



Proactive by Design



EXTENT OF CONTAMINATION STUDY REMOVAL WORK PLAN Former Wolverine Tannery Rockford, Michigan

June 18, 2018

File No. 16.0062335.02



PREPARED FOR:

Wolverine World Wide, Inc.
Rockford, Michigan

Rose & Westra, A Division of GZA

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Via Email

June 18, 2018
File No. 16.0062335.02

Mr. Jeffrey Kimble, On-Scene Coordinator (OSC)
United States Environmental Protection Agency - Region 5
9311 Groh Road
Grosse Ile, Michigan 48135

Re: Extent of Contamination Study Removal Work Plan
Former Wolverine Tannery, Rockford, Michigan

Dear Mr. Kimble:

On behalf of Wolverine World Wide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), has prepared this Extent of Contamination Study Removal Work Plan (RWP) for the former Wolverine Tannery in Rockford, Michigan. This RWP was prepared in response to the EPA Region 5 Unilateral Administrative Order for Removal Actions¹ (UAO) effective February 1, 2018, associated with the Former Wolverine Tannery and House Street Disposal Area. This RWP is submitted pursuant to Paragraph 20(a) of the UAO. This RWP was prepared to incorporate, into our April 24 work plan², your required modifications and comments, as described in the United States Environmental Protection Agency's letter to Wolverine dated May 22, 2018³ and your email on June 15, 2018.

Please note that sampling for PFAS and the evaluation of background groundwater quality will be performed for the concurrent investigation under MDEQ jurisdiction.

Very truly yours,

Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

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Attachment

¹ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Docket No. V-W-18-C-004.

² Work plan by GZA titled "Draft Removal Work Plan, Former Wolverine Tannery, Rockford, Michigan."

³ Letter from EPA to Wolverine titled "Draft Removal Work Plan, Former Wolverine Tannery, Rockford, Michigan: Approval with Modifications."





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APPENDICES

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Acronym	Definition
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituent of Concern
CN	Cyanide
CSM	Conceptual Site Model
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
GAC	Granular Activated Carbon
GSIC	Groundwater Surface Water Interface Criteria
HASP	Health and Safety Plan
MDEQ	Michigan Department of Environmental Quality
PFAS	Perfluoroalkyl Substances
PID	Photoionization Detector
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
R&W/GZA	Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
RWP	Removal Work Plan
Site	Former Wolverine Tannery, Rockford, Michigan
SOP	Standard Operating Procedure
SPLP	Synthetic Precipitation Leaching Procedure
SPT	Standard Penetration Test
SVOC	Semi-Volatile Organic Compound
TAL Metals	AL, Hg, Sb, As, Ba, Be, B, Cd, Cr Total, Cr VI, Co, Cu, Fe, Pb, Mg, Mo, Ni, Se, Ag, Na, Ti, Tl, V, and Zn
TCE	Trichloroethene a.k.a. trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TSCA	Toxic Substances Control Act
UAO	Unilateral Administrative Order
µg/kg	Micrograms Per Kilogram
VOC	Volatile Organic Compound
Wolverine	Wolverine World Wide, Inc.



1.0 INTRODUCTION

On behalf of Wolverine World Wide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), prepared this Extent of Contamination Study Removal Work Plan (RWP) in response to EPA's UAO⁴ effective February 1, 2018, associated with the Former Wolverine Tannery and House Street Disposal Site. This RWP responds to the required actions to be implemented in Section XI. (Work to be Performed), Paragraph 18 a. through g. of the UAO related to the Former Wolverine Tannery in Rockford, Michigan ("Site")⁵. As required in UAO Section XI. Paragraph 20 (a), this RWP includes a schedule for the work required by the UAO. The objectives of the removal actions described in this RWP identify and assess the extent of COCs on the Site.

A draft HASP and FSP for the Site and a draft QAPP, prepared by R&W/GZA, dated March 5, 2018, have been submitted to EPA. EPA has provided comments, dated March 26, 2018, on the FSP and QAPP. R&W/GZA is preparing responses to EPA's comments.

This RWP contains references to ongoing PFAS investigation activities concurrently being performed under MDEQ supervision pursuant to Part 201 of the Michigan Natural Resources and Environmental Protection Act. These references are included to providing factual background and context.

2.0 BACKGROUND

Information summarized in this section is based on R&W/GZA's understanding of Site conditions as documented in the reports listed in **Appendix A** which are incorporated herein by reference. Site documents were reviewed along with publicly available historical maps and aerial photographs, and the results of previous subsurface evaluations relative to the information included in UAO Section IV. (Findings of Fact) and development of the Extent of Contamination Study.

This Site historically had a street address of 123 North Main Street, Rockford, Michigan. The location of the Site and recent Site/Site vicinity ground surface conditions are depicted on **Figure 1**. The Rogue River flows to the south along the western boundary of the Site, and Rum Creek transects the Site from east to west. A pedestrian path (i.e., White Pine Trail) is located along the western boundary of the Site, and Main Street is located along the eastern boundary of the Site. A parking lot adjoins the Site to the north. A parking lot and commercial properties adjoin the Site to the south, and parking lots and residential properties are located east of Main Street.

The Site was first developed in the 1800s, with an ice house, lumber yard and associated coal storage located north of Courtland Street and west of Main Street in the late 1800s. A shoe factory was constructed north of Rum Creek circa 1903, and the tannery was constructed south of Rum Creek circa 1908. Both buildings were

⁴ CERCLA Docket No. V-W-18-C-004

⁵ The UAO and certain other documentation refer to the Tannery's historical street address of 123 Main Street in Rockford. This street address was changed many years ago. The former Tannery site addressed by this RWP is comprised of eight (8) parcels of property having the street addresses and legal descriptions set forth in Wolverine's revised draft Notice to Successors in Title, submitted to OSC Kimble on March 7, 2018. The Tannery site is also illustrated in **Figure 1** attached.



expanded throughout the years, with the tannery expanding to the south and west onto formerly-residential land and a lumber/coal yard, respectively. The tannery operated until 2009 and was demolished during 2010 and 2011. The foundations of the demolished tannery buildings were left in place (i.e., after demolition), covered with fill and topsoil, and seeded. In certain locations, up to 8 feet of fill material was placed over the remnants of the foundations. A retail outlet store and certain paved parking areas remain on the Site (**Figure 1**).

Subsurface investigations including sampling and laboratory analysis of soil, sediment, groundwater, surface water, and pore water have been performed on the Site on behalf of Wolverine by R&W and R&W/GZA. Investigations commenced in 2011 and have progressed continuously since that time. EPA and MDEQ have periodically participated in the investigations which included performing over sixty soil borings, analyzing or field screening over 40 soil samples, installing 47 monitoring wells, collecting and testing over 140 groundwater samples, 55 pore water samples, and 18 surface water samples.

A Site Plan is provided as **Figure 2A** which identifies the locations of monitoring wells, soil borings, and other sampling locations. Locations from which soil samples were submitted for analytical analyses are depicted on **Figure 2B**. The results of the previous Site investigations and R&W/GZA's knowledge of Site (including documents summarized in **Appendix B**) use provide a significant level of characterization of the subsurface environmental conditions at the Site.

Local hydrogeology, summarized in the CSM, includes fill and shallow sand dominated alluvial deposits overlying a relatively thick sequence of alternating sand and silt/clay deposits at generally between 10 to 20 feet. Groundwater flow within the alluvial deposits is generally toward the west with discharge to the Rogue River, and locally to Rum Creek (**Figure 3**).

Based on ground surface topography and the location of surface water bodies adjacent to the Site, the vertical groundwater flow within deeper overburden (i.e., from the alternating sand and silt/clay deposits to the alluvial sand deposits) was assumed to be upward. However, the results of water level gauging within recently constructed multilevel well clusters (MW-301A through D; MW-303A through E; MW-309A through D; and MW-310A through C) preliminarily indicate a vertically downward hydraulic component of the hydraulic gradient from the alluvial sand deposits to the silt and clay deposits (**Figure 3**). Additional hydraulic head data from within the upper silt/clay deposits are being collected and the lateral continuity of the silt/clay deposits is being investigated to further evaluate vertical groundwater flow and COC transport for the ongoing PFOA/PFOS-related investigation.

The Tannery operated for approximately 100 years to produce leather primarily for footwear. The tanning processes used a variety of chemicals, including salt, surfactants (i.e., detergents/soap) for fatliquoring (adding oil to the tanned hide), lime and sodium sulfide, ammonium salts, enzymes, sulfuric acid and chromium sulfate to tan the hide, and various dyes, colorants, oils, and protectants/additives. Wolverine also used solvent-borne and water-borne finishes over the decades.

COCs identified in samples collected from the Site and locations downgradient of the Site include VOCs, SVOCs, arsenic, chromium, acetate, ammonia, chloride, and sodium. These COCs are likely related to the Site and exceed regulatory soil and groundwater criteria in some samples. However, some observed analytes may be related to background or off-Site sources.



Hides and leather scraps have been encountered in soil borings drilled north of Rum Creek, between the retail outlet store and the White Pine Trail. Leather scraps have also been encountered within soil samples collected between the White Pine Trail and the Rogue River. The approximate lateral extents of hides and leather scrap based on borings performed by R&W during 2013 are depicted on **Figure B5** in **Appendix B**.

3.0 EXTENT OF CONTAMINATION STUDY

Proposed sampling, analysis, data evaluation, and reporting constituting the required Extent of Contamination Study are summarized in this section. This section also includes a summary of the technical approach and objectives of the proposed work. The Extent of Contamination Study is organized into tasks described in the following subsections in the general order that they would be performed; however, certain tasks may be performed concurrently.

Detailed subsurface exploration techniques, sampling procedures and laboratory analyses are provided in the FSP. Detailed SOPs including methodology, equipment, and documentation protocols, are provided in Appendix A of the QAPP.

3.1 TECHNICAL APPROACH

The proposed Extent of Contamination Study tasks were selected to provide supplemental and confirmatory concentration data to further evaluate the distribution of Site COCs and transport and fate, including transport to the Rogue River and human receptor pathways. Data collection includes: (1) supplemental samples collected in the vicinity of identified potential sources (biased soil borings and sampling locations); and (2) data collected to search for other potential COC sources (random soil borings and sampling locations).

Objectives of Extent of Contamination Study include:

- Conduct Extent of Contamination Study to determine vertical and horizontal limits of COCs (on-site and adjacent to the Site) for soil, sediment, and groundwater;
- Further evaluation of groundwater surface water interactions (potential mass flux/transport velocity); and
- Evaluation of the potential for VOC vapor intrusion into buildings.

Elements of this Extent of Contamination Study may be modified based on the results of on-going Site investigations and the results of the investigations proposed herein.

3.2 EXTENT OF CONTAMINATION STUDY TASKS

3.2.1 Site Control

Warning signs - "Warning: Investigation Ongoing at This Site, No Trespassing" - will be posted on the existing Site fence. Active work areas outside of the Site fence will be posted with warning signs and cordoned off using traffic cones and caution tape during the times when work is taking place.



3.2.2 Proposed Laboratory Analytes

Each of the samples collected for laboratory analyses during completion of the Extent of Contamination Study tasks described in the remainder of **Section 3.2**, excluding soil vapor samples, will be submitted for analysis of the following:

- VOCs;
- SVOCs;
- Metals Al, Sb, As, Ba, Be, B, Cd, Cr Total, Cr VI, Co, Cu, Fe, Pb, Mg, Hg, Mo, Ni, Se, Ag, Na, Ti, Tl, V, and Zn (TAL metals);
- Acetate;
- Total ammonia, nitrate, and nitrite;
- Chloride;
- CN (total and available);
- Formate;
- Acetate;
- Total phosphorus;
- Sulfate and sulfide.

Sufficient soil will be collected and submitted to the laboratory so the Toxicity Characteristic Leaching Procedure, SW-846 Method 1311 (TCLP) metal analysis can be performed if the laboratory identifies total metal concentrations exceeding 20 times their maximum TCLP values for hazardous waste.

Samples submitted for laboratory analyses will be analyzed in accordance with the methods described in the QAPP and FSP.

Soil vapor samples will be submitted for laboratory analysis of VOCs as described in **Section 3.2.10**.

3.2.3 Site-Specific Health and Safety Plan

A Site-specific Draft HASP addressing the activities described in the RWP was previously submitted to EPA.

3.2.4 Soil Sampling

The soil sampling strategy includes collection of soil samples from identified AOCs, and in consideration of the size and historic use of the Site, from locations selected based on a grid overlain on the Site plan. The intent of the strategy is to further evaluate soil quality within identified AOCs, as well as throughout the remainder of the Site



using non-biased methods. A minimum of 102 soil sampling locations are proposed in the following subsections, including:

- Twenty-five sampling locations along the White Pine Trail and AOCs F and H;
- Seventeen soil sampling locations within AOCs B through E, G, and J;
- Seven soil sampling locations within the footprint of former waste treatment plant structures;
- Two soil sampling locations along the waste treatment plant pipe runs; and
- Fifty-one soil sampling locations based on the Site sampling grid.

R&W/GZA field personnel will continuously screen soil samples collected as described in this subsection (*i.e.*, subsection 3.2.4) in the field for the presence of COCs including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals. Soil samples collected for laboratory analysis, as described in the following subsections (*i.e.*, subsections 3.2.4.1 and 3.2.4.2), will be submitted for analysis of the parameters listed in **Section 3.2.2**. Samples submitted for laboratory analyses will be analyzed in accordance with the methods described in the QAPP and FSP.

The following subsections summarize the proposed sampling locations.

3.2.4.1 AOC Sampling

This subtask includes collecting soil samples from AOCs B through H as depicted on **Figure 4B**; the former maintenance area (excavated during 2010); S-1 soil sampling area; near the former Primary Clarifier; and along the White Pine Trail. Fifty-one soil sampling locations associated with AOC sampling are proposed and are depicted on **Figure 4B**. Additional samples maybe collected at the discretion of EPA or R&W/GZA. Final soil sample locations will be selected in the field based on access. AOC A will be addressed by installation of a groundwater monitoring well (**Section 3.2.6**) due to access limitations.

White Pine Trail/Tannery Waste Area

The objective of the proposed soil sampling between the White Pine Trail and the Rogue River and within and near AOCs F and H is to visually observe fill, where present, for the presence of leather scrap and hides. This soil sampling is focused on areas north of Rum Creek that have not previously been sampled, with limited confirmatory sampling south of Rum Creek. A total of 25 soil sampling locations associated with the White Pine Trail/Tannery Waste Area are illustrated on **Figure 4B**. The number of sampling locations is a function of the proposed spacing between samples, topography, and locations of prior borings. Soil sampling locations along the White Pine Trail were selected based on topography and the location of previous soil borings to further evaluate the potential presence of leather scrap and hides between the White Pine Trail and Rogue River. Within the area immediately north of the current known lateral extent of leather scrap an approximate 50-foot spacing between sample locations is proposed due to the proximity to the leather scrap. Further north and to the south of Rum Creek an approximate 100-foot spacing is proposed.



Direct push drilling methods will be used to continuously collect soil samples throughout the fill layer. Borings will be advanced until native soils are encountered. Soil borings will be collected in 5-foot long disposable sleeves and photographed by R&W/GZA upon retrieval from the borehole.

In areas that cannot be safely accessed using a direct push drill rig, R&W/GZA personnel will observe the riverbank and slope for leather scrap. Observations will be made from the top of the slope and from the Rogue River via watercraft. Observations will include photographic documentation of the ground surface. Hand auger borings will be performed in areas that are not accessible to a drill rig. Performance of hand auger borings will be based on the conditions encountered in adjacent direct push soil borings; observations of the riverbank and slope; and the ability to maintain worker safety.

R&W/GZA field personnel will continuously screen soil samples in the field for the presence of COCs including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals.

At each soil sampling location, two soil samples will be collected for laboratory analyses, including a soil sample collected from the upper 2 feet of the native soil. Soil samples will be submitted for total COC analyses listed in **Section 3.2.2**.

At each soil sampling location where leather scrap and/or hide is observed, the presence of these materials will be documented and will be included in the soil samples or as separate samples from each location where it is encountered and will be submitted for laboratory analysis for the parameters listed in **Section 3.2.2**. Scrap/hide samples may be analyzed using the SPLP and TCLP at the discretion of EPA and R&W/GZA. Sufficient sample volume will be collected to allow TCLP analysis if total metals concentrations exceed 20-times the TCLP criteria.

Soil borings will be backfilled with drill cuttings and/or bentonite, as necessary, from the respective boring.

AOCs B through E, G, and J

The rationale for soil sample collection within AOCs B through E, G, and J is summarized on **Figure B5 in Appendix B**. At these soil sampling locations, soil samples will also be collected continuously from the ground surface using direct push boring methods. A total of 17 soil sampling locations related to AOCs B through E, G, and J are illustrated on **Figure B4**. The number of sampling locations proposed is based on the size of each of the AOCs and our professional judgment. Additional sampling locations may be selected based on degree to which the AOCs can be located at the Site. Borings will be advanced to approximately 5 feet below the bottom of clean fill or original ground surface if fill is not encountered. If field screening suggests COCs are potentially present in a boring, the soil sampling will continue vertically downward within the boring until no evidence of COCs is identified based on field screening.

Where former building floor/foundation slabs are encountered, the slab will be cored to provide access to soils beneath the slab. Use of an excavator or backhoe will be required at these locations to remove clean fill and provide access for coring floor slabs. At certain locations, up to 8 feet of fill may be present over the remnants of the former building foundations. R&W/GZA anticipates that the thickness of fill will prohibit entry into some of the excavations necessary to core through remnants of the former building floor/foundation slabs. In these locations, conventional drilling methods may be used to penetrate the former building floor/foundation slabs and collect soil samples. Drilling methods may include conventional cased borings (advanced using drive and wash or



spun casing methods), and/or hollow steam auger methods. Drilling methods will be selected by R&W/GZA field staff with approval by EPA representatives based on the conditions encountered. The objective of the selection of drilling method at each of the locations will be to minimize the amount of drilling/coring water necessary to penetrate the former building floor/foundation slab and maintain the representativeness of the soil beneath the former building floor/foundation slabs. If the presence of foundations (i.e., footings and foundation walls) or the construction of the slab (i.e., thickness or presence of reinforcing bars) make coring impracticable, an alternate location will be selected as close to the proposed sampling location, as is practicable.

R&W/GZA field personnel will continuously screen soil samples in the field for general indicators of the presence of COCs in soil including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals. If field screening suggests COCs are potentially present in any boring, the soil sampling will continue vertically downward within the boring until no evidence of COCs is identified based on field screening, and appropriate samples will be collected to determine the vertical extent of the contamination.

A minimum of two soil samples from each boring location will be collected for laboratory analysis, including one sample collected from the upper 2 feet of the soil boring relative to the ground surface elevation prior to demolition and one sample collected from the remainder of the boring selected by EPA and R&W/GZA field personnel based on the results of field screening. Analytes are listed in **Section 3.2.2**. Refer to the FSP and QAPP for detailed sampling procedures, sample preservation, sample packaging, chain of custody, field QA and QC sample requirement, and laboratory QA/QC.

Soil borings will each be backfilled with drill cuttings and/or bentonite, as necessary, from the respective boring. At locations where excavations are performed to allow access for coring through former floor slabs, excavations will be backfilled, topsoil replaced, and grass seed applied to the ground surface.

Former Wastewater Treatment Plant and Pipe Run

Soil borings will be drilled at the locations depicted on **Figure 4B** within the former wastewater treatment plant (WWTP) and adjacent to the untreated wastewater pipe run (WWTP influent line). Soil boring locations include a total of 7 borings drilled within the footprints of former WWTP structures and 2 borings drilled adjacent to the WWTP influent line. Former WWTP structures include the primary clarifier; final clarifier; WWTP building; wet well; equalization tanks; and aeration tank. The soil borings will be drilled, and soil samples collected for laboratory analysis to evaluate the potential for historical releases and presence of residual soil contamination from the WWTP structures and from pipe run that formerly connected the tannery to the WWTP. Certain grid-based sample locations will also provide data to evaluate the potential for historical releases from these structures.

At each of these soil sampling locations, soil samples will be collected continuously from the ground surface using direct push boring methods. R&W/GZA field personnel will continuously screen soil samples in the field for the presence of COCs including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals. Borings will be advanced to approximately 5 feet below the bottom of clean fill or original ground surface if fill is not encountered. If field screening indicates COCs are potentially present in a boring, the soil sampling will continue vertically downward within the boring until no evidence of contamination is identified based on field screening. A minimum of two soil samples from each boring location will be collected for laboratory analysis, with soil samples collected based on the results of field screening.



Where former building floor/foundation slabs are encountered, procedures used to access soil beneath the floor/foundation slabs will be consistent with those described for AOCs B through E, G, and J.

Soil borings will each be backfilled with drill cuttings and/or bentonite, as necessary, from the respective boring. At locations where excavations are performed to allow access for coring through former floor slabs, excavations will be backfilled, topsoil replaced, and grass seed applied to the ground surface.

3.2.4.2 Grid-Based Soil Sampling

Under this subtask, soil samples will be collected at locations selected within an equilateral triangular grid superimposed on the site. The maximum length of the side of a triangle within the grid will be 194 feet. Within the central portion of the Site, the length of the sides of the triangle will be decreased to 97 feet reflective of the historical Site use depicted in **Appendix B**. The proposed grid was developed using VSP7⁶. Assuming a circular hot spot with a radius of 50 feet and the proposed triangular grid spacing within the central portion of the Site (i.e., 97 feet), VSP7 calculates a 95 percent probability of finding the hot spot.

Soil samples will be collected at the grid nodes, except for locations where previous soil samples have been collected within approximately 25 feet of the grid node. R&W/GZA proposes to collect 51 supplemental soil samples based on the grid-based sampling approaches. R&W/GZA field personnel will continuously screen soil samples in the field for the presence of COCs including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals. If field screening suggests COCs are potentially present in a boring, the soil sampling will continue vertically downward within the boring until no evidence of COCs is identified based on field screening.

Sampling and analytical methods are described in the FSP and QAPP, respectively.

3.2.5 Monitoring Well Installation

Groundwater monitoring wells will be constructed within the upper sandy deposits at locations identified below (**Section 3.2.4**). R&W/GZA anticipates installation of up to approximately 10 additional monitoring wells. The primary objective of the monitoring well installation program will be to provide sampling locations to further evaluate groundwater surface water interactions including COC transport. Monitoring well installation will include:

- A minimum of five monitoring wells installed along the downgradient Site boundary (i.e., the Rogue River);
- One groundwater monitoring well installed downgradient of the location of a former heating oil tank shown within the outlet store (AOC A, **Figure 4A**). Based on the proximity of this AOC relative to the existing retail outlet building (i.e., location within the courtyard and potentially beneath the building), soil sampling is not proposed;
- One groundwater monitoring well installed downgradient of the S-1 soil sampling area to evaluate potential presence of TCE in groundwater and potential for migration to indoor air (**Figure 4A**). Evaluation of TCE

⁶ Visual Sampling Plan 7 (version 7.10), © Battelle Memorial Institute, released December 22, 2017.



concentration in groundwater is proposed based on the detection of TCE in soil samples collected in the S-1 soil sampling area;

- One groundwater monitoring well installed in the location of the former piping runs where process piping was located, to evaluate the potential for historical releases from and residual COC soil contamination related to the piping runs; and
- Additional wells may be installed, if necessary to meet the objectives of the Extent of Contamination Study, at locations to be selected in the field and coordinated with MDEQ and EPA.

Soil samples will be collected while drilling at each monitoring well location. R&W/GZA field personnel will continuously screen soil samples in the field for the presence of COCs including visual, olfactory, XRF, and PID methods. Field screening will be performed in minimum 1-foot intervals. If field screening results suggest COCs are potentially present, soil sampling will continue vertically downward within the boring until no evidence of COCs is identified based on field the screening. However, no boring will be drilled vertically downward into a potential confining layer, where penetrating the layer may increase the potential for downward vertical transport of COCs. If evidence of COCs are identified at depth and a potential confining layer is also identified in the boring, a decision to continue or discontinue the boring will be made in the field and coordinated with MDEQ and EPA.

At each boring location, two soil samples will be collected for laboratory analyses, including a soil sample collected from the upper 2 feet of the native soil. Soil samples will be submitted for total COC analyses listed in **Section 3.2.2**. Sampling and analytical methods are described in the FSP and QAPP, respectively.

3.2.6 Groundwater Quality Sampling

One round of groundwater samples will be collected from the monitoring wells installed per **Section 3.2.5**. Sampling of newly installed wells will be performed a minimum of two weeks following installation and development. Additionally, one round of groundwater samples will be collected from existing monitoring wells in consultation with EPA representatives to provide data needed to evaluate water quality trends, and for comparison to the data for samples collected from the newly installed wells. Existing wells will be selected for sampling based on historical water quality data and the results of the preceding tasks, including the results of the initial sampling round from the newly installed monitoring wells. Existing well sampling will focus on wells located proximate to newly installed wells. The primary objective of sampling existing wells concurrent with the newly installed wells is to provide data needed to evaluate concentrations detected in the newly installed wells relative to historic spatial and temporal concentration trends (i.e., are data collected from newly installed wells representative of a larger spatial or temporal trend that may impact their interpretation).

R&W/GZA will collect groundwater samples following the “Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells,” by U.S. EPA, Region I, Revision 4, dated September 19, 2017 (EPA Region I, 2017). Refer to the FSP and QAPP for detailed sampling procedures, sample preservation, sample packaging, chain of custody, field QA and QC sample requirement, and laboratory QA/QC requirement. Analytes are listed in **Section 3.2.2**. Groundwater purged during the sampling process will be managed as described in **Section 6.0**.



3.2.7 Surface Water Quality Sampling

Two rounds of surface water samples will be collected from the seven locations illustrated on **Figure 4A**. Collection of the second round of surface water samples will be performed a minimum of one month after the first round. Surface water samples will be collected during periods of normal to low flow as observed during normal summer conditions. The locations were selected to provide data to evaluate site and background contributions to the concentrations of Site-related COCs. Surface water sampling will include locations up- and downstream of the Site on the Rogue River; up- and downstream ends of Rum Creek; up- and downstream of the confluence of the Rogue River and Rum Creek, and at a point within the area downstream of the former waste water treatment facility.

The surface water sampling task will also include observation of the eastern shoreline of the Rogue River from the Rogue River to identify outfalls to the Rogue River. Observations will be made along the Site boundary with the Rogue River. Water quality samples will be collected from outfalls if the source of the water may be related to the Site (i.e., municipal storm drains will not be sampled).

Analytes are listed in **Section 3.2.2**. Refer to the FSP and QAPP for detailed sampling procedures, sample preservation, sample packaging, chain of custody, field QA and QC sample requirement, and laboratory QA/QC requirement.

3.2.8 Stream Flow and Level Gauging

Stream flow and level will be gauged at selected locations to provide data for the evaluation of groundwater-surface water interactions and COC transport. Stream flow within Rum Creek will be directly measured at Main Street and the pedestrian bridge just upstream from the confluence of Rum Creek and the Rogue River. Measurements will include channel cross-section profiling and flow velocity measurement. Stream flow for the Rogue River will be obtained from the USGS Rockford Dam gage.

Surface water elevation reference points will be established within the Rogue River at the upstream and downstream ends of the Site; the confluence of the Rogue River and Rum Creek; at the Rockford Dam; and on Rum Creek at Main Street. Each of the surface water gauging locations will be equipped with a pressure transducer set to record water levels on a minimum frequency of once every four hours. The pressure transducers will be removed at the end of the study or before winter conditions.

3.2.9 Supplemental Sediment Sampling

Samples of sediment will be collected within the Rogue River and Rum Creek to supplement historical sampling along riverbanks and provide background sediment quality data. Samples will be collected by R&W/GZA personnel within depositional environments in the stream channels. Current depositional environments immediately upstream and adjacent to the Site will be identified and field mapped by R&W/GZA. Preliminarily proposed sampling locations are illustrated on **Figure 4C**, including 10 transects of the Rogue River. Each of the transects will include a minimum of three sampling locations (i.e., a minimum of 30 sediment sampling locations).

Sediment samples will also be collected from:

- Rum Creek at locations upstream of the eastern Site boundary and on Site, upstream of the confluence with the Rogue River;



- An apparent eddy area on east side of the Rockford Dam;
- Well-used access points along the edge of the Rogue River; and
- The islands located within the Rogue River from the upstream end of the site to the Rockford Dam (island sampling locations may be located along transects but are in addition to the three minimum sampling locations along each transect). The location and number of island sediment samples will be selected in the field in consultation with MDEQ and EPA.

The preliminary locations depicted on **Figure 4C** may be modified following the field mapping of depositional environments; however, a minimum of 10 transects will be completed including one transect located downstream of the Rockford Dam. Final mapping of the depositional environments will include collection of sediment cores using a vibracoring or manual coring techniques to evaluate grain size distribution to document the type of a depositional environment at the selected sampling location.

At least two samples will be collected from each location, unless no sediment exists. If no sediment exists, one sample will be collected of the bottom core material. If the thickness of sediment encountered at a sampling location is equal to or greater than 6 feet, a total of 3 sediment samples will be collected from the sampling location.

Sediment samples will be collected using a manually driven or hand held vibratory coring device. To the extent technically feasible using the coring method, sediment will be cored to the depth necessary to collect samples fine grained sediment (fine sand and silt to clay) representative of relatively lower energy depositional environments. R&W/GZA field personnel will continuously screen soil samples in the field for COCs using visual methods.

Samples will be submitted for laboratory analysis, including Site-related parameters listed in **Section 3.2.2**, as well as TOC, and grain size distribution. Refer to the FSP and QAPP for detailed sampling procedures, sample preservation, sample packaging, chain of custody, field QA and QC sample requirement, and laboratory QA/QC requirement.

3.2.10 Initial Vapor Intrusion Study

An initial vapor intrusion study will be performed as required by UAO Paragraph 18(d). The UAO states that the requirement is based on the reported historical use of TCE at the Tannery Property. Limited concentrations of TCE have been detected in soil samples (S-1-W [200 µg/kg; 2.0-2.5 feet] and S-1-N [61 µg/kg; 1.1-1.7 feet]).

The objective of the vapor intrusion evaluation will be to determine whether historical use of TCE at the Tannery results in potential vapor intrusion into buildings. The study and sampling locations will be performed in consultation with EPA staff. The proposed vapor intrusion evaluation data includes collecting soil vapor samples from the 9 locations depicted on **Figure 4A** along the perimeter of the Site where potentially occupied structures are located within 100 feet of the Site. A soil vapor sample will also be collected near soil sample location S-1-W.

Soil vapor samples will be submitted for laboratory analysis of VOCs by EPA Method TO-15. Soil vapor sampling techniques, sampling procedures and laboratory analyses are provided in the FSP. GZA's SOP including methodology, equipment, and documentation protocols, is provided in Appendix A of the QAPP (GZA SOP A22), which incorporates and is consistent with EPA Science and Ecosystem Support Division Operating Procedure SESDPROC-307-R3).



Installation and sampling of a groundwater monitoring well will also be performed downgradient of the S-1 soil sampling area to evaluate potential presence of TCE in groundwater and potential for migration to indoor air. Evaluation of TCE concentration in groundwater is proposed based on the detection of TCE in soil samples collected in the S-1 soil sampling area, which is the only area in which TCE has been detected at the Site (**Figure 4A**).

3.2.11 Survey

A survey of the location and elevation of ground surface at each of the soil and groundwater sampling locations will be completed by a surveyor licensed by the State of Michigan. The top of the PVC riser of each monitoring well will also be included in the survey to provide a reference point elevation for the calculation of groundwater/hydraulic head elevation. The location and elevation of surface water level reference points described in **Section 3.2.8** will also be established by the surveyor. Monitoring well and sampling locations will be surveyed to an accuracy of <1 foot; ground surface elevations will be determined to an accuracy of 0.1 foot; and elevations will be determined to an accuracy of 0.01 foot.

Sediment sampling locations will be estimated by R&W/GZA field staff using Global Positioning System methods, with a lateral accuracy of 3 feet.

3.2.12 Data Evaluation and Reporting

The information and data collected during completion of the Extent of Contamination Study will be evaluated by R&W/GZA relative to the previously-presented Site investigation objectives. Data will be evaluated as collected for completeness relative to the objectives of the work, and data gaps identified for potential supplemental sampling consistent with this RWP. If data gaps are identified, sampling in accordance with this Plan will be initiated within one week of identifying the gap.

The work performed will be summarized, where appropriate, along with historical data, and data from the Extent of Contamination Study will be compiled and presented in a report. The report will include figures and tables summarizing the information collected and results of soil, groundwater, and surface water sampling and analyses.

4.0 REMOVAL ACTION IMPLEMENTATION

Upon completion of the above scope of work, a preliminary risk evaluation will be performed to evaluate the potential human health and environmental pathways. The preliminary risk assessment will include comparing Site data to established EPA and State of Michigan environmental standards (ARARs for this site).

The results of the risk evaluation will be provided to EPA for determination of the need for further removal actions. If directed by EPA, an EE/CA will be performed and this section will be updated with a removal action implementation plan, which will detail Site preparation and security measures, Site controls to prevent accidental releases and off-Site migration, construction and operation areas, waste staging and segregation operation, decontamination zone, air monitoring and dust control, if applicable, confirmation sampling, waste transportation and disposal plan, Site restoration, etc.



5.0 OFF-SITE MIGRATION CONTROL

Based on the existing data, leather scrap and hides are present in certain areas north of Rum Creek. The Site is generally covered with topsoil and vegetation or impermeable surfaces. Therefore, the likelihood of COC off-Site migration via air deposition, overland storm water flow, and erosion is low. If investigation identifies or creates conditions conducive to erosion, control measures such as straw bales, silt fence, etc. will be implemented prior to conducting the investigative activity.

During the investigation, excavated soil will be assumed to be contaminated and managed to prevent transport. Excavated soil will be placed on two layers of minimum 6-mill polyethylene sheeting or stored within a drum or watertight covered container. Soil piles will be covered with one layer of minimum 6-mill polyethylene sheeting when not being actively accumulated or managed. Excess soil (i.e., soil that cannot be placed back within an excavation or borehole) will be disposed of as described in **Section 6.0**.

6.0 INVESTIGATION DERIVED WASTE DISPOSAL

Except as noted, investigation-derived materials from the proposed investigation work will be containerized and staged at the Site before being disposed off-Site. The soil or waste will be sampled in accordance with the permit for the selected disposal facility. Potential waste characterization analyses include TCLP VOCs, semi-VOCs, TCLP RCRA metals, and waste characteristics including ignitability, reactivity and corrosivity. According to the EPA Off-Site Rule (40 CFR 300.440), the waste will be disposed of in a facility operating in compliance with the RCRA, the TSCA, or other applicable Federal or State requirements.

Containerized groundwater from sampling and well development activities will be treated using GAC and discharged to the ground surface adjacent to the sampling/well location where collected for locations within the area enclosed by the Site fence. For sampling locations/wells located outside of the area enclosed by the Site fence, treated groundwater will be discharged within the area enclosed by the Site fence up gradient of the sampling/well location. The treatment system will include two GAC canisters in series and will be sized based on the results of existing Site groundwater data.

7.0 ANTICIPATED SCHEDULE

Per EPA's direction, the investigation will be performed in 10 weeks from on-site mobilization. The final report summarizing the data and activities (including data points, photographs, and data tables; refer to **Section 3.7**) will be submitted one calendar month from receipt of the last electronic data deliverable from the lab. See **Appendix C** for an estimated project schedule.



Figures




LEGEND

 = APPROX. LOCATION OF SITE BOUNDARY

NOTES:

- 1) BASE MAP DERIVED FROM NEDERVELD SITE SURVEY DATED NOVEMBER 22, 2013
- 2) DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS COLLECTED BY GOOGLE EARTH IN APRIL 2016

SCALE: 1" = 300'




ROSE & WESTRA
A DIVISION OF GZA
Grand Rapids, Michigan
GEOTECHNICAL-ENVIRONMENTAL-ECOLOGICAL
WATER-CONSTRUCTION MANAGEMENT

CREATED BY: KJB

APPROVED BY: JMW

DATE: 5/30/18

FILE NAME: 62335_02_WP_FIG1

LOCATION PLAN

WOLVERINE WORLD WIDE
FORMER TANNERY SITE, 123 MAIN ST, ROCKFORD, MICHIGAN
EXTENT OF CONTAMINATION STUDY
REMOVAL WORK PLAN

PROJECT NO.
16.0062335.02

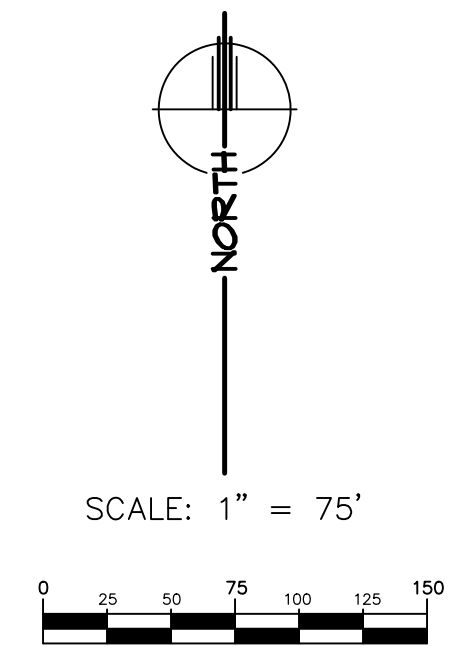
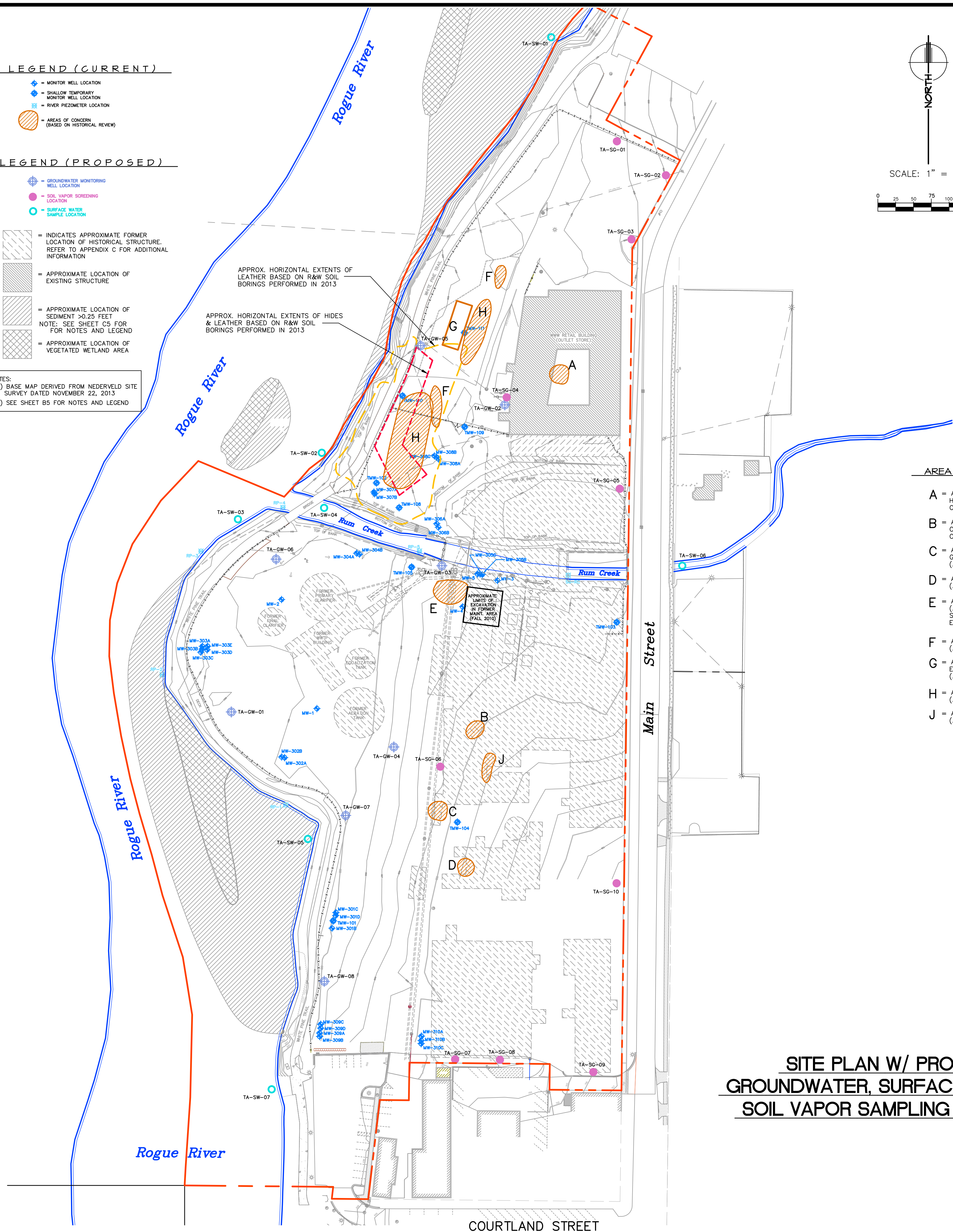
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FIGURE NO.

- LEGEND (CURRENT)**
- MONITOR WELL LOCATION
 - SHALLOW TEMPORARY MONITOR WELL LOCATION
 - RIVER PIEZOMETER LOCATION
 - AREAS OF CONCERN (BASED ON HISTORICAL REVIEW)

- LEGEND (PROPOSED)**
- GROUNDWATER MONITORING WELL LOCATION
 - SOIL VAPOR SCREENING LOCATION
 - SURFACE WATER SAMPLE LOCATION
 - INDICATES APPROXIMATE FORMER LOCATION OF HISTORICAL STRUCTURE. REFER TO APPENDIX C FOR ADDITIONAL INFORMATION
 - APPROXIMATE LOCATION OF EXISTING STRUCTURE
 - APPROXIMATE LOCATION OF SEDIMENT >0.25 FEET NOTE: SEE SHEET C5 FOR FOR NOTES AND LEGEND
 - APPROXIMATE LOCATION OF VEGETATED WETLAND AREA

NOTES:
1) BASE MAP DERIVED FROM NEDERVELD SITE SURVEY DATED NOVEMBER 22, 2013
2) SEE SHEET B5 FOR NOTES AND LEGEND



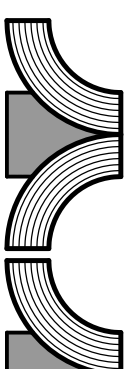
- AREA OF CONCERN LEGEND**
- A = APPROX. LOCATION OF FORMER HEATING OIL TANK. (AS INDICATED ON 1911 & 1918 SANBORN MAPS)
 - B = APPROX. LOCATION OF OIL TANK. (AS INDICATED ON 1931 SANBORN MAP)
 - C = APPROX. LOCATION OF 9,000 GALLON SULFURIC ACID TANK (AS INDICATED ON 1931 SANBORN MAP)
 - D = APPROX. LOCATION OF COAL BIN (AS INDICATED ON 1931 SANBORN MAP)
 - E = APPROX. LOCATION OF GASOLINE TANK (AS INDICATED ON 1931 SANBORN MAP & SHOWN AS EXCAVATED ON FTC&H 1993 ESA REPORT - WESTERN UST)
 - F = APPROX. LOCATION OF "TANNERY WASTE" (AS INDICATED IN FTC&H 1993 ESA REPORT)
 - G = APPROX. LOCATION OF "TIN SHED" WHICH HAD EARTHEN FLOOR & STORED HYDRAULIC OILS (AS INDICATED IN FTC&H 1993 ESA REPORT)
 - H = APPROX. LOCATION OF HIDE STORAGE (AS INDICATED IN FTC&H 1993 ESA REPORT)
 - J = APPROX. LOCATION OF SOUTHERN EXCAVATION (AS INDICATED IN FTC&H 1993 ESA REPORT)

**SITE PLAN W/ PROPOSED
GROUNDWATER, SURFACE WATER, and
SOIL VAPOR SAMPLING LOCATIONS**

DRAWN BY	KJB
DESIGN BY	JMM
DATE	6/11/16
FILE NO.	62335_NP_4A
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DATE	
BY	
REVISIONS	
REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS	

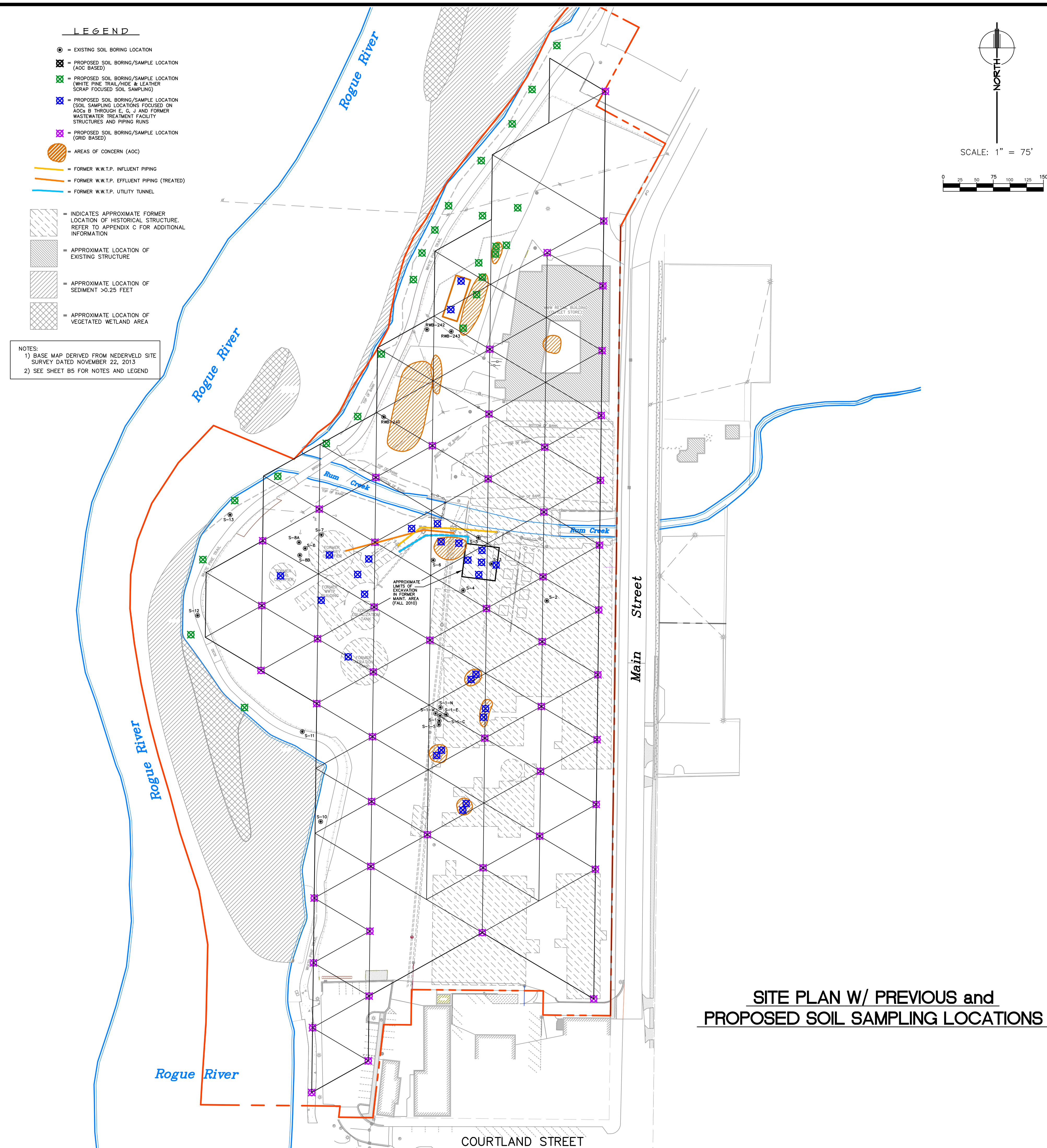
**WOLVERINE WORLD WIDE
FORMER TANNERY SITE, 123 MAIN ST, ROCKFORD, MI
EXTENT OF CONTAMINATION STUDY
REMOVAL WORK PLAN**

ROSE & WESTRA
A DIVISION OF GZA
Grand Rapids, Michigan

 GEOTECHNICAL-ENVIRONMENTAL-ECOLOGICAL-WATER-CONSTRUCTION MANAGEMENT

PROJECT NO.
16.0062335.02
SHEET NO.

4A





Appendix A – Reports by R&W/GZA

APPENDIX A

REPORTS BY R&W/GZA

Document Name/Subject Line	Document Date	Document Type	Addressee	Author	Pages
Wolverine World Wide - Former Rockford, Michigan Tannery - Post Demolition Environmental Investigation	9/19/2011	Letter Report	D. Latchana, WWW	M. Westra, R&W	11
CERCLA Preliminary Assessment Report for Wolverine World Wide Former Tannery	6/14/2012	Report	USEPA	J. Walczak, MDEQ	150
Wolverine World Wide (WWW) - Former Rockford, Michigan Tannery - Round 2 Environmental Investigation	2/6/2012	Letter Report	D. Latchana, WWW	M. Westra, R&W	333
Wolverine World Wide (WWW) - Former Rockford, Michigan Tannery - Round 2 Environmental Investigation	2/10/2012	Letter Report	J. Walczak, MDEQ	M. Westra, R&W	4
Wolverine World Wide (WWW) - Former Tannery, Status Report	8/31/2015	Memo	J. Pawloski and M. Gamble, MDEQ	M. Westra, R&W	31
Slug Tests at the Former Wolverine World Wide Tannery	12/11/2014	Memo	M. Gamble, MDEQ	J. Morehouse and M. Westra, R&W	7
December 2015 Pore Water Investigation - Former Wolverine World Wide Tannery	4/27/2016	Report	WWW	R&W	101
Summary of Concerns - Related to the Recent Demolition of the 15-acre Wolverine World Wide, Inc. Tannery Site in Rockford, MI and Its Long-Term Environmental Impact on the Rogue River Watershed	6/21/2011	Report	S. Erickson, MDEQ	Unknown	169
Wolverine World Wide, Inc. (Wolverine) PFAS Response	11/2/2017	Correspondence	D. Latchana, WWW	S. Leeming, MDEQ	3
Phase I Environmental Site Assessment Michigan Northern Railroad Between Courtland and Main Streets Rockford, Michigan	1/10/1994	Report	MDEQ	Fishbeck, Thompson, Carr & Huber, Inc	56
Staff Report: A Biological Survey of the Rogue River Watershed Kent and Newaygo Counties, Michigan, August 1998	8/1/2003	Report	Unknown	D. Rockafellow, MDEQ	25
Staff Report: A Biological Survey of the Rogue River Watershed Kent and Newaygo Counties, Michigan, August 2003	8/1/2004	Report	Unknown	D. Rockafellow, MDEQ	30
Pollution Incident Prevention Plan for Wolverine Leathers Division	1/1/2007	Report	Unknown	Wolverine Leathers	86
Wolverine World Wide - Additional Wastewater Treatment Plant Data	Various	Various - Correspon	Various	Various	53
Certified Sanborn Map Report	11/1/2012	Report	WWW	EDR	21

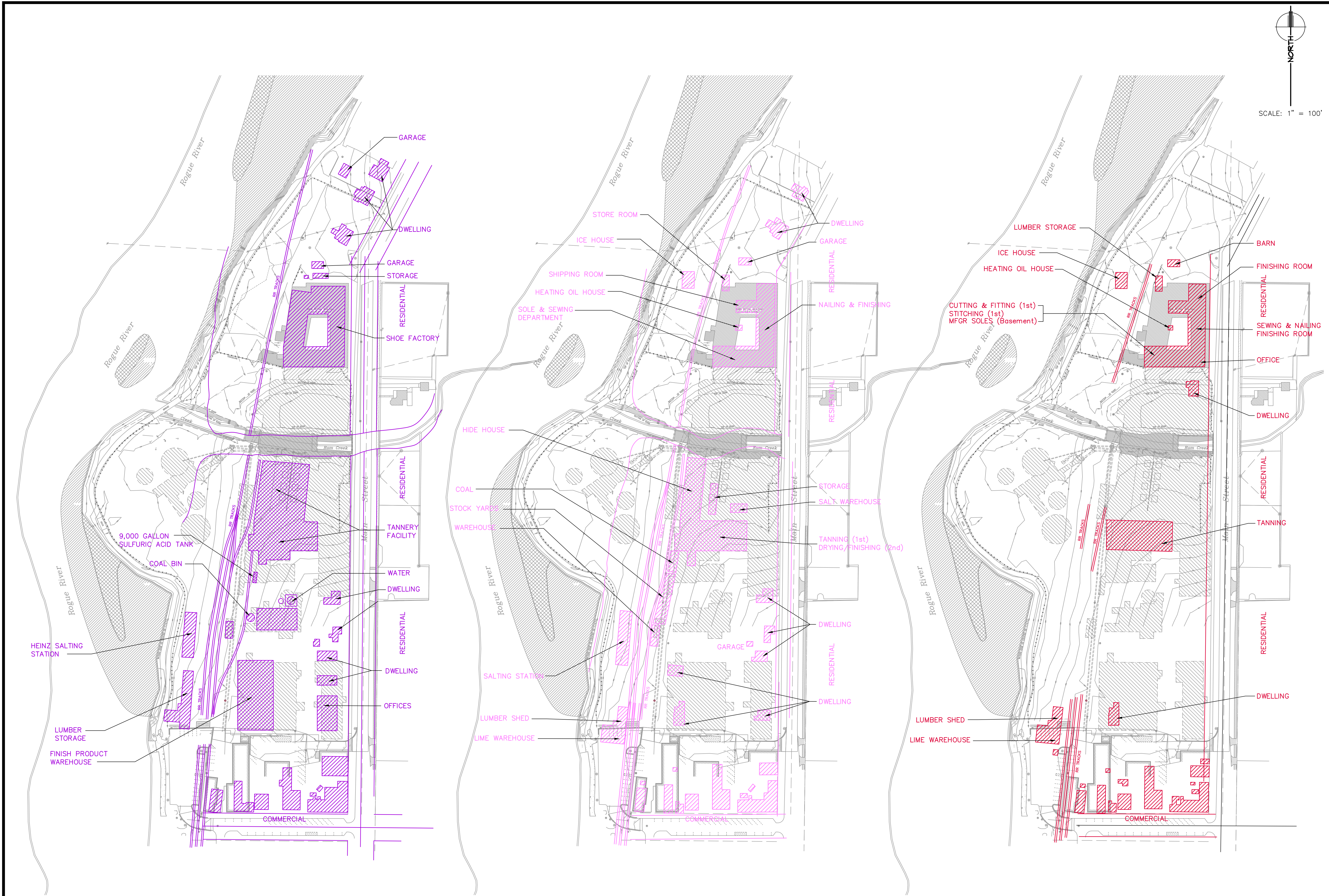
APPENDIX A

REPORTS BY R&W/GZA

Document Name/Subject Line	Document Date	Document Type	Addressee	Author	Pages
The EDR Aerial Photo Decade Package	11/2/2012	Report	WWW	EDR	12
The EDR Radius Map Report with GeoCheck	11/1/2012	Report	WWW	EDR	180
The EDR-City Directory Image Report	11/7/2012	Report	WWW	EDR	23
EDR Historical Topographic Map Report	11/1/2012	Report	WWW	EDR	9
Report of soils and Foundation Investigation for the Wolverine World Wide Sewage Disposal System	6/10/1976	Report	B. Elenbaas, Fishbeck, Thompson, Carr & Huber, Inc.	E. Paas, Materials Testing Consultants, Inc.	38
Wolverine World Wide, Inc. - Former Tannery	11/8/2017	Report	A. Hendershott, MDEQ	M. Westra and L. Powers, R&W/GZA	339
Wolverine World Wide - Former Tannery, Status Report Southern Investigation Area (south of Rum Creek)	2/3/2014	Memo	J. Pawloski and M. Gamble, MDEQ	M. Westra, R&W	20
Former Wolverine World Wide Tannery, Rockford, Michigan	3/20/2014	Letter Report	M. Gamble, MDEQ	M. Westra, R&W	60
Part I of Wolverine World Wide's Response to U.S. EPA's Request for Information Pursuant to Section 104 of CERCLA for Wolverine World Wide's Former Tannery Site (SSID: C593) in Rockford, Michigan	4/12/2012	Correspondence	G. Watts, USEPA	M. Robinson, Warner Norcross & Judd	1
Wolverine World Wide's Response to U.S. EPA's Request for Information Pursuant to Section 104 of CERCLA for Wolverine World Wide's Former Tannery Site (SSID: C593) in Rockford, Michigan, Part I	4/12/2012	Letter Report	USEPA	J. O'Brien, WWW	4
Part II of Wolverine World Wide's Response to U.S. EPA's Request for Information Pursuant to Section 104 of CERCLA for Wolverine World Wide's Former Tannery Site (SSID: C593) in Rockford, Michigan	5/18/2012	Correspondence	G. Watts, USEPA	M. Robinson, Warner Norcross & Judd	1
Wolverine World Wide's Response to U.S. EPA's Request for Information Pursuant to Section 104 of CERCLA for Wolverine World Wide's Former Tannery Site (SSID: C593) in Rockford, Michigan, Part II	5/18/2012	Letter Report	USEPA	J. O'Brien, WWW	9



Appendix B – Historical Site Use Summary



1931 SANBORN MAP
OVERLAY ONTO CURRENT BASE

1918 SANBORN MAP
OVERLAY ONTO CURRENT BASE

1911 SANBORN MAP
OVERLAY ONTO CURRENT BASE

NOTE: SEE SHEET B5 FOR NOTES AND LEGEND

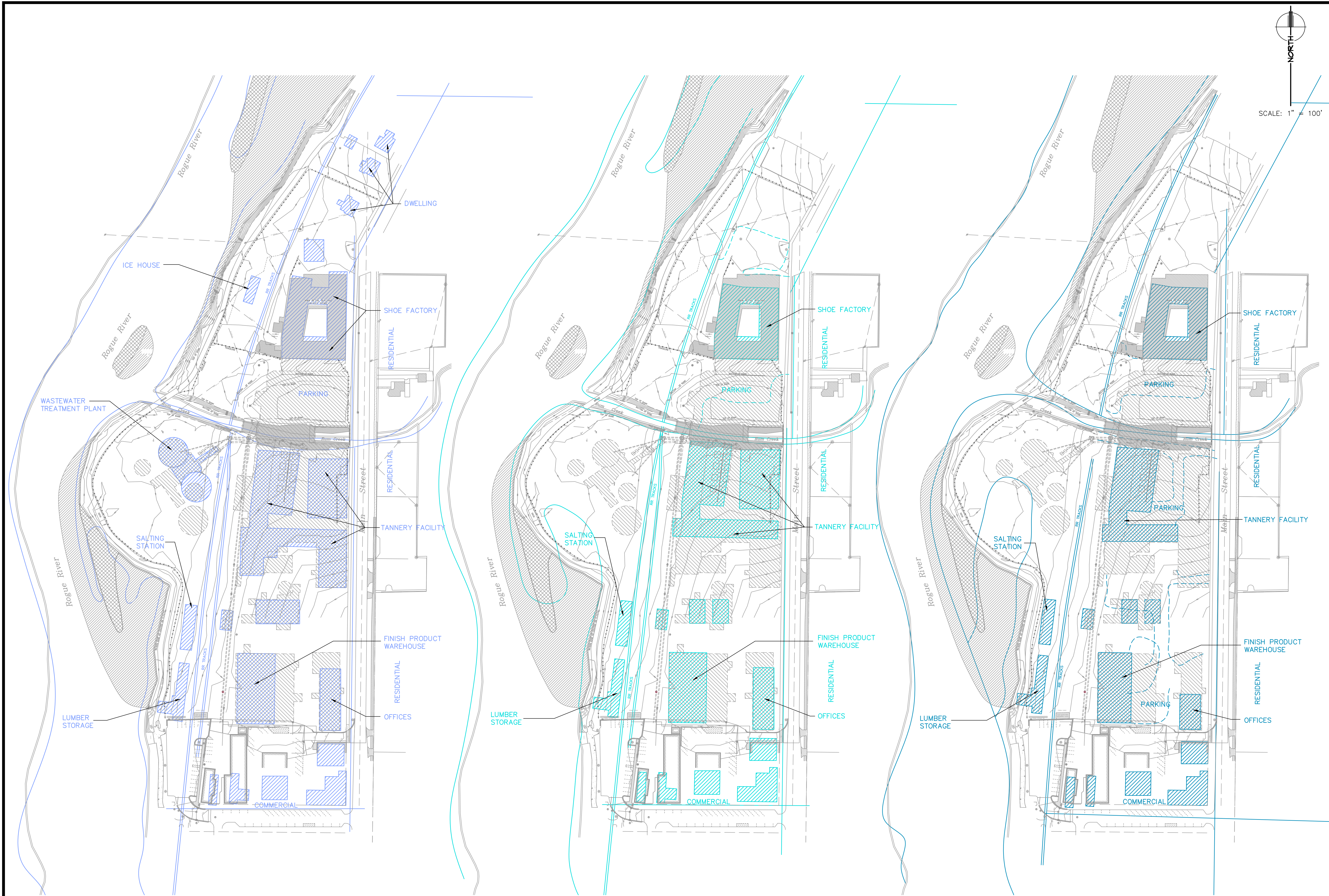
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WOLVERINE WORLD WIDE
FORMER TANNERY - ROCKFORD, MICHIGAN
EXTENT OF CONTAMINATION STUDY
REMOVAL WORK PLAN

ROSE & WESTRA
A DIVISION OF GZA
Grand Rapids, Michigan
GEOTECHNICAL-ENVIRONMENTAL-WATER-CONSTRUCTION MANAGEMENT

PROJECT NO.
16.0062335.02
SHEET NO.

B1



1960 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE

1950 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE

1938 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE

NOTE: SEE SHEET B5 FOR NOTES AND LEGEND

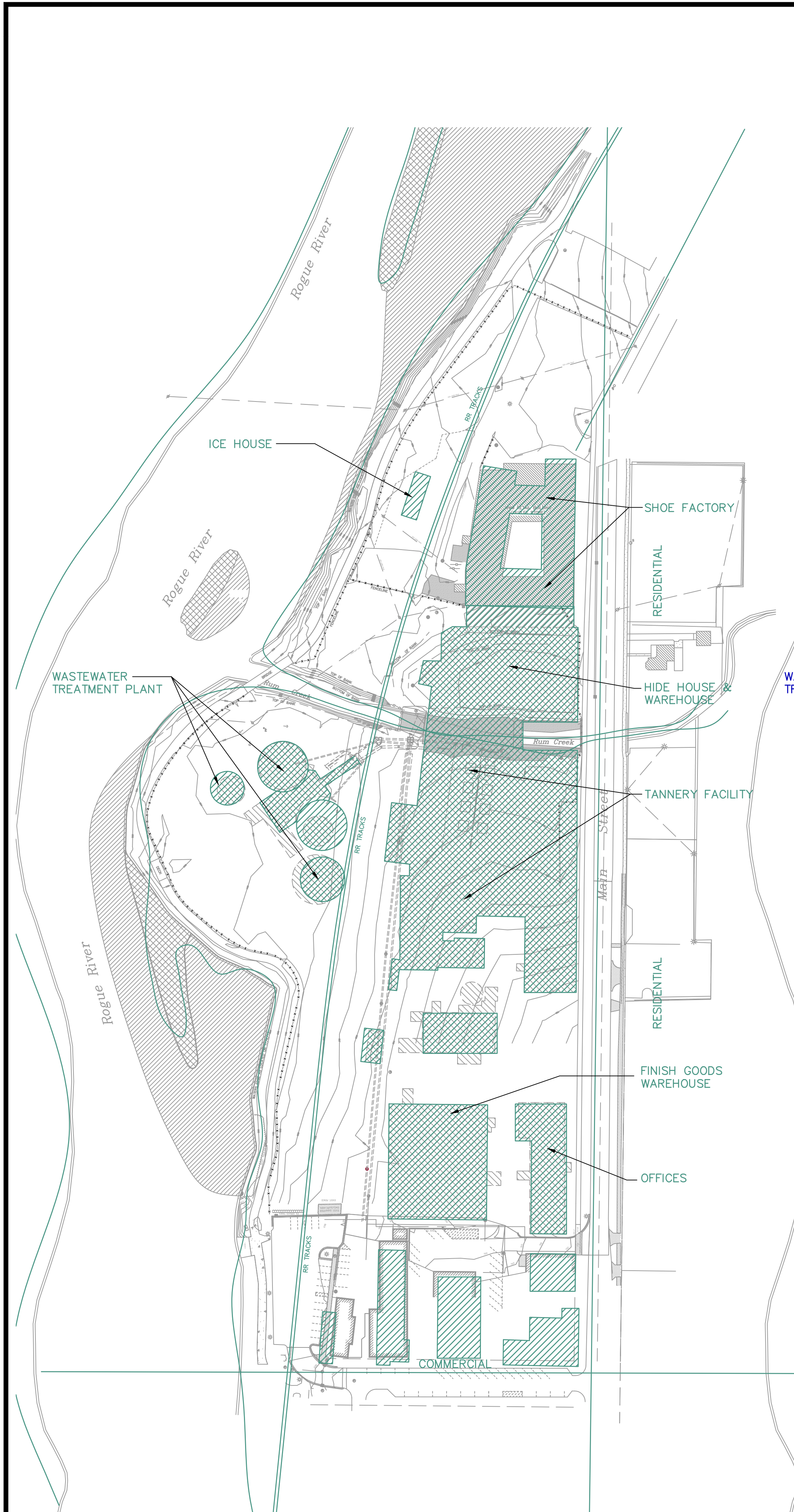
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WOLVERINE WORLD WIDE
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EXTENT OF CONTAMINATION STUDY
REMOVAL WORK PLAN

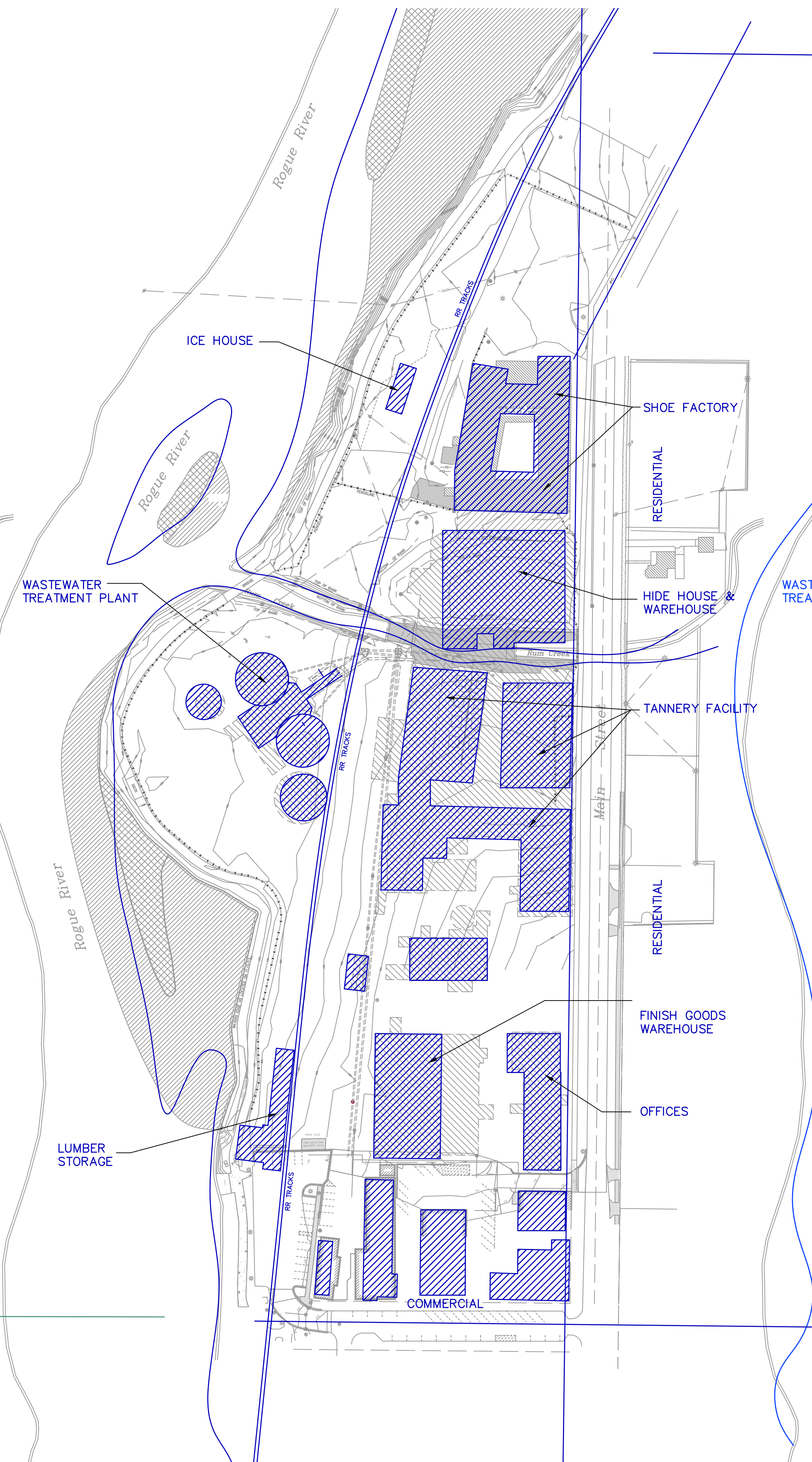
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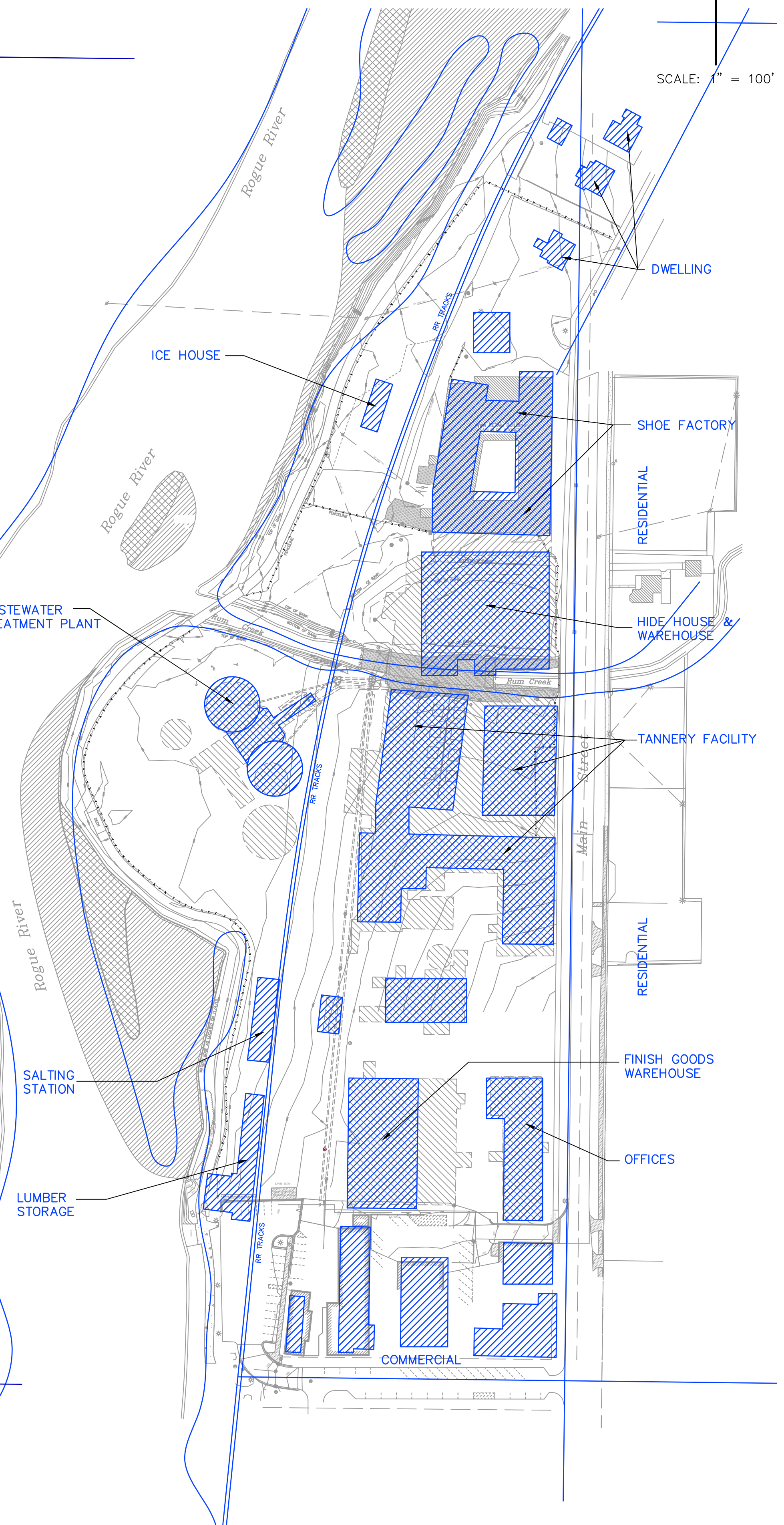
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1993 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE

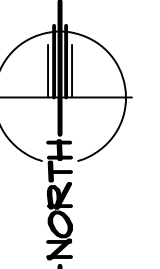


1978 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE



1967 AERIAL PHOTO
OVERLAY ONTO CURRENT BASE

SCALE: 1" = 100'



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WOLVERINE WORLD WIDE
FORMER TANNERY - ROCKFORD, MICHIGAN
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REMOVAL WORK PLAN

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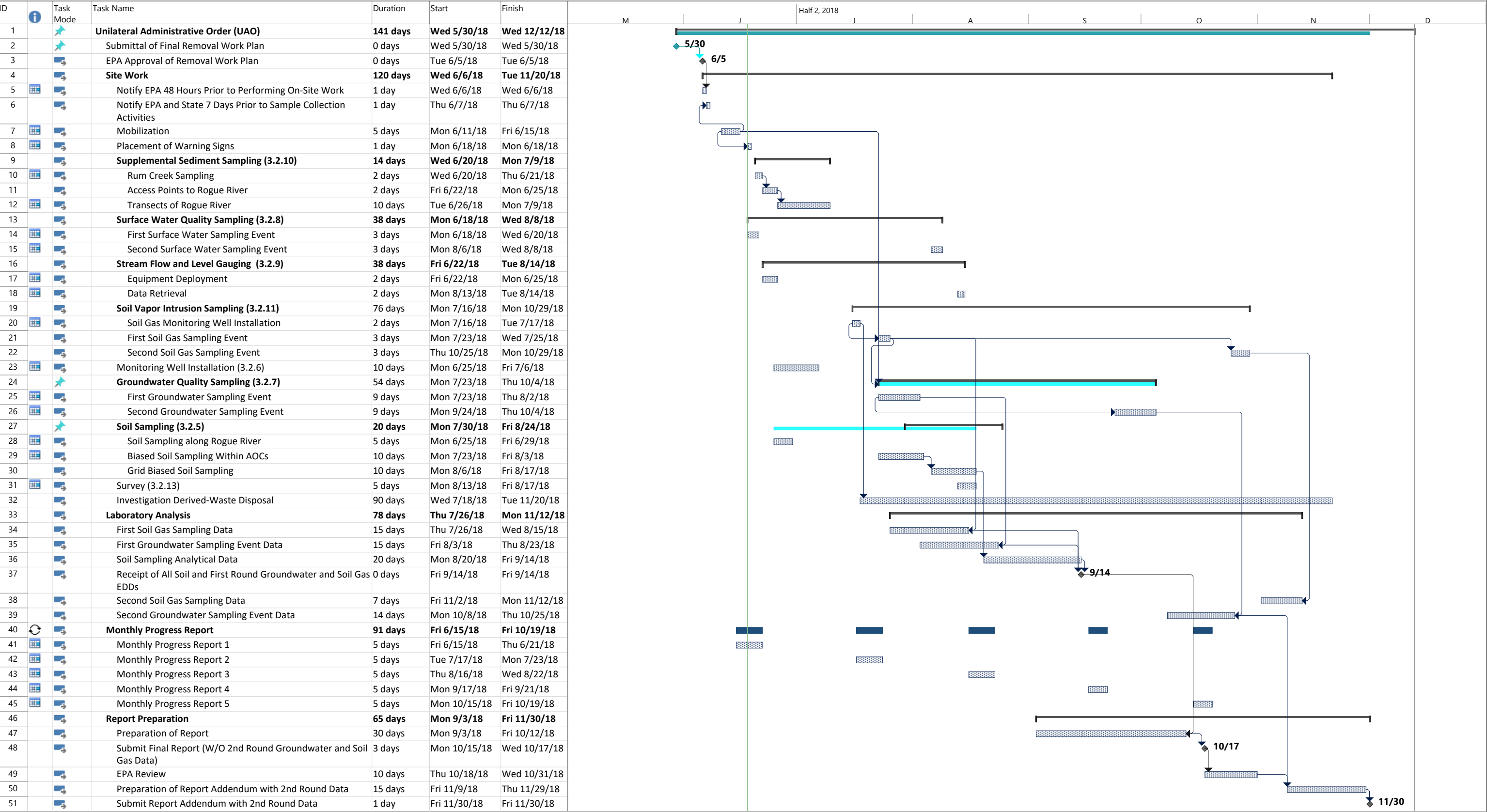
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SHEET NO.

B3

NOTE: SEE SHEET B5 FOR NOTES AND LEGEND



Appendix C – Estimate Project Schedule



Project: UAO schedule 051718
Date: Mon 6/18/18

Task

Split

Milestone

Summary

Project Summary

Inactive Task

Duration-only

Manual Summary Rollup

Manual Summary

External Milestone

Deadline

Progress

Manual Progress



GZA GeoEnvironmental, Inc.