into which runoff from the stockpiled soil may have flowed, resulting in a moderate potential for surface water and sediment contamination. No runoff control features were in place to prevent runoff from entering the nearby drainage area. Thus, there is moderate potential that contaminants could be present in the surface soils along the natural drainage path. There is low potential for subsurface soil or groundwater contamination.

3.3.3 Evaluation of Existing Data

No previous investigations have been conducted at the soil staging site since removal of the soil piles. Soil data are needed to evaluate whether significant contaminant releases have occurred.

3.4 PAPER MILL ROAD DISPOSAL AREA (SITE 25)

3.4.1 Potential Contaminant Sources

This site is located east of Paper Mill Road and north of a set of railroad tracks (Figure 4). This site was first identified in the Environmental Photographic Interpretation Center (EPIC) report (1986) as a possible disposal area used from prior to 1949 until sometime before 1968. It was reportedly used for storage of surplus materials awaiting salvage or sale. Ground staining, along with debris, mounded material, vehicles, and containers were noted in successive aerial photos studied for the EPIC report. The area is presently overgrown, although the vegetation in the area appears stressed. Stained areas are covered by a black, tar-like substance at the surface. Areas with small chunks of asphalt, clinkers, and gravel are also present.

No information exists concerning possible contaminant releases at this site. Given the past use of the site as a storage area for vehicles, containers, and equipment, contamination

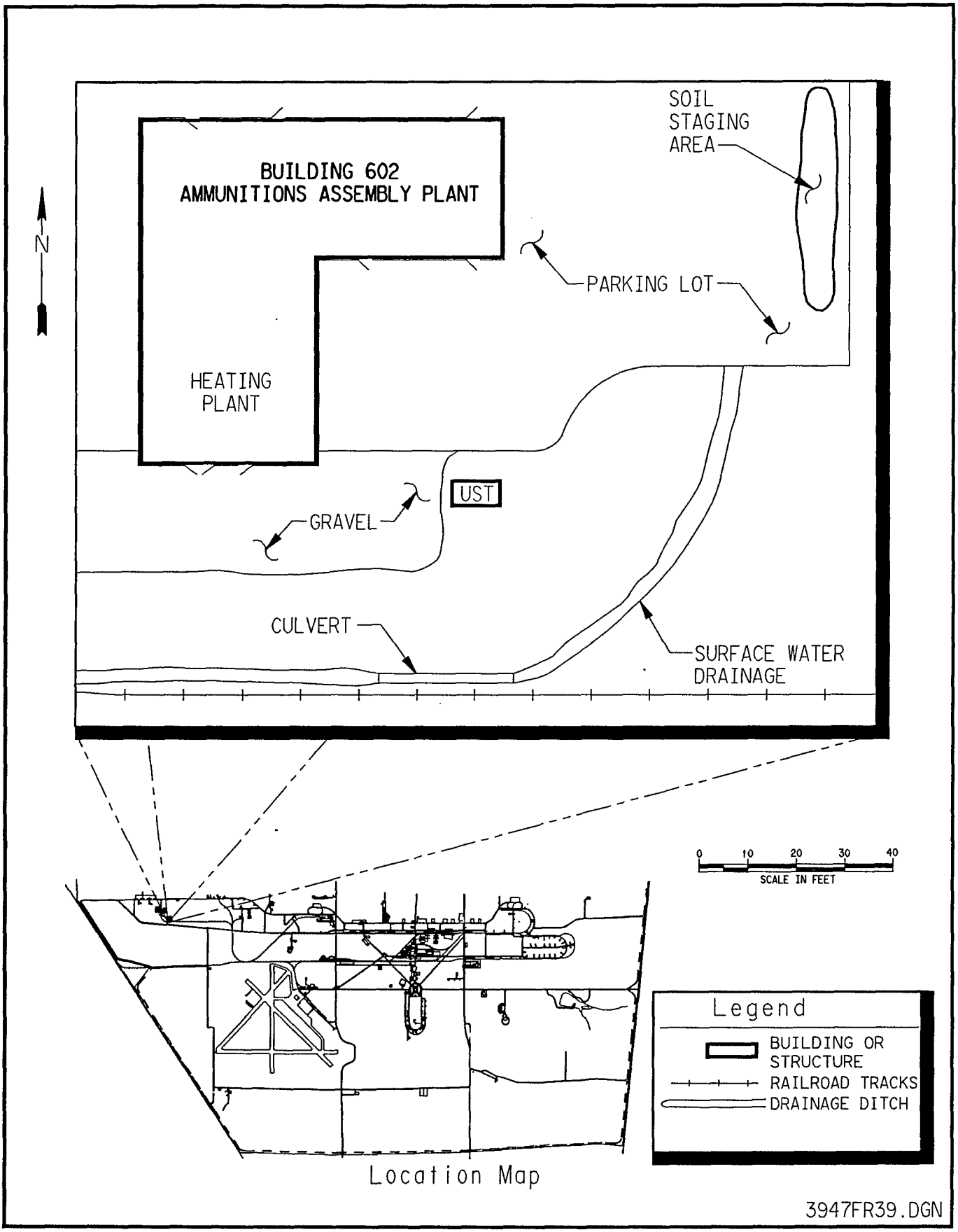

Figure 3. Location Map for Building 602, Soil Staging Area

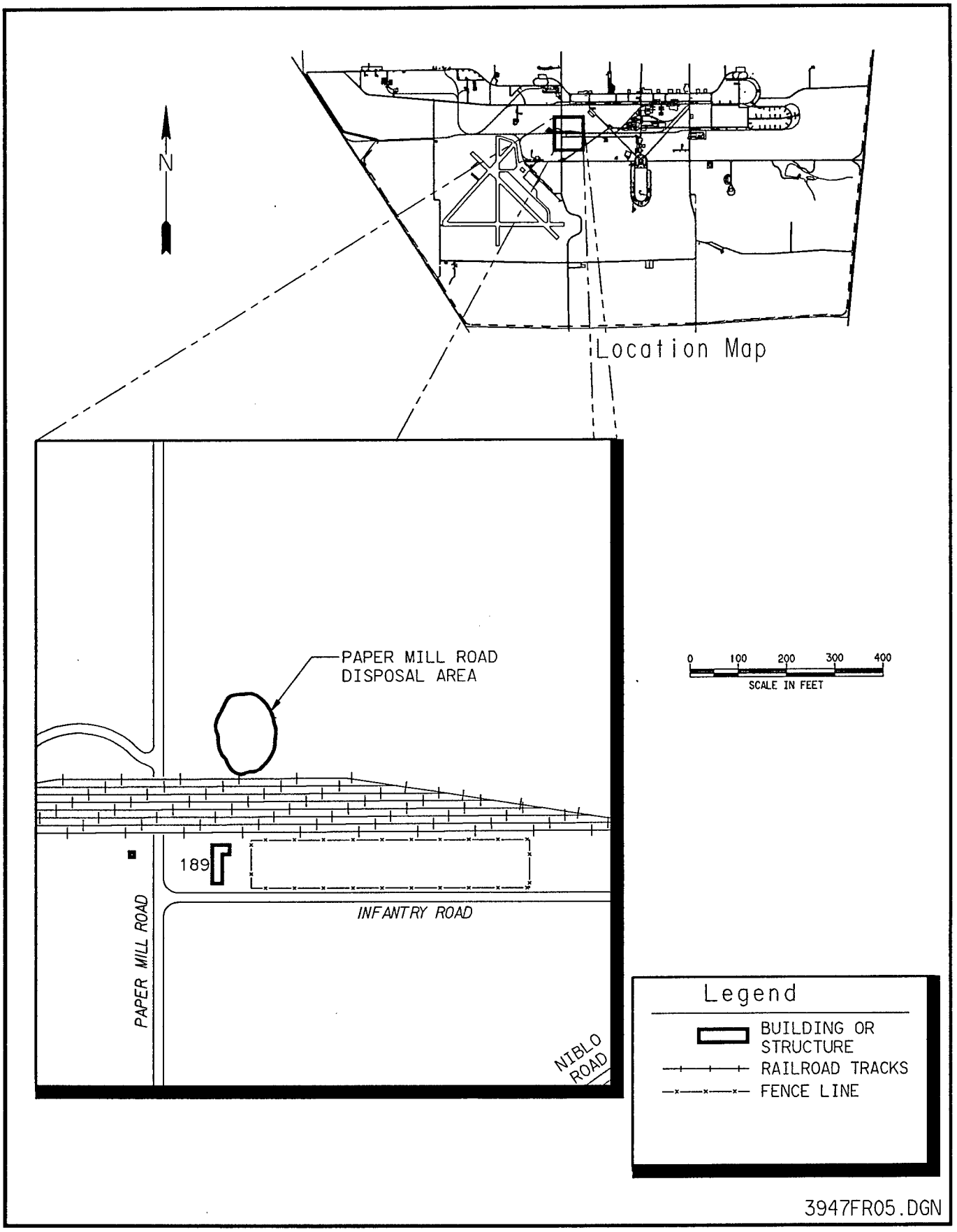

Figure 4. Location Map of Paper Mill Road Disposal Area

related to vehicle fluids, pesticides, and metals may be present at this site. The black tar-like substance may be waste oil, thus PCBs may also be a concern.

3.4.2 Evaluation of Contaminant Pathways

There is moderate potential for surface- and subsurface-soil contamination related to vehicle fluids, pesticides, and metals at this site. Surface runoff could also result in the contamination of the surface-water pathway, but this potential is considered low. Contamination of the groundwater pathway is possible via infiltration of precipitation to the water table, but, again, the potential for groundwater contamination is considered low.

3.4.3 Evaluation of Existing Data

No information exists concerning the nature of potential contaminants at this site. To date, no data have been collected to determine the presence or absence of contamination at this site.

3.5 DRMO STORAGE AREA (SITE 26)

3.5.1 Potential Contaminant Sources

This site is located at the northeast corner of Paper Mill Road and Infantry Road, adjacent to Building 189 (Figure 5). It consists of a flat, gravel-covered open storage area approximately 150 feet wide and 300 feet long (Kearney, 1992). The area is surrounded by a 6-foot-high chain link fence and is currently used to store scrap metal and scrap equipment from JPG prior to being sold to off-site vendors.

A small area in the northwestern part of the site is used to store spent lead-acid vehicle batteries. The batteries are brought to the unit from the Building 186 Spent Lead-Acid Battery Storage and stored prior to off-site reclamation. The batteries are placed on wooden pallets, which rest directly on the recently laid gravel. At the time of the visual site inspection, there were approximately 50 batteries on five pallets (Kearney, 1992). The tops of the batteries were covered with plastic and a layer of cardboard. Facility representatives stated that the batteries are normally stored 3 to 4 months before they are shipped off-site for recycling.

According to facility personnel, the southeastern corner of the site was used prior to 1980 for the storage of waste oil and transformers containing less than 50 parts per million (ppm) of PCBs. The material was reportedly stored on pallets that rested on the gravel surface (Kearney, 1992).

This site was first identified in the EPIC report (1986) as an open storage area used from prior to 1949 until at least 1980. Mounded materials, ground stains, debris, and piles of

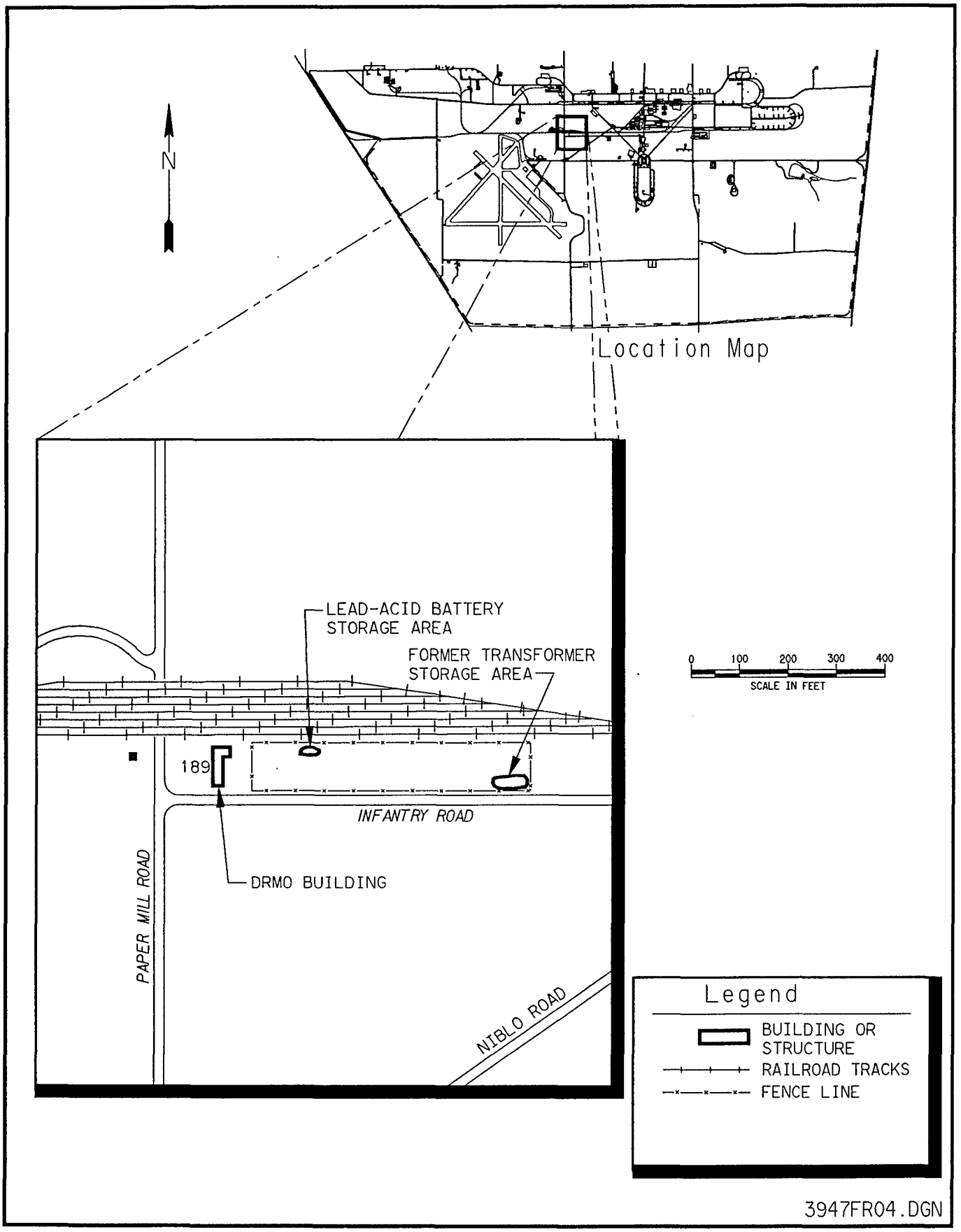

Figure 5. Location Map of DRMO Storage Area

crates were identified in a succession of aerial photos. No ground staining was noted during the visual site inspection for the Kearney (1992) report.

3.5.2 Evaluation of Contaminant Pathways

There are no known release controls at this site. There is a moderate release potential to surface water because of the proximity to drainage ditches and the ground staining noted in the historical aerial photographs. Spent lead-acid batteries are stored on wooden pallets set on the gravel-covered soil. Runoff from the battery storage area could flow to open ditches along the railroad siding just north of the unit. The flow would then turn to the west toward a natural stream. Runoff from the portion of the site formerly used to store waste oil and transformers could flow south to an open ditch along Infantry Road and then west about 1,000 feet to a natural stream (Kearney, 1992).

There is a moderate to high potential for soil contamination based on the stains noted in the historical aerial photographs. Potential for downward migration of contaminants via leaching or infiltration also exists, but is considered low.

3.5.3 Evaluation of Existing Data

No sample data exist for this site. Soil sample data are needed to determine if contaminant release has occurred.

3.6 SEWAGE SLUDGE APPLICATION AREAS (SITE 27)

3.6.1 Potential Contaminant Sources

There are four areas located in the vicinity of the Old Incinerator (Building 185) and the Sewage Treatment Plant (Building 177) that were formerly used to dispose of sewage sludge generated by the Sewage Treatment Plant (Figure 6). The sludge was reportedly applied to the ground and allowed to dry. The areas are now covered with grass and are generally flat.

There is no sign of mounding, and the vegetation is well established, indicating that the areas have not been used for disposal of sewage sludge in the recent past.

The areas received sludge from the drying beds of the Sewage Treatment Plant, which in the past was reported to have had problems with high levels of silver and cyanide in the effluent. The silver and cyanide were generated in the JPG photographic lab and transferred to the Sewage Treatment Plant via the Sanitary Sewer System. Silver was reportedly discharged through these systems from the start of the photographic laboratory operations until 1967, and cyanide was discharged from the start of operations until 1980. PCBs are a potential contaminant at this site because they are commonly found in sewage sludge at older treatment plants.

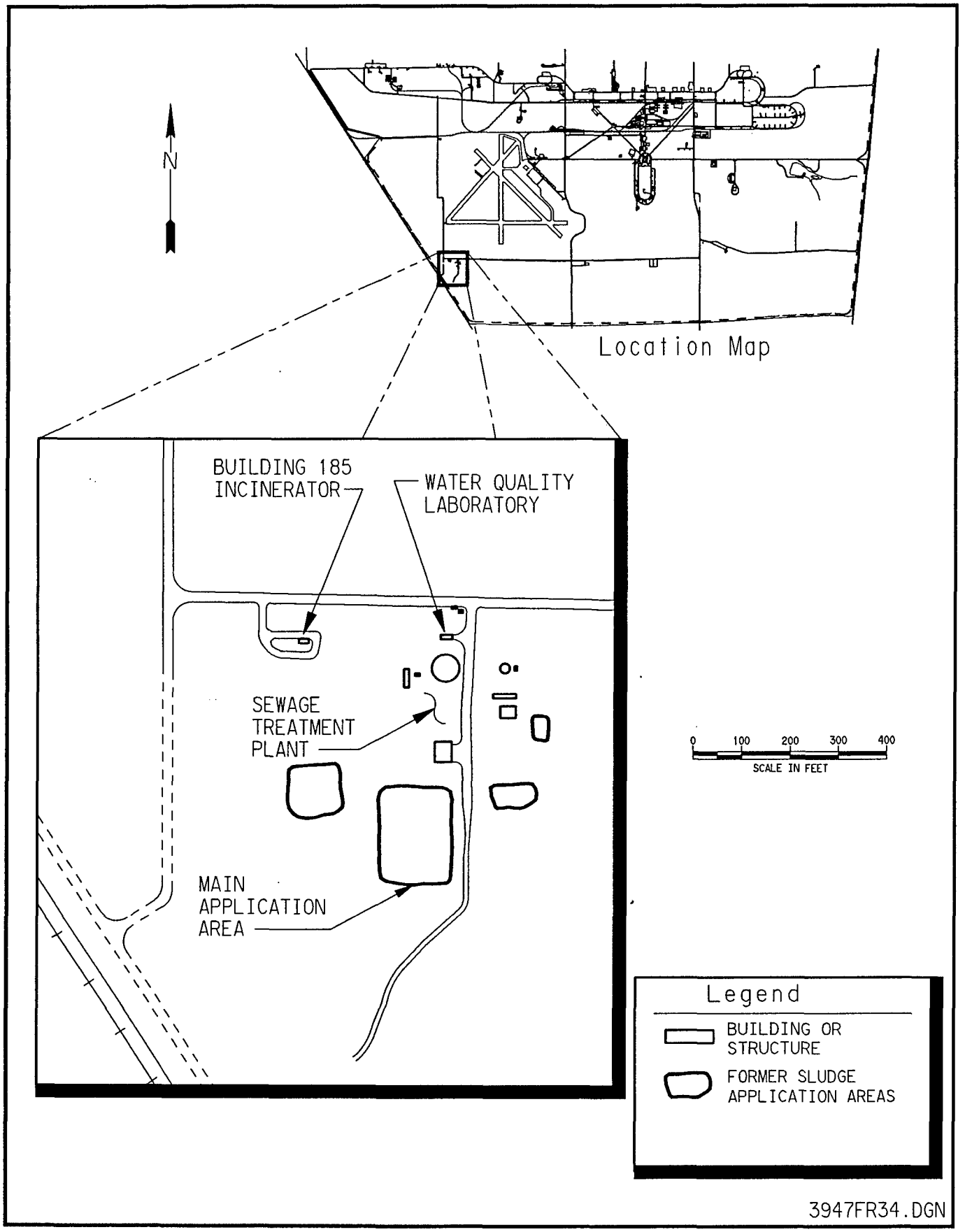

Figure 6. Location Map of Sewage Sludge Application Areas

3.6.2 Evaluation of Contaminant Pathways

There is no concern about contamination of the air pathway at the site because of the non-volatile nature of the wastes.

There is a moderate potential for release of contaminants to soil, and a low potential that subsequent leaching may have transported metals to the groundwater pathway.

There is slight potential for release to surface water via runoff into Harberts Creek, which is several hundred feet away to the southeast.

3.6.3 Evaluation of Existing Data

There are no data concerning the wastes contained in the sludge-application areas; however, water and sediment samples taken from Harberts Creek in January of 1992 near the Sewage Treatment Plant outfall revealed detectable concentrations of silver in the water and sediments. The silver may be related to the sewage treatment outfall, leaching and runoff from the sludge-application areas, or runoff from the Gator Z Mine Test area upstream.

3.7 GATOR Z MINE OPEN BURN AREA (SITE 28)

3.7.1 Potential Contaminant Sources

This area is located in the southeastern portion of the facility about 600 feet north of Mine Field Road along an unnamed gravel road, which leads north of the mine test area (Figure 7). The area is flat, open, and non-vegetated. The ground is stained black and was reportedly used from 1985 until recently to burn scrap styrofoam and plywood packing material from the Gator Z Mine Test Area. The scrap material was first used as damping material during mine testing prior to disposal. As a result, there is potential for live detonators and blasting caps to be imbedded in the scrap. Due to this potential, the material cannot be shipped off-site for sale or disposal. The packing material was taken to the open burn area and burned directly on the ground surface. Burning was conducted several times per month. There is also scrap metal at the area. After each burn, the ashes were collected and stored in drums. A toxicity characteristic leaching procedure (TCLP) analysis was performed on the ash to determine the appropriate disposal. The open burning was conducted under a variance to air pollution regulations granted by Indiana Department of Environmental Management (IDEM). The facility recently began burning the scrap at the New Incinerator upon approval of an application submitted to IDEM in March of 1991 (Kearney, 1992). The only release control at the site was the removal of the ash after burning had been conducted. The wastes and residues potentially contain explosive residues and heavy metals.

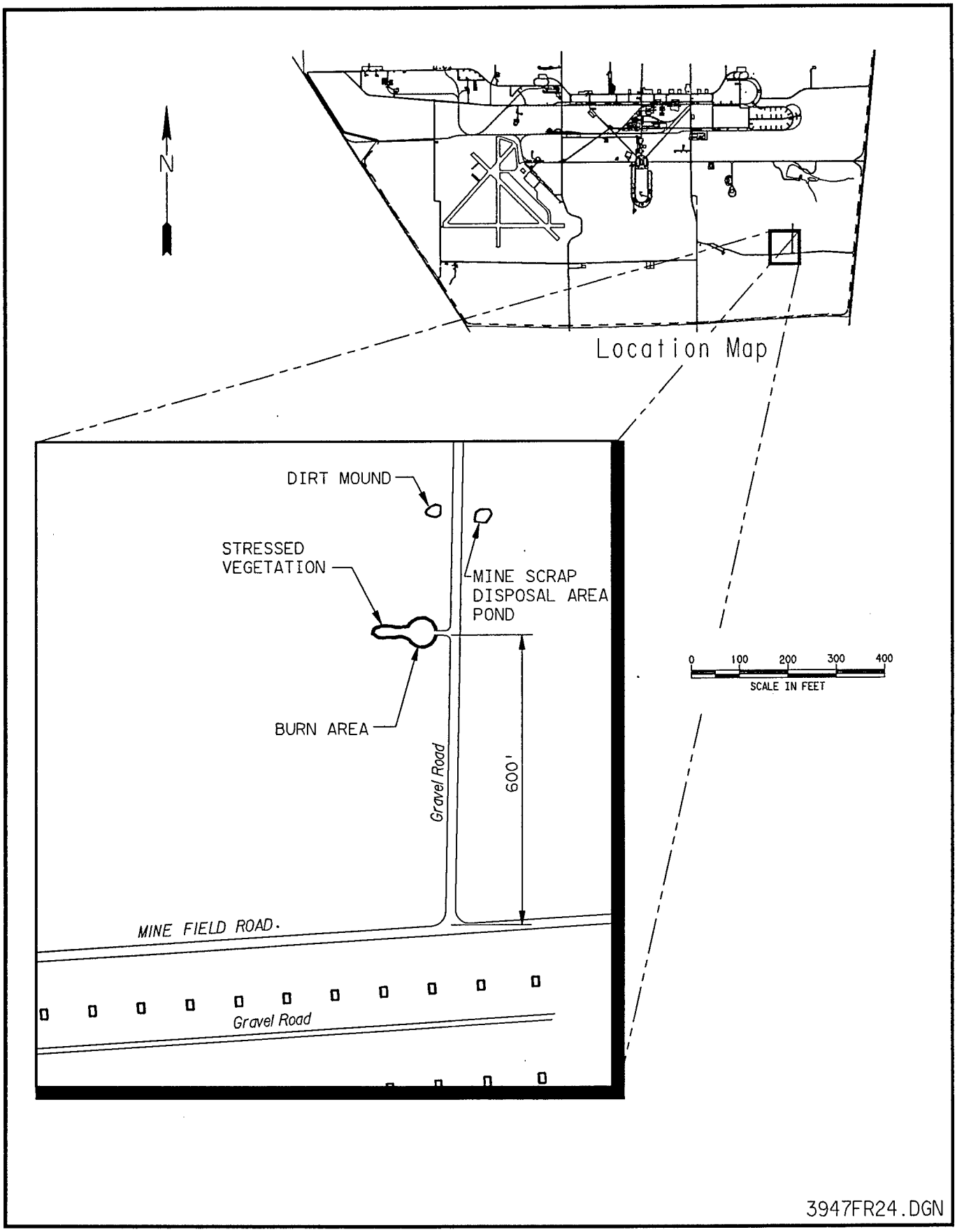

Figure 7. Location Map of Gator Z Open Burn Area and Gator Z Mine Scrap Disposal Area

3.7.2 Evaluation of Contaminant Pathways

There is a high release potential to the soil because the burning was conducted on the ground surface. Consequently, there is also some potential for leaching of contaminants from the soil to the groundwater, although the clay soil probably retards this process.

It appears that runoff from the area flows south toward Mine Field Road and would eventually discharge into Harberts Creek (Kearney, 1992). There is a low-release potential to surface water based on the distance of 1,500 feet to the nearest surface-water drainage (Harberts Creek).

There was a high-release potential for particulates to air since open burning was conducted. However, the unit was operated under an air pollution variance granted by the IDEM. Open burning at the site is no longer conducted. Thus, there is no longer potential for contamination of the air pathway.

3.7.3 Evaluation of Existing Data

Facility representatives state that TCLP analysis of the residual ash and selected soil samples collected from within the unit are available; however, the data have not been reviewed by the RI/FS team.

3.8 GATOR Z MINE SCRAP DISPOSAL AREA (SITE 29)

3.8.1 Potential Contaminant Sources

This area is located about 250 feet north of the Gator Z Mine Open Burn Area (Site 28) (Figure 7, p. 21). There is an open water-filled pit, approximately 12 feet wide, 25 feet long, and 5 feet deep. The pit was used to dispose of the steel components of "bouncing betty" mines after they had been tested at the mine test area. The material in the pit is believed to be primarily the steel carcasses; however, there may be explosive residues on the steel. The area was reportedly last used in 1970, but the exact period of operation is unknown. The pit does not have a surface-water outlet. The pit reportedly dries up periodically, revealing many pieces of steel scrap embedded in the bottom. There is a mound of dirt approximately 70 feet west of the pit that also appears to be manmade. No information is available on the origin of the mound. This mound may represent a burial site or it may be dirt that was excavated from the open pit.

3.8.2 Evaluation of Contaminant Pathways

There is a moderate potential for release of residual explosives to the soil and sediment in the pit. Release potential to groundwater is considered low. Because there is no outlet to surface water, there is low release potential for contaminants to surface water. There is also low release potential to the air pathway because of the non-volatile, non-particulate waste.

3.8.3 Evaluation of Existing Data

There is currently no data on the specific chemicals or extent of chemical contamination for this site.

3.9 BUILDING 204, PESTICIDE STORAGE AREA (SITE 30)

3.9.1 Potential Contaminant Sources

Building 204 is located on the south side of Woodfill Road (Figure 8). A variety of containers of pesticides and herbicides have been stored in Building 204 in past years. The building has a concrete floor, and the quantities of wastes are reported to be small and are handled appropriately. Any accidental spills inside of the facility would be contained, posing no significant threat to human health or the environment. The facility was found to be in compliance with the applicable regulations during the 1990 environmental audit (Environmental Protection Agency (EPA) 1990); however, past practices are not well known and some contamination to outside soils may have resulted from previously unreported or uncontrolled spills. A small building just east of Building 204 appears to be used for mixing pesticides and rinsing containers. Even though there is concrete containment around the area, there is moderate potential that runoff from this area could reach the surface-water pathway either along the road on the north side or along the railroad on the south side of the building.

3.9.2 Evaluation of Contaminant Pathways

If unreported spills have occurred, there is high potential for a release to the soil. There is low potential for contamination of groundwater. The nearest natural surface-water drainage is over 2,000 feet away; thus, there is little likelihood of surface-water contamination even if a release entered one of the two nearby man-made surface-water pathways.

3.9.3 Evaluation of Existing Data

There are data available on the types and amounts of chemicals stored in Building 204. Also, there are probably data available on any recent spills, although no data have been reviewed. The list of chemicals stored in the building as of July 1987 included a number of insecticides, some rodenticides, and several herbicides.

3.10 BUILDING 227, FORMER STORAGE PAD (SITE 31)

3.10.1 Potential Contaminant Sources

There is an open shed (Shed 11) east of Building 227, adjacent to a 30-foot-by-50-foot concrete pad (Figure 9). The shed and the pad have historically been used to store

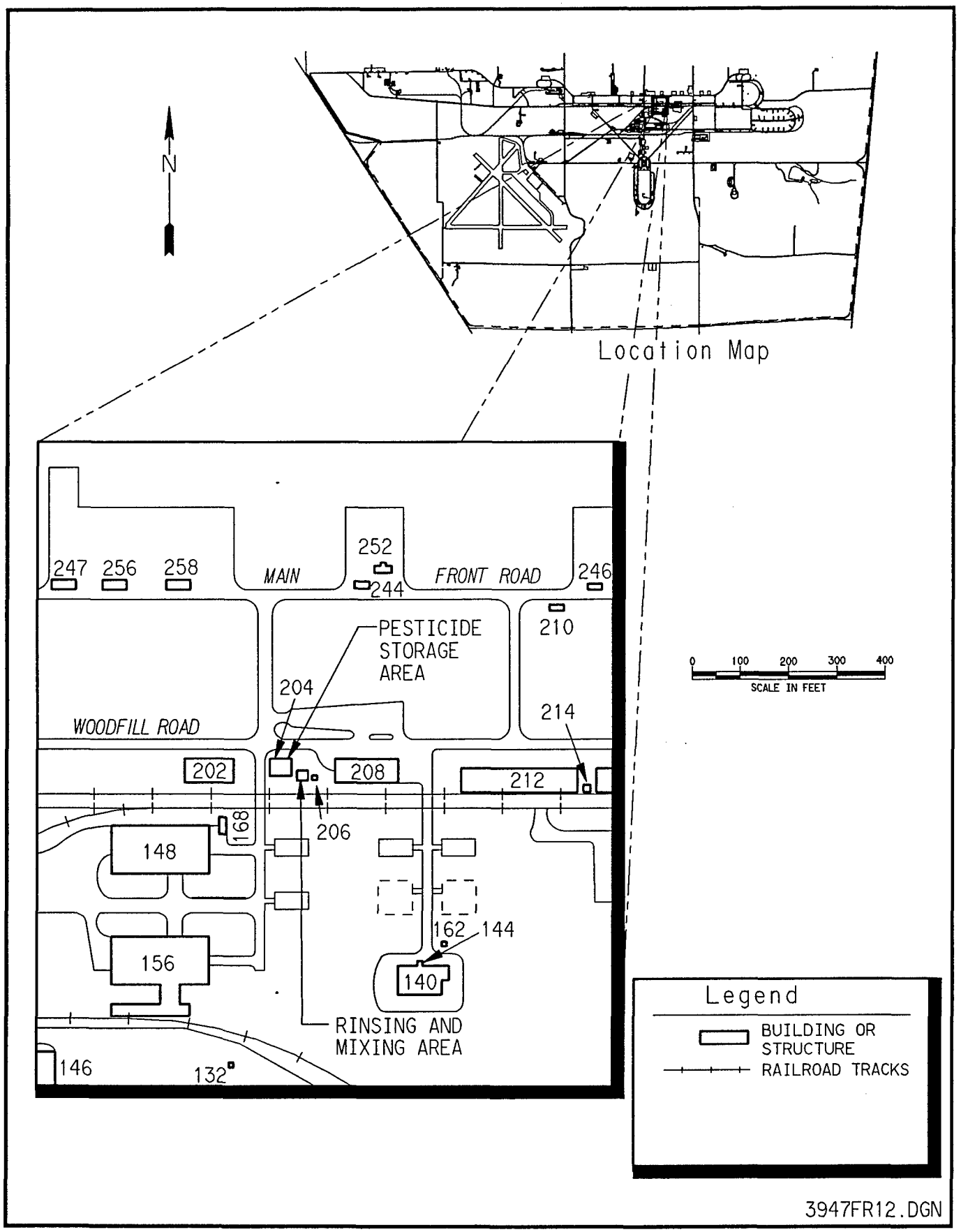

Figure 8. Location Map of Building 204, Pesticide Storage Area

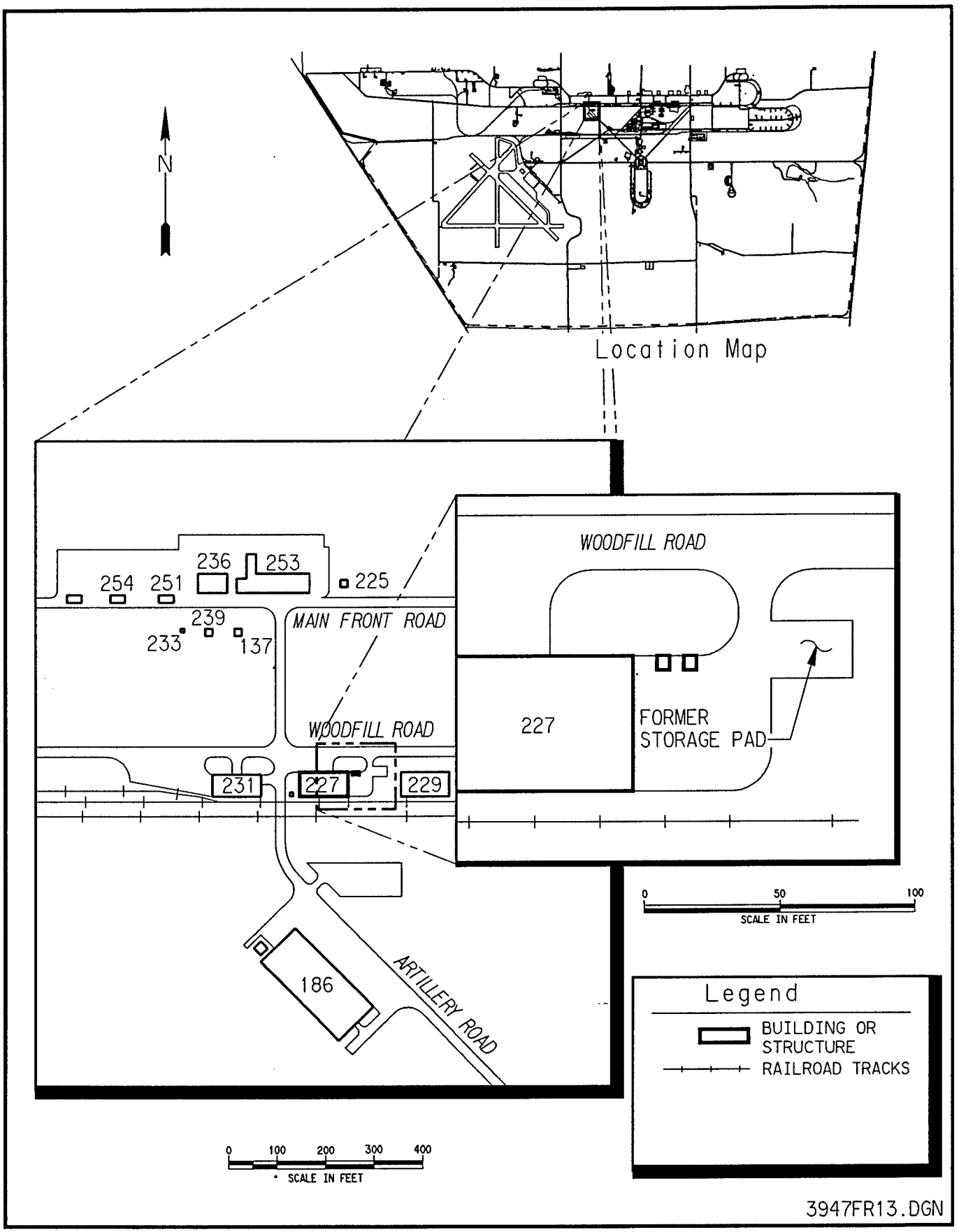

Figure 9. Location Map of Building 227, Former Storage Pad

stoddard solvent, waste oil, paint wastes, and lubricants. Possible spills of stored materials during loading, unloading, or storage could have resulted in release of contaminants to environmental pathways. From observations made during three site visits, the chance of a major spill having occurred appears to be slight; however, there is a dark stained area, approximately 3 square feet, at the northeastern corner of the concrete pad.

3.10.2 Evaluation of Contaminant Pathways

There is a drainage swale that could constitute a surface-water pathway located a few feet north of the concrete pad along the road. Storm-water drainage could be considered a possible release mechanism because untreated surface water could have entered Middle Fork Creek. Surface-water and sediment sampling of Middle Fork Creek conducted in January of 1992 revealed no organic contaminants of concern, indicating that no significant residual contamination remains from these events. There is potential for contaminants to infiltrate the soil and enter the groundwater; however, the low permeability of the clay soils would hinder this process. If spilled, volatile contaminants could contaminate the air pathway; however, the volatiles would rapidly dissipate and the hazard would be short term.

3.10.3 Evaluation of Existing Data

There are currently no data concerning potential soil contamination at the site.

3.11 BUILDING 105, LOCOMOTIVE MAINTENANCE PIT (SITE 32)

3.11.1 Potential Contaminant Sources

Building 105 is located just west of Meridian Road near the intersection with Niblo Road (Figure 10). The locomotive maintenance pit is located inside of Building 105. It is a 36-foot-long by 5-foot-wide trench covered with steel plates. The actual construction of the trench is unknown, but it is assumed to be concrete. The trench is located in the northeastern corner of the building with the long axis running east to west. The trench was formerly used for locomotive maintenance and allowed access to the underside of locomotives. The trench may have received fluids that were drained, spilled, or leaked from the locomotives during maintenance. There are no records documenting whether or not the trench was cleaned out after locomotive maintenance ceased. The exact period of operation is unknown, but it is assumed that the pit was constructed at the same time as the building in the early 1940s. It is not known when the locomotive maintenance operations ceased. There have been no known releases of hazardous wastes or other contaminants from the area.

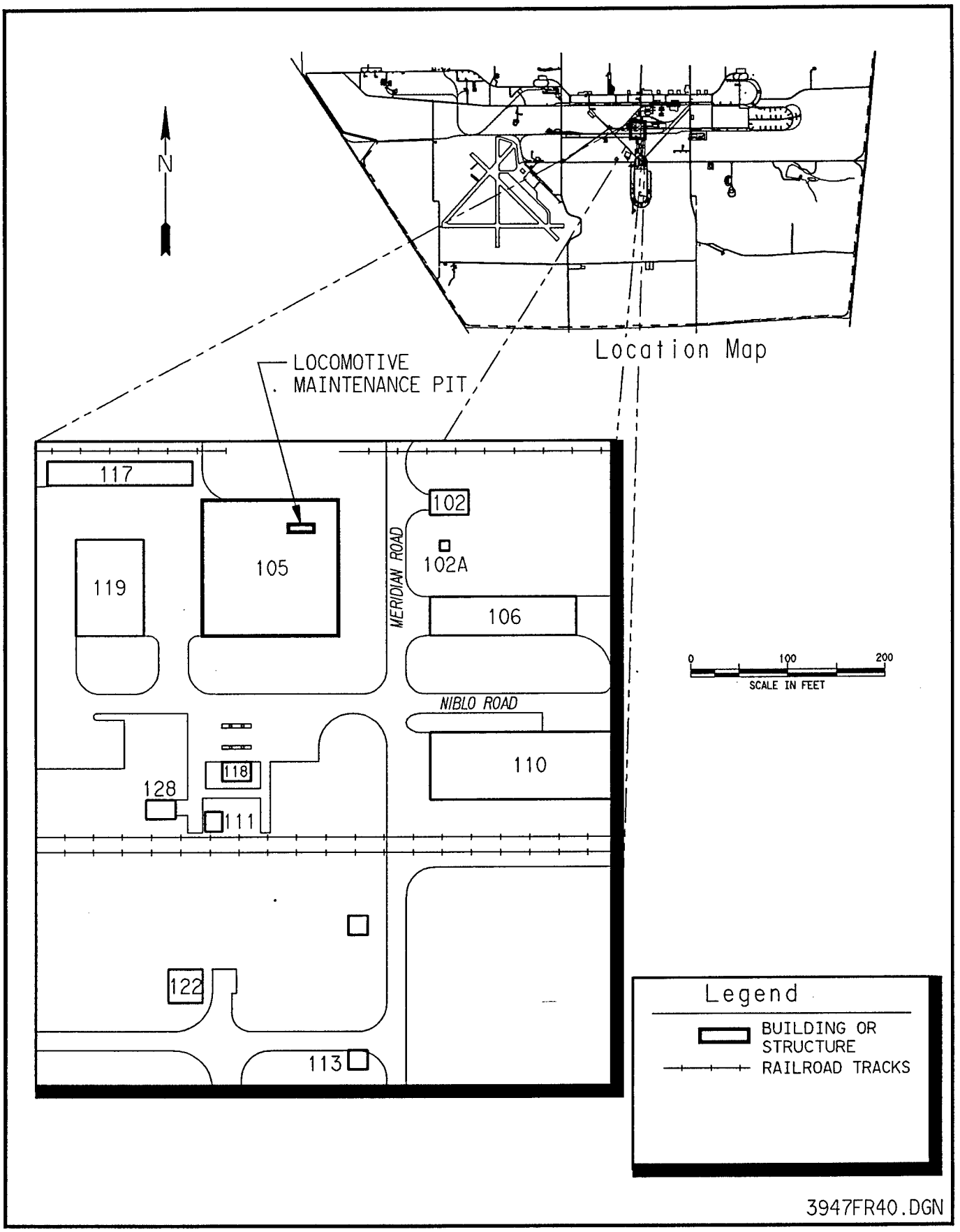

Figure 10. Location Map of Building 105, Locomotive Maintenance Pit

3.11.2 Evaluation of Contaminant Pathways

There is an unknown release potential to soil and groundwater because the construction of the trench is unknown. There would be a moderate potential for release to soil and groundwater if the trench is not lined with concrete. There would be little to no potential for contamination of surface water unless there is an outlet underground into the storm sewer. There is low release potential to air because the trench is located indoors and contaminants would be below grade.

3.11.3 Evaluation of Existing Data

There are no data on the construction of the trench. There are also no contaminant data on the site.

3.12 BUILDING 333, NEW INCINERATOR (SITE 33)

3.12.1 Potential Contaminant Sources

Building 333 is located west of Infantry Road (Figure 11) and is used to dispose of burnable trash, including paper, debris, plywood, and polyurethane. The polyurethane may be contaminated with methylene chloride and iron oxide from inert filling operations conducted in Building 211. The unit began operations in 1978 and is currently active. Ash from the incinerator was formerly placed in fiberboard drums and disposed of at the Gate 19 Landfill. The ash is routinely analyzed for cyanide, sulfide, ignitability, pH, and TCLP metals prior to disposal. There are no release controls at the site although the incinerator is indoors. The main release mechanism would be particulates released directly into the atmosphere from the incinerator stack. It has been determined that the incinerator is exempt from air emission permit requirements based on the type and amount of materials disposed of there.

3.12.2 Evaluation of Contaminant Pathways

There is moderate potential for surface-soil contamination from airborne particulates settling onto the ground around the incinerator. These particles could be transported via overland flow to surface water, or contaminants could be leached from the surface soils into the subsurface and contaminate groundwater. However, the potential for contamination of these pathways is considered low.

3.12.3 Evaluation of Existing Data

There is reportedly data available from the routine sampling of ash; however, it has not been reviewed.

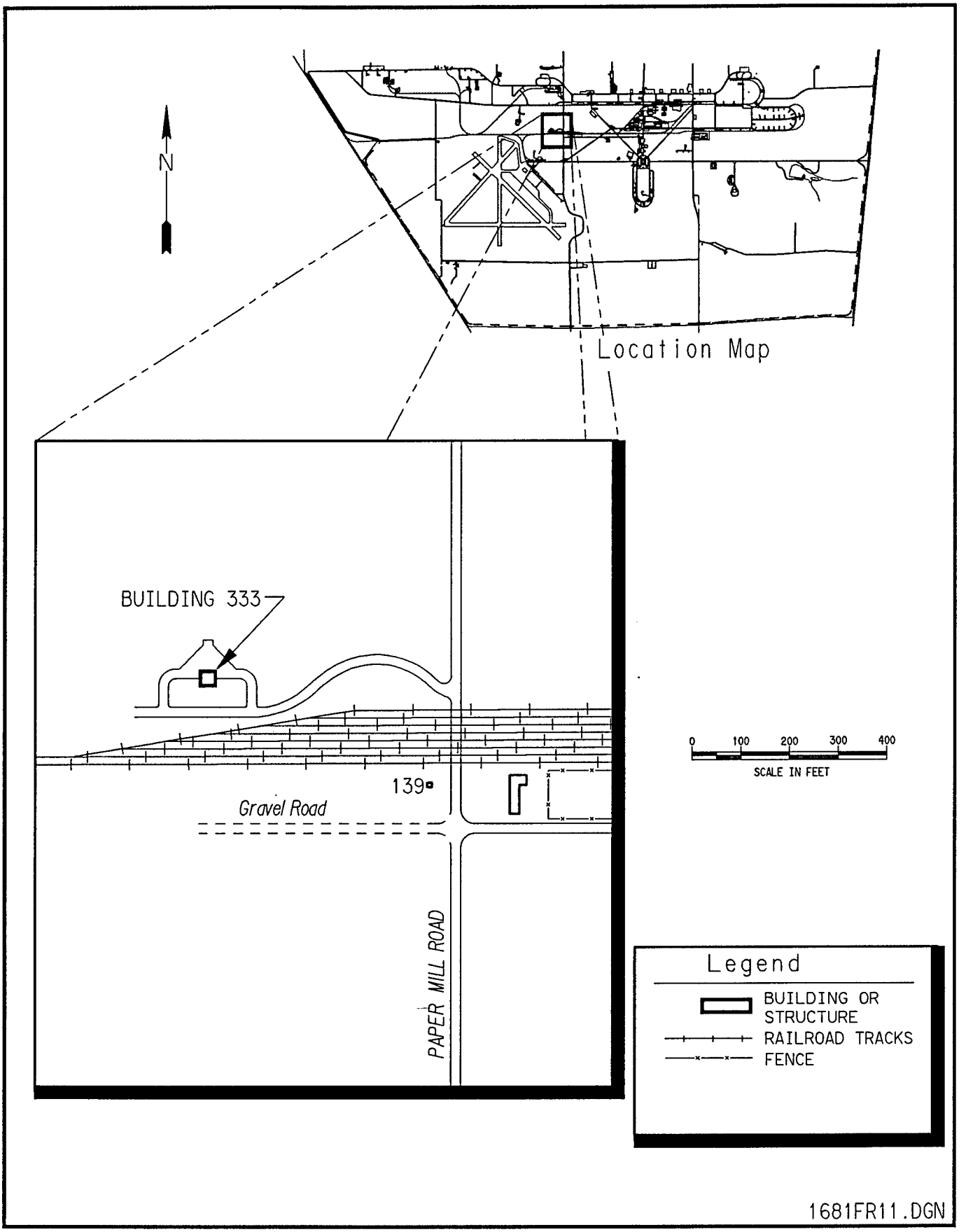

Figure 11. Location Map of Building 333, New Incinerator

3.13 BUILDING 136, SANDBLASTING AREA (SITE 34)

3.13.1 Potential Contaminant Sources

This area is located west of Building 136 (Figure 12). It consists of an approximately 20-by-20-foot area on a 6-inch-thick asphalt pad that is used for sandblasting operations. Vehicles and other equipment are sandblasted there prior to being painted inside Building 136. In the past, red primer containing lead was used as a base coat on the vehicles and equipment. Currently, green primer without lead is used as a primer or base coat. Waste sand is analyzed for hazardous constituents prior to disposal. The rate of sand consumption was not known by facility personnel.

At the time of the visual site inspection, there was freshly applied gravel covering about half of the pad and sand mixed with paint particles on the soils surrounding the unit. The sand/paint mixture extended to approximately 2 yards beyond the perimeter of the asphalt. The unit began operating in the 1940s and is still active. There are no known release controls at the site.

3.13.2 Evaluation of Contaminant Pathways

There is moderate potential for soil contamination by lead-based paint chips from the sandblasting operation. Potential for surface-water and groundwater transport is low because of the relative immobility of the paint particles. However, a man-made drainage swale is present about 75 feet northwest of the pad along the railroad, and it receives periodic surface-water runoff during precipitation events.

3.13.3 Evaluation of Existing Data

No data have been reviewed for the site although the waste sand has reportedly been analyzed for hazardous constituents prior to disposal.

3.14 BUILDING 602, FORMER LEAKING UNDERGROUND STORAGE TANK (SITE 35)

3.14.1 Potential Contaminant Sources

A steel underground storage tank (UST) was formerly located south of Building 602 (Figure 13). The tank was used to store No. 6 Fuel Oil. On November 26, 1990, the Emergency Response Branch of IDEM received a report of a release of hydrocarbon fuel to a ditch south of Building 602. The report indicates that the probable source of the fuel was the UST that had recently been removed from that location. However, the record of the November 26, 1990, release which identifies No. 6 Fuel Oil as the spilled material, cannot be located. A review of the files indicates that the other UST at Building 602 contained No. 2 Fuel Oil. Facility representatives reportedly worked with IDEM on the cleanup, which

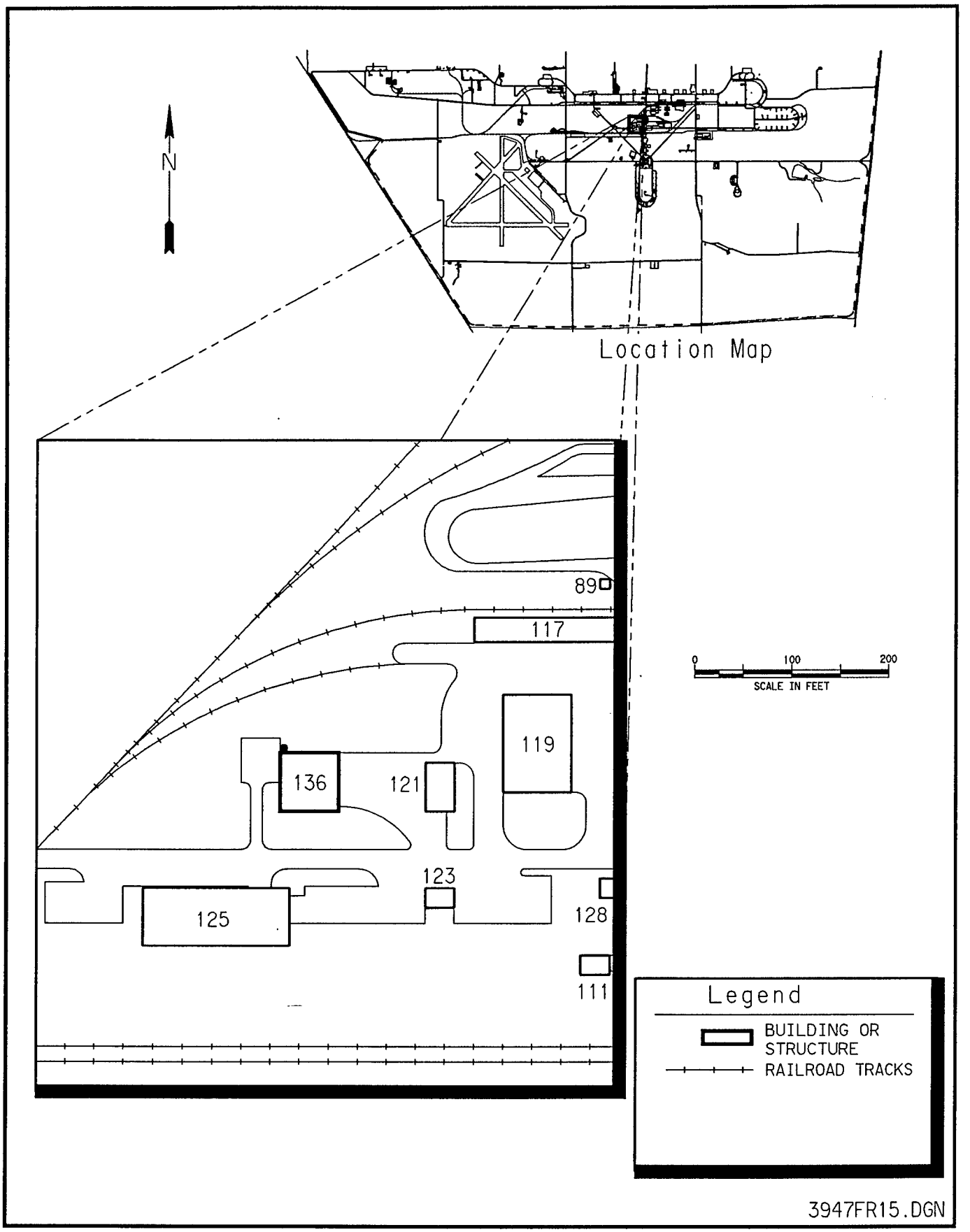

Figure 12. Location Map of Building 136, Sandblasting Area

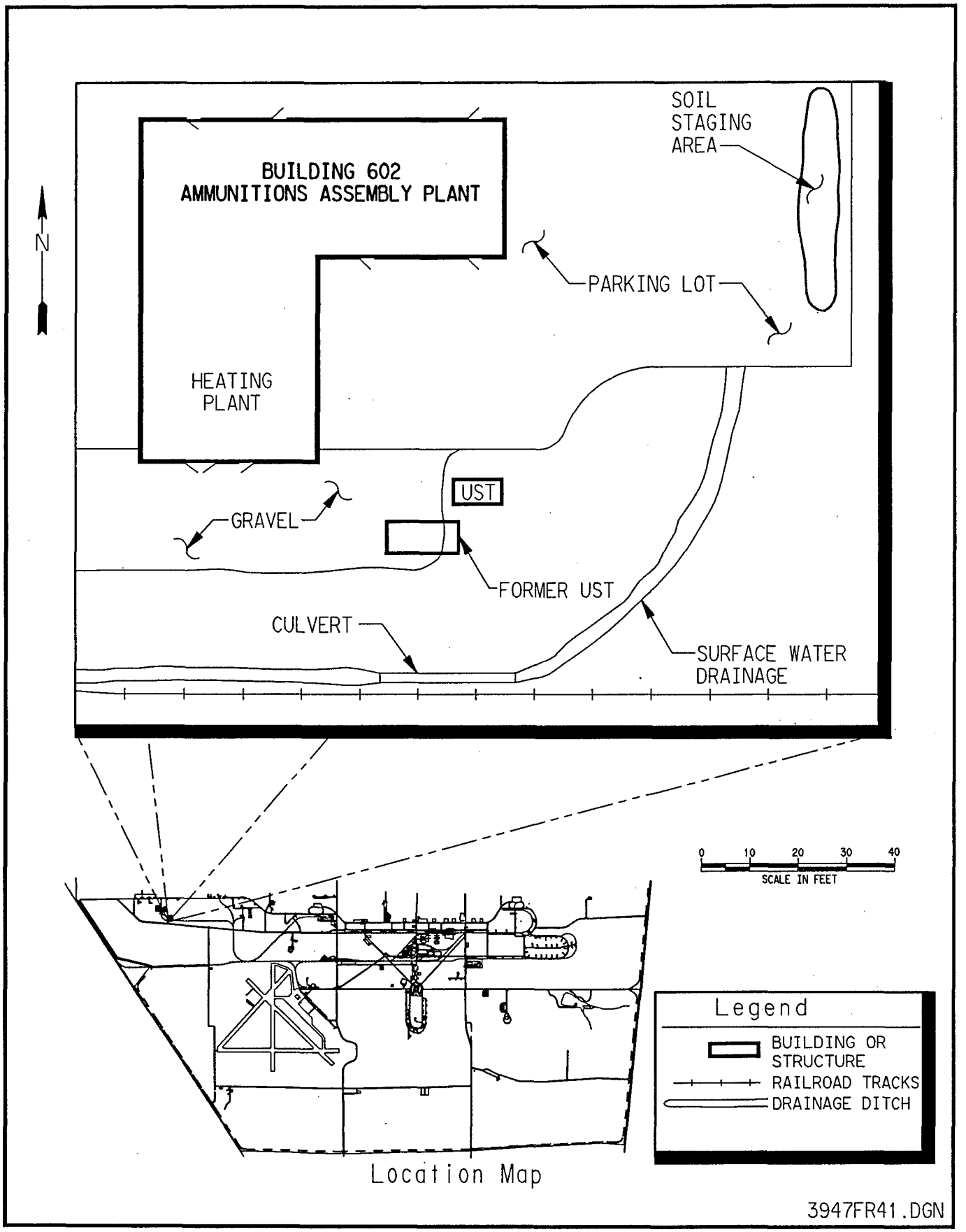

Figure 13. Location Map of Building 602, Former Leaking UST

included soil sampling in the excavation. The soil-sample results have not been reviewed. The area is a concern because part of the tank contents were released to the Storm Sewer Drainage System.

3.14.2 Evaluation of Contaminant Pathways

The spill to the ditch had a high potential of contaminating the surface-water pathway south of the building. There is also moderate potential for residual contamination of sediment in the ditch. Infiltration and leaching could result in contamination of the groundwater at the site although the potential is low.

3.14.3 Evaluation of Existing Data

The existing soils data have not been reviewed. There are no data on potential contaminants in the surface-water or groundwater pathways.

3.15 NO. 2 OIL SPILL AT BUILDING 103 (SITE 36)

3.15.1 Potential Contaminant Sources

Building 103 is located west of Meridian Road and north of the railroad tracks (Figure 14). The Building 103 oil spill took place in April of 1988 and was caused by the overfilling of an UST at the Central Heating Plant. About 300 gallons of No. 2 Heating Oil was spilled, covering about 600 square feet of soil south of Building 103. Most of the oil went into a nearby containment ditch, and approximately 65 percent of the spill was removed from the ditch during the initial spill response. Most of the remainder was removed using absorbents, which were subsequently landfilled or incinerated. According to facility personnel, the spill was cleaned up in 3 hours, and neither the storm sewer nor groundwater was affected. This area is of concern because of the nature of the contaminants and the lack of soil sample data confirming the cleanup.

3.15.2 Evaluation of Contaminant Pathways

Although the pathways of concern during the spill cleanup would have included vapors in the air, there is currently no risk to the air pathway since the spill was cleaned up in 1988. Any volatile compounds on the surface would have long since dissipated. The oil spilled out onto the ground surface and, most likely, resulted in surface-soil contamination. Potential for subsurface soil, groundwater, and surface-water contamination is low because of the immediate cleanup response.

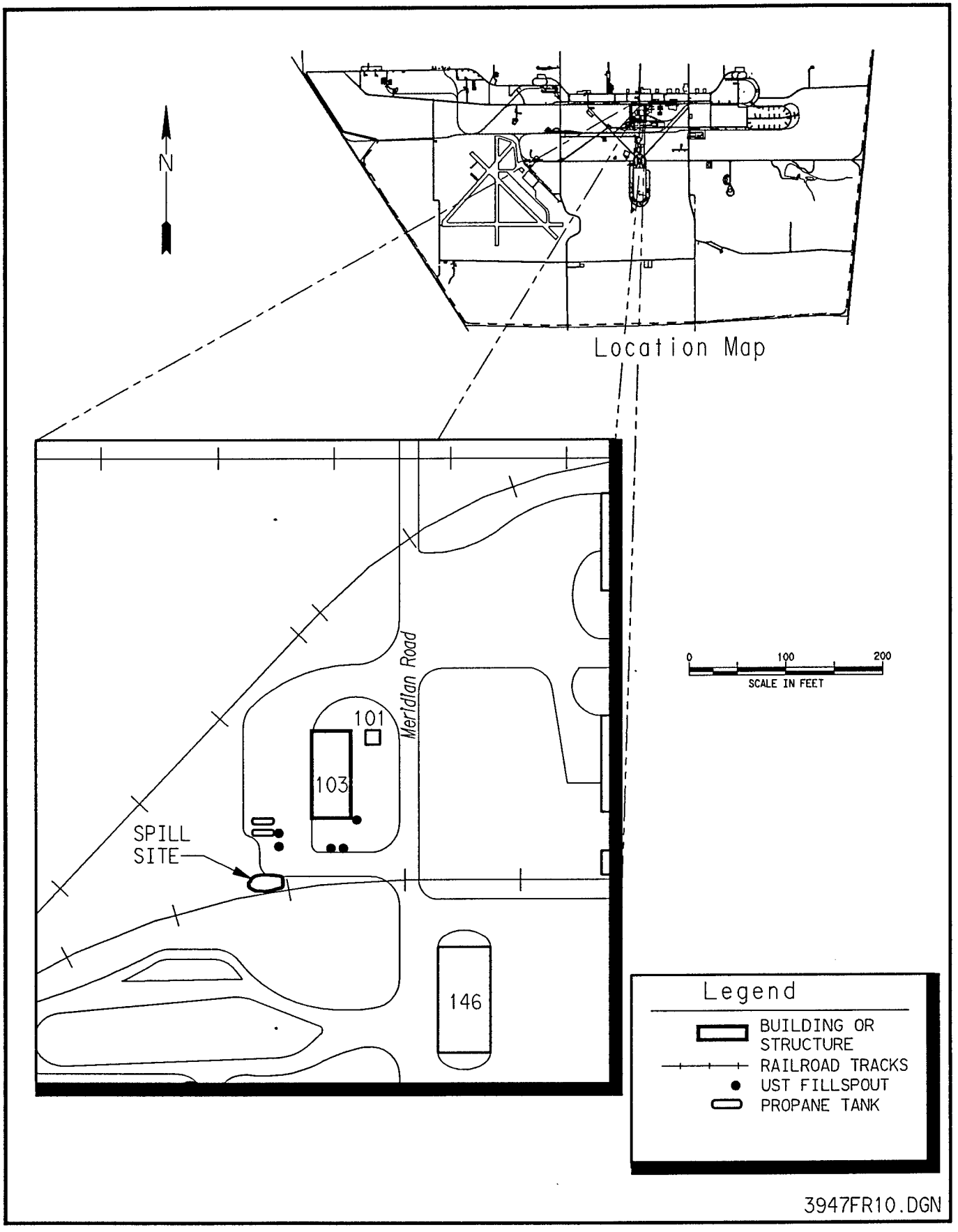

Figure 14. Location Map of No. 2 Fuel Oil Spill at Building 103

3.15.3 Evaluation of Existing Data

No sample data exist for the Building 103 oil spill. Although there is a lack of evidence for significant risk to human health or the environment, soil sample information is recommended in order to confirm the cleanup. If evidence of subsurface soil contamination down to the water table is encountered, then groundwater sample information will also be required.

3.16 GASOLINE STATION, BUILDING 118 (SITE 37)

3.16.1 Potential Contaminant Sources

The gasoline station is located in the south-central portion of the facility at the intersection of Niblo and Meridian Roads (Figure 15). It consists of an office building (Building 118), a diesel pump house, a gasoline pump house, dispensing pumps, underground piping, and five USTs. The gasoline station has been in operation since 1942. Diesel fuel, No. 2 Fuel Oil, and unleaded gasoline are currently stored and dispensed at the station. Previous fuels handled at the station included kerosene, white gas, No. 1 Fuel Oil, and leaded gasoline. Four of the tanks were removed in 1990. During a visual inspection in 1992, stains were noted on the floor of the diesel pump house.

3.16.2 Evaluation of Contaminant Pathways

Although no leaks or spills at the station have been reported, it is unlikely that no spills or leaks have occurred over the life of the unit. The potential for soil and groundwater contamination is unknown until further investigation is conducted. Because of the rapid volatilization and dispersion of the most toxic constituents of fuels, contamination of the air pathway is of little concern except at the time of a release.

3.16.3 Evaluation of Existing Data

Routine tank-testing data, which indicate the existing USTs are not leaking, are available. Several of the unnecessary USTs were removed in 1990. Soil sampling was not conducted at the time of the removal; however, water-sample data of questionable validity indicates that there are detectable concentrations of lead, benzene, and naphthalene at the site. There were no reports that the tanks were leaking at the time of removal. There are no known release controls on the underground piping, so no evaluation of potential piping leaks is possible at this time. Stains noted on the floor of the diesel pump house are an indication that at least minor spills may have occurred there in the past.

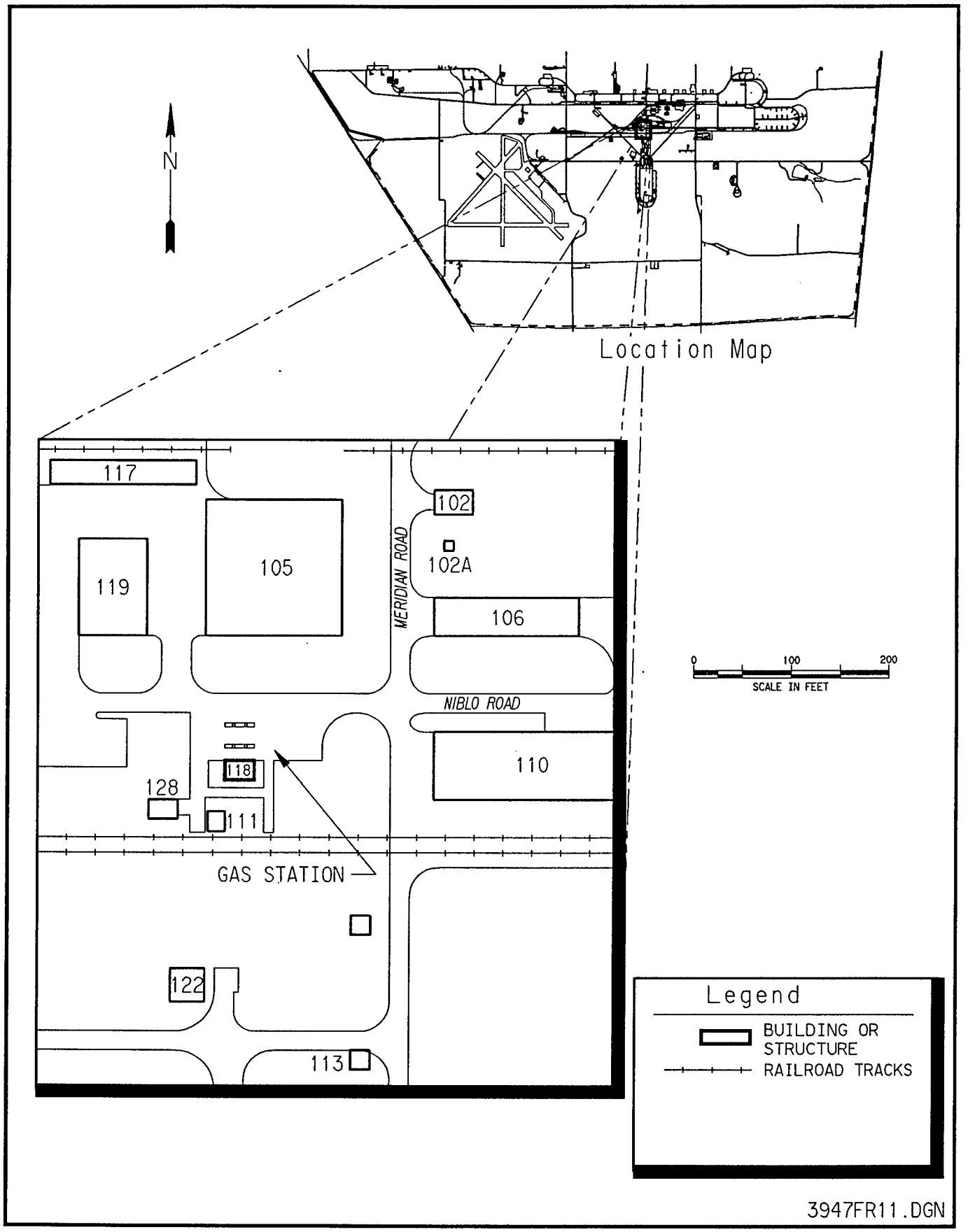

Figure 15. Location Map of Gas Station, Building 118

3.17 NORTHWEST-SOUTHEAST RUNWAY TEST AREA (SITE 38)

3.17.1 Potential Contaminant Sources

This site is presently used for flare testing as evidenced by the burned appearance of the ground surface. The burned area is rectangularly shaped and is approximately 150 feet wide and several hundred feet long (Figure 16). The area is coincident with an area identified on a 1945 facilities map as a mine/mortar test area (see Section 3.28). It is located about midway along the runway and is of concern because of the lack of documentation on the types of wastes that may have resulted from the burning flares. Most flares contain magnesium, white phosphorus, sulphur, and either potassium or sodium nitrate. White phosphorus is poisonous when ingested and is ignitable at ambient temperatures. The other constituents present little or no hazard.

3.17.2 Evaluation of Contaminant Pathways

Contamination of the air pathway is a concern during actual testing; however, because of the high reactivity and volatility of the various flare constituents, there is little concern once testing has been completed.

Testing of flares on the ground surface may have resulted in residual contamination of surface soil with magnesium, phosphorus, sulphur, and nitrates. These compounds are generally abundant in the earth's crust and are not particularly toxic by contact. Leaching of the residual flare components into the subsurface may have resulted from the infiltration of natural precipitation. If enough residual contamination was present, this leaching might result in groundwater contamination. Rainfall runoff and the resulting erosion of the surface soil could result in surface-water contamination. The potential for subsurface-soil, groundwater, and surface-water contamination is considered low for this site.

3.17.3 Evaluation of Existing Data

No data are currently available for the area. Data on the type and frequency of flare testing may be available in JPG records; however, no records have been reviewed. Thus, only the visual observation of the burned ground surface and the reports of flare testing as the cause of this burned area are evidence for concern at this site.

3.18 GATOR Z MINE TEST AREA (SITE 39)

3.18.1 Potential Contaminant Sources

This site is located in the southeastern portion of the facility west of the East Perimeter Road between Mine Field Road and a tributary to Harberts Creek (Figure 17). It encompasses approximately 220,000 square yards. There are 26 mine test-pits placed in two long east-west rows parallel to Mine Field Road. Each pit consists of a steel box, open to the soil on

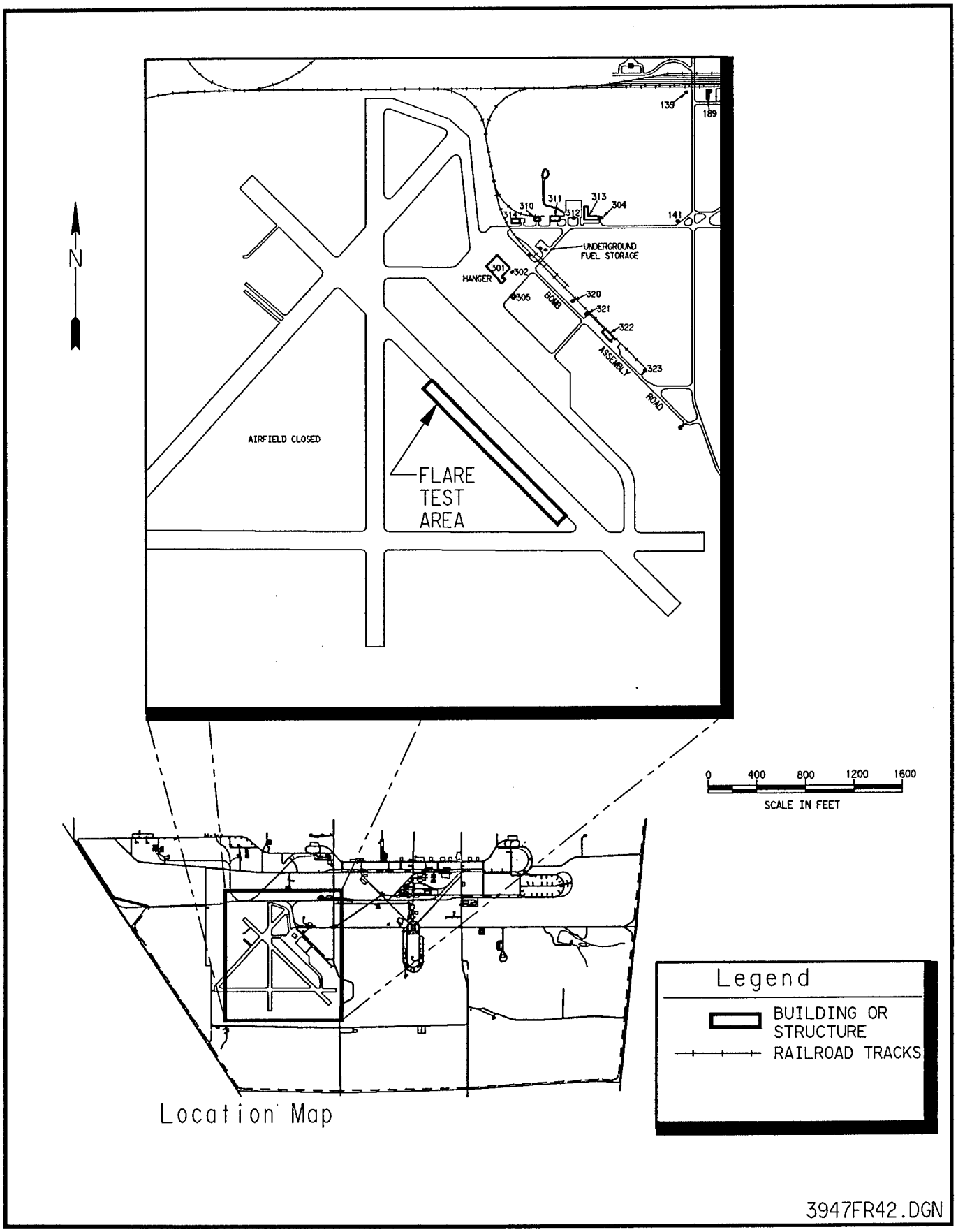

Figure 16. Location Map of Northwest-Southeast Runway Test Area

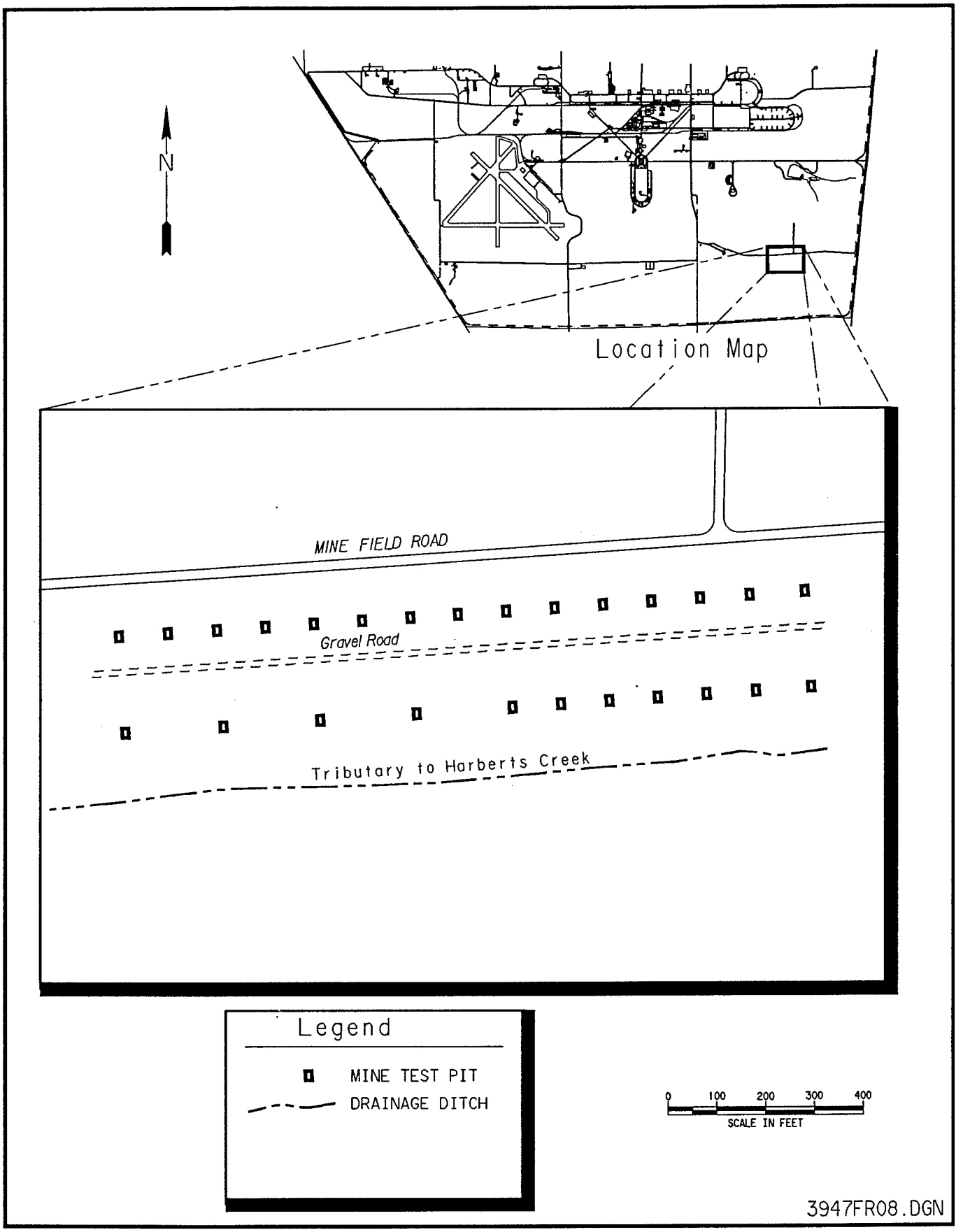

Figure 17. Location Map of Gator Z Mine Test Area

the bottom and fitted with a removable top. Concrete walls surround the steel boxes. These steel boxes are periodically used to test the performance of explosive mines. The debris is cleaned from the pits after each use. Precipitation can enter the steel boxes and exit via drain pipes in the bottom. The drain pipes empty into drainage swales that lead to Harberts Creek. The area is a concern because of the potential for residual explosives and potential release of lithium, vanadium, and arsenic to surface water and sediments. Mercury may also be a concern as it is used in the manufacture of some pyrotechnics and explosives.

3.18.2 Evaluation of Contaminant Pathways

Contamination of the air pathway is only a concern during testing. The area is secured during testing periods to minimize potential exposures to volatile fumes and explosion hazards. Drainage from the pits is directed via drainage swales to a ditch leading to Harberts Creek. There is a moderate potential for contamination of sediments in the drainage swales, in Harberts Creek, and of the surface water in Harberts Creek.

3.18.3 Evaluation of Existing Data

Water and sediment samples were collected from Harberts Creek by Rust E&I personnel in January of 1992 and by Army Environmental Hygiene Agency (AEHA) personnel in July of 1992. Silver was detected in the water and sediment of Harberts Creek during both sampling efforts. The potential sources of the silver are the wastewater treatment plant discharge, runoff from sludge application areas, and the Gator Z Mine Test Area.

3.19 DISCHARGE/FILL PIPE AT BUILDING 259 (SITE 40)

3.19.1 Potential Contaminant Sources

This site is located adjacent to Building 259, just north of the Building 295 Small Arms Firing Range (Figure 18). It consists of a horizontal pipe that exits the building and extends to the edge of the nearby railroad tracks. There is a black tar-like material on the ground surface at the end of the pipe, which appears to be some type of petroleum hydrocarbon, hence, the assumption that the pipe was formerly used to discharge some type of liquid hydrocarbon. There is currently no information on the former use of the site or materials handled at the site. Leaching or infiltration of the possible hydrocarbon material is considered the only potential source at the site.

3.19.2 Evaluation of Contaminant Pathways

The black tar-like material appears to have been in place for a considerable length of time, perhaps several years, and any volatile contaminants would long since have dissipated into the atmosphere. There are no well defined surface-drainage pathways at the site, and the site is located over 1 mile from the nearest creek. The material appeared to be fairly inert at the

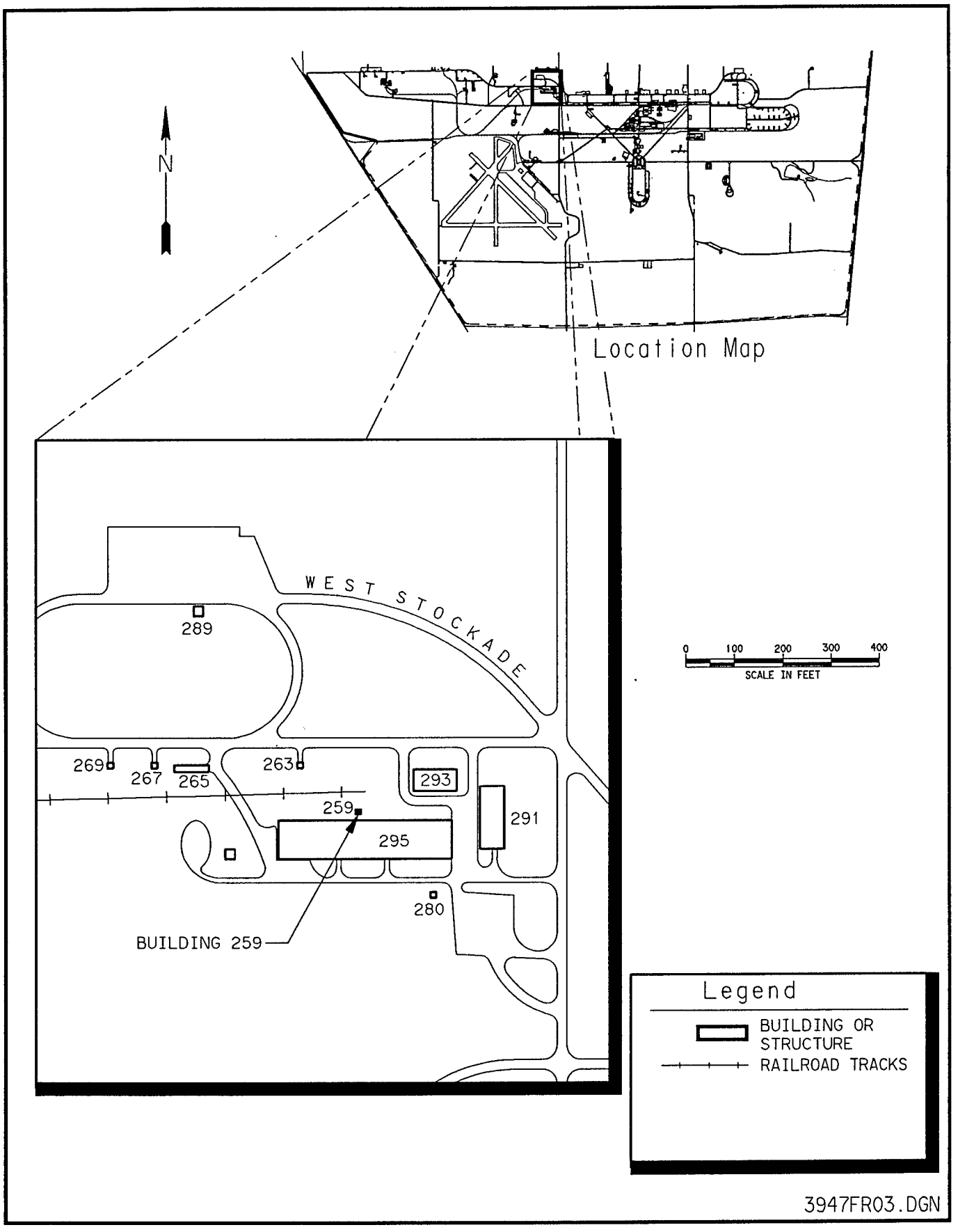

Figure 18. Location Map of Discharge/Fill Pipe at Building 259

time of observation in July of 1992; however, it was most likely less viscous when fresh. Based on this evaluation, the soil is the only medium likely to have been contaminated.

3.19.3 Evaluation of Existing Data

There are currently no known data for this site.

3.20 BUILDING 281, FUEL OIL FROM FORMER UST (SITE 41)

3.20.1 Potential Contaminant Sources

Two USTs were located at this site (Figure 19). One was a 500-gallon UST, and the other tank was a 650-gallon concrete UST. Both tanks were used to store No. 2 Fueld Oil. The tanks were removed in the Spring of 1992. It is unknown if the tanks had been leaking prior to removal. It is assumed that the attendant underground piping was at least partially removed at the time of the tank removals. Soil samples collected from the excavation at the time of the tank removals were tested for total petroleum hydrocarbons. Results ranged from 14.4 to 650 mg/kg for four soil samples. The potential contaminant sources include potential spills or leaks that occurred prior to the tank removals or possible residual soil contamination left after the tank removals. It is not apparent whether or not the tanks were properly closed under IDEM regulations. There is no surface evidence of soil contamination.

3.20.2 Evaluation of Contaminant Pathways

If spills or leaks occurred at the site, soil and groundwater would be the most likely pathways for contaminant migration. There are no nearby natural surface-water drainages; however, there is a small drainage ditch a few feet northwest of the former tank location. The air pathway is of little concern at this time, since there are no reports of surface spills and the tanks were removed in the Spring of 1992. Unless there is residual soil or groundwater contamination at the site, the source of contamination has been removed and the site probably represents a low potential for contaminant spreading into other pathways.

3.20.3 Evaluation of Existing Data

Data regarding the tank removals indicate that there may be residual subsurface soil contamination at the site. The location of the tanks and the type of fuel stored in the tanks is known; otherwise, there is no information indicating that proper closure was attained.

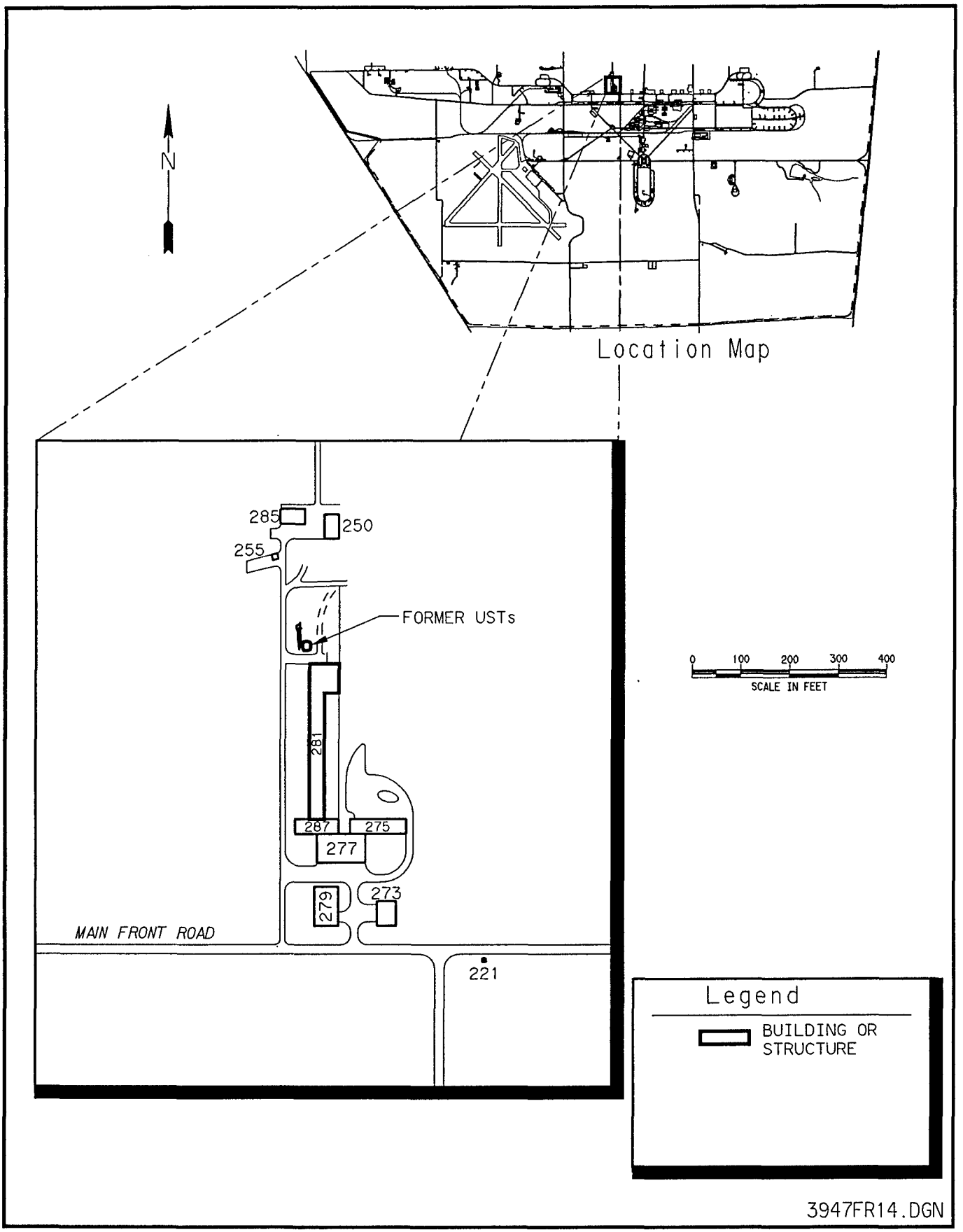

Figure 19. Location Map of Building 281, Former UST

3.21 BUILDING 281, INDOOR RANGE (SITE 42)

3.21.1 Potential Contaminant Sources

This site is located just north of the firing line and west of Meridian Road (Figure 20). The indoor range was used to test small arms for training. Lead dust and lead oxide inside the firing lanes are the primary contaminants of concern. There is low potential for lead to be transported outside of the building.

3.21.2 Evaluation of Contaminant Pathways

The outdoor air pathway is not considered a concern at this site. There is a low potential for lead to have been transported outside of the building to soils. There is an even lower potential for lead to be leached through the soil into the groundwater pathway considering the low solubility of lead and its high affinity for soil particles. There are no nearby surface-water pathways and very little likelihood of surface-water contamination by lead. The soil backstops, the dirt floors, and possible lead-oxide coatings on walls indoors are the main concerns.

3.21.3 Evaluation of Existing Data

No data are currently available concerning possible lead contamination inside of the building. It is assumed that the dirt floors and concrete walls of the firing lanes contain some lead contamination, which is of little concern as long as access is restricted; however, sampling is needed to determine both appropriate disposal of the dirt and potential for reuse of the building.

3.22 POSSIBLE USTs OR WELLS AT ARTILLERY AND INFANTRY ROADS (SITE 43)

3.22.1 Potential Contaminant Sources

This site is located near the intersection of Artillery and Infantry Roads, just north of the water tower (Figure 21). There are two vertical pipes rising approximately 3 feet above two concrete slabs (former building floors). The slabs are separated by an open grassy area approximately 100 feet across on the south side of the railroad tracks. There is no visible soil staining around the stand pipes. The history and former uses of the site are unknown. It is also unknown if the pipes were fill pipes for USTs, wells, or some other type of plumbing related to the former buildings. If they were fill pipes for USTs, then it is possible that No. 2 Fuel Oil was stored on-site and a potential contaminant source is present. If the pipes represent wells or other plumbing, then there is little likelihood that any contaminant source is present.

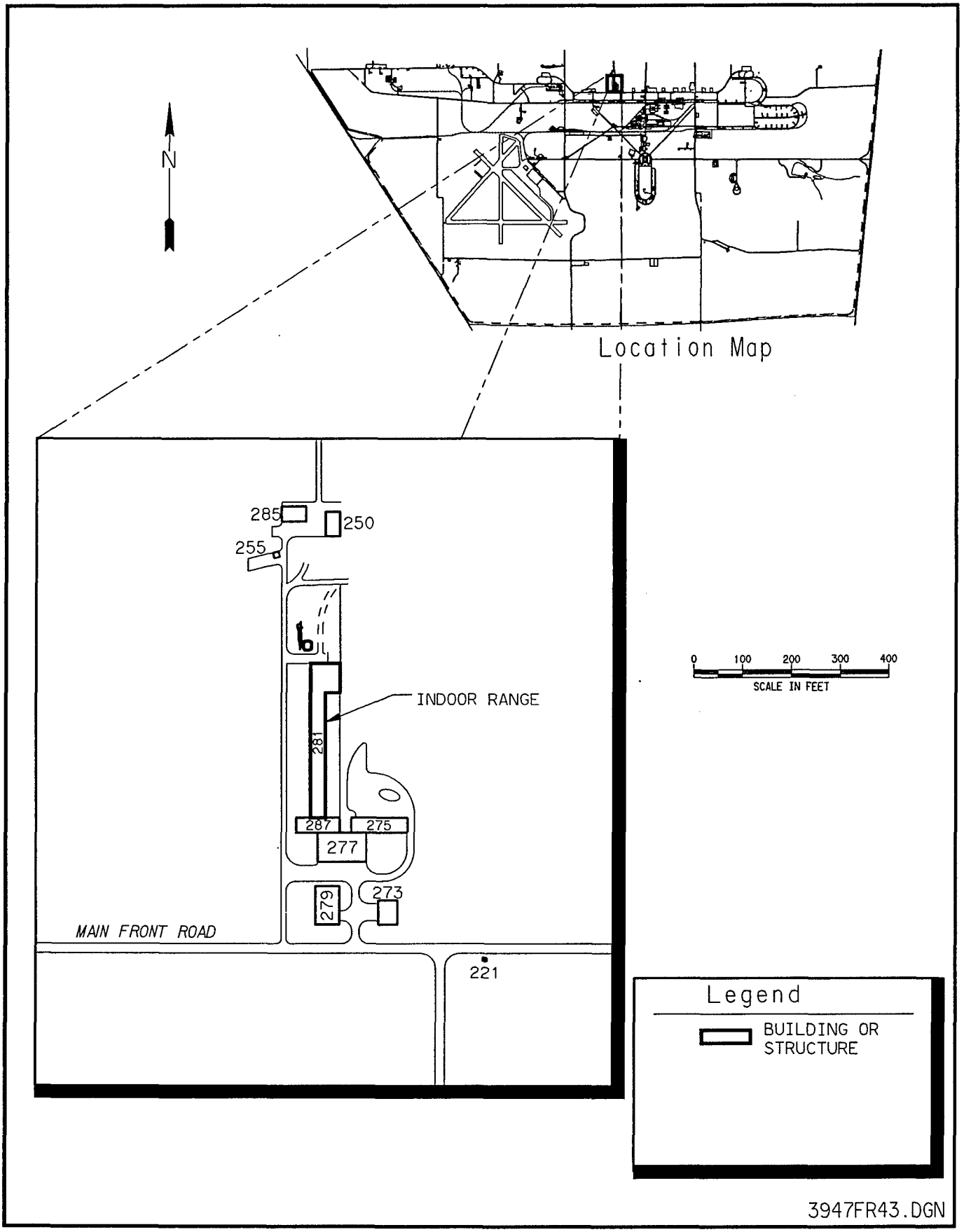

Figure 20. Location Map of Building 281, Indoor Range

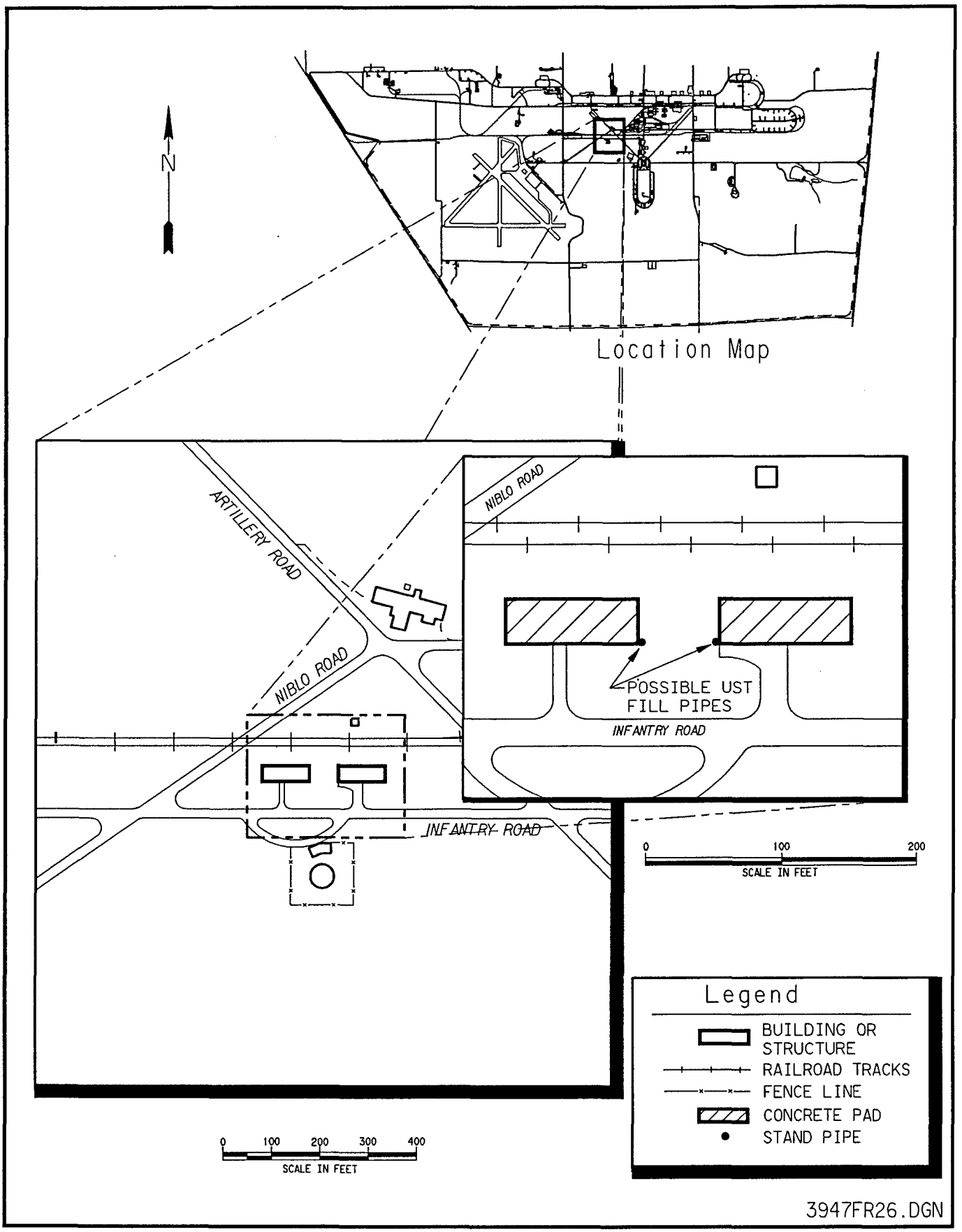

Figure 21. Location Map of Possible Underground Storage Tanks at Artillery and Infantry Roads

3.22.2 Evaluation of Contaminant Pathways

If there are USTs at the site, then there is moderate potential that spills or leaks could have contaminated soil and/or groundwater. If, however, there are no USTs at the site, then there is low potential for the presence of contamination in either soil or groundwater. The air pathway is not a concern. There are no nearby surface-water bodies and little likelihood of transport of potential contaminants to surface-water pathways.

3.22.3 Evaluation of Existing Data

There is currently no information on the site, other than the location and description given above.

3.23 UNDERGROUND CONCRETE VAULT NEAR AIRPORT RAILROAD TRACKS (SITE 44)

3.23.1 Potential Contaminant Sources

Site 44 is located just northeast of the airport railroad tracks east of the hangar area (Figure 22). There is no information on the former use of the site, but it appears to be a vault for underground piping that possibly leads to USTs at the former fuel storage area across the road northwest of the vault. The site may have been related to the distribution system for fuel once stored there. The vault was partially filled with water when observed in July of 1992 and had a thin surface layer of some type of hydrocarbon liquid. The hydrocarbon was a distinct immiscible layer and had a kerosene-like odor, but it did not create a sheen on the water. It appeared to be somewhat degraded judging from the algae scum buildup on the water surface. The fluid may be a type of hydraulic oil. The vault, the associated underground piping, and possibly some associated USTs would constitute potential contaminant sources.

3.23.2 Evaluation of Contaminant Pathways

The concrete vault appears to contain a small quantity of hydrocarbon liquid as well as water. It is not apparent whether or not the vault has leaked; however, if leaks are present, there is potential for soil and groundwater contamination. The purpose and extent of the underground piping is unknown, but, assuming that pipes were once used to transfer fuel underground, there is also the possibility that leaks may have occurred that could have contaminated soil and groundwater.

3.23.3 Evaluation of Existing Data

There are no known data for the site other than the observations listed above.

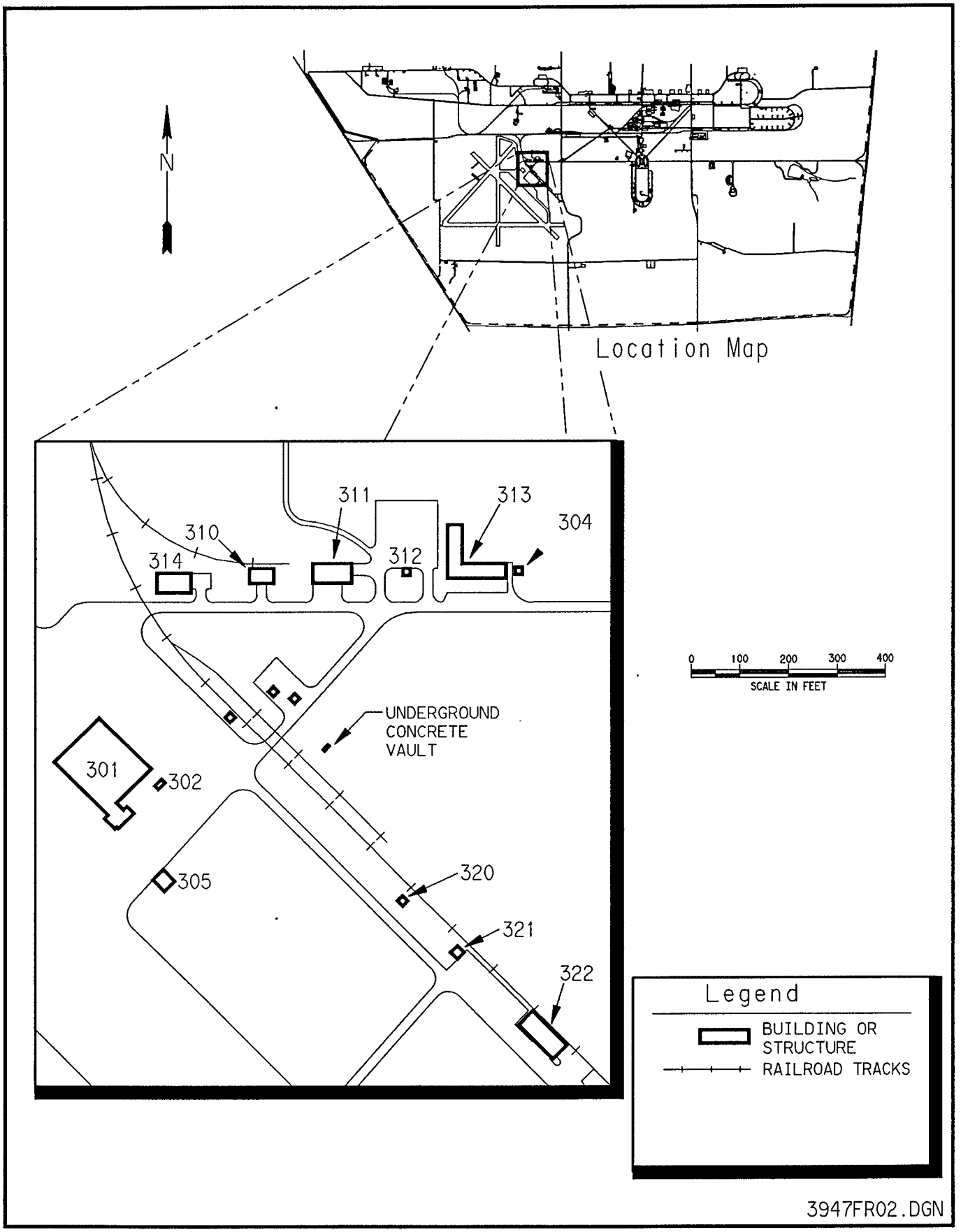

Figure 22. Location Map of Underground Concrete Vault Near Airport Railroad Tracks

3.24 POSSIBLE UNEXPLODED ORDNANCE AT AIRPORT (SITE 45)

3.24.1 Potential Contaminant Sources

This site is not defined, but is assumed to include most of the area around the former airport runways. Reportedly, an area located on the southwestern side of the northwest-to-southeast runway was used as a mine and mortar test area (Figure 23). The subject site has reportedly been surface cleared visually by JPG explosive ordnance personnel. Thus, the remaining potential hazard is from subsurface (i.e., buried) unexploded ordnance (UXO). The potential for subsurface UXO is considered low.

3.24.2 Evaluation of Contaminant Pathways

If buried UXO is present at the site, there is low potential for explosives to leach from the ordnance into soil and possibly reach groundwater. There are no nearby surface waterways that are likely to be impacted because the area is no longer used for mine or mortar testing. There is no potential for contamination of the air pathway.

3.24.3 Evaluation of Existing Data

The only known data on UXO at the airport is a map obtained from JPG, showing the approximate location of an area reportedly used for mine and mortar testing as described above. It has also been reported that the ground surface has been visually cleared by facility explosive ordnance (EO) personnel. The mortar testing has been confirmed by facility EO personnel; however, mine testing is unconfirmed and there is no evidence for it other than a historic map designating the area as a mine/mortar test area.

3.25 OLD FLARE TEST SITES (2) AT THE SOUTH END OF AIRPORT (SITE 46)

3.25.1 Potential Contaminant Sources

According to historical reports, these two sites have apparently been used to launch flares for flare testing. The sites reportedly used to launch the flares were located at the south end of the airport, south of the east-west runway (Figure 24). The flares were reportedly launched from there onto the east-west runway. However, no visible burned areas were noted during the site visit. The sites are of concern because of the lack of documentation on the types of wastes that may have resulted from the burning flares. Most flares contain magnesium, white phosphorus, sulphur, and either potassium or sodium nitrate. White phosphorus is poisonous when ingested and ignitable at ambient temperatures. The other components present little or no hazard.

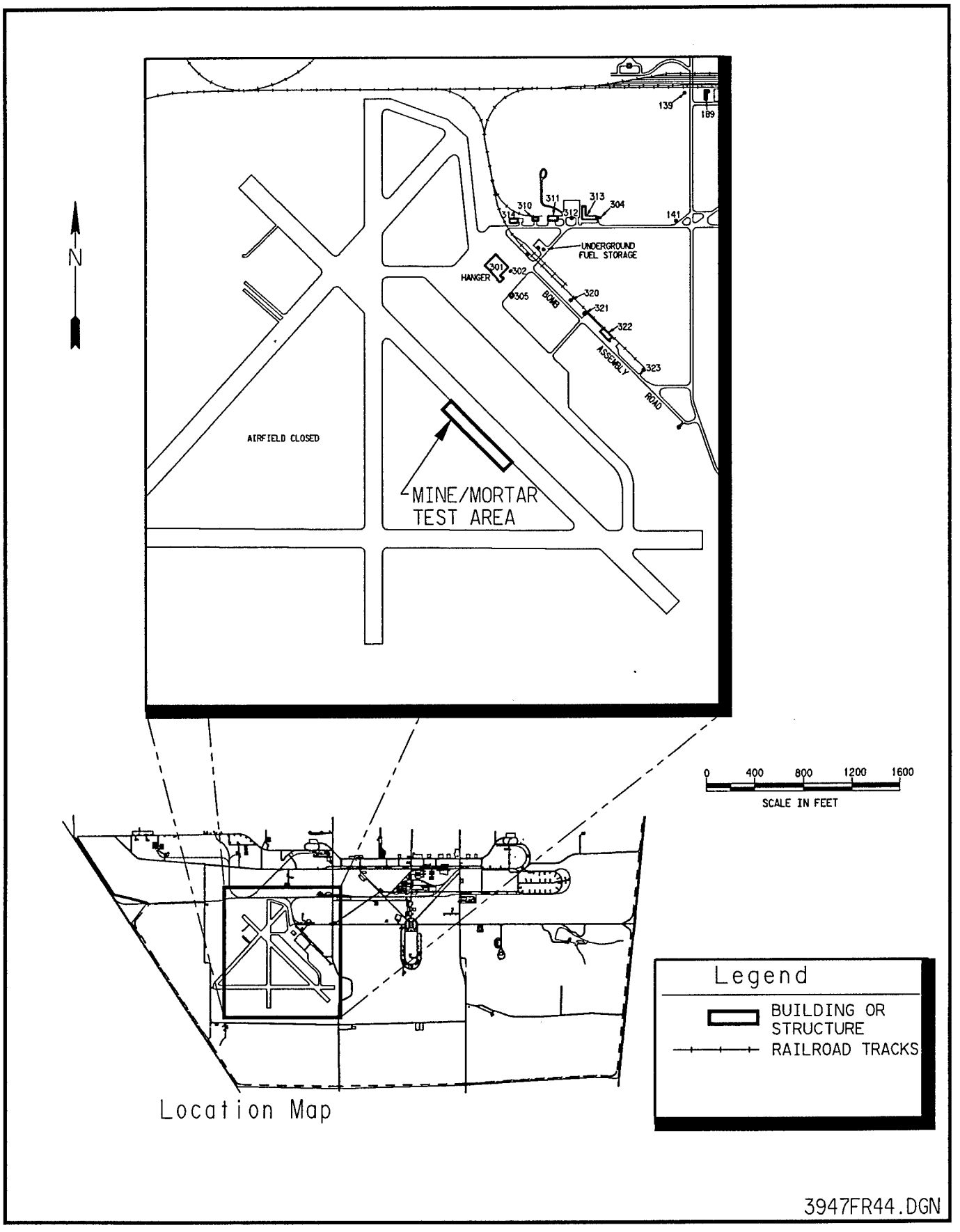

Figure 23. Location Map of Possible Unexploded Ordnance at Airport

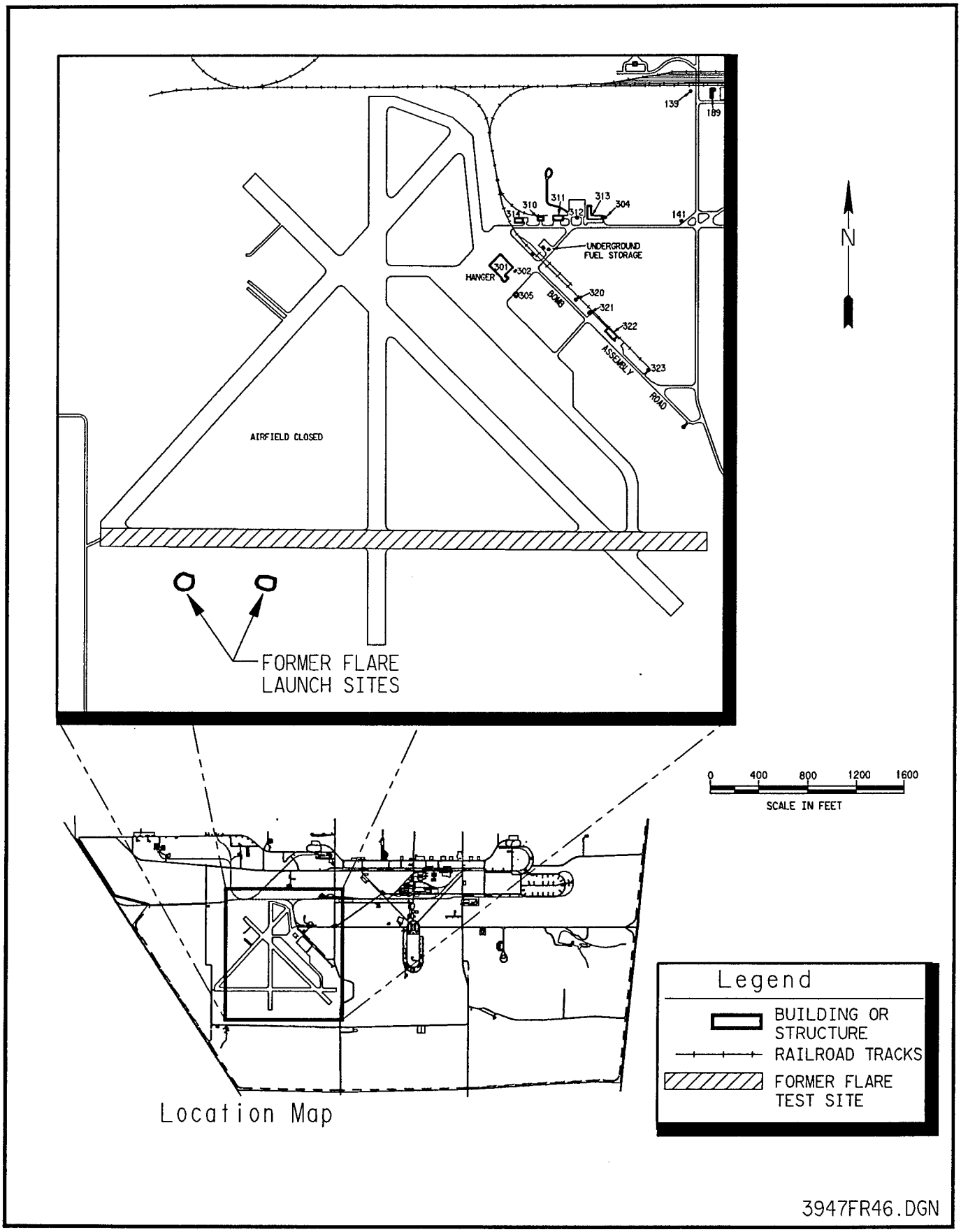

Figure 24. Location Map of Old Flare Test Sites (2) at South End of Airport

3.25.2 Evaluation of Contaminant Pathways

Contamination of the air pathway is only a concern during actual testing because of the high reactivity and volatility of the various flare constituents. However, once testing is completed, there is little concern. Since testing is no longer conducted, the air pathway is no longer a concern.

Testing of flares on the ground surface may have resulted in residual contamination of surface soil with magnesium, phosphorus, sulphur, and nitrates. These compounds are generally abundant in the earth's crust and are not particularly toxic by contact. Leaching of the residual flare components into the subsurface may have resulted from the infiltration of natural precipitation. If enough residual contamination was present, this leaching might result in groundwater contamination. Rainfall runoff and the resulting erosion of the surface soil could result in surface-water contamination. The potential for subsurface-soil, groundwater, and surface-water contamination is considered low for this site.

3.25.3 Evaluation of Existing Data

No data are currently available for the area. Data on the type and frequency of flare testing may be available in JPG records; however, no records have been reviewed. Thus, only the reports of flare testing are evidence for concern at the sites.

3.26 WOODED AREA SOUTH OF THE AIRPORT (SITE 47)

3.26.1 Potential Contaminant Sources

This area is characterized by numerous round surface depressions in the soil of a wooded area southeast of the north-south airport runway and north of Engineers Road (Figure 25). The cause of the depressions is unknown; however, they appear to be possible mine- or mortar-impact sites. The area has not been active for a considerable time as evidenced by trees up to 6 inches in diameter that have grown back into the depressions. UXO is a potential hazard at this site.

3.26.2 Evaluation of Contaminant Pathways

Contamination of the air pathway is not a concern considering the apparent amount of time elapsed since the testing may have occurred.

The site is adjacent to a branch of Harberts Creek; thus, surface-water runoff could potentially transport explosive residues to the surface-water pathway. Additionally, infiltration of surface water contaminated by explosive residues could result in contamination of groundwater; however, the presence of several feet of clay soil overlying bedrock would inhibit infiltration. Thus, the potential for groundwater contamination is considered low.

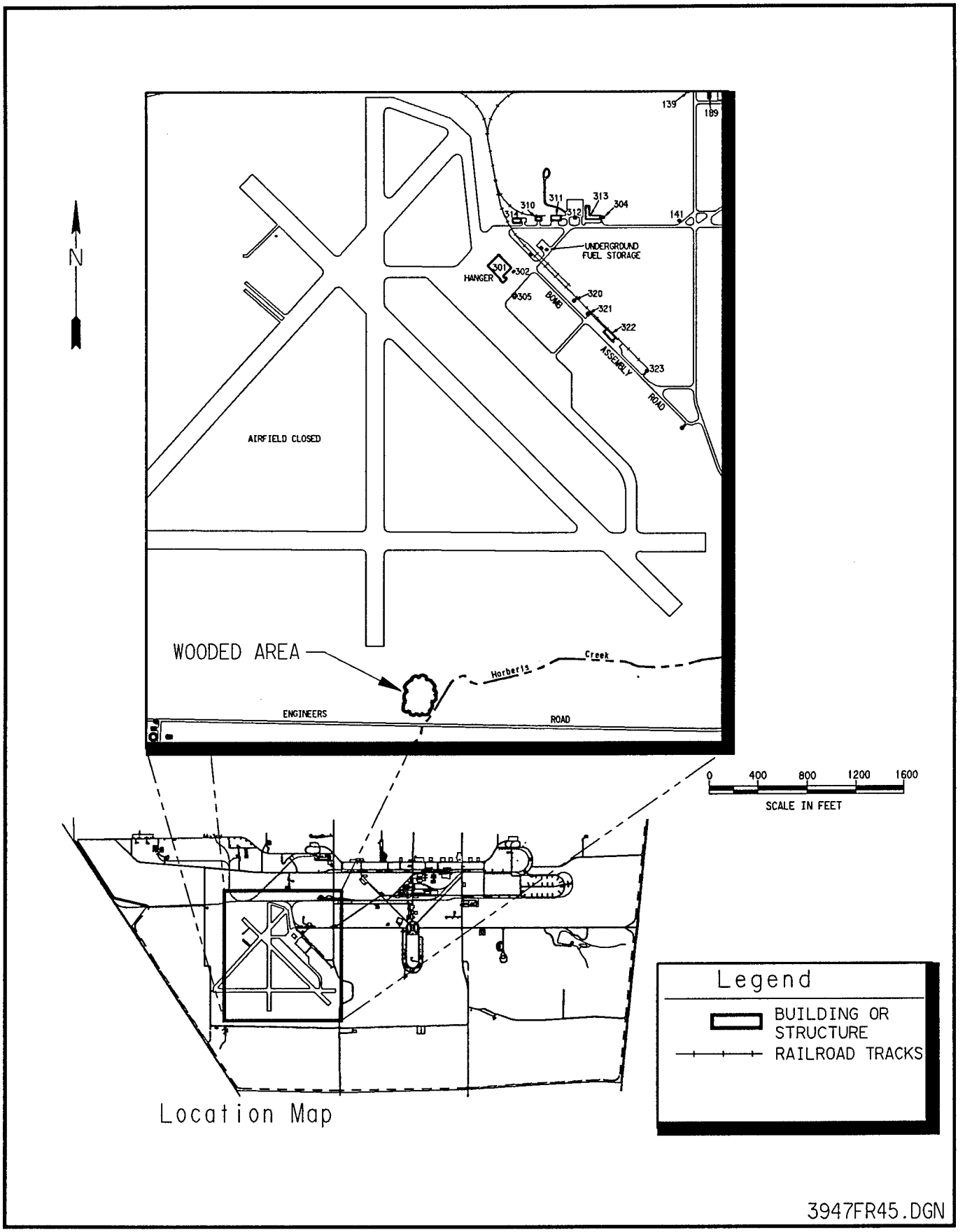

Figure 25. Location Map of Wooded Area South of Airport

3.26.3 Evaluation of Existing Data

No data are currently available for the site; however, surface-water samples collected from Harberts Creek in January of 1992 revealed no detectable explosive residues. This indicates that contamination of the surface-water pathway may not be a concern. Furthermore, considering the stable vegetated appearance of the site and the relatively impermeable clay soils at the ground surface, it is unlikely that groundwater contamination has resulted from infiltration of explosive residues.

3.27 AMMUNITION STORAGE IGLOOS SOUTH OF THE FIRING LINE (SITE 48)

3.27.1 Potential Contaminant Sources

Most of the 32 Ammunition Storage Igloos are located along Igloo Loop at the eastern end of the cantonment area. The igloos consist of earth-covered concrete bunkers and have reportedly been used primarily for storage of ammunition and ammo components.

3.27.2 Evaluation of Contaminant Pathways

The air pathway is of little concern because of the enclosed nature of the igloos. The surface-water and groundwater pathways are protected by the igloos concrete floors, which prevent possible spills from coming in contact with the soil or surface water.

3.27.3 Evaluation of Existing Data

There are some records available on the materials stored in the igloos; however, no records search has been conducted. Facility personnel maintain an inventory of the igloos that would probably reveal the historical content of the igloos. Reports of spills may also be available in facility records, which would assist in evaluating contamination potential.

3.28 EXPLOSIVE ORDNANCE SOUTH OF THE FIRING LINE (SITE 49)

3.28.1 Potential Contaminant Sources

A review of facility maps, showing past ordnance testing and disposal sites south of the firing line, has resulted in the identification of several areas of potential UXO. Sites identified from 1945 facility maps include the potential ammo dump site southwest of the intersection of the railroad and Tokyo Road (Site 16), a mine test area north of the Gator Z mine test area, and a hand-grenade/M-80 simulator test area north of the open burn area (Figure 26). The potential ammo dump site is included as a site in the final work plans (September of 1992) and will not be discussed here. One rocket range has been identified southeast of the intersection of Ordnance Drive and Shun Pike Road from a 1954 facility

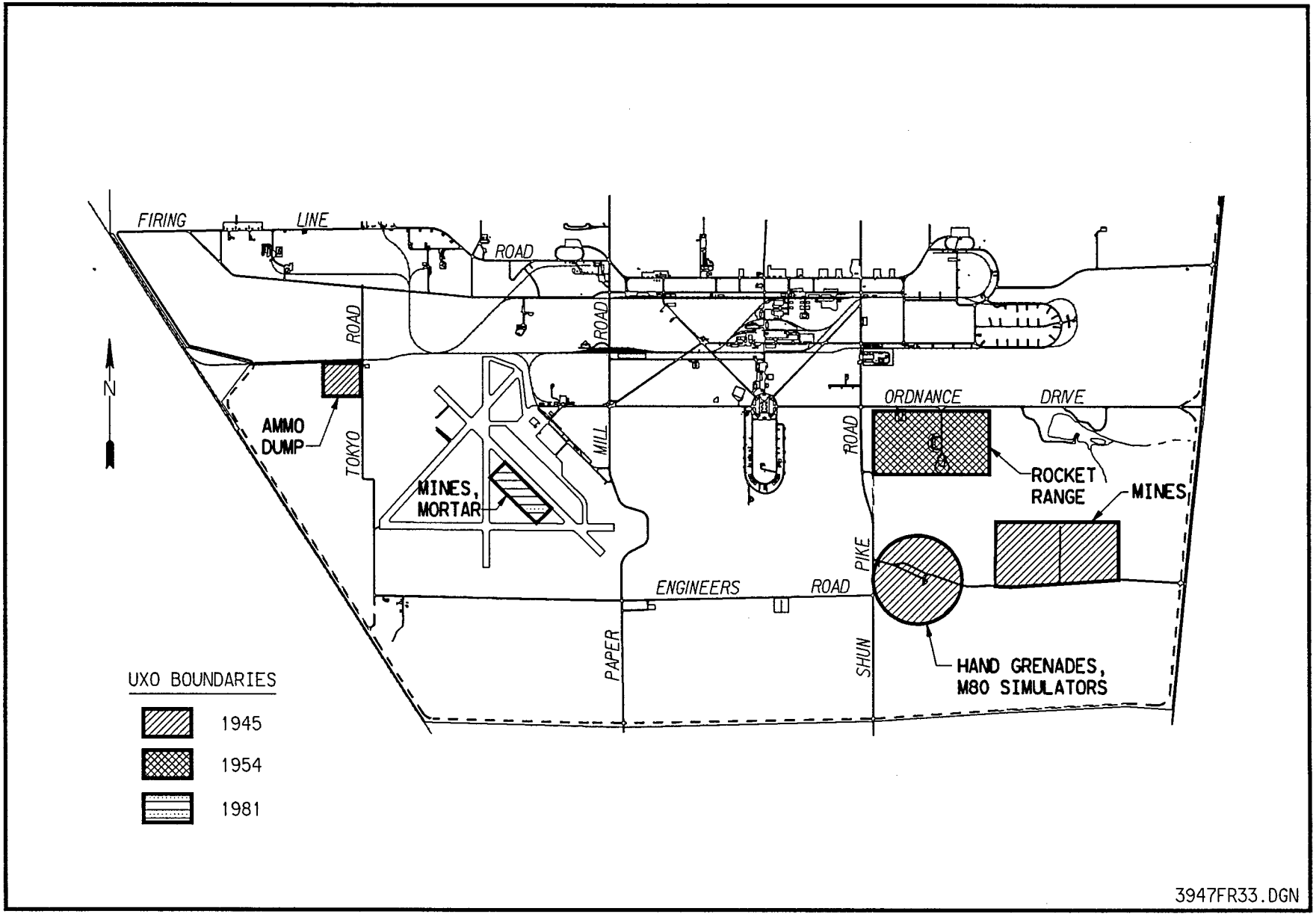

Figure 26. Location Map of Unexploded Ordnance South of Firing Line

map. A mine and mortar test site was identified on a 1981 facilities map; it coincides with the flare test area along the northwest-to-southwest airport runway. This area is discussed in Section 3.17 and Section 3.24. Thus, only three new areas are included in this section: the rocket range, the hand-grenade-testing area, and the mine test area. Potential contaminant sources include UXO and explosive residues.

3.28.2 Evaluation of Contaminant Pathways

The air pathway is not a concern at any of these sites because active testing has not been conducted at the sites for several years and explosive residues are not volatile.

There is potential for explosive residues to be transported by surface-water runoff into various branches of Harberts Creek, which drains these areas. Additionally, infiltration of surface water contaminated by explosive residues to groundwater could result in contamination of groundwater. The potential for subsurface-soil, groundwater, and surface-water contamination resulting from these sites is considered low.

3.28.3 Evaluation of Existing Data

There is currently no information on contamination at any of the identified possible UXO sites. However, surface-water sample results for samples collected from Harberts Creek in January of 1992 showed no detectable explosives, indicating that there is probably not a significant surface-water contamination problem from the sites. Furthermore, considering the stable vegetated appearance of the sites and the relatively impermeable clay soil overlying the bedrock aquifer, it is unlikely that groundwater contamination has resulted from infiltration of explosive residues. Therefore, the most likely hazard at these areas is potential UXO.

3.29 BUILDING 186, WASH RACK AND OIL/WATER SEPARATOR (SITE 50)

3.29.1 Potential Contaminant Sources

The Building 186 wash rack consists of an outside concrete pad surrounded by a concrete berm that directs runoff into a concrete drainage sump (Figure 27). The sump is also connected to the floor drain inside of Building 186. Motor vehicles and heavy equipment have been washed on the pad, and the wash water typically drained into the sump and then via an oil/water separator into the sanitary sewer. Spills inside of Building 186 from routine vehicle maintenance are also directed through the sump to the oil/water separator. Potential contaminants include petroleum, oil, and lubricants (POL), all of which are washed off of the vehicles. The frequency of use is unknown.

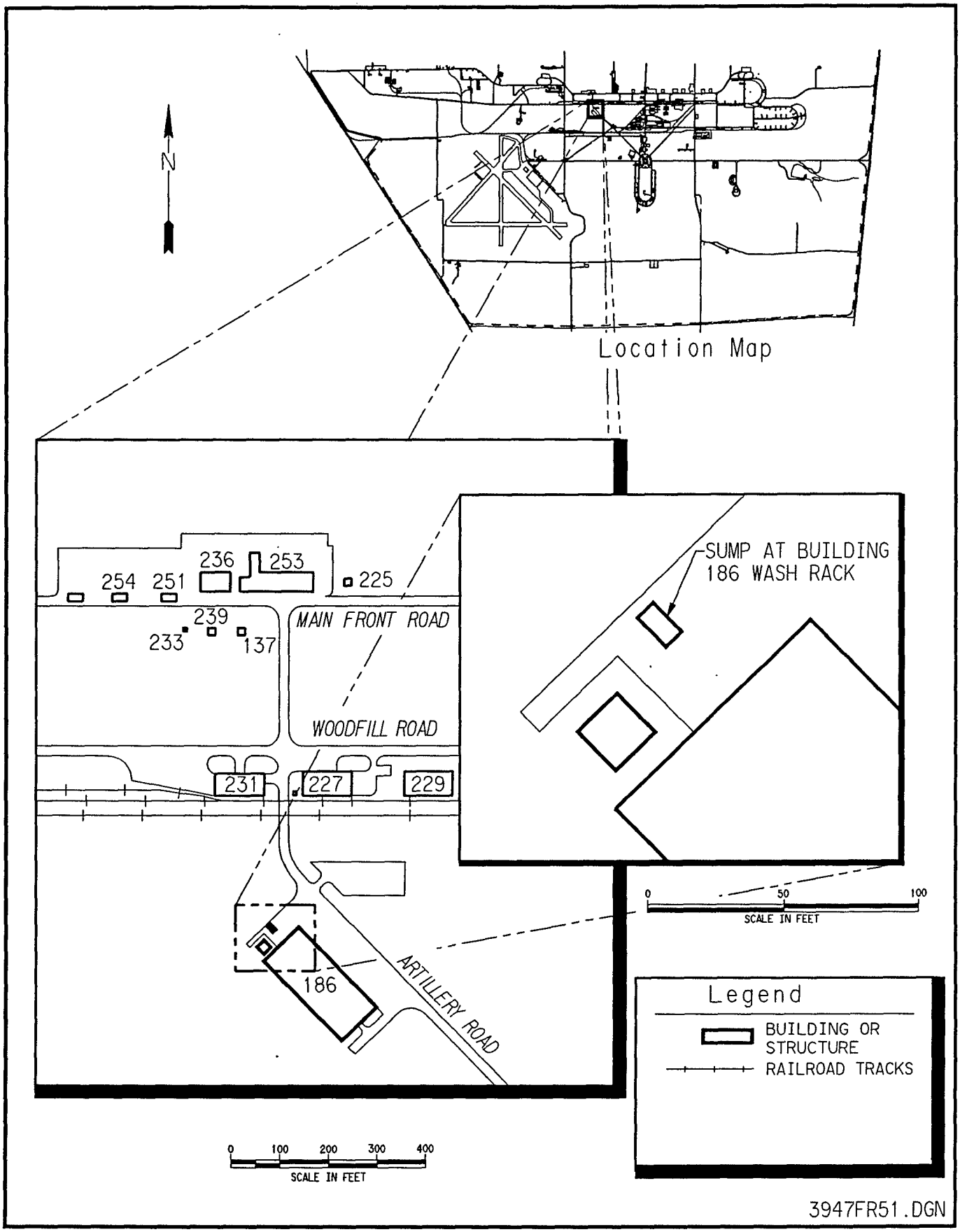

Figure 27. Location Map of Building 186, Wash Rack

3.29.2 Evaluation of Contaminant Pathways

There is some potential for volatilization of POL constituents from the wash rack, especially during equipment washing.

There is low potential for overspray from the wash rack to contact soils beyond the concrete berm. If the overspray contained contaminants, soil contamination could result. There are no surface-water drainages located nearby; thus, there is little potential for contamination of the surface-water pathway. Furthermore, the low permeability of the clay soils would limit infiltration of contaminated overspray into the subsurface, and the potential contamination of the groundwater pathway would also be low.

The integrity of the concrete sump is unknown. If there are cracks in the concrete sump, the contents could leak out into subsurface soil and possibly to the groundwater. However, because any free product that may accumulate would float, the potential for discharge to soil and groundwater is considered low.

3.29.3 Evaluation of Existing Data

There are currently no data on the frequency of use or the exact nature of potential contaminants at the wash rack. It is assumed that the oil/water separator and the sanitary sewage treatment plant are sufficient to remove or treat any contaminants in the wash-rack waste stream. The sewage-treatment-plant outfall is regulated under a National Pollutant Discharge Elimination System (NPDES) permit to ensure that the discharge meets regulatory criteria.

3.30 BACKGROUND SAMPLES

3.30.1 Potential Contaminant Sources

In order to determine what constitutes contamination at designated sites at JPG, it is necessary to determine the environmental background concentrations of various chemicals and elements. Background soil sampling locations are shown in Figure 28. Background groundwater samples will be obtained from upgradient wells at all sites where monitoring wells are installed.

3.30.2 Evaluation of Contaminant Pathways

The relative concentrations of naturally occurring metals in soil can have significant impact on surface-water and groundwater quality. Determination of background values for metals is necessary in order to determine the difference between the contribution from naturally occurring sources and facility sources.

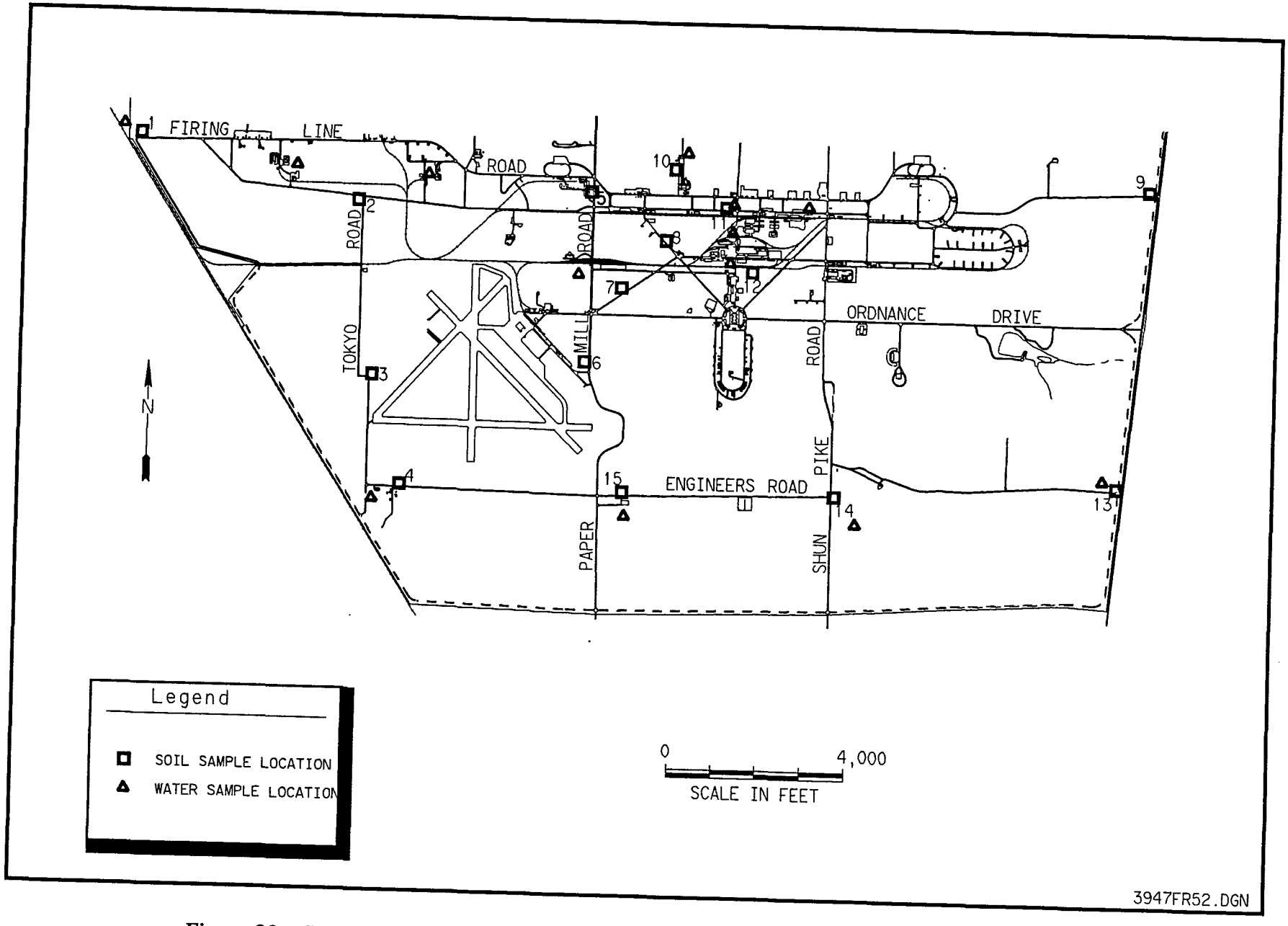

Figure 28. Sampling Locations for Background Soil and Groundwater Samples

3.30.3 Evaluation of Existing Data

There are some regional data available from the Indiana State Department of Natural Resources and the U.S. Geological Survey regarding concentrations of metals in surface water, stream sediments, and groundwater. There are also limited data available for the surface water in streams entering JPG. However, there is no known local background soil or groundwater data for metals.

4.0 DATA NEEDS, DATA QUALITY OBJECTIVES, AND TECHNICAL APPROACH

Section 3.0 provided an assessment of 29 AREEs in terms of their potential for releasing contaminants to environmental pathways and the corresponding risks to human health and the environment. A review of previous investigations was also conducted to determine the need for the collection of additional data. Section 4.0 provides a summary of the identified data needs, data quality objectives, and the technical approach to data collection for those sites that may present a significant threat to human health or the environment. These sites require the collection of additional data to determine if contaminants have been released to the environment and, if released, the levels, extent, and potential risk to human health and the environment. Although the general technical approach to data collection is presented in this section, details of the field and laboratory procedures to be used are provided in the *Addendum to the Sampling Design Plan* (Volume II).

Data quality in this section is expressed in terms of levels established by the EPA to describe analytical levels that are appropriate for the different data uses under the RI/FS process. A Level I refers primarily to field measurements and field test kits that can provide an indication of contamination, but generally do not provide accurate concentration values. Level II uses instruments and techniques with the ability to identify specific analytes and assign a concentration, but with a wide range in data quality depending upon equipment and procedures used. Level III generally corresponds to laboratory analysis using EPA Contract Laboratory Program (CLP) procedures with similar detection limits, but requiring less rigid quality assurance/quality control (QA/QC) requirements than CLP. Level IV refers to laboratory analysis using CLP procedures and protocols with rigorous QA/QC. Data uses for this RI/FS are limited primarily to site characterization and risk assessment. Evaluation of remedial-action alternatives may require more data than is proposed in this plan (e.g., accurate volume estimates of contaminants exceeding remedial-action standards). USAEC-certified analytical methods are to be used for this RI/FS. An example of a correlation table between EPA methods and USAEC methods has been prepared (see Table 8 in *Final Technical Plan*, September 1992). Data Quality Levels III and IV also apply to USAEC-certified methods.

4.1 BUILDING 216, LOCOMOTIVE MAINTENANCE PIT (SITE 22)

4.1.1 Data Needs

No data currently exist for the site. The site was initially identified during an environmental audit by the NEIC conducted in 1989. The pit was covered with wooden beams and was not inspected. There is no information concerning the contents of the pit or the presence of possible leaks from the pit. Depending on the construction of the pit and evidence of potential releases from the pit, soil samples may be needed to determine the level and extent of potential contamination. Determination of the sump discharge path, if any, needs to be performed.

4.1.2 Data Quality Objectives

Level I data will be obtained from the pit inspection. If, upon inspection of the pit, evidence of a potential release is discovered, then a soil boring will be drilled adjacent to the pit. Samples collected from the boring will be analyzed for TPH, VOCs, PCBs, and semi-VOCs. Level III data will be obtained.

4.1.3 Technical Approach

If a soil boring is warranted, then samples should be collected at approximate depths of 0 to 1 foot, 4 to 5 feet, and 9 to 10 feet (or at the soil-groundwater interface). Additionally, at least one of the wells proposed in Section 4.2.3 for the solvent pit at Building 216 will be drilled in a location downgradient of the locomotive maintenance pit deemed most likely to be contaminated.

4.2 BUILDING 216, POTENTIAL SOLVENT DISPOSAL PIT (SITE 23)

4.2.1 Data Needs

No data currently exist for the site. In fact, it is not certain that the rock pit on the east side of Building 216 was actually used for solvent disposal. Subsurface-soil samples are needed to determine the level and extent of potential contamination. Monitoring wells may be needed to provide information on water quality and groundwater flow direction.

4.2.2 Data Quality Objectives

Subsurface-soil samples should be collected to determine if contaminants are present and, if present, to provide initial site characterization information on the horizontal and vertical extent of the contaminants. If soil contamination is present, then groundwater samples from monitoring wells will be collected to determine if contaminants have entered the groundwater pathway. Both soil samples and groundwater samples should be analyzed for VOCs, semi-

VOCs, and total metals. The resulting analytical data will be Level III and may be used in site characterization and the assessment of risk to human health and the environment.

4.2.3 Technical Approach

Three soil borings will be drilled around the perimeter of the pit to the water table. Samples will be collected at approximate depths of 0 to 1 foot, 4 to 5 feet, and 9 to 10 feet and analyzed for VOCs, semi-VOCs, and total metals. If the soil samples reveal contamination of the subsurface, then three downgradient monitoring wells and one upgradient monitoring well will be installed. These wells will be sampled and analyzed for VOCs, semi-VOCs, and total metals. In addition, water-level measurements and aquifer testing will be performed to support groundwater modeling and contaminant fate and transport analysis. One of the downgradient wells will be located in the position most likely to intercept possible groundwater contamination resulting from the locomotive maintenance pit. This well will also be sampled for TPH (EPA Method 418.1).

4.3 BUILDING 602, SOIL STAGING AREA (SITE 24)

4.3.1 Data Needs

No previous investigations have been conducted at this site. Surface-soil samples need to be collected along the natural drainage paths in the area where the contaminated soil was stockpiled in order to determine if contaminant release has occurred.

4.3.2 Data Quality Objectives

The surface-soil samples will provide initial site characterization data to determine if contaminants have been released and to assess the need for further investigations. Level III data quality will be obtained.

4.3.3 Technical Approach

Two surface-soil samples will be collected along the natural drainage paths in the area where the contaminated soil was stockpiled. These samples will be analyzed for TPH (EPA Method 418.1).

4.4 PAPER MILL ROAD DISPOSAL AREA (SITE 25)

4.4.1 Data Needs

No information exists concerning the nature of contaminants present at this site. The site was initially identified as a possible disposal site by analysis of historical aerial photos (EPIC

report, 1986). Ground staining was observed in a succession of aerial photos, along with debris, mounded material, vehicles, and containers. The area is presently vegetated, although the vegetation appears stressed. Stained areas have a black, tar-like substance at the surface. Areas with small chunks of asphalt, clinkers, and gravel are also present. Surface- and subsurface-soil sampling and analysis are needed to determine if contaminants have been released to the environment as a result of previous storage and disposal activities at this site.

4.4.2 Data Quality Objectives

Surface- and subsurface-soil sample data should be collected to determine if contaminants are present and to provide initial information on the horizontal and vertical extent of the contamination. Samples should be analyzed for TPH, PCBs, pesticides, and total metals. The resulting analytical data will be Level III and will be used for initial site characterization.

4.4.3 Technical Approach

Three surface samples will be collected in areas of surface staining and/or stressed vegetation. In addition, three soil borings will be drilled to the saturated zone or the water table. Samples will be collected at approximate depths of 0 to 1 foot, 4 to 5 feet, and 9 to 10 feet. Both surface and subsurface samples will be analyzed for TPH, PCBs, pesticides, and total metals.

4.5 DRMO STORAGE AREA (SITE 26)

4.5.1 Data Needs

There is no information concerning the nature and extent of contamination at Site 26. The site was originally identified during the aerial photo study (EPIC report, 1986). Records show that lead-acid batteries and PCB-containing transformers have been stored at the site. Soil-sample data are needed from the two storage areas to determine if there has been a release of contamination to the soil.

4.5.2 Data Quality Objectives

Surface-soil sample data should be collected to determine if a release has occurred. Samples from the lead-acid-battery storage area should be analyzed for lead. Surface-soil samples are also needed from the former transformer storage area to determine if soils are contaminated with PCBs or oil. Level III data are needed for initial site characterization and risk evaluation.

4.5.3 Technical Approach

Three near-surface soil samples will be collected from the lead-acid-battery storage area and analyzed for lead. Three near-surface soil samples will be collected from the southeastern corner of the storage area (formerly, the transformer storage area) and analyzed for TPH and PCBs.

4.6 SEWAGE SLUDGE APPLICATION AREAS (SITE 27)

4.6.1 Data Needs

The potential for contaminant transport to surface and groundwater needs to be assessed. Information on the residual metals and cyanide content at the four sludge-application areas is needed to determine the potential for contamination of nearby Harberts Creek. Because PCBs are commonly found in sewage sludge at older treatment plants, the possibility of PCB contamination in the application areas needs to be assessed.

4.6.2 Data Quality Objectives

The purpose of sampling will be to confirm soil contamination at the sludge application areas. Near-surface soil-sample data should be collected to determine what contaminants are present in the sludge-application areas. Level III data are needed for risk analysis and site characterization.

4.6.3 Technical Approach

The locations of sludge-application areas will be verified visually. Approximately 12 near-surface soil samples will be collected from former sludge-application areas and analyzed for total metals and cyanide. Four composite soil samples (1 from each application area) will be collected and analyzed for PCBs.

4.7 GATOR Z MINE OPEN BURN AREA (SITE 28)

4.7.1 Data Needs

Because there is a high potential for release of contaminants to the soil from the burning conducted at the site, information is needed on contaminants in the near-surface soil. The low potential for contamination of surface and groundwater does not warrant additional data on these pathways at this time. Because the unit operates under an air-pollution variance, there is no need for air-pollution data.

4.7.2 Data Quality Objectives

The objective of the investigation will be to establish whether or not the surface soil has been contaminated with metals or explosives. Also, the residual contamination in the ash needs to be assessed. Level III quality data will be obtained on soil and ash samples to support risk analysis. Analytical parameters will include total metals, leachable metals, and explosives.

4.7.3 Technical Approach

Any existing data will be obtained and reviewed. One ash sample will be collected and analyzed for TCLP metals, total metals, and explosives. Three near-surface soil samples will be collected from 0 to 2 feet deep and analyzed for explosives and total metals.

4.8 GATOR Z MINE SCRAP DISPOSAL AREA (SITE 29)

4.8.1 Data Needs

There are currently no data on the nature and extent of contamination at this site. Even though the pit containing scrap has not been used since 1970, it is possible that the pit water and sediment may be contaminated with explosives and possibly metals. It is also possible that other pits, which are now covered with soil, might have existed in the area. Data are needed to assess the extent of contamination in the pit and the potential for the existence of other buried pits.

4.8.2 Data Quality Objectives

The objectives of the site investigation will be to determine the existence of contamination in the open pit and the existence of additional buried pits. Field-reconnaissance quality data will be obtained by a geophysical survey of the area around the open pit. These data will be useful in determining if additional buried pits are present. Level III quality data will be obtained by sampling sediment and water in the open pit. If metals contamination is detected in the sediment at three standard deviations above background, the sediment samples will be analyzed for leachable metals by TCLP.

4.8.3 Technical Approach

Three surface-water and sediment samples will be collected from the disposal area and analyzed for explosives and total metals. A geophysical survey will be performed over the 1 acre surrounding the disposal pit in order to identify other potential disposal areas.

4.9 BUILDING 204, PESTICIDE STORAGE AREA (SITE 30)

4.9.1 Data Needs

There is a low potential for release to the environment of pesticides stored inside of Building 204. However, there is potential that releases to surface soils could have resulted from mixing and rinsing conducted in the shed east of Building 204. Thus, data on the nature and extent of possible surface-soil contamination along surface-water pathways are needed.

4.9.2 Data Quality Objectives

The objective of the site investigation is to determine if surface-soil contamination exists along surface-water pathways around Building 204. Level III quality data will be obtained from near-surface soil samples. Analytical parameters will include organochlorine pesticides.

4.9.3 Technical Approach

Three near-surface soil samples will be collected from around the perimeter of the building and analyzed for pesticides, including DDT. The sample sites will be located in areas most likely to receive surface runoff from rinsing and mixing activities.

4.10 BUILDING 227, FORMER STORAGE PAD (SITE 31)

4.10.1 Data Needs

There is no evidence or record of a major spill having occurred at this site; however, the stained area at the northeastern corner of the concrete pad indicates that some surface-soil contamination is likely. Data are needed to evaluate the lateral and vertical extent of this contamination.

4.10.2 Data Quality Objectives

The objectives of the investigation will be to determine the nature and extent of contamination associated with the stained area at the site and to determine if remediation of the area is necessary. Level I quality data will be obtained during field screening of soil samples for VOCs in order to determine if contamination exists. Level III quality data will be obtained on soil samples collected to support remedial objectives. Analytical parameters will include TPH and total metals. If metals are detected at three standard deviations above background, then leachable metals will be determined by TCLP.

4.10.3 Technical Approach

Three soil borings will be drilled to the saturated zone or to the water table near the northeastern corner of the concrete pad. Four samples will be collected per boring (one at the surface) and analyzed for TPH (EPA method 418.1) and total metals.

4.11 BUILDING 105, LOCOMOTIVE MAINTENANCE PIT (SITE 32)

4.11.1 Data Needs

There have been no known releases of contaminants from this site. The potential for a release appears to be slight; however, the construction and integrity of the pit are not known. There is also no information on residual contaminants that might remain in the pit. An inspection of the pit is needed; if there are cracks that might serve as contaminant pathways to the subsurface, then soil samples may be required.

4.11.2 Data Quality Objectives

Reconnaissance-level data are needed to evaluate the potential for a release from the pit. If there appears to be a release mechanism to the subsurface, Level III data are needed to determine the nature and extent of contamination. Analytes should include TPH, VOCs, PCBs, and semi-VOCs.

4.11.3 Technical Approach

A visual inspection of the locomotive maintenance pit beneath the rail tracks will be performed. The potential for contaminant releases will be evaluated and identified. If sampling is warranted, up to three soil samples will be collected from potential release points and analyzed for TPH, VOCs, PCBs, and semi-VOCs.

4.12 BUILDING 333, NEW INCINERATOR (SITE 33)

4.12.1 Data Needs

Reportedly, there are data available from the routine sampling of the ash generated at the incinerator. This information is needed to assess the likelihood of leaching of contaminants from particles that exit the stack and settle on surrounding surface soils during burning. A review of the existing data from routine ash sampling is needed in order to evaluate the types of contaminants that might be released from the site. Data are also needed to determine if ash fall has contaminated soil downwind of the incinerator.

4.12.2 Data Quality Objectives

The objectives of the investigation will be to determine the release potential and the leachable constituents of the ash and to determine if surrounding surface soils have been contaminated. Level III quality data will be generated from TCLP metals analysis of the ash and metals analysis of the soil. The existing Level II analytical data from routine ash sampling will be reviewed and included in the evaluation of contamination potential. This data will be considered Level II because the data were not generated under the quality control plan for the RI/FS.

4.12.3 Technical Approach

Any existing data will be reviewed, and one ash sample will be collected and analyzed for TCLP metals. Two near-surface soil samples will be collected from the prevailing downwind direction and will be analyzed for metals. If metals in soil exceed three standard deviations above background, then TCLP metals analysis will be performed to determine the leachable metals.

4.13 BUILDING 136, SANDBLASTING AREA (SITE 34)

4.13.1 Data Needs

There is the potential that lead-based paints contaminated the surface soil around the pad. Information on the extent of this possible contamination is needed in order to evaluate the potential for leaching to the groundwater or transport to surface water. Information on the background metals in the unused sandblasting material and the added contaminants in the used sand is also needed.

4.13.2 Data Quality Objectives

The objectives of the site investigation will be to evaluate the nature and extent of contamination in soil around the sandblasting area and in the used sand. Level III quality data will be obtained from surface-soil samples collected around the perimeter of the sandblasting area. Level III data will also be generated by analysis of used and unused sand samples. Level II data generated by routine analysis of used sand will also be reviewed and included in the evaluation of contamination potential. If the analysis for total metals reveals metals values above three standard deviations above background, then the samples will be analyzed for leachable metals by TCLP.

4.13.3 Technical Approach

Three near-surface soil samples will be collected from locations around the perimeter of the outdoor sandblasting area and analyzed for total metals. One composite sample will be

collected from used sand stored in drums outside the building and analyzed for total metals. One sample of unused sand will be collected and analyzed for total metals to provide data on background metals concentrations.

4.14 BUILDING 602, FORMER LEAKING UNDERGROUND STORAGE TANK (SITE 35)

4.14.1 Data Needs

Reports of a spill at the site caused by the removal of a UST prompted a cleanup of the site. Data are needed to determine if the surface-water pathway was contaminated by the spill. Review of the soils data generated during the UST removal is needed to determine if the site was properly closed.

4.14.2 Data Quality Objectives

The objectives of the site investigation are to determine if residual contamination is present from the reported spill and to confirm cleanup of the site. Level III quality data will be obtained from soil samples collected around the former tank location and along the nearby surface-water drainage. The Level II data generated by sampling of the tank excavation during the UST removal will also be reviewed and included in a contaminant-release assessment.

4.14.3 Technical Approach

The existing documentation in JPG files on the response to the spill will be reviewed and the extent of the release evaluated. Since the release potential appears to be high, three near-surface soil samples will be collected and analyzed for TPH. These samples may also be used to confirm cleanup of the site.

4.15 NO. 2 OIL SPILL AT BUILDING 103 (SITE 36)

4.15.1 Data Needs

There is no confirmatory sampling information available to show that the oil spill was cleaned up to standards. The spill may have contaminated surface and subsurface soil as well as groundwater downgradient of the site; thus, soil sampling is needed to determine if contamination exists. Groundwater data may also be needed if subsurface soil contamination is discovered down to the water table.

4.15.2 Data Quality Objectives

Petroleum-hydrocarbon contamination of soils and groundwater may have resulted from the spill. TPHs are contaminants of concern in soils, and TPH; benzene, toluene, ethylbenzene, and xylene (BTEX); and semi-VOCs are contaminants of concern in groundwater. Level I data should be obtained and evaluated during the field investigation in order to select samples for laboratory analysis. The laboratory analytical data will provide Level III data quality for evaluation of remedial options and potential risk to human health and the environment. Data on the aquifer parameters and groundwater potentiometric surface will be collected to assist in fate and transport assessment.

4.15.3 Technical Approach

Four soil borings are recommended to be drilled to the saturated zone or to the water table. Three samples should be collected per boring and analyzed for TPH. If subsurface soil contamination is discovered down to the water table, then one upgradient monitoring well and three downgradient wells should be installed around the spill area to a depth of approximately 35 feet and screened at the first water-producing zone. Four groundwater samples will be collected and analyzed for TPH, BTEX, and semi-VOCs. A field method for screening soil and/or groundwater samples for VOCs will be implemented in order to determine optimum locations for monitoring wells. Water levels will be measured on the wells to define the groundwater potentiometric surface, and aquifer tests will be performed to provide data on groundwater flow.

4.16 GASOLINE STATION, BUILDING 118 (SITE 37)

4.16.1 Data Needs

This facility has been in operation for 50 years as a fuel storage and dispensing facility. Because of the nature of operations at this site, data are needed to determine the possible sources of contamination and the extent, if any, of contamination in the soil and groundwater.

4.16.2 Data Quality Objectives

The objectives of the investigation will be to establish whether or not leaks and spills have occurred and, if so, the extent of the resultant petroleum-hydrocarbon and lead contamination to soil and groundwater. Level I quality data will be obtained during field screening of soil samples and groundwater samples for VOCs in order to determine optimum monitoring-well locations. Level III quality data will be obtained on soil and groundwater samples collected to support risk assessment. Analytical parameters will include VOCs, metals, and BTEX. If soil contamination is indicated based on field screening, TPH analyses may be required in order to evaluate the need for soil remediation.

4.16.3 Technical Approach

Monitoring wells will be installed to collect both groundwater and soils data. One well will be installed in the vicinity of the USTs, one well upgradient of the area, and three additional wells downgradient of the USTs. Well depths will be approximately 35 feet, and the wells will be screened at the first water-producing zone. Up to 15 soil samples will be collected from the wells during drilling and analyzed for BTEX, lead, and VOCs. If contamination is suspected based on field screening, TPH analyses will also be performed. All monitoring-well water samples will be analyzed for BTEX and VOCs. The wells will be tested for floating contaminants, and the thickness of any floating contaminants will be determined. Water levels will be measured in the wells to define the groundwater potentiometric surface, and aquifer tests will be performed to provide data on groundwater flow.

4.17 NORTHWEST-SOUTHEAST RUNWAY TEST AREA (SITE 38)

4.17.1 Data Needs

Flare testing is periodically conducted at this site. A records search and interviews with facility personnel are needed to determine the type of flares tested and the frequency of flare testing. Upon determination of the type of flares used, the specific potential contaminants need to be listed. An evaluation of hazard potential based on the identified contaminants of concern is needed. If there are contaminants that may pose significant risk to human health or the environment, then soil sampling may be required to confirm contamination and to evaluate the extent of the contaminants of concern. If no contaminants of concern are identified, the site will be recommended for no further action; however, soil sample data may be required in order to support the no-action recommendation.

4.17.2 Data Quality Objectives

The objectives of the proposed activities are to identify the type and frequency of flare testing and to determine the contaminants of concern. Because these objectives do not require analytical testing, no level of data quality is assigned to the activities. If soil sampling is deemed necessary based on the preliminary assessment, then Level III analytical data will be obtained from soil samples analyzed for contaminants of concern (possibly metals and explosives).

4.17.3 Technical Approach

The investigation will begin with interviews of facility personnel to determine the type of flares tested and the frequency of flare testing. A review of any available records will also be conducted. Based on the results of this research and evaluation of the contaminants of concern, the potential for risk to human health and the environment will be assessed. If there does not appear to be reason for concern, at least one confirmatory surface-soil sample will be collected and analyzed for total metals and explosives. If, however, significant

contaminants of concern are identified, additional soil sampling may be required. If additional sampling is deemed necessary, this additional sampling will be conducted as an amendment to this plan.

4.18 GATOR Z MINE TEST AREA (SITE 39)

4.18.1 Data Needs

Data are needed on the potential contaminants of concern (i.e., explosives and metals) that might result from mine testing and on whether or not any of these potential contaminants have been carried by surface water into the area's drainage ditches or Harberts Creek.

4.18.2 Data Quality Objectives

The objectives of proposed activities are to collect data to identify specific contaminants of concern and to determine if any contaminants have migrated into the soils and sediments of the surface-water drainages. Level III data are required to support the risk assessment. The area is relatively large; however, by collecting biased samples from areas most likely to be contaminated, it will be possible to determine if there is any reason for concern at the site.

4.18.3 Technical Approach

In order to determine the specific contaminants of concern, three surface-soil samples will be collected from three different test pits. In order to determine if surface-water drainage has transported contaminants to the drainages, three surface-soil samples will be collected from the drainage swales, including at least one from the south side of the area along Harberts Creek. The samples will be analyzed for explosives and total metals.

4.19 DISCHARGE/FILL PIPE AT BUILDING 259 (SITE 40)

4.19.1 Data Needs

Information on the use and materials handled at the site needs to be researched. A thorough inspection of the area is needed to evaluate the potential for a release. Recommendations for further action are needed. The components of the black tar-like substance needs to be assessed.

4.19.2 Data Quality Objectives

The objectives of the proposed activities are to determine the site history, identify potential contaminants of concern, and evaluate the potential for a contaminant release. A sample of the soil under the black tar-like substance will be collected to determine the chemical

constituents. Level III data will be obtained from petroleum-hydrocarbons analysis to be used for a comparison to action-level criteria.

4.19.3 Technical Approach

The former use of the site and materials handled there will be researched. An inspection of the area will be performed to evaluate the potential for a release. One sample will be collected and analyzed for TPH. Based on this evaluation, recommendations will be made either for additional sampling or no further action.

4.20 BUILDING 281, FUEL OIL FROM FORMER UST (SITE 41)

4.20.1 Data Needs

Data on the tank removal are required to determine if the site was properly closed. Soil-sample data obtained at the time of the tank removal is insufficient to determine disposition of the site. Both surface and subsurface data will be required to ensure that there is no residual contamination around the former tank location. If soil contamination is present, groundwater monitoring wells may be needed to determine if residual groundwater contamination is present.

4.20.2 Data Quality Objectives

The objectives of the proposed activities will be to determine if the former UST was properly closed and if soil or groundwater contamination is present at the site. Level III data will be obtained from soil and possibly groundwater samples analyzed for TPH. Groundwater Level III data will be obtained for TPH, VOCs, and semi-VOCs. Level I data for soil samples will be obtained for VOCs during drilling using a field screening method. If wells are installed, water-level and aquifer-parameter data will be obtained from monitoring wells to provide information for risk analysis.

4.20.3 Technical Approach

A records search will be conducted to determine if any information exists concerning the closure of the tank and soil samples collected at that time. Three soil borings will be drilled in or around the former UST area. Three soil samples will be collected per boring and analyzed for TPH. If evidence of soil contamination exists down to the water table, one upgradient monitoring well and three downgradient monitoring wells will be installed at or near the boring locations. If installed, the wells would be sampled for VOCs, TPH, and semi-VOCs. If wells are needed, a field-screening method for soil and/or groundwater samples will be implemented in order to determine optimum locations for monitoring wells.

4.21 BUILDING 281, INDOOR RANGE (SITE 42)

4.21.1 Data Needs

Data are needed to determine if the dirt floor and interior surfaces of the range have been contaminated with lead dust or lead oxides.

4.21.2 Data Quality Objectives

Level III quality data are needed on lead in surface soil in order to assess the potential risk of lead-contamination migration to groundwater and surface water. Level III quality data are needed for lead on the interior surfaces of the firing ranges.

4.21.3 Technical Approach

Three surface-soil samples will be collected inside of the building and analyzed for leachable lead by TCLP. These data will be evaluated to determine the risk and the possible need for additional action. Ten wipe samples will be collected from the firing range walls and analyzed for lead.

4.22 POSSIBLE USTs OR WELLS AT ARTILLERY AND INFANTRY ROADS (SITE 43)

4.22.1 Data Needs

Information on the former use of the two standpipes at the site is needed. A determination of the existence of possible USTs must be made.

4.22.2 Data Quality Objectives

Reconnaissance-level data will be collected to determine the possible need for sampling. If sampling is needed, the samples will be proposed as a follow-up to the initial investigation.

4.22.3 Technical Approach

An inspection will be performed at the area and an evaluation made for contaminant release potential. The standpipes will be physically checked to determine the depth, construction, and probable contents of the pipes. The data will be used to determine the need for additional studies. A magnetometer survey will be preformed to detect possible USTs.

4.23 UNDERGROUND CONCRETE VAULT NEAR AIRPORT RAILROAD TRACKS (SITE 44)

4.23.1 Data Needs

There appears to be a small quantity of liquid hydrocarbon product in the vault. The type of hydrocarbon should be determined. The former use of the site also needs to be researched. The extent of any associated underground piping or tanks should be determined. Information is also needed to determine if a release to the surrounding soil has occurred from the vault.

4.23.2 Data Quality Objectives

Level III quality data will be obtained from soil sampling. Level III data will also be obtained for the product in the vault in order to determine the appropriate disposition of the liquid. Reconnaissance-level data will be collected to determine the former use of the site, and to determine the existence and extent of underground piping and tanks.

4.23.3 Technical Approach

An inspection of the site will be performed to determine the potential for a release. The past use of the site will be identified through records search and physical examination. A geophysical survey will be performed to locate possible USTs and associated underground piping. One free product sample will be collected and analyzed for bulk identification. Three soil borings will be drilled to the saturated zone or to the water table. Three soil samples will be collected per boring and analyzed for TPH, VOCs, and semi-VOCs. If groundwater contamination appears likely, three monitoring wells may be installed and sampled for TPH, VOCs, and semi-VOCs.

4.24 POSSIBLE UNEXPLODED ORDNANCE AT AIRPORT (SITE 45)

4.24.1 Data Needs

The area has reportedly been visually cleared by facilities EO personnel. This clearance needs to be verified. The existence of buried UXO has not been investigated. A geophysical survey of the area that was reportedly used for mine and mortar testing is also needed to determine if there is extensive buried UXO.

4.24.2 Data Quality Objectives

The objectives of the investigation will be to confirm that the area has been surface cleared for UXO and to determine if significant quantities of subsurface UXO are present. Reconnaissance-level data will be obtained by performing a geophysical survey of the former testing area. The area is coincident with the flare test area (see Section 4.17), and Level III

soils data generated by the investigation described for the flare test area will also be incorporated into this site investigation. If evidence of significant buried UXO is found, then more intrusive investigation, such as trenching, will be considered.

4.24.3 Technical Approach

Reportedly, the subject site has been visually surface cleared by JPG explosives ordnance personnel. This clearance will be verified. A geophysical survey of the area adjacent to the northwest-southeast runway will be performed to locate near-surface metal objects and anomalies. This data will be evaluated to determine the need for a more intrusive investigation.

4.25 OLD FLARE TEST SITES (2) AT SOUTH END OF AIRPORT (SITE 46)

4.25.1 Data Needs

Data are needed on the type of testing conducted. The specific flare components need to be identified, and the potential for contaminant release needs to be evaluated.

4.25.2 Data Quality Objectives

The objectives of the investigation will be to determine the potential for and the types of contamination that may have resulted from past testing.

4.25.3 Technical Approach

Past testing operations at the subject site will be investigated, and the potential for releases to the environment will be evaluated. A more thorough walk over will be conducted in order to find any possible burned areas.

4.26 WOODED AREA SOUTH OF AIRPORT (SITE 47)

4.26.1 Data Needs

The main concern at the site is the potential for UXO from possible former mine or mortar testing conducted in the area. There are no records available, and the site is only identified by the round surface depressions, which may be impact craters.

4.26.2 Data Quality Objectives

The purpose of the investigation is to determine if significant quantities of UXO are present. This determination will assist the assessment of residual-explosives potential in the area. Reconnaissance-level data will be obtained from a geophysical survey of the wooded area.

4.26.3 Technical Approach

The site has reportedly been surface cleared by JPG explosives ordnance personnel. This clearance will be verified. A geophysical survey will be performed in the wooded area (comprising approximately 5 acres) in order to locate any significant concentrations of near-surface explosive ordnance left from possible mine or mortar testing.

4.27 AMMUNITION STORAGE IGLOOS SOUTH OF FIRING LINE (SITE 48)

4.27.1 Data Needs

Data on the past and present contents of the igloos are needed to evaluate the potential for a contaminant release. A visual inspection is also needed to identify specific release mechanisms and release controls.

4.27.2 Data Quality Objectives

The objective of the investigation will be to determine the potential for a contaminant release from the ammunition storage igloos. A preliminary assessment of each igloo will be conducted.

4.27.3 Technical Approach

All igloos south of the firing line will be identified, and the present and past contents of each will be investigated. Any evidence of releases from the igloos will be investigated. There are currently no plans to obtain any samples; however, if evidence of a contaminant release is observed, appropriate sampling will be recommended.

4.28 EXPLOSIVE ORDNANCE SOUTH OF FIRING LINE (SITE 49)

4.28.1 Data Needs

Data on the type and frequency of ordnance testing conducted at the sites are needed. Visual UXO clearance of the sites is also needed.

4.28.2 Data Quality Objectives

The objectives of the investigation will be to perform a preliminary assessment of the contamination potential, based on the type and frequency of testing, and to visually clear the sites for UXO.

4.28.3 Technical Approach

A file search will be performed and JPG personnel will be interviewed to determine potential locations of explosive ordnance. Visual inspections of potential locations will be performed, and recommendations for further action will be provided.

4.29 BUILDING 186, WASH RACK AND OIL/WATER SEPARATOR (SITE 50)

4.29.1 Data Needs

Data on the frequency of use and types of contaminants present at the site are needed. The sump and oil/water separator need to be inspected to determine the integrity of the construction and to determine if there is a potential for past releases of contaminants to the subsurface.

4.29.2 Data Quality Objectives

The objectives of the investigation will be to determine the release potential from the sump and the oil/water separator.

4.29.3 Technical Approach

The sump at the wash rack and the oil/water separator will be emptied, and the solid contents will be stockpiled for facility personnel to sample and dispose of. The sump and separator will be inspected for integrity, and an assessment of the contaminant-release potential will be made.

4.30 BACKGROUND SAMPLING

4.30.1 Data Needs

According to IDEM regulations for metals contamination in soil, if a particular metal exceeds three standard deviations above average background, cleanup of that metal may be required. Data are needed to establish the average background values for metals in soil at JPG. Data are also needed on background values of metals in groundwater.

4.30.2 Data Quality Objectives

The objective of the sampling will be to provide data on background metals values in soil and groundwater at JPG. Level III quality data will be obtained from near-surface soil sampling across the facility. Level III quality data will be obtained from proposed upgradient wells at sites across the facility. The samples will be analyzed for total metals content.

4.30.3 Technical Approach

Fifteen background soil samples will be collected and analyzed for total metals. Sample locations will be selected from across the area and included in the RI/FS. Wells are proposed for 13 sites. These 13 upgradient wells will provide background groundwater data. The sample data will be statistically evaluated in order to determine background values for metals in soil at the facility. The results of the statistical evaluation will then be used to determine when site-specific soil samples have exceeded three standard deviations above background and if the samples need to be analyzed for leachable metals.

5.0 RI WORK TASKS

A summary description of the various work tasks required to complete an RI/FS for the area south of the firing line at JPG is included in the Jefferson Proving Ground RI/FS Technical Plan dated September 1992.

6.0 PROJECT SCHEDULE

Table 4 is the proposed work schedule for conducting RI/FS activities at JPG in terms of work task duration. This schedule assumes the following:

- A September 28, 1992 project start date.
- A 15-working-day Army review, comment, and approval cycle for primary documents.
- A 30-working-day regulatory review, comment, and approval cycle for primary documents.
- The work scope proposed in this addendum will be combined with that proposed in Task Order 0005, and all tasks will be performed concurrently as one RI/FS.
- Final Work Plan addenda for the Task 0005 Modification sites will not be required prior to performance of field work.
- Complete evaluation of soil-sample results will not be required prior to the installation of monitoring wells.
- A risk assessment must be completed prior to writing the RI or FS reports.
- Changes in federal, state, or local laws and statutes, which affect the type and amount of data collection (e.g., additional contaminants added to the Target Compound List or promulgating more restrictive maximum contaminant levels (MCLs) for specific contaminants), do not occur during the completion of the RI.

Table 4. Work Schedule for Task Order 0005 Modification

Event	Date
Task 0005 Award Date	Sep 28, 1992
Submit Draft Work Plan Addenda	Nov 13, 1992
Start Field Investigation	Nov 16, 1992
Complete Field Effort	July 14, 1993
Submit Army Draft RI Report	Jan 18, 1994
Submit Army Draft FS Report	May 03, 1994
Submit Draft Final RI Report	Mar 08, 1994
Submit Draft Final FS Report	Jun 22, 1994
Submit Final RI Report	May 18, 1994
Submit Final FS Report	Sep 02, 1994

WBS Code	Task Name	1992		1993				1994		
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
221-5	Jefferson Proving Ground RI/FS									
221-5.01	Initial Site Visit									
221-5.02	Resource Management Plan									
221-5.03	Work Plan Addendums									
221-5.04	Asbestos Survey									
221-5.05	Field Work									
221-5.06	Remedial Investigation Report									
221-5.07	Feasibility Study on All Sites									
221-5.08	Project Management									

Figure 29. Gantt Chart of Project Schedule

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