

ATTACHMENT 12

**Inland-Fisher Guide Division
General Motors Corporation
1445 Parkway Avenue
Trenton, New Jersey 08650-1019**

ECRA Case No. 92713

ECRA SES SAMPLING PLAN

Prepared by:

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March 9, 1993

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1.0 EXECUTIVE SUMMARY

Following the announcement of the closure of the General Motors, Inland Fisher Guide Division facility at 1445 Parkway Avenue, Trenton, New Jersey, in accordance with the Environmental Cleanup Responsibility Act, (ECRA), a Site Evaluation Submission has been prepared. After a review of existing records, a soil sampling plan was deemed appropriate to address areas of potential environmental concern.

The facility covers approximately 84 acres, including a main production building covering approximately 1.1 million square feet, an oil fired, power generating plant, an industrial waste water treatment facility and various ancillary buildings. A substantial proportion of the facility is paved, with parking for approximately 2,500 vehicles.

Operations at the facility are continuing at present, with a phased transfer of individual processes planned to start during mid-1993. Much of the existing operating production equipment will either be moved to alternate facilities for continued operation or transported off site for storage. At this time it is envisioned that any future operators of the facility will use it for industrial purposes.

To provide as complete a record as possible of the information regarding the facility, all documentation is provided in the form of attachments to the Site Evaluation Submission (SES) form. A list of these attachments is included immediately following the Certification page of the SES. Attachments 1-11 provide information in response to specific questions in the SES, including copies of permits, descriptions of operations, hazardous substance and waste containment descriptions and inventory and information regarding discharges. The Sampling Plan proposal, immediately following this Executive Summary, forms Attachment 12 to the SES document and is bound separately. Due to the large volume of documentation available regarding historic sampling at the facility, particularly information addressing groundwater conditions, a summary of the historical data is provided as Attachment 13. Documentation addressing the decommissioning of underground storage tanks at the facility is provided as Attachment 14, and the reports, addressing underground storage tank and groundwater issues

are included as Attachments 15-21. A copy of the closure plan for the RCRA hazardous waste storage area forms Attachment 22.

The Soil Sampling Plan was prepared based on a review of site records, previous sampling and preliminary inspections of the facility. As discussed above, groundwater issues at the facility have been addressed extensively in reports previously submitted to the NJDEPE, culminating in the May 1991 Groundwater Impact Study Report, currently under review by the NJDEPE Division of Water Resources. A summary of previous groundwater remedial investigation activities is provided in Section 5.0 of the Sampling Plan. The information presented in the Impact Study Report identifies three sources which impact groundwater at the site. The Naval Air Propulsion Center, (NAPC), located to the north and west of the facility, is the source of the elevated trichloroethylene (TCE) concentrations in the groundwater. The former sludge drying lagoons are the likely source of select metals and the chlorobenzenes, benzene, toluene, methylene chloride and 1,1,1-TCA detected in monitoring wells downgradient of the lagoons. Historic leakage from an underground storage tank, since removed, has resulted in elevated concentrations of gasoline related compounds downgradient of the former tank location. GM believes that groundwater investigation activities have been comprehensive and characterize groundwater concerns originating at the Site. Additional remedial investigation activities for groundwater are not warranted at this time, and GM also believes that sufficient groundwater data exist to prepare a site-related Groundwater Cleanup Plan. Any further on-site groundwater investigation, if warranted, would be based on the response from the NJDEPE to the May, 1991 Impact Study and on the results of the Soil Sampling Plan. If the Soil Sampling Plan results demonstrate a new area of concern outside the area characterized in past groundwater investigations, a Groundwater Sampling Plan will be developed for these new soil areas. As such, no detailed discussion of groundwater issues or proposals for further investigation is included in this document.

Soils issues are addressed in detail in the soil sampling plan proposal, with each area of potential environmental concern, (AEC), discussed in relation to (i) historical operations at that location and (ii) a visual assessment of the current conditions. To facilitate review, the property has been divided into eleven areas, based on operational use. Within each area, the past and current uses,

including manufacturing processes and stored materials are reviewed, with a description of any potential environmental concerns. Where sampling is deemed appropriate, the number and depth of samples and the proposed analytical parameters are given. Each AEC discussion is accompanied by an area map, showing facility features and approximate sampling locations.

As noted in the General Information Submission (GIS), the ECRA trigger for the facility was the announcement by the General Motors Corporation, (GM) of their intent to cease operations at the facility. It is GM's intention to carry out a phased closure of the manufacturing operations, starting in the second half of 1993. Consequently, building interior sampling will be deferred at this time. As individual manufacturing operations are closed, removed and relocated, appropriate decommissioning in accordance with current NJDEPE policy will be performed. With respect to building interiors, as the continued use of the facility will remain commercial or industrial, closure operations will be limited to drains and subsurface impoundments.

Full details of soil sampling techniques and equipment and analytical protocol are provided in the soil sampling plan, with a schedule indicating the proposed timeframe for sampling, analysis, report preparation and a projected date for the submission of the final report to the NJDEPE.

2.0 INTRODUCTION

In accordance with the requirements and conditions of New Jersey Environmental Cleanup Responsibility Act (ECRA) N.J.S.A. 13:1K-6, the following proposed Soil Sampling Plan has been prepared. This sampling plan has been developed in order to establish baseline environmental conditions in and around the General Motors Inland Fisher Guide Division facility located in Trenton, New Jersey. The sampling plan includes a summary of known historical site operations, a description of past and present manufacturing operations conducted in specific areas of environmental concern, and a proposed investigative approach for determining what, if any impact to soils may have resulted from historical site operations.

Soils:

Proposed soil sampling activities have been based upon the results of a preliminary site inspection; meetings and discussions with GM facility management, and GM representatives; a review of plans and construction drawings for the Site; and results of previous field investigations conducted at the GM facility. All sampling activities will be conducted in accordance with the requirements outlined in the New Jersey Department of Environmental Protection and Energy (NJDEPE) Technical Requirements for Site Remediation, Proposed New Rules: N.J.A.C. 7:26E (New Jersey Register, May 1992) and the NJDEPE Field Sampling Procedures Manual (May 1992). An area by area discussion of proposed soil sampling activities, including proposed sample locations, frequency, and analytical parameters is addressed in Sections 6.0 and 7.0 of this document.

Building Interiors:

It is GM's understanding that the NJDEPE Industrial Site Evaluation Element of the ECRA program will no longer regulate building interior issues such as interior staining, surface contamination, and asbestos unless the property in question is going to be sold for residential use. Information provided by corporate GM representatives indicates that projected future site use will remain commercial or industrial. It is anticipated that GM will continue current plant

operations until December 1993. Consequently, building interior sampling will be deferred at this time. Phased building closure plans will be developed however, coincident with the cessation of all plant manufacturing operations. Elements of the closure plans shall include provisions for identifying and investigating potential areas of environmental concern in accordance with the Department's Technical Requirements for Site Remediation. Closure plans will be submitted to NJDEPE for evaluation and approval prior to implementation of proposed investigative and closure activities.

3.0 FACILITY DESCRIPTION AND HISTORY

3.1 SITE LOCATION AND DESCRIPTION

The Inland-Fisher Guide Division of General Motors (GM) is located at 1445 Parkway Avenue in Ewing Township, Mercer County, New Jersey (Figure 3.1).

The total land area of the Inland-Fisher Guide facility is approximately 83.84 acres (Appendix 1). The facility is bound to the west by the New York Division - Delaware & Bound Brook Railroad; to the south by the Trenton Branch - Delaware & Bound Brook Railroad; to the north by Parkway Avenue and the United States Naval Reservation; and to the east by Sylvia Avenue. Structural development (Figure 3.2) is generally limited to the southern and western portions of the property. The main structure present on the property is the manufacturing building, which occupies the northwestern quarter of the property. This building contains approximately 1 million square feet of space. The facility's administrative offices are located in the northernmost portion of the building, while the remainder of the building houses the manufacturing operations.

Two smaller structures near the southwest corner of the manufacturing building serve as the facility's company vehicle garage and paint storage building. Located near the southeast corner of the manufacturing building, the maintenance building houses the facility's support services and is also used for receiving.

The facility's power plant is located to the east of the manufacturing building, along with the associated fuel tanks and cooling towers. The power plant uses #6 fuel oil to generate steam for the facility.

Three small structures located to the north of the power plant house the gas meters, bottled gas storage area, and electrical switches, respectively.

The facility's wastewater treatment plant is located on the southern portion of the property. All industrial process wastewater generated at the facility is routed to the plant via underground

process sewers where it is pre-treated prior to discharge to the Ewing-Lawrence Sewerage Authority (ELSA) located on White Head Road. The plant includes an oil water separator, sludge settling tanks, waste treatment tanks, and a small structure used for operation of the wastewater treatment plant.

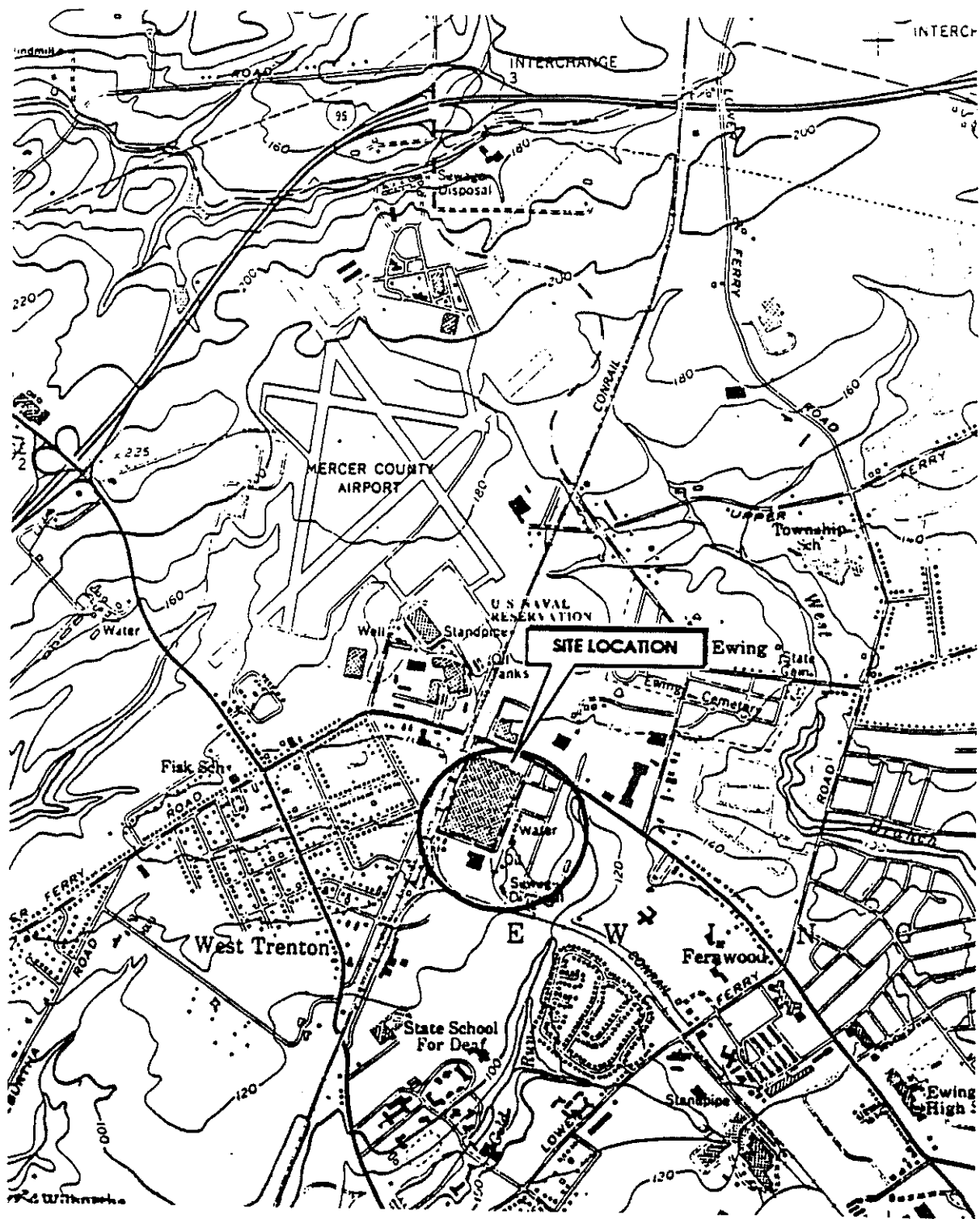
The facility's hazardous waste drum storage area is located between the wastewater treatment plant and the #6 fuel tanks. This area is surrounded by a concrete berm with chain link fencing. Additional raw material drum storage areas were located to the south and east of the maintenance building but have since been relocated to inside the building. Storage of miscellaneous materials is conducted near the drum storage area in an open lot to the south of the maintenance building.

Four paved parking areas are located on the property. A small parking lot is located at the northwestern corner of the manufacturing building, adjacent to Parkway Avenue. The South Parking Lot, located to the south of the manufacturing building, has a total capacity of 406 cars. The East Parking Lot, located to the east of the manufacturing building and to the north of the power plant, has a capacity of 428 cars. The Power House Parking Lot, located to the east of the power plant and to the north of the wastewater treatment plant, has a total capacity of 1,540 cars.

Rail spurs connected to the Trenton Branch of the Delaware and Bound Brook Railroad enter the southern portion of the property in two locations and enter the manufacturing building at its southeast and southwest corners.

Four inactive sludge drying beds are located on the southeastern portion of the property, covered with top soil. These sludge drying beds were previously operated in association with the wastewater treatment plant.

Gold Run Creek flows through the eastern portion of the property from north to south, including a small dammed section, located at the northeast corner of the property. The remainder of the undeveloped eastern area of the property is characterized by deciduous wooded areas.



SOURCE: USGS QUADRANGLE (PENNINGTON, NJ)



FIGURE 3-1

SITE LOCATION MAP

FISHER GUIDE DIVISION, GENERAL MOTORS CORP.,
EAST TRENTON, NEW JERSEY



McLAREN/HART
ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY

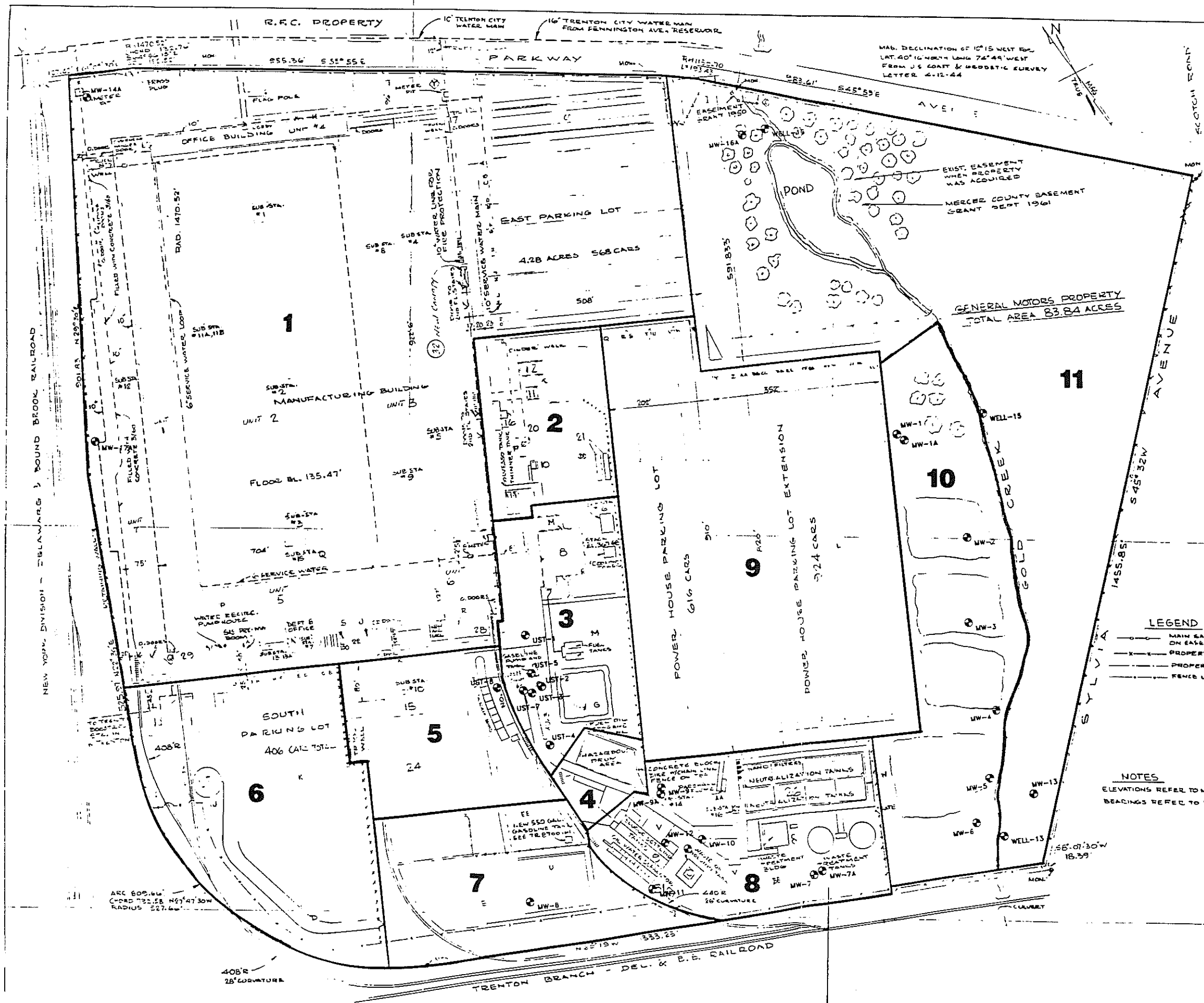
DRWN: B.R.F.

CHK'D: E.C.

JOB#: 12-0800773-001

DATE: 02/04/93

SCALE: 1" = 2000'



UNIT (NO.)	DESCRIPTION	FLOOR AREA (SQ. FT.)
1	MAIN BUILDING - MFG. TOOL ROOM	70,000
2	MAIN BUILDING - MANUFACTURING AREA	368,770
3	MAIN BUILDING - MFG. & SHIPPING AREA (2 STORIES)	359,850
4	MAIN BUILDING - OFFICES	36,780
5	MAIN BUILDING - SOUTH EXTENSION (WEST)	66,127
6	MAIN BUILDING - SOUTH EXTENSION (EAST)	51,600
7	MAIN BUILDING - RECEIVING AREA	80,800
8	POWER HOUSE	26,000
9	SLUDGE SETTLING TANKS	120
10	GAS METER HOUSE	576
11	PROPANE STORAGE BUILDING	760
12	PRIMARY SWITCH HOUSE	1,724
13		
14	GARAGE (COMPANY CARS & TRUCKS)	3,380
15	SALVAGE BUILDING	6,574
16	TRUCK SCALE HOUSE (REMOVED)	15
17	EAST GATE HOUSE	57
18		
19	PAINT STORAGE BUILDING	4,360
20	WATER STORAGE TANK	
21	30,000 GAL. PROPANE STORAGE (ONE NEW, ONE PROPOSED)	
22	DEION BUILDING (CLOSED)	1,800
23	200,000 GAL. WATER STORAGE TANK (GRAVITY FEED)	
24	STORAGE BUILDING	40,000
25		
26	ACID SEWAGE HOLDING TANKS (150,000 GALS. EACH)	
27	SUB-STATION NO. 16	533
28	PLASTER SOLUTION STORAGE BLDG.	4,150
29	ZINC RECLAIM BLDG.	4,490
30	CHLORINE GAS STORAGE AREA (CLOSED AREA #1)	
31	OIL-WATER SEPARATOR	
32	EAST ENTRY CANOPY	675

FF	OIL-WATER SEPARATOR	4,490
EE	ADDED 550 GAL. GAS TANK	
DD	ADDED NEW PROPANE	11,747
CC	ADDED NEW PARKING AREA	14,175
BB	WASTE TREATMENT BLDG. ADDED	7,177
AA	NEW PARALLEL FLUME	
Z	NEW WASTE TREATMENT TANKS	
Y	NEW SIDEWALK & MOVED FENCE	7,017
X	NEW SOUTH ENTRANCE	2,214
W		
V	WAS 20' OF THE EXISTING INCURVED	3,541
U	SLUDGE DRYING BEDS REMOVED	3,541
T	RELOCATION SUB #6	14,175
S	CHLORINE STORAGE (CLOSED AREA #1)	10,167
R	SOLUTION STORAGE BLDG.	1,747
Q	ZINC RECLAIM BLDG.	4,490
P	ADDED SUB #15	2,174
O	REDESIGNED TANK & WATER RECL.	2,174
N	NEW CRANE ADDED	1,747
M	INDUSTRIAL WASTE TREATMENT FACILITY	1,747
L	POWER HOUSE ADDITION & FUEL TANKS ADDED	3,490
K	WAS 280 CARS IN ON DRAINAGE LOT EXTENSION	11,747
J	REVISED SOUTH PARKING LOT	14,175
I	ADDED DEION BLDG. & 200,000 GAL. TANK	11,747
H	ADDED EASEMENT & CHANGED TOTAL AREA	2,174
G	BEARINGS CHANGED TO CORRESPOND WITH RELOCATION IN PROPERTY FILE	2,174
F	ADDED FUEL OIL STORAGE TANK TO SUB #6	1,747
E	ADDED SANITARY SEWER OFF RESEARCH & DEVELOPMENT	1,747
D	REDESIGNED TANK & WATER RECL.	1,747
C	ADDED SOUTH PARKING LOT	14,175
B	ADDED PARKING LOT & EXISTING FENCE	11,747
A	POWER HOUSE BUILDING LOT & REVISED	1,747
	NEW FENCE AREA ADDED	11,747

FIGURE 3.2

FACILITY PLAN SHOWING AREAS 1-11

FISHER GUIDE DIVISION, GENERAL MOTORS CORP., EAST TRENTON, NEW JERSEY
ECRA CASE #92713

McLAREN/HART
ENVIRONMENTAL ENGINEERING CORP.

DRWN: B.R.F. CHK'D: E.C.
JOB#: 12-0800773-000 DATE: 02/08/93

Surface runoff is collected in storm drains across the property which direct the stormwater to discharge points in Gold Run. Sanitary wastewater is channeled to the ELSA sewer in Parkway Avenue. As mentioned above, all process wastewater is pre-treated on-site prior to discharge to the ELSA sewer.

3.2 SITE HISTORY

The following information regarding the Site History of the Inland-Fisher Guide division of General Motors was obtained from the Groundwater Impact Study Summary Report prepared by Lawler, Matusky & Skelly Engineering Consultants (LMS) dated May 1991.

The GM Trenton Plant was constructed in 1937 and started manufacturing operations for the old Ternstedt Division in 1938. The plant produced one product, automotive window regulators for Fisher Body. Manufacturing operations included metal stamping and fabrication. During the period 1942-1945 the Trenton Plant stopped all automotive hardware production when, for wartime purposes, five area GM plants were recast into Eastern Aircraft Corporation. The plant re-tooled and produced 7,546 Avenger Torpedo Bombers during World War II. During this time the plant was operated by the Eastern Aircraft Corporation.

After the conclusion of World War II, the plant was returned to the Ternstedt Division, which operated from 1945-1968. The manufacturing operations were expanded to include window regulators, door handles, seat adjusters, and vent windows. Processes included metal stamping, plating (copper, nickel, and chrome), and painting operations.

In 1968 the Ternstedt Division was merged into Fisher Body. Manufacturing operations were expanded to include aluminum anodizing and plastic injection molding. Additional painting operations were added to paint plastic products, aluminum products, and seat adjuster components.

In 1970 there was a major production shift with the design elimination of the automobile's vent window. The loss of the vent window eliminated half of the zinc die cast operations, which

resulted in the subsequent closure of several of the platers. The available floor space was filled with PVC plastic extruders used to manufacture body side moldings.

In 1976 aluminum fabrication and anodizing were consolidated by Fisher Body; these components of the Trenton Plant's operations were transferred to the Columbus, Ohio, plant. Consequently, Trenton's aluminum anodizer and associated paint area were shut down. Encapsulated glass operations were assigned to the manufacturing floor space.

Fisher Body was merged with the Guide Lamp division of GM to form Fisher Guide in 1984. Subsequently, the electrostatic paint operation was shut down in 1988 as a result of the designed phase-out of the interior paint moldings operation. An ELPO primer and powder paint operation replaced the former electrostatic paint operation. The most recent addition to the Trenton Plant's manufacturing processes is the bi-laminate roll form and extrusion process. This process consists of an aluminum or stainless steel sheet being roll formed and coated with PVC in one operation. The bi-laminate roll form and extrusion process was initiated in 1986 and continues to this day.

Fisher Guide was merged with the Inland division of GM to form Inland Fisher Guide (GM) in 1989. No major changes to plant operations occurred as a result.

3.3 PREVIOUS INVESTIGATIONS

Previous environmental investigations conducted at the GM facility include the following:

- **INSTALLATION OF MONITORING WELLS AT THE FISHER GUIDE DIVISION GM PLANT**, by Lawler, Matusky & Skelly Engineers, April 1986.
- **GROUNDWATER MONITORING WELL INSTALLATION**, Wells near Powerhouse, by O'Brien & Gere, June 1988.
- **UNDERGROUND STORAGE TANK INVESTIGATION - PHASE 2**, by Roy F. Weston, Inc., June 1988.
- **UNDERGROUND STORAGE TANK INVESTIGATION - PHASE 3**, by Roy F. Weston, Inc., May 1989.

- GROUNDWATER REMEDIATION PLAN, by Roy F. Weston, Inc., June 1989.
- PUMP TEST AND AQUIFER ANALYSIS, by Roy F. Weston, Inc., November 1989.
- GROUNDWATER IMPACT STUDY SUMMARY REPORT, by Lawler, Matusky & Skelly Engineers, May 1991.
- SOIL SAMPLING AND ANALYTICAL PLANS FOR RCRA CLOSURE OF HAZARDOUS WASTE UNITS, by IFG Trenton, December 4 and December 21, 1990.
- RCRA CLOSURE PLAN FOR HAZARDOUS WASTE MANAGEMENT UNITS, by IFG Trenton, March 13, 1991.

Each of these investigations is summarized below.

3.3.1 Installation of Monitoring Wells at the Fisher Guide Division GM Plant, by Lawler, Matusky & Skelly Engineers, April 1986

On March 5, 1986, 12 monitoring wells were drilled to the competent bedrock (12-20 feet). The wells were installed in response to NJDEPE requirements related to GM's NJPDES Permit #NJ0053295, later changed to NJ0075469. Continuous split spoon samples were collected during the drilling. The screened interval in each well was designed to extend from 5 feet above the measured water level to the bottom of the borehole. Flush-joint 4-inch diameter PVC casing and 20-slot well screen were used to construct the wells. Protective steel casings were installed (3-foot stickups) and the well number and NJDEPE well permit number were stamped on each protective casing. Each well was developed for at least one hour in accordance with the NJDEPE specification for construction of unconsolidated monitoring wells. Sampling was not conducted at the time of installation.

3.3.2 Groundwater Monitoring Well Installation, Wells near Powerhouse, by O'Brien & Gere, June 1988

This well installation program, conducted as a requirement of GM's NJPDES Permit #NJ0053295, consisted of installation of 4 bedrock monitoring wells. A proposed overburden well was subsequently deleted from the program due to lack of overburden groundwater in the proposed area. The bedrock well design included installation of 6-inch steel casing through the

overburden, grouted in place at a depth of 10 feet into the bedrock. Sampling was not conducted at the time of installation.

3.3.3 Underground Storage Tank Investigation - Phase 2, by Roy F. Weston, Inc., June 1988

In October 1987, GM completed tank closure activities for a 4,000-gallon underground gasoline storage tank. Post-excavation soil sampling results indicated the presence of gasoline constituents exceeding NJDEPE action limits for soils. Based on analytical results for soil samples collected during tank closure activities, a Phase 2 groundwater investigation was completed.

Phase 2 investigative activities included the installation of four bedrock monitoring wells, one upgradient and three downgradient of the former location of the tank. The wells were sampled for petroleum hydrocarbons (TPH), benzene/toluene/ethylbenzene/xylene (BTEX), and total lead. The purpose of the Phase 2 Investigation was to further delineate the area of concern and to make recommendations for remediation. The results of the investigation indicated that the primary area impacted by the former leaking underground storage tank (LUST) was within 75 feet of the former LUST's location. Based upon the results of the investigation, Weston recommended resampling of two wells to confirm the BTEX results and acquire volatile organic compound (VOC) concentration information. Installation of a groundwater recovery and air stripping system to remediate the area was also recommended. The Underground Storage Tank Investigation - Phase 2 Report was submitted to NJDEPE on July 12, 1988.

3.3.4 Underground Storage Tank Investigation - Phase 3, by Roy F. Weston, Inc., May 1989

As a result of the Phase 2 investigation, the NJDEPE required additional wells to determine the vertical and areal extent of contamination prior to development of appropriate remedial activities. Five additional monitoring wells were installed. The wells included 2 shallow monitoring wells (20 feet deep), 2 bedrock wells (40 feet deep), and 1 deep bedrock well 125 feet deep). NJDEPE required GM to sample all new and previous wells and analyze them for BTEX, TBA, MTBE, 1,2-dichloroethane, methanol, petroleum hydrocarbons, and total lead.

The Phase 3 Investigation indicated that the vertical extent of contamination was up to 80 feet below grade. Weston recommended that additional investigations be conducted in the area, including quantification of site-specific hydraulic conductivity, in order to finalize a design for a groundwater recovery and remediation system. The Underground Storage Tank Investigation - Phase 3 Report was submitted to NJDEPE on May 11, 1989.

3.3.5 Groundwater Remediation Plan, by Roy F. Weston, Inc., June 1989

The Groundwater Remediation Plan was developed by Roy F. Weston, Inc. for GM in response to exceedances of groundwater limits specified in the facility's NJPDES Discharge to Groundwater (DGW) permit (#NJ0053295), detected during routine quarterly groundwater monitoring, the results of which were submitted to NJDEP on May 3, 1988. NJDEP required that GM develop and submit a groundwater remediation plan for several areas near the property boundaries as part of their "conditionally acceptable" rating of the facility. The plan summarized the groundwater sampling which had been completed at that time and estimated the horizontal extent of contamination in the overburden.

As part of the plan, Weston proposed a study to determine the extent of impact to the groundwater which included installation and sampling of additional wells, a pumping test, and sampling of surface water and sediment.

3.3.6 Pump Test and Aquifer Analysis, by Roy F. Weston, Inc., November 1989.

During the week of October 9, 1989, Roy F. Weston, Inc. conducted a pump test based on the Phase 3 Underground Storage Tank Investigation Report. The investigation included measurement of background static water levels for a period of 37 hours, completion of a step-drawdown test, completion of a constant pumping rate test, and completion of a recovery test. The activities were completed to obtain information to design a groundwater recovery system and support the groundwater recovery and treatment recommendations outlined in the Groundwater Remediation Plan. Based upon the flow conditions and levels of contaminants in the groundwater, Weston recommended that an air stripper be used for remediation. Weston recommended that a performance test be conducted upon completion of the remediation system

to assure optimum operation. Time series sampling was also recommended to evaluate the effectiveness of the recovery system.

3.3.7 Groundwater Impact Study Summary Report, by Lawler, Matusky & Skelly Engineers, May 1991.

A Groundwater Impact Study was conducted by Lawler, Matusky & Skelly Engineers (LMS) at the request of GM. The report summarized most of the previous groundwater investigations by other contractors. The document considers that all discovered groundwater problems are associated with three probable source areas, including:

- UST Area
- Sludge Impoundment Area
- Naval Air Propulsion Center.

LMS tabulated the data from all MW wells and listed the average, minimum, and maximum concentrations by individual compound for each well. LMS concluded that TCE and DCE are from off-site source (Naval Air Propulsion Center), since MW-4 through 7 don't contain these compounds yet have the highest concentrations of compounds attributable to the Sludge Drying Beds. LMS stated that barium, manganese, and copper are naturally present in the groundwater. Arsenic, cadmium, lead, nickel and zinc have been detected in most of the wells above background levels. LMS concluded that significant interaction occurs between the Site's groundwater and Gold Run. The Groundwater Impact Study Report was submitted to NJDEPE on August 12, 1991.

3.8 SOIL SAMPLING AND ANALYTICAL PLANS FOR RCRA CLOSURE OF HAZARDOUS MANAGEMENT SITES, December 4 and December 21, 1990; CLOSURE PLAN FOR HAZARDOUS WASTE MANAGEMENT UNITS, March 13, 1991.

In order to delist the GM Trenton plant from an approved TSDF facility status to a "less than 90 days" generator status, GM initiated a RCRA closure of all hazardous waste management units operated at the facility. These units included:

- hazardous waste drum storage area;
- (3) aboveground dichlorobenzene solution storage tanks;
- 30,000-gallon underground waste oil storage tank;

A certification document pertaining to the completion of all waste removal and structure decontamination activities was prepared by GM and submitted to NJDEPE on March 27, 1992. As detailed below, the certification excluded actions to be performed for soil sampling and soil remediation activities.

All closure activities were conducted in accordance with the above referenced soil sampling and analytical plans and the closure plan with the following exception. As approved by NJDEPE, proposed soil sampling activities in the vicinity of the former waste oil UST have been deferred until demolition of the primary wastewater treatment unit is complete.

Results of the soil sampling investigation conducted around the hazardous waste drum storage area have revealed the presence of elevated base neutral and/or metals concentrations. NJDEPE has stated that based on results of the soil sampling investigation, remediation of the area will be required. It is GM's understanding that the project has been referred to the NJDEPE site remediation program. GM anticipates implementing all necessary remedial action measures after receiving further direction from NJDEPE.

Finally, NJDEPE has delisted the dichlorobenzene tanks from hazardous waste facility status, however, a complete delisting of the hazardous waste drum storage area and the waste oil UST will be contingent upon the completion of all soil sampling and remediation activities deemed necessary.

4.0 ENVIRONMENTAL SETTING

The following information regarding the Environmental Setting of the Inland-Fisher Guide division of General Motors was obtained from the Groundwater Impact Study Summary Report prepared by Lawler, Matusky & Skelly Engineering Consultants (LMS) dated May 1991.

4.1 SITE TOPOGRAPHY AND DRAINAGE

The GM facility is located in Ewing Township, north of Trenton, New Jersey. The Site is located in a fluvial drainage basin to the north and east of the Delaware River. The watershed general topographic dip and stream flow are all south to southwest. This region exhibits generally subdued relief and low topography (e.g., 50 to 350 ft of elevation). Land use ranges from moderate to intense development, especially near the major highways and rail rights-of-way. Two streams, the Shabakunk and Gold Run Creeks, provide surface drainage for the area in the vicinity of GM. Both streams flow towards the south and west and terminate in the Delaware River. Gold Run enters GM's property from the north by way of a culvert beneath Parkway Avenue. Gold Run flows south-southwest through GM's property and separates the developed portion of the Site to the west from that which is undeveloped to the east.

Mercer County includes parts of two geomorphic provinces: the Piedmont lowlands and the Atlantic coastal plain. The contact between these two provinces is identified by a ridge of Paleozoic and Precambrian metamorphic rocks that outcrop well south of the Site and along the banks of the Delaware River. The ridge is exposed at the falls (i.e. the fall line) at Trenton.

4.2 SITE GEOLOGY

4.2.1 Surficial Soils

Surface and near-surface soils at this Site are reported to be mixed "cut and fill" of undefined identity and composition. In addition to fill material obtained from local sources, these soils are likely to include local soils that have been reworked by construction activities. The original soils

on-site and/or the local sources of fill probably consisted of deeply weathered, well-drained upland soils. GM's boring logs show that the native soils, where undisturbed, comprise the uppermost 1-2 ft of unconsolidated sediment on-site. In general, the soil horizon is least disturbed in the northern and eastern portions of the Site in the vicinity of Gold Run. By comparison, the heavily reworked areas within the southern and central portions of GM's complex contain as much as 4-10 ft of mixed fill, soil, and overburden sediments.

The Mercer County New Jersey Soil Conservation Service identifies the local soil types as Sassafras and Matapeake soils (Tedrow [1986] uses the name Galestown for Matapeake). Regardless of their nomenclature, these soils were developed from preexisting fluvial and glacial outwash sediments. The uppermost sandy facies of these sediments were reworked and developed into the Sassafras soils. The finer-grained sediments associated with the generally broad, flat, and periodically flooded areas developed the Matapeake (or Galestown) soil cover.

Both the Sassafras and Matapeake soils are generally well-drained. The shallow horizons of the Sassafras display permeabilities of up to 2 in./hr (=1500 ft/yr). The deeper Matapeake soils display significantly lower permeabilities of ≤ 0.2 in./hr (=150 ft/yr). Barriers to infiltration into the underlying overburden and/or bedrock are unknown and/or undescribed for these soils. Given the well-drained and generally permeable nature of these soils, they are likely to provide significant recharge to the overburden groundwater beneath them.

4.2.2 Overburden Geology

Overburden geology in the vicinity of GM is reported to include a complex mix of preglacial riverine and floodplain deposits. These unconsolidated sediments include interbedded fluvial sandy silts and clays, sands, and gravels, which unconformably overlie bedrock of Triassic age. A thin (1-4 ft thick) zone of loose, heavily weathered and highly permeable sandstone is present between the base of the overburden sediments and the top of competent bedrock in most areas.

The fluvial overburden sediments observed beneath GM have been investigated and mapped by Bowman and Lodding (1969), Minard and Rhodehamel (1969), and Owens and Minard (1962,

1975). Outwash sands and gravels are found to the south and west of GM, and are associated with deglaciation. They were deposited by meltwater streams flowing usually generally southward from the receding glaciers (Owens and Minard 1975). The fluvial sediments are those associated with interglacial or preglacial time, when streams other than those produced by glacial meltwater were depositing sediment in a subaerial environment.

LMS' review of the available boring logs from GM confirms the fluvial description of these sediments provided in previous work (Bowman and Lodding 1969; Minard and Rhodehamel 1969; Owens and Minard 1962, 1975). The fluvial origin of the overburden material observed at GM is supported by the lithology and stratigraphy. The observed (and inferred) presence of erosional stream channels within and along the bedrock surface also supports a fluvial origin. LMS' review of GM's boring logs suggests the presence of a north-south trending buried stream channel (or erosional surface on top of competent bedrock or fracture) in the center of the Site beneath the approximate location of the UST area. Buried stream channels are also reported to exist to the south and west of GM (Owens and Minard 1975). The potential effect of such features on the hydrogeologic character of the Site is to emphasize groundwater flow volumes through these channels.

The overburden sediments observed at GM strongly reflect the composition of the bedrock beneath them. The Stockton Formation beneath the Site is comprised of arkosic, hematite-stained sedimentary rocks of Triassic age. As the layer of fluvial overburden material overlying the Stockton is relatively thin, the initial hypothesis, based upon a knowledge of soil development, would be that it is likely to reflect a mineral composition similar to that of the Stockton. The lithology of the overburden sediments noted in GM's boring logs confirms this hypothesis. The unconsolidated deposits observed at GM have been termed Tar2, (e.g. Tertiary [age] Arkose [composition] No. 2) by Owens & Minard (1975).

4.2.3 Bedrock Geology

The uppermost bedrock unit beneath the overburden of the GM Site and its immediate surroundings has been identified through previous investigations as the Stockton Formation (LMS

1987; O'Brien & Gere 1987; Weston 1988a; Weston 1988b; Weston 1989a; Weston 1989b; Weston 1989c). The Stockton Formation is part of the larger Newark Group of Triassic-aged sedimentary rocks which originated within the depositional system of an ancestral stream system draining an upland to the southeast (Widmer, 1964). The Stockton Formation consists of "cycled" strata of fine-to-medium grained sandstones, coarser-grained sandstones and conglomerates, and finer-grained siltstones and mudstones (shales). However, strata of conglomerates and cemented coarse-grained sandstones are not as common as the other lithologies within the Stockton Formation. The strata of the Stockton Formation (as well as other formations in the Newark Group) are typified by their nearly homogenous rust to deep red-brown coloration caused in part to hematite (iron) staining. However, some Stockton-age subunits exhibit the blue-green coloration indicative of copper staining. While the iron-rich staining is dominant in the Stockton observed at GM, the boring advanced for MW-17A (as well as for several previous borings) encountered 1-2 ft of copper-stained strata. Therefore, it is not likely that background concentrations of iron and copper may be present in the Site's soils and groundwater (Degens 1965).

The Stockton Formation occurs as outcrops and bedrock as far north of GM as Rockland County, New York, and south to its contact with the ridge of Paleozoic and Precambrian metamorphic rocks found along the Delaware River. LMS' review of boring logs for monitoring wells completed into the bedrock at GM has shown that fine-to-medium grained sandstones and shales dominate the strata of the Stockton Formation observed on-site. GM's boring logs show that approximately 1-4 ft of relatively soft, heavily weathered and fractured sandstone overlies the "competent" bedrock surface, as indicated by the refusal of split spoons. The transition from fractured to competent bedrock in the subsurface is typically marked by a compositional change from the sandstone to harder, finer-grained siltstone and mudstone strata.

At the GM Site, the competent bedrock surface slopes from the northwest (≥ 132 ft of elevation near MW-14 and MW-17A) to the southeast (≤ 98 ft of elevation near MW-13, MW-15, and MW-15A). LMS's evaluation of bedrock elevation data has revealed the presence of an unknown feature on the bedrock surface beneath the central portion of the Site. This feature coupled with the spatial distribution of selected groundwater contaminants identified during

previous sampling investigations suggests the presence of a structural irregularity which has a controlling effect on overburden groundwater flow parts. Irregularities in the bedrock surface geometry beneath the Site can be attributed to both the large-scale structural deformation of the Stockton Formation and the localized effects of fluvial sculpturing on the varying lithologic character (particularly hardness) of the uppermost strata of the Stockton Formation.

The Stockton Formation plunges at low angles under the Lockatong Argillite Formation to the north and west. The Stockton and the Lockatong formations are both deformed and dip in that direction, although the angles of dip vary depending on degree of structural deformation. The bedding planes in the Stockton beneath GM dip to the northwest at ≈ 8 to 10° (Widmer 1965). It is noteworthy that the dip of the bedding planes is in the opposite direction of the slope of the competent bedrock surface, which is towards the southeast.

4.3 SITE HYDROGEOLOGY

Two groundwater-bearing zones have been identified beneath GM. The uppermost saturated zone occurs in the overburden and the second occurs in the underlying Stockton Formation. The overburden groundwater is unconfined; however, some of the monitor wells (e.g., MW-1, MW-8, and MW-9) installed on-site are either intermittently or typically dry. Therefore, groundwater occurrence at water table conditions in the overburden is nonuniform. The groundwater in the Stockton Formation is found to be under semi-confined conditions as indicated from water level measurements taken from well couplets (MW-1 and MW-1A, MW-7 and MW-7A, MW-9 and MW-9A, and MW-15 and MW-15A). Previous hydrogeologic investigations of the GM Site have been conducted since 1986 (LMS 1986; LMS 1987; O'Brien & Gere 1987; Weston 1988a; Weston 1988b; Weston 1989a; Weston 1989b; Weston 1989c). Information on the location of the existing monitor wells on-site is shown on the Site plan provided in Appendix 1.

4.3.1 Overburden Hydrogeology

Overburden sources of groundwater have generally not been developed for commercial, industrial, or domestic use anywhere in Mercer County (Widmer 1965). As mentioned above,

unconfined groundwater is found to be absent or sporadically absent in some overburden wells which are installed just above bedrock. Previous investigations have suggested that groundwater occurs in overburden sediments where thickness exceeds 10 ft (Weston 1989c). Previous work has suggested that the net flow direction of overburden groundwater is to the southeast under a horizontal gradient of ≈ 0.02 ft/ft (Weston 1989a). However, Weston (1989b) noted a southward component of flow in the vicinity of the UST area. Based on LMS' investigation of Gold Run and the observations noted above, the ≈ 0.02 ft/ft horizontal gradient calculated by Weston (1989a) may be valid only for its period of observation. LMS' work suggests that pronounced groundwater flow in the overburden is "episodic" in response to meteorological forcing. Furthermore, flow conditions in the overburden vary beneath different portions of the Site. Contour maps prepared by LMS utilizing "Surfer" computer software indicate that a clear flow direction from west to east can be discerned across the southern half of the Site.

For contour maps prepared exclusively for the southern half of the Site, a southward component to groundwater flow direction has become more apparent. This feature is consistent with the topographic trend for the area, of decreasing elevation to the southeast.

A definite anomaly in the water table surface however is indicated beneath the southeastern corner of the Site. It is propagated by the depressed water level (relative to the adjacent wells) in MW-2. To the west and east of MW-2 (at MW-3 and MW-15, respectively) the water table has been measured at elevations which are approximately seven feet above competent bedrock. At MW-2 the water table was measured as being less than one foot above the competent bedrock surface. Previous rounds of water level readings are consistent with this result.

A fracture zone or otherwise highly permeable portion of the bedrock is indicated, a zone which provides a conduit for overburden groundwater either to deeper levels, or simply southward via a channelized flow path in the bedrock surface.

A similar feature is indicated at MW-10, -11, and -12, in that the water table is within approximately one foot of competent bedrock, whereas to the west and east (MW-8 and MW-7,

respectively) the water table is between five and ten feet above bedrock. The flow direction is from northwest to southeast and the above mentioned anomalies are quite apparent.

LMS' review of the existing data on water level measurements, coupled with the continuous water level measurements obtained during its investigation of the interaction of the groundwater system with Gold Run, indicates that there are strong meteorological effects on the occurrence and movement of groundwater in the Site's overburden. It has been determined, based on LMS' review of GM's boring logs, water level data, and our field observations made during the installation of the new monitoring wells that overburdening groundwater flow paths utilize the weathered zone on top of bedrock, as well as the lower portion of the overlying fluvial deposits. This observation implies that there are also strong structural constraints on the occurrence and movement of overburden groundwater. This latter observation is consistent with LMS' interpretations of the Site's hydrogeology.

Based on LMS' observations noted above and its evaluation of groundwater data, the overburden groundwater has been found to move in discreet pathways and not as a uniform surface. Groundwater in the Site's overburden appears to occur and migrate as two channels that flow along the competent bedrock surface towards the south (through the central portion of the Site) and towards the southwest corner of the Site, respectively. This interpretation is consistent with the observations of previous investigations (Weston 1989b; Weston 1989c). The unexplained subsurface feature in the central portion of the Site (noted above) appears to confine and/or direct the occurrence and migration of overburden groundwater.

4.3.2 Bedrock Hydrogeology

Widmer (1965) has identified the Stockton bedrock as the only major source of potable groundwater in the county. However, naturally occurring (background) concentrations of total dissolved solids (TDS) and other inorganic parameters such as iron, manganese, copper, and barium, as well as the relatively low yields observed for local bedrock wells may restrict its use as an aquifer in the area (Brobst 1965; Degens 1965; Widmer 1965). Based on the observed (average) concentrations of TDS alone (≥ 500 ppm), groundwater in the Stockton bedrock

beneath GM should be classified as Class GW3 under N.J.A.C. 7:9-6.5 Ground Water Designated Uses and Quality Criteria. N.J.A.C. 7:9-6.5 (d) states that Class GW3 groundwaters "shall be suitable for conversion to fresh potable waters or other beneficial uses." In addition, the average concentrations of manganese (1580.59 ppb), copper (12.52 ppb), and barium (556.67 ppb) in bedrock groundwater (which are expected to be largely attributable to natural background conditions), further limit the usefulness of bedrock groundwater in the area. These observations may explain why industries in the area (including GM) use potable waters supplied by the City of Trenton.

Groundwater occurs in the Stockton as a function of the secondary porosity of its sandstone, siltstone, and conglomerate strata. The secondary porosity of these strata is gained from their fractures, joints, and solution cavities, as well as partings along their bedding planes (Weston 1989c; Widmer 1965; Freeze and Cherry, 1979). Well yields in the Stockton have been estimated at a maximum 15 gallons per minute (gpm) (Widmer 1965). However, the observed yields of GM's bedrock wells have been estimated to be much lower (1-2 gpm).

The potentiometric surface of the bedrock groundwater slopes toward the southeast. Supporting data collected during LMS's investigation has illustrated the increased head that bedrock groundwater is subject to, thus supporting the conclusion that the bedrock groundwater occurs under confined conditions (Freeze and Cherry, 1979).

Vertical gradients between the bedrock and overburden groundwater bearing zones have been discerned from the different head measurements obtained from well couplets, e.g. MW-1 and MW-1A (0.03 ft/ft downward). MW-7 and MW-7A (0.08 ft/ft downward) and MW-15 and MW-15A (1.32 ft/ft upward). Driscoll (1986) cites "leaky" confined conditions for some formations. In this scenario, groundwater confined between relatively impermeable strata and subject to greater than atmospheric pressure leaks slowly into or out of the unit via sporadic fractures or intergranular voids. The confining strata are impermeable enough to limit overall groundwater flow upwards under head, but do allow for the transmission of small quantities of water. LMS has determined, based upon observations, that this type of system is in effect at GM.

It is interesting to note that a transition from a slight downward vertical gradient west of Gold Run to a strong upward vertical gradient east of Gold Run occurs on-site. This observation lends support to the inference that Gold Run follows a north-south trending normal fault or extensive fracture system. This zone of increased fractures provides the conduit for bedrock groundwater (under pressure) to rise above the level of groundwater in MW-15. Interaction of the bedrock groundwater system with Gold Run was suspected by Weston (1989c), but was unproven until the LMS study. Inasmuch as groundwater in MW15A (adjacent to Gold Run) has at least 16 ft of head and the confined aquifer is a leaky one, interconnection of the bedrock aquifer and Gold Run is implicit.

Observations of locally varying strike/dip in the Stockton and the variation of the Stockton's strike beneath GM, are indicative of structural deformation (Widmer, 1965). Structural deformation and post-depositional stress-jointing (as is common in Newark Group rocks) of the Stockton may locally enhance its vertical hydraulic conductivity (Widmer, 1965). This jointing probably occurred contemporaneously with the normal faulting of near-surface rock units which commonly occurred in the eastern United States during the Triassic. However, the degree and spatial variation of both lateral and vertical interconnections in the bedrock beneath GM are not fully known.

Strong hydraulic connection was not observed among most bedrock wells during a pump test conducted by Weston (1989b). However, the observed migration on-site of groundwater contaminants as well as the interconnection between monitor wells UST-2 and UST-8 observed during the pump test (Weston, 1989b), reinforce the inference that some horizontal interconnections exist in the Stockton beneath GM. In contrast, the observed lack of interconnection of UST-2 with other UST monitor wells during this pump test indicates that there is substantial spatial variation of the degree of interconnection among bedrock wells on-site.

Based upon the observed anomalies in the overburden groundwater table and the confined condition exhibited by the bedrock aquifer, a complex hydrogeologic system has been discerned beneath GM. Overburden groundwater is providing increased head to the bedrock aquifer via

discrete, pronounced, generally vertical fractures in the bedrock. The bedrock aquifer is one characterized by isolated permeable sections confined by irregularly-spaced impermeable strata. The variable lateral interconnection within the bedrock aquifer is attributable to the alluvial character of the Triassic Stockton Formation. The meandering nature of sub-aerial net-depositional systems is well documented, and results in a pronounced lateral variation in sedimentary facies as discovered by the drilling efforts at GM and reported by Widmer (1965). The head provided by overburden groundwater undoubtedly is augmented by upgradient elevated off-site reservoirs.

5.0 GROUNDWATER REMEDIAL INVESTIGATION SUMMARY

A groundwater monitoring program has been in place at the IFG Trenton facility since 1986. IFG's ongoing groundwater monitoring program was required pursuant to IFG's New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Groundwater (DGW) permit number NJ0053295 administered under N.J.A.C. 7:14-1 et seq. The groundwater monitoring program has involved the installation of 21 overburden and bedrock monitoring wells. Nine additional monitoring wells were installed as part of a separate groundwater investigation associated with a former underground storage tank (UST).

In May 1991, a Groundwater Impact Study Report was submitted to the NJDEPE Division of Water Resources. The Groundwater Impact Study Report includes groundwater sampling data, locations of monitoring wells, monitoring well specifications, groundwater and surface water elevation data, and surface water sampling data. The May 1991 report is presently undergoing review by NJDEPE.

The groundwater investigation activities conducted to date have been comprehensive and characterize groundwater at the site. The spatial and vertical distribution of the 30 on-site wells comprehensively evaluates the groundwater in the active and historically active areas of the site. Results of these investigation activities indicate that groundwater at the site has been impacted by three sources: the area of a former 4,000 gallon UST; the sludge impoundment area; and most significantly, the Naval Air Propulsion Center (NAPC), located upgradient of IFG.

5.1 BACKGROUND (Upgradient) GROUNDWATER QUALITY

Substantial information exists to identify the Naval Air Propulsion Center (NAPC), upgradient of IFG, as the source of Trichloroethylene (TCE) and its degradation products seen in IFG monitoring wells. Supporting data for this is provided in the May 1991 report, and is summarized below.

- The NAPC is located directly across Parkway Avenue from IFG. The principal directions of both surface water drainage and groundwater flow in the area have been determined to be to the south and east. NAPC is upgradient of IFG because it is both west and north of IFG.
- NAPC has used significant quantities of TCE as a heat-exchange medium in cooling towers since 1955. These cooling towers are located in the Brine Handling Area. The cooling towers have an operational volume of 25,000 gal. Over 50,000 gal of TCE have been replaced in the system since 1955. NAPC estimated that 500 gal have leaked from this system to the ground surface.
- Three reported spills of TCE have occurred at NAPC. The total volume of TCE lost as a result of these spill is estimated at 1200 gal.
- TCE and its principal anaerobic degradation products (1,2-trans-DCE and vinyl chloride) are the principal volatile organic compounds (VOCs) detected in the groundwater beneath the IFG facility. Other VOCs, metals, and semi-volatile compounds are also migrating downgradient from the NAPC.
- TCE and its degradation products have not been detected in IFG's overburden wells. Since these wells typically contain the highest concentrations of the compounds attributed to IFG's former sludge impoundments, this observation further supports an off-site source of TCE and its degradation products.
- The overburden is hydraulically connected to the fractured bedrock. This observation, together with the potentially high horizontal conductivity of the weathered rock zone, explains the widespread occurrence of TCE.
- A historical record search has failed to provide indication of any use of TCE at the IFG facility.

5.2 UST AREA

The principal contaminants detected in the UST area consist of the relatively light petroleum compounds typical of gasoline, including the aromatic VOCs benzene, toluene, ethylbenzene and xylene (BTEX), and lead. These detections were a result of a gasoline release associated with the former UST.

Based on detections of BTEX in groundwater monitoring wells, the extent of the groundwater plume associated with this area is approximately 175-feet of the former UST in the downgradient direction (southeast), and approximately 125 feet to the east and the west, parallel to strike of the bedrock. The areal distribution of lead concentrations is similar to that identified for BTEX concentrations. The vertical extent of impacted groundwater is estimated to be up to 80 feet below the ground surface.

A conceptual approach to IFG's remediation of the UST area was included in the 1991 Groundwater Impact Study Report, and incorporates the installation of recovery wells to remove the impacted groundwater. This approach would be further evaluated in the Cleanup Plan for groundwater.

5.3 SLUDGE IMPOUNDMENT AREA

The principal waste stream to the former impoundments originated from IFG's painting and plating processes. Limited volatiles, semi-volatiles and metals were detected in groundwater at the sludge impoundment area.

The VOC detections observed in the monitor wells consist of TCE and its degradation products, DCE and vinyl chloride, trichlorobenzene, dichlorobenzene, chlorobenzene, benzene, 1,1,1-TCA and methylene chloride. The volatile organic compounds used as solvents in IFG's painting and plating processes included trichlorobenzene, dichlorobenzene, toluene, minimal amounts of TCA, and methylene chloride. Although benzene and chlorobenzene were not used as part of the painting and plating processes, these compounds were detected in samples of sludge, and are

possibly degradation products of trichlorobenzene and/or dichlorobenzene. Therefore, the compounds due to site-related activities would likely include trichlorobenzene, dichlorobenzene, chlorobenzene, benzene, toluene, methylene chloride and TCA. The detections of TCA, however, may also be attributed to NAPC, since TCA is commonly associated with TCE. This possibility would be further evaluated and addressed in a Cleanup Plan for groundwater.

In addition to the VOCs described above, these painting and plating processes generated wastes that contained several semi-volatile compounds and metals, as demonstrated by analytical results from samples of sludge. However, the overburden wells immediately surrounding the impoundments have shown only sporadic detection of bis(2-ethylhexyl) phthalate (a common laboratory-related contaminant), di-n-butyl phthalate, naphthalene, acenaphthalene, fluorene, phenanthrene, and phenols (total recoverable). This observation would also be further evaluated relative to the overall groundwater management strategy for the site, and would be addressed in a Cleanup Plan for groundwater.

The metals arsenic, barium, cadmium, copper, lead, manganese, nickel, and zinc were also detected in the groundwater monitoring wells at the sludge impoundment area. Although samples of sludge indicated detections of these metals, some of these metals, including arsenic, barium, copper, iron and manganese were also detected in the upgradient monitoring wells. In addition, barium, copper, iron and manganese are typically detected in groundwater that occurs in Triassic sedimentary rocks such as those which underlie the site. Also, a soil sample collected at the NAPC indicated detections of arsenic, cadmium and lead. As such, the detections of arsenic, barium, copper, lead, iron and manganese may be attributed to the sludge as well as background and upgradient concentrations. The possibility of multiple sources of these metals would be considered in preparation of a Cleanup Plan for groundwater.

A conceptual approach for the remediation of this area was also included in the Groundwater Impact Study. The plume of contaminants associated with the impoundments has been characterized and it is limited in terms of both its areal extent and the concentrations of the site-related compounds described above. The plume capture and remediation component of this

remedial effort could be tied into the same treatment system employed for the UST area. Such an approach would be evaluated in the Cleanup Plan for groundwater.

5.4 SUMMARY OF GROUNDWATER REMEDIAL INVESTIGATION CONCLUSIONS AND APPROACH

- There are two water-bearing zones at the site. The first zone is nonuniform and when present, occurs in the overburden material. The second water-bearing zone occurs within the bedrock fractures of the Stockton Formation.
- Groundwater flow in the overburden and bedrock appears to flow in discrete pathways, predominantly in the south and southeast directions.
- Three sources of impacts to groundwater have been identified: the area of the former USTs; the sludge impoundment area; and most significantly, upgradient sources from the NAPC.
- The vertical and horizontal extent of impacts to groundwater due to on-site sources has been characterized for the purpose of developing a Cleanup Plan for groundwater at the site.
- A Cleanup Plan for groundwater, if warranted, will be developed to address on-site sources of groundwater impacts pending NJDEPE's review of the 1991 Groundwater Impact Study and results of the Soil Sampling Plan. If the Soil Sampling Plan results demonstrate a new area of concern outside of the area characterized in past groundwater investigations, a Groundwater Sampling Plan will be developed for these new soil areas.
- Due to the substantial amount of groundwater remedial investigations conducted to date, as well as the demonstrated impact to groundwater from upgradient sources of contamination, no additional groundwater investigation work is warranted at this time.

6.0 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

The following proposed ECRA SES- Soil Sampling Plan has been designed in order to establish baseline environmental conditions in and around the GM Trenton, NJ facility property. Proposed sampling activities have been based upon the results of a preliminary site inspection; meetings and discussions with GM facility management and GM representatives; a review of plans and construction drawings for the Site; and results of previous field investigations implemented at the GM facility.

Previous investigative findings pertinent to the currently proposed soil sampling investigation have been summarized in Section 3.3 of this report. All sampling results for each identified area of concern are also summarized and discussed here, as necessary, including any recommendations for additional actions. As discussed in the Introduction, Section 2.0 and the Groundwater Remedial Action Summary, Section 5.0, the proposed sampling plan will only address soils. With regard to building interiors, it is anticipated that GM will continue current plant operations until December 1993. Consequently, building interior sampling will be deferred.

All soil sampling activities will be conducted in accordance with the requirements outlined in the NJDEPE Technical Requirements for Site Remediation, Proposed New Rules: N.J.A.C. 7:26E (New Jersey Register, May 1992) and the NJDEPE Field Sampling Procedures Manual (May 1992). Implementation of the proposed sampling plan shall be contingent upon securing all necessary state and local permits. The objective of the proposed sampling activities shall be to determine what, if any, impact to soils may have resulted from historical site operations. An area by area discussion including proposed sample locations, frequency, and analytical parameters is detailed below.

Soil sampling activities will be conducted utilizing hand auger techniques where possible or with a drill rig using hollow stem auger and dedicated split spoon methodology. Samples will be classified and logged in the field by a qualified geologist. Auger cuttings and split spoon samples at each boring location will be visually inspected for the presence of moisture and

obvious contamination such as staining and/or odors. Unless otherwise specified, samples collected for all analytical parameters other than volatile organics will be obtained 0 to 6 inches below grade.

Samples collected for volatile organics analysis will be collected from an interval 6 to 24 inches below grade. The split spoon sample will be field screened using a photoionization detector or flame ionization detector (PID/FID) or utilizing any other methods deemed appropriate. The six inch interval registering the highest field measurement will be collected for volatile organic analysis. If a visual inspection of sample core indicates that the soil consists of less than 15 percent silt/clay, the six inch interval above the saturated zone will be sampled, or a six inch interval within the next lower soil horizon consisting of 15 percent or more silt/clay, or at 9.5 to 10 feet, whichever is encountered first. Again, all samples collected for volatile organic analysis will be obtained from a discrete six inch increment.

Samples collected for analysis shall be analyzed according to EPA approved methods by a New Jersey certified laboratory. Samples to be characterized for parameters as recommended and specified in each area location will be analyzed in accordance with the following methods:

Total Petroleum Hydrocarbons (TPH)	EPA Method 418.1
Volatile Organic Compounds (VOC)	EPA Method 624/8240
Base Neutral/Acid Extractables (BNA)	EPA Method 625/8270
Priority Pollutant Metals (PPM)	EPA Method 7000 Series
Cyanide (CN)	EPA Method 335.3
Polychlorinated Biphenyls (PCB)	EPA Method 606/8080
pH	EPA Method 9045

A sample summary table including analytical parameters, sample intervals and the total number of samples required by location is provided in Table 6.1.

TABLE 6-1

SUMMARY OF SOIL SAMPLING LOCATIONS

GENERAL MOTORS: INLAND-FISHER GUIDE DIVISION

ECRA CASE # 92713

# OF SAMPLES	DEPTH	AREA	LOCATION	PARAMETERS	REFERENCE FIGURE
1	Field Determine	2	Above Ground Storage Tank Area	TPH and VOC	6.2
3	Field Determine	3	Power Station and Fuel Storage Area (500,000 gallon AST)	TPH and PAH	6.3
2	0"-6"	3	Power Station and Fuel Storage Area (Blowdown Sump)	TPH and PAH	6.3
2	6" below invert	3	Power Station and Fuel Storage Area (Blowdown Sump)	TPH and PAH	6.3
1	0"-6"	3	Power Station and Fuel Storage Area (Cooling Tower)	pH and PP Metals	6.3
3	0"-6"	5	Raw Materials Storage and Maintenance Area (Metal Scrap Bins)	TPH and PP Metals	6.5
1	0"-6"	6	South Parking Lot (550-gallon Diesel AST)	TPH	6.6
5	Field Determine	7	Die and Raw Materials Storage Area (Former Sludge Drying Bed #5)	TPH, VOC, PP Metals, TOC, CN, pH	6.7
10	5'-5.5'	8	Wastewater Treatment Plant (Former Sludge Settling Tanks)	TPH, VOC, BN, PP Metals, CN, pH	6.8
10	6" below invert	8	Wastewater Treatment Plant (Former Sludge Settling Tanks)	TPH, VOC, BN, PP Metals, CN, pH	6.8
1	Field Determine	8	Wastewater Treatment Plant (Former Trash Incinerator)	PP Metals, pH	6.8
4	0"-6"	9	Power House Parking Lot and Equipment Storage Area	TPH, PP Metals, VOC	6.9
10	Field Determine	10	Former Sludge Drying Beds #1 through #4	TPH, VOC, PP Metals, TOC, CN, pH	6.10

AST: Above Ground Storage Tank.

BN: Base Neutrals.

CN: Cyanide

NA: Not Applicable

PAH: Poly Aromatic Hydrocarbons

PP Metals: Thirteen Priority Pollutant Metals

TCLP: Toxic Characteristic Leaching Procedure.

TOC: Total Organic Carbon.

TPH: Total Petroleum Hydrocarbons.

VOC: Volatile Organic Compounds.

Area #1 Manufacturing Building and East Parking Lot

The Manufacturing Building was constructed by GM in 1937 for producing automotive window components. Manufacturing operations included metal stamping and fabrication. In 1942 automotive parts production ceased and the facility was re-tooled and operated by the Eastern Aircraft Corporation for the production of Avenger Torpedo Bombers. In 1945 GM resumed automotive manufacturing operations and simultaneously expanded manufacturing capacity to include the production of window regulators, door handles, seat adjusters and vent windows.

The manufacturing building is constructed of masonry brick and steel support beams however, certain sections of the southeast and southwest extensions also contain wooden support structures. The building floor consists of a 6 to 8 inch re-enforced concrete throughout the plant. Various floor sections of the plating and extrusion lines have also been covered with asphalt and/or wooden floor tiles. Portions of the floor tile are periodically removed and replaced with new blocks. According to records, resulting debris, comprised of wood and asphalt blocks, is disposed as hazardous waste. All sump and containment pits beneath existing and former plating lines are lined with 6 to 8 inches of concrete and are of similar construction to the concrete floor. A portion of these pits were decontaminated and filled with concrete as certain plating lines became obsolete.

Wastes collected in each of the sump and containment pits have been historically discharged directly to the facilities industrial process sewer system for on-site treatment in the wastewater treatment plant. Other plant utilities such as employee rest rooms and water fountains are connected to sanitary lines and some to storm sewer lines discharging to the POTW. Industrial process sewer, sanitary sewer and storm sewer schematic layouts are provided in Appendix 2 and 3. Rainwater collected from roof-top drains is discharged via roof leaders which are connected directly to the main storm water sewer line. This storm water main discharges into Gold Run Creek at outfall locations 001 and 002. Finally, supporting utilities such as heat/electricity, and gas are provided by the Plant Power House and PSE&G respectively.

The existing operational floor space is subdivided into seven units consisting of

- (Unit #1) - a manufacturing tool room;
- (Unit #2) - the manufacturing area;
- (Unit #3) - a two story manufacturing and shipping area;
- (Unit #4) - general office space;
- (Unit #5 and #6) - the diecast and two story extensions; and
- (Unit #7) - Steel bag receiving area.

Operational processes historically conducted in the manufacturing building include metal stamping, electroplating, painting, bilaminate extrusion, zinc phosphating, and encapsulated glass operations. The following summarizes past and present manufacturing activities known to have been conducted within each area. A Manufacturing Building floor plan is provided in Appendix 4.

Consistent with the phased closure of the interior manufacturing operations, all sampling will be deferred at this time. As individual manufacturing operations are closed, removed and relocated, appropriate decommissioning in accordance with current NJDEPE policy will be performed.

Interior Facilities

Unit #1: Manufacturing Tool Room

Operations currently located in this area include numerous tool storage rooms, an injection molding process area, and a encapsulated glass prep room. Chemical compounds utilized in the tool storage room areas primarily include degreasers containing Safety Kleen Solvent 105-MS. The injection molding process contains 6 operational nylon injection molding lines. The approximate dimensions of each injection molding line are 15'x10'x9'. The process line area is surrounded by a 6-inch deep concrete lined collection trench. Lubricating oils which collect

in the trench are removed by a sump pump and transferred to a mobile collection tank, before being shipped off-site for oil recycling.

The encapsulated glass prep area is no longer operational. When in use, an adhesive bond was applied to window glass in preparation for further processing. Chemical compounds utilized in an associated spray gun application parts washing process included MEK and toluene solvents. Occasional service touch-up painting is also conducted in this area.

Unit #2: Manufacturing Area

Manufacturing processes currently operational in this area include bi-laminate extrusion lines, encapsulated glass molders, PVC extruder lines, manual and electronic seat adjuster manufacturing and assembly lines, metal stamping and fabrication lines with associated high speed presses, a zinc phosphate machine, and the No.12 plater line. Manufacturing processes previously conducted in this area include the operation of a diecasting area (currently known as bi-laminant lines 12 thru 15), a plastic molding line (currently known as electric seat adjuster line #2), lacquer and enamel painting area (currently known as manual seat adjuster fabrication presses) and former plating lines #4, #5 (acid-wash, nickel and copper), #6 (chromium), #9, and #11 (copper, nickel and chromium).

Bi-laminant Extrusion. The bi-laminate extrusion process began operations at the facility in 1986 and continues at present. Stainless steel and aluminum coil products are roll formed and coated with a thin PVC coating in a co-extrusion/roll forming process. An in-line cleaning and adhesive application is conducted prior to the application of the PVC coating.

Encapsulated Glass Molders. The encapsulated glass molder area was formerly used for the anodized aluminum painting operation. In approximately 1976, encapsulated glass molding machines were installed. This operation involves application of a thin film of adhesive to automotive side window glass and placement of the glass in a molder where the glass is encapsulated in a frame of PVC.

Extruder Line. Operation of the extruder line process for the production of PVC body side moldings began in approximately 1970 and continues at present. The scale of this operation has been greatly reduced however, in comparison to the 1970's.

Metal Stamping and Fabrication. The metal stamping and fabrication line process involves the rolling and stamping of metal sheets into the desired parts. Excess metal from the stamping operation is collected in bins and shipped off-site for recycling.

Zinc Phosphater. The heavy zinc (black) phosphater was put into operation in 1977 in order to increase the corrosion resistance of the seat adjusters. This unit replaced the former water-based paint system.

Electroplating. From 1948 to present, plating has been conducted at the facility. From 1954 to 1988 a total of 10 copper, nickel and/or plating machines and 2 aluminum anodizers were used. Presently, one plater (plating line No. 12) is operational. Zinc diecast parts are electroplated with copper, nickel, and chromium in plating process tanks. Plating solutions (acid copper solution, chromic acid solution, Semi-Brite nickel solution, Brite nickel solution, and caustic) are stored in ASTs located in the solution storage section of the manufacturing building (Unit #6). Plating solution is pumped via pipeline to the plating process tanks. Plating buildup on the dip racks is removed using nitric acid in the steel bay building (Unit #7). At one time, the spent nitric acid was returned to the vendor for reclamation of the nickel metal. Currently, the spent acid is treated in the on-site waste water treatment system.

3,300-Gallon Underground Oil Tank. A former underground waste oil tank was located beneath the building floor adjacent to the encapsulated glass GKN molders in Unit #2. The UST was installed in the late 1970's and is of concrete construction. This tank reportedly contained waste hydraulic oil generated during operation of the GKN molders.

In 1988, the concrete UST and associated piping were abandoned in place. According to facility records, the waste oil tank and piping system were filled with a caustic sodium hydroxide

solution, purged, and triple rinsed with water. Subsequent to decontamination, the UST and piping were sealed with concrete.

UNIT #3: Manufacturing and Shipping Area

The Manufacturing and Shipping area is a two-story unit consisting of various storage areas and painting operations. The first story of Unit #3 is primarily occupied by warehouse space with an associated shipping office and shipping dock. Other supporting operations located in this area include a basket storage area, a security room, a chemistry lab, and battery storage area. The remainder of the floor space is occupied by the ELPO-Powder Coating operation.

ELPO Powder Coating. This powder paint operation began in 1987. The ELPO light zinc phosphater process consists of electrophoretic deposition of a nonhazardous water-based ELPO primer and acrylic powder paint on parts. Trace amounts of solvents are present in the ELPO primer.

Operations located on the second level of Unit #3 include a packaging area, an ELPO applique and ELPO paint salvage area. Supporting operations also located in this area include engineering offices and conference rooms, a blue print room, a mail room and stationary store, lockers, a cafeteria and kitchen, a computer room, and training center. According to facility personnel, manufacturing operations formerly conducted on the second level of Unit #3 include an electrostatic painting and zinc phosphator, and a paint mixing area.

Electrostatic Painting. The electrostatic painting area was in operation from approximately 1955 to 1988. The primary paints used were enamels. The primary solvent utilized was Aromatic 100, which was purchased in bulk, stored in an above ground storage tank, and pumped to the second floor paint mix room for use. Toluene, xylene, and other solvents were also used for paint mixing and spray gun purging.

UNIT #4: Offices

The unit #4 area of the manufacturing building includes general employee office space, and conference room area. No manufacturing operations or storage of any significant amount of chemicals are known to have been conducted here.

UNIT #5: South Extension West

Manufacturing processes currently operated in the Unit #5 area include zinc die cast machines and a zinc alloy remelt area, a buffing section, and door handle assembly area. Supporting operations also include an equipment storage room, a maintenance area, and a buffing compound storage room. Manufacturing processes formerly conducted in this section included the operation of plating lines #2 and #7 (currently known as interior handle buff area), and the dichlorobenzene degreaser area (currently known as interior door handle assembly and buffing compound storage area), and a zinc reclamation pit.

Zinc in the current die cast operation is smelted on-site and cast into automotive door handles and other parts. After they are allowed to cool, excess material is removed from the parts and returned to the smelter for re-use. The zinc parts are then further processed in the plating and painting areas.

UNIT #6: South Extension East

The Unit #6 area of the manufacturing building consists of a solution storage area and limited office space. Six above ground storage tanks containing plating solutions are located in this area. These ASTs include: 35,000-gallon copper cyanide; 20,000-gallon chromic acid; 25,000-gallon acid copper; 18,000-gallon Semi-Brite nickel solution; 18,000-gallon Brite nickel solution; and 15,000-gallon caustic. According to facility personnel, plating solutions are mixed at the plater, using raw materials diluted with water. As previously discussed, plating solutions are pumped via overhead pipelines directly to the plating process tanks located at the No.12 Plater line in Unit #6. Secondary containment in the tank area consists of a concrete-lined trench.

UNIT #7: Receiving Area

Unit #7 is presently utilized as a receiving and storage area for purchased parts, plastics, encapsulated molds, and aluminum/steel coil. Additional manufacturing processes currently operating in this area include a nitric acid rack strip area, and several concrete lined metal scrap pits. Operations formerly located in the Unit #3 section included zinc phosphate and chromium washing (currently known as plastic storage), paint application, deionized water processing, cyanide-zinc barrel plating (currently known as purchased parts receiving), an aluminum anodizer and caustic aluminum etching operation, and the anodized phosphoric and chromic acid stripping area.

The aluminum anodizing process was operated from approximately 1960 to 1980. Aluminum stampings and roll-formings were buffed and processed through two anodizers. The process produced a hard aluminum oxide (anodize) coating on the aluminum moldings using various acids and an electric current.

The cyanide-zinc electroplating operation was conducted at the facility from 1955 to 1977. In this operation, steel stampings were processed through a barrel plating machine where a zinc coating was electroplated on the steel for corrosion protection.

Exterior Facilities

Power Substations

A total of 11 transformer substations are located in and around the manufacturing building. Substations #1 through #4, #8, #9, #11A/#11B, #12 and #15 have been identified at areas located on the manufacturing building roof. Substation #5 is located within the manufacturing building. According to facility records, substations #1, #5, #8, #9, #11A/#11B, and #12 contain PCBs at concentrations greater than 500 ppm. Substations #2, #3, #4, and #15 reportedly contain non-PCB mineral oils. The manufacturing building roof was not accessible during site inspection activities. Consequently, the physical condition of the roof area surrounding each

transformer has not been documented. According to GM personnel, with the exception of Substation #14, no spills or leakage from the transformers are known to have occurred in this area. The leak from a transformer within Substation #14 occurred within the containment area and was cleaned up without a discharge to the environment. Due to the nature of the substation locations, no soil sampling is proposed.

Power substations #7 and #13A/#13B are located south of the manufacturing building and according to facility records, substation #7 contains mineral oil while substations #13A/#13B contain PCBs. Both PCB substations are surrounded by a concrete, lined, secondary containment system. Rainwater from the secondary containment flows through a sump equipped with imbibitor beads and an alarm to prevent any discharge of PCB containing dielectric fluid in the event of a leak from the transformers. No indications of staining or leakage were identified during the site inspection. Therefore, no sampling is proposed in this area.

Former 30,000-Gallon and 18,000-Gallon Above Ground Dichlorobenzene Storage Tanks:

One 30,000-gallon and two 18,000-gallon above ground dichlorobenzene tanks are located outside of the manufacturing building on the south apron in a concrete lined secondary containment system. When in use, these ASTs reportedly contained spent dichlorobenzene solutions generated during operation of the electroplating lines. In June 1985 the tanks were emptied, cleaned and formerly abandoned.

In September 1991, GM decommissioned the ASTs during NJDEPE approved RCRA closure activities. All closure activities were conducted in accordance with the Soil Sampling and Analytical Plan (December 4, 1990) and Closure Plan (March 13, 1991) submitted to NJDEPE. The decommissioning process of the ASTs, secondary containment area and associated plumbing consisted of a decontamination procedure followed by a triple rinse. Based on results of the NJDEPE approved closure process and the current disposition of the ASTs, no additional investigation is proposed at this time. Therefore, no sampling will be conducted in this area.

Water Recirculation Unit and Pump House:

The water recirculation pump house is located at approximately the southwestern corner of unit #5 in the manufacturing building. This water recirculation system consists of a pump, an aboveground 6' x 8' concrete lined tank constructed of pre-cast concrete and cooling tower. Cooling water from the die cast operation is pumped via overhead pipes to the equipment, circulated to the cooling tower, and then re-directed back to the die cast operation. No identifiable concerns relating to the historical operation of the circulation pumping apparatus were noted during the site inspection. Therefore, no sampling is proposed at this location.

Former Chlorine Storage:

A former compressed chlorine gas cylinder storage area is located east of the decommissioned dichlorobenzene storage tanks. The compressed gas was utilized in the plating operation cyanide destruction process. In 1986-7 this system was upgraded, using a hypochlorite solution as an alternative. Consequently, use of the compressed chlorine gas cylinders was discontinued. No identifiable concerns relating to the former storage of gas cylinders were noted during the site inspection. Therefore, no sampling is proposed in this area.

AREA #2 Above Ground Storage Tank Area

Four ASTs, a propane storage building, and an electrical switching station have been identified in the area located east of the manufacturing building and south of the east parking lot. Details concerning historical usage of the various installations and the current status of each AST are summarized below.

Former 5,000-Gallon Paint Thinner Tank and Former 4,000-gallon Solvent Tank:

A former above ground paint thinner tank, solvent tank and an associated pump station were installed in during the 1950's and subsequently decommissioned during 1987-1988. The solvent and paint thinner ASTs were formerly used to store "Aromatic 100" solvent and

MEK/toluene/marisol thinner respectively, for use in the paint processes conducted in the manufacturing building. According to facility personnel, Aromatic 100 solvent was pumped directly to the paint room via overhead lines; the thinner however was pumped into 55 gallon drums at the adjacent pump island and transferred to the process line. Facility records indicate that the original solvent tank was cleaned, decommissioned and removed. In 1991, a new process oil tank was placed on the concrete cradles left over from the former solvent tank. The decommissioned paint thinner AST, pump station and related underground piping is out of service but still remains in place. Hydraulic oil currently stored in the process oil tank is pumped from the tank as needed, placed in 55 gallon drums and transferred directly to the process line.

Records indicate that both existing tanks are constructed of carbon steel and have been installed on concrete frames within a concrete lined secondary containment system. No visible staining was identified on the pavement beneath the ASTs during the site inspection. In order to determine if historical operation of the pump station and associated subsurface piping may have potentially impacted surrounding soils, one soil boring (Figure 6.2) shall be installed downgradient of the pipe and analyzed for TPH and VOC. Continuous split spoon sampling will be conducted to a depth of 10 feet or to the water table, whichever is less. The sample evidencing the highest apparent contamination based on field screening and visual factors such as odors or staining will be selected for analysis.

Liquid Propane Gas Tank and Propane Storage Building:

The propane storage building is located east of the manufacturing building. This steel and brick structure was constructed in 1938 and has been historically used for the purpose of storing liquid propane gas cylinders and various bottled gases. One 10,000-gallon liquid propane gas (LPG) tank is also located east of the process oil and paint thinner tanks. The LPG tank was installed in the early 1970's and has been empty since 1989. No identifiable concerns relating to the historical operation of the LPG were noted during the site inspection. Therefore, no sampling is proposed at this location.

400,000-Gallon Water Tank:

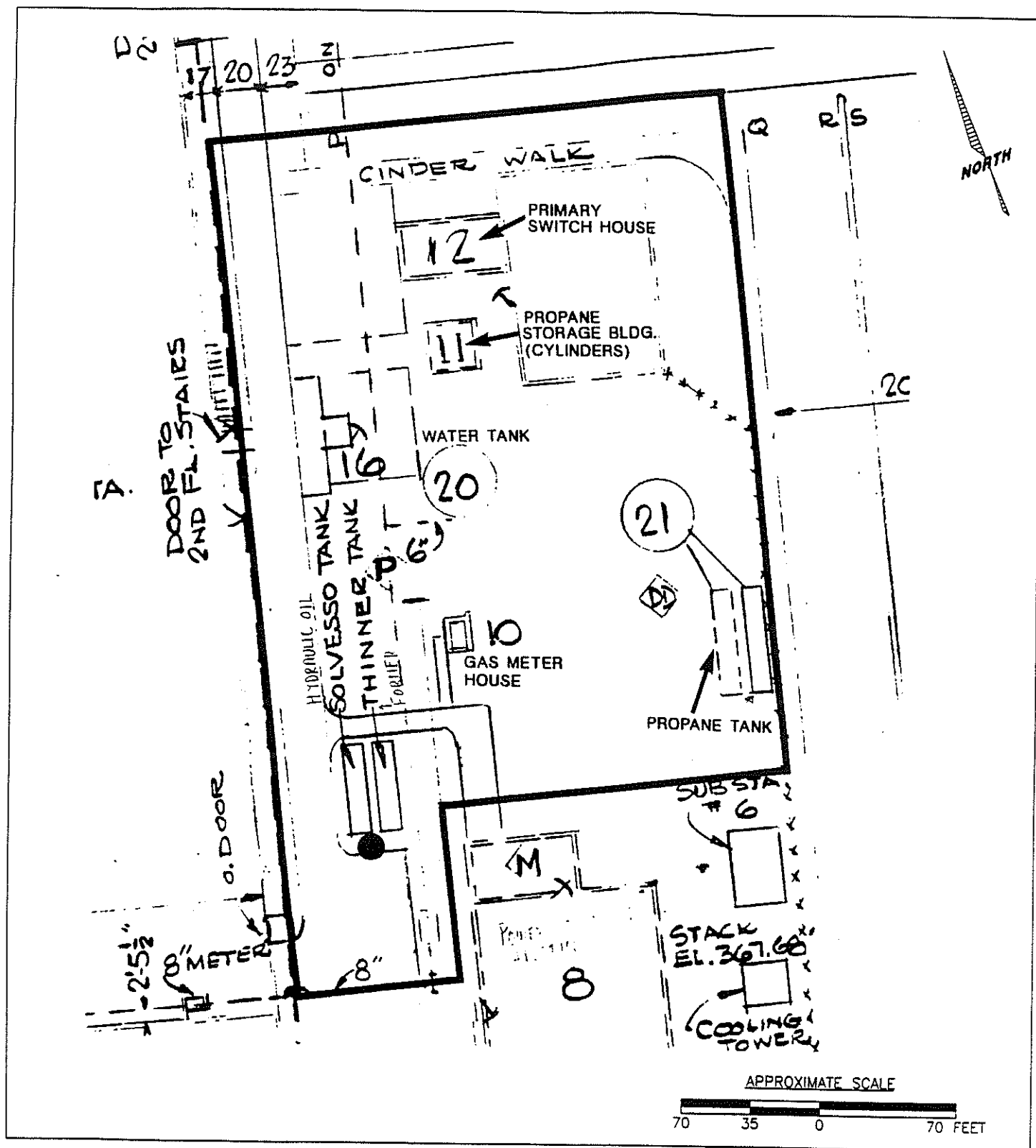
A 400,000-gallon water tank is located north of the solvent and paint thinner ASTs. Records indicate that the water tank was installed in 1937-1938 and is of steel construction. Water stored in this tank is used to supply the facility's power house boilers. No identifiable concerns relating to tank usage were noted during the site inspection. Therefore, no sampling is proposed for this location.

Primary Switch House:

A primary switch house consisting of 3 transformers is located north of the propane storage building. The area surrounding the switching station is covered with gravel. Information obtained from facility records regarding dielectric fluid samples previously collected and analyzed indicate the presence of PCBs in one of the three transformers at concentrations slightly above 500 parts per million. No staining was observed in this area and so no sampling is proposed.

AREA #3 Power Station and Fuel Storage

The Power House facility, cooling tower, and associated power substation were constructed in 1937 for the purposes of supplying heat and power to the manufacturing building complex. The original power house building contained three coal-powered steam boilers. In 1957-1958, GM constructed a Power House addition, including a fourth oil-fired boiler, and installed three above ground fuel oil tanks south of the boiler house. In addition, all of the remaining three boilers were converted to oil-burning units. Two underground storage tanks (USTs) containing gasoline were formerly located west of the above ground fuel oil storage tank area. These gasoline USTs were removed in 1987 and 1989. A third UST was used for the temporary storage of paint during inside paint process tank maintenance. This tank was formerly located west of the Power House and was also removed during tank closure activities conducted in 1989. Sampling is discussed in the following sections.



LEGEND

- MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
- *—*—* PROPERTY & FENCE LINE
- - - - - PROPERTY LINE
- · - · - · FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

FIGURE 6-2

PROPOSED SOIL SAMPLING LOCATIONS
AREA 2—ABOVE GROUND STORAGE TANK AREA

FISHER GUIDE DIVISION, GENERAL MOTORS CORP.,
EAST TRENTON, NEW JERSEY



McLAREN/HART
ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY

DRWN: B.R.F.

CHK'D: E.C.

JOB#: 12-0800773-001

DATE: 01/28/93

30,000-Gallon and 500,000-Gallon Aboveground #6 Fuel Oil Tanks:

Two 30,000-gallon and one 500,000 gallon above ground fuel oil tanks and associated piping are located south of the Power House within a unlined, gravel-covered secondary containment system. Records indicate that the ASTs were installed in approximately 1954 for the purpose of storing #6 fuel oil. Each of the three ASTs and associated piping are reportedly constructed of carbon steel. The tank exteriors have been insulated with polyurethane foam. The fuel oil distribution system consists of steam heated subsurface piping which has been enclosed in an insulated concrete containment vault.

At the time of installation, the 30,000 gallon ASTs were placed on a supporting steel frame thus eliminating contact with soils. No staining was observed on the soils and gravel beneath these ASTs during the site inspection. Therefore, no sampling is proposed for the area beneath the 30,000-gallon ASTs.

The tank bottom of the 500,000-gallon AST, as installed, is in direct contact with surrounding soils. In order to determine if historical operation of the AST may have potentially impacted subsurface soils, three soil borings (Figure 6.3) will be installed at locations spaced equidistantly around the base of the tank. Continuous split spoon sampling shall be conducted to a depth of 10 feet or to the water table, whichever is less. The sample in each boring evidencing the highest contamination based on field screening and visual observations such as odors or staining shall be selected for TPH and PAH analysis.

Two concrete lined steam condensate blowdown sumps are located adjacent to the three ASTs. Some oily black staining was observed on the gravel surrounding each of these units during the site inspection. Consequently, one boring shall be installed down gradient of each blowdown sump (Figure 6.3) and analyzed for TPH and PAHs. Samples shall be collected from the 0-6 inch interval below the surface gravel and at the interval 6 inches below the sump invert.

Cooling Tower East of Power House:

Sampling of soils adjacent to the cooling unit will be conducted in order to determine whether additives to the cooling water, which may have contained potential contaminants, were discharged to the ground surface thus impacting soils. One soil boring (Figure 6.3) will be installed adjacent to the cooling tower and sampled for metals and pH.

Former Underground Gasoline Storage Tanks:

A 4,000-gallon "fleet" tank was installed in 1971 and was used for fleet car refueling and was removed in 1987. A 2,000-gallon "maintenance tank" was installed in 1979 and was used to supply fuel for on-site vehicles and equipment. This tank was removed August 1989 and did not appear to have leaked. Tank registration documents indicated that the tanks and associated piping were constructed of paint/asphalt coated steel.

In October 1987, GM completed tank removal for the 4,000-gallon UST. Post-excavation soil sampling results for the 4,000-gallon tank excavation indicated the presence of gasoline constituents exceeding NJDEPE action limits for soils. Based on analytical results of soil samples collected during tank closure activities, Phase II and Phase III groundwater investigations were initiated and completed. The groundwater investigations fully characterized the extent of soils and groundwater contamination associated with historical usage of the former UST's. Data obtained during subsequent groundwater investigations, submitted to the NJDEPE in June 1988 and May 1989 have gained sufficient information to develop a groundwater remedial action strategy. Therefore, no sampling is proposed in this area.

Power Substation #6 and #16:

Transformer stations #6 and #16 are located northeast of the Power House. The area surrounding the transformer stations are paved with concrete. Facility records indicate that the transformer dielectric fluids do not contain PCBs. No staining or other signs of leakage were

observed on the surrounding pavement during the site inspection and so no samples are proposed at these locations.

Former Underground Paint Tank:

A former 2,500-gallon paint UST was installed in 1970 and subsequently removed in 1989 during NJDEPE approved Tank Closure Activities. The UST was historically used to store paint collected from the facility paint line process Tank in the Manufacturing Building. Tank registration documents indicate that the tank and associated piping were constructed of single wall carbon steel.

In December 1986 the UST was emptied and decommissioned. In order to comply with the federal and state technical requirements for underground storage tanks (40 CFR, Part 280) the UST was subsequently excavated and removed. Upon removal of the tank system, post-excavation soil samples were collected and analyzed for paint constituents including zinc, barium, titanium, and VOC compounds. A findings report detailing results of the site assessment investigation was submitted to NJDEPE for evaluation on January 31, 1990. Based on analytical results it does not appear that soils have been impacted due to historical operation of the former UST. Therefore, no sampling is proposed at this location.

AREA #4 Process Waste and Hazardous Drum Staging Area

Hazardous Drum Staging Area:

The process waste and hazardous drum storage area is located south of the 500,000-gallon No.6 fuel oil tank and northeast of the wastewater treatment plant. The staging area originally consisted of a concrete pad. In 1985 a bermed concrete secondary containment system was constructed. A catch basin located at the south east corner of the containment area discharges runoff directly to the waste water treatment system. Both hazardous and nonhazardous wastes including oils, solvents, adhesives, paints, and metal bearing sludges have historically been staged at this location. In order to delist the GM Trenton Plant from an approved Treatment,

Storage and Disposal (TSDF) facility status to a "less than ninety (90) days" generator status, GM completed a RCRA Closure of the drum staging area. All closure activities were conducted in accordance with the Soil Sampling and Analytical Plan (December 4, 1990) and Closure Plan (March 13, 1991) submitted to NJDEPE. Closure activities included decontamination of the concrete containment system and soil sampling. An SSAP findings report was prepared by GM and submitted to NJDEPE on April 27, 1992. Results of the soil sampling investigation around the hazardous drum staging area revealed the presence of elevated BN and/or metals concentrations in eleven of twelve samples collected. NJDEPE has stated (September 8, 1992) that based on results of the soil sampling investigation, remediation of the area shall be required. It is GM's current understanding that the project has been referred to the NJDEPE site remediation program.

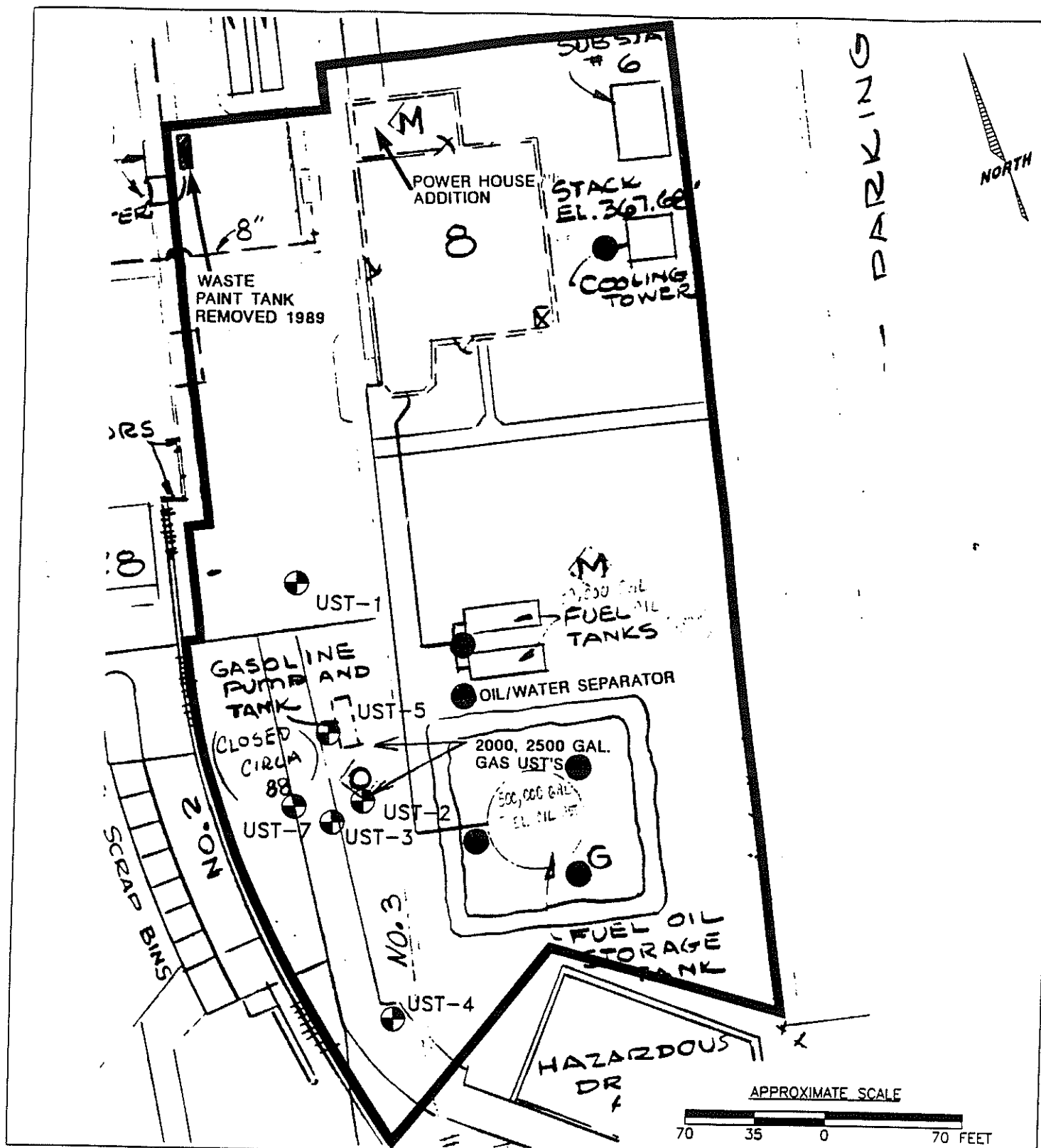
GM has continued to stage hazardous wastes in the drum staging containment area within the less than ninety day timeframe. No staining or other indications of leakage were noted on the intact concrete floor during the site inspection, therefore, no sampling is proposed for this location. The catch basin located at the southeast corner of the containment unit will be visually inspected for integrity during the proposed soil sampling investigation. Photo documentation collected during the inspection activities will be available to the NJDEPE as required.

Transformer Substation #14:

To the southwest of the hazardous waste storage area is located transformer substation # 14; the transformer dielectric fluids are documented as containing PCBs. The transformer is covered with a roof and equipped with a steel lined secondary containment. No discharges to the environment have occurred from the secondary containment and so no sampling is proposed.

Waste Roll-Offs:

A total of five waste roll-off containers are located on the pavement surrounding the hazardous waste staging area. A sixth roll-off containing phosphate sludge is staged in an unpaved area adjacent to the northwest corner of the hazardous waste area. Facility wastes staged in the



LEGEND

- MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
- PROPERTY & FENCE LINE
- PROPERTY LINE
- FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

FIGURE 6-3

PROPOSED SOIL SAMPLING LOCATIONS
AREA 3--POWER STATION AND FUEL STORAGE

FISHER GUIDE DIVISION, GENERAL MOTORS CORP.,
EAST TRENTON, NEW JERSEY



McLAREN/HART
ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY

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JOB#: 12-0800773-001

DATE: 01/28/93

containers include buffing dirt, asphalt and wood floor tiles with oily debris removed from the manufacturing area, industrial construction debris, and phosphate sludges. All materials are non-hazardous with the exception of the asphalt and wood floor tiles, which are classified as "New Jersey Hazardous". Appropriate off-site disposal is used for each of the waste streams. No staining was observed on the pavement surrounding the waste containers during the site inspection. Therefore, no sampling is proposed at this location.

AREA #5 Raw Materials Storage and Maintenance Area

The Storage and Maintenance Building was constructed in the 1940's. This structure was originally used as a salvage and storage area during World War II. Specific operations conducted by GM subsequent to this period include forklift and machine press repair, light equipment maintenance, electronics and pipe fitting shops, welding and sheet metal shops, inventory storage, and a shipment receiving area. Chemicals used or stored in the building include lubricating oils, cutting oils, acetylene gas for use in the welding area. According to information obtained from GM personnel, lighting ballasts which may contain PCB material are also known to be stored in the electronics shop. No floor drains were identified during the site inspection.

Support operations and additional storage areas exterior to the Maintenance Building include a raw materials drum storage pad, a vehicle wash area, a series of metal scrap storage bins. Finally, power substation #10 is located north of the salvage area.

Shipping and Receiving Area:

A shipping and receiving loading dock area is located at the northwest corner of the Maintenance Building. There are no records of any spills in this area and no evidence of staining on the surrounding pavement. Therefore, no samples are proposed for this location.

Power Substation #10:

Power substation #10 is located north of the Maintenance Building. Facility records indicate that the transformer dielectric fluid contains PCBs. The area surrounding the substation is paved with concrete sub-base and asphalt cover. No staining or other signs of leakage were observed on the surrounding pavement during the site inspection. Therefore, no samples are proposed at this location.

Vehicle Wash Area:

A vehicle/equipment washing and staging area is located northeast of the salvage storage area. This staging area consists of a concrete pad surrounded by a concrete lined collection trench. According to facility personnel, water in the collection trench is discharged directly to the process sewer. Some minor staining was observed on the pad during the site inspection. The concrete pad, collection trench and surrounding pavement all appear to be in good condition. Therefore, no sampling is proposed for this area. The collection trench will be visually inspected for integrity during the proposed soil sampling investigation. Photo documentation collected during the inspection activities will be available to the NJDEPE as required.

Raw Materials Drum Storage Pad:

A raw materials drum storage area was located east of the Maintenance Building and has recently been relocated inside. The drum storage pad and surrounding area is paved with concrete. This area is bordered by an unpaved grassy area to the north, however all surface water drainage associated with the raw materials drum storage pad is directed to the south. Various chemicals stored in this location include sulfuric acid, hydrochloric acid, acidic cleaners, nitric acid, and metal working oils. No staining or other evidence of leakage was identified in the drum storage area during the site inspection. Therefore no sampling is proposed at this location.

Metal Scrap Bins:

Metal scrap bins are located east of the Maintenance Building and raw materials drum storage pad. The area beneath each partitioned bin is paved with concrete. Materials historically stored here include bulk buffing media, wooden pallets, outdated metal die casts, and scrap metal collected from the metal stamping operation for recycling. Several open top roll-off units containing the aforementioned materials are also located on the pavement adjacent to the metal bin storage area.

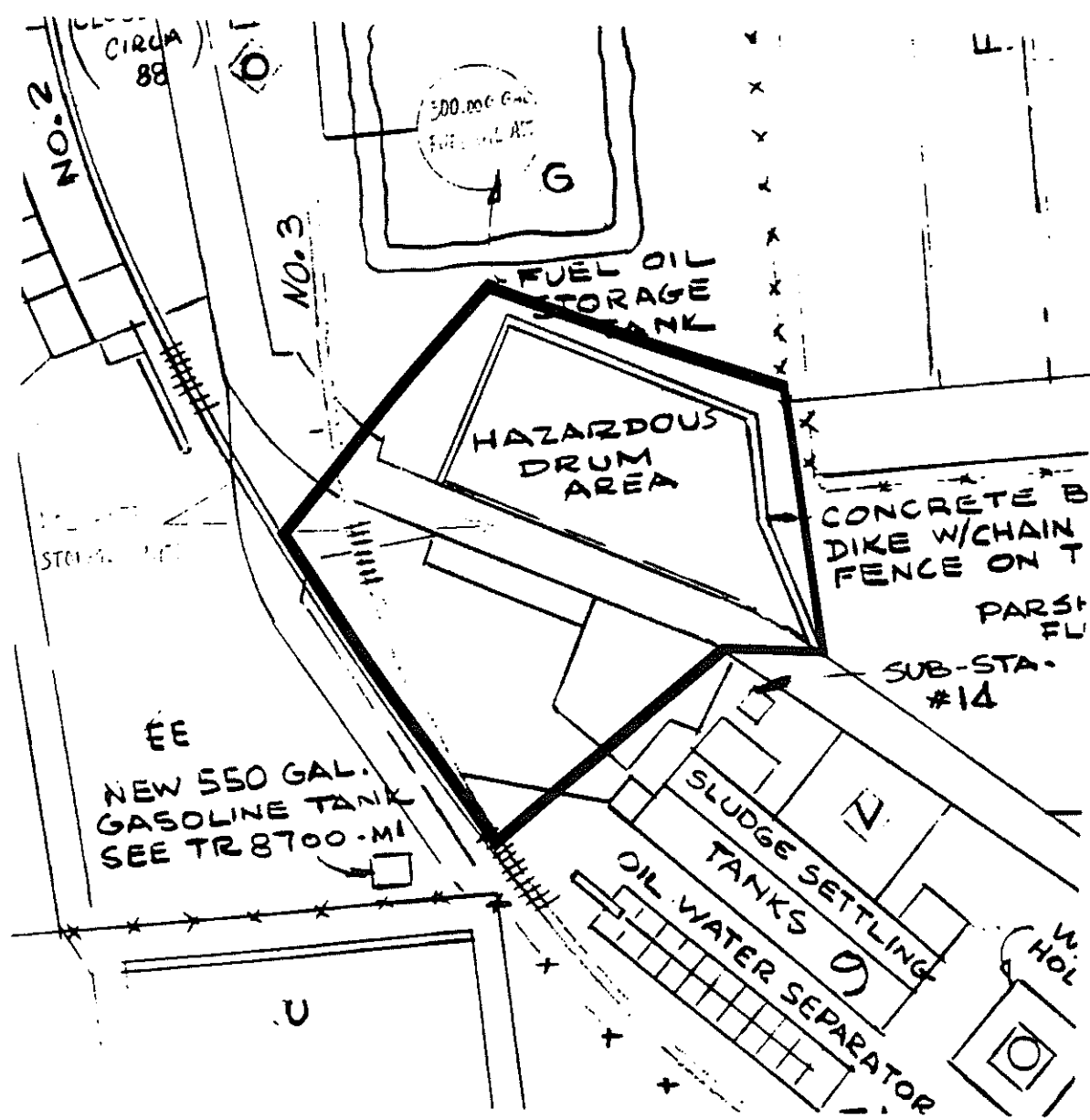
Minor staining was observed on the pavement surrounding the metal bin storage units. In order to assess the potential for soil contamination beneath the pavement, three soil borings (Figure 6.5) will be drilled along the eastern edge of the storage area. Soil samples shall be collected from the 0-6 inch interval beneath the pavement and analyzed for TPH and metals.

AREA #6 South Parking Lot with Paint Storage Building and Maintenance Garage

The south parking lot is located west of the Maintenance Building and south of the Manufacturing Building. This lot is used for employee parking and the temporary staging of metal parts bins and plastic packaging. A railroad spur intersects the western edge of the lot and terminates at the southwest corner of the Manufacturing Building. Additionally, a paint storage building and vehicle maintenance garage are located in the northwest of the parking area. Finally, a 200,000-gallon aboveground gravity water tower exists south of the paint storage building.

Metal Bin Storage:

The southern and western perimeter of the south parking lot area is used for the temporary storage of empty metal bins and plastic packaging. No environmental concerns relating to the usage of this area were identified during the site inspection. Therefore, no sampling is proposed.



NOTE:
NO SOIL SAMPLES PROPOSED

LEGEND

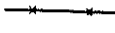
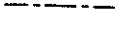
-  MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
-  PROPERTY & FENCE LINE
-  PROPERTY LINE
-  FENCE LINE INSIDE PROPERTY LINE
-  APPROXIMATE MONITORING WELL LOCATION
-  PROPOSED SOIL BORING LOCATION

FIGURE 6-4

PROPOSED SOIL SAMPLING LOCATIONS
AREA 4-PROCESS WASTE AND
HAZARDOUS DRUM STAGING AREA

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JOB#: 12-0800773-001	DATE: 01/28/93

Paint Storage Building:

Chemical materials staged in the paint storage building include acrylic powder paint, wet paints, nonhazardous water-based primer, general maintenance paint, and various plater chemicals. All chemicals are stored in limited quantities for use on the painting and electroplating lines. No floor drains are known to exist in this building. In addition, no evidence or record of any discharges have been identified. Therefore, no sampling is proposed at this location.

Maintenance Garage:

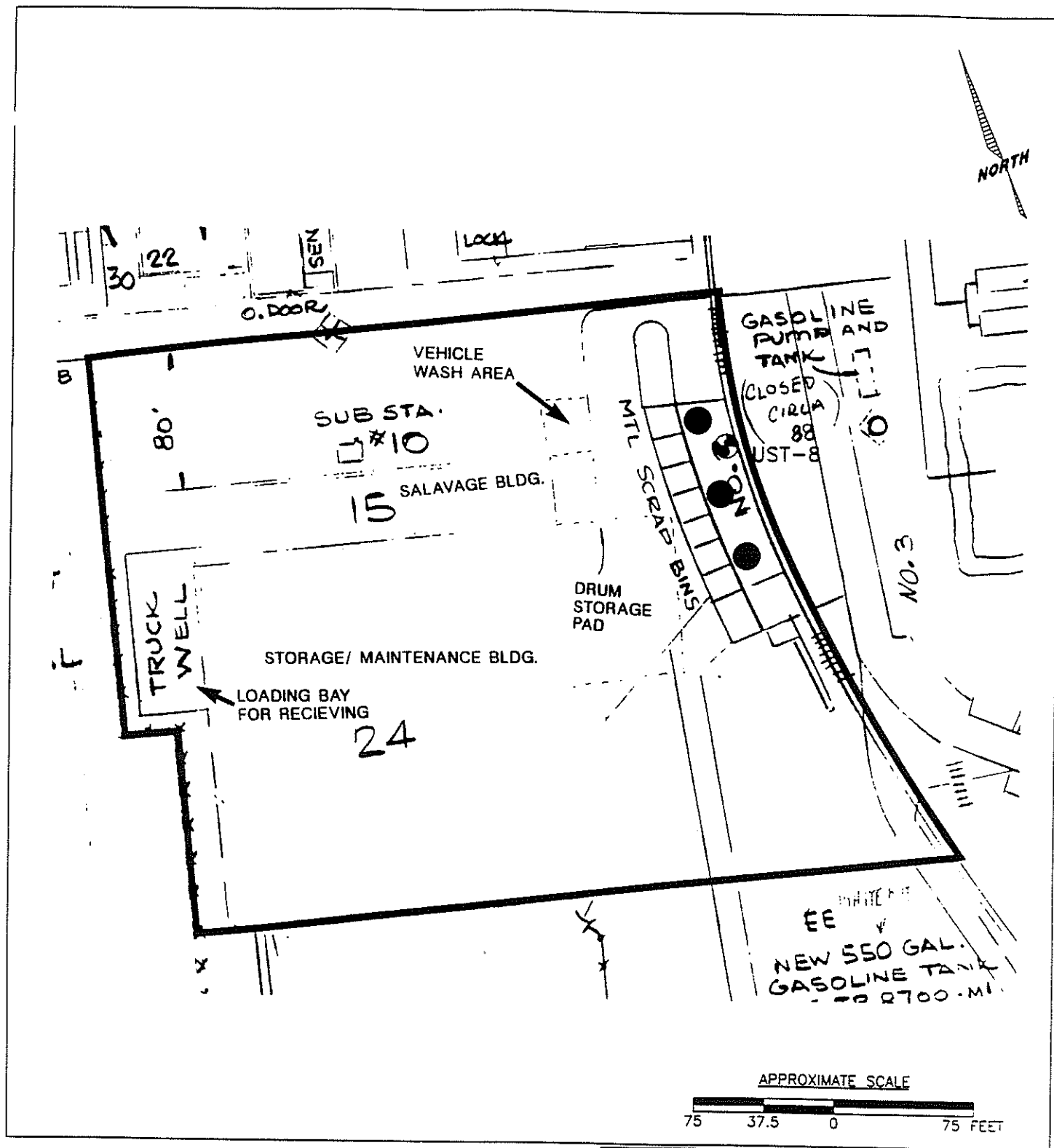
The garage is used primarily for the maintenance of forklifts and other light vehicles. Limited quantities of materials associated with the maintenance operations such as lubricating oils, hydraulic oils and compressed gases are stored in this area. A single floor drain was identified in the store room. This drain is reportedly connected to a storm drain. No evidence of spill releases or staining were identified around the floor drain during the site inspection.

550-Gallon Aboveground Diesel Storage Tank:

A 550-gallon AST is located south of the garage. Diesel fuel is stored in this AST for the purpose of fueling small vehicles. Some oil staining was noted on the surrounding soils located beneath a fill port. Consequently, one soil boring (Figure 6.6) will be collected in the area of staining. A sample shall be collected from the 0-6 inch interval and analyzed for TPH.

200,000-Gallon Aboveground Water Tank:

A 200,000-gallon water tank is located south of the paint storage building. Records indicate that the AST was installed in the late 1940's and is of steel construction. Water stored in this tank



LEGEND

- MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
- PROPERTY & FENCE LINE
- PROPERTY LINE
- FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

FIGURE 6-5

PROPOSED SOIL SAMPLING LOCATIONS
AREA 5—RAW MATERIALS STORAGE
AND MAINTENANCE

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EAST TRENTON, NEW JERSEY



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ENVIRONMENTAL ENGINEERING CORP
WARREN, NEW JERSEY

DRWN: B.R.F.

CHK'D: E.C.

JOB#: 12-0800773-001

DATE: 01/28/92

is used to augment the facilities fire emergency supply. No concerns relating to tank usage were noted during the site inspection. Therefore no sampling is proposed at this location.

Area #7: Die Storage and Raw Materials Storage (Former Sludge Drying Bed #5)

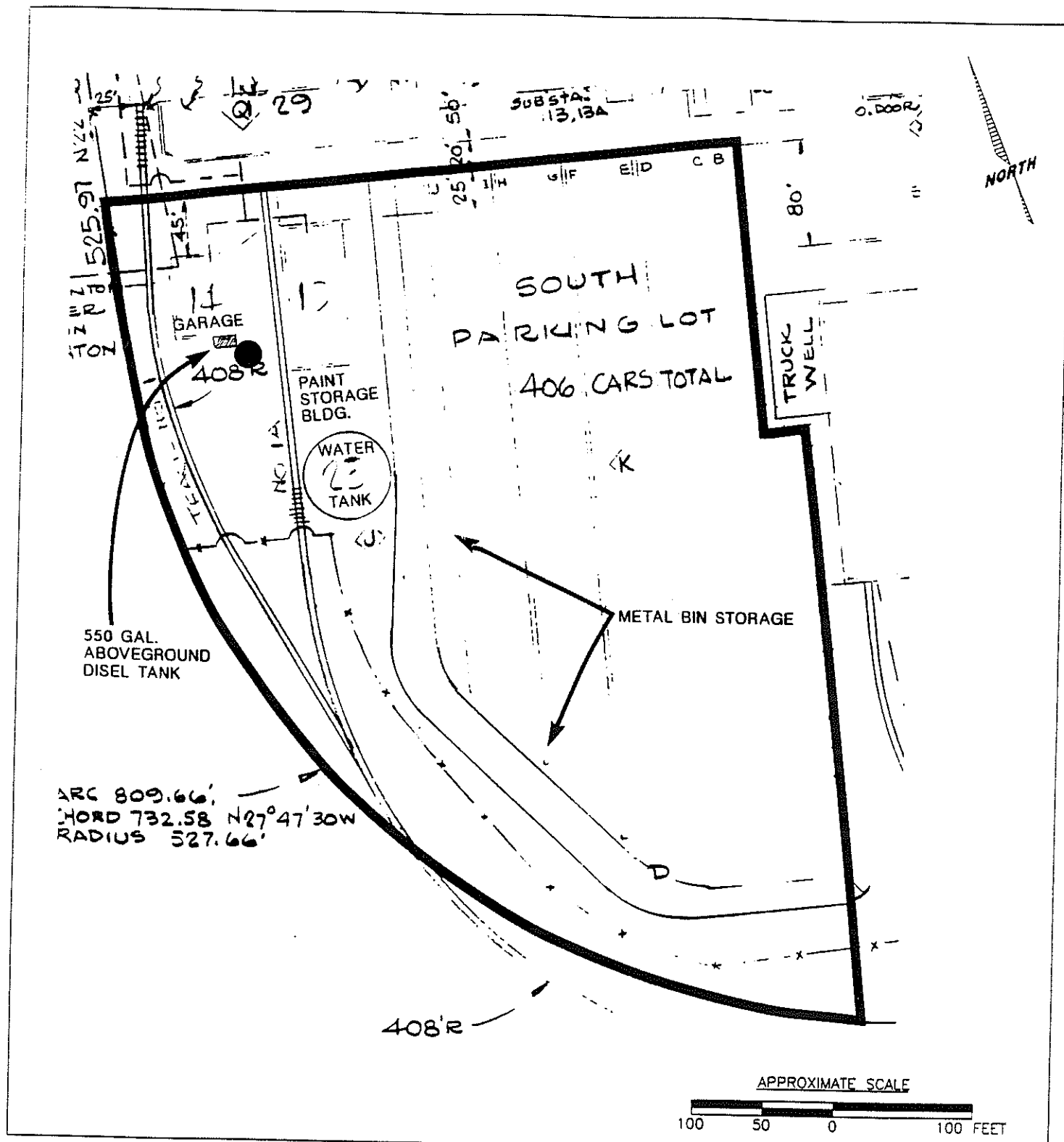
The die and raw materials storage area is located west of the waste water treatment facility. A railroad spur intersects the eastern edge of the storage area and terminates at the southwest corner of the maintenance building. This area is currently used for the temporary storage of dies and drummed raw materials. According to facility personnel, the unpaved area east of die cast storage was formerly operated as a sludge drying bed (sludge drying bed #5). Finally, a 550-gallon above ground gasoline tank is located north of the former sludge drying bed and north west of the waste water treatment facility.

Die Storage:

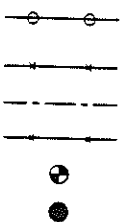
The storage area has been historically used for the temporary staging of steel dies and molds utilized in the zinc die cast operation. When not in use, the dies are inventoried, placed on wooden pallets, and temporarily staged on the concrete pavement until additional usage is required. No environmental concerns relating to this area were identified during the site inspection. Therefore, no sampling is proposed at this location.

Raw Materials Drum Storage:

The raw materials drum storage area was located at the southwest corner of the Maintenance Building and north of the die cast storage. Since then, it has been moved inside to Equipment Storage. The area is approximately 60' x 70' and is paved with concrete. This area has been historically used for the storage of drummed raw materials including cutting oils, lube oil, Chem-Clean concentrate, and caustic potash. Chemical materials stored here are primarily used in operations conducted in the maintenance building. No staining or other evidence of leakage were noted during the site inspection. Therefore, no sampling is proposed at this location.



LEGEND



- MAIN SANITARY SEWER ON EASEMENT 20' WIDE (TO EWING TWP.)
- PROPERTY & FENCE LINE
- PROPERTY LINE
- FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

FIGURE 6-6

PROPOSED SOIL SAMPLING LOCATIONS
AREA 6-SOUTH PARKING LOT WITH PAINT
STORAGE BUILDING AND MAINTANCE GARAGE

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DATE: 01/28/01

550-Gallon Above Ground Gasoline Tank:

The 550-gallon gasoline AST was installed in 1989 for the purpose of fueling maintenance equipment. According to facility records the tank is of steel construction and is located within a metal secondary containment system including a metal roof. No evidence of leakage or staining was noted in the secondary containment during the site inspection. Therefore, no sampling is proposed at this location.

Former Sludge Drying Bed #5:

Former Sludge Drying Bed #5 is located west of the waste water treatment plant and east of the die cast storage area. According to facility records, the asphalt lined impoundment was operated for a limited period during the late 1950's. Process waste waters generated from GM's painting and plating operations have been historically treated at an on-site waste water treatment facility. Sludges generated during the waste water treatment process were dewatered in the sludge drying bed and eventually disposed of off-site. GM discontinued use of the sludge drying bed #5 due to mechanical operational problems. Alternatively, four new sludge drying beds were constructed east of the waste water treatment plant. Details regarding the current disposition of these four impoundments are presented in the Area #10 discussion. No records relating to the exact dimensions of the impoundment or the subsequent decommissioning process were available at the time of this submission.

In order to characterize the nature of any sludge residuals which may still exist in the former impoundment area, a total of 5 soil borings (Figure 6.7) will be drilled. The objective of this sampling will be to vertically and horizontally define the limits of sludge material and thus potential soil contamination so that a remediation strategy, if necessary, can be developed.

Proposed sampling procedures to be implemented at this location are as follows. A sampling grid will be established in order to maintain horizontal control during the sampling investigation and for verifying the locations of sampling points with respect to site features. Continuous split spoon sampling shall be conducted at each boring location until the asphalt liner is encountered.

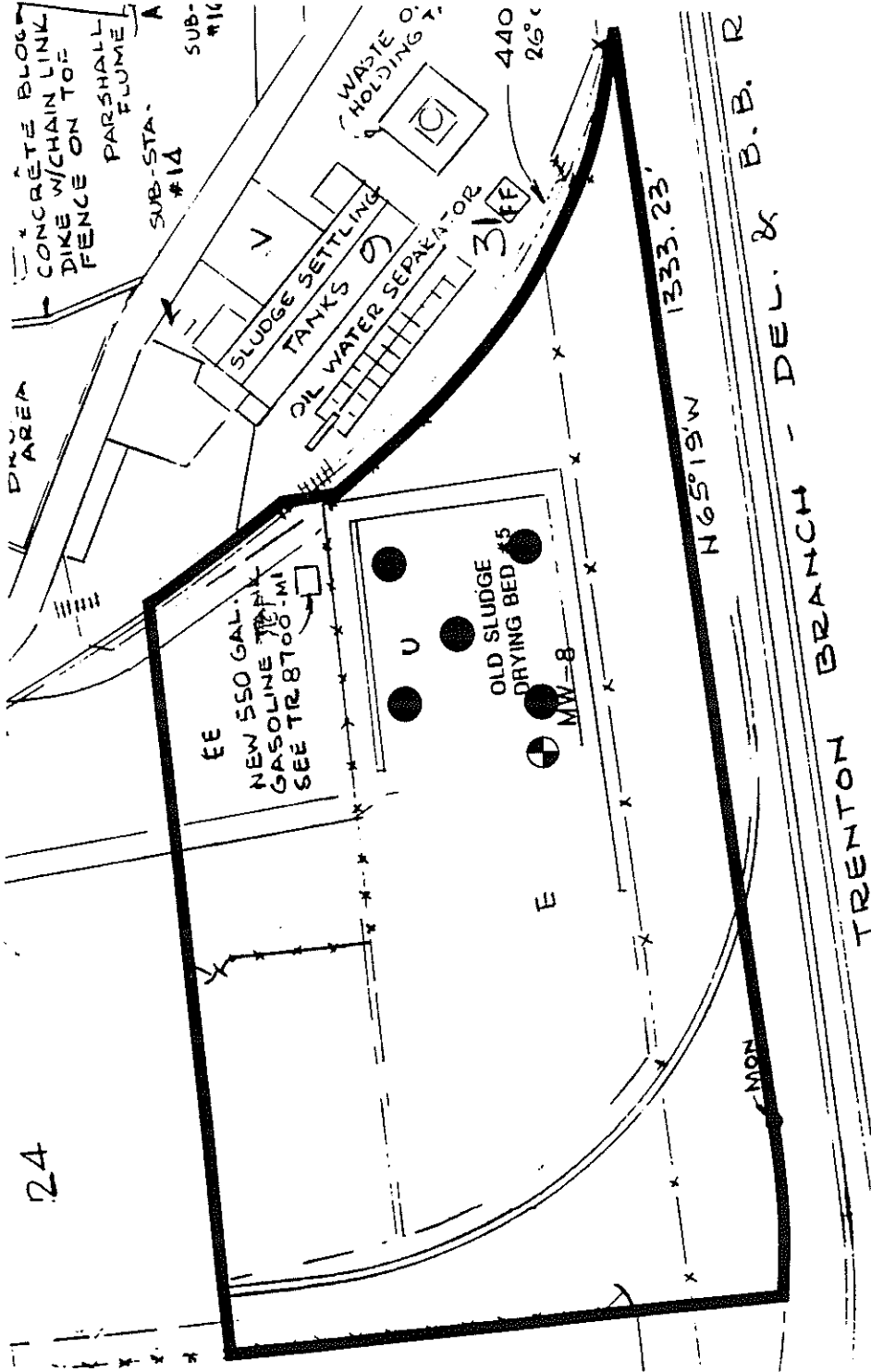
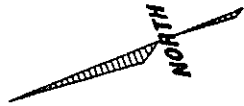
Sediment samples for analysis shall be collected from each distinct sediment layer greater than 6 inches thick. Each split spoon sample collected within a layer shall be field screened. The sample evidencing the highest apparent contamination based on field screening and visual factors such as odors and staining will be selected for analysis. Analytical parameters for selected samples will include TPH, metals, CN, pH, TOC and VOC compounds.

AREA #8 Wastewater Treatment Plant

The wastewater treatment plant is located southeast of the power house and hazardous waste containment area. The plant was constructed in 1937 initially in order to process wastewaters generated in the facilities plating and painting processes prior to discharge. The wastewater treatment area consists of a waste treatment building, eight 150,000-gallon neutralization tanks with associated sand filters, two former 1,000,000-gallon sludge settling tanks, an oil-water separator, two 20,000-gallon sludge thickening tanks, an above ground 11,000-gallon waste oil holding tank, a parshall flume, a 8,000-gallon sulfuric acid AST, a 8,000-gallon sodium bisulfite AST, a 9,000-gallon sodium hydroxide AST, and a 8,000-gallon sodium hypochlorite AST. Two power substations are located west of the neutralization tanks and north of the sludge settling tanks. Finally, information obtained from facility personnel indicates that a trash incinerator was formerly located in the waste oil holding tank area.

Plating fluids (including copper-cyanide, acid-copper, and nitric acid baths used to plate and strip nickel-chromium), waste oils (consisting of spent lubricating or metals fluids and hydraulic oils), and contact cooling water (used in the molding of plastics) are discharged directly from the process lines in the manufacturing building to the industrial process sewer system. The treatment plant also receives sludges from the power house boiler treatment tanks and non-contact cooling water from the cooling tower. Construction records indicate that all wastewater process sewers are constructed of a ceramic crock material. A sanitary and acid sewers schematic flow drawing is presented in Appendix 2.

24



LEGEND

- MAIN SANITARY SEWER ON EASEMENT 20' WIDE (TO EWING TWP.)
- *—*—* PROPERTY & FENCE LINE
- *—*—* PROPERTY LINE
- *—*—* FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

APPROXIMATE SCALE



FIGURE 6-7

PROPOSED SOIL SAMPLING LOCATIONS
AREA 7-DIE AND RAW MATERIALS STORAGE

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WARREN, NEW JERSEY

DRWN: B.R.F.	CHK'D: E.C.
JOB#: 12-0800773-001	DATE: 02/28/93

Information obtained from GM personnel regarding wastewater discharge history indicates that in 1938, wastewater was treated for cyanide and pH. At this point in time pre-treated water was discharged to the City of Trenton facility through the sewer system. Due to Trenton City's treatment capacity problems, wastewater was subsequently discharged to the Ewing-Lawrence Sewage Authority (ELSA), the local publically owned treatment works (POTW). As such, all pretreated industrial wastewater is currently discharged to the ELSA-POTW. The plant's daily treatment capacity is estimated to be approximately 1,000,000 GPD.

The wastewater treatment process consists of the following. Process wastewater from the plating, anodizing, phoscoating, die casting and washing, parts finishing and stripping, heat treatment, and power house operations, and the paint spray and cleaning booths area discharged to the industrial sewers. All cyanide wastes are first treated at the in-plant cyanide treatment system prior to discharge to the process sewer. Wastewater received by the treatment plant is first directed to an oil-water separator. It is during this phase of the treatment process that oil is removed via an oil skimmer and collected in the waste oil AST. Next, the aqueous fraction of the wastewater is gravity fed to the neutralization tanks and treated with sodium hydroxide, sulfuric acid, sulfur dioxide, and sodium hypochlorite, as required.

Pumped discharge from the neutralization tanks is treated with a coagulant and directed to a sludge settling tank. The resulting aqueous phase is pumped through sand pressure filters, a parshall flume and discharged to the POTW. Sludges collected from the settling tank are directed to the sludge thickening tanks at the treatment building, processed through a plate and frame filter press with resulting filter cake removed for disposal. Residual fluids collected during the filter press process are re-directed to the neutralization tanks. Sludges removed from the oil skimmer tank are directed to the neutralization tanks for final treatment.

Oil-Water Separator:

The oil-water separator is located northwest of the waste oil AST and west of the former sludge settling tanks. According to records the oil-water separator was installed in September 1990 in order to replace the adjacent sludge settling tanks located just to the east. The separator system

consists of 10 concrete lined cells (which have been treated with an acid-proof coating) with waste oil/sludge sumps and a pump house located at either end. Construction as-built drawings indicate that the base of the separator was installed approximately 2.0 feet into bedrock or 16.5 feet below grade. The treatment capacity of the system is approximately 1.5 million gallons per day for each side.

Wastewater collected from the process is directed to the neutralization tanks for further processing. Waste oil skimmed during separation is pumped to the adjacent waste oil AST. Finally, sludges which have settled out of solution are pumped to the waste stream for final treatment. The transfer of all oil, water, and underground constituents is conducted through above ground piping.

The oil-water separator system is of fairly new construction and has been operational for only a short period of time. In addition, all interior surfaces have been treated with an acid proof coating thus contributing significant corrosion resistance to the concrete base. Given the brief period of operation and the nature of it's construction, it is not likely that the system will have impacted the surrounding soils. Therefore, no sampling is proposed at this location.

Sanitation Deck Washdown Area:

A vehicle/equipment washing and staging deck area is located northeast of the new oil-water separator system. This staging area consists of a bermed concrete pad. A sump pit located at the southeast corner of the containment area discharges wash water directly to the oil-water separator for pretreatment in the wastewater treatment facility. Some staining was observed at the southwest corner of the containment area during the site inspection. The concrete pad and collection sump and surrounding pavement all appear to be in good condition. Therefore, no sampling is proposed for this area. Alternatively, the collection sump will be visually inspected for integrity during the proposed soil sampling investigation. Photo documentation collected during the inspection activities will be available to the Department as required.

Former Primary Sludge Settling/Waste Oil Tanks:

The former sludge settling/waste oil tanks are located west of the wastewater treatment plant and east of the new oil water separator. The entire unit consists of an oil skimming unit, two 160,000-gallon sludge settling tanks, and a 30,000-gallon waste oil tank. The waste oil tank shares a common wall with the eastern primary sludge settling tank. The primary sludge settling and waste oil tanks are constructed of reinforced concrete extending to a depth of approximately eleven feet below grade.

This unit was installed in 1938 for the purpose of removing process waste cyanide and neutralization from wastewaters prior to further pretreatment. The oils typically consisted of spent lubricating or metal working fluids and hydraulic oils. All oils were either transported to the waste oil storage tank by a honey wagon specifically designated for this purpose or discharged to the industrial process sewer. All oils discharged directly to the sewer were removed at the two primary sludge treatment tanks. At the south end of these two tanks was an isolated "calm" zone. In this zone a skimming apparatus was used to remove any oil from the surface of the water and gravity discharged directly through a sheet metal screen to the waste oil storage tank.

In order to delist the GM Trenton plant from an approved TSDF facility status to a "less than 90 days" generator status, GM initiated a RCRA Closure of the waste oil tank. All closure activities were conducted in accordance with the Soil Sampling and Analytical Plans (December 4 and 21, 1990) and Closure Plan (March 13, 1991) submitted to NJDEPE, with several exceptions.

Prior to decommissioning, all waste oil was removed from the waste oil tank for recycling at an off-site oil reclamation facility. The tank was then decontaminated using a biodegradable alkaline cleaner and triple rinsed. Subsequent to decontamination, each wall of the tank was sand blasted. In order to determine if soils may have been impacted during historical operation of the waste oil tank, a sampling plan SSAP was developed. Subsequent to decontamination and demolition, post-excavation samples would be collected and analyzed for target compound list

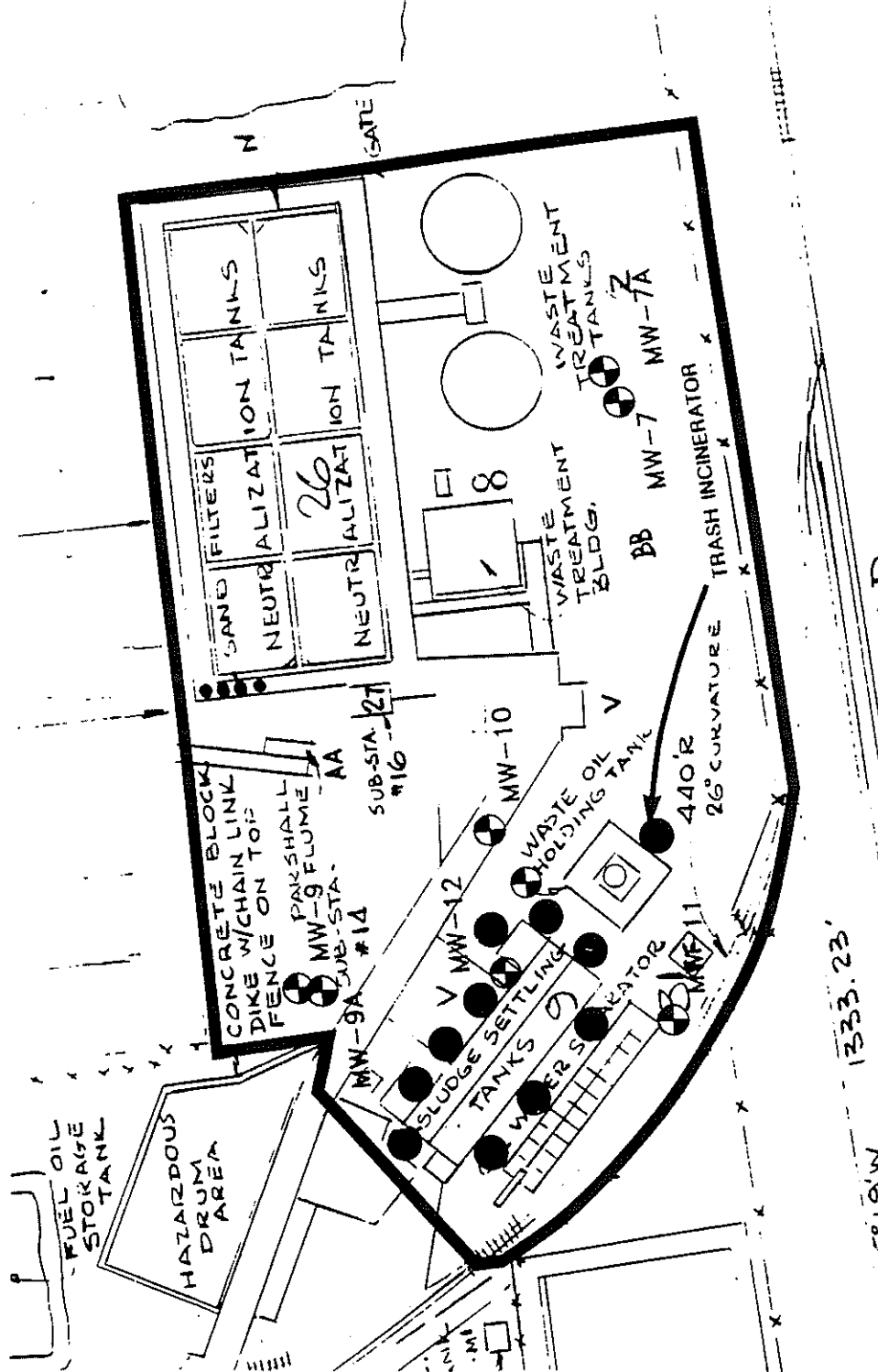
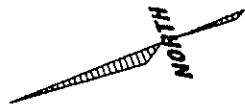
(TCL) volatile organic compounds, chromium, copper, nickel, and lead, PCBs, cyanide, and TCLP base neutral compounds. Soil sampling associated with the closure of the waste UST was not completed however. As approved by NJDEPE, sampling has been deferred due to the proximity of the two adjacent primary sludge settling tanks.

Upon decommissioning, each primary sludge settling tank contained approximately 500 cubic yards of F006 plating sludge. Currently, sludges are removed from the former primary settling tanks and processed into the wastewater sludge treatment facility in quantities which do not exceed the facilities treatment capacity. GM anticipates demolition and removal of the primary settling tanks subsequent to the removal of all sludges.

Due to the size and historical usage of the primary sludge settling tanks, the porous nature of the tank construction materials, and potential for seepage, a total of 10 soil borings (Figure 6.8) will be drilled to the perimeter of the tanks. Based on the dimensions of the tanks soil samples will be collected from the 5.0 to 5.5' interval and again six inches below the tank invert. Samples shall be analyzed for TPH, metals, pH, cyanide, BN, and VOC compounds.

11,000-Gallon Above Ground Waste Oil Tank:

The waste oil tank was designed as a collection point for waste oils skimmed from the surface of the primary settling and oil removal tanks. The tank is located to the southeast of the primary settling tanks within a bermed secondary containment equipped with a plastic liner and drainage sump. The tank is constructed of steel coated with an insulating material; it has a 11,000-gallon capacity and stands vertically within the secondary containment. Due to operational problems with the oil skimmers and a reduction of the amounts of oil entering the combined sewer, only limited quantities of oil have been removed since the system was installed. In view of the age of the tank system, and as there have been no leaks or discharges from the waste oil tank system, including the above ground pipework from the primary settling tanks, no soil sampling is proposed. Groundwater monitoring wells MW-10 and MW-11 are located to the northeast and northwest, respectively, of the waste oil tank; no indication of petroleum compounds has been noted in either of these wells.



LEGEND

- MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
- *— PROPERTY & FENCE LINE
- — — PROPERTY LINE
- — — FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

APPROXIMATE SCALE



FIGURE G-8

PROPOSED SOIL SAMPLING LOCATIONS
AREA 8-WASTE WATER TREATMENT AREA

FISHER GUIDE DIVISION, GENERAL MOTORS CORP.,
EAST TRENTON, NEW JERSEY



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WARREN, NEW JERSEY

DRWN: B.R.F.

CHK'D: E.C.

JOB#: 12-0800773-001

DATE: 02/28/93

Neutralization Tanks:

The discharge from the primary settling and oil removal tanks flows under gravity at an average flow of 600-800 gpm to the bank of neutralization tanks. A total of eight tanks, each with a capacity of 150,000-gallons, are used for dosing the effluent with sodium hydroxide, sulfuric acid, sulfur dioxide and sodium hypochlorite. The dimensions of the tanks are approximately 63 feet by 44 feet, and the tanks are constructed of reinforced concrete. The tanks are fully operational as part of the wastewater treatment system, and there is no indication that the integrity of the tanks has been compromised or that there have been any discharges from the tanks onto the surrounding soils. No sampling is proposed at this time.

Waste Treatment Sludge Settling Tanks:

Effluent from the neutralization tanks is pumped at a flow of 1200-1500 gpm to two, 1,000,000-gallon settling tanks. At present, only one of these tanks is operational, the other being empty and out of service. Both tanks are of a similar design, above ground and circular, constructed of reinforced concrete sides and base. Both tanks are approximately 60 feet in diameter with walls 20 feet high. No leaks or spills from either of the tanks are known, and no sampling is proposed at this time.

Waste Treatment Building:

Liquid effluent from the settling tanks is gravitationally directed to the pressure filter wet well and through sand polishing filters to the sanitary sewer, via the parshall flume. Sludges are pumped to above ground sludge thickener and storage tanks, located to the south of the wastewater treatment facility. Both tanks are constructed of steel, approximately 30 feet high and 10 feet diameter. Sludge from the tanks is pumped inside the wastewater treatment building to a filter press, where remaining moisture is removed and the sludge reduced to a cake form for disposal. Filtrate is separated and circulated back to the neutralization tanks. All caked sludges are manifested off-site for disposal. As all operations, including the loading of the caked

material onto roll-offs, are conducted inside the building in an area with a concrete floor, no sampling is proposed.

Former Trash Incinerator:

To the west of the primary settling and oil removal tanks was the former location of a trash incinerator which was used for the disposal of general combustible trash such as paper products and wooden pallets. The incinerator was taken out of service in approximately 1960. As no samples were taken at the time of decommissioning, it is proposed to take continuous split-spoon samples from one soil boring (Figure 6.8) in the former incinerator location, to the depth of the underlying bedrock. Samples will be visually inspected and field screened, with a six-inch increment selected for analysis. The sample selected will be analyzed for priority pollutant metals and pH.

AREA #9 Power House Parking Lot and Equipment Storage Area

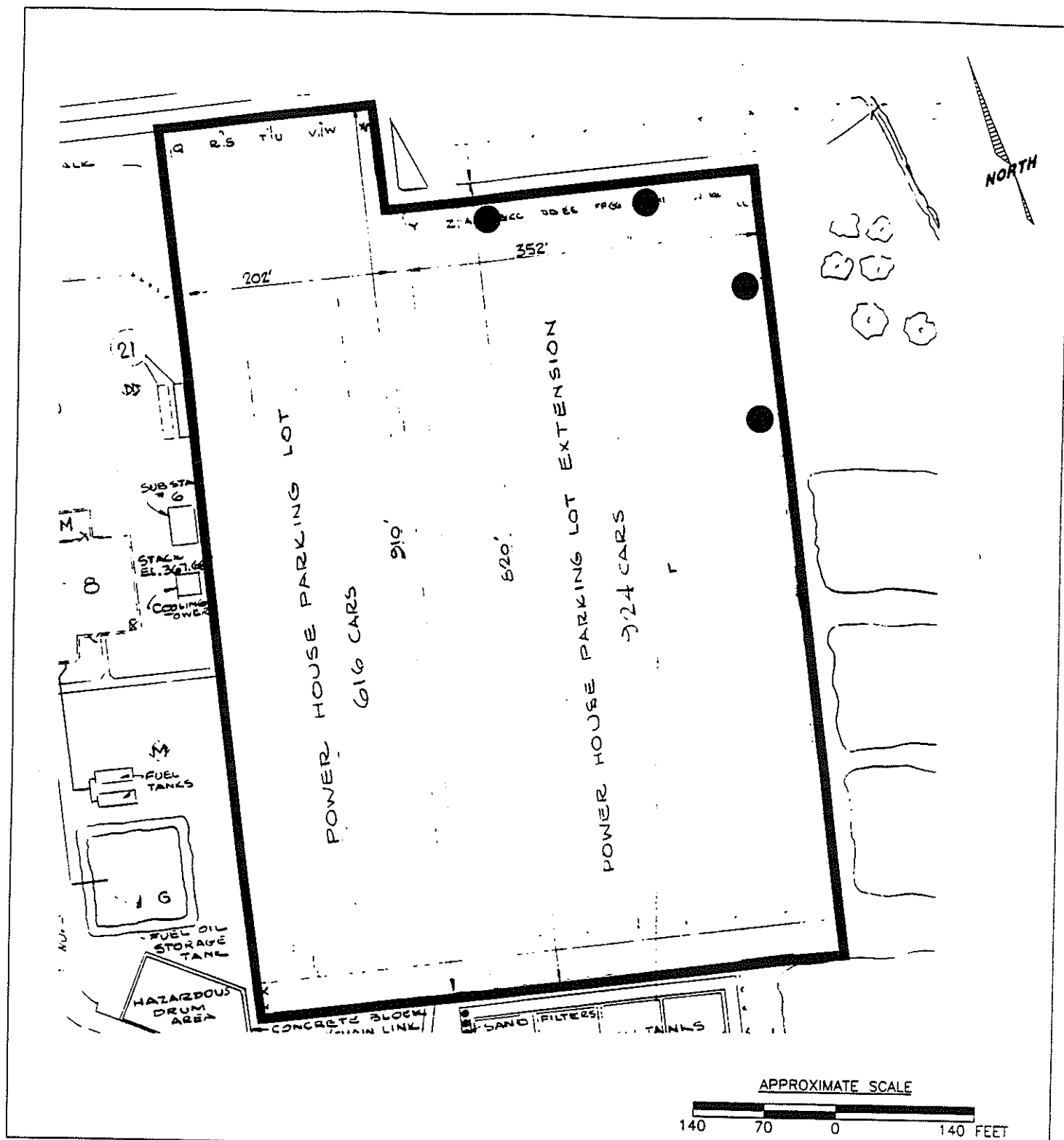
The power house parking lot and equipment storage area are located east of the power house facility and west of the sludge drying beds. This area was originally utilized as an overflow parking area for employees. The lot consists of both concrete and asphalt paved base and covers an approximate area of 550' x 820'. Currently this area is used for the temporary storage of various equipment and materials removed from the maintenance and manufacturing buildings. Equipment identified during the site inspection include metal parts racks, filter canisters from the buffing line, metal drop boxes and baskets, a dumpster containing construction debris, a Conair PVC hopper/heater/circulation unit, filter tanks, paint pressure canisters, sump pumps, fork lifts, a copper plater, hydraulic presses, and metal scrap. Minor staining was observed on the pavement surrounding hydraulic presses located along the northern edge of the lot. This area is bordered by soil to the north. In order to determine whether potential soil contamination may have resulted from equipment storage in this area, four soil samples (Figure 6.9) will be collected from the unpaved area. Samples will be collected from the 0-6 inch interval and analyzed for TPH, metals, and VOC compounds.

AREA #10 Former Sludge Drying Beds #1 through #4

Former Sludge Drying Beds #1 through #4 are located east of the waste water treatment plant and west of Gold Run Creek. According to facility records, the unlined impoundments were operated for the period of approximately the mid 1950's to 1972. Process waste waters generated from GM's painting and plating operations have been historically treated at an on-site waste water treatment facility. Sludges generated during the waste water treatment process were dewatered in the sludge drying beds and periodically excavated and disposed of off-site. Chemical constituents present in the sludges may have included CN, trace organic solvents, copper, nickel, chromium, and zinc. In 1972 GM discontinued use of the sludge drying beds and began processing waste sludges through a filter press operation prior to transporting the material for off-site disposal. No records relating to the exact areal dimensions of the impoundments were available at the time of this submission. Information provided by site personnel indicate that the total depth of each impoundment was approximately 4 feet below ground surface.

Closure of the former impoundments was conducted from 1973 to 1974. The closure procedure consisted of emplacement of non-hazardous construction and demolition debris in each impoundment to or near grade, leveling of the impoundments side walls (which were constructed of native soils), and the emplacement of a final cover of construction debris fill material. According to facility personnel, sludges that were present in the former impoundments at the time of closure were not removed.

In 1984, a limited sampling investigation was conducted in the former impoundments in support of a New Jersey Pollution Discharge Elimination System (NJPDES) permit application process for groundwater discharge associated with the closed sludge drying beds. On March 8, 1984 Lawler, Matusky and Skelly Engineers collected a total of eight soil and four water samples from four test pits which were excavated in the impoundments. Samples were analyzed for priority pollutant compounds plus 40 additional peaks and total cyanide. Analytical results indicated the presence of nickel, chromium, cyanide, arsenic and organic solvents in sludge samples and water samples collected from each of the impoundments. A findings report



LEGEND

- MAIN SANITARY SEWER ON EASEMENT
20' WIDE (TO EWING TWP.)
- *—*— PROPERTY & FENCE LINE
- — — — — PROPERTY LINE
- +—+— FENCE LINE INSIDE PROPERTY LINE
- ⊕ APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

FIGURE 6-9

PROPOSED SOIL SAMPLING LOCATIONS
AREA 9-POWER HOUSE PARKING LOT
AND EQUIPMENT STORAGE AREA

FISHER GUIDE DIVISION, GENERAL MOTORS CORP.,
EAST TRENTON, NEW JERSEY



McLAREN/HART
ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY

DRWN: B.R.F.

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DATE: 01/28/93

detailing results of the investigation was prepared and submitted to the NJDEPE for review in April 1986.

Based on results of the preliminary sampling investigation, a formal groundwater investigation was initiated in 1986 with the installation and sampling of 12 monitoring wells located both upgradient and downgradient of the four inactive sludge drying impoundments. GM continues to monitor groundwater quality in this location in accordance with the requirements set forth in their NJPDES/DGW permit number NJ0075469 as revised in March 1990. As discussed in Section 3.3 of this report, several additional groundwater investigations have been conducted at the site in order to determine the impact of historical operations and documented discharges to groundwater, including those identified in the former sludge impoundment area. These reports have been submitted to NJDEPE for review and are currently being evaluated by the NJDEPE.

A review of available analytical documentation has revealed the presence of selected compounds in samples collected from the former sludge impoundments. The precise areal extent of residual sludge material and potentially impacted soils however, have not been determined. In order to further characterize the nature of sludge materials which may still exist in the former impoundment area, a total 10 soil borings (Figure 6.10) will be drilled. This preliminary investigation is designed to determine the extent and magnitude of the sludge material, and so the area encompassing lagoons #1 through #4 will be treated as a single area of concern. However, based on the findings of the investigation, remedial action may be performed on each lagoon individually.

Detailed sampling logs will be kept in order to accurately characterize the vertical extent of each distinct sediment layer identified during drilling activities. Sediment samples for analysis shall be collected from each distinct sediment layer greater than 6 inches thick. Each split spoon sample collected within a layer shall be field screened. The sample evidencing the highest apparent contamination based on field screening and visual factors such as odors and staining will be selected for analysis. Analytical parameters for selected samples will include TPH, metals, CN, pH, TOC and VOC compounds.

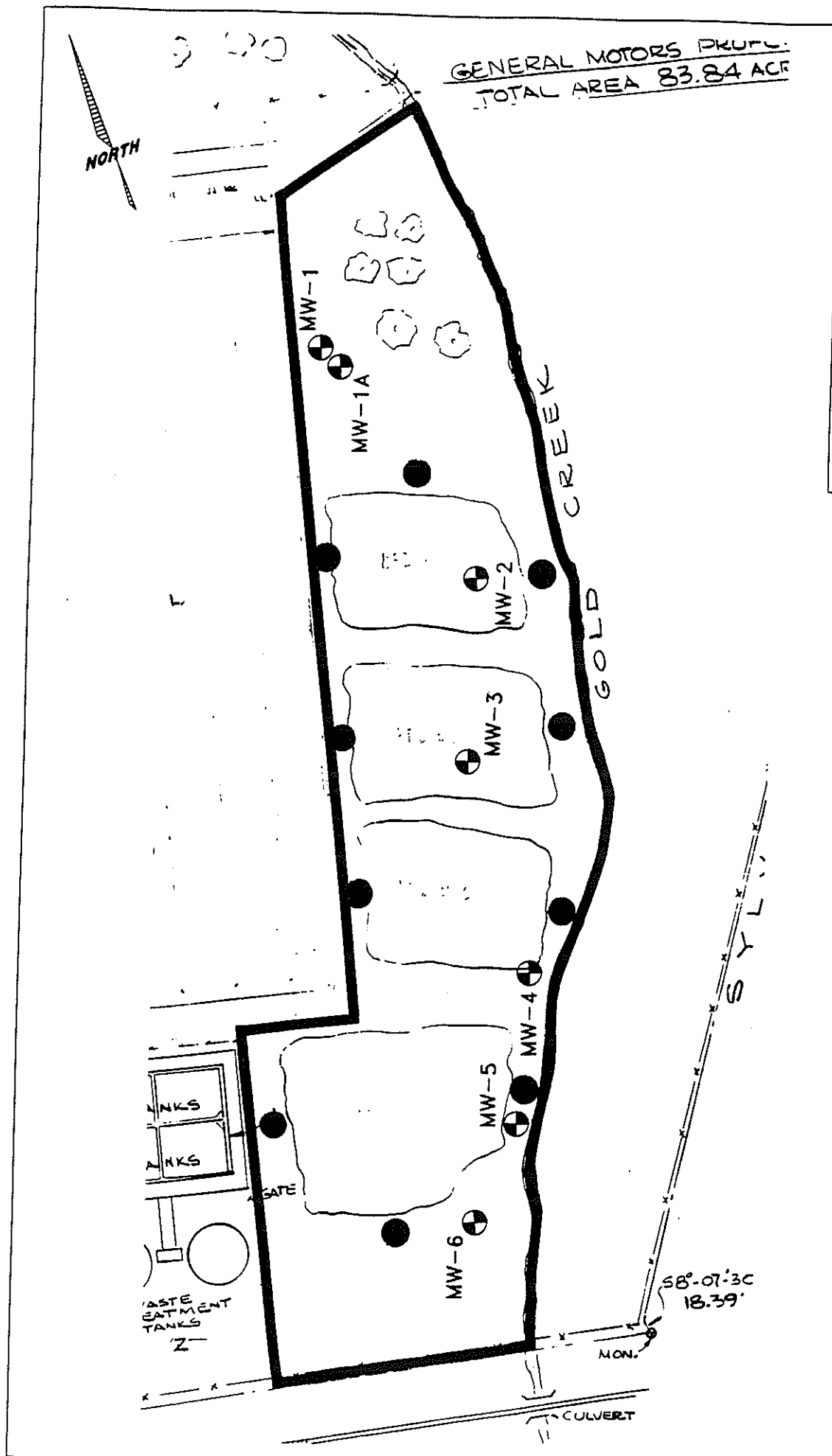


FIGURE 6-10	
PROPOSED SOIL SAMPLING LOCATIONS AREA 10-FORMER SLUDGE DRYING BED AREA	
FISHER GUIDE DIVISION, GENERAL MOTORS CORP. EAST TRENTON, NEW JERSEY	
 McLAREN/HART ENVIRONMENTAL ENGINEERING CORP. WARREN, NEW JERSEY	
DRWN: B.R.F.	CHK'D: E.C.
JOB#: 12-0600774-001	DATE: 06/01/92

LEGEND

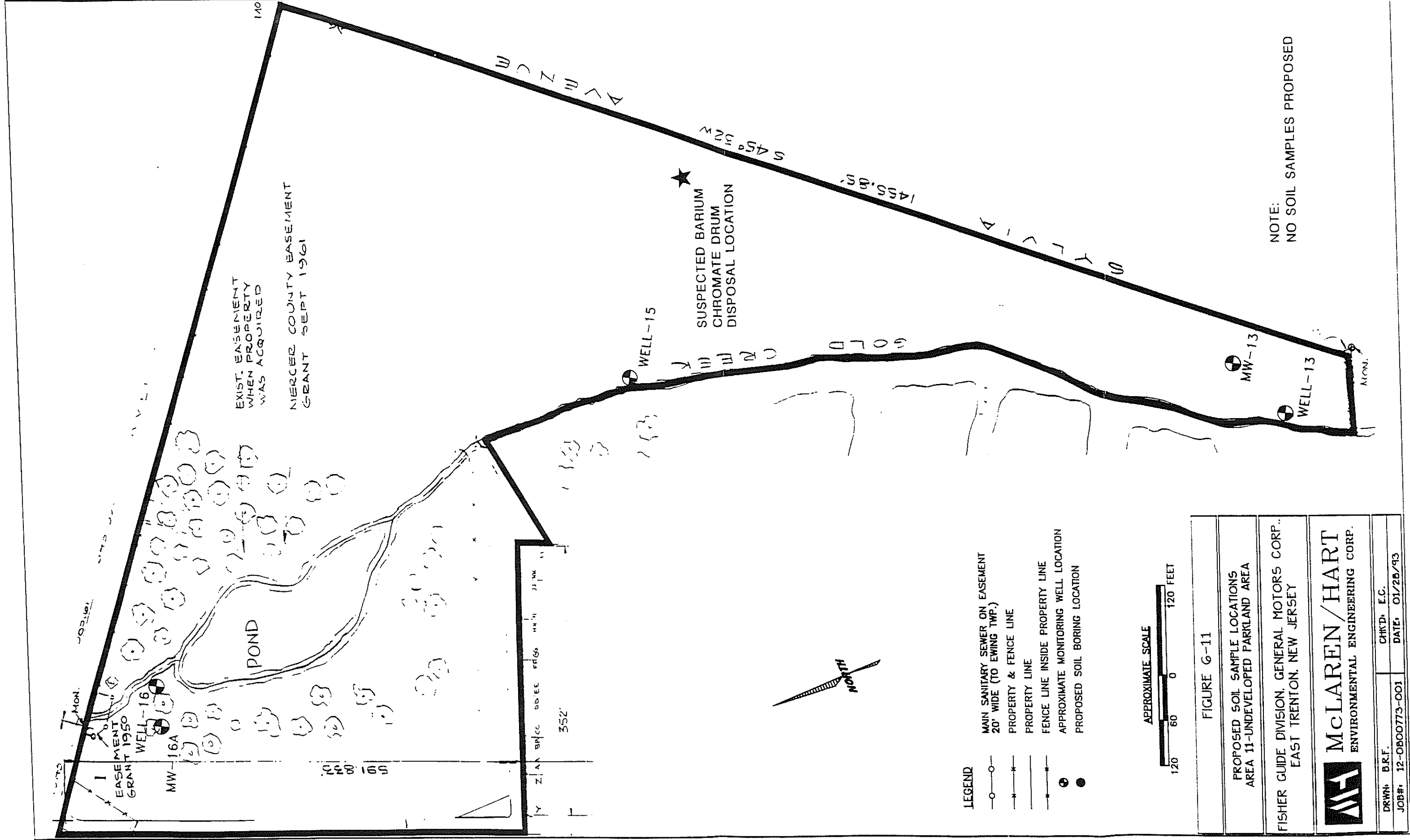
- — ○ MAIN SANITARY SEWER ON EASEMENT 20' WIDE (TO EWING TWP.)
- x — PROPERTY & FENCE LINE
- — — PROPERTY LINE
- · — FENCE LINE INSIDE PROPERTY LINE
- APPROXIMATE MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION

APPROXIMATE SCALE

130 65 0 130 FEET

AREA #11 Undeveloped Parkland Area

A parcel of undeveloped parkland (Figure 6.11) is located along the northeastern and far eastern edge of the GM property. This area is intersected along its length by Gold Run Creek. A picnic area and former baseball diamond are located in the northeast corner of the area. Information obtained from facility personnel indicate that this area has never been used for any manufacturing purposes. Recently obtained information from a former employee suggested that one location, indicated on Figure 6.11, was used for the disposal of approximately forty, 55-gallon drums containing barium chromate waste. GM is currently compiling a closure plan for this location which will involve an initial investigation to assess the current condition of the drums, if present, before proceeding with their removal and disposal. If there are any indications that the integrity of the drums has been compromised, soil samples will be collected and analyzed for the appropriate parameters to assess any impact on the surrounding soils. The NJDEPE will be kept informed as to all progress in this matter.



7.0 QUALITY ASSURANCE/QUALITY CONTROL

The purpose of this Quality Assurance/Quality Control (QA/QC) Plan is to document the procedures that will be implemented to ensure the quality, representativeness, and completeness of data generated from sampling activities at GM.

All collection and analysis of soil samples will be performed using current NJDEPE or USEPA accepted field and laboratory protocol.

7.1 SAMPLING EQUIPMENT/DECONTAMINATION

All sampling equipment (e.g. split spoons, trowels, hand augers) will be constructed of stainless steel. To reduce the possibility of cross-contamination of samples, all sampling and measuring equipment will be decontaminated prior to use. Sampling equipment will be decontaminated in the field using the following method: non-phosphate detergent and water wash; tap water rinse; distilled, deionized water rinse; 10% nitric acid rinse; distilled, deionized water rinse; acetone rinse; air dry; distilled, deionized water rinse. All drilling equipment will be steam cleaned between soil borings.

7.2 SOIL SAMPLING

Shallow soil samples will be collected with hand augers or hand trowels. Subsurface soil samples will be obtained by first using a hollow-stem auger drill rig to penetrate any surface cover. Split spoon samplers, each of 2-foot length, will then be advanced to obtain soil samples at discrete depth intervals. Samples which will be analyzed for volatile organic compounds (VOCs) will be disturbed as little as possible: i.e., surface soils will not be homogenized prior to filling sample bottles.

7.3 FIELD QUALITY CONTROL SAMPLES

Quality Control (QC) samples will be collected throughout the field investigation. These samples will serve as controls to check on cross-contamination which may occur in sample handling, storage, or shipment. In particular, the QC samples will provide quality checks on bottle preparation, equipment decontamination, ambient conditions, and blank water quality.

Trip blanks, consisting of analyte-free water in 40 milliliter (ml) vials, will be provided by the laboratory. Trip blanks will travel to the Site with the empty sample bottles and will be shipped back to the laboratory from the Site with the collected samples. The trip blanks will be analyzed for VOCs only and will be required only when samples are collected for VOC analysis. Trip blanks will accompany samples at a rate of one per shipment or two-day sampling event.

Field blanks for all matrices will be aqueous rinsate blanks. Analyte-free water from the laboratory will be passed through decontaminated sampling equipment and collected in the appropriate empty sample bottle. One field blank will be collected per day per matrix and will be analyzed for the same parameters as their associated matrix.

Duplicate samples will be collected from each matrix for five percent of the regular samples. The duplicate samples will be collected at the same location and, if possible, from the same sample aliquot as the original sample. The duplicate samples will be labelled so the laboratory is not aware that they are duplicates. Extra sample volume will be collected for matrix spike/duplicate analysis.

7.4 SAMPLE BOTTLES/PRESERVATION

Sample bottles (containing preservatives as required) will be supplied by the laboratory. Sample bottle and preservation requirements are listed below.

Analyte Preservatives

Sample Bottle (Aqueous/Solid)

VOCs

Glass vial with teflon-lined septum/HCl (aq. only) wide-mouth glass jar with teflon liner. Cool 4 deg. C.

Extractables

Amber glass bottle with teflon liner/wide mouth glass jar with teflon liner. Cool 4 deg. C.

Metals

Plastic or glass bottle HNO₃ (aq. only). Cool 4 deg. C.

Phenols

Glass bottle H₂SO₄ (aq. only). Cool 4 deg. C.

Cyanide

Glass or plastic bottle NaOH (aq. only). Cool 4 deg. C.

Petroleum Hydrocarbons

Glass bottle HCl (aq. only). Cool 4 deg. C.

PCBs/Pesticides

Glass bottle. Cool 4 deg. C.

7.5 SAMPLE CUSTODY AND SHIPMENT

Sample custody will be documented by the field team from the time the samples are collected until the samples are shipped to the laboratory. Sample bottles will be labelled, sealed, and packed on ice for shipment to the laboratory. Chain of custody forms (Figure 7.1) will accompany the samples. All pertinent sample information will also be recorded in the field notebook. Samples will be shipped to the laboratory on the same day they are collected whenever possible.

7.6 ANALYTICAL LABORATORY AND METHODS

All samples will be analyzed by a NJDEPE-certified laboratory. Analysis of all samples will be performed according to USEPA SW-846 methods or 600-series methods (aqueous only). For GC/MS methods, library searches will be performed.

Analytical results and associated quality assurance (QA) information will be supplied in a Tier II/ECRA format, consistent with the deliverable requirements outlined in the NJDEPE Technical



Name: _____
 Affiliation: _____
 Phone: _____
 Address: _____
 Client/Job No: _____
 Job Name: _____ Location: _____

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No.of Cont.	Preservatives	Analysis Requested/Remarks

Comments: _____

Relinquished by: _____ Date: _____ Shipment Method: _____
 Time: _____ Airbill No.: _____

Received by: _____ Date: _____ Relinquished by: _____ Date: _____
 Time: _____ Time: _____

Received by: _____ Date: _____ Relinquished by: _____ Date: _____
 Time: _____ Time: _____

Final Disposition of Samples: _____

Received by: _____ Date: _____ Time: _____

Requirements for Site Remediation, Proposed New Rules: N.J.A.C.7:26E (New Jersey Register, May 1992). The data packages will include results summary sheets, chains of custody, laboratory chronicles, methodology summaries, non-conformance summaries and other required analytical documentation (method blanks, tuning, calibration, spike recovery, detection limits).

Unless otherwise specified, analytical parameters referred to in the sampling plan will follow a uniform format. Analytical methods are outlined below.

- Volatile Organic Compounds (VOC) refers to USEPA Methods 8240 for soils and 624 for aqueous samples.
- Base Neutrals (BN) and Acid Extractables (AE) refer to USEPA Methods 8270 for soils and 625 for aqueous samples.
- Priority Pollutant Metals (Metals) refers to USEPA's 6000 and 7000 series of methods.
- Corrosivity (pH) refers to USEPA Method 9045.
- Polychlorinated Biphenyls (PCBs) and Pesticides refer to USEPA Methods 8080 for soils and 608 for aqueous samples.
- Total Petroleum Hydrocarbons (TPH) refers to USEPA Method 418.1 for aqueous samples. Method 418.1 is also used for soils, per modification in The ECRA GUIDE.
- USEPA Priority Pollutants (PP) includes VOC, BN, AE, Metals, PCBs, and Pesticides as above, plus Total Phenol (USEPA Methods 9066 for soils and 420.2 for aqueous samples) and Total Cyanide (USEPA Methods 9012 for soils and 355.3 for aqueous samples).

8.0 SCHEDULE

The schedule for implementing the proposed sampling plan is provided in Figure 8.1. The schedule as detailed, includes provisions for permit acquisition, implementation of proposed sampling activities, laboratory analysis, preparation of a Soil Sampling Results Report and if needed, preparation of a Supplemental Sampling Plan. Implementation of the proposed sampling plan shall be contingent upon securing all necessary permits.

ECRA Case # 92713
GM Trenton, NJ
Proposed Soil Sampling Plan Schedule

Task Name	1993										1994	
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan		
SAMPLING PLAN APPROVAL		■										
Local Permits		■										
NOTIFY NJDEPE OF FIELDWORK		■										
Conduct Soil Sampling			■	■	■							
Soil Sample Analysis				■	■	■	■					
Data Evaluation						■	■	■				
Prepare Draft Data Report								■	■			
Prepare Draft Cleanup Report									■	■		
Client Review										■		
Prepare Final Report										■		
SUBMIT FINAL REPORT											■	

NOTE: Implementation contingent on permitting and regulatory approval

