REMEDIAL ACTION PLAN

John Deere Horicon Works
East Lake Street Bridge/Rock River
Horicon, Wisconsin

BRRTS #02-14-543152

HYDE ENVIRONMENTAL, INC.

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Prepared For:

John Deere Horicon Works
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Horicon, Wisconsin

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July 2016

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"I, James Lindemann, hereby certify that I am a Hydrogeologist, as that term is defined in s. NR 712.03 (3), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

James C. Lindemann, Hydrogeologist	July 20, 2016 Date

REMEDIAL ACTION PLAN

John Deere Horicon Works
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Horicon, Wisconsin

1.0 EXECUTIVE SUMMARY

This plan presents the proposed remedial activities to prevent the reoccurrence of liquid-phase hydrocarbons (LPH) from entering the Rock River near the East Lake Street Bridge area at the John Deere Horicon Works (JDHW) facility in Horicon, Wisconsin. The area of concern is located near the northeast corner of the intersection of East Lake Street and the Rock River. It predominantly consists of concrete-covered areas west of the JDHW Buildings R and G. The area is directly connected to an active operating part of the JDHW factory, and once housed two 20,000-gallon aboveground storage tanks (ASTs) removed in the early 1970s. The area also housed other oil tanks dating as far back as the early 1890s.

Investigative work completed since 2001 included the installation of nine recovery wells, four monitoring wells and over 40 soil borings. Approximately 14 gallons of LPH have been recovered from the site wells to date. Remedial work completed to date includes the removal of approximately 920 tons of petroleum-contaminated soil from the area in the summer of 2015.

The current remedial objectives are to remove accessible petroleum-contaminated soil located between the previously-excavated area and the Rock River, with the ultimate goal of the removal to eliminate future discharges of LPH to the nearby Rock River. This goal is expected to be accomplished by the removal and disposal of approximately 250 cubic yards of soil to depths between 10 and 11 feet.

The geology of the Horicon area consists of glacial deposits overlying Ordovician bedrock. Groundwater in the Horicon area is mapped as less than 10 feet deep. Water is supplied to the City of Horicon residents and JDHW by three municipal wells. On-site soil consists of fill, which is a mixture of non-native materials including foundry sand (friable mix of fine to medium sand with slag) and multi-colored layers of various mixtures of clay, silt and sand indicative of fill. Native deposits consisting of highly organic peat are located near the water table, at depths between 6.5 and 8 feet.

Site preparation for remediation includes the installation and maintenance of sediment and erosion controls, demolition and removal of concrete pavement, removal of a storm sewer, and abandonment of one monitoring well and two recovery wells. Approximately 250 cubic yards of soil is anticipated to be removed and sent to a solid waste facility for disposal. The excavation is expected to extend to between approximately 10 and 11 feet deep. Groundwater will be removed from the excavation, if necessary, and pumped to the City of Horicon water treatment plant. LPH, if present, will be removed by petroleum-absorbent recovery mats and/or a vacuum truck.

Soil samples will be collected from the completed excavation to document the remaining petroleum impacts to soil. The samples will be analyzed by a Wisconsin-certified laboratory for diesel range organics (DRO), petroleum volatile organic compounds (PVOCs) and polynuclear aromatic hydrocarbons (PAHs).. Post-excavation monitoring will include the replacement of any removed monitoring wells removed during excavating and quarterly monitoring of groundwater for four consecutive quarters.

A Remedial Action Report will be submitted at the conclusion of the remedial activities, providing details of the actions and documenting the disposal of contaminated soil, impacted groundwater and related events.

2.0 SITE BACKGROUND

2.1 Responsible Party and Site Location

The JDHW facility is located in Horicon, Wisconsin at 300 N. Vine Street. It is located in the SE quarter of the NW quarter of Section 6, Township 11 North, Range 16 East, in Dodge County (Figure 1).

The responsible party contact is:

Dan Ketter Phone: 920-485-4411
John Deere Horicon Works
300 N. Vine Street
Horicon, Wisconsin 53032

The consultant contact is:

James Lindemann Phone: 262-250-1226
Hyde Environmental, Inc.
W175N11163 Stonewood Drive, St. 110
Germantown, Wisconsin 53022

2.2 Remedial Action Objectives

The short-term remedial objective is to remove petroleum-contaminated soil from the East Lake Street Bridge/Rock River area - BRRTS No. 02-14-543152 (Site), with a long-term goal of eliminating future petroleum discharges to the nearby Rock River.

2.3 Site Description

The site is located within the JDHW factory grounds and consists of a concrete-covered area outside and west of Buildings R and G to the east and the Rock River to the west (Figure 2). The site is further defined by the E. Lake Street Bridge to the south and a JDHW air handling unit to the north. The area is an access area to an active operating part of the JDHW factory. The site is protected from public access by a six-foot tall chain link fence parallel to E. Lake Street and the Rock River. The site is also protected by 24-hour security. A 3- to 10-foot wide strip of land between a security fence and the Rock River consists of an unpaved grass-covered surface. Rock and concrete walls protect the site from erosion from the Rock River.

2.4 Site History

In 2001, a subsurface investigation was initiated in an area between the John Deere Horicon Works Building R and the Rock River, just north of Lake Street, after an oily sheen was observed on the river's water surface near the east bank of the Rock River. The most probable source of the sheen was thought to be fuel oil that had leaked into the ground from two former 20,000-gallon aboveground storage tanks (ASTs) removed from a nearby location in the early 1970s. The tanks were estimated to be located in the area adjacent to, or now covered by, a portion of a pump house (Building G4).

A review of historical Sanborn Fire Insurance maps revealed that the area between the Rock River and the structures near Lake Street has had a long history of petroleum storage. Buildings had been present prior to 1894 in the area currently occupied on or near Building R. It is not clear whether the current Building R is the same structure that was mapped in 1894. The 1894 map depicts an "Oil Tank Underground" just west of a building in an area between the Rock River and the structure. The use, type and volume of oil stored at this location were not provided on the map. Additional information on the map depicts storage of coal and coke just north of the oil tank.

A 1904 Sanborn map depicts the site to be occupied by The Van Brunt Manufacturing Co., an agriculture equipment manufacturing company purchased by John Deere in 1911. This document (provided previously in a July 2015 Remedial Action Plan) depicts two oil tanks at locations west of the tank depicted in the 1894 map. The tank shown in the 1894 map is no longer present. The use, type and volume of oil stored these tanks were also not provided on the map.

By 1913, both 1904 "oil tanks" were no longer shown in this area and have been replaced by "iron and fire brick" storage areas. The additional potential sources are only significant in that they provide a possible explanation for more widespread impacts that could not be explained by the presence of the ASTs removed in the 1970s.

Excavating to date has not revealed evidence of tanks and /or remains of tanks in the area of impact.

Investigative activities initially performed since 2001 focused on the area near Building G4, a pump house located near the southeast corner of Building R, due to the presence of petroleum sheen on the Rock River just west of Building G4. Since 2001 over 40 soil borings (including wells) have been drilled on site. Various reports were completed since 2001 and sent to the Wisconsin Department of Natural Resources (WDNR), including the following:

- Contaminant Investigation, Lake Street Bridge/Rock River Project, Building R, Graef, Anhalt, Schloemer & Associates, Inc., July 2001.

- Remedial Action Plan, Lake Street Bridge/Rock River Project, Building R, Graef, Anhalt, Schloemer & Associates, Inc., January 2010.
- Petroleum Product Passive Remedial System Operation Report, Lake Street Bridge/Rock River Project, Building R, Graef, Anhalt, Schloemer & Associates, Inc., February 2013.
- Groundwater Monitoring Report, E. Lake Street Bridge/Rock River, Hyde Environmental, Inc., October 20, 2014.

Remedial work initially focused on limiting the migration of liquid-phase hydrocarbons (LPH) to the Rock River. This was completed by installing petroleum-absorbing socks in the wells and securing absorbent booms along the east bank of the Rock River. From July 2010 through February 2013 approximately 14 gallons of LPH has been recovered from the nine recovery wells (RW-1 though RW-9) and two monitoring wells (MW-1 and MW-2).

Between July 27, 2015 and August 4, 2015, approximately 762 tons (approximately 590 cubic yards) of petroleum-contaminated soil was removed from the site. An additional 158 tons of petroleum-contaminated soil and clean fill was removed near and west of Building G4 between March 24 and April 5, 2016 to facilitate the replacement of a broken sewer lateral in the area of concern.

2.5 Geology

The geology of the Horicon area consists of glacial deposits overlying Ordovician bedrock of the Galena, Decorah, and Platteville Formations (Devaul et al., 1983). The unconsolidated deposits in the Horicon area consist of pitted outwash and other ice contact deposits. The bedrock is mapped as Ordovician cherty dolomite. The depth to bedrock near the site is estimated to be less than 50 feet.

The subsurface soil on-site consists of fill, which is a mix of non-native materials including foundry sand (friable mix of fine to medium sand with slag) and multi-colored layers of various mixtures of clay, silt and sand indicative of fill. Native deposits consisting of highly organic peat start near the water table at depths between 6.5 and 8 feet.

2.6 Hydrogeology

The depth to groundwater in the Horicon area is mapped as less than 10 feet deep (Devaul et al., 1983). Groundwater is expected to flow away from areas of higher elevation toward lowlands. Water is supplied to the City of Horicon residents and the JDHW by three municipal supply wells. For security reasons, the locations of the wells were not disclosed.

At the site, groundwater has been observed to be less than 10 feet deep in the fill and unconsolidated deposits. Recent groundwater monitoring events have shown the direction of groundwater flow at the site to vary between the northeast and northwest, with the predominant direction as northwest. These directions are intuitively different from the expected westerly flow direction. It is likely that local groundwater flow is dominated by a dam located approximately 0.4 miles to the south adjacent to Legion Park.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 Overview

The remedial actions will include removing the surface (concrete) pavement and petroleum-contaminated soil to an approximate depth of 10 to 11 feet. The volume of contaminated soil to be removed is estimated at 300 cubic yards (in place). The contaminated soil will be transported to Advanced Disposal landfill, N7296 County Road V, Horicon, WI, while the concrete will be transported to a local recycler. Soil samples will be collected from the excavation at the conclusion of work to document the remaining petroleum impacts, if any. The excavation will be refilled low-permeability materials (clay) and the area paved with concrete.

3.2 Soil Cleanup Goals

The cleanup goal is to remove as much petroleum-contaminated soil from the area between the previously-excavated area west of Building R and a seawall holding back the Rock River. The ultimate objective of the removal is to prevent the reoccurrence of a sheen and/or LPH from entering the Rock River. Because of the limited working space caused by a subsurface concrete deadman used as shoring for the river wall, and other site obstructions, including utilities and a storm-water drain, the volume of soil removed will be limited by the accessibility to the areas (Figure 2).

3.3 Site Preparation

Site preparation includes the installation and maintenance of sediment and erosion control, including silt fences, straw bale barriers, ditch checks and sediment traps. The local storm sewers will be covered, so that sediment cannot reach the Rock River for the duration of the project. A permit will be secured from the City of Horicon for the erosion control activities associated with the excavation.

Additional site preparation includes the demolition and removal of concrete pavement. Concrete debris will be disposed at a nearby concrete recycling facility. The proposed excavation area is presented in Figure 2.

Monitoring well MW-3 and recovery wells RW-1 and RW-2 are expected to be removed as part of the planned excavation. The wells will be abandoned by filling with bentonite prior to excavating, to insure that portions of wells are not left open below the surface. Well abandonment forms will be included with the Remedial Action Report. Petroleum-absorbent booms will remain in place along the east bank of the Rock River during and, for a few months, after the soil removal process. The booms placement and removal will be made at the discretion of JDHW environmental staff.

3.4 Contaminated Soil Removal

The lateral extent of the proposed excavation area has been determined by previous soil investigation activities and excavation during 2015 and is shown in the attached Figure 2. The proposed excavation area is defined by site restrictions including a security fence, utilities and the proximity to the Rock River. Approximately 250 cubic yards (in place) (350 tons) of soil is anticipated to be removed and sent to a solid waste facility for disposal. Based on current site conditions, the excavation is expected to extend to a maximum of 11 feet deep, or less, if groundwater penetrates the excavation at a rate that cannot be controlled by pumping. The final excavation size and depth will be determined by several factors including the volume of groundwater entering the excavation and the location of utilities. The lateral extent of the soil impacts has been defined based on drilling results, as shown in Figure 2. The impacted soil will be removed from an area between the Rock River and a concrete deadman west of Building R.

Because of the locations of the impacted soil, care will be taken to not damage utilities and the retaining wall holding back the Rock River. The excavated areas will be benched, as necessary, to prevent damage to utilities including sewer laterals, storm sewers, and electric lines, which are located in and/or near the planned excavation. To ensure that there will be no damage to the utilities, some impacted soil may have to remain in place.

3.5 Confirmation Soil Sampling

Soil samples will be collected from every 20 linear feet of the completed excavation wall. Soil samples will be collected from excavation walls for every four feet in depth, starting at one foot. For example, in an 11-foot excavation, wall samples would be collected at 1, 5 and 9 feet; in a 7-foot deep excavation, wall samples would be collected at 1 and 5 feet. An attempt will be made to collect one soil sample for every 400 sq. ft. (20 ft. x 20 ft. area) from the bottom of the excavation. Soil samples collected below the water table will be identified as aquifer matrix samples. In the event groundwater enters the excavation at a pace that pumping is unable to keep up with, soil samples will not be collected from the bottom of the excavation.

Soil samples will be analyzed by a Wisconsin-certified laboratory for diesel range organics (DRO), petroleum volatile organic compounds (PVOCs) and polynuclear aromatic hydrocarbons (PAHs). Samples collected for analysis will be placed on ice and transported under chain-of-custody to a Wisconsin-certified laboratory.

3.6 Excavation Dewatering

In the event groundwater enters the excavation at a rate that interferes with excavating, it will be pumped as free of liquids as fast as possible to allow the continuation of excavating. As in past excavating, the water will be pumped directly to a City of Horicon

sewer lift station or other point acceptable to the City. Liquids pumped to the City of Horicon sewer will be pretreated by pumping the water directly through a bag filter capable of removing sediment. Water will not be pumped to the sanitary sewer if LPH is obviously present.

If LPH is present in the excavation, large-diameter oil recovery booms will be employed to capture and direct LPH to parts of the open area of excavation that allow for effective petroleum recovery. Petroleum-absorbent recovery mats will be placed in the excavation to recover petroleum, as needed. Mats and booms saturated with petroleum will be stored in covered 55-gallon steel drums. The drums will be secured and treated by an off-site, licensed treatment facility.

Should large volumes of water and/or LPH enter the excavation, a vacuum truck may be called to the site to remove the impacted liquid. Groundwater/fuel removed with a vacuum truck will be manifested and treated as special waste by the selected treatment firm.

4.0 SITE RESTORATION

The completed and sampled remedial excavation will be filled with clean soil and/or gravel. Backfill placed below and near the present water table will consist of a clay-rich material. In the event that groundwater enters the excavation at a rate that cannot be captured by pumping, it may necessary to place granular materials at the bottom of the excavation prior to filling the excavation with clay-rich materials. Clay-rich materials and/or clean granular soil with varying percentages of clay, silt and sand will be placed over the clay-rich materials. Clay has been selected as fill so as to retard the movement of residual contaminants toward the Rock River.

Eight to 12 inches of gravel will be installed over the clay-rich fill to serve as a based layer for final paving. The excavated area will be completed with approximately 8 to 10 inches of concrete. The fill and gravel will be compacted by equipment specifically designed for the task. This generally requires that rolling vibratory compactors or impact-type compactors will be used for fill and compacted in no greater than 8-inch lifts. Compaction and paving will meet specifications acceptable to John Deere Horicon Works.

5.0 POST-EXCAVATION CARE

One monitoring well (MW-3) and recovery well (RW-1), currently used in the groundwater monitoring network, will be removed as a result of the excavation activities. Recovery well RW-2 will not be replaced as it is not in the current network as it is in close proximity with well RW-1. To monitor the groundwater conditions after the removal of the soil, wells MW-3 and RW-1 will be replaced with two inch diameter monitoring wells. These wells will be used for several purposes including, but not limited to, collecting groundwater samples, monitoring groundwater levels, checking for the presence/absence of LPH and checking the water chemistry for natural attenuation progress. To monitor the groundwater conditions adjacent to the completed excavations, monitoring wells MW-2R, MW-3R (a replacement for current well MW-3), MW-4, MW-5 (replaces RW-1) and RW-8 will be sampled for a minimum of four quarterly events post-excavation.

After that period, recommendations for additional monitoring or site closure with no further action will be considered based on the sampling results and observations. Booms placed in the Rock River have been placed in the river at the discretion of the JDHW environmental staff. Monitoring and maintenance of the booms will continue to be provided by JDHW staff and removed at the discretion of the staff.

6.0 SCHEDULE

The remedial action schedule is provided in Table 1. The schedule projects a timetable for the major tasks that are the components of the remedial actions proposed by this document, including:

- Issuance of a contract to a qualified remediation contractor
- Performance of remediation
- Installation and sampling of a replacement monitoring well
- Preparation of a Remedial Action Report

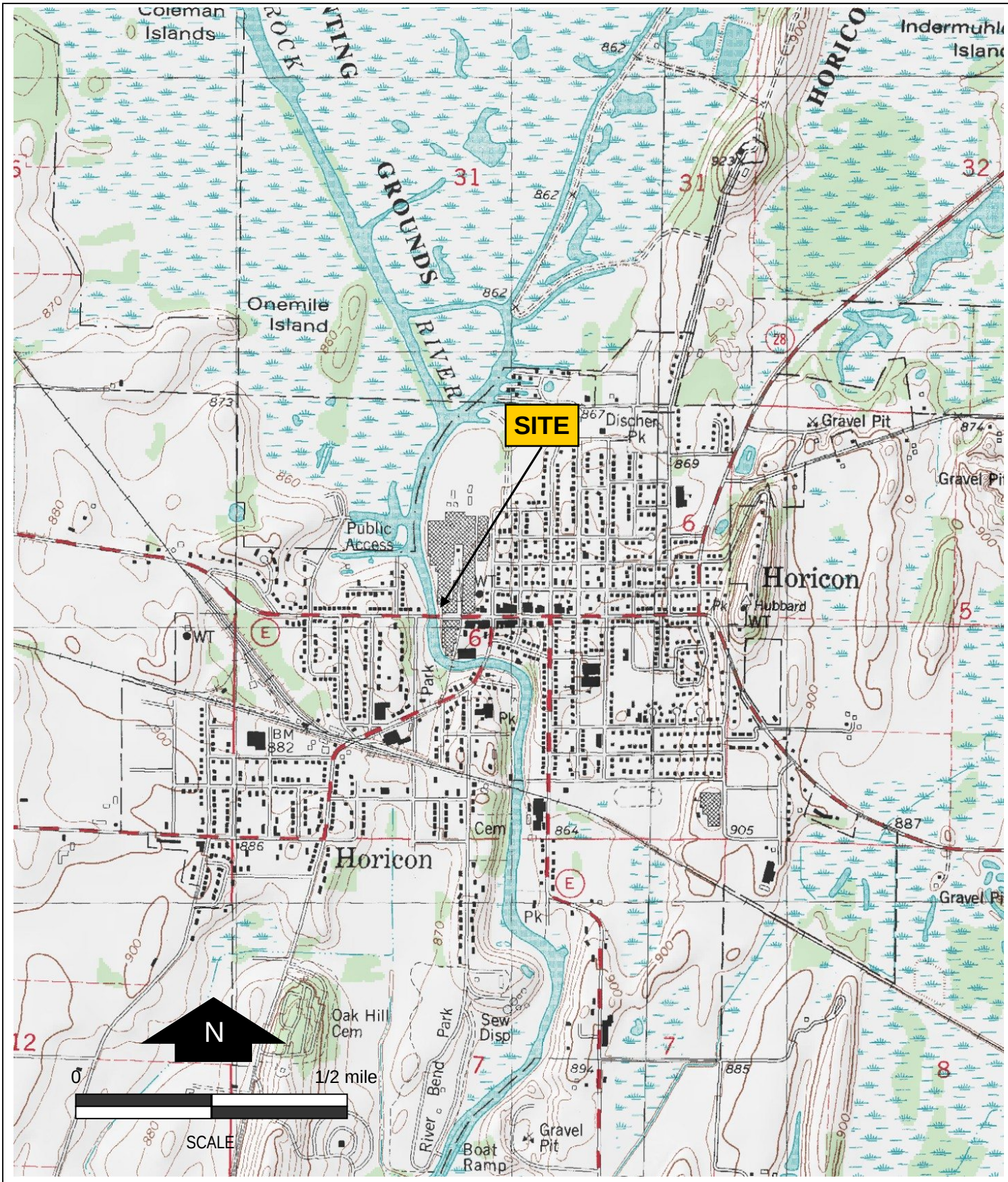
JDHW and Hyde will make every reasonable effort to adhere to the timetable outlined in the project schedule provided in Table 1.

7.0 REPORTING

A Remedial Action Report will be prepared to present the results of the remedial and follow-up activities. The report will provide appropriate background information, summarize previous investigative and remedial work, and provide dates and descriptions of pertinent field activities. It will include photographs of the recent remedial excavation and backfilling activities. The report will include a table summarizing the soil results that are completed by the laboratory. It will include appropriately-scaled figures that depict the final soil sampling locations and depths. Cross-sections will be provided in the event they convey the analytical results more clearly than plan view figures. Copies of laboratory reports and waste manifests will be attached. The report will include backfill source locations, pavement and soil disposal locations, groundwater treatment locations and disposal manifests.

The report will provide recommendations pertinent to the findings of the remedial activities.

FIGURES

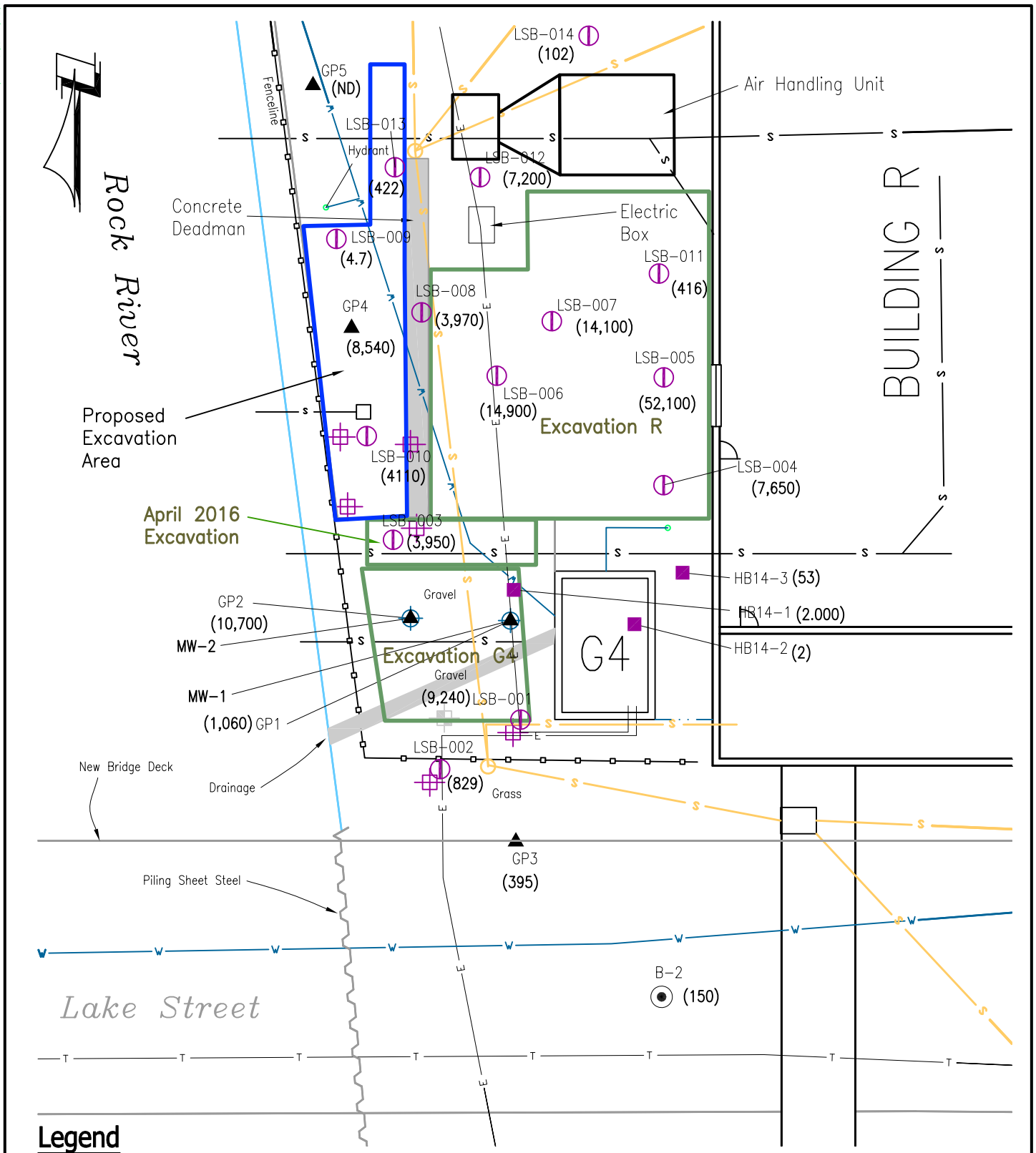


Source: http://www.digital-topo-maps.com/, Horicon and Mayview South, WI Quadrangles, 7.5 minute Services, 1980, USGS

HYDE ENVIRONMENTAL, INC.

FIGURE 1
SITE LOCATION

John Deere — Horicon Works
Horicon, Wisconsin



Legend

- HYDE Boring (Jan 2014)
- Boring Location (GAS 2001)
- Boring Location (MSA 2013)
- (1,060) DRO Concentration (mg/Kg)
- HYDE Boring Location (Nov 2014)
- Monitoring Well w/groundwater elevation (feet relative to site datum)
- Recovery Well (4 inch diameter) w/groundwater elevation (feet relative to site datum)
- Excavation Areas – July 2015 & April 2016

0 20'
SCALE

HYDE ENVIRONMENTAL, INC.

Figure 2

PROPOSED EXCAVATION AREA

JOHN DEERE HORICON WORKS – LAKE STREET BRIDGE
Horicon, Wisconsin

TABLE

TABLE 1. REMEDIAL ACTION SCHEDULE

John Deere Horicon Works E. Lake Street Bridge
Horicon, WI

Date	Task
7/21/2016	Submission of the Remedial Action Plan (RAP) to WDNR
7/22/2016	Issuance of a Contract to a Qualified Remediation Contractor
7/25/2016	Start of Remedial Actions
7/29/2016	Completion of Remedial Actions
Sept. 2016	Installation of Monitoring Wells
Oct. 2016	Completion of a Remedial Action Report