

Notice: Use this form to request a **written response (on agency letterhead)** from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records law [ss. 19.31 - 19.39, Wis. Stats.].

Definitions

"Property" refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

"Liability Clarification" refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

"Technical Assistance" refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

"Post-closure modification" refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

Do **not** use this form if one of the following applies:

- Request for an **off-site liability exemption or clarification** for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the **Lender Liability Exemption**, s 292.21, Wis. Stats., **if no response or review by DNR is requested**. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an **exemption to develop on a historic fill site** or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- **Request for closure** for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

All forms, publications and additional information are available on the internet at: dnr.wi.gov/topic/Brownfields/Pubs.html.

Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program **and** the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.
4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located. See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.

Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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Section 1. Contact and Recipient Information

Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name	First	MI	Organization/ Business Name
Turtenwald	Randy		City of La Crosse
Mailing Address			City
400 La Crosse St.			La Crosse
			State
			WI
			ZIP Code
			54601
Phone # (include area code)	Fax # (include area code)	Email	
(608) 789-7569		Turtenwaldr@cityoflacrosse.org	

The requester listed above: (select all that apply)

- Is currently the owner
 Is considering selling the Property
 Is renting or leasing the Property
 Is considering acquiring the Property
 Is a lender with a mortgagee interest in the Property
 Other. Explain the status of the Property with respect to the applicant:

Contact Information (to be contacted with questions about this request)

Select if same as requester

Contact Last Name	First	MI	Organization/ Business Name
Storlie	John	C	The OS Group, LLC
Mailing Address			City
444 21st St S			La Crosse
			State
			WI
			ZIP Code
			54601
Phone # (include area code)	Fax # (include area code)	Email	
(608) 433-9389	(608) 433-9386	john.storlie@theosgrp.com	

Environmental Consultant (if applicable)

Contact Last Name	First	MI	Organization/ Business Name
Storlie	John	C	The OS Group, LLC
Mailing Address			City
444 21st St S			La Crosse
			State
			WI
			ZIP Code
			54601
Phone # (include area code)	Fax # (include area code)	Email	
(608) 433-9389	(608) 433-9386	john.storlie@theosgrp.com	

Section 2. Property Information

Property Name		FID No. (if known)	
La Crosse Wells 23 & 24			
BRRTS No. (if known)		Parcel Identification Number	
02-32-000065		17-10253-20	
Street Address		City	State
Fisherman Rd		La Crosse	WI
		ZIP Code	
		54603	
County	Municipality where the Property is located	Property is composed of:	Property Size Acres
La Crosse	<input checked="" type="radio"/> City <input type="radio"/> Town <input type="radio"/> Village of La Crosse	<input type="radio"/> Single tax parcel <input type="radio"/> Multiple tax parcels	725

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1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

- No Yes

Date requested by: _____

Reason: _____

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

- No. **Include the fee that is required for your request in Section 3, 4 or 5.**
 Yes. **Do not include a separate fee.** This request will be billed separately through the VPLE Program.

Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:

Section 3. Technical Assistance or Post-Closure Modifications;

Section 4. Liability Clarification; or Section 5. Specialized Agreement.

Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: [Numbers in brackets are for WI DNR Use]

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - **Include a fee of \$350.** Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - **Include a fee of \$700.**
- Review of Site Investigation Report - NR 716.15, [137] - **Include a fee of \$1050.**
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - **Include a fee of \$1050.**
- Review of a Remedial Action Options Report - NR 722.13, [143] - **Include a fee of \$1050.**
- Review of a Remedial Action Design Report - NR 724.09, [148] - **Include a fee of \$1050.**
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - **Include a fee of \$350.**
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - **Include a fee of \$425.**
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - **Include a fee of \$425.**

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - **Include a fee of \$700.**
- Hazardous Waste Determination - **Include a fee of \$700.**
- Other Technical Assistance - **Include a fee of \$700.** Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. **Include a fee of \$1050, and:**
 - Include a fee of \$300 for sites with residual soil contamination; and
 - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

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Skip Sections 4 and 5 if the technical assistance you are requesting is listed above and complete Sections 6 and 7 of this form.

Section 5. Request for a Specialized Agreement

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: dnr.wi.gov/topic/Brownfields/lgu.html#tabx4.

- Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]
 - ❖ **Include a fee of \$700, and the information listed below:**
 - (1) Phase I and II Environmental Site Assessment Reports,
 - (2) a copy of the Property deed with the correct legal description.
- Agreement for assignment of tax foreclosure judgement - s.75.106, Wis. Stats. [666]
 - ❖ **Include a fee of \$700, and the information listed below:**
 - (1) Phase I and II Environmental Site Assessment Reports,
 - (2) a copy of the Property deed with the correct legal description.
- Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (e), Wis. Stats. [630]
 - ❖ **Include a fee of \$1400, and the information listed below:**
 - (1) a draft schedule for remediation; and,
 - (2) the name, mailing address, phone and email for each party to the agreement.

Section 6. Other Information Submitted

Identify all materials that are included with this request.

Send both a paper copy of the signed form and all reports and supporting materials, and an electronic copy of the form and all reports, including Environmental Site Assessment Reports, and supporting materials on a compact disk.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

- Phase I Environmental Site Assessment Report - Date: _____
- Phase II Environmental Site Assessment Report - Date: _____
- Legal Description of Property (required for all liability requests and specialized agreements)
- Map of the Property (required for all liability requests and specialized agreements)
 - Analytical results of the following sampled media: Select all that apply and include date of collection.
 - Groundwater Soil Sediment Other medium - Describe: _____
 - Date of Collection: _____
- A copy of the closure letter and submittal materials
- Draft tax cancellation agreement
- Draft agreement for assignment of tax foreclosure judgment
- Other report(s) or information - Describe: Site Investigation Work Plan, La Crosse Municipal Wells 23 & 24

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

- Yes - Date (if known): _____
- No

Note: The Notification for Hazardous Substance Discharge (non-emergency) form is available at: dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf.

Section 7. Certification by the Person who completed this form

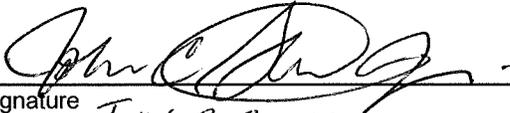
- I am the person submitting this request (requester)
- I prepared this request for: City of La Crosse, Attn: R. Turtenwald
Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

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Signature *JOHN C. STORLIE*

30 OCT 2019

Date Signed

Principal Consultant

Title

(608) 433-9389

Telephone Number (include area code)

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Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a [DNR regional brownfields specialist](#) with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>.

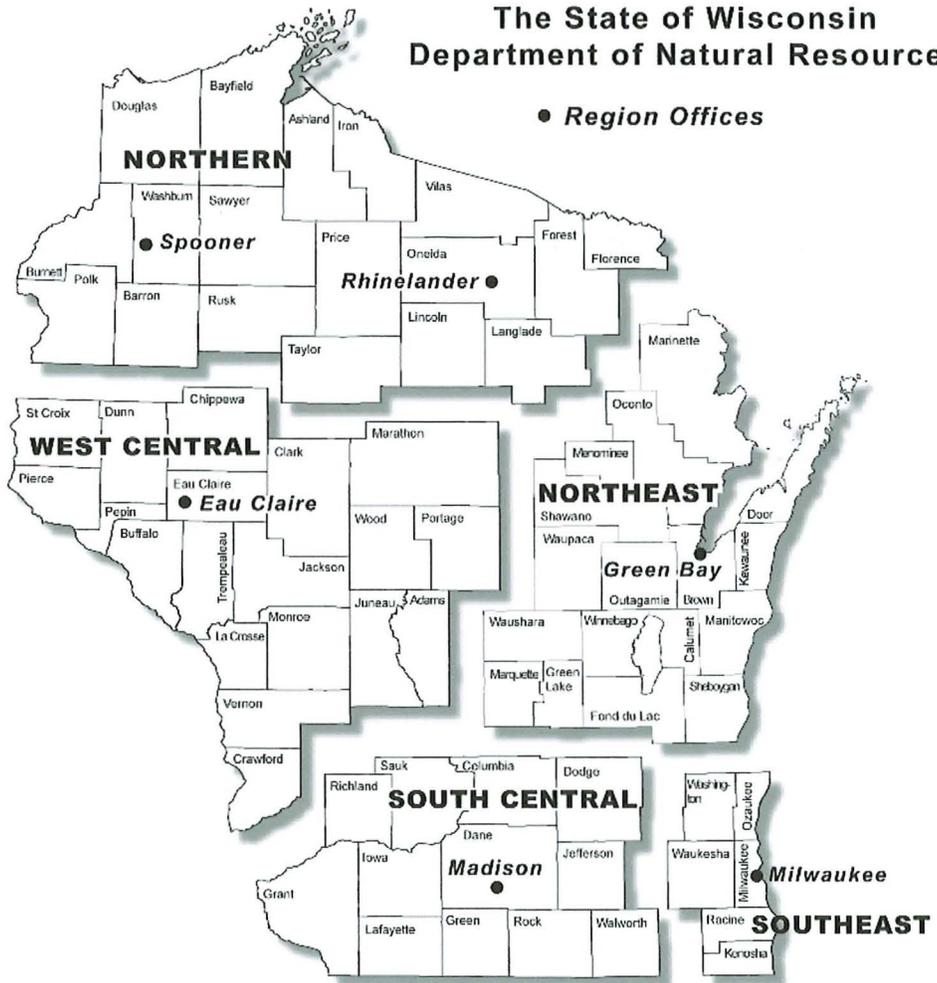
DNR NORTHERN REGION
Attn: RR Program Assistant
Department of Natural Resources
223 E Steinfest Rd Antigo, WI 54409

DNR NORTHEAST REGION
Attn: RR Program Assistant
Department of Natural Resources
2984 Shawano Avenue
Green Bay WI 54313

DNR SOUTH CENTRAL REGION
Attn: RR Program Assistant
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg WI 53711

DNR SOUTHEAST REGION
Attn: RR Program Assistant
Department of Natural Resources
2300 North Martin Luther King Drive
Milwaukee WI 53212

DNR WEST CENTRAL REGION
Attn: RR Program Assistant
Department of Natural Resources
1300 Clairemont Ave.
Eau Claire WI 54702



Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		

SITE INVESTIGATION WORK PLAN

La Crosse Municipal Wells 23 & 24

*La Crosse Municipal Wells 23 & 24
Fisherman Rd, La Crosse, WI
WDNR BRRTS # 02-32-000065*

Prepared for
City of La Crosse, Wisconsin

October 30, 2019



Site Investigation Work Plan

La Crosse Municipal Wells 23 & 24
Fisherman Rd, French Island, La Crosse, WI
WDNR BRRTS # 02-32-000065

October 30, 2019

Prepared for

City of La Crosse, Wisconsin



Prepared by

The OS Group, LLC



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Site Information

Site Name

La Crosse Wells 23H & 24H (the Site)

Site Address

Fisherman Road, La Crosse, Wisconsin 54603

Site Location

PLSS: W ½ of Sec 8 and the E ¼ of Sec 7, T16N, R07W

Latitude: 43° 52.55' N

Longitude: 91° 14.76' W

WTM: X Coordinate (WTM91): 419894

Y Coordinate (WTM91): 378833

The Site is located at the La Crosse Regional airport in the City of La Crosse, adjacent to the Black River. The La Crosse Municipal Airport is located in the W ½ of Section 8 and the E ¼ of Section 7, Township 16N, Range 7W, in La Crosse, Wisconsin. The airport is located on the northern part of French Island, an island bound by the Black River to the east, the Mississippi River to the west and Lake Onalaska (an impoundment of the two rivers) to the north and northwest. The site's location is depicted in Figure 1, Site Location Map, obtained from WDNR RR Site Maps¹.

Contact Information

Name, Address and Contact for Responsible Party

Randy Turtenwald, City Engineer

City of La Crosse (the City)

400 La Crosse Street

La Crosse, Wisconsin 54601

TurtenwaldR@cityoflacrosse.org

Name and Address of Environmental Consultant

John Storlie, PG, Principal Hydrogeologist

Coulee Environmental Solutions, a division of

The OS Group, LLC

444 21st Street South

La Crosse, Wisconsin 54601

John.Storlie@theOSgrp.com

¹ WDNR, RR Site Maps (<https://dnrmaps.wi.gov/H5/?viewer=rrsites&run=RR2&DSN=32998>). Accessed by OSG on September 3, 2019.

Information Gathered during Scoping

Scoping of this Site Investigation predominantly relied upon the Wisconsin Department of Natural Resources (WDNR) case file (DNR BRRTS # 02-32-000065). While certain key points are summarized here, the user of this document is directed to the full reference documents.

History of the Site

In the May 10, 2019 “Reopening of Closed Case”, Responsible Party letter to the City of La Crosse, the WDNR described the site history thus:

On April 18, 2019, the Remediation and Redevelopment program of the Wisconsin Department of Natural Resources (WDNR) was made aware that Polyfluoroalkyl Substances (PFAS) have been routinely detected in municipal well 23, located on the east side of French Island. After discussing the matter with Utilities Manager, Bernard Lenz, and Water Superintendent, Lee Anderson, and after reviewing the file of the above-mentioned site that investigated VOC impacts to municipal wells 23 and 24, the WDNR has determined that contamination on or from the above-described site poses a threat to public health, safety, welfare or the environment.

The volatile organic compound (VOC) release for which the City of La Crosse was responsible was closed by WDNR on May 5, 2010. Based on the information that has been submitted to WDNR regarding this site, we believe that this newly reported PFAS contamination is related to firefighting foam that was used at the same fire training burn pits which were the source of VOC contamination in municipal wells 23 and 24. The WDNR also believes that a response action in the form of additional investigation and possible remedial action is needed due to the known impacts above the health advisory level to municipal well 23, and the potential for impacts to municipal well 24.²

In the December 2003 Request for Site Closure³, the City’s then environmental consultant for the site, RMT, described the history of the site thus:

The La Crosse Municipal Airport is located in the northern portion of French Island in La Crosse, Wisconsin (Figure 1). Two of the City’s production wells (23H and 24H), located on the eastern side of French Island, were shut down as of November 1994, except for emergency back-up use, because of the presence of chlorinated volatile organic compounds (VOCs) and xylenes in samples from the wells. The source of the contamination was identified as the two former test burn pits that were located approximately 3,000 feet northwest of the municipal wells.

² Wisconsin Department of Natural Resources (2019). “Reopening of Closed Case”, Responsible Party letter to the City of La Crosse. May 10, 2019. Eau Claire, WI.

³ RMT (2003). Request for Site Closure - WDNR BRRTS# 02-32-000065, City of La Crosse Municipal Airport, La Crosse, Wisconsin, December 11, 2003, Correspondence to WDNR. December 11, 2003. Madison, WI.

The test burn pits were used by the La Crosse Fire Department for firefighting training, which reportedly took place during the 1970s through about 1988. Waste solvents that were collected from local industries were poured on a sand fill and plastic liner in the test burn pits. The solvents were then ignited and extinguished with a firefighting foam. The firefighting foam consisted primarily of water and 2-(2-butoxyethoxy)-ethanol, with small amounts of detergents, surfactants, and a thickener. The use of the firefighting foam is not believed to be a significant source of environmental impacts from the test burn activities.

The Wisconsin Department of Natural Resources (WDNR) determined that the waste solvents disposed in the test burn pits were listed and/or characteristic hazardous wastes. Although the Fire Department and the airport apparently received approval from the WDNR to conduct the training drills through 1988, the City did not have a hazardous waste license or a permit to treat, store, or dispose of hazardous wastes.

A soil pore gas and groundwater quality study was performed at the site in June 1992 (Layne GeoSciences, 1992), to assess the presence and extent of soil and groundwater contamination near the former burn pits. An additional subsurface investigation was conducted in February and March 1993 (Layne Geosciences, 1993) to assess the presence and extent of groundwater contamination between the former burn pits and City wells 23H and 24H. The WDNR required the City to conduct additional subsurface investigative activities and treatability studies, and to complete closure activities.

In May 1994, RMT, Inc. (RMT), was retained by the City to conduct the activities necessary to obtain the WDNR's approval of a closure plan for the hazardous waste units. RMT performed additional investigations during the summer of 1994 and presented the Additional Investigation Activities, Treatability Studies, and Remedial Options Analysis (1994). The City of La Crosse and RMT proposed installing a single remediation well to pump and treat the water before discharging the water to the Black River. In a meeting in December 1994, the WDNR approved this remedial action. RMT prepared the Remedial Action Plan (1995), which presented the preliminary engineering concepts for the groundwater recovery and treatment system.

The groundwater recovery well (RW-1) and treatment system (aeration via flow over a rock-filled channel) were installed near monitoring well nest MW-IIS/1/D and began operation in October 1995. RW-1 was pumped at a rate of approximately 400 gallons per minute for over 3 years. Over the period of operation, the concentration of VOCs in groundwater and in the recovery well effluent consistently declined. As a result, in a meeting held in January 1999 and in a follow-up letter (WDNR, 1999), the WDNR approved the shutdown of the recovery well. RW-1 was shut down in February 1999.

Municipal well 23H was returned to limited service in May 1997. In August 1997, the WDNR gave approval for increased operation and a monthly monitoring frequency. As agreed in the January 1999 meeting with the WDNR, municipal supply well 24H was returned to service as needed by the water utility. Both 23H and 24H continue to operate, and sampled on a quarterly basis.

SEH Memo

In 2016, the La Crosse Water Utility (LCWU), retained Short Elliott Hendrickson Inc. (SEH) to design a water sampling and testing plan for Well 23H for the LCWU to implement that would document the presence (and concentration) or lack of PFOS in the Well 23H water supply. In a June 14, 2019 Memorandum⁴ to Bernard Lenz, City Utilities Manager, and Leland Anderson, Water Utility Superintendent, SEH provide the following background information:

The La Crosse Water Utility (LCWU) was a participant in US Environmental Protection Agency's third round of its Unregulated Contaminant Monitoring Rule (UCMR3) program. US EPA published in 2012 the list of unregulated contaminants to be sampled by selected water utilities throughout the country. La Crosse was included in this list of utilities. UCMR3 included sampling and testing for 28 chemicals and two viruses, including Perfluorinated Alkyl Acids (PFAS). Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above recommended levels in the UCMR3 water samples collected for La Crosse Well 23H during 2014 and 2016.⁵

Knowledge of the source, type and amount of contamination

Polyfluoroalkyl Substances (PFAS), presumably from firefighting foam, is the type of contamination currently under investigation. As stated above, firefighting training was conducted at test burn pits at the airport from the 1970s through approximately 1988. An August 12, 2019, the City and The OS Group, LLC (OSG) held a project kick off meeting in City Hall. In that meeting Assistant Fire Chief Jeff Murphey stated that, in recent years, the firefighting foams used at the airport were Aqueous Film Forming Foam (AFFF) (also referred to as "Class B Foam") manufactured by 3M and others. No records of products used historically are readily available. According to Assistant Chief Murphy, no foam has been used during practice drills for about 25 years, and at some point, the pits were re-constructed with concrete containment.

Environmental Media Affected or Potentially Affected

Affected and potentially affected media include groundwater, soils and surface water. Groundwater is known to be affected as the contaminant was identified by sampling of wells 23 and 24.

⁴ Sandford, R. & Kent, B., SEH (2019), June 14, 2019. Memo to Bernard Lenz-PE, Leland Anderson, RE: Well 23H Perfluorinated Compound Testing. La Crosse, WI

⁵ Sanford, K & Kent, B., SEH (2019). La Crosse, WI. P. 1.

Physiographical & Geological Setting, Significant Hydrologic Features

The 2003 RMT Closure Request summarizes the setting thus:

The airport is located on the northern part of French Island, and is constructed on the flat-lying flood plain deposits of the Mississippi and Black Rivers, which surround the island. The Black and Mississippi Rivers are dammed adjacent to the island creating Lake Onalaska, which borders the Island to the north and northwest (Figure 1).

Regional Geology and Hydrogeology

The unconsolidated sediment in the western part of La Crosse County is composed of alluvial and outwash deposits of the Mississippi River, consisting mainly of well-sorted sand and gravel. The alluvial sand and gravel deposits are approximately 150 feet thick and are underlain by Cambrian Sandstone.

The direction of groundwater flow across the study area is generally to the southeast, toward the Black River. The flow direction is controlled by the relative elevations of Lake Onalaska and the Mississippi and Black Rivers. The Mississippi and Black Rivers are dammed to the west and north of the island, creating a strong underflow across the island. The results of a pumping test conducted on the wells on French Island indicate that the aquifer is highly transmissive with good hydraulic connection to the rivers (W.G. Keck & Associates, 1972).⁶

Adjacent Land Uses

The site is a regional airport; adjacent land uses include “Airport Beach”, a non-official recreational beach; the Upper Mississippi River National Wildlife and Fish Refuge; Lake Onalaska; the Black River; and further from the suspected PFAS plume, residential and commercial neighborhoods in the City of La Crosse and the Town of Campbell. Neighborhoods in the Town of Campbell to the south of the airport are served by private water supply wells.

Topography

The site topography is flat and on the margins of French Island sloping to the Black River⁷.

Geology

According to a November 1994 report on the site by RMT⁸,

The site is underlain by a well sorted medium sand that was deposited as alluvial outwash. A trace of gravel was encountered in some of the borings, along with occasional thin coarse-grained layers. The sand ranges in color from yellowish brown to

⁶ RMT (2003). P. 2.

⁷ USGS (2018). Onalaska Quadrangle, Wisconsin - La Crosse County, 7.5-Minute Series. 2018

⁸ RMT (1994). November 1994. Additional Investigative Activities, Treatability Studies and Remedial Options Analysis for The City of La Crosse Municipal Airport Former Test Burn Pits. Madison, Wisconsin

brown and is loose to medium dense. The alluvial sand is underlain by Cambrian Sandstone, which occurs at a depth of approximately 150 feet below grade.

Hydrology and Hydrogeology

The site is located on flat-lying flood plain deposits of the Mississippi and Black Rivers, which surround the island. The Black and Mississippi Rivers are dammed adjacent to the island creating Lake Onalaska, which borders the Island to the north and northwest.

According to RMT's 2003 Closure request:

Groundwater Use

The principal aquifer in La Crosse County is the alluvial sand and gravel deposits, which are capable of yielding more than 3,000 gallons per minute (gpm) in some areas. The City of La Crosse owns and operates 16 high-capacity municipal wells. The City's wells are screened in the alluvial sand and gravel deposits, at depths ranging from 90 to 160 feet below grade. The wells pump at rates ranging from 1,100 to 3,400 gpm.

In addition to the City's wells, the U.S. National Fisheries Research Center owns and operates three high-capacity wells that are used to provide water supply for the Fish Hatchery on French Island. The Fish Hatchery wells are located on the eastern side of French Island near the Black River, approximately 0.5 mile south of City wells 23H and 24H. The Fish Hatchery wells have a design capacity of 1,800 gpm and produce an average of approximately one million gallons of water per day.⁹

OSG reviewed the WDNR online drinking & groundwater use information system database for information regarding the Fish Hatchery high-capacity wells. As recently as 2018, all three Fish Hatchery wells were active with a reported withdrawal rate of 9,400,000 gallons/month/well.¹⁰

According to the 1994 RMT report¹¹:

The groundwater flow direction is to the south-southeast toward the Black River, with a horizontal hydraulic gradient of approximately 0.001. Based on water levels recorded in the three well nests at the site, the vertical gradient in the alluvial sand is negligible compared to the horizontal gradient. [Based on] Three pumping tests were performed on-site in the 1970s and early 1980s ... (t)he water levels responded relatively quickly to river level changes, indicating good hydraulic connection to the river (W.G. Keck & Associates, 1972). Pumping tests... performed for the City of La Crosse in 1976 and 1980 [and] ...data from the Fish Hatchery well were used to calculate an aquifer transmissivity

⁹ RMT (2003). P. 3.

¹⁰ WDNR. Drinking & Groundwater Use Information System (https://dnr.wi.gov/wateruse/pub_v3_ext/source/). Accessed by OSG on October 24, 2019.

¹¹ RMT (1994). Pp. 11-15.

of 245,000 gal/day/ft, which indicates a very productive aquifer. On the basis of an aquifer thickness of 150 feet, the hydraulic conductivity of the aquifer is approximately 220ft/day (8×10^{-2} cm/s).

The hydraulic conductivity values calculated for the monitoring wells are generally consistent between monitoring wells, indicating a homogeneous aquifer. Calculated hydraulic conductivity of the monitoring wells ranged from 8×10^{-3} to 3×10^{-2} cm/s, with a geometric mean of approximately 1×10^{-2} cm/s. ...

Groundwater flow velocities in the alluvial sand were calculated using the hydraulic conductivity from the pumping test (8×10^{-2} cm/s), the average horizontal hydraulic gradient (0.001), and an assumed effective porosity of 20 percent (de Marsily, 1986). Based on these values, the calculated horizontal flow velocity is approximately 400 feet per year.

The June 14, 2019 SEH memo to the City Water Utility describes the pumping rates of Well 23 and its correlation to PFAs sampling results from July 26, 2017 to April 15, 2019, at which time “Well 23H was shut off and remains off”¹².

In an October 18, 2019 email, Leland Anderson, Water Superintendent, La Crosse Water Utility, stated:

The wells on the north side of La Crosse are used during high demand times usually during summer months or if other Wells are down for maintenance. These are used for fire protection for the City’s north side industrial parks in the event of a major fire. Manufacturers prefer the north side Wells because the Wells provide better water quality for their productions and these are high capacity Wells that pump around 2,000 gallons per minute of water. We only have a 5,000,000 gallon reservoir and the Wells provide the demand of water to maintain and fill the reservoir. We have daily demands of 15 to 20 million gallons during summer months which is 4 times what the reservoir can hold.¹³

Potential Hazardous Substance Migration Pathways

Dissolved Contaminants in Groundwater

Based on the chlorinated solvents contamination plume as documented in the earlier study and remediation at the site, it is clear that groundwater flow is likely the predominant mechanism of PFAS contaminant transport. The groundwater flow path and rates at the site are well understood, and the plume is likely originating at the test burn pits and migrating toward receptors, Wells 23 & 24 and the Black River. The pumping of municipal well 23 may have served to intercept the PFAS contaminant

¹² Sanford, K & Kent, B., SEH (2019). La Crosse, WI. P. 3.

¹³ Anderson, L., La Crosse Water Utility. October 18, 2019. Email to John Storlie, The OS Group, LLC. La Crosse, WI

plume, in whole or in part, but when not pumping, it is likely that the plume has discharged to the Black River adjacent to well 23.

Dissolved Contaminants in Surface Water

It has been documented at other sites that PFAS groundwater plumes discharging into surface waters have migrated and persisted in detectable concentrations. Thus, there is potential for PFAS migration in the Black River.

Receptors

Water Supply Wells

Documented impacts to municipal water supply Well 23 triggered the re-opening of the BRRTS Case.¹⁴ In the August 12, 2019, project kick off meeting between the City and OSG.

Black River

Based on the persistence of PFAS and low detection limits utilized in PFAS investigations, as well as the documented contaminants in Well 23 adjacent to the Black River, CES anticipates that the surface water quality of the black river have been affected by PFAS contaminants from the airport test burn pits.

Scope of Work

Approach

The initial objective of the site investigation will be to define the extent and degree of PFAS contamination in the soils and groundwater and identity whether detectable impacts to the Black River water quality have occurred. No soil or groundwater samples were analyzed for PFAS during the previous VOC investigation and remedial action. Nevertheless, at least initially, the operating assumptions guiding the PFAS investigation are that:

1. PFAS contamination originated from the same burn pits; and
2. Groundwater contamination is likely following the same path as the VOC contamination.

Therefore, monitoring well and piezometer placement and depth are based on the VOC plume previously identified at the site.

CES proposes to perform the following scope of work to complete the NR 716 Site Investigation of the PFAS contamination. All sample locations will be located by GPS.

¹⁴ Wisconsin Department of Natural Resources. May 10, 2019. Letter to The City of La Crosse, Reopening of Closed Case, La Crosse Municipal Wells 23 & 24, Fisherman Rd, French Island, La Crosse, WI, DNR BRRTS # 02-32-000065. Eau Claire, WI

Contaminants & Parameters

Based on the known and potential receptors, affected or potentially affected environmental media and contaminant migration pathways outlined above, over the course of the investigation, OSG proposes to collect samples from the following environmental media:

- Groundwater
- Soil
- Surface water

As discussed in the Receptor section above, drinking water samples have been analyzed from Wells 23 and 24. Thus, no potable water samples are anticipated to be collected and analyzed by OSG as part of this investigation. Rather, OSG intends to rely on well sample results previously provided by the Water Utility.

Analytical Method and Analytes

All soil, groundwater and surface water analyses denoted as lab or laboratory will be performed following modified EPA method 537, per an October 21, 2019 email from David Rozeboom, West Central Region Team Supervisor, Remediation and Redevelopment Program, Wisconsin Department of Natural Resources¹⁵. In that email, Mr. Rozeboom stated:

The DNR recommends the following lab methods for sample analysis:

1. *Method 537.1 for drinking water.*
2. *Modified 537 for soil, groundwater and surface water. We are allowing laboratories to use their own in-house developed method as long as the criteria specified in the WI guidance document (described above) for PFAS are met.*

All media will be analyzed for all 36 compounds per the WDNR's *PROPOSED - Wisconsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Criteria - Version 9.11.2019 - Per- and Polyfluorinated Alkyl Substances (PFAS) Analysis Using Isotope Dilution by LC/MS/MS*,¹⁶. Should WDNR guidance or lab certifications change during the conduct of this investigations, OSG's methods will be modified accordingly.

Sampling Procedures

Except where WDNR guidance exists, PFAS sampling procedures will follow the latest version of Michigan Department of Environmental Quality (MDEQ) technical guidance

¹⁵ Rozeboom, D., WDNR, Remediation and Redevelopment Program, Wisconsin Department of Natural Resources. October 21, 2019. Email to John Storlie, The OS Group, LLC. Eau Claire, WI

¹⁶ Wisconsin Department of Natural Resources. September 11, 2019. *PROPOSED - Wisconsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Criteria - Version 9.11.2019 - Per- and Polyfluorinated Alkyl Substances (PFAS) Analysis Using Isotope Dilution by LC/MS/MS*. Madison, WI.

(https://www.michigan.gov/pfasresponse/0,9038,7-365-86510_87154-469832--,00.html). The guidance published as of the date of this document are:

- *General PFAS Sampling Guidance*, October 2018
- *Soil PFAS Sampling Guidance*, November 2018
- *Groundwater PFAS Sampling Guidance*, October 2018
- *Surface Water PFAS Sampling Guidance*, November 2018
- *MDEQ PFAS Sampling Quick Reference Field Guide*, October 17, 2018

In addition, the surface water field investigation will follow WDNR's *Surface Water PFAS Sampling, V1.0, Draft*, June 24, 2019, or its latest version in effect at the time of the surface water field investigation. Where differences exist between the WDNR and MDEQ guidance documents, OSG will rely on WDNR guidance, even if only draft or proposed.

Surface Water Investigation

To evaluate the impact to the Black River from the PFAS plume, two (2) surface water samples will be collected from the Black River:

- One (1) background surface water sample will be collected upstream from Wells 23 & 24
- One (1) downstream surface water sample

Exact locations will be determined prior to the surface water sampling event based on input and concurrence from WDNR. The upstream background sample will likely be collected just below the spillway. The downstream sample will be downstream of the Airport Beach, likely upstream from or at the I-90 bridge.

Surface water sample collection procedures should match those used by the WDNR for its sampling of the Mississippi River during its water chemistry monitoring events on June 27, July 25 and August 14, 2019. OSG will coordinate sample collection techniques with the Monitoring Section of the WNDNR's Water Quality Program.

Soil Investigation

OSG will drill ten (10) borings, by hollow-stem auger. Seven (7) of the borings will be converted to four (4) monitoring wells and three (3) piezometers. Six (6) borings will be drilled in "location 1," the assumed source area (i.e., near the former burn pits and former monitoring wells MW-1S, MW-1D and MW-8), and four (4) borings will be drilled in "location 2," downgradient near former monitoring wells MW-4, MW-6, and MW-11S. See figure 3, proposed soil boring and monitoring well locations. During drilling, soil samples will be collected continuously by split-spoon sampler (except at the second boring at the piezometer nest). Soils will be classified according the Unified Soil Classification System.

Three (3) soil samples from each of the six (6) "location 1" borings and two (2) soil samples from three (3) of the four (4) "location 2" borings will be submitted to an analytical environmental laboratory for PFAS analysis via modified EPA method 537 (i.e., samples will not be collected from one of the borings

installed at the piezometer nest at former MW-11S/MW-11I). Twenty-four (24) soil samples in total will be lab analyzed. No field screening techniques exist for PFAS compounds.

“Location 1” soil samples will be collected from depths of 1 to 2 feet, 5 to 6 feet, and 11 to 12 feet below ground surface (bgs). “Location 2” soil samples will be collected from depths of 9 to 10 and 19 to 20 feet bgs.

Groundwater Investigation

Based on the VOC-contaminant plume previously defined during the VOC investigation conducted at the site, OSG will install four (4) water table monitoring wells and three (3) piezometers at the site.

Location 1: Three (3) water table monitoring wells will be installed in “location 1”, the suspected source area (i.e., former burn pits):

- One (1) monitoring well at former monitoring well MW-1S.
- One (1) monitoring well up-gradient at former monitoring well MW-8.
- One (1) monitoring well at former MW-7.
- Groundwater elevations at these locations previously ranged from approximately 12 to 17 feet bgs, and therefore, OSG will install these three wells to a depth of twenty (20) feet bgs with fifteen (15) foot screens.

Location 2: OSG proposes to install three piezometers, at an intermediate depth, and one (1) water table monitoring well in “location2”. One (1) piezometer will be installed at former MW-11I, which had the highest VOC concentrations in the prior years of monitoring. One (1) piezometer will be installed NNE of former MW-4 former monitoring well, and one SSW of former MW-6. Depth and screen length will match that of former MW-11I, as described in Table 1, below.

The monitoring wells and piezometers will be constructed per Chapter NR 141, Wisconsin Administrative Code, with flush-threaded, 2-inch ID, schedule 40 PVC pipe. Wells within the airport will be flush-mounted. Depth and screen lengths are described below:

Table1: Monitoring Well Depths and Screen Lengths

Proposed Well #	Nearest Former Well #	Location	Location Description	Previous Depth to Water (feet)	Proposed Well Depth (feet)	Screen Length (feet)
MW-101	MW-1S	1	Source Area	13 – 17	20	15
MW-102	MW-8	1	Up-gradient of Source Area	13 – 15	20	15
MW-103	MW-7	1	Side- / down-gradient of Source Area	10 - 13	20	15
MW-104S	MW-11S	2	Down-gradient	22 – 27	33	15
PZ-104I	MW-11I	2	Down-gradient	22 – 27	60	5
PZ-105I	MW-4	2	Side- / down-gradient	17 – 21	55	5
PZ-106I	MW-6	2	Side- / down-gradient	17 - 21	55	5

Monitoring well and piezometer top of casings and adjacent ground surface will be surveyed to an on-site datum and mean sea level (if an MSL datum is available on site) and groundwater elevations measured prior to each sampling event. After development per NR 141, groundwater samples will be collected from the monitoring wells and piezometers and field analyzed for pH, specific conductivity, dissolved oxygen and oxidation-reduction potential using a flow-through cell. Groundwater samples will be submitted to a laboratory for PFAS analyses as described above. After one (1) sampling event, the potential need for additional monitoring points will be reevaluated.

Reporting of Results

Because multiple mobilizations and phases of field investigation are anticipated, OSG will provide status updates to the City and the WDNR after each phase of the field investigation. A comprehensive NR 716 Site Investigation Report (SIR) will be completed after the completion of all phases of investigations. Status will include a letter summarizing work completed, observations, findings, conclusions and recommendations, with updated tables of results, figures and attachments, as needed and appropriate.

Investigative Waste Management

Soil cuttings from HSA drilling and excess sediment samples will be drummed and stored in a secure area on site. Monitoring well development and purge water will be drummed and secured on site, and disposal will be based on analytical results. Disposal of groundwater soil and sediment investigative waste (IW) will be determined at later phase of the investigation.

Certification

I, John C. Storlie, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature



Printed name and title

John C. Storlie, PG, Principal Hydrogeologist

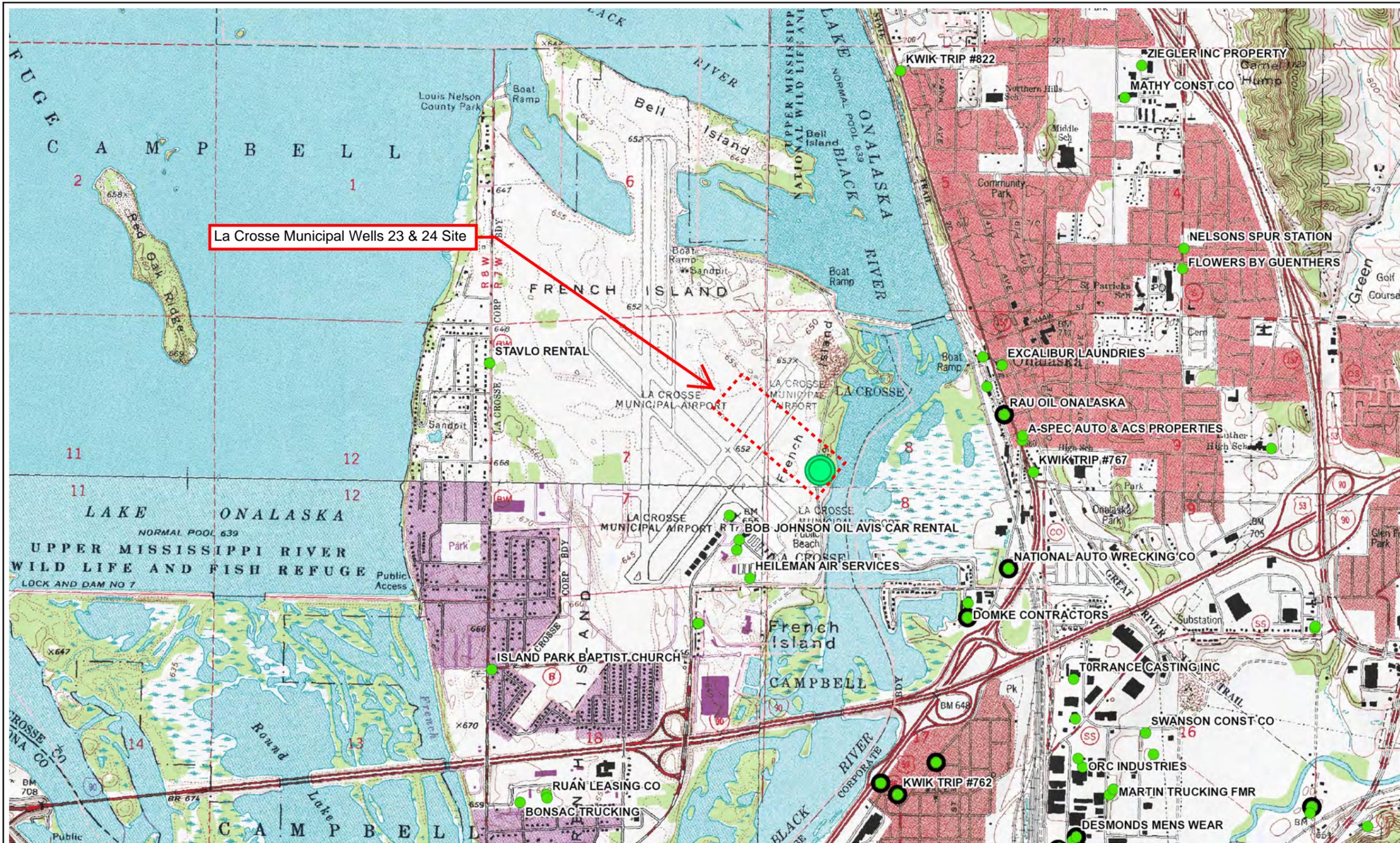
October 30, 2019

Date



Figure 1: Site Location Map

BRRTS # 02-32-000065 - LA CROSSE MUNICIPAL WELLS 23 & 24



Legend

- Open Site
- Open Site Boundary
- Closed Site
- Continuing Obligations Apply
- Facility-wide Site



0.8 0 0.38 0.8 Miles
 NAD_1983_HARN_Wisconsin_TM
 © Latitude Geographics Group Ltd.

1: 23,760



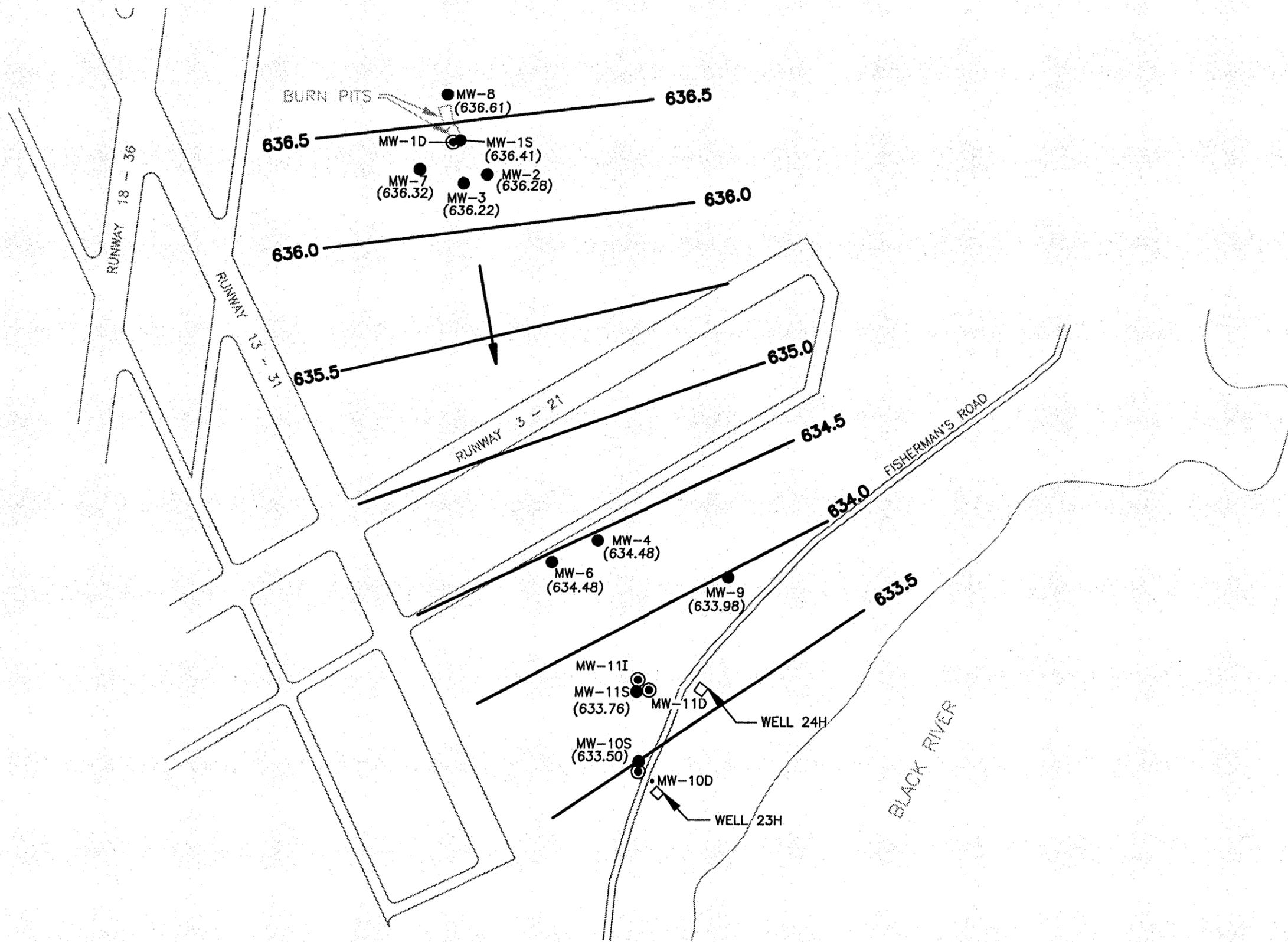
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/org/legal/>

Note: Not all sites are mapped.

Notes

Source:
 Wisconsin DNR RR Sites map, <https://dnrmaps.wi.gov/H5/?viewer=rrsites&run=RR2&DSN=32998>,
 accessed 09/03/2019

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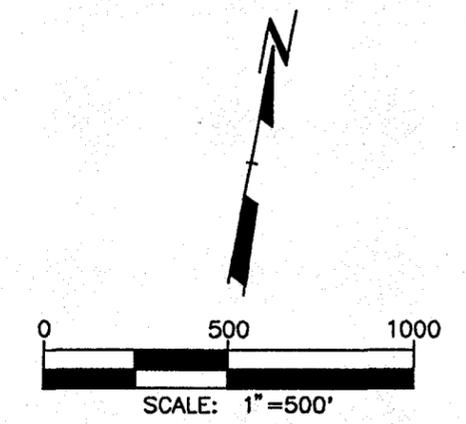


LEGEND

- MW-11S WATER TABLE WELL
- ⊙ MW-11I
MW-11D PIEZOMETER
- (636.61) WATER TABLE ELEVATION (FEET, NGVD)
- 636.5 — WATER TABLE CONTOUR
- ← DIRECTION OF GROUNDWATER FLOW

NOTES

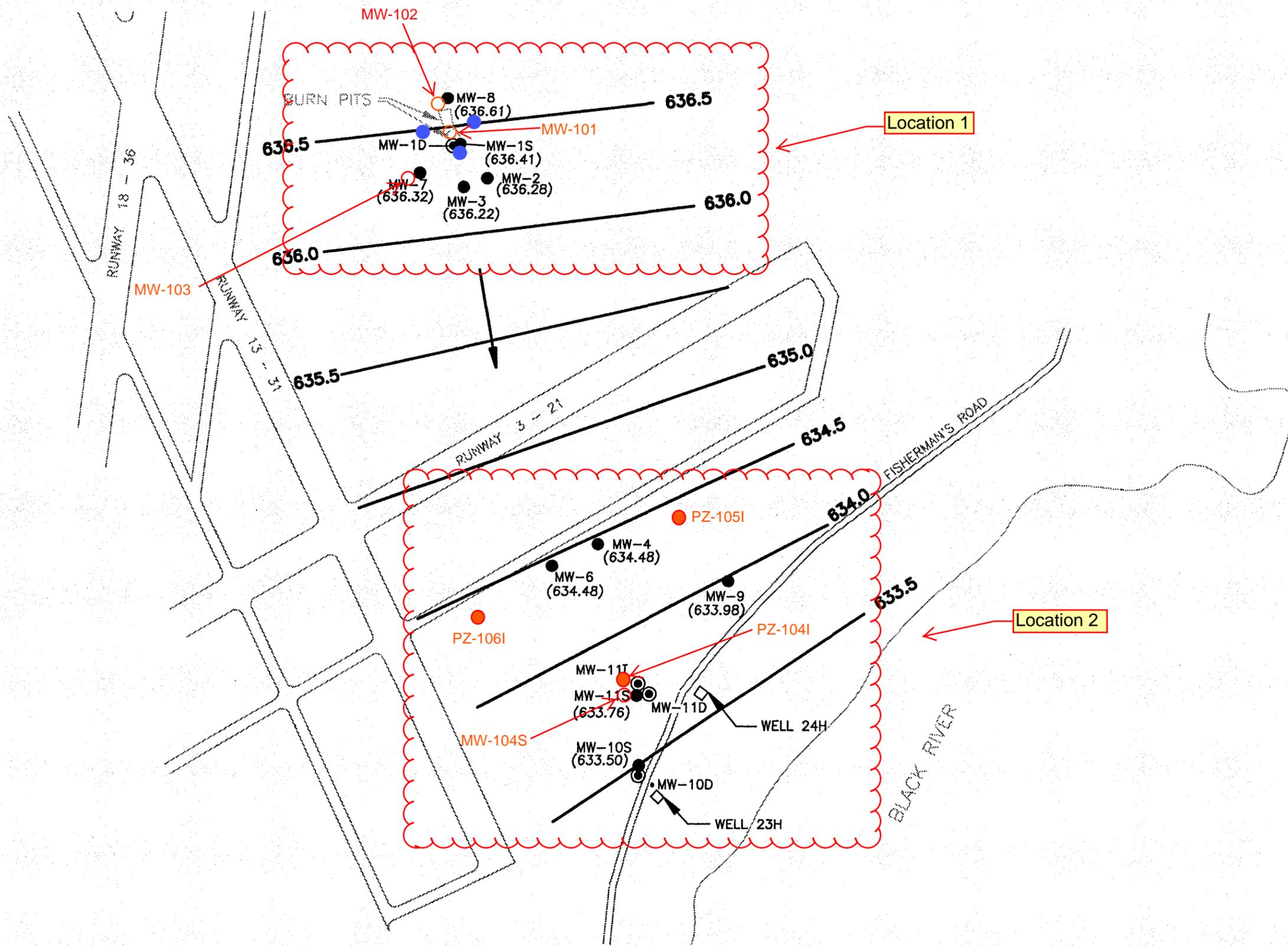
1. SURVEY DATA PROVIDED BY THE CITY OF LA CROSSE ON 7/14/94.



**Figure 2: Site Layout
 Municipal Wells 23 & 24
 La Crosse, Wisconsin**

	DWN. BY: DPR
	APPROVED BY: <i>LEH</i>
	DATE: NOVEMBER 1994
	PROJ. # 3051.03
	FILE # 30510305

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LEGEND

- MW-11S WATER TABLE WELL
- ⊙ MW-11I
MW-11D PIEZOMETER
- (636.61) WATER TABLE ELEVATION (FEET, NGVD)
- 636.5 — WATER TABLE CONTOUR
- ← DIRECTION OF GROUNDWATER FLOW
- Proposed Monitoring Well
- Proposed Piezometer
- Proposed Soil Boring

NOTES

1. SURVEY DATA PROVIDED BY THE CITY OF LA CROSSE ON 7/14/94.

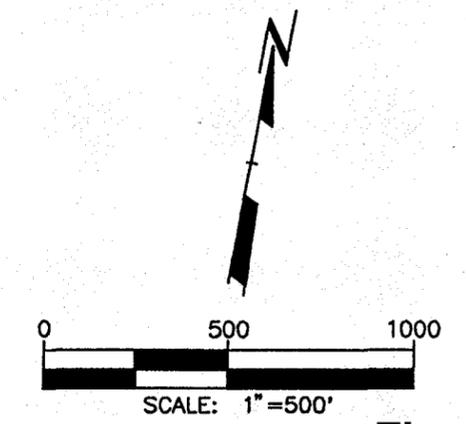


Figure 3
 Proposed Boring & Monitoring Well / Piezometer Locations
 Municipal Well 23 and 24
 La Crosse, Wisconsin

Figure modified by The OS Group, LLC on 10/25/19

	DWN. BY: DPR
	APPROVED BY: <i>LEH</i>
	DATE: NOVEMBER 1994
	PROJ. # 3051.03
	FILE # 30510305