

**From:** Henderson, Dave <Dave.Henderson@aecom.com>  
**Sent:** Monday, April 19, 2021 7:40 AM  
**To:** GravelPit; Beggs, Tauren R - DNR; Witte, Edward  
**Subject:** Former Newton Pit - Emerging Contaminant WP Update #2, Continued On-site Investigation  
**Attachments:** Emerging Contaminant WP Update #2\_041921\_final.pdf

Team,

Attached is the *Emerging Contaminant Work Plan #2 – Continued On-site Investigation* for the Former Newton Pit.

Tauren, I have also submitted this through the WDNR's portal system.

Thanks  
dsh

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## Letter of Transmittal

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Attention:	Mr. Tauren Beggs Hydrogeologist, WDNR 2984 Shawano Ave Green Bay, WI 54313	Date:	4/19/21
Project reference:	Former Newton Pit BRRTS No. 02-36-000268	Project number:	60135471

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**We are sending you the following:**

Number of originals:	Number of copies:	Description:
One	Zero	Emerging Contaminant Work Plan Update #2 – Continued On-Site Investigation

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Mr. Beggs,

Attached is the Emerging Contaminant Work Plan Update #2 – Continued On-Site Investigation for the Former Town of Newton Gravel Pit, Manitowoc Wisconsin.

Please let me know if you have any questions.

Thank you.



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David Henderson, P.E.  
Senior Project Manager  
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[dave.henderson@aecom.com](mailto:dave.henderson@aecom.com)

Cc: Kathleen M. McDaniel, City Attorney, City of Manitowoc  
Dan Koski, Director of Public Infrastructure, City of Manitowoc

April 19, 2021

Mr. Tauren Beggs  
Hydrogeologist  
Wisconsin Department of Natural  
Resources  
2984 Shawano Avenue  
Green Bay WI 54313-6727

**Emerging Contaminant Work Plan Update #2 – Continued On-Site Investigation  
Former Town of Newton Gravel Pit  
BRRTS No. 02-36-000268  
AECOM Project No. 60135471(82518)**

Dear Mr. Beggs,

AECOM Technical Services, Inc. (AECOM), on the behalf of the City of Manitowoc (City), is pleased to submit this emerging contaminant work plan update to investigate per- and polyfluoroalkyl substances (PFAS) related to the Former Town of Newton Gravel Pit site, 3130 Hecker Road, Manitowoc Wisconsin.

Presented below is emerging contaminant background information along with an updated work plan for additional PFAS site investigation activities focused on the northwest corner of the Former Town of Newton Gravel Pit property.

### Emerging Contaminant Background Information

The Former Newton Gravel Pit property is owned by the City of Manitowoc, is approximately 58 acres in size, and is located at 3130 Hecker Road in the Town of Newton, Manitowoc County Wisconsin. The property is situated in the southeast quarter of the northwest quarter of Section 02, Township 18N, Range 23E. A property location map is included as Figure 1.

The land use near the property is rural. Bordering the property to the west is an active gravel pit, to the north is farmland and forest, to the east is farmland and rural residences, and to the south is farmland and an active gravel pit. A small creek, Silver Creek, flows through the property from the north/northwest to the south/southeast. Site features are shown on Figure 2.

During the 1960's and early 1970's liquid industrial waste was disposed of within two areas that have been determined to be the source areas for impacts at the site. The Western Source Area is located on an elevated area of the property along the western property line. The Northern Source Area is located on the north central portion of the property. In addition, historical aerial photos indicate former drying ponds were present in the northwest corner of the property.

In July 2018, at the request of the Wisconsin Department of Natural Resources (WDNR), AECOM conducted a limited groundwater assessment for PFAS<sup>1</sup>. The limited investigation focused on the property boundaries, the

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<sup>1</sup> *Limited Groundwater Assessment for Emerging Contaminants*, Former Town of Newton Gravel Pit, 3130 Hecker Road, Manitowoc, Wisconsin, BRRTS no. 02-3-000268, AECOM Project No. 60581251, October 22, 2018

Western Source Area, the Northern Source Area, and based on anecdotal information along with historic aerial photography, an area in the northwestern portion of the property that historically contained former drying ponds. The limited investigation sampled groundwater from seven monitoring wells. Groundwater samples were analyzed for PFAS compounds using the Modified EPA Method 537, isotope dilution method, for the Michigan 24 compound list. Laboratory analytical results indicated that PFAS are present in the groundwater beneath the site and that concentrations of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) compounds exceed the EPA advisory level lifetime HAL at one location (WT-01).

On September 24, 2018, AECOM notified<sup>2</sup> the WDNR that emerging contaminants (i.e. PFAS) were present in the groundwater at the Former Newton Pit site. In response to the notification, the WDNR issued an updated responsible party (RP) letter<sup>3</sup> to the City informing them of their legal responsibilities and the next steps to be taken associated with the PFAS release.

In compliance with the updated RP letter, an *Emerging Contaminant Monitoring Work Plan*<sup>4</sup> was developed and submitted to the WDNR for initiating an emerging contaminant site investigation. The work plan included both potable well and groundwater monitoring well sampling activities. The emerging contaminant potable well sampling was conducted during the October 2018 event and the results have been reported under a separate cover<sup>5</sup>.

The emerging contaminant groundwater investigation was conducted in association with fall 2018 on-site groundwater sampling event<sup>6</sup>. In total, between the two 2018 PFAS sampling events, 16 on-site wells and the groundwater treatment pond were sampled and analyzed using EPA Method 537 modified, isotope dilution, for the State of Michigan list of 24 PFAS analytes. Analytical results indicated that PFAS were present in the on-site groundwater and in the waters of the treatment pond. At the time no source area was defined for the PFAS compounds.

In March of 2020 the City provided a *Revised Emerging Contaminant Work Plan Update #1*<sup>7</sup> to the WDNR for continued groundwater, potable well, and surface water sampling. The workplan was approved by the WDNR, with additions to the potable well and surface water monitoring scope of work.

The Work Plan Update #1 groundwater monitoring<sup>8</sup> was conducted in June of 2020, which included PFAS sampling for the remaining 38 monitoring wells associated with the site. Groundwater samples were analyzed using EPA Method 537 modified, isotope dilution, for the Wisconsin list of 36 PFAS analytes. Analytical results indicated that PFAS were present in the wells sampled.

The Work Plan Update #1 potable well sampling<sup>9</sup> was conducted in conjunction with the June 2020 volatile organic compound (VOC) potable well sampling event. In total, 15 addresses were scheduled for PFAS sampling and 15 addresses were sampled. Water samples were analyzed using EPA Method 537 modified, isotope dilution, for the Wisconsin list of 36 PFAS analytes. The laboratory analytical data indicated that PFAS are present in the potable wells sampled.

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<sup>2</sup> Notification for Hazardous Substance Discharge, WDNR Form 4400-225, submitted to WDNR on September 24, 2018

<sup>3</sup> Roxanne N. Chronert, WDNR, to City of Manitowoc, September 24, 2018. *Reported Contamination at Manitowoc City/Former Newton Tn Gravel Pit*, 3130 Hecker Road, Manitowoc.

<sup>4</sup> *Emerging Contaminant Monitoring Work Plan and Project Status Update*, Former Town of Newton Gravel Pit, BRRTS no. 02-3-000268, AECOM Project No. 60135471(82518), October 24, 2018

<sup>5</sup> *October 2018 VOC Semi-Annual Potable Well Monitoring Letter Report and Initiation of Per- and Polyfluoroalkyl Substances (PFAS) Monitoring*, Former Town of Newton Gravel Pit, BRRTS No. 02-36-000268, AECOM Project No: 60135471(82518), February 18, 2019

<sup>6</sup> *Northern Source Area Sampling, 2018 VOC Annual Groundwater Monitoring, and Initial Emerging Contaminant Groundwater Investigation Report*, Former Town of Newton Gravel Pit, BRRTS No. 02-36-000268, WDNR FID No. 436104020, AECOM Project No: 60135471(82518), June 5, 2019

<sup>7</sup> *Revised Emerging Contaminant Work Plan Update #1*, Former Town of Newton Gravel Pit, BRRTS No. 02-36-000268, AECOM Project No: 60135471(82518), March 18, 2020

<sup>8</sup> *Emerging Contaminant Groundwater Investigation Update Report, June 2020*, Former Town of Newton Gravel Pit, BRRTS No. 02-36-000268, WDNR FID No. 436104020, AECOM Project No: 60135471(82518), February 26, 2021

<sup>9</sup> *June 2020 VOC Semi-Annual and PFAS Potable Well Monitoring Letter Report*, BRRTS No. 02-36-000268, AECOM Project No: 60135471(82518), December 30, 2020

The Work Plan Update #1 Silver Creek surface water sampling<sup>10</sup> was conducted during August and November 2020. Sampling was conducted both upstream and downstream of the gravel pit site. Water samples were analyzed using EPA Method 537 modified, isotope dilution, for the Wisconsin list of 36 PFAS analytes. In total, 15 surface water samples were obtained from 11 locations during the two events. Analytical results indicate that PFAS were present in the surface water at all sample locations.

On November 6, 2020, the Wisconsin Department of Health Services (WDHS) reported-out the 11<sup>th</sup> Cycle of Groundwater Standards Proposals. In combination with the WDHS Cycle 10 recommendations, there are now 12 proposed individual standards and a proposed combined standard for 6 PFAS.

Effective March 1, 2021 the WDNR modified the Wisconsin 36 PFAS laboratory analytical list. Three PFAS were removed from the original list, making the updated Wisconsin PFAS laboratory analytical list of 33 compounds.

The proposed Cycle 11 standards and the updated Wisconsin analytical list of 33 PFAS have been incorporated into this Work Plan Update #2.

At this time no source has been defined for the PFAS identified during sampling associated with the Former Newton Pit.

## Emerging Contaminant Work Plan Update #2

This work plan update is provided in general accordance with the requirements of the Wisconsin Administrative Code Chapter NR 700 rule series with the understanding that multiple work plans for the project are currently in place and approved by the WDNR. Therefore, this work plan update is intended to be reviewed in conjunction with the existing plans.

### Former Drying Ponds PFAS Investigation

The goal for the activities proposed in this work plan is to further investigate the former drying ponds present in the northwest corner of the property and to aid in the hydrological understanding of the northwest corner, especially how groundwater flow relates to the surface water of Silver Creek.

Review of historical aerial photos indicate that several former drying ponds were located in the northwest corner of the property. Historical photos for 1967 and 1973, Figures 3 and 4 respectively, show the drying ponds. Figures 5 and 6 show the ponds as an approximate georeferenced 'best fit' transparent overlay on the site features map. The following site details relate to the location of the former drying ponds:

- Existing monitoring well nest, WT-01 and PZ-01, is located within the southwest portion of the western former drying pond.
- The active footprint of the area has expanded westward over the years. This expansion has covered a large portion of the eastern drying ponds and included the re-construction of a western safety berm along the edge of active area. The western berm, at least in part, has been constructed using environmentally impacted soils as approved by the WDNR under Low-Hazard Waste Grant of Exemption. This includes soils from the following projects:
  - Little Manitowoc River Restoration project (WDNR FID #436104020, BRRTS #02-36-000268). This fill contained low levels of metals, polychlorinated biphenyl's, and semi-volatile organic compounds/polycyclic aromatic hydrocarbons.
  - KK Building Property project (WDNR FID #436062550). This fill contained foundry sand, ash, porcelain debris, brick slag, etc. and low levels of lead.
- The footprint of the western drying pond is currently used as the location for the disposal of clean fill. Most of the pond's footprint has been backfilled with fill.

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<sup>10</sup> 2020 Silver Creek Emerging Contaminants Sampling Letter Report, Former Town of Newton Gravel Pit, BRRTS No. 02-36-000268, AECOM Project No: 60135471(82518), March 15, 2021

- The eastern drying ponds (i.e. what appear to be four connected ponds) are currently under the western safety berm for the firing range and the western lawn area of the range itself.

The proposed work plan includes the advancement of six soil borings, with limited soil sampling. The borings will be converted into NR-141 compliant groundwater monitoring wells followed by one initial round of groundwater sampling. The proposed monitoring well locations, schedule, and methods are as follows.

#### Soil Boring/Monitoring Well Locations and Schedule

See Figures 7 and 8 for the proposed soil boring/monitoring well locations and how they compare to the former drying pond areas as noted on the 1967 aerial photo overlay. The proposed soil borings/monitoring well locations are as follows:

- One boring/water table well (WT-35) within the eastern drying pond.
- One boring/water table well (WT-36) within the northwest corner of the western drying pond.
- One soil boring for sampling and a monitoring well nest located in the northwest corner of the property. The well nest will include a water table well (WT-37), a 630-series piezometer (PZ-37A) (i.e. approximately ½ the depth to bedrock), a 600-piezometer (PZ-37B) (i.e. just above bedrock), and a bedrock piezometer (PZ-37C).

No soil boring/monitoring wells are proposed to be located within the western safety berm. If field conditions limit the placement of the soil borings/monitoring wells where proposed, the wells will be relocated to facilitate their completion.

The proposed investigation activities will be completed in spring of 2021 with groundwater sampling following after well development.

#### Methods

There are potential cross contamination issues associated with PFAS sampling due to the presence of these compounds in many commercial products. Therefore, AECOM PFAS-certified sampling teams will conduct the PFAS monitoring events. AECOM certification requires attending an internal PFAS sampling training course and reviewing the AECOM PFAS Sampling Guidance document designed to make AECOM samplers aware of the products known to have tested positive for PFAS compounds, as well as identifying PFAS-free products that are appropriate to use in the sampling environment.

The proposed field activities procedures are as follows.

#### *Pre-Field Planning*

Prior to field activities, a site visit will be conducted with representatives from the City of Manitowoc and AECOM to mark out final monitoring well locations based on current field conditions (e.g., fill material conditions and feedback from the firing range manager). Although, no utilities are expected, "Digger's Hotline" will be contacted and the City will be informed to mark utilities.

AECOM will verify that the drilling subcontractor is following PFAS-free drilling protocols and providing PFAS-free materials for the project.

#### *Drilling and Soil Sampling*

Drilling will include the completion of six borings utilizing roto sonic drilling techniques with a 6-inch outer barrel and 4.5-inch outside diameter (OD) inner sampling barrel. Roto sonic borings will be continuous sampled by extracting 5 to 10-foot soil cores until the total depth of the boring has been achieved. Core lengths will depend on the geologic media. The soil cores will be vibrated out of the inner barrel into PFAS-free plastic sheeting shaped in a cylinder and tied off on both ends to form a bag. A decontaminated steel knife will be used to cut open the plastic sheet bags and the soil will be sampled for laboratory analysis and described for geological reference.

The goal of the PFAS soil sampling is to obtain soil representative of the bottom elevation of the former drying ponds. In the historical database for the site, AECOM has a 1973 aerial topographic survey of the property by Aero-Metric Engineering, Inc., of Sheboygan, Wisconsin. The 1973 survey provides elevation data for the drying ponds and the surrounding area, but the vertical datum for the survey is not clearly identified. AECOM proposes to field check the current site elevation data and compare it to the 1973 elevation data. This comparison should provide a relative elevation for the drying ponds and identify the elevation where a buried organic layer representative of the bed of the former drying ponds may be located. The proposed soil sampling schedule is as follows:

- One soil sample from boring/water table well, WT-35, within the eastern drying pond from the estimated pond bottom elevation, or below.
- One soil sample from boring/water table well, WT-36, within the northwest corner of the western drying pond from the estimated pond bottom elevation, or below.
- One soil sample from boring/water table well, WT-37, at the northwest corner of the property at the same relative elevation as the WT-35 and WT-36 samples. This location is outside of the former drying ponds footprint. Obtaining a soil sample from WT-37 should act as a background sample relative to the two former drying pond samples.

Soil samples for laboratory analysis obtained from the selected depth intervals will be transferred, with a decontaminated stainless steel spoon or nitrile gloves, to appropriate laboratory-supplied containers, labeled, and maintained on ice in insulated coolers. Samples will be shipped overnight in the cooler, on ice, under chain-of-custody protocol to a WDNR PFAS certified laboratory, or a laboratory that has applied for Wisconsin certification, for analyses.

Soil samples will be analyzed for the Wisconsin list of 33 PFAS using EPA modified Method 537.1 isotope dilution. A Level 4 data package will be requested from the laboratory. Due to the use of the isotope dilution method, Matrix Spike/Spike Duplication (MS/MSD) analysis will not be requested. AECOM will provide a laboratory data validation review using procedures described in the National Functional Guidelines for High Resolution Superfund Method Data Review (EPA, April 2016), as appropriate.

Quality control samples will include a field water blank poured during the field work and an equipment blank obtained from the drilling equipment. No duplicate soil samples are proposed.

Geology will be documented on a WDNR Boring Log Information Form (4400-122).

#### *Borehole Abandonment (if needed)*

All borings not converted into wells will be sealed with a bentonite chips, neat cement grout, bentonite-cement grout, sand-cement grout, concrete or bentonite-sand slurry. Grouts or slurries will be placed by a tremie pipe at the bottom of the boring and grouted until the grout flows to the surface. The grout will be allowed to settle for a minimum of 24 hours. If settlement occurs, bentonite chips will be gravity poured to 1 foot of the surface and the boring topped off with drill cuttings or natural fill material. The borehole sealing procedures will meet the requirements for NR 141, Abandonment Requirements.

Borehole abandonment will be documented on a WDNR Well / Drillhole / Borehole Filling & Sealing Report, Form 3300-005.

#### *Monitoring Well Installation*

Wells will be installed at four different levels, which includes: 3 water table wells, a 630-series piezometer, a 600-series piezometer, and a bedrock piezometer.

The water table wells will be installed with screens set across the water table, if possible and designated with the prefix WT. The standard construction for the water table wells (WT-35, WT-36 and WT-37) will include 2-inch diameter Schedule 40 PVC riser, and a 2-inch diameter by 10-foot long Schedule 40 PVC, No. 10 slot (0.010-

inch) well screen. Water table wells will consist of filter pack sand and annular space seal or bentonite seal. Where possible, filter pack sand will extend from 1.0 feet below the well screen to 2.0 feet above the well screen. Filter pack sand above the well screen may vary based on the location of the water table. Fine sand pack will be placed 2 feet above the top of the filter pack sand. Bentonite chips will be placed on the top of the filter pack sand and gravity poured up to 0.5 foot below the ground surface for the annular space seal/bentonite seal. The well riser should extend approximately 2 to 3 feet above ground surface with a lockable protective casing placed over the well. Within the protective casing, filter pack sand should be placed to within 6 inches of the top of the well riser, and a weep hole drilled in the bottom of the protective casing to allow drainage.

The 630-series piezometer will be installed with the screen bottom elevation set at approximately 630 feet MSL (approximately 80 feet BGS) and designated with the prefix PZ. The standard construction for the 630-series piezometer (PZ-37A) will include 2-inch diameter Schedule 40 PVC riser, and a 2-inch diameter by 5-foot long Schedule 40 PVC, No. 10 slot (0.010-inch) well screen. Piezometer wells will consist of filter pack sand, fine sand and bentonite seal and annular space seal. Filter pack sand will extend from 1.0 feet below the well screen to 2.0 feet above the well screen. Fine sand pack will be placed 2 feet above the top of the filter pack sand. Then a bentonite seal consisting of bentonite chips will be gravity poured on the top of the fine sand pack so that the seal is 5 feet thick. The annular space seal will consist of pumping a Wisconsin approved grout with a side discharging tremie pipe. The grout will be allowed to settle, then bentonite chips will be gravity poured to 0.5 foot below ground surface. The well riser should extend approximately 2 to 3 feet above ground surface with a lockable protective casing placed over the well. Within the protective casing, filter pack sand should be placed to within 6 inches of the top of the well riser, and a weep hole drilled in the bottom of the protective casing to allow drainage.

The 600-series piezometer will be installed with the screen bottom elevation set at approximately 600 feet MSL (approximately 100 feet BGS) and designated with the prefix PZ. The bedrock piezometer will be installed with the screen bottom set approximately 20 feet below the top of bedrock and designated with the prefix PZ. The standard construction for the 600-series piezometer (PZ-37B) and bedrock piezometer (PZ-37C) will include 2-inch diameter Schedule 80 PVC riser, and a 2-inch diameter by 5-foot long Schedule 80 PVC, No. 10 slot (0.010-inch) well screen. Piezometer wells will consist of filter pack sand, fine sand and bentonite seal and annular space seal. Filter pack sand will extend from 1.0 feet below the well screen to 2.0 feet above the well screen. Fine sand pack will be placed 2 feet above the top of the filter pack sand. Then a bentonite seal consisting of bentonite chips will be gravity poured on the top of the fine sand pack so that the seal is 5 feet thick. The annular space seal will consist of pumping a Wisconsin approved grout with a side discharging tremie pipe. The grout will be allowed to settle, then bentonite chips will be gravity poured to 0.5 foot below ground surface. The well riser should extend approximately 2 to 3 feet above ground surface with a lockable protective casing placed over the well. Within the protective casing, filter pack sand should be placed to within 6 inches of the top of the well riser, and a weep hole drilled in the bottom of the protective casing to allow drainage.

Guard posts will be installed around each of the wells. Generally, three guard posts will be used for each well, however, the actual number of guard posts will be determined in the field and will be sufficient to protect the wells from equipment and vehicles.

Well construction will be documented on WDNR Monitoring Well Construction forms (4400-113A).

#### *Monitoring Well Development*

The newly installed wells will be developed by AECOM using PFAS free submersible pumps and/or bailers. AECOM will document the well development, recording date, depth of well from top of well casing, depth of water from top of well casing, volume removed, estimated sediment and visual water clarity. For wells not installed in fine-grained deposits and having normal water level recovery, initial development will require removal of 5 gallons and reversal or surges with a bailer to avoid bridging by particles. Development will be considered complete when 10 well volumes have been removed for wells that do not pump dry and 3 to 5 well volumes for wells that do pump dry. It is also desired to achieve the best possible clarity of the groundwater.

Well development will be documented on WDNR Monitoring Well Construction forms (4400-113B).



### *Groundwater Sampling*

Groundwater samples will be obtained using PFAS free pump, tubing and low-flow sampling procedures. AECOM will document the well sampling, recording field parameters including pH, temperature and specific conductance, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity. Sampling will be considered when 3 consecutive measurements of field parameters pH, temperature, and specific conductance are stabilized to within 10% or a maximum of 60 minutes of low flow pumping.

The water samples will be collected in laboratory-supplied 250ml HDPE bottles without preservative. The sample bottles, once filled, will be stored on ice in insulated coolers. Samples will be shipped overnight in the cooler, on ice, under chain-of-custody protocol to a WDNR PFAS certified laboratory, or a laboratory that has applied for Wisconsin certification, for analyses.

Groundwater samples will be analyzed for the Wisconsin list of 33 PFAS using EPA modified Method 537.1 isotope dilution. A Level 4 data package will be requested from the laboratory. Due to the use of the isotope dilution method, Matrix Spike/Spike Duplication (MS/MSD) analysis will not be requested. AECOM will provide a laboratory data validation review using procedures described in the National Functional Guidelines for High Resolution Superfund Method Data Review (EPA, April 2016), as appropriate.

Quality control samples will include a field water blank poured during the field work and an equipment blank obtained from the sampling equipment. One duplicate groundwater sample is proposed.

Groundwater field parameters will be documented on field data forms.

### *Equipment Decontamination*

Decontamination of the stainless-steel equipment will consist of removing solids from the equipment, washing with Alconox, and then triple rinse with PFAS-free water. Decontamination of the drilling rig and down-hole equipment will include steam cleaning with PFAS-free water.

### *Survey*

Upon completion of the well installations, the new monitoring wells will be surveyed. Survey will include the top of the PVC casing elevation, adjacent ground surface elevation, and the spatial co-ordinates (X and Y coordinates). The elevations will be reported to the nearest 0.01 foot and provided in State Plane or Manitowoc County coordinate systems.

### *Investigation Derived Waste*

Investigation derived waste will be disposed of at the gravel pit site. Soil cuttings for the WT-37 well nest will be thin spread at the drilling location. Soil cuttings for WT-35 and WT-36 will be thin spread within the former drying pond locations as close to the boreholes as possible. Development, purge, and decontamination water will be discharged into the on-site groundwater treatment pond. Disposable equipment (e.g., sampling gloves, protective clothing, etc.) will be collected and disposed of off-site as solid waste.

### *Reporting*

Preliminary groundwater and soil sampling results will be reported to the WDNR. If the investigation results are supportive of a separate delineation report, AECOM will prepare such a report. Otherwise, the formal reporting of the well installation and sampling activities will occur in the 2021 annual groundwater and surface water sampling report. Groundwater results will be compared to the proposed PFAS Preventive Action Limit (PAL) and Enforcement Standard (ES) limits.


## Closing

The potential need for additional PFAS site investigation activities, beyond what is proposed in this work plan, will be evaluated pending the results from the proposed sampling and future discussions with the WDNR.

Unless otherwise notified by the WDNR, the City intends to proceed with the activities proposed in this Work Plan Update. If you have any questions, please contact Dave Henderson at 414.944.6190 or [dave.henderson@aecom.com](mailto:dave.henderson@aecom.com).

Sincerely,

AECOM Technical Services, Inc.



Robert Weseljak  
Hydrogeologist  
AECOM  
[robert.weseljak@aecom.com](mailto:robert.weseljak@aecom.com)



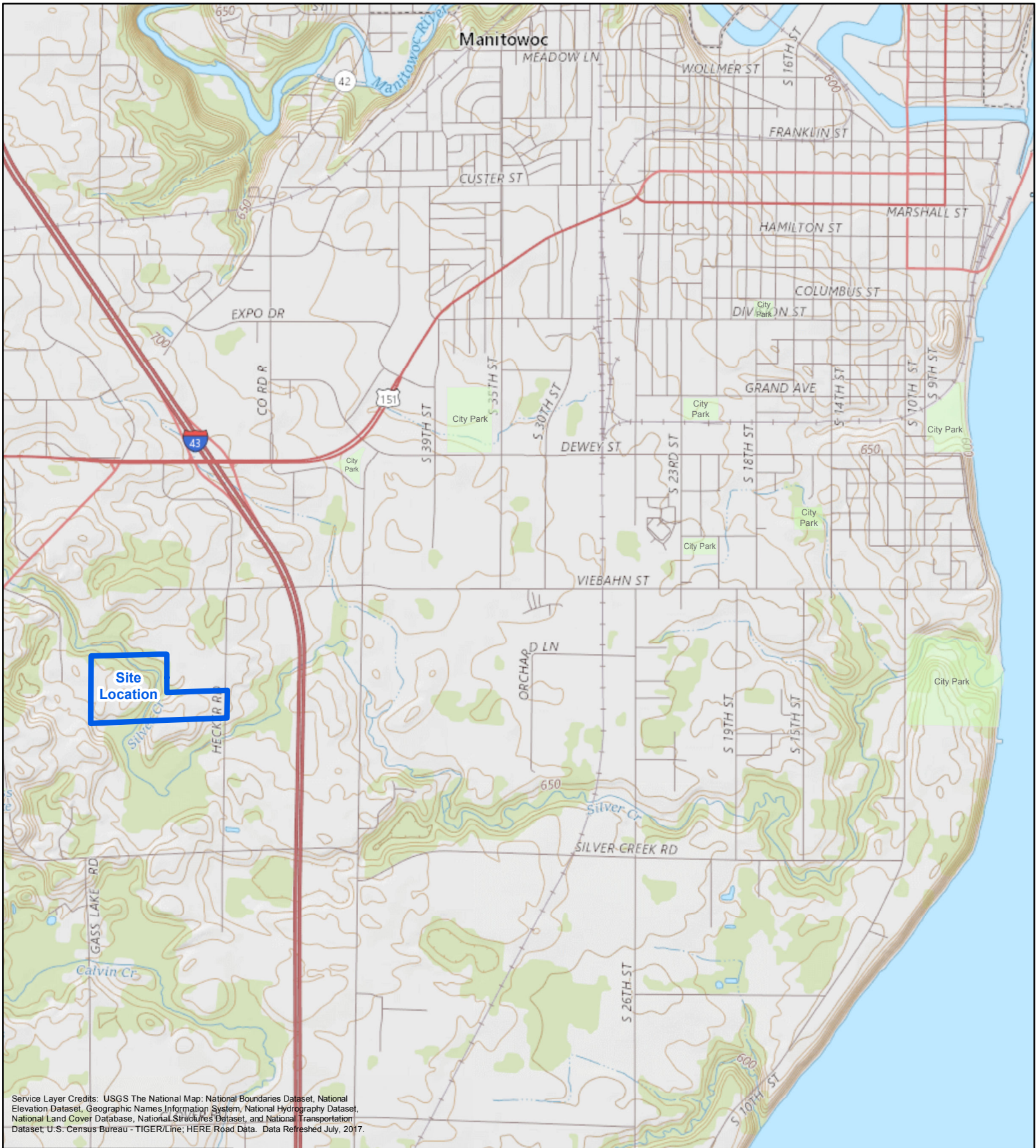
David Henderson, P.E.  
Senior Project Manager  
AECOM  
[dave.henderson@aecom.com](mailto:dave.henderson@aecom.com)

### Attachments:

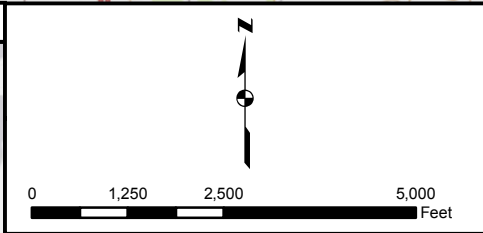
- Figure 1 Site Location Map
- Figure 2 Site Features
- Figure 3 1967 Aerial Photo
- Figure 4 1970 Aerial Photo
- Figure 5 1967 Aerial Overlay with Site Features
- Figure 6 1973 Aerial Overlay with Site Features
- Figure 7 Proposed Monitoring Well Locations
- Figure 8 Proposed Monitoring Well Locations with 1967 Aerial Photo Overlay

Cc: Kathleen M. McDaniel, City Attorney, City of Manitowoc  
Dan Koski, Director of Public Infrastructure, City of Manitowoc

## Figures



Service Layer Credits: USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data. Data Refreshed July, 2017.



AECOM - Milwaukee Office  
1555 River Center Dr  
Milwaukee WI



FORMER NEWTON GRAVEL PIT

**SITE LOCATION MAP**





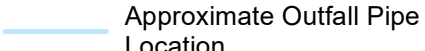
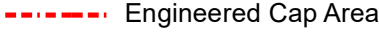
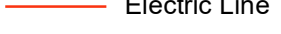



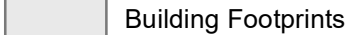
Project No. 60135471 Drawn By: RW Date: June 2018

**Figure 1**

## FIGURE 2 SITE FEATURES

Former Newton Gravel Pit  
Manitowoc, Wisconsin

### Legend

-  Monitoring Well(s)
-  Staff Gauge
-  Gravel Pit Roads
-  Approximate Pond Location
-  Approximate Outfall Pipe Location
-  Engineered Cap Area
-  Electric Line
-  Civil Divisions
-  Parcels
-  Streams
-  Building Footprints

1 inch = 250 feet

# AECOM

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APPROVED BY: DH

DATE: 2/18/2021

**Project No.: 60135471**

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








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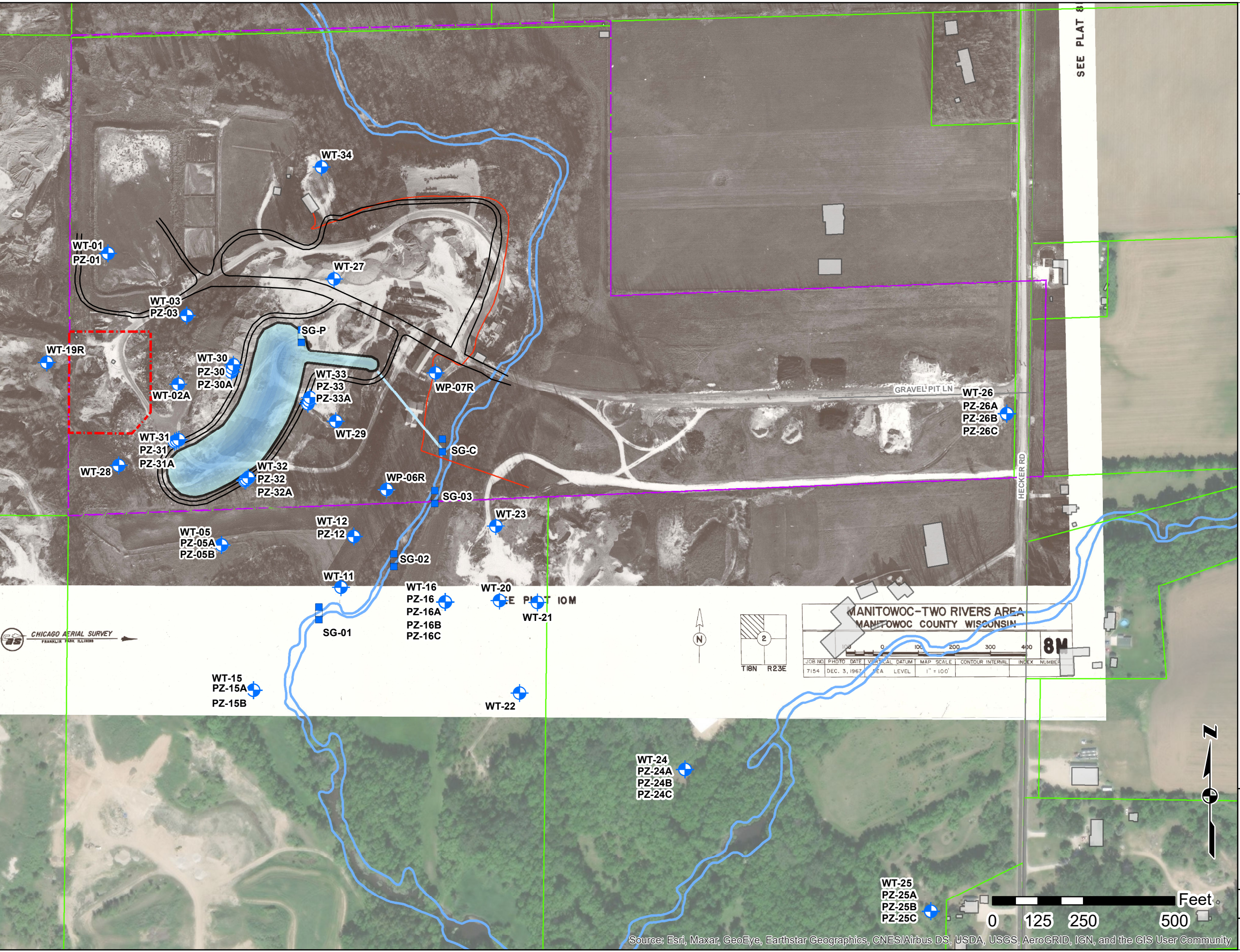
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**FIGURE 3  
1967 AERIAL**

Former Newton Gravel Pit  
Manitowoc, Wisconsin

**Legend**

-  Monitoring Well(s)
-  Staff Gauge
-  Gravel Pit Roads
-  Approximate Pond Location
-  Approximate Outfall Pipe Location
-  Engineered Cap Area
-  Electric Line
-  Civil Divisions
-  Parcels
-  Streams
-  Building Footprints



1 inch = 250 feet

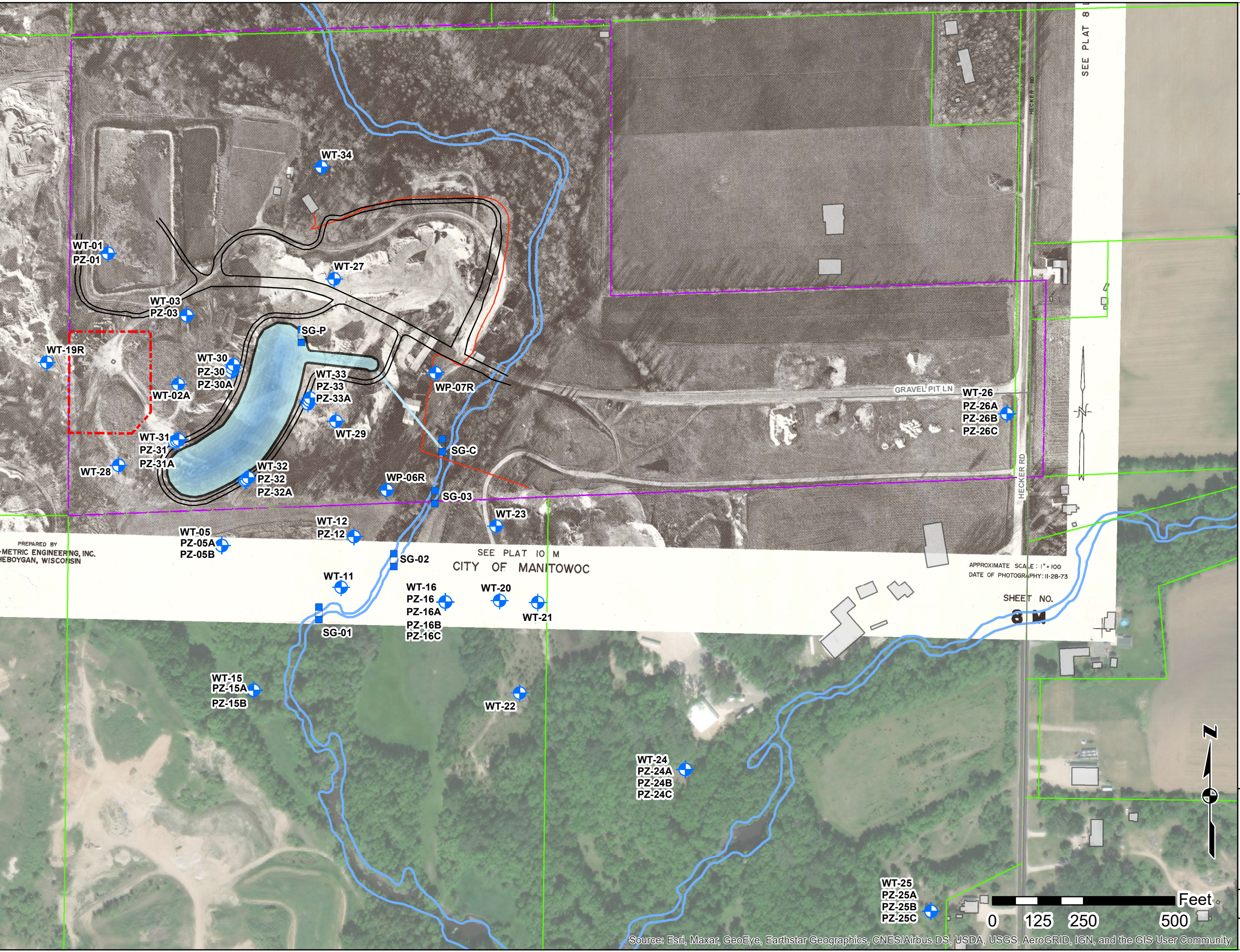


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








Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**FIGURE 4**  
**1973 AERIAL**

Former Newton Gravel Pit  
Manitowoc, Wisconsin

**Legend**

-  Monitoring Well(s)
-  Staff Gauge
-  Gravel Pit Roads
-  Approximate Pond Location
-  Approximate Outfall Pipe Location
-  Engineered Cap Area
-  Electric Line
-  Civil Divisions
-  Parcels
-  Streams
-  Building Footprints

1 inch = 250 feet



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**FIGURE 5**  
**1967 AERIAL**  
**OVERLAY**

Former Newton Gravel Pit  
Manitowoc, Wisconsin

**Legend**

- Monitoring Well(s)
- Staff Gauge
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Engineered Cap Area
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

1 inch = 250 feet

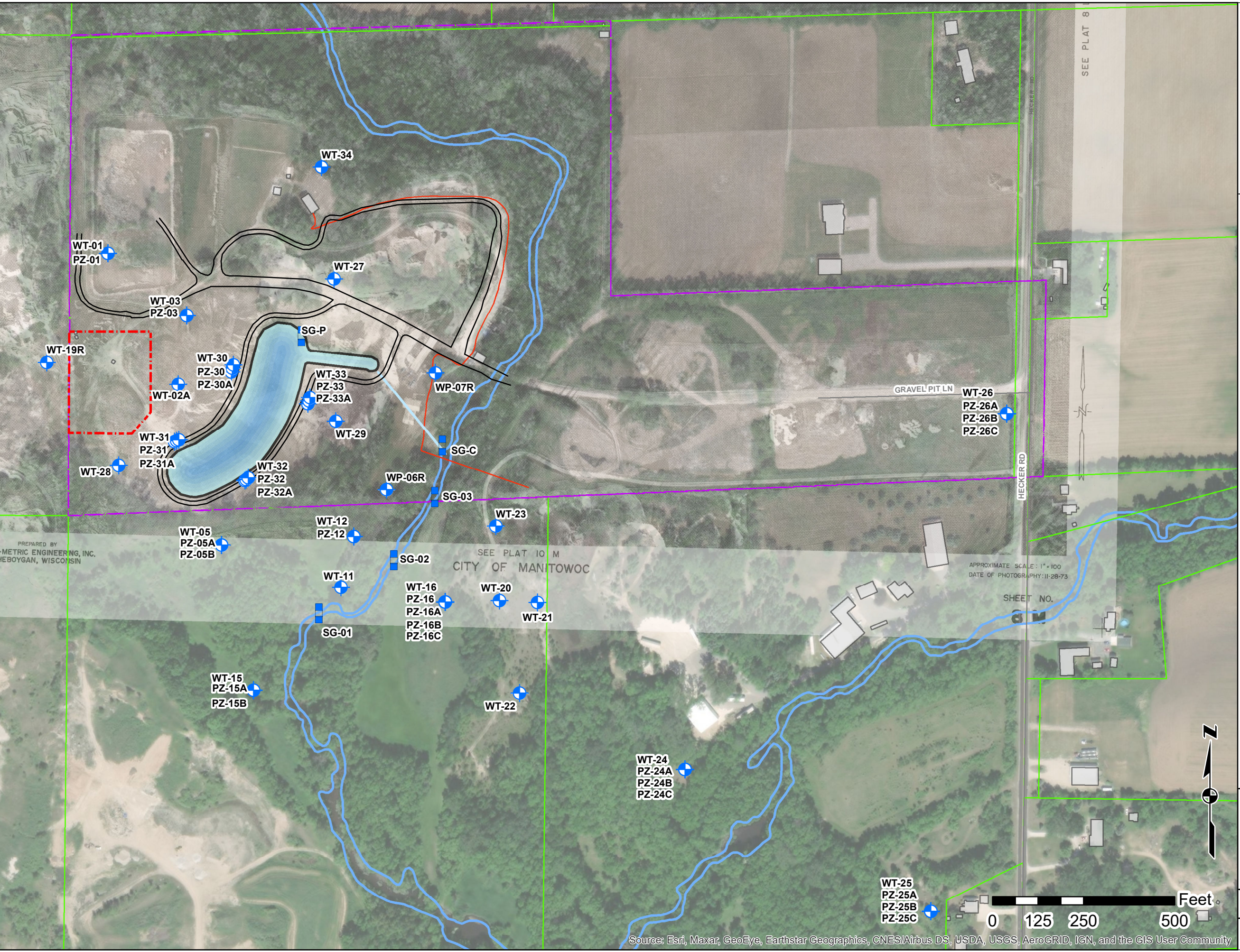


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**FIGURE 6  
1973 AERIAL  
OVERLAY**

Former Newton Gravel Pit  
Manitowoc, Wisconsin

**Legend**

- Monitoring Well(s)
- Staff Gauge
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Engineered Cap Area
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

1 inch = 250 feet



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



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# FIGURE 7 PROPOSED MONITORING WELLS

Former Newton Gravel Pit  
Manitowoc, Wisconsin

## Legend

-  Proposed Monitoring Wells
-  Monitoring Well(s)
-  Staff Gauge
-  Gravel Pit Roads
-  Approximate Pond Location
-  Approximate Outfall Pipe Location
-  Engineered Cap Area
-  Electric Line
-  Civil Divisions
-  Parcels
-  Streams
-  Building Footprints

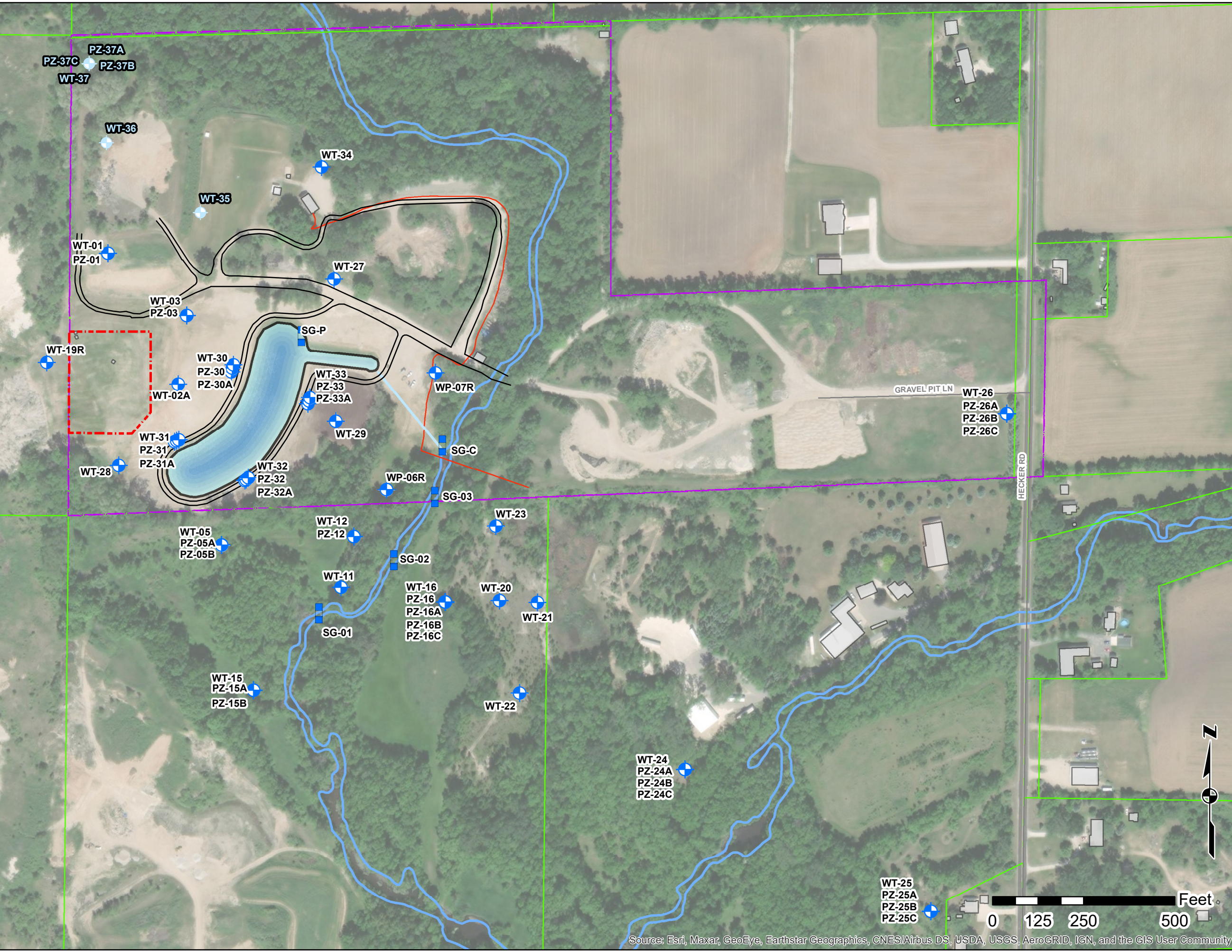
1 inch = 250 feet

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**FIGURE 8  
PROPOSED MONITORING  
WELLS WITH 1967 OVERLAY**

Former Newton Gravel Pit  
Manitowoc, Wisconsin

**Legend**

- Proposed Monitoring Wells
- Monitoring Well(s)
- Staff Gauge
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Engineered Cap Area
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

1 inch = 250 feet

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