Public Review Document for Pilot Study on the
Racine Steel Castings North Lot Project
1425 North Memorial Drive
Racine, Wisconsin
City of Racine – USEPA Cleanup Grant

This document has been prepared to inform the public and seek public input regarding the City's plans to conduct a pilot study to further evaluate options related to the cleanup of the Racine Steel Castings – North Lot Site at 1425 North Memorial Drive in Racine, Wisconsin.

Site Background

The Racine Steel Castings – North Lot (RSC-North) is an approximately 2.3-acre parcel that is part of a larger property located at 1425 North Memorial Drive in Racine, Wisconsin, as shown on Figure 1. The layout of the site and delineation of the North Lot is shown on Figure 2. The Racine Steel Castings site has a history of industrial use since at least the late 1800s, which included use as a foundry, historic filling, underground and aboveground storage tanks, electric transformers, chemical drum storage, and several reported spills/releases. The City has conducted extensive investigation of the subject property over the last approximate 7 years and is evaluating options and planning for remedial action prior to redevelopment of the site.

In general, much of the site is covered with foundry sand fill, and has low levels of metals, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs) that are anticipated to be addressed by capping and institutional controls, in conjunction with redevelopment of the site. One area within the RSC-North, totalling approximately 3000 square-feet, has also been identified with PCB soil impacts above the United States Environmental Protection Agency (USEPA) Toxic Substances Control Act (TSCA) regulated concentration of 50 milligrams per kilogram (mg/kg) and high concentrations of 1,2,4-trichlorobenzene (TCB). Schematics showing the sample locations and corresponding PCB and TCB concentrations are provided as Figures 3 and 4.

In addition, low levels of metals, PAHs, PCBs and VOCs have been detected in one or more groundwater samples collected from existing monitoring wells on the site. The most recent groundwater sampling was conducted in April 2017 to evaluate the monitoring well network and obtain a baseline of contaminant concentrations necessary to design the natural attenuation monitoring plan.

Preliminary Site Redevelopment Plan

The subject property is anticipated to be redeveloped as an industrial site. No specific development has been identified at this time.

Remedial Alternatives Under Consideration

Five alternatives for remedial action at the subject site were considered with the goal of achieving a low-occupancy use classification while maximizing the potential for the resale and

redevelopment, which is currently impaired by the contamination present. The alternatives discussed below were evaluated based on effectiveness, implementability and cost.

Alternative 1: No Action

The "No Action" alternative was considered but disregarded. While implementable and cost-effective, it is does not meet regulatory requirements for soil and groundwater remediation and would potentially create a risk for direct contact with contaminated soil. It would also significantly hinder the proposed redevelopment of the site. This option was discounted.

Alternative 2: Limited Excavation/Off-Site Disposal of PCB/TCB-Impacted Soil with Natural Attenuation of Groundwater and Site Capping as Necessary to Achieve Case Closure

This alternative consists of excavation of PCB/TCB-contaminated soil with off-site disposal and site capping as necessary to remedy affected soil at the site. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA). Further details of this alternative will be presented in a later document.

Based on the estimated extent of PCB/TCB soil contamination at the subject site, the estimated cost to implement the soil excavation/off-site disposal including MNA groundwater sampling, abandoned utility removal, site capping, and associated reporting is $925,000. Under this remedial alternative, active remediation could be completed within 1 month and regulatory case closure could likely be secured within a 2 to 3 year timeframe, after completion of MNA.

Alternative 3: In-Situ Thermal Treatment of PCB/TCB-Impacted Soil with Natural Attenuation of Groundwater and Site Capping as Necessary to Achieve Case Closure

This alternative consists of treating PCB/TCB contaminated soils in place using a thermal conductive heating technology to heat the soil to approximately 300 degrees Celsius which increases the volatilization rate of the contaminants for extraction, and site capping as necessary to remedy affected soil at the site. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA). Further details of this alternative will be presented in a later document.

Based on the estimated extent of PCB/TCB soil contamination at the subject site, the estimated cost to implement the in-situ thermal treatment, including MNA groundwater sampling, abandoned utility removal, site capping, and associated reporting is $2,273,000. Under this remedial alternative, active remediation could be completed within 18 months and regulatory case closure could likely be secured within a 2 to 3 year timeframe, after completion of MNA.

Alternative 4: Limited Excavation with On-Site Treatment of PCB/TCB-Impacted Soil with Natural Attenuation of Groundwater and Use of Existing Building Slabs/Pavement as Site Cap

This alternative consists of excavation and on-site treatment of PCB/TCB-impacted soil using a mobile thermal treatment unit and replacement of the treated soil in the excavation area along

with site capping as necessary to remedy affected soil at the site. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA). Further details of this alternative will be presented in a later document.

Based on the estimated extent of PCB and TCB soil contamination at the subject site, the estimated cost to implement the excavation with on-site treatment of soil including MNA groundwater sampling and associated reporting is $1,079,000. Under this remedial alternative, active remediation could be completed within 1 to 2 months and regulatory case closure could likely be secured within a 2 to 3 year timeframe, after completion of MNA.

Alternative 5: In-Situ Chemical Reduction of PCB/TCB-Impacted Soil with Natural Attenuation of Groundwater and Site Capping as Necessary to Achieve Case Closure

This alternative consists of treating PCB/TCB contaminated soils in place using a chemical reduction technology, which chemically converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert, along with site capping as necessary as the selected remedial action option to remedy affected soil at the site. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA). Further details of this alternative will be presented in a later document.

Based on the estimated extent of PCB/TCB soil contamination at the subject site, the estimated cost to implement the in-situ chemical reduction alternative, including MNA groundwater sampling, site capping, and associated reporting is $764,000. Under this remedial alternative, active remediation could be completed within 6 months and regulatory case closure could likely be secured within a 2 to 3 year timeframe, after completion of MNA.

Cost Comparison of Remedial Alternatives

The preliminary estimated cost range for the viable remedial options (not including “No Action”) presented above are as follows:

- Excavation with Off-Site Disposal $741,000 to $1,230,000
- *In-Situ* Thermal Remediation $1,819,000 to $2,567,000
- Excavation with On-Site Soil Treatment $864,000 to $1,431,000
- *In-Situ* Chemical Reduction $612,000- to $1,021,000

Since in-situ chemical reduction appears to be the lowest cost alternative, the City has elected to perform a pilot study to verify that the technology will be effective in reducing the existing site concentrations and contaminants of concern. The basic concepts of the pilot study are discussed further below.

Proposed In-Situ Chemical Reduction Pilot Study

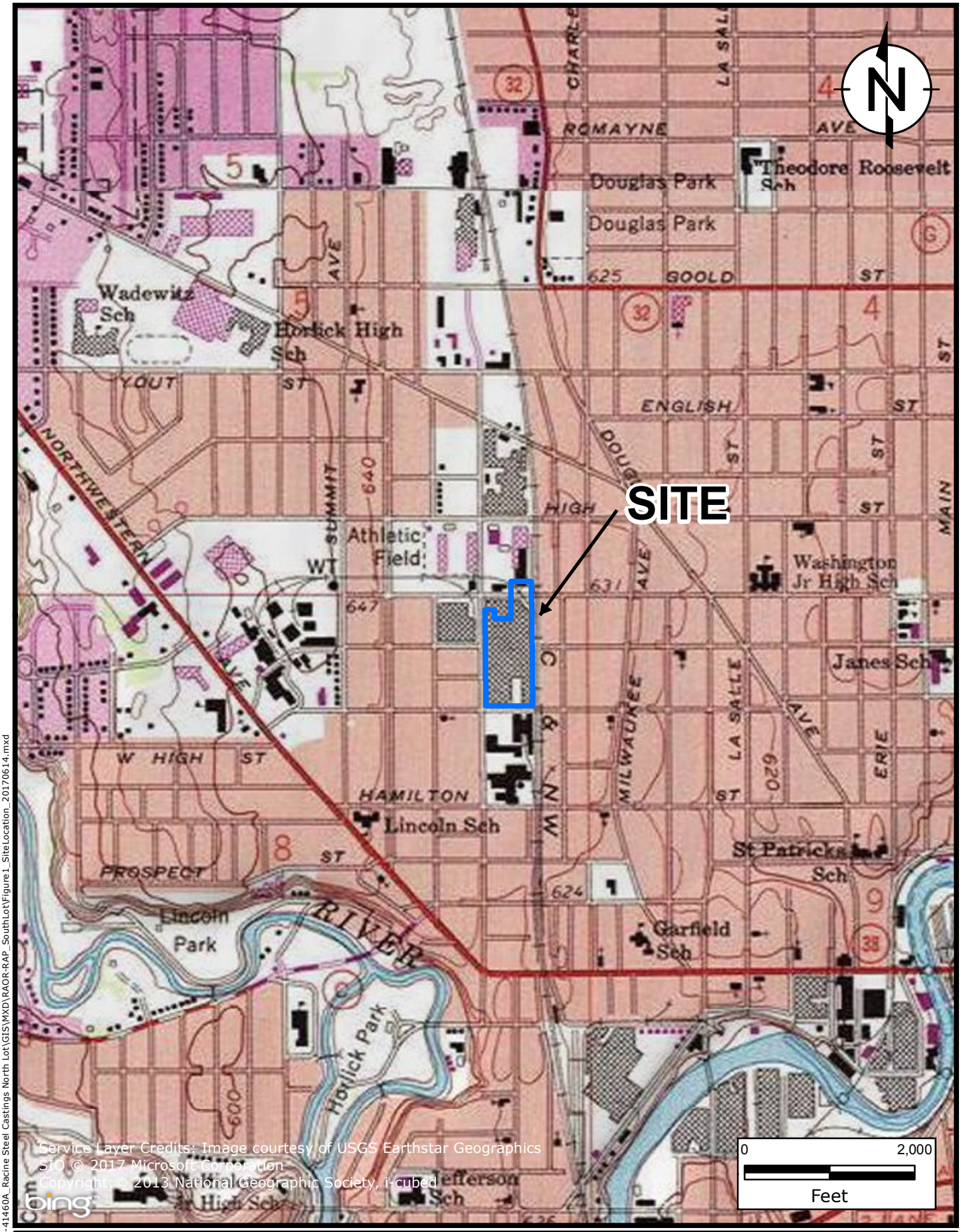
The purpose of the pilot study is to determine the overall effectiveness of the technology relative to the contaminants of concern and site specific soil/groundwater conditions; to

determine methods that could optimize further treatment, if necessary; and to begin to reduce the high levels of contaminants on the site. The pilot study will focus on the area of highest concentrations of contaminants on the site (see Figure 5). It will consist of treatment with a patented process consisting of mainly calcium peroxide which will be injected into the subsurface and/or mixed into the soil using excavating equipment. The pilot study treatment will occur over an approximate 2 week period and will be followed by performance verification soil sampling and monitoring to determine overall effectiveness for full-scale implementation. If the pilot testing is successful in meeting the overall treatment goals and objectives, it is anticipated that additional treatments may be necessary and a final remedial action plan will be prepared at that time.

The estimated cost to complete the pilot study, including the required monitoring and reporting is approximately $200,000 to $283,000. This cost will be covered using USEPA grant funds. If necessary, the size and other aspects of the Pilot Test will be adjusted to keep costs within budget.

Decision document

A decision document will be issued at the close of the 20-day public comment period.



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DRAFTED BY: AMW | DATE: 6/14/2017

SITE LOCATION
NORTH LOT
RACINE STEEL CASTINGS
RACINE, WISCONSIN

FIGURE
1

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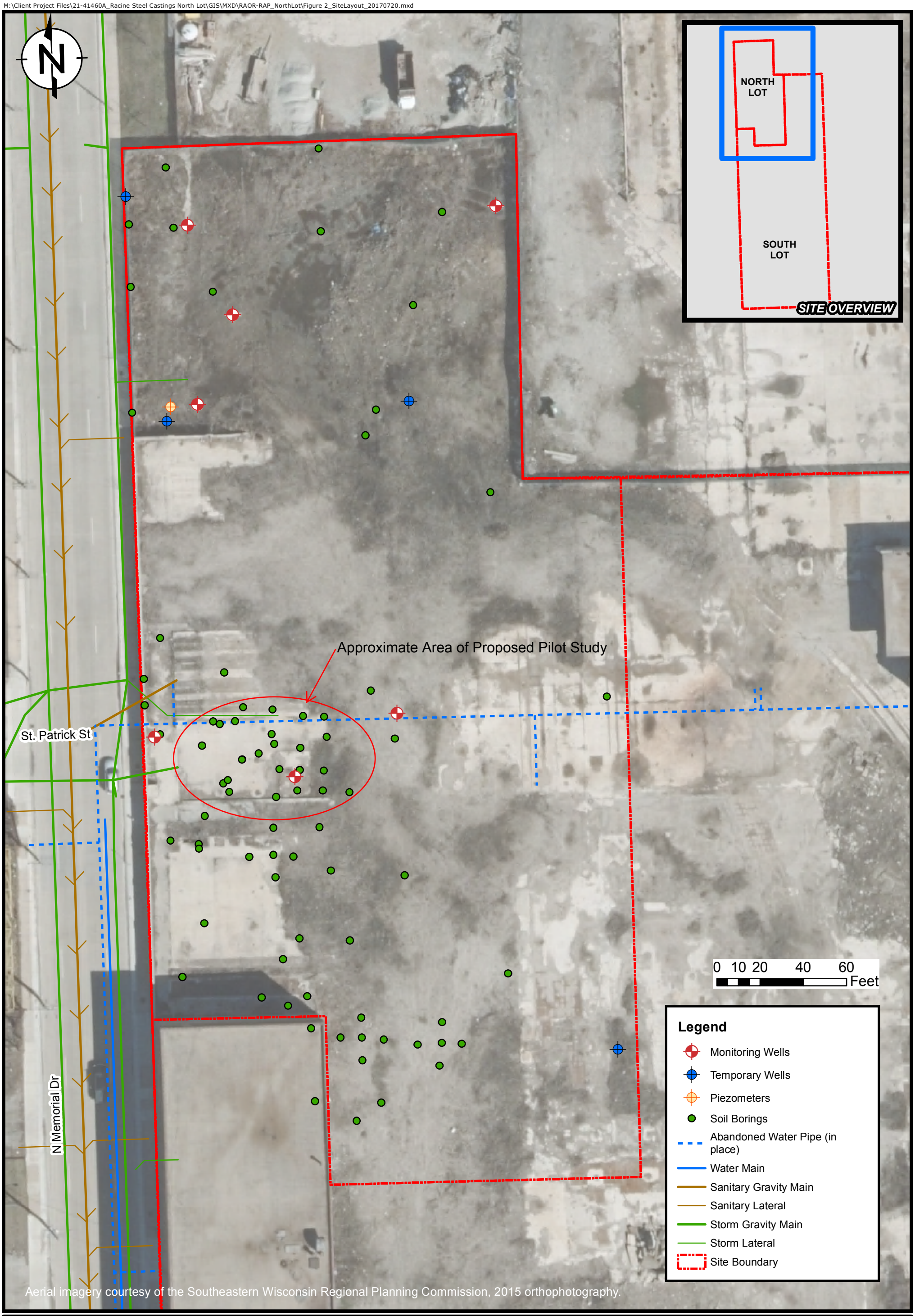

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DRAFTED BY: SCA | DATE: 7/20/2017

SITE LAYOUT AND PROPOSED PILOT STUDY TREATMENT AREA - NORTH LOT

RACINE STEEL CASTINGS
RACINE, WISCONSIN

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FIGURE
2

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M:\Client Project Files\21-41460A_Racine Steel Castings North Lot\GIS\MXD\Figure 7_ExtentofTotalPCBsinSoil_20170815.mxd

F2 0.5-2.5' 0.0645 J C
P1 0-2' 3.58 A,B,C
SB37N 2' 2.2 A,B,C **SB37N 4'** 47 A,B,C **SB37N 6'** 2.3 C **SB37N 8'** 3.4 C **SB37N 10'** 180 C,D
BNL-07 1-2' 0.15 C **BNL-07 4-5'** 2.6 C **BNL-07 7-8'** 320 C,D **BNL-07 10-11'** 0.61 C **BNL-07 13-14'** 0.086 C
SB-37 0.5-1.5' 16.4 A,B,C **SB-37 2.5-3'** 3,320 A,B,C,D
SB372016 2' 9,200 A,B,C,D **SB372016 4'** 6,600 A,B,C,D **SB372016 6'** 6,000 C,D **SB372016 8'** 120 C,D **SB372016 10'** 1,000 C,D
F1 0.5-2.5' NE
SB37W 2' 2.8 A,B,C **SB37W 4'** 0.42 A,C **SB37W 6'** 3.1 C **SB37W 8'** 1.0 C
F5 0.5-2.5' 0.0594 J C
SB-36 1-2' 3.01 A,B,C **SB-36 5-6'** NE
F6 0.5-2.5' 0.0275 J C **F6 2.5-3.5'** NE
SB37S 2' 16,000 A,B,C,D **SB37S 4'** 9,000 A,B,C,D **SB37S 6'** 25,000 C,D **SB37S 8'** 3,600 C,D **SB37S 10'** 4,400 C,D
BNL-18 1-2' 1,400 A,B,C,D **BNL-18 4-5'** 520 C,D **BNL-18 7-8'** 5,400 C,D **BNL-18 10-11'** 47 C **BNL-18 13-14'** 16 C **BNL-18 16-17'** 160 C,D **BNL-18 19-20'** 3.4 C
F4 0-2' 0.358 A,C
F4A 0.5-2' NE
G2N 2' 150 A,B,C,D **G2N 4'** 29 A,B,C **G2N 6'** 140 C,D
G2W 2' NE **G2W 4'** NE
G-14 0.5-2.5' NE
P2 0-2' 0.772 A,C
BNL-02 1-2' 2.2 A,B,C **BNL-02 4-5'** 0.34 C **BNL-02 7-8'** 1.2 C **BNL-02 10-11'** 0.10 C **BNL-02 13-14'** 0.029 J C
BNL-15 1-2' 2.0 A,B,C **BNL-15 4-5'** 11 C **BNL-15 7-8'** 1,000 C,D **BNL-15 10-11'** 65 C,D **BNL-15 13-14'** 0.86 C
F3A 0.5-2.5' 0.0757 J C
G1 0.5-2.5' 42 A,B,C **G1 5-6.5'** 0.606 C **G1 8-10'** NE
G15N 2' 0.095 J C **G15N 4'** NE
G2S 2' 17 A,B,C **G2S 4'** 0.28 A,C
G-11 0.5-2.5' 71.9 A,B,C,D **G-11 2.5-4.5'** 1.42 A,B,C
G15W 2' NE **G15W 4'** NE
G15E 2' 4.5 A,B,C **G15E 4'** NE
BNL-37 1-2' 13 A,B,C **BNL-37 4-5'** 0.019 J C
SB-27 2-5' 0.0318 J C
SB-28 1-2' 0.0922 C
L2 3-4' NE
SB37E 2' 4.6 A,B,C **SB37E 4'** 11,000 A,B,C,D **SB37E 6'** 2,100 C,D **SB37E 8'** 16,000 C,D **SB37E 10'** 120 C,D
BNL-03 1-2' 0.86 A,C **BNL-03 4-5'** 9.3 C **BNL-03 7-8'** 2,400 C,D **BNL-03 10-11'** 14,000 C,D **BNL-03 13-14'** 24 C
G-15 0.5-2.5' 50.6 A,B,C,D **G-15 2.5-4.5'** 29.7 A,B,C
G-12 0.5-2.5' 5.29 A,B,C **G-12 2.5-4.5'** 0.219 C
G11W 2' 0.83 A,C **G11W 4'** 0.29 A,C
G7 0.5-2.5' 4.83 A,B,C **G7 4.5-6.5'** 0.131 C **G7 8-10'** NE
G-8 0.5-2.5' 7.71 A,B,C **G-8 2.5-4.5'** 2.29 A,B,C
G11S 2' 0.28 A,C **G11S 4'** 0.016 J C
G3 0.5-2.5' 2.49 A,B,C **G3 5-7'** 4.27 C
BNL-23 10-11' 3.3 C **BNL-23 13-14'** 2.6 C **BNL-23 16-17'** 0.91 C **BNL-23 19-20'** 1.1 C **BNL-23 Composite** 540 A,B,C,D
SB38W 2' 5.8 A,B,C **SB38W 4'** 4.6 A,B,C **SB38W 6'** 1,700 C,D **SB38W 8'** 17,000 C,D **SB38W 10'** 10,000 C,D
SB38N 2' 47,000 J A,B,C,D **SB38N 4'** 4,300 A,B,C,D **SB38N 6'** 1,500 C,D **SB38N 8'** 12,000 C,D **SB38N 10'** 6,500 C,D
P10 0-2' 1.31 A,B,C
SB-39 4-5' 0.218 C **SB-39 6-7'** 0.153 C
SB-35 2-3' 18.3 A,B,C **SB-35 3-7'** 0.0343 J C
G2 0.5-2.5' 66.2 A,B,C,D **G2 4.5-6.5'** 0.35 C **G2 8-10'** NE
G9S 2' 6.2 A,B,C **G9S 4'** NE
G11E 2' 3.4 A,B,C **G11E 4'** 2.1 A,B,C
G16E 2' 35 A,B,C **G16E 4'** 13 A,B,C
SB-34 1.25-3' NE
GP-123 3-4' 0.322 A,C
SB-33 1-1.75' 1.25 A,B,C
BNL-08 1-2' 0.15 C **BNL-08 4-5'** 0.039 J C **BNL-08 7-8'** 0.27 C **BNL-08 10-11'** 9,200 C,D **BNL-08 13-14'** 380 C,D
SB382016 2' 2,700 A,B,C,D **SB382016 4'** 830 A,B,C,D **SB382016 6'** 220 C,D **SB382016 8'** 5,400 C,D **SB382016 10'** 2,400 C,D
SB-21 0.5-1.5' 0.0876 C
G-13 0.5-2.5' 6.33 A,B,C **G-13 2.5-4.5'** NE
G9N 2' 2.1 A,B,C **G9N 4'** 1.1 A,B,C
G-9 0.5-2.5' 73.9 A,B,C,D **G-9 2.5-4.5'** 0.979 A,B,C
G16S 2' 8.8 A,B,C **G16S 4'** 1,500 A,B,C,D **G16S 6'** 11 C
SB38E 2' 3.1 A,B,C **SB38E 4'** 14 A,B,C **SB38E 6'** 15 C **SB38E 8'** 0.16 C
BNL-12 1-2' 740 A,B,C,D **BNL-12 4-5'** 74 C,D **BNL-12 7-8'** 2,800 C,D **BNL-12 10-11'** 5,000 C,D **BNL-12 13-14'** 23 C **BNL-12 16-17'** 19 C **BNL-12 19-20'** 3.3 C
SB-38 2-3' 266 A,B,C,D **SB-38 5-6'** 1,180 C,D
SB38S 2' 190 A,B,C,D **SB38S 4'** 880 A,B,C,D **SB38S 6'** 720 C,D **SB38S 8'** 57 C,D **SB38S 10'** 970 C,D
G-16 0.5-2.5' 150 A,B,C,D **G-16 5-7'** 0.446 C
G2E 2' 93 A,B,C,D **G2E 4'** 210 A,B,C,D **G2E 6'** 1.4 J C
G-10 0.5-2.5' 1.93 A,B,C **G-10 2.5-4.5'** NE
G11N 2' 0.37 A,C **G11N 4'** 2.4 A,B,C
G9E 2' 0.056 C **G9E 4'** NE
G9W 2' 8.1 A,B,C **G9W 4'** 8.5 A,B,C

NORTH LOT
SOUTH LOT
SITE OVERVIEW

0 15 30 60 90 120
Feet

Note: Concentrations of total polychlorinated biphenyls (PCBs) are compared to the Wisconsin Department of Natural Resources Residual Contaminant Levels (RCLs). Exceedances of the RCLs are displayed on this figure, with exceedances of the Direct Contact RCLs limited to soil samples collected within 0 to 4 feet of the ground surface.The table below displays the RCLs for these parameters in units of milligrams per kilogram (mg/kg). The results are also displayed in mg/kg.

Parameter	Non-Industrial Direct Contact RCL (A)	Industrial Direct Contact RCL (B)	Groundwater Pathway RCL (C)
Total PCBs	0.234	0.967	0.0094

Total PCB concentrations were also compared to the TSCA PCB remediation waste concentration of 50 mg/kg, and exceedances are noted by the letter 'D'.

Legend

Total PCBs in Soil
(Maximum by Location)
- No exceedance (NE)
- Exceeds Groundwater Pathway
- Exceeds Non-Industrial Direct Contact
- Exceeds Industrial Direct Contact
- Exceeds TSCA Limit (50 mg/kg)

- Abandoned Water Pipe (in place)
- Water Main
- Sanitary Gravity Main
- Sanitary Lateral
- Storm Gravity Main
- Storm Lateral
- Site Boundary

Aerial imagery courtesy of the Southeastern Wisconsin Regional Planning Commission, 2015 orthophotography.

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EXTENT OF TOTAL PCBs IN SOIL
NORTH LOT
RACINE STEEL CASTINGS
RACINE, WISCONSIN

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FIGURE
3

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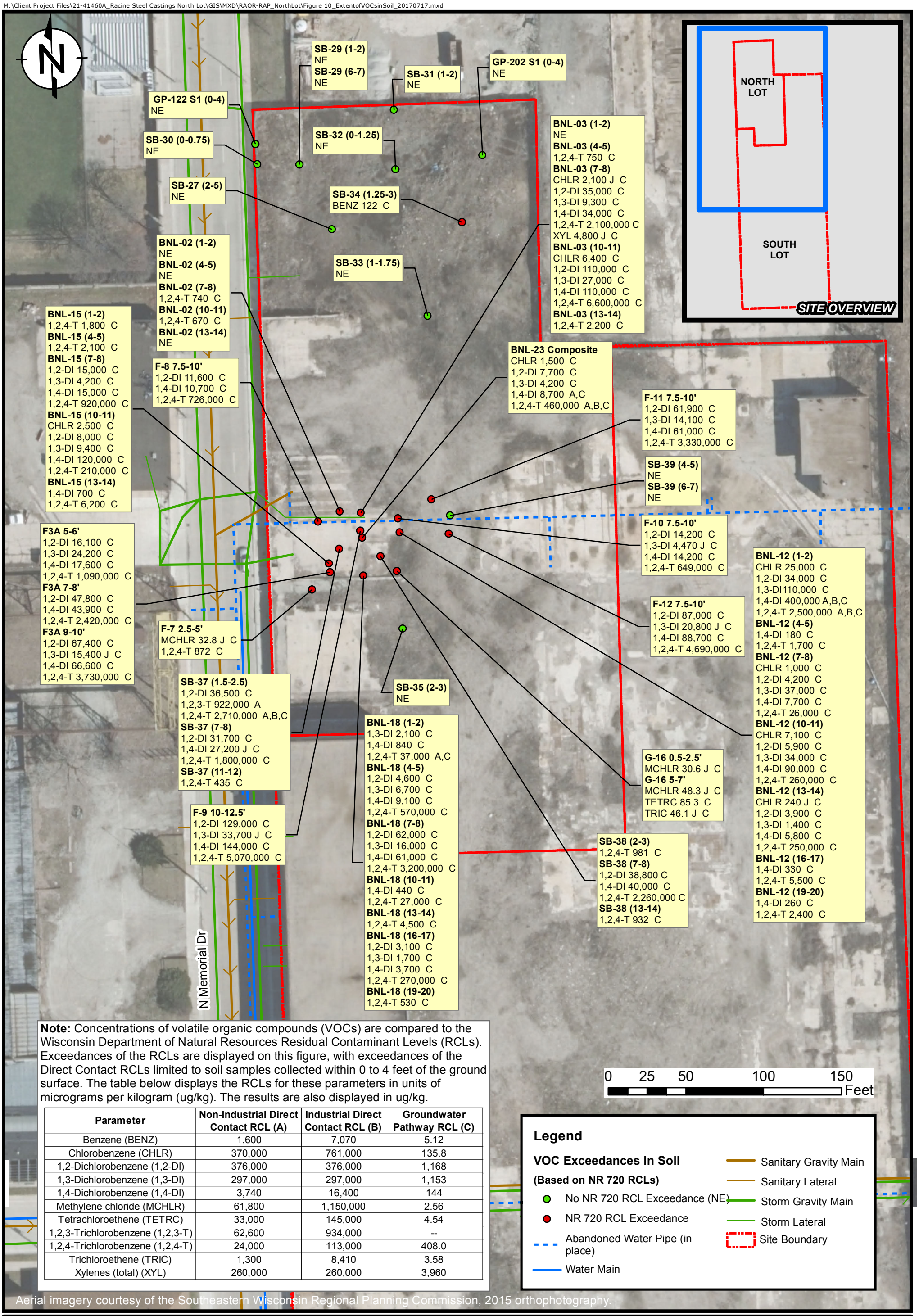

Note: Concentrations of volatile organic compounds (VOCs) are compared to the Wisconsin Department of Natural Resources Residual Contaminant Levels (RCLs). Exceedances of the RCLs are displayed on this figure, with exceedances of the Direct Contact RCLs limited to soil samples collected within 0 to 4 feet of the ground surface. The table below displays the RCLs for these parameters in units of micrograms per kilogram (ug/kg). The results are also displayed in ug/kg.

Parameter	Non-Industrial Direct Contact RCL (A)	Industrial Direct Contact RCL (B)	Groundwater Pathway RCL (C)
Benzene (BENZ)	1,600	7,070	5.12
Chlorobenzene (CHLR)	370,000	761,000	135.8
1,2-Dichlorobenzene (1,2-DI)	376,000	376,000	1,168
1,3-Dichlorobenzene (1,3-DI)	297,000	297,000	1,153
1,4-Dichlorobenzene (1,4-DI)	3,740	16,400	144
Methylene chloride (MCHLR)	61,800	1,150,000	2.56
Tetrachloroethene (TETRC)	33,000	145,000	4.54
1,2,3-Trichlorobenzene (1,2,3-T)	62,600	934,000	--
1,2,4-Trichlorobenzene (1,2,4-T)	24,000	113,000	408.0
Trichloroethene (TRIC)	1,300	8,410	3.58
Xylenes (total) (XYL)	260,000	260,000	3,960

Legend

VOC Exceedances in Soil

(Based on NR 720 RCLs)

- No NR 720 RCL Exceedance (NE)
- NR 720 RCL Exceedance
- Abandoned Water Pipe (in place)
- Water Main
- Sanitary Gravity Main
- Sanitary Lateral
- Storm Gravity Main
- Storm Lateral
- Site Boundary

Aerial imagery courtesy of the Southeastern Wisconsin Regional Planning Commission, 2015 orthophotography.

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EXTENT OF VOCs IN SOIL
NORTH LOT

RACINE STEEL CASTINGS
RACINE, WISCONSIN

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FIGURE
4

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