From: Byers, Harris <Harris.Byers@stantec.com>
Sent: Wednesday, May 20, 2020 1:08 PM
To: Van Der Kloot, James; Beggs, Tauren R - DNR; Adam Tegen
Subject: Supplemental UST Assessment - 1512 Washington Street
Attachments: UST Assessment.pdf

Team:

On behalf of the Community Development Authority of the City of Manitowoc, Stantec recently completed a supplemental assessment of the underground storage tanks formerly abandoned in place at 1512 Washington Street. The attached letter summarizes the supplemental assessment and outlines next steps for removal. Of particular note, a few additional soil samples are proposed on Figure 2, as UST 2 remains in place.

As Tauren and I discussed yesterday, residual petroleum impacts were formerly closed under BRRTS case number 03-36-274209. The attached supplemental letter and the report to be generated following tank removal will be included in the BRRTS database as supplemental information. Soil samples to be collected beneath the tanks following removal will update Site conditions to further plan for reuse; however, the results are not likely to result in reopening the BRRTS case.

Sincerely,

Harris Byers, Ph.D.
Sr. Brownfields Project Manager

Direct: 414 581-6476
Harris.Byers@stantec.com

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12075 Corporate Parkway Suite 200
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Stantec Consulting Services Inc.
12075 Corporate Parkway, Suite 200 Mequon WI 53092

May 18, 2020
File: 193706270

Attention: Mr. Adam Tegen
Community Development Director
City of Manitowoc
900 Quay Street
Manitowoc, WI 54220

Dear Mr. Tegen,

Reference: Supplemental Underground Storage Tank Assessment
Former Mirro Facility
1512 Washington Street
Manitowoc, Wisconsin
BRRTS ID: 03-36-274209 (Closed LUST)
USEPA ACRES ID: 169132

As a continuance of the Stantec (2019) *Site-Specific Sampling and Analysis Plan for a Chapter NR 716 WAC Site Investigation* (SSSAP), and on behalf of the City of Manitowoc (City), Stantec Consulting Services (Stantec) has completed a supplemental assessment of remaining underground storage tanks (USTs) at the Brownfield property located at 1512 Washington Street in Manitowoc, Wisconsin (herein referred to as the "Property"). The location of the Site is illustrated on Figure 1. This work was completed using funds provided through a site-specific Brownfield assessment grant awarded to the Community Development Authority of the City of Manitowoc (CDA) by the United States Environmental Protection Agency (USEPA) in 2018 under cooperative agreement number BF-00E02380. The USEPA Assessment, Cleanup and Redevelopment Exchange System (ACRES) ID for the Property is 169132. The Wisconsin Department of Natural Resources (WDNR) Bureau for Remediation and Redevelopment Tracking System (BRRTS) closed case number associated with the USTs is 03-36-274209

BACKGROUND

As described in the Stantec (2016) Phase I ESA, four former fuel oil underground storage tanks (USTs) were abandoned in place in 2001 by filling with a cementous slurry as the former industrial buildings prevented complete UST removal at the time of tank closure. Residual petroleum impacts were closed under BRRTS case number 03-36-274209. As noted in the Stantec (2019) SSSAP, records suggest two of the USTs were subsequently removed. However, there was some uncertainty as to which USTs were removed due to conflicting historic records/drawings. Additionally, tank size was inconsistent in historic records. Therefore, to provide clarity on the number, size, and relative locations/orientations of remaining USTs in the target area, a supplemental assessment was warranted. For consistency, UST numbering discussed in this letter corresponds to numbers given to each UST at the time of closure. Methods

This supplemental assessment included completion of a geophysical survey by Ground Penetrating Radar Systems, Inc. (GPRS) using ground penetrating radar (GPR). The tops of USTs were exposed through

shallow test trenches to confirm the location/orientation/size of remaining tanks. Photographic documentation of Site work is provided in Attachment A and the GPRS field report is provided in Attachment B.

GEOPHYSICAL SURVEY

On May 12, 2020, GPRS completed a geophysical survey using GPR of an approximately 2,000 square foot area where two possible tank anomalies had been identified during previous geophysical surveys. In summary, GPRS identified two subsurface anomalies consistent with USTs. The anomalies were marked in the field with yellow paint and were consistent with the locations of the two western USTs (UST 3 and UST 4; Figure 2) suspected to remain at the Property (Attachment A, Photo No. 1). The survey noted that the top of the suspected tanks was approximately 1.5 feet below grade. The GPRS scan included the area east of UST 3 and UST 4, but did not identify anomalies consistent with tanks. GPRS also investigated a manhole approximately 80 feet east of the scan area and observed piping of unknown nature that was unable to be traced using GPR or electromagnetic (EM) technologies.

TEST PITS AND SUPPLEMENTAL TANK ASSESSMENT – METHODS

On May 13, 2020, the City of Manitowoc removed the concrete from over the target area with an excavator equipped with a hydraulic breaker attachment (Attachment A, Photo Nos. 2-3). The concrete was measured to be six to eight inches thick with minimal reinforcing “pencil rod” wire present, approximately ¼ inch in diameter (Attachment A, Photo No. 4). A bucket attachment was used to remove the pieces of concrete, which were stockpiled north of the tank excavation (Attachment A, Photo Nos. 5-6).

Surficial fill was slowly removed to expose the top of the USTs. The location/orientation of the identified USTs corresponds to UST 3 and UST 4 abandoned in place in 2001 (Attachment A, Photo Nos. 7-9). The relative orientations of UST 3 and UST 4 are illustrated on Figure 2. A steel plate tack-welded on the top of UST 4 was removed to confirm tank contents (Attachment A, Photo Nos. 10-11) and a shallow excavation extended downward adjacent to the eastern end of the UST to confirm the tank diameter (Attachment A, Photo Nos. 12-13).

A partially removed UST was unexpectedly encountered east of UST 4, which is consistent with the location/orientation/size of UST 2 (Attachment A, Photo Nos. 15-18). The relative location of UST 2 is illustrated on Figure 2. The top of the tank had been removed and the tank appeared to be backfilled with general site fill and demolition debris. The entire length of UST 2 was revealed, and the excavation extended further east and south of UST 2 to confirm no additional tanks remain in the area. No additional USTs were encountered (Attachment A, Photo Nos. 19-25 and 27).

For site safety, the excavations were backfilled to mitigate the risk of slips, trips or falls. Stockpiled concrete and a small quantity of apparently clean spoil remains on the north side of the excavation (Attachment A, Photo Nos. 26 and 28).

RESULTS

All three tanks encountered (UST 2, UST 3, and UST 4) were approximately five feet in diameter and 30 feet long, corresponding to each having an approximate 4,406-gallon capacity, which is consistent with tank sizes listed in UST abandonment documentation prepared in 2001. Further information for each tank is provided below.

UST 2 – NORTHEAST TANK

Tank Location. UST 2 was bounded by a former foundation wall approximately one to two feet north of the tank that appeared to narrow with depth, general site fill and a former foundation wall approximately seven feet south of the tank, and by UST 4 approximately two feet west of the tank. It appears that a subsurface former wall running parallel with the eastern end of the tank was cut to accommodate the tank in the space; the opening in the wall was the same width as the tank diameter (five feet) and was continuous north and south of the cut-out. The cut-out in the wall did not appear to extend south to former UST 1.

Tank Contents. The tank appeared to be backfilled with general site fill (brick, debris) and trace amounts of imported gravel. It is unclear whether this is the same material that the tank was originally abandoned with, or if the tank was intended for removal in 2003, but for one reason or another was replaced back into the excavation and filled with general site debris.

Surrounding Soil Quality. Impacted soils were not encountered near UST 2. However, previous work suggests that residual petroleum impacts may be present beneath the center of the UST.

UST 3 – SOUTHWEST TANK

Tank Location. UST 3 was bounded by a former foundation wall approximately one to two feet south of the tank that appeared to narrow with depth, a subsurface brick wall approximately three inches west of the tank, UST 4 approximately two feet north of the tank, and general fill to the east.

Tank Contents. Stantec soil boring/monitoring well SB-25/MW-25 (installed March 2019) was inadvertently installed through the previously abandoned tank, approximately one-foot east of the western end of the tank (Attachment A, Photo No. 8). While not intentional, the soil and groundwater data associated with SB-25/MW-25 provided in the Stantec (2020) Phase II ESA offers insight into UST abandonment material and current soil and groundwater quality directly beneath the UST.

The boring log for SB-25/MW-25 is included as Attachment C, and notes “medium-grained sand” above surface of the tank (approximately 1.5 – 2 feet below grade and consistent with field observations on May 13, 2020), and “pulverized concrete” and “pulverized Portland cement” from two to seven feet below grade (corresponding with the inside of the five-foot diameter tank). Apparent tank contents are consistent with UST abandonment records prepared in 2001. As noted on the soil boring log for SB-25/MW-25, the tank is underlain by “saturated sand” from seven to 10 feet below grade.

Surrounding Soil Quality. As presented in the Stantec (2020) Phase II ESA, VOCs were not detected in tank abandonment materials or in soil directly below the tank. MW-25 is screened from five to 15 feet below grade, representing an interval that includes both the inside of the tank and beneath it. Groundwater was sampled for chloride, fluoride, dissolved metals and VOCs in April 2019. The concentrations of petroleum VOCs in groundwater were all less than laboratory limits of quantification (Stantec, 2020). The only constituent that was detected at a concentration greater than the groundwater enforcement standard (ES) was bromodichloromethane; bromodichloromethane is a common byproduct of drinking water disinfection and was therefore disregarded as a constituent of concern in the Stantec 2020.

Somewhat consistent with observations made at the time of UST closure, a very small quality of soil with a weathered petroleum-like odor was encountered near the bottom of the east end of UST 3. Petroleum impacted soils were not removed as part of this assessment. Medium-grained sandy fill removed to expose the surface of UST 3 was used to backfill the excavation.

Reference: Supplemental Underground Storage Tank Assessment; Former Mirro Facility; 1512 Washington Street; Manitowoc, Wisconsin

UST 4 – NORTHWEST TANK

Tank Location. The tank was bounded by a former foundation wall approximately one to two feet north of the tank that appeared to narrow with depth, a brick wall approximately three inches west of the west end of the tank, UST 3 approximately two feet south of the tank, and by UST 2 approximately two feet east of the tank.

Tank Contents. An approximate 1.5-foot square tack-welded cutout was removed from the top of UST 4 by the excavator. The tank appeared to be filled with inert concrete or cement, which is consistent with UST abandonment records prepared in 2001.

Surrounding Soil Quality. No evidence of residual impacts to soil were encountered at UST 4.

FUTURE ACTIONS

As proposed in Section 7.3 of the Stantec (2019) SSSAP, proposed UST removal will consist of the following tasks:

- Task 1.0 – Contractor Procurement, Permit Acquisition, and Health and Safety Planning
- Task 2.0 – Tank Removal
- Task 3.0 – Backfilling
- Task 4.0 – Closure Assessment

Prior to the proposed removal of the remaining USTs at the property, MW-25 will be abandoned pursuant to NR 141 Wisconsin Administrative Code (WAC), and will be reinstalled following tank removal. As proposed in Section 7.4 of the Stantec (2019) SSSAP and illustrated with additional sample locations associated with UST 2 on Figure 2, soil assessment below and adjacent to the USTs will be performed following removal per Wisconsin Department of Agriculture, Trade and Consumer Protection requirements, as applicable. If residual soil impacts following tank removal are present, one or more groundwater monitoring wells may be installed to determine if groundwater has been impacted in those areas.

We trust this information meets your needs and we look forward to working with you on this project.

Regards,

STANTEC CONSULTING SERVICES INC.

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QA/QC Manager
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REFERENCES

Stantec, 2016b, Phase I ESA for 1512 Washington Street, Manitowoc, Wisconsin, June 28, 2016.

Stantec, 2019. Site-Specific Sampling and Analysis Plan for a Chapter NR 716 WAC Site Investigation, 1512 Washington Street, Manitowoc, Wisconsin, January 9, 2019.

Stantec, 2020. Phase II Environmental Site Assessment, Investigation of PCB Impacts to Soil Beneath the Loading Dock and Area 8 and Continued Assessment of Site-Wide Impacts to Soil and Groundwater, 1512 Washington Street, Manitowoc, Wisconsin, March 19, 2020.

LIMITATIONS

This Supplemental Tank Assessment was performed in accordance with generally accepted practices of the profession for performing similar studies at the same time and in the same geographical area. Stantec observed that degree of care and skill generally exercised by the profession under similar circumstances and conditions. No other warranty is expressed or implied.

Stantec observations, findings, and opinions must not be considered as scientific certainties, but only an opinion based on our professional judgment concerning the significance of the data gathered during the course of the investigation. Specifically, Stantec does not and cannot represent that the Site contains no hazardous or toxic materials or other latent condition beyond that observed by Stantec.

Stantec does not warrant that this submittal represents an exhaustive study of all possible environmental concerns at the project area. The items investigated as part of this study represent likely sources of environmental concerns at the project area and are consequently believed to adequately address the public at risk at the present time.

ENCLOSURES

Figures
Figure 1 – Site Location and Local Topography
Figure 2 – Remaining Underground Storage Tanks

Attachments
Attachment A – Photographic Documentation
Attachment B – GPRS Summary of Scanning for Underground Storage Tanks
Attachment C – SB-25/MW-25 Soil Boring Log

FIGURES

Figure No.
1

Title
Site Location and Local Topography

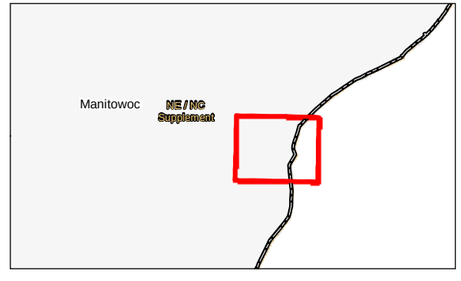
Client/Project
City of Manitowoc
USEPA Brownfield Assessment Grant
Hazardous Substances

0 1,050 2,100 Feet

193703931
Prepared by HLB on 5-24-16

N

Legend
Target Site



Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
2. Data Sources Include:
Topo Map: USGS/National Geographic Society

Stantec

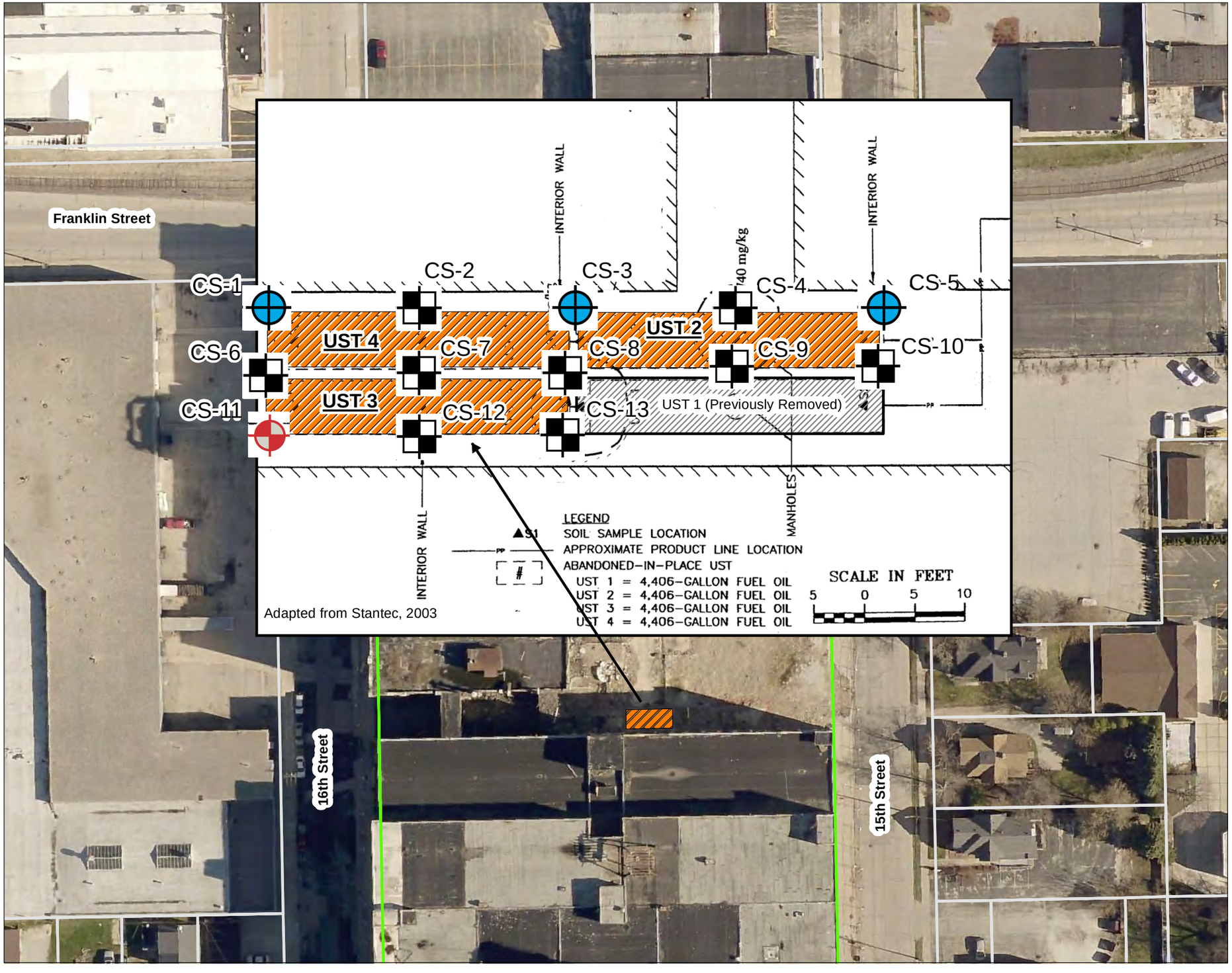


Figure No.
2

Title
Figure 2. Location of Remaining USTs and Proposed Sampling Locations

Client/Project
City of Manitowoc
USEPA Brownfield Assessment Grant
Hazardous Substances

0 45 90 Feet

1937003931
Prepared by HLB on 5-18-2020

Legend

N

- Target Property
- Parcels
- (3) Underground Storage Tanks
- Proposed Soil Sample
- Proposed Soil Sample / Temp Well
- Proposed Groundwater Monitoring Well

Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803
2. Feet
3. Data Sources Include:
   Orthophotography: 2015 City of Mantiowoc

Stantec

APPENDICES

APPENDIX A
Photographic Documentation

Stantec

Photographic Log

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 1

Photo Location:
Southeast corner of UST 3

Direction:
Looking northwest

Survey Date:
5/13/2020

Comments:
Underground Storage Tank (UST) anomalies marked by GPRS (UST 3 on left side, UST 4 on right side).

Photograph ID: 2

Photo Location:
South of tank bed

Direction:
Looking northwest

Survey Date:
5/13/2020

Comments:
Using a hydraulic concrete breaker to break the concrete over UST 3 and UST 4.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 3

Photo Location:
East of UST 3

Direction:
Looking west

Survey Date:
5/13/2020

Comments:
Broken concrete prior to removal over UST 3 and UST 4; monitoring well MW-25 is visible.

Photograph ID: 4

Photo Location:
Tank bed surface

Direction:

Survey Date:
5/13/2020

Comments:
The thickness of the concrete was between six and eight inches (field notebook pictured is seven inches tall); wire "pencil rod" reinforcement is also visible.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 5

Photo Location:
South of tank bed

Direction:
Looking northwest

Survey Date:
5/13/2020

Comments:
Removing the concrete pieces using an excavator.

Photograph ID: 6

Photo Location:
North of tank bed

Direction:
Looking east

Survey Date:
5/13/2020

Comments:
Broken concrete, fill piping and fill sand taken out of the excavation in the vicinity of UST 3 and UST 4.

Client:	City of Manitowoc	Project:	193706270
Site Name:	Former Mirro Facility	Site Location:	1512 Washington Street

Photograph ID: 7 **Photo Location:** Northwest corner of tank bed **Direction:** Looking southeast **Survey Date:** 5/13/2020 **Comments:** Exposing the surface of UST 4 (foreground) and UST 3.	
Photograph ID: 8 **Photo Location:** Southwest corner of tank bed **Direction:** Looking northeast **Survey Date:** 5/13/2020 **Comments:** Exposing the surface of UST 3 (foreground) and UST 4; MW-25 is visible, and was installed through the western end of UST 3.	

Client:	City of Manitowoc	Project:	193706270
Site Name:	Former Mirro Facility	Site Location:	1512 Washington Street

Photograph ID: 9 **Photo Location:** West of UST 4 **Direction:** Looking east **Survey Date:** 5/13/2020 **Comments:** UST 4 (shown), approximately two feet south of the northern foundation wall (left of the tank); both the northern and southern foundation walls appeared to taper toward the tanks with depth.	
Photograph ID: 10 **Photo Location:** Cut-out from UST 4 **Direction:** **Survey Date:** 5/13/2020 **Comments:** An approximate 1.5-foot square cut-out that was tack-welded onto the top of the eastern end of UST 4; this plate was removed by the excavator to reveal the fill contents of the tank beneath.	

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 11

Photo Location:
Cut-out from UST 4

Direction:

Survey Date:
5/13/2020

Comments:
The contents of the tank exposed after removing the 1.5-foot square plate; the tank abandonment contents were observed to be concrete or cement.

Photograph ID: 12

Photo Location:
East of UST 3

Direction:
Looking southwest

Survey Date:
5/13/2020

Comments:
The eastern end of UST 3. A small area of black staining was observed at the bottom of the excavation beneath a small hole in the side of the tank; while exposing the side of UST 3, the western end of UST 2 was discovered (bottom-right corner of the photograph).

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 13

Photo Location:
East of UST 4

Direction:
Looking southwest

Survey Date:
5/13/2020

Comments:
Measuring the diameter of UST 3; each of the tanks revealed was five feet in diameter and 30 feet long.

Photograph ID: 14

Photo Location:
Temporary soil stockpile from UST 3

Direction:

Survey Date:
5/13/2020

Comments:
Black staining noted in soil during the last bucket excavated east of UST 3; the impacted soil was immediately placed back into the bottom of the excavation from where it came from, and backfilled with visually/olfactory unimpacted soil.

Client:	City of Manitowoc	Project:	193706270
Site Name:	Former Mirro Facility	Site Location:	1512 Washington Street

Photograph ID: 15 **Photo Location:** East of UST 3 **Direction:** Looking northwest **Survey Date:** 5/13/2020 **Comments:** Three tanks visible from the former location of UST 1; UST 3 (left), UST 4 (top-right), and UST 2 (bottom-left). City employee is standing in the approximate two-foot space between UST 4 and UST 2.	
Photograph ID: 16 **Photo Location:** South of UST 3 **Direction:** Looking northeast **Survey Date:** 5/13/2020 **Comments:** Further excavation to reveal UST 2; the top of the tank was removed, and appeared to be backfilled with general site fill.	

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 17

Photo Location:
West of tank bed

Direction:
Looking east

Survey Date:
5/13/2020

Comments:
Another view of the three tanks; UST 2 (by excavator), UST 3 (right) and UST 4 (left).

Photograph ID: 18

Photo Location:
Southwest of UST 2

Direction:
Looking northeast

Survey Date:
5/13/2020

Comments:
Continuing to reveal UST 2 to confirm the length of the tank.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 19

Photo Location:
UST 2

Direction:
Looking east

Survey Date:
5/13/2020

Comments:
A mangled steel sheet was observed in the bottom of the tank bed south of UST 2 (in the area where UST 1 would formerly have been); this is presumed to be the top of UST 2 that was cut away.

Photograph ID: 20

Photo Location:
East end of tank bed

Direction:
Looking north

Survey Date:
5/13/2020

Comments:
The eastern end of UST 2 (rusted metal face shown near bottom center of the photograph), and an opening cut into the north-south running wall just east (right) of it.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 21

Photo Location:
East end of tank bed

Direction:
Looking west

Survey Date:
5/13/2020

Comments:
The eastern end of UST 2, as seen from directly east of UST 2.

Photograph ID: 22

Photo Location:
East end of tank bed

Direction:
Looking south

Survey Date:
5/13/2020

Comments:
The eastern end of UST 2 (rusted metal face shown near bottom center of the photograph), and the opening cut into the north-south running wall just east (left) of it.

Client:	City of Manitowoc	Project:	193706270
Site Name:	Former Mirro Facility	Site Location:	1512 Washington Street

Photograph ID: 23

Photo Location:
East end of tank bed

Direction:
Looking west

Survey Date:
5/13/2020

Comments:
Digging a north-south transect through the center of former UST 1 to confirm that it was removed.

Photograph ID: 24

Photo Location:
UST 2

Direction:
Looking southwest

Survey Date:
5/13/2020

Comments:
The north-south transect was performed from the southern side of UST 2 (right) to the foundation wall (left); no sign of UST 1 was observed.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 25

Photo Location:
Northwest corner of tank bed

Direction:
Looking southeast

Survey Date:
5/13/2020

Comments:
The three USTs discovered during site work; UST 2 (far left), UST 3 (front-right) and UST 4 (front-left). UST 1 (former location far right) was not encountered.

Photograph ID: 26

Photo Location:
East of tank bed

Direction:
Looking west

Survey Date:
5/13/2020

Comments:
Backfilling the excavation to a minimum of three feet below grade for safety.

Client:	**City of Manitowoc**	**Project:**	**193706270**
Site Name:	**Former Mirro Facility**	**Site Location:**	**1512 Washington Street**

Photograph ID: 27

Photo Location:
West end of tank bed

Direction:
Looking east

Survey Date:
5/13/2020

Comments:
Tank bed after being filled in to a minimum of three feet below grade for safety.

Photograph ID: 28

Photo Location:
Southeast of tank bed

Direction:
Looking northwest

Survey Date:
5/13/2020

Comments:
Stockpiled materials from the excavation remain on the north side of the tank bed and include concrete (far right), imported fill sand (middle right) and general site fill (bottom right).

APPENDIX B
GPRS Summary of Scanning for Underground Storage Tanks

Summary of Scanning for Underground Storage Tanks (UST's)

Prepared For: Stantec

Prepared By:
Paul Mandella
paul.mandella@gprsinc.com
Senior Project Manager-Wisconsin
262.599.2736

May 12, 2020

May 12, 2020

Stantec
Attn: Harris Byers
Site: 1512 Washington Street, Manitowoc, WI.

We appreciate the opportunity to provide this report for our work completed on May 12, 2020.

PURPOSE

The purpose of this project was to search for any suspected underground storage tanks (USTs) or suspected UST-related piping/anomalies remaining on the property. The scope of work consisted of _1_ location(s) measuring approximately 2000 sqft. The area to be scanned was previously scanned by GPRS and 2 possible tank anomalies were marked. The customer would like the possible UST anomalies to be remarked for further investigation.

EQUIPMENT

- **Underground Scanning GPR Antenna**. The antenna with frequencies ranging from 250 MHz-450 MHz is mounted in a stroller frame which rolls over the surface. The surface needs to be reasonably smooth and unobstructed in order to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the feasibility of GPR. The data is displayed on a screen and marked in the field in real time. The total depth achieved can be as much as 8' or more with this antenna but can vary widely depending on the types of materials being scanned through. Some soil types such as clay may limit maximum depths to 3' or less. As depth increases, targets must be larger in order to be detected and non-metallic targets can be especially difficult to locate. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link
- **Electromagnetic Pipe Locator**. The EM locator can passively detect the electromagnetic fields from live AC power or from radio signals travelling along some conductive utilities. It can also be used in conjunction with a transmitter to connect directly to accessible, metallic pipes or tracer wires. A current is sent through the pipe or tracer wire at a specific frequency and the resulting EM field can then be detected by the receiver. A utility's ability to be located depends on a variety of factors including access to the utility, conductivity, grounding, interference from other fields, and many others. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link
- **GPS**. This handheld GPS unit offers accuracy down to 4 inches; however, the accuracy will depend on the satellite environment and obstructions and should not be considered to be survey-grade. Features can be collected as points, lines, or areas and then exported into Google Earth or overlaid on a CAD drawing. For more information, please visit: Link

PROCESS

The EM pipe locator was used to connect to accessible, traceable pipes that may be tank-related such as vent pipes or product lines. A current is induced onto the pipe which creates an electromagnetic field that can be traced using the receiver. We can then attempt to trace these pipes to their origin or end point and paint or flag their locations.

Initial GPR scans were collected in order to evaluate the data and calibrate the equipment. Based on these findings, a scanning strategy is formed, consisting of scanning the entire area in a grid with 2' scan spacing in order to locate any potential UST's that may remain at the site. The GPR data is viewed in real time and anomalies in the data were located and marked on the surface along with their depths using paint. Relevant scan examples were saved and will be provided in this report.

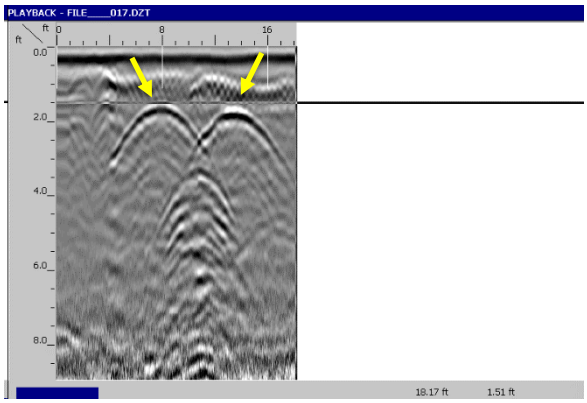
LIMITATIONS

Please keep in mind that there are limitations to any subsurface investigation. The equipment may not achieve maximum effectiveness due to soil conditions, above ground obstructions, reinforced concrete, and a variety of other factors. No subsurface investigation or equipment can provide a complete image of what lies below. Our results should always be used in conjunction with as many methods as possible including consulting existing plans and drawings, exploratory excavation or potholing, visual inspection of above-ground features, and utilization of services such as One Call/811. Depths are dependent on many factors so depth accuracy can vary throughout a site and should be treated as estimates only. Relevant scan examples were saved and will be provided in this report.

FINDINGS

The subsurface conditions at the time of the scanning allowed for maximum GPR depth penetration of 4' in most areas. No utilities were located in the immediate work area during the scanning as there was no apparent above ground features in the work area that would indicate utilities entered the work area. There was one manhole approximately 80' to the east of the scan area that was investigated. The manhole had unknown piping that was unable to be traced with EM or GPR technologies. The equipment and methods used did detect reactions from potential UST's. The following pages will provide further explanation of the findings.

Prepared for: Stantec Prepared By: Paul Mandella Date of Scanning: 5-12-2020	**Terms and Conditions** GPRS does not provide land survey or civil engineering data collection or documentation. This is provided as a reference map of the field markings and is not survey-grade.	**LEGEND**			1512 Washington Street, Manitowoc, WI.	Prepared by: GPRS
		▭	Scan Limits (white box)	Approx. Tank Limits		
		●	Unknown Manhole			



GPR Data Screenshot- 2 suspected UST's represented by the yellow arrows. The depth of the suspected tanks is approximately 1.5' deep.

Site Photo- Inside of unknown manhole.

Site Photo- Tank Extents represented by yellow paint.

Site Photo- Tank Extents represented by yellow paint.

GPR Data Screenshots and Photos	1512 Washington Street, Manitowoc, WI.	GPRS

CLOSING

GPRS, Inc. has been in business since 2001, specializing in underground storage tank location, concrete scanning, utility locating, and shallow void detection for projects throughout the United States. I encourage you to visit our website (www.gprsinc.com) and contact any of the numerous references listed.

GPRS appreciates the opportunity to offer our services, and we look forward to continuing to work with you on future projects. Please feel free to contact us for additional information or with any questions you may have regarding this report.

Signed,

Paul Mandella
Senior Project Manager—Wisconsin

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APPENDIX C
SB-25/MW-25 Soil Boring Log

· NEED TO PID

193706270 Site:	Boring Number: SB-25/MW-25	Page: 1 of 2	
Site Name: Former Mirro Facility	Boring Location:	Date: 3/26/2019	
Address: 1512 Washington Street Sheboygan, Wisconsin	AS STAKED	Start: 1610 Finish: 1645	

Boring recovery (feet)	Sample number	Sample time	Sampled for	Depth (feet)	Detailed Soil and Rock Description	Depth (feet)	PID collection and sample time	PID (ppm)	Well Log (if applicable)	Remarks
					+ CONCRETE DIFFICULT TO GET THROUGH 2-5'					
2/2'				0.5	0-1.5' SANDY GRAVEL W/ BRICK + COBBLES, DRY, BRICK IS POROUS, YELLOW+ IN 1-3" PIECES. COBBLES ARE ~ 20% + 3-5". SAND MATRIX IS DARK GREY-BROWN, MED GRAINED, SUBROUNDED. TRACE WOOD	0.5	1645	0.3		Abbreviations:
				1		1		0.4		D = Dry
				1.5		1.5				W = Wet
				2		2		0.5		M = Moist
1.5/3'				2.5	1.5-2' MED-GRAINED SAND, YELLOW-BROWN. MOIST	2.5		0.3	BENTONITE	fbg = feet below grade
				3		3				HC = Hydrocarbon
				3.5	2-5' PULVERISED CONCRETE, BEIGE, SOME MOISTURE	3.5		0.7	FINE SAND	
				4		4				
				4.5		4.5		0.5	SAND	
2/2'				5	5-7' PULVERISED PORTLAND CEMENT/CEMENT, MOIST, BEIGE, COARSE SANDY MATRIX, WHOLE NOT SOLID (~50% SAND, 50% GRAVEL-COBBLE SIZED)	5				
				5.5		5.5		1.1		* = Recovery is less than 100% due to compaction of soils/sands in core sampler, recovery is full recovery.
	SB-25 6-7 1450		VOC	6		6				
				6.5		6.5		1.2		
				7		7				
1/3'				7.5	7-10 SAT'D SAND, SOME SILT. SAND IS MED-GRAINED, SUBROUNDED. GREY-BROWN.	7.5				
				8		8				
				8.5		8.5				
				9		9				
				9.5		9.5				
				10	END BORING @ 10'	10				

End of Boring @ 10 bgs - BLEW-DRILL WOOL N-15.

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data			
▼ Depth While Drilling	7'	Rig	
▽ Depth After Drilling	n/a	GeoProbe Depth	10'
		Geologist	Whitney Cull
		Driller/Co.	Cascade

193706270	Site:	Boring Number: SB-25/MW-25	Page: 1 of 2
Site Name:	Former Mirro Facility	Boring Location:	Date: 3/ /2019
Address:	1512 Washington Street Sheboygan, Wisconsin		Start: Finish:

Boring recovery (feet)	Sample number	Sample time	Sampled for	Depth (feet)	Detailed Soil and Rock Description	Depth (feet)	PID collection and sample time	PID (ppm)	Well Log (if applicable)	Remarks
				0.5	A BLIND DRILLED WELL TO SGS @ 15'	0.5				**Abbreviations:** D = Dry W = Wet M = Moist fbg = feet below grade HC = Hydrocarbon
				1		1				
				1.5		1.5				
				2		2				
				2.5		2.5				
				3		3				
				3.5		3.5				
				4		4				
				4.5		4.5				SAND
				5		5				
				5.5		5.5				* = Recovery is less than 100% due to compaction of soils/sands in core sampler, recovery is full recovery.
				6		6				
				6.5		6.5				
				7		7				
				7.5		7.5				
				8		8				
				8.5		8.5				
				9		9				
				9.5		9.5				
				10		10				
					End of Boring @ 15 bgs					

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data			
▼ Depth While Drilling		Rig	
	GeoProbe Depth	10'	Geologist: Whitney Cull
▽ Depth After Drilling: n/a	Driller/Co.	Cascade	