2021 Hazardous Waste Scanning Project

File Form Naming Convention.

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Note 1: Each category is separated by a period "."
Note 2: Each word within category is separated by an underscore "_"

Specific File Naming Convention Label:

V00334 Workplan.VCP.V00334.2002-06-28.Data_Gap_Addendum.pdf

ENVIRONMENTAL RESOURCES MANAGEMENT

Sonoco Products Company

Addendum To The Work Plan For Remedial Investigation - Data Gap Investigation

Greif Bros. Facility
2122 Colvin Boulevard
Town of Tonawanda,
Erie County, New York

New York State Department of Environmental Conservation Voluntary Cleanup Program Number V00334-9

28 June 2002

ERM Project Number D6714.00

Environmental Resources Management
5788 Widewaters Parkway
Dewitt, New York 13214

ERM

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ASP	Analytical Services Protocol
ASTM	American Society for Testing and Materials
bgs	Below ground surface
DGI	Data Gap Investigation
DNAPL	Dense non-aqueous phase liquid
ERM	Environmental Resources Management
FID	Flame ionization detector
ft msl	Feet above mean sea level
GC/MS	Gas chromatography/mass spectrometry
HASP	Health and Safety Plan
HSA	Hollow-stem auger
IDW	Investigation-Derived Waste
IRM	Interim Remedial Measure
MDLs	Method detection limits
µg/kg	Micrograms per kilogram
µg/L	Microgram per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCBs	Polychlorinated biphenyls
PID	Photoionization detector
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
QAPP	Quality Assurance Project Plan
RSCOs	Recommended Soil Cleanup Objectives
SOPs	Standard operating procedures
SVOCs	Semivolatile organic compounds
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TPH	Total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VCP	Voluntary Cleanup Program
VOCs	Volatile organic compounds
VRI	Voluntary Remedial Investigation

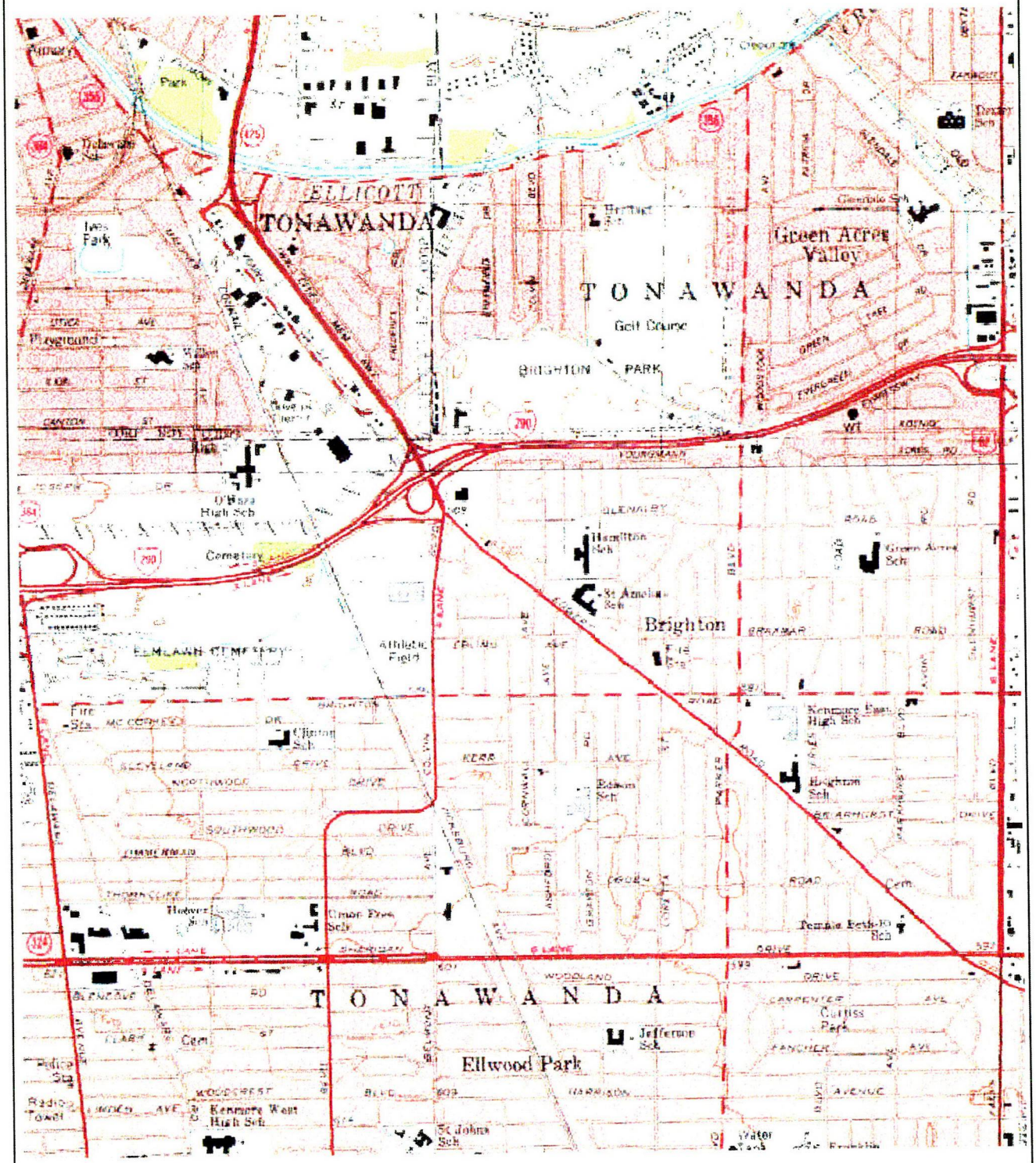
Section 1

1.0 INTRODUCTION

Environmental Resources Management (ERM) is providing professional environmental investigation and remediation services at the Greif Bros. Corporation facility located at 2122 Colvin Boulevard in the Town of Tonawanda, Erie County, New York (the Facility). Figure 1-1 presents a map showing the location of the Facility. Figure 1-2 presents a map showing general Facility layout and the locations of selected features. The Facility is the subject of a Voluntary Cleanup Program (VCP) agreement between Sonoco Products Company, Greif Bros. Corporation, and the New York State Department of Environmental Conservation (NYSDEC).

ERM performed several rounds of investigation at the Facility since 1998. Investigation activities performed to date were presented and summarized in the Voluntary Remedial Investigation (VRI) Report dated 28 November 2001 (ERM, 2001). Several data gaps were identified by ERM subsequent to completion of the VRI and additional activities were proposed to obtain additional data in these areas. Proposed activities were presented in Section 7.0 of the VRI Report and are collectively referred to as the Data Gap Investigation (DGI). The New York State Department of Environmental Conservation (NYSDEC) reviewed the VRI Report and provided comments in correspondence dated 22 January 2002. NYSDEC is requiring additional environmental investigation at the Facility. NYSDEC requested that ERM prepare an Addendum to the Work Plan for Remedial Investigation (ERM, 2000). ERM respectfully submits this document to fulfill the regulatory requirement for submission of an Addendum to the Work Plan for Remedial Investigation.

Figure 1-1
Site Location Map
Greif Bros. Facility
Tonawanda, New York



Source: USGS Topographic Quads, Buffalo, NY and Tonnawanna East, NY

ERM, INC.

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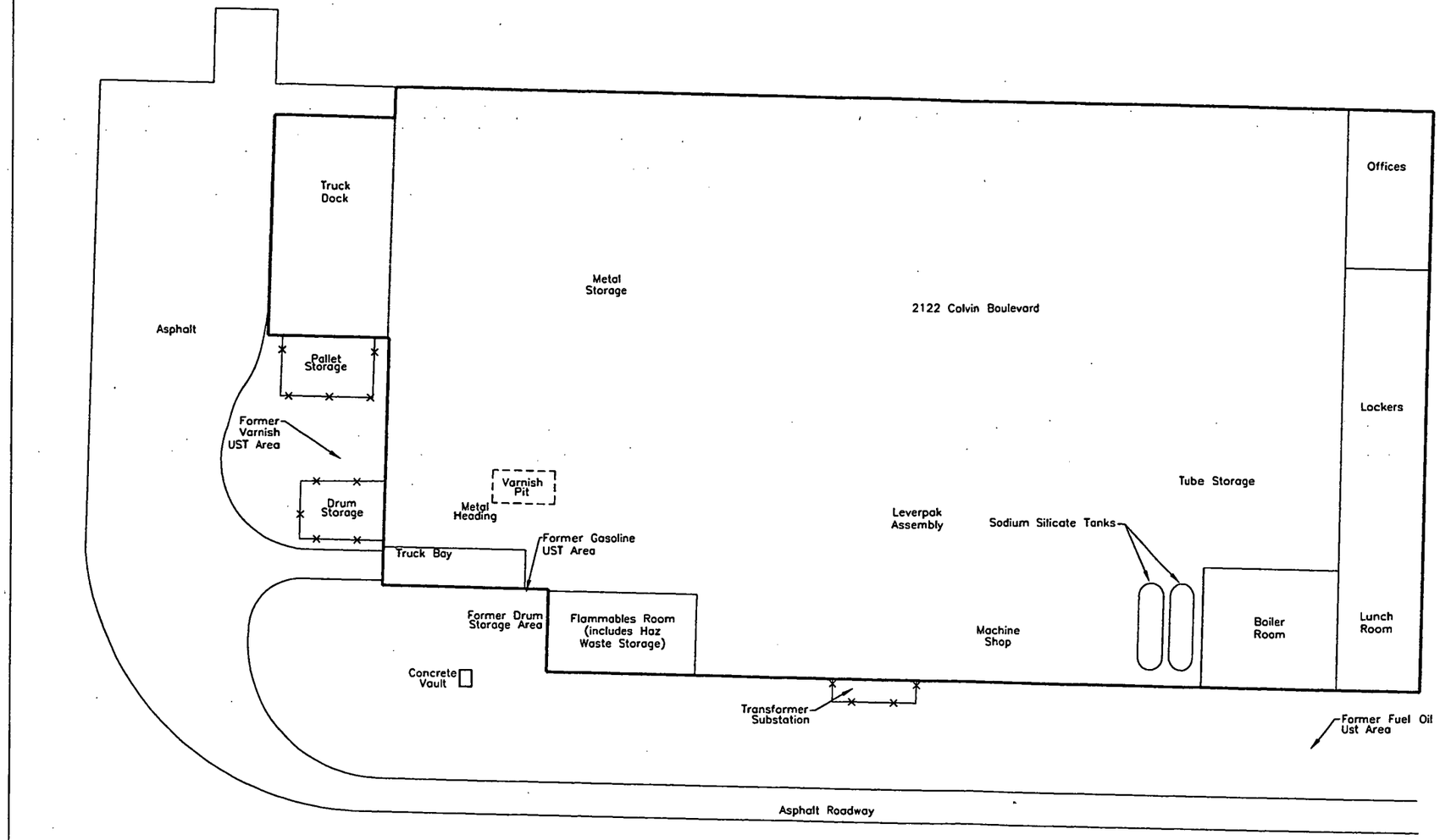
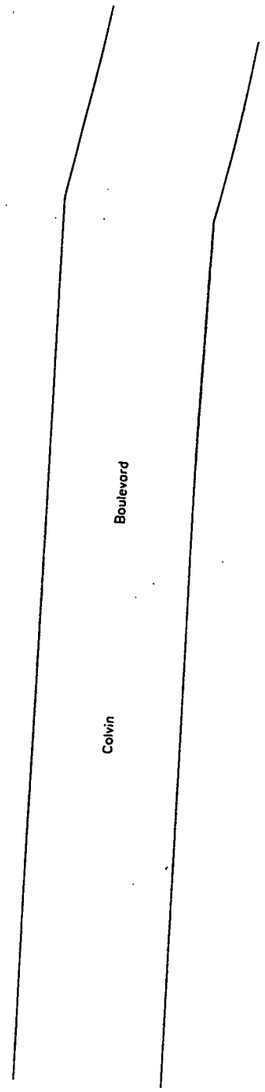
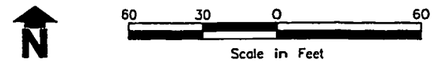
Figure 1-2
Facility Layout Map
Greif Bros. Facility
Tonawanda, New York







Section 2

Section 2

2.0 SUMMARY OF PREVIOUS INVESTIGATION

Several rounds of investigation have been conducted at the Facility. Detailed descriptions of previous investigation activities are presented in the Work Plan for Remedial Investigation (ERM, 2000) and the VRI Report (ERM, 2001). Subsequent paragraphs of this section summarize previous investigation activities at the Facility.

Soil

The initial subsurface investigation at the Facility performed by ERM was conducted in April 1998 and was designated the Phase II Investigation. The Phase II Investigation included the following main components:

- installation and sampling of seven soil borings using direct-push technology;
- installation and sampling of three temporary ground water monitoring wells;
- installation and sampling of three shallow soil borings using a hand auger;
- analysis of samples at an approved environmental laboratory for one or more parameters including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and polychlorinated biphenyls (PCBs); and
- preparation of a report presenting the results of the Phase II investigation.

ERM conducted a follow-up investigation at the Facility in November and December 1998 to further evaluate the nature and extent of affected soil and ground water. This follow-up investigation was designated the Phase III investigation and focused on the areas of affected soil and ground water apparently concentrated near the southwestern portion of the building. The Phase III Investigation included the following main components:

- installation and sampling of 20 additional soil borings using direct-push and hollow-stem auger drilling technologies;
- installation and sampling of five permanent ground water monitoring wells and one temporary monitoring well inside the building;
- collection of water level data and ground water samples for laboratory analysis; and
- preparation of a report presenting the results of the Phase III investigation.

Data generated during the Phase II and Phase III investigations suggested that affected soil was limited predominantly to the southwestern portion

of the Facility beneath the main building in proximity to an abandoned varnish pit, the former varnish UST excavation, the former drum storage area, and proximal to soil boring GB-10. Several VOCs were detected in soil samples collected from several soil borings installed at the Facility during the Phase II and Phase III investigations. The predominant VOCs detected in Facility soil include trichloroethene (TCE), 1,1,1-trichloroethane (TCA), and xylenes. Several SVOCs were detected in soil samples in two areas: 1) the former northern railroad spur into the Facility; and 2) south of the former drum storage area.

A Voluntary Remedial Investigation (VRI) was performed by ERM in the summer of 2001. The VRI included the following main components:

- a passive soil vapor survey;
- soil boring installations and soil sampling and analysis;
- investigation of subsurface utilities;
- sampling and analysis of ground water samples from existing monitoring wells;
- installation and sampling of new shallow overburden ground water monitoring wells;
- installation and sampling of new intermediate overburden ground water monitoring wells;
- installation of new deep overburden ground water monitoring wells;
- collection of a sample from a concrete vault south of the former drum storage area; and
- visual inspection of the varnish pit.

Review of soil boring logs indicates that Facility geology can be characterized as generally consisting of the following stratigraphic units in descending order (from ground surface to depth):

- a fill unit typically 2-12 feet thick consisting predominantly of brown to gray and black sand, vitreous slag-like gravel or limestone-like gravel, and ash-like material with lesser amounts of silt or silty clay;
- an orange-brown to red-brown silty clay/clay unit typically 10-32 feet thick consisting predominantly of clay and silt, locally mottled gray, with occasional, apparently discontinuous lenses of silt or sand;
- a silty sand unit typically 6-18 feet thick consisting predominantly of dark reddish-brown silt and sand;
- a lower, dark yellowish-brown silty clay unit typically 18-40 feet thick with apparently discontinuous lenses of silt or silty sand;
- a lower, dark grayish-brown sand or silty sand unit on top of bedrock typically 12 to 24 feet thick and locally gravelly; and
- bedrock consisting of hard, micritic dolostone (a calcium-magnesium carbonate rock) with lesser amounts of nodular anhydrite (an anhydrous calcium sulfate mineral).

The total thickness of overburden at the Facility ranges from 73.5 to 80 feet. VOC- and SVOC-affected soil identified to date is limited to the fill unit or the upper silty clay/clay unit. As expected, the silty clay/clay units are characterized by low apparent permeability relative to the silty sand units.

Detailed examination of bedrock cores indicates that bedrock at the Facility consists predominantly of dark greenish-gray, dolomitized carbonate mudstone with some fissility, horizontal stylolites, and low apparent matrix porosity and permeability. Nodular, light gray anhydrite comprises approximately five percent of bedrock by volume. Some sub-horizontal fractures with small apertures were present, but most fractures appeared to be filled with anhydrite and calcite. Diagenetic iron oxide was present over an estimated five percent by volume of rock cores. Bedrock encountered at the Facility is consistent with published descriptions of the Syracuse Formation of the Upper Silurian Salina Group (Rickard, 1969). Ground waters influenced by similar lithologies typically are relatively hard and often are aesthetically unsatisfactory for potable water supply uses.

The geometry of the top of the silty clay/clay unit was mapped to evaluate potential geologic control on subsurface migration of compounds of potential concern. Figure 5-5 in the VRI Report (ERM, 2001) reveals a central low area in the vicinity of the truck bay with adjacent, connected low areas towards the north (varnish pit) and south (former drum storage area). These areas apparently coincide with excavation activities that were probably associated with installation of the varnish pit and the former gasoline UST. A secondary low area appears to extend towards the west along the southern railroad spur that formerly entered the facility at the truck bay and in the vicinity of monitoring wells MW-7 and MW-9.

Remediation of some VOCs in soil in selected portions of the Facility appears warranted based on detected concentrations of VOCs that exceed Facility-specific Recommended Soil Cleanup Objectives (RSCOs) calculated by ERM based on applicable NYSDEC guidance (NYSDEC, 1995). Available data suggests remediation of soil is appropriate in the following portions of the Facility;

- the former varnish UST area;
- the former drum storage area;
- the soil boring GB-10 area;
- near the current drum storage area (soil boring GB-14);
- the truck bay area; and
- the varnish pit area.

Remediation of some SVOCs in soil in portions of the Facility appears warranted based on detected concentrations of SVOCs that exceed Facility-specific RSCOs calculated by ERM based on applicable NYSDEC guidance (NYSDEC, 1995). Available data suggest remediation of SVOCs in Facility soil appears warranted in the following areas:

- the former varnish UST area;
- east of the varnish pit (soil boring GB-27); and
- along the north side of the access road to the western portion of the facility (soil borings GB-10 and GB-33).

Review of available data and published scientific literature (USGS, 1984) suggests remediation of metals in Facility soil is not warranted.

Ground Water

Based on regional topography and the distribution of major surface water features, regional ground water flow direction beneath the Facility is expected to be towards the north-northwest. Significant variation in moisture content and permeability was observed in the overburden units at the Facility. This suggests ground water will tend to flow towards and into the more permeable units (fill and coarser overburden units). However, the relatively low permeability character of the silty clay/clay units encountered at the Facility would tend to impede ground water flow between more permeable (coarser) overburden units unless the silty clay/clay units are significantly fractured. These observations as well as the apparent discontinuous geometry of some sand units encountered in the overburden units suggests ground water flow direction at the Facility may be quite variable both laterally and vertically.

Three distinct saturated zones have been identified at the Facility that appear to be transmissive relative to clay and/or bedrock units.

- shallow overburden (water locally perched in fill and/or native silty sand);
- intermediate overburden (silty sand beneath the uppermost silty clay unit); and
- deep overburden (lowermost silty sand unit on top of bedrock).

The silty clay/clay units are generally wet at depth. However, very wet or wet intervals in the silty clay/clay units are occasionally recorded on soil boring logs that are bounded either above or below (or both) by zones of lower moisture content. This observation may indicate the presence of fracture zones in the silty clay/clay units acting as preferential conduits for ground water transport between the more transmissive fill and silty sand units. This suggests the silty clay/clay units may be leaky aquitards.

Shallow overburden monitoring wells typically are screened across the contact between the fill unit and the underlying silty clay/clay unit. Ground water is initially encountered in fill materials and shallow overburden beneath and proximal to the building. Shallow overburden ground water appears to be consistent with water that is accumulating in the relatively permeable fill on top of the less permeable silty clay/clay unit. Shallow ground water was not reported during installation of soil borings outside the area immediately surrounding the main building. However, the less permeable character of the silty clay/clay unit suggests some time may be required for obvious water to accumulate in the borehole.

Intermediate overburden monitoring wells are typically screened in the uppermost silty sand unit. Monitoring well MW-8 was also screened in the uppermost silty sand unit encountered during drilling. However, review of elevation and soil boring data in suggests the silty sand unit encountered in boring MW-8 may not be continuous with or hydraulically connected to the uppermost silty sand unit screened in monitoring wells MW-1 through MW-7. These data suggest the intermediate overburden zone is heterogeneous on the scale of the Facility and may consist of several discrete hydrogeologic units.

Deep overburden monitoring wells are screened in the lowermost silty sand unit on top of bedrock. The occurrence of significant gravelly sand and gravel in some borings (e.g., MW-9) suggests the deep overburden unit may be locally capable of significant water production. However, the immediate proximity to dolostone and evaporite bedrock suggests produced water quality may not be aesthetically acceptable due to naturally occurring geological conditions. Several intermediate and deep monitoring wells were installed adjacent to one another to provide data useful for evaluation of vertical hydraulic gradient. Comparison of water levels indicates there is a downward hydraulic gradient between the intermediate and deep overburden zones near the southwestern portion of the Facility.

VOCs were detected in shallow overburden ground water samples collected during the Phase II and Phase III investigations. VOCs detected consist predominantly of TCE, TCA, xylenes, and several other chlorinated and non-chlorinated compounds typically associated with chlorinated solvents, petroleum, and/or varnish. Review of the laboratory analytical results for ground water samples collected during the Phase III and VRI investigations indicates that VOCs were not detected in ground water samples collected from the intermediate overburden ground water zone. Ground water data suggest that affected ground water is limited to the shallow overburden ground water zone beneath the main building in proximity to the former varnish pit, the area

of the former varnish UST excavation, and the former drum storage area. These areas are generally coincident with estimated areas of affected soil. This distribution suggests that migration of organic compounds in ground water away from source areas is not significant at the Facility.

Available data indicate that remediation of VOCs in shallow overburden ground water is appropriate at the Site based on the detected concentrations of VOCs and comparison with ambient ground water quality standards and guidance values established by NYSDEC (1998). SVOCs were not detected in Site ground water from any zone at concentrations requiring remediation. Detected concentrations of metals in ground water that exceed applicable water quality standards appear to be naturally occurring based on the type of bedrock present beneath the Facility and are similar in all portions of the Facility tested. These data and observations suggest additional investigation of metals in ground water appears unwarranted.

VOCs and SVOCs were not detected in intermediate or deep overburden ground water at concentrations above ambient water quality standards and guidance values. Therefore, remediation of intermediate and/or deep overburden ground water appears unwarranted based on existing data. However, additional investigation of intermediate overburden ground water is recommended in the vicinity of the varnish pit and the truck bay to evaluate whether or not VOCs have migrated vertically downward into the underlying silty sand unit.

Investigation by Others

ERM received correspondence from NYSDEC indicating that Empire Geoservices, Inc. (Empire), on behalf of Ciminelli Development Company, Inc. (Ciminelli), performed environmental investigation activities in 2001 in portions of the Facility. NYSDEC provided ERM with a copy of the report prepared by Empire for Ciminelli and requested that ERM incorporate the Empire report into the VRI. The scope of work performed by Empire included the following main components:

- installation of seven test borings for environmental and geotechnical evaluation;
- installation and sampling of two temporary ground water monitoring wells; and
- laboratory analysis of ground water samples for VOCs, SVOCs, and selected metals.

Materials interpreted to be fill including silt, sand, silty clay, cinders, and slag-like gravel were reported from ground surface to depths ranging from two to eight feet. Other subsurface geologic units encountered

during the Empire investigation appear comparable to geologic units encountered during other investigations at the Facility. Geotechnical data are not presented in the Empire report.

VOCs and metals were not detected in samples collected by Empire at concentrations above ambient ground water quality standards or guidance values (NYSDEC, 1998). SVOCs were not detected in either ground water sample with the exception of 11 micrograms per liter (µg/l) of bis-2-ethylhexylphthalate in the ground water sample collected from the temporary well installed in soil boring B-7. This concentration is greater than NYSDEC's ambient ground water quality standard (5 µg/l). However, Empire suggests the possibility that bis-2-ethylhexylphthalate may have been introduced into the sample by their project laboratory.

Section 3

3.0 PROPOSED DATA GAP INVESTIGATION

Review of available data and comments received from NYSDEC in correspondence dated 22 January 2002 and subsequent telephone conversations suggests the following areas require additional investigation to further estimate the extent of affected media and to facilitate additional remedial design.

Soil

- Estimate the lateral extent of VOC-affected soil north of the varnish pit;
- estimate the vertical extent of VOC-affected soil beneath and north of the varnish pit;
- estimate the lateral extent of VOC-affected soil west and south of soil boring GB-14;
- estimate the lateral extent of VOC and SVOC-affected soil in the truck bay area;
- estimate the lateral and vertical extent of SVOC-affected fill or soil in the HA-3 area;
- estimate the extent of SVOC-affected soil on the north side of the access road to the western portion of the facility;
- evaluate potential lateral migration of VOCs away from the sub-floor sanitary pipe in the vicinity of soil vapor survey location SV-F2; and
- collect geotechnical data adjacent to foundations in the former varnish UST area and the former drum storage area to facilitate proposed interim remedial measures in these areas.

Ground Water

- Estimate and confirm the extent of shallow overburden ground water north, east, south, and west of the varnish pit;
- characterize intermediate overburden ground water beneath the varnish pit area, north of the varnish pit area, and in the truck bay area;
- evaluate the presence or absence of shallow overburden ground water in the vicinity of soil boring GB-14;
- evaluate shallow overburden ground water in the vicinity of the former drum storage area;
- evaluate shallow overburden ground water in the vicinity of the former varnish UST area; and
- additional evaluation of shallow overburden ground water along the south and southeastern walls of the building.

Figure 7-1 from the VRI Report has been revised to show locations of proposed soil borings and ground water monitoring wells to address

correspondence from NYSDEC dated 22 January 2002 and subsequent telephone discussions with NYSDEC (Figure 3-1). Several areas with apparent data gaps will be addressed or eliminated by implementation of one or more of the potential Interim Remedial Measures (IRMs) discussed in Section 8.0 of the VRI Report (ERM, 2001), specifically excavation actions proposed by ERM and approved by NYSDEC in the former varnish UST area and the former drum storage area. Installation of monitoring wells in these areas at this point is not recommended due to proposed excavation in these areas (i.e., monitoring wells installed in these areas now would be destroyed during excavation activities). Installation of ground water monitoring wells in these areas will be proposed after implementation of potential IRMs described in the following section.

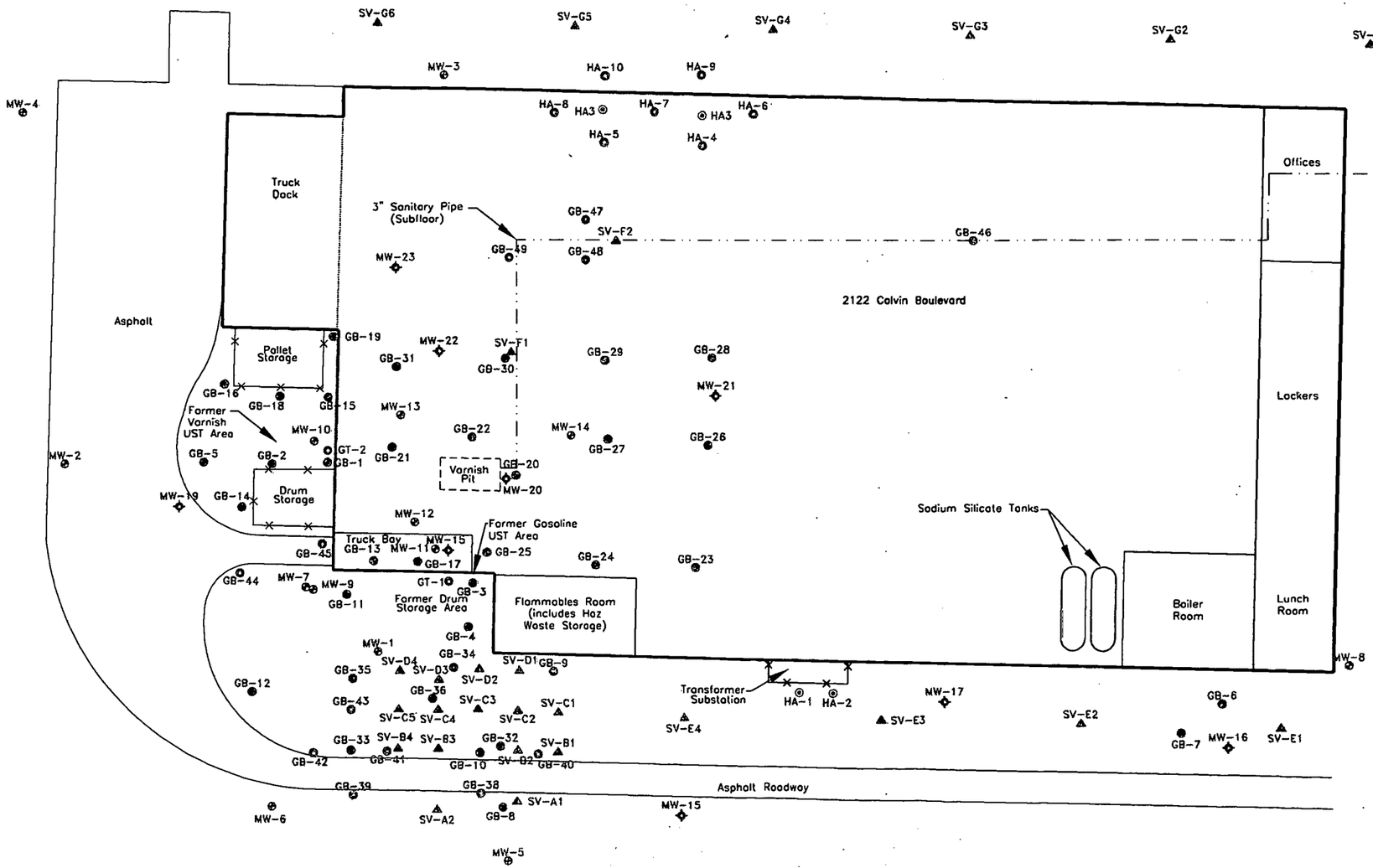
Installation of soil borings, monitoring wells, sample collection methodologies, laboratory analytical parameters, and other aspects of the proposed Data Gap Investigation will be performed in general conformance with the NYSDEC-approved RI Work Plan (ERM, 2000). However, review of Table 6-10 from the VRI Report (ERM, 2001) demonstrates that several VOCs detected in soil and ground water at the Site have ionization potentials greater than the ionization potential of a standard PID lamp (typically 10.2 to 10.8 eV). Therefore, ERM proposes to use flame ionization detectors (FIDs) or PIDs with lamps rated at 11.4 eV or higher for all future field screening of soil at the Facility.

ERM also proposes to collect and analyze a round of ground water samples for chemicals of potential concern as well as for various analytical parameters useful in evaluating the potential for natural attenuation. Parameters useful in evaluating natural attenuation processes include selected VOCs and their degradation products, common electron donors (ammonia, ferrous iron, soluble manganese, and sulfide), common electron acceptors (dissolved oxygen, ferric iron, nitrate, sulfate, manganese), alkalinity, carbon dioxide, methane, hydrogen, dissolved organic carbon, total organic carbon, total dissolved solids, hardness, other major cations, and other major anions.

3.1 *PLANNING*

As required by law, ERM will file a request through Dig Safely New York for member company subsurface utility clearance. The Facility owner (Greif Bros.) will identify and mark the locations of private subsurface utilities. Prior to drilling, each location will be reviewed for the presence of aboveground and subsurface utility lines.

Figure 3-1
Proposed Data Gap Investigation
Greif Bros. Facility
Tonawanda, New York



Legend

- Proposed Shallow Overburden Monitoring Well Location
- Proposed Shallow Overburden Soil Boring
- Proposed Geotechnical Soil Boring
- Proposed Intermediate Overburden Monitoring Well
- Monitoring Well Location
- Soil Vapor Location
- Soil Boring Location
- Hand Auger Location

N

60 30 0 60

Scale in Feet

All soil borings and monitoring wells installed during the DGI will be surveyed following completion of fieldwork. ERM's subcontractor William A. Schutt and Associates of Bowmansville, New York (WSA) will horizontally and vertically locate the ground (or floor) elevation and the top of the well casing elevation, if applicable, at a marked reference point to the nearest 0.01 foot vertically and to the nearest 0.1 foot horizontally. Reference marks will generally be placed on the north side of the well casing when possible. All Facility surveying will be performed under the supervision of a New York-licensed surveyor from a local datum referenced to mean sea level.

3.2 *SOIL INVESTIGATION*

Soil investigation will be performed in the areas indicated in Section 3.0. All soil borings will be installed using direct-push and/or hollow-stem auger (HSA) drilling methods in general conformance with Standard Operating Procedures (SOPs) outlined in the Work Plan for Remedial Investigation (ERM, 2000). Table 3-1 presents a summary of proposed soil borings and sampling for additional soil investigation including area of concern, drilling methodologies, sampling methodologies, analytical parameters, and other relevant information.

An ERM geologist will describe soil samples and record relevant data and information on ERM soil boring logs. Soil will be described regarding color, textural characteristics, density or consistency, moisture content, odor, and other pertinent observations. All soil cores will be screened in the field using a calibrated FID or PID with a 11.4 electron volt (eV) or higher lamp. Soil samples for laboratory analysis will be collected from the one-foot interval with the highest FID or PID readings or from the interval that appears to be most affected based on visual and/or olfactory observations.

All soil samples will be submitted to a New York State Department of Health (NYSDOH)-approved environmental laboratory for analysis of parameters indicated in Table 3-1. Soil samples from soil borings GT-1 and GT-2 will be analyzed for the following geotechnical parameters in order to obtain data that will facilitate remedial design of excavation controls for proposed IRMs in the former drum storage area and the former varnish UST area:

- grain size distribution;
- moisture content;
- porosity;

TABLE 3-1
SUMMARY OF PROPOSED DATA GAP INVESTIGATION - SOIL
GREIF BROS. FACILITY - TONAWANDA, NEW YORK
NYSDEC VCP NUMBER V00334-9
ERM PROJECT NUMBER D6714.00

DGI INVESTIGATION AREA	SAMPLE LOCATION	DRILLING METHOD	TOTAL DEPTH	SAMPLE ZONE	ANALYTICAL PARAMETERS
VOCs north of varnish pit (lateral extent)	MW-23	HSA	16'	Shallow	VOCs
	GB-49	Direct Push	16'	Shallow	VOCs
VOCs north of and beneath varnish pit (vertical extent)	MW-18	HSA	33'	Intermediate	VOCs
	MW-20	HSA	33'	Intermediate	VOCs
	MW-22	HSA	33'	Intermediate	VOCs
VOCs south and west of GB-14 (lateral extent)	MW-19	HSA	20'	Shallow	VOCs
	GB-44	Direct Push	14'	Shallow	VOCs
	GB-45	Direct Push	14'	Shallow	VOCs
VOCs and SVOCs in truck bay area (lateral extent)	MW-18	HSA	28'	Shallow	VOCs, SVOCs
	MW-20	HSA	33'	Shallow	SVOCs
	GT-1	HSA	20'	Shallow	VOC, SVOCs
	GB-45	Direct Push	14'	Shallow	SVOCs
SVOCs in the HA-3 area (lateral and vertical extent)	HA-4	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-5	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-6	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-7	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-8	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-9	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
	HA-10	Direct Push	6'	0-1'	SVOCs
				5-6'	SVOCs
SVOCs in the GB-10/GB-33 area (lateral and vertical extent)	GB-38	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
	GB-39	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
	GB-40	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
	GB-41	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
	GB-42	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
	GB-43	Direct Push	16'	3-4'	SVOCs
				13-14'	SVOCs
VOCs near SV-F2 (lateral extent)	GB-46	Direct Push	6'	Shallow	VOCs
	GB-47	Direct Push	6'	Shallow	VOCs
	GB-48	Direct Push	6'	Shallow	VOCs
Geotechnical	GT-1	HSA	20'	Fill	Geotechnical
				Silty Clay/Clay	Geotechnical
	GT-2	HSA	20'	Fill	Geotechnical
				Silty Clay/Clay	Geotechnical

NOTES:

- HSA = Hollow-stem auger
- VOCs = TCL VOCS by USEPA Method 8260
- SVOCs = TCL SVOCs by USEPA Method 8270
- Geotechnical = grain size, moisture content, porosity, bulk density, total organic carbon, and Atterburg limits

- bulk density;
- total organic carbon; and
- Atterburg Limits (liquid and plastic)

3.3 *GROUND WATER INVESTIGATION*

Ground water investigation will be performed in the areas indicated in Section 3.0. All soil borings for monitoring wells will be installed using HSA drilling methods in general conformance with SOPs outlined in the Work Plan for Remedial Investigation (ERM, 2000). Table 3-2 presents a summary of proposed ground water monitoring wells and sampling including area of concern, drilling methodologies, analytical parameters, and other relevant information.

An ERM geologist will describe soil cores and will record relevant data and information on ERM soil boring logs. Soil will be described by an ERM geologist, screened in the field, and sampled for relevant laboratory analyses as described above.

Well installation procedures are discussed in SOP#3 of the Work Plan for Remedial Investigation (ERM, 2000). Soil borings for ground water monitoring wells will be installed using HSAs with a minimum inside diameter of 4.25 inches. Any open borehole below the desired depth of the bottom of the well screen will be backfilled with bentonite chips, hydrated with potable water, and overlain by six inches of clean silica sand (Morie #00 or equivalent). Double casing of some monitoring wells may be necessary to address the potential for migration of compounds of potential concern from shallow overburden ground water to deeper horizons. Monitoring wells will be constructing using two-inch diameter polyvinyl chloride (PVC) riser and 0.010-inch ("10-slot") factory pre-slotted PVC well screen. Sand filter packs will be constructed using clean silica sand to a minimum height of two feet above the top of the well screen. Well screens will be 10 feet in length unless ERM and NYSDEC agree to other lengths in the field based on borehole-specific conditions.

ERM's drilling subcontractor will develop all new wells to facilitate collection of representative ground water samples. Wells will be developed according to the procedures outlined in SOP #4 of the Work Plan for Remedial Investigation (ERM, 2000). All well development information will be recorded on appropriate ERM well development forms.

Approximately two weeks after new wells have been developed, ground water levels will be measured and samples will be collected from all new

TABLE 3-2
SUMMARY OF PROPOSED DATA GAP INVESTIGATION - GROUND WATER
GREIF BROS. FACILITY - TONAWANDA, NEW YORK
NYSDEC VCP NUMBER V00334-9
ERM PROJECT NUMBER D6714.00

AREA DESIGNATION	SAMPLE LOCATION	INSTALLATION METHOD	TOTAL DEPTH	SAMPLE ZONE	ANALYTICAL PARAMETERS
Varnish pit area (lateral extent)	MW-21	HSA	16'	Shallow	VOCs, MNA
	MW-23	HSA	16'	Shallow	VOCs, MNA
Varnish pit/truck bay area (initial)	MW-18	HSA	33'	Intermediate	VOCs, SVOCs, MNA
	MW-20	HSA	33'	Intermediate	VOCs, SVOCs, MNA
	MW-22	HSA	33'	Intermediate	VOCs, SVOCs, MNA
GB-14 area	MW-19	HSA	18'	Shallow	VOCs, MNA
South/Southeast of Building	MW-15	HSA	15'	Shallow	VOCs, SVOCs, MNA
	MW-16	HSA	15'	Shallow	VOCs, SVOCs, MNA
	MW-17	HSA	15'	Shallow	VOCs, SVOCs, MNA

NOTES:

- HSA = Hollow-stem auger
- Newly-installed monitoring wells are shown in this table; all existing wells will be sampled for VOCs and natural attenuation parameters
- Dissolved oxygen, pH, oxidation-reduction potential, conductivity, and temperature will be measured in the field for all wells
- VOCs = TCL VOCS by USEPA Method 8260
- MNA = monitored natural attenuation parameters (see list below)
- SVOCs = TCL SVOCs by USEPA Method 8270

MNA parameters include:
- common degradation products not listed in USEPA-8260 (ethene, ethane, acetic acid, etc.)
- common electron acceptors (dissolved oxygen, ferric iron, sulfate, nitrate, manganese)
- common electron donors (ferrous iron, sulfide, ammonia, soluble manganese)
- alkalinity (bicarbonate, carbonate, hydroxide)
- carbon dioxide
- methane
- hydrogen
- total organic carbon
- dissolved organic carbon
- total dissolved solids
- hardness
- other major cations (soluble calcium, magnesium, sodium, potassium)
- other major anions (soluble carbonate, bicarbonate, chloride)

and existing monitoring wells at the Facility. Ground water sampling will be conducted in conformance with procedures detailed in SOP#4 of the Work Plan for Remedial Investigation (ERM, 2000). Field parameters including dissolved oxygen, pH, oxidation-reduction potential, conductivity, and temperature will be measured and recorded initially (prior to purging) and after removal of each well volume (minimum of three well volumes prior to sample collection). All measurements will be recorded on ERM ground water sampling records. All ground water samples will be submitted to a NYSDOH-approved environmental laboratory for analysis of parameters indicated in Table 3-2.

3.4 *INVESTIGATION-DERIVED WASTE*

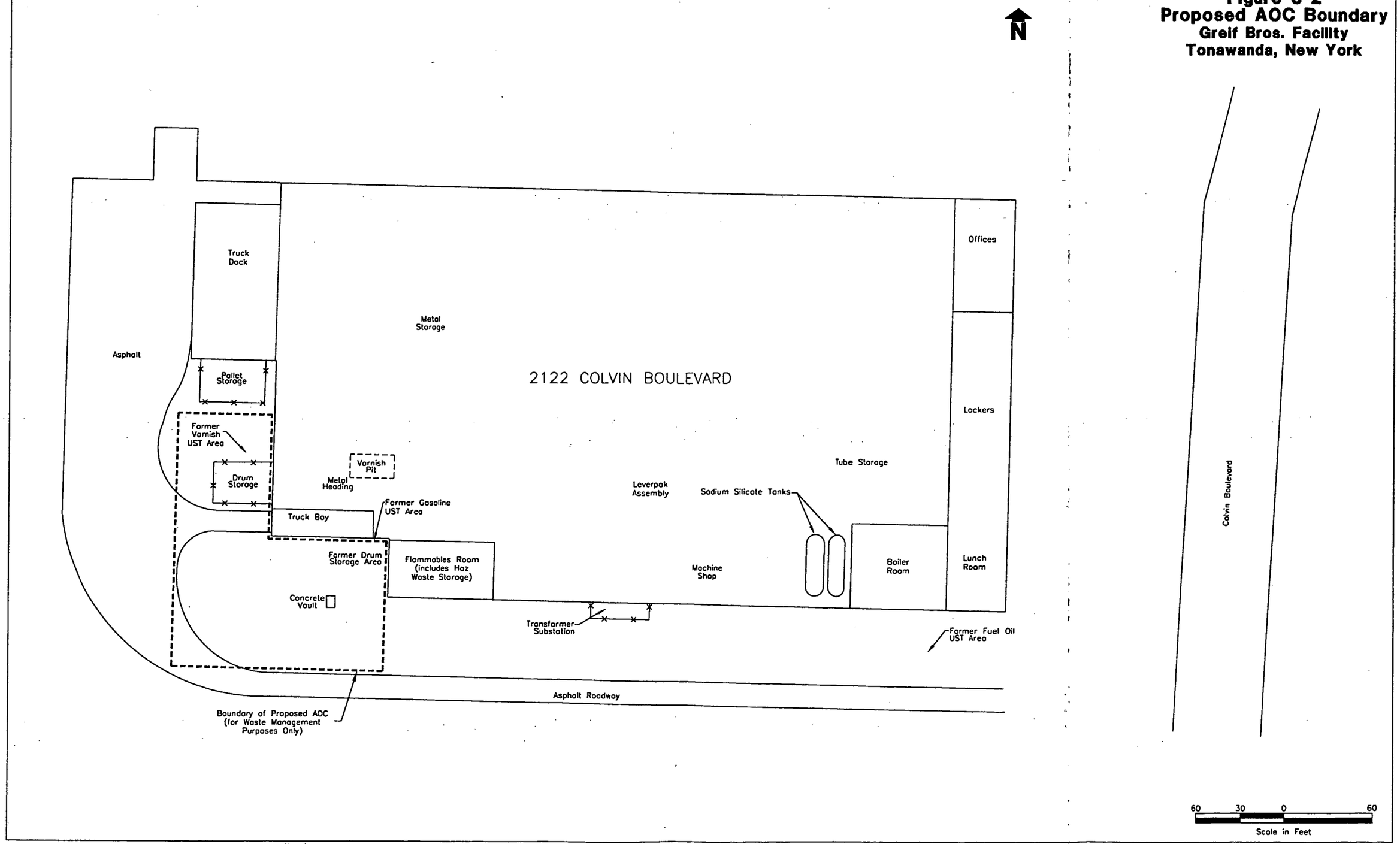
The United States Environmental Protection Agency (USEPA) encourages on-site management and handling of investigation-derived waste (IDW) when practicable, as long as on-site management and handling are protective of human health and the environment and do not violate existing federal or state regulations (USEPA, 1991). For purposes of IDW management, ERM proposes to define an "Areas of Contamination" (AOC) as defined by USEPA (1991) covering two portions of the Facility:

- the former drum storage area; and
- the former varnish UST area.

Figure 3-2 presents a map showing the proposed boundary of the AOC for purposes of IDW management and handling. If acceptable to NYSDEC, ERM proposes to implement USEPA's approach as outlined in USEPA (1991) for IDW generated during the DGI. ERM proposes not to include other areas of concern at the Facility in the defined AOC due to their location beneath the main building and/or potential issues regarding the practicability of temporary staging of IDW in other areas.

All on-Facility handling of IDW will be performed in conformance with the general procedures outlined in USEPA (1991). ERM proposes to place IDW soil cuttings generated inside the AOC into a shallow pit dug in the former drum storage area and/or the former varnish UST area. The pit(s) will be installed at a location that will eventually be excavated as part of the NYSDEC-approved Interim Remedial Measure for this area of concern. After generation of IDW during the DGI is completed, the pits will be covered with clean topsoil with a minimum thickness of one foot. IDW soil cuttings generated in areas outside the proposed IDW boundary will be placed into steel 55-gallon drums in a secured area of the Facility. Drums will be labeled to indicate the sources (individual sample locations) of the soil in the drum. The waste soil in each drum will be

Figure 3-2
Proposed AOC Boundary
Greif Bros. Facility
Tonawanda, New York



profiled based on knowledge of the waste and/or analytical results from soil samples collected in the AOC.

Fluids generated from drilling, equipment cleaning, well development, purging, or sampling activities will be temporarily stored at the Facility in polyethylene tanks or steel 55-gallon drums and tested for appropriate waste characterization parameters. The final recommendation for IDW water disposal will be based on knowledge of the waste and/or laboratory analytical results. Personnel protective equipment (PPE), disposable sampling equipment, and plastic sheeting generated during the DGI will be placed into heavy-duty polyethylene bags. These bags will subsequently be placed into the Facility's normal solid waste dumpsters for eventual transport and disposal off Facility at a NYSDEC-permitted solid waste disposal facility.

3.5 *QUALITY ASSURANCE/QUALITY CONTROL*

All sampling and quality assurance/quality control (QA/QC) activities will be conducted in accordance with the NYSDEC-approved Quality Assurance Project Plan (QAPP) contained in Appendix C of the Work Plan for Remedial Investigation (ERM, 2000). ERM will request NYSDEC Analytical Services Protocol (ASP) Level B deliverables from the project laboratory for all investigative samples collected at the Facility.

Analyte-free water will be obtained from the project laboratory for use in equipment cleaning procedures and for field rinsate blank sampling. Samples and sample coolers will be handled in conformance with the following standard procedures:

- obtain all sample jars from the project lab;
- ensure that all sample jar labels are filled out completely;
- ensure that all labels agree exactly with the chain of custody;
- ensure that the project laboratory supplies correct containers for parameters indicated;
- ensure there are no bubbles in aqueous VOC sample vials;
- fill out chain of custody forms thoroughly (use ink, sign, use correct dates, no blank spaces, etc.);
- make sure sample containers don't break by protecting them with bubble wrap or other protective materials;
- use copious amounts of ice in cooler to maintain samples at plus/minus 4 degrees C; and
- place a custody seal on the outside of the cooler and ensure it is signed and dated prior to transport to the project laboratory.

ERM anticipates all sample coolers will be hand-delivered to the project laboratory. Laboratory analytical data generated during the DGI will be reviewed by an ERM chemist experienced in data validation procedures. The data validation process will be performed according to NYSDEC guidelines for preparation of a Data Usability Summary Report (DUSR). The DUSR will be presented as a separate section or appendix of the DGI Report (see Section 3.7 below entitled "DGI Report").

3.6 *HEALTH AND SAFETY*

Personnel involved with field activities are required to adhere to the NYSDEC-approved Facility-specific Health and Safety Plan (HASP) presented in Appendix D of the NYSDEC-approved Work Plan for Remedial Investigation (ERM, 2000). Investigation activities will be performed by ERM personnel trained in accordance with 40 CFR 1920.120 (hazardous waste operations) and/or other applicable Occupational Safety and Health (OSHA) requirements and in accordance with the requirements of the HASP. Activities will be monitored to determine if any potential health or safety threat exists and/or if applicable action levels outlined in the HASP are exceeded.

Air quality in work areas and adjacent areas will be monitored periodically with a calibrated FID or PID and an electronic aerosol monitor during intrusive work. ERM shall implement an appropriate course of action as outlined in the HASP if air monitoring reveals concentrations that exceed action levels detailed in the Facility-specific HASP.

3.7 *DGI REPORT*

The results of the DGI will be compiled into a report that will be submitted to NYSDEC and other relevant parties for review and comment. The DGI Report will summarize field work, laboratory analytical data, and results derived from DGI activities and will also include the following:

- three-dimensional computer modeling of the vertical and lateral extent of affected media in each area of concern;
- a DUSR will be presented to facilitate evaluation of the quality of resulting laboratory analytical results from the DGI; and
- a revised discussion of potential IRMs will be presented if appropriate based on the results of the DGI.

Potential IRMs discussed in the VRI Report (ERM, 2001) and approved by NYSDEC will not be initiated prior to submission of the DGI Report and receipt of approval from NYSDEC and other relevant parties.

Section 4

4.0 REFERENCES CITED

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