



*Prepared For:*

*Thermo Fisher Scientific, Inc.*



**Investigation Work Plan - Revised**  
**Former Hamilton Industries Facility,**  
**Two Rivers, Wisconsin**  
**BRRTS Activity #02-36-578316**

March, 2017

Environmental Resources Management  
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*Prepared for: Thermo Fisher Scientific*

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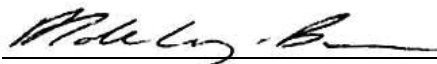
*March, 2017*

*Project Number: 0383990*



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Environmental Resources Management, Inc. (ERM), on behalf of Fisher Scientific International, LLC, a wholly owned subsidiary of Thermo Fisher Scientific, Inc. (the "Client"), prepared this work plan to further investigate soil and groundwater conditions at the former Fisher Hamilton Scientific Inc. (aka Hamilton Industries Site) ("the Site") located at 1316 East 18th Street in Two Rivers, Wisconsin (Figure 1). The work plan has been prepared to satisfy the requirements of the Wisconsin Administrative Code (WAC) Chapter NR 716.09 Site Investigation Work Plan. The Wisconsin Department of Natural Resources (WDNR) requires that a work plan be prepared and submitted to the agency for review and approval prior to initiation of investigation activities.

The investigative activities outlined in this work plan are in response to a letter received by the Client from the WDNR, dated November 18, 2016, requiring within 60 days, by January 13, 2017, further investigation of volatile organic compounds (VOCs), metals at the Site (BRRTS Activity #02-36-578316). ERM is submitting this work plan for an informal review by WDNR and intends to initiate the site investigation within 90 days of submitting this work plan once receiving its acceptance and approval by WDNR. Previous subsurface investigations have been conducted in the vicinity of the Site, including a July-August, 2016, off-Site investigation conducted by the City of Two Rivers along the East River Street right-of-way south of the Site, soil sampling associated with a water main utility work performed in the southeastern portion of the Site in October 2016, and a Phase II Environmental Site Assessment (ESA) performed in November 2016 by the City of Two Rivers.

For the off-Site subsurface investigation performed in July-August 2016, the City contracted McMahon Engineers (McMahon) to collect soil and groundwater samples, resulting in samples that had concentrations of Trichloroethylene (TCE) and metals that exceeded WDNR residual contaminant levels (RCLs). However, it should be noted that groundwater metal samples collected were from temporary wells and were not field filtered.

ERM and McMahon Engineers split soil samples from two excavations during the water main utility work. The ERM samples contained concentrations of metals that exceeded RCLs, but were consistent with background concentrations, the McMahon samples contained concentrations of lead and TCE that exceeded RCLs. The Phase II ESA reported that the McMahon soil sample was collected from 8 feet below ground surface (bgs) and may represent conditions in groundwater.

Based on a review of historical records, ERM initially identified the former Kahlenburg property just south of the Site as a potential source area for the impacts of TCE to the south of the Site. This was based on the historical uses of

the former Kahlenburg property as shoe polish manufacturer and chemical laboratory/medical supply manufacturer in the immediate vicinity of the detections of highest concentrations of TCE in groundwater.

Additional Phase II ESA activities were performed by the City of Two Rivers and identified concentrations of TCE in groundwater both up-gradient and downgradient of the Kahlenburg Property, however the source of these impacts is still unknown. A revised work plan was prepared due to the additional data obtained from the Phase II ESA. This report presents the revised work plan for investigating the soil and groundwater conditions at the Site associated with the previous detections of chlorinated VOCs (CVOCs).

## 2.0 PROJECT BACKGROUND

### 2.1 SITE LOCATION, CONTACTS, AND DESCRIPTION

The Site is located at 1316 18<sup>th</sup> Street in Two Rivers, Wisconsin. The Site is located in the east half of Section 1, Township 19 North, Range 24 East in Manitowoc County. The location of the Site is shown on Figure 1, developed from the United States Geological Survey (USGS) 7.5-minute quadrangle for Two Rivers, Wisconsin, dated 1978.

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The Site is located on approximately 11.72 acres of land situated on two irregularly shaped parcels, between Jefferson Street and the East Twin River, north of 15<sup>th</sup> Street and south of 19<sup>th</sup> Street in Two Rivers, Wisconsin. The Site is divided into two separate parcels by 17<sup>th</sup> Street although both parcels are identified by the same PIN number. The Subject Property is currently vacant with the exception of one approximately 300-square foot brick building. The

purpose of this remaining brick building is suspected to be a pump house associated with City of Two Rivers water or sewer utilities and is located near the northeastern boundary of the Subject Property. Along the shoreline of the East Twin River and north of 17<sup>th</sup> Street is a broken concrete platform, possibly used at one time for loading and unloading material for shipping via a water route. Along the East Twin River south of 17<sup>th</sup> street is a steel sheet pile wall along which is in a paved area, and according to historic aerial photographs, was used for the parking of cars during facility operations.

The remainder of the Site is covered with vegetated soil. Three sewer manholes are located on the Site in line with 18<sup>th</sup> Street. A fire hydrant is located near the would-be intersection of 18<sup>th</sup> Street and East River Road.

## 2.2 *PHYSICAL SETTINGS*

### 2.2.1 *Topography and Hydrology*

The Site is located at an elevation of approximately 590 feet above mean sea level, is generally flat, and slopes slightly to the east towards the East Twin River. Surface water at the Site also drains to the east via overland flow to the East Twin River. The overall topographic trend of the surrounding area also slopes to the east. The nearest surface water body is the East Twin River, bounding the Site to the east.

According to flood zone and National Wetland Inventory (NWI) data collected, the Site is not located within wetland delineated areas or the 100 or 500-year flood plains. Flood zone and NWI data was obtained by EDR from the Federal Emergency Management Agency (FEMA) and U.S. Fish and Wildlife Services, respectively. The mean elevation of Lake Michigan, the discharge water body of the East Twin River, is approximately 578.66 feet and therefore approximately several feet lower than the Site elevation and not likely to flood due to high river or lake water levels

### 2.2.2 *Geology and Hydrogeology*

According to the United States Department of Agriculture Natural Resources Conservation Service web soil survey data for Manitowoc County, the surface soils in the vicinity of the Site are a combination of Oakville loamy fine sand and re-worked fill material consisting of sandy loam. The Oakville Loam is described as a dark brown, excessively drained soil composed of fine to very fine eolian-derived sand. Previous investigations in the vicinity of the Site encountered fill material overlying alluvial or flood plain deposits to at least 33 feet below ground surface and similar geologic conditions are expected beneath the Site. Groundwater, in direct hydraulic connection with the East Twin River is expected to be encountered at depths ranging between 5 and 20 feet below land

surface. There are 6 United States Geological Survey groundwater wells located within 1 mile of the Site. Only one of these wells is located within 1/8 mile from the Site.

According to well driller's records in the area, the shallow subsurface is comprised of sand and clay deposits overlying limestone bedrock which is encountered between 100 and 140 feet below land surface.

### 2.3 *SUMMARY OF PREVIOUS INVESTIGATIONS*

ERM reviewed previous environmental reports associated with the focus area of this investigation. The following noteworthy items were identified through a review of the previous reports and additional historical sources:

In July-August 2016, the City of Two Rivers contracted with McMahan Engineers of Appleton, WI to advance three soil borings along the East River Street right-of-way south of the Site. Soil and groundwater samples were collected from each boring and submitted to Synergy Laboratory in Appleton, WI for analysis of VOCs and metals. Two soil samples contained elevated concentrations of TCE above the WDNR's soil-to-groundwater pathway RCL and the metals arsenic, lead and mercury exceeding the WDNR's soil-to-groundwater pathway RCL.

In October 2016, The City of Two Rivers performed two excavations on the Site as part of a water main repair. Excavated soils from both excavations were segregated from each excavation and isolated on plastic tarps. One split sample was collected from each soil pile (SP-1 and SP-2) by the City of Two Rivers' contractor, McMahan, and ERM. Samples collected by ERM were submitted to Pace Analytical of Green Bay, Wisconsin for analysis of RCRA metals and VOCs. VOCs were not detected within either ERM soil sample above method detection limits. Arsenic was detected in both samples, but at concentrations below the background threshold value (BTV) for arsenic in the area soils. Additional metals (cadmium and lead) were detected in ERM sample SP-2, but again were below the respective BTVs for both of these metals. Samples collected by McMahan were submitted to Synergy Environmental Lab of Appleton, Wisconsin for analysis of VOCs, RCRA metals. Concentrations of TCE and lead were detected within the soil sample collected from SP-1 at concentrations that slightly exceeded the WDNR soil-to-groundwater RCL and BTV for lead.

In November 2016, The City of Two Rivers conducted a Phase II ESA in the vicinity of the Site in November, 2016 (report dated February 16, 2017). The investigation included the installation of five groundwater monitoring wells in City-owned properties adjacent to and / or up-gradient of the Kahlenburg property, and along the southern property boundaries of the Thermo Fisher properties.



The results of the city's Phase II ESA indicated groundwater was impacted with CVOCs above the WDNR groundwater enforcement standard (ES), but that no other VOC or RCRA metals were observed above either the WDNR ES or preventive action limit (PAL). It should be noted that the reported exceedances of Barium in groundwater in the Phase II were based on an erroneous value for the PAL for Barium of 40 ug/l (the actual value is 400 ug/l).

### **3.0 INVESTIGATION APPROACH**

This work plan presents the following proposed activities for the Site investigation.

#### **3.1 SUBSURFACE UTILITY CLEARANCE**

Prior to initiation of the soil and groundwater investigation, ERM will use a subsurface clearance protocol in attempt to identify any underground infrastructure in the proposed areas of the borings. This protocol includes studying maps of the underground infrastructure and conducting public and private utility locates to identify underground utilities in areas where proposed intrusive work will be conducted.

#### **3.2 SUBSURFACE INVESTIGATION**

ERM will retain a licensed drilling contractor to advance twelve borings to further define the lithology and groundwater flow direction at the Site. Ten of the borings will be installed to a depth of approximately 30 feet below ground surface (ft bgs), as they are located at a higher ground surface elevation. The other two borings will be installed to a depth of approximately 20 ft bgs. Soil borings will be performed on a continuous basis with macro-core sleeves. Six of the borings will be converted to temporary monitoring wells. All temporary wells will be constructed of 1-inch Schedule 40 PVC slotted well screens and risers, silica sand filter packs and bentonite chip surface seals. Five of the wells will be constructed with above grade PVC stick-up risers and caps, the sixth well, located in a parking lot, will be flush mounted and finished with a flush-mount cover. The temporary groundwater monitoring wells are being installed for the purpose of determining the groundwater elevation across the site and the groundwater flow direction. The temporary monitoring wells will be abandoned within 120 days of installation.

Once groundwater elevations have been determined ERM will conduct vertical aquifer sampling (VAS) immediately adjacent to each of the twelve boring locations. VAS will be performed on a once-pass through process (screen point sampler or similar technology), within five feet of each of the soil boring locations. Each screen point sample location will be advanced to approximately the same total depth as the adjacent soil boring. Up to three discreet groundwater samples will be collected at each VAS location. The proposed soil boring and vertical aquifer sampling locations are provided on Figure 2.

### 3.3 SOIL SAMPLING

Geological logs will be completed for each soil boring by ERM personnel. Notes will be made of visual and/ or olfactory evidence of contamination. Soil cores will be field screened for the presence of VOCs by using a photoionization detector (PID) equipped with an 11.7eV lamp and the headspace technique. The headspace technique includes:

- Placing approximately 50 - 100 grams of a representative soil sample into a clean quart-sized plastic bag;
- Sealing, agitating, and allowing the sample to equilibrate for 10 to 15 minutes; and
- Measuring the concentration of vapors in the headspace above the soil sample by inserting the probe of the PID into the bag.

The PID is capable of semi-quantitatively measuring total VOC concentrations in parts per million by volume (Vppm) compared to an equivalent standard. A headspace reading of 1 Vppm or less is used as an indication of clean soil conditions.

Soil analytical sampling is not anticipated; however, sampling containers will be available on site in the event soil impacts are suspected (either from elevated PID readings or visual indications observed by ERM geologist). Up to six soil samples may be collected based on field screening results. Collected samples will be retained for laboratory chemical analysis of CVOCs (SW 846 Method 8260B). Samples will be collected in laboratory-supplied bottles of appropriate volume and preservation, stored in cooled packaging and dispatched to the laboratory with full chain of custody tracking documentation. ERM will utilize a Wisconsin-certified environmental laboratory (Pace Analytical of Green Bay, Wisconsin) with a standard turnaround of 10 business days for all sample analyses.

### 3.4 GROUNDWATER SAMPLING

Based on the presence of nearby surface water bodies, groundwater is estimated to potentially be present at a depth of approximately 5-20 ft bgs; however there is some uncertainty to the exact depth due to the change in topography from the upland portions of the site to the lower areas adjacent to the river.

Once the groundwater elevation is determined, vertical aquifer sampling (VAS) will be conducted within five feet of each of the twelve soil boring locations. VAS will be accomplished using a once-pass through process (screen point sampler or similar technology) to minimize aquifer disturbance and cross contamination. Three discreet groundwater sample will be collected from each location; one sample from 2-1/2 feet into the aquifer, one sample from 7-1/2 feet

into the aquifer, and one sample from 12-1/2 feet into the aquifer. Groundwater samples will be submitted for laboratory analysis of CVOCs (SW 846 Method 8260B). Samples will be collected in laboratory-supplied bottles of appropriate volume and preservation, stored in cooled packaging and dispatched to the laboratory with full chain of custody tracking documentation. ERM will utilize a Wisconsin-certified environmental laboratory with a standard turnaround of 10 business days for all sample analyses.

### 3.5 *SURVEY*

Upon completion of the soil borings and temporary wells, each location will be surveyed to establish the relative vertical elevation of each based on a local benchmark. As described, depth to groundwater measurements will be taken in each well in order to provide a preliminary understanding of the groundwater flow direction in the investigation area.

### 3.6 *INVESTIGATION DERIVED WASTE*

Investigation derived waste (IDW) (e.g. soil cuttings, development and purge water, etc.) will be placed in DOT approved drums and retained at the Site for subsequent disposal. Following receipt of laboratory analytical results, Thermo Fisher will be responsible for disposal of the IDW.

### 3.7 *QA/QC*

Sample depths will be finalized in the field based upon field observations. It is anticipated that up to 36 groundwater grab samples will be submitted for laboratory analysis. One trip blank per cooler will also be analyzed for CVOCs for quality assurance / quality control purposes. New nitrile gloves will be used between each sample location and between each sample collected to prevent cross contamination. Any sampling materials used during sample collection will be new per each sample collected or decontaminated using deionized (DI) water with Alconox® wash, and DI water rinse.

## **4.0 INVESTIGATION REPORTING AND SCHEDULE**

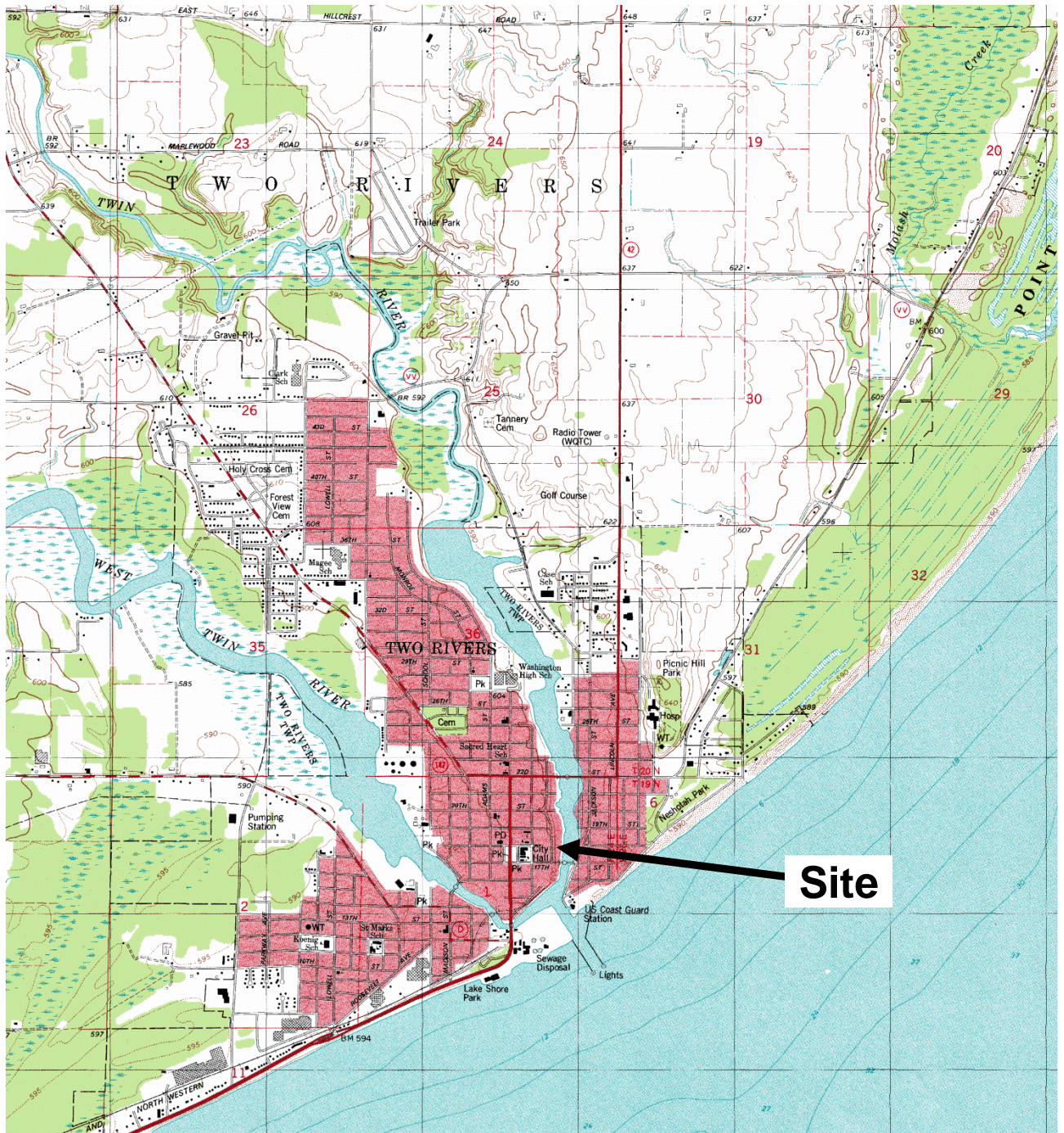
### **4.1 REPORTING**

The Site Investigation Report will be prepared according to ERM standard report format and WDNR requirements. The report will be submitted within 60 days after the site investigation and receipt of the laboratory data and will include a description of the Site investigation activities, field work methodologies, and analysis of the findings based on the regulatory framework, and a final evaluation. The final report, appendices, and photos will be provided to the WDNR in hard copy. Within 60 days after submitting the Site Investigation Report, ERM will prepare and submit a Remedial Actions Options Report to WDNR, if warranted.

### **4.2 SCHEDULE**

ERM intends to comply with WDNR's steps as outlined within its letter to the Client, dated, November 18, 2016. Mobilization for the investigation will be initiated once subsurface clearance activities can be completed. Due to the close proximity of the water utilities, subsurface clearance activities will require hand clearing of borings. Field sampling activities are expected to take one week. If frozen soil conditions restricts ERM's ability to safely install the borings, ERM intends to propose to WDNR's its acceptance and approval that the proposed investigation work be completed in spring of 2017.

## *Figures*



SOURCE: Two Rivers, WI 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, 1978

APPROX. SCALE: 1:50,000



**SITE LOCATION MAP**  
**Former Hamilton Industries Facility**  
**1316 18th Street**  
**Two Rivers, Wisconsin**

Figure

**1**



*This information is for environmental review purposes only.*

**FIGURE 2**

**EXISTING AND PROPOSED BORINGS/WELLS  
Former Thermo-Fisher Facility  
Two Rivers, Wisconsin**

