

Borski, Jennifer - DNR

From: Goebel.Tiffany <Tiffany.Goebel@we-energies.com>
Sent: Thursday, July 12, 2012 1:53 PM
To: Borski, Jennifer - DNR
Cc: Christopher A. Robb; Brian G. Hennings (bhennings@naturalrt.com)
Subject: We Energies Appleton MGP Canal Dewatering Report; BRRTS No 02-45-000042
Attachments: ENV-WDNR Appleton MGP Canal Dewatering Report Transmittal 12 Jul 2012.pdf; 1508 Canal Dewatering Assessment 2011 FINALa.PDF

Jennifer,

The Canal Dewatering Report for the Appleton MGP, along with the related transmittal letter is attached for your review. I have also forwarded a paper copy to you via regular mail. Please let us know if you have questions or concerns regarding the information in the report. We are continuing to evaluate potential locations for an additional well, and plan to be in touch in August regarding our related recommendations. If you have questions or concerns in the meantime, please give me a call.

Thanks!
Tiffany

Tiffany Goebel, PE
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(414) 254-9827 (cell)



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Milwaukee, WI 53203
www.we-energies.com

**R + R - OSH
RECEIVED**

JUL 16 2012

TRACKED **REVIEWED**

43

July 12, 2012

Jennifer Borski
Hydrogeologist, Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
625 E County Road Y, Suite 700
Oshkosh, WI 54901

Re: Canal Dewatering Report
We Energies' Appleton MGP Site, FID #445033380; BRRTS #02-45-000042

Dear Ms. Borski:

In October and November of 2011, the canal adjacent to the Appleton MGP site (Site) was dewatered for downstream dam maintenance operations. We Energies took advantage of this opportunity to inspect conditions within the canal. This included physical inspection of the canal bottom and bank adjacent to the Site as well as the collection of several rounds of water levels from Site monitoring wells. Enclosed is a report, prepared by Natural Resource Technology (NRT), summarizing the observations made and the associated data analysis as it relates to both current conditions and Site history.

If you have questions or concerns regarding the information presented here, please call or email me at (414) 221-2850 or tiffany.goebel@we-energies.com, respectively.

Sincerely,

Tiffany Goebel, PE
Senior Environmental Consultant

Enclosure

cc: B Hennings, NRT
C Robb, NRT

ENV-WDNR Appleton MGP Canal Dewatering Report Transmittal 12 Jul 2012.docx



TECHNICAL MEMORANDUM

Date: July 12, 2012
To: Tiffany Goebel, We Energies
From: Chris Robb and Brian Hennings
Subject: 2011 Canal Dewatering Assessment
We Energies Appleton Former MGP Site

NR-OSH
RECEIVED

JUL 16 2012

TRACKED 43
REVIEWED

From October 6, 2011 through November 10, 2011 portions of the Fox River Canal adjacent to the former Appleton manufactured gas plant (MGP) site were dewatered to facilitate maintenance activities at two downstream hydroelectric units owned by Neenah Paper. This technical memorandum summarizes observations collected by We Energies representatives during these canal dewatering activities.

Relevant History

The Fox River Canal is located southeast and directly adjacent to We Energies' former Appleton MGP site (Site). The canal serves as a headrace for three hydroelectric power units located downstream of the Site; two owned by Neenah Paper. The MGP on the Site operated from approximately 1867 to 1954. Initial environmental investigations at the Site were completed in 1996 and 2001, and identified various MGP residuals including: BTEX, PAHs, tar or oil like materials, lighter phase oils or sheen, blue stained wood chips, and ash or clinkers. In April 2002, We Energies learned that in conjunction with Neenah Paper's annual maintenance shutdown, a substantial drawdown of the Fox River was planned for early August 2002. This allowed We Energies the unique opportunity to perform a visual assessment of conditions at the bottom of the canal and excavate approximately 400 to 450 cubic yards of previously identified weathered coal tar as documented in the *Interim Remedial Action Documentation Report*, November 2002. The drawdown did not result in complete dewatering of the canal and as shown in Photo 1 (Attachment A); water flowed through the canal at a depth of 6 inches to 3 feet.

Consequently, We Energies coordinated a second drawdown with Neenah Paper in 2003 to facilitate installation of a temporary dam to complete canal dewatering for full scale removal of MGP residuals (Photo 2, Attachment A); as documented in the *Phase I Remedial Construction Documentation Report*, April 19, 2004. The 2003 excavation procedure effectively removed 2,040 tons of MGP residuals from a 21,700 square foot area from the bottom of the Fox River Canal. Following completion of the removal operation, the excavated area was armored with 3-inch crushed, washed stone to restore the excavation to the original canal bottom grades and protect the excavated surface from scouring.



We Energies completed the remedial action at the site in 2004, which included *in situ* stabilization/solidification of approximately 34,000 cubic yards of soil located in upland areas adjacent to the Fox River Canal.

During these remedial actions, We Energies gathered the following information pertinent to discussion of the 2011 canal dewatering observations:

- Adjacent to the former MGP site, the Fox River Canal substrate consisted of rock, cobble and debris (e.g., concrete pieces, asphalt, bottles), and had silt overlying most of the cobble and debris. Less than three inches of sand/silt substrate was present across the majority of the canal bottom. The sand/silt substrate and portions of the underlying weathered rock, including cobbles and large gravel, was removed during the remedial actions in 2002 and 2003.
- The excavated canal substrate was replaced with 3-inch crushed, washed stone to the original canal bottom grades (Photo 3, Attachment A).
- Prior to 2002 and since completion of the Fox River Canal remedial action in 2003, We Energies has not observed sheen, ebullition mobilizing MGP residuals, or free phase residuals appearing on the water surface within the canal. *a state of bubbling up or boiling with exception of 2011 drawdown*
- Drawdown of the Fox River Canal is not a regular occurrence. Drawdown of the canal is performed only as necessary since extended drawdowns of the canal and the Fox River necessitate shutdown of Neenah Paper's operations. Since 2002, We Energies is aware of only two additional drawdown events: one in 2003 to facilitate We Energies' remedial construction operations in the canal and the drawdown in 2011.

2011 Canal Dewatering

From October 6, 2011 through November 10, 2011 portions of the Fox River Canal adjacent to the former Appleton MGP site were dewatered to facilitate maintenance activities at two downstream hydroelectric units owned by Neenah Paper (Photo 4, Attachment A). We Energies recognized this as a unique opportunity to proactively inspect the integrity of the remedial action completed in 2003 and 2004, and collect groundwater levels to further evaluate the connection between groundwater in the lower till and surface water in the canal.

Neenah Paper arranged to have a contractor install an inflatable temporary dam approximately 380 feet upstream of their two hydroelectric units (Figure 1). This allowed inspection of the remedy and canal from approximately MW-21, the approximate mid-point of the Site (west to east), to the east past MW-22 (Photo 5, Attachment A). Areas upstream of MW-21 were not dewatered and could not be inspected.

The following timeline summarizes the dewatering activities pertinent to the canal observation activities:

- 10-6-2011: Temporary dam installed by Neenah Paper.
- 10-11-2011: We Energies representatives (NRT) perform first inspection of remedy and canal.
- 10-20-2011: NRT performs second inspection of canal.
- 10-31-2011: WDNR meets with We Energies on-site for canal inspection.

- 11-09-2011: Temporary dam overtopped by water in the canal. Temporary dam removed.
- 11-18-2011: Restoration of disturbed riverbank completed and inspected by NRT.

Groundwater levels were recorded on October 3, 10, 14, 20, and November 17, 2012.

Canal Inspections and Observations

October 11, 2011 Inspection

On October 11, 2011, NRT mobilized to the Site to inspect the integrity of the completed remedy. NRT's objectives during the inspection included:

- Evaluate riverbank stability/integrity along the Site.
- Evaluate canal bottom integrity along the Site.
- Evaluate repair requirements for the riverbank where the temporary dam was placed.
- Collect photographs and observations.

A secondary objective was to double check the total depths of the MW-21/PZ-21B well nest to support our evaluation of groundwater flow patterns for the *2011 Annual Report*.

NRT recorded the following observations during the inspection:

- The riverbank adjacent to the Site is in excellent condition. No evidence of scour, rip rap displacement, rip rap degradation, or river bank failure was observed during the inspection (Photo 6, Attachment A).
- No evidence of sheen or MGP residuals was observed along or at the toe of the riverbank.
- Leakage around the temporary dam resulted in water flowing along the canal bottom from 1 to 6 inches in depth (Photo 7, Attachment A).
- No evidence of sheen or MGP residuals were observed on the water surface in the dewatered canal (Photo 7, Attachment A) or upstream of the temporary dam.
- Some areas of the dewatered canal bottom exhibited sheen when disturbed or agitated (Photo 8, Attachment A). These areas were adjacent to the riverbank along the former MGP site near MW-21. No free phase MGP residuals were observed.
- A small amount of free product (dense NAPL [non-aqueous phase liquid]) was observed in MW-21 while recording the well's total depth. Thickness of the dense NAPL was not able to be accurately recorded. No dense NAPL was observed in PZ-21.

Observations of sheen along the canal bottom were not expected. We Energies elected to further evaluate the presence of sheen along and around the canal while the temporary dam was still in place.

October 20, 2011 Inspection

On October 20, 2011, NRT mobilized to the Site to perform a second inspection of the dewatered canal. NRT's objectives during the second inspection included:

- Evaluate the nature and extent of observed sheen in the dewatered canal.

- Evaluate additional monitoring wells surrounding the canal (MW-12, MW-13, MW-20, MW-22, and MW-23/PZ-23) for presence/absence of dense NAPL.
- Collect photographs and observations.

NRT initiated assessment of MGP residuals in the canal immediately downstream of the temporary dam, adjacent to the riverbank at MW-21. NRT used the following procedure to evaluate the extent of MGP residuals in the canal:

1. Start at riverbank adjacent to the Site. Walk transects perpendicular to riverbank and canal to determine extent.
2. While walking transects, periodically pole/disturb the rock substrate and record the presence/absence of sheen and MGP residuals (Photo 9 and 10, Attachment A).
3. Determine at each transect the lateral extent of observed residuals. Record the location of the extent with a hand held GPS unit (depicted with red dots on Figure 1).
4. Record observations and collect photographs as appropriate.

Using this procedure, NRT walked a total of 11 transects ranging from approximately 25 to 40 feet apart. NRT inspected the entire dewatered portion of the canal. The results of the assessment and limits of observed sheen are shown on Figure 1. In addition, NRT recorded the following observations:

- The canal substrate mostly consists of 3-inch clear stone, placed during the 2003 remedial action, and rock. A few small pockets of soft deposits (sand/silt/shells) 6 to 10 inches thick were observed. These soft pockets appeared to coincide with low areas along the canal bottom.
- Poling revealed sheen from near the river bank (adjacent to the Site) to the limits recorded on Figure 1.
- Two areas revealed small (up to dime sized) droplets of free phase residuals when disturbed (Figure 1 and Photo 11, Attachment A). These areas did not exhibit free phase residuals when left alone and free phase mobilization via ebullition was also not observed. ↳ bubbling up

When the limits of observed sheen were mapped, NRT observed that these limits generally correlate with the limits of canal excavation performed in 2003 (Figure 1).

NRT also evaluated monitoring wells MW-12, MW-13, MW-20, MW-22, and MW-23/PZ-23 surrounding the canal for the presence/absence of dense NAPL. Dense NAPL was not observed in any of the wells except MW-20. At MW-20, a trace of dense NAPL was observed on the weight sent to the bottom of the well, but no thickness could be measured.

October 31, 2011 Meeting with WDNR

Following collection of these observations and processing of the GPS data, We Energies notified Ms. Jennifer Borski of the observations on October 25, 2011. On October 31, 2011, We Energies, WDNR representatives, and NRT met on-site to review the observations and provide WDNR the opportunity to inspect the canal.

Groundwater Levels and Evaluation

Groundwater measurements were collected before (October 3), during (October 10, 14, and 20), and after (November 17) the canal dewatering event to evaluate changes in groundwater flow and the hydraulic connection between groundwater in the lower till and surface water in the canal. Piezometric surface elevation maps (Figures 2 through 6) were created for each round of observations.

It was expected that the canal would be completely dewatered after installation of the temporary dam and the groundwater in the lower till would respond. Figure 2 indicates the water level in the canal was at 720.82 feet three days prior to dewatering. Following dewatering, the bed of the canal (which is at an elevation of approximately 713 feet) was mostly exposed. NRT photographed weathered bedrock in the canal bottom (Photo 12, Attachment A), which is likely connected to the lower till groundwater flow system.

Observations collected three days prior to dewatering (Figure 2) are representative of normal flow at the site north of the canal. The gradient is low across the site such that the piezometric surface is contoured 0.1-foot intervals to evaluate flow directions. The gradient is very flat west of MW-21, and past monitoring events indicate that flow direction can be variable in this area. The gradient is steeper east of MW-21 and groundwater flow is consistently northeast (parallel to flow in the canal) as it approaches the Middle Appleton Dam (located just off the map to the east of the Fox River Mills apartments). Under normal conditions, the potentiometric surface of the lower till unit in wells adjacent to the canal is lower than the surface water elevation of the canal (suggesting that the canal typically behaves as a losing stream).

Observations collected during dewatering of the canal (Figures 3, 4, and 5) suggest that dewatering rapidly changed groundwater flow direction and gradient north of the canal. The first round of measurements collected four days after dewatering indicate the piezometric surface of the lower till downstream of the temporary dam had decreased between 4 and 5 feet (Figure 3). The gradient across the site increased such that the piezometric surface could be contoured at 1-foot intervals.

The relationship between groundwater and surface water also changed within those four days after dewatering. Under normal conditions, the potentiometric surface of the lower till unit is lower than the surface water elevation of the canal and groundwater would flow roughly parallel to the canal northeast toward the Middle Appleton Dam. During dewatering the relationship was reversed and the potentiometric surface of the lower till was higher than the elevation of the bed of the canal (around 713 feet); which suggests that the dewatered section of the canal started behaving like a gaining stream. Groundwater flow direction changed during dewatering by rotating slightly eastward to flow sub-parallel with the canal.

The flow pattern present four days after dewatering (illustrated on Figure 3) is consistent with observations one week (Figure 4) and two weeks (Figure 5) after dewatering. This suggests that groundwater in the lower till had reached a new equilibrium within four days.

On the south side of the dewatered canal at well nest MW-23 and PZ-23 similar observations were made with respect to potentiometric surface elevation. MW-23 is screened in the lower till and PZ-23 is screened in the shallow bedrock just below MW-23. Under normal flow conditions, the groundwater elevation in PZ-23 is slightly lower than in MW-23 indicating a downward gradient. Groundwater elevations in both wells are also lower than surface water in the canal which is consistent with the canal behaving as a losing stream. Both wells experienced a decrease in groundwater elevation (around 5.5 feet) within four days of dewatering and remained at those levels. The relationship between groundwater and surface water also changed during dewatering as the surface water elevation dropped below the groundwater elevations in these wells indicating the canal was behaving like a gaining stream.

Observations collected eight days after dam removal (Figure 6) indicated a return to more normal flow conditions. The gradient across the Site returned to low levels such that the contours need to be plotted at 0.1-foot intervals to evaluate flow direction. West of MW-21, where groundwater flow direction is variable, MW-13R appeared to be recovering more slowly than the other wells. East of MW-21, it appeared that a full recovery to normal flow direction takes longer than eight days as flow direction is more northerly than northeasterly.

Summary

We Energies has performed extensive source removal in the canal during remedial operations performed in 2002 and 2003, and has been performing post remediation groundwater monitoring at the Site since 2004. As documented in annual groundwater monitoring reports submitted since that time, and most recently in the *2011 Annual Report*, MGP impacts to the lower till are known and have been previously identified in past submittals.

The groundwater elevations measured around the dewatering event suggest a solid hydraulic connection between the canal and the lower till. However, the presence of this connection does not mean that MGP residuals in the lower till are migrating from the site toward the canal. Past groundwater monitoring events and groundwater levels measured before and after canal dewatering suggest that the canal behaves as a losing stream when the surface water elevation in the canal is maintained for normal operation of the dams and paper mill. Under those normal conditions, water transfers from the canal into the lower till inhibiting migration of MGP residuals towards the canal. Only during the dewatering event did the groundwater elevation measurements suggest that the canal behaves like a gaining stream, allowing for migration toward the canal.

We Energies observations suggest MGP residuals observed in the canal during dewatering are likely trapped in discrete pockets or fractures of the rock substrate that make up the bottom of the canal, as a result of past practice and the historic presence of source materials along the canal bottom for many years (removed from the canal in 2002 and 2003). The sheen only became apparent in the canal when

the canal was dewatered, groundwater started to flow toward the canal, and the canal bottom was physically disturbed.

- Is maintenance of headrace a necessary continuing obligation?

No evidence of sheen or free phase MGP residuals in the canal has been reported to We Energies during normal flow conditions. Further, no natural processes, such as ebullition, have been observed that could mobilize MGP residuals from the lower till into the canal.

We Energies also has knowledge that water levels in the canal are maintained at very consistent elevations by Neenah Paper and that canal dewatering is an infrequent occurrence. Thus, conditions observed during canal dewatering, which could potentially mobilize MGP residuals from the lower till towards the canal, are rare and unlikely the source of the observations. In the absence of the significant shift in groundwater flow caused by canal dewatering combined with physical disturbance, MGP residuals will likely remain contained in the rock substrate as the canal loses water to the lower till.

however, an increase in well concentrations may justify RA in lower till.

Future Actions

Due to the presence of MGP residuals observed during the canal dewatering and the dense NAPL observed in MW-21, We Energies has implemented the following procedures to further evaluate the former Appleton MGP site and adjacent canal during the 2012 groundwater monitoring events:

- Measure presence/absence of dense NAPL and thickness at MW-2R, MW-12R, MW-13R, MW-19, MW-20, MW-21, MW-22, MW-23, and PZ-23 during each quarterly groundwater monitoring event.
- Observe the Fox River Canal and look for evidence of sheen, ebullition, or MGP residuals.
- Install a new staff gauge (SG-3) directly upstream of Neenah Paper's hydroelectric units (Figures 2 – 6) and measure the water level in the canal along with water levels in the lower till. These measurements will assist with further evaluation of the Fox River Canal/lower till hydraulic connection.
- Expand the quarterly sampling events for another year and include quarterly analysis of benzene and naphthalene at monitoring wells MW-20 and MW-21, and BTEX and naphthalene at MW-22.

Results of these future actions will be evaluated and summarized in the forthcoming annual groundwater monitoring report.

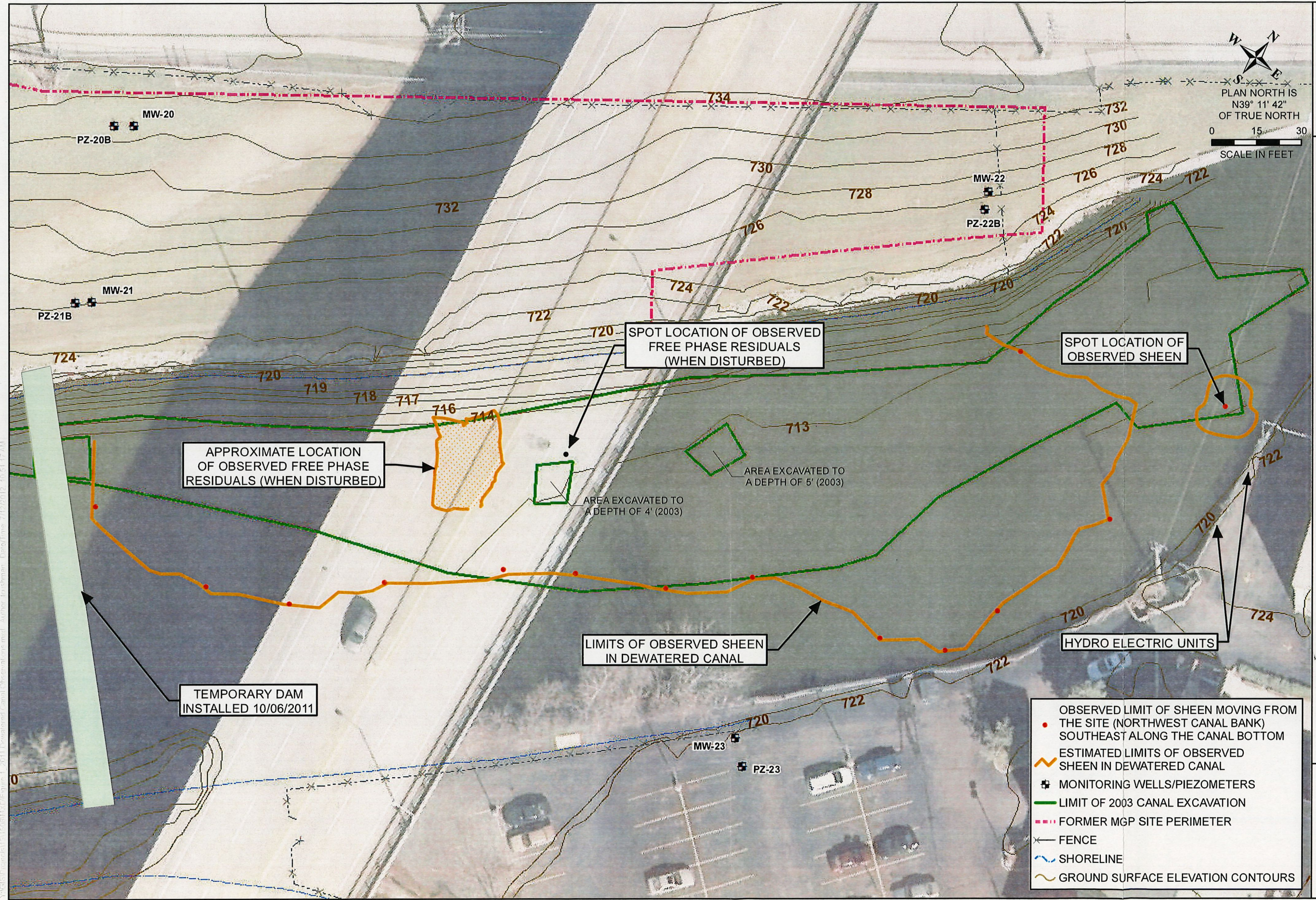
Figures

- Figure 1 – 2011 Dewatered Canal Observations
- Figure 2 – Lower Till Piezometric Surface Elevation – October 3, 2011
- Figure 3 – Lower Till Piezometric Surface Elevation – October 10, 2011
- Figure 4 – Lower Till Piezometric Surface Elevation – October 14, 2011
- Figure 5 – Lower Till Piezometric Surface Elevation – October 20, 2011
- Figure 6 – Lower Till Piezometric Surface Elevation – November 17, 2011

Attachments

Attachment A: Photographic Log

FIGURES



DRAWN BY/DATE:
TDC 7/9/12
REVIEWED BY/DATE:
BGH 7/9/12
APPROVED BY/DATE:
CAR 7/12/12

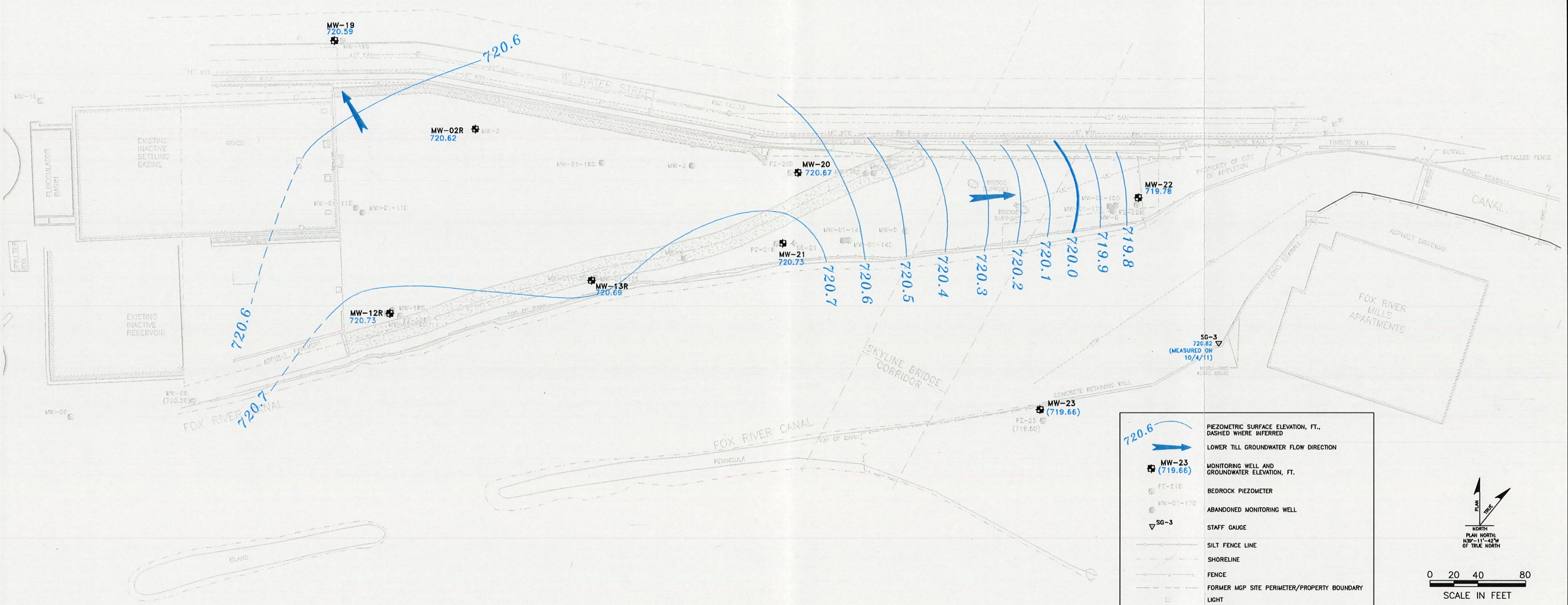
2011 DEWATERED CANAL OBSERVATIONS
OCTOBER 20, 2011
FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY
WE ENERGIES
APPLETON, WISCONSIN

PROJECT NO. 1508/19
FIGURE NO. 1

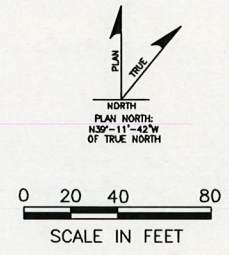


Y:\GIS\Projects\151508MGP\Figures_1_2011_Dewatered_Canal_Observations.mxd Author: Jorshman Date/Time: 7/12/2012 10:51:17 AM

CONTOUR INTERVAL = 0.1 FOOT
THREE DAYS PRIOR TO DEWATERING



	PIEZOMETRIC SURFACE ELEVATION, FT., DASHED WHERE INFERRED
	LOWER TILL GROUNDWATER FLOW DIRECTION
	MONITORING WELL AND GROUNDWATER ELEVATION, FT.
	BEDROCK PIEZOMETER
	ABANDONED MONITORING WELL
	STAFF GAUGE
	SILT FENCE LINE
	SHORELINE
	FENCE
	FORMER MGP SITE PERIMETER/PROPERTY BOUNDARY
	LIGHT
	POWER POLE
	GRAVEL ACCESS ROAD
	SANITARY SEWER LINE
	OVERHEAD ELECTRICAL, TELEPHONE & CABLE TV LINE
	GAS MAIN LINE
	STORM SEWER LINE
	UNDERGROUND ELECTRICAL LINE
	UNDERGROUND TELEPHONE LINE
	WATER MAIN LINE
	MGP GAS VALVE
	GAS VALVE
	FIRE HYDRANT
	WATER VALVE
	MANHOLE
	STORM CATCH BASIN
	DOWN GUY



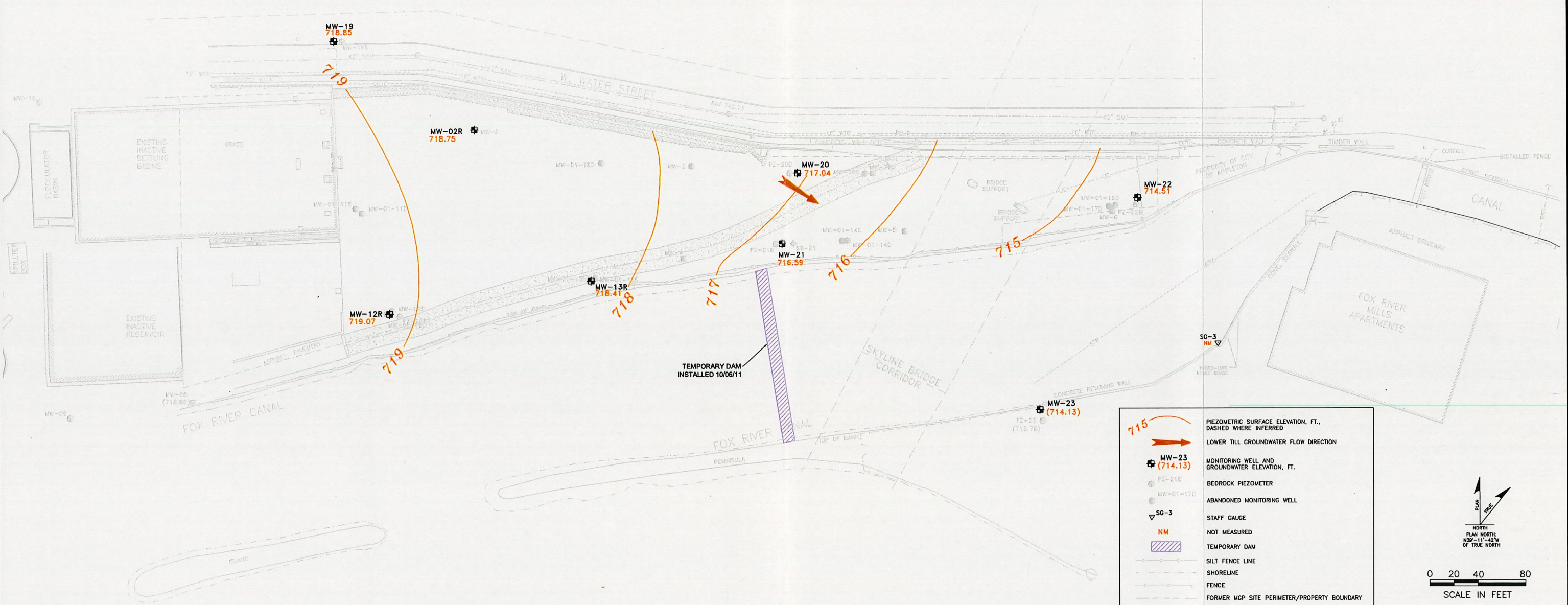
NOTE:
1. WATER LEVELS IN PARENTHESIS WERE NOT INCLUDED IN CONTOURS.

SOURCE NOTE:
1. THIS DRAWING WAS DEVELOPED FROM A SURVEY BY CAROW LAND SURVEYING CO., INC., APPLETON, WISCONSIN, PROJECT NO. C0111.11, DATED 11-30-01, REVISIONS, DECEMBER 2001, FEBRUARY 2002, AUGUST 2002 AND SEPTEMBER 2002, DIGITAL FILE NEWATER.DWG. REVISION RECEIVED FROM CAROW 8-15-02.
2. PORTIONS OF THIS DRAWING WERE DEVELOPED FROM A DRAWING BY STS CONSULTANTS LTD., PROJECT NO. 84703XB, PROJECT FILE 652003, FIGURE NO. 2, DATED 8-9-98.
3. ISLAND-PENINSULA LOCATIONS DEVELOPED FROM TOPOGRAPHIC MAP BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN, PROJECT NO.1991109, DATE OF PHOTOGRAPHY: 11-9-98.
4. SURVEYS FROM MARTENSON-EISELE JANUARY 2004, 157556RINTGRD.DWG, 157556RINTSUB.DWG.
5. RECORD MONITORING WELL LOCATIONS, GRAVEL ROAD ALIGNMENT AND FINAL GRADES FROM SURVEYS BY WILLIAMS ENVIRONMENTAL SERVICES, INC., DIGITAL FILES DATED OCTOBER 5, 2004.

SURVEY NOTES:
1. BENCHMARK 1: NAIL IN POWER POLE #71-3183 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR THE NORTHWEST PROPERTY CORNER, ELEVATION = 734.68 (CITY DATUM).
2. BENCHMARK 2: NAIL IN POWER POLE #71-3184 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR ENTRANCE, ELEVATION = 739.80 (CITY DATUM).
3. SUBJECT PROPERTY IS ZONED M-2 & PD/C2: GENERAL INDUSTRIAL DISTRICT & PLANNED DEVELOPMENT OVERLAY DISTRICT/GENERAL COMMERCIAL DISTRICT.
4. CURB ELEVATIONS SHOWN ARE TOP OF CURB, SUBTRACT 0.5' TO OBTAIN GUTTER ELEVATIONS UNLESS NOTED OTHERWISE.

	PROJECT NO. 1508/19A	LOWER TILL PIEZOMETRIC SURFACE ELEVATIONS OCTOBER 3, 2011	
	DRAWN BY: RLH 07/09/12	2011 CANAL DEWATERING ASSESSMENT FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY WE ENERGIES CITY OF APPLETON, WISCONSIN	
CHECKED BY: CAR 07/09/12	APPROVED BY: CAR 07/12/12	DRAWING NO: 1508-19A-B01C	FIGURE NO. 2
		REFERENCE: .	

CONTOUR INTERVAL = 1 FOOT
FOUR DAYS AFTER DEWATERING



715

→

MW-23 (714.13)

FZ-21E

MW-01-17D

SG-3

NM

TEMPORARY DAM

SILT FENCE LINE

SHORELINE

FENCE

FORMER MGP SITE PERIMETER/PROPERTY BOUNDARY

LIGHT

POWER POLE

GRAVEL ACCESS ROAD

SANITARY SEWER LINE

OVERHEAD ELECTRICAL, TELEPHONE & CABLE TV LINE

GAS MAIN LINE

STORM SEWER LINE

UNDERGROUND ELECTRICAL LINE

UNDERGROUND TELEPHONE LINE

WATER MAIN LINE

MGP GAS VALVE

GAS VALVE

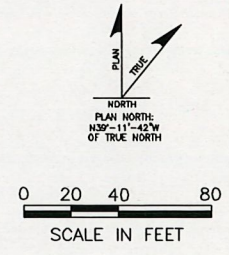
FIRE HYDRANT

WATER VALVE

MANHOLE

STORM CATCH BASIN

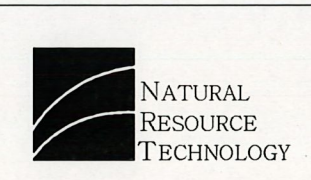
DOWN GUY



NOTE:
1. WATER LEVELS IN PARENTHESIS WERE NOT INCLUDED IN CONTOURS.

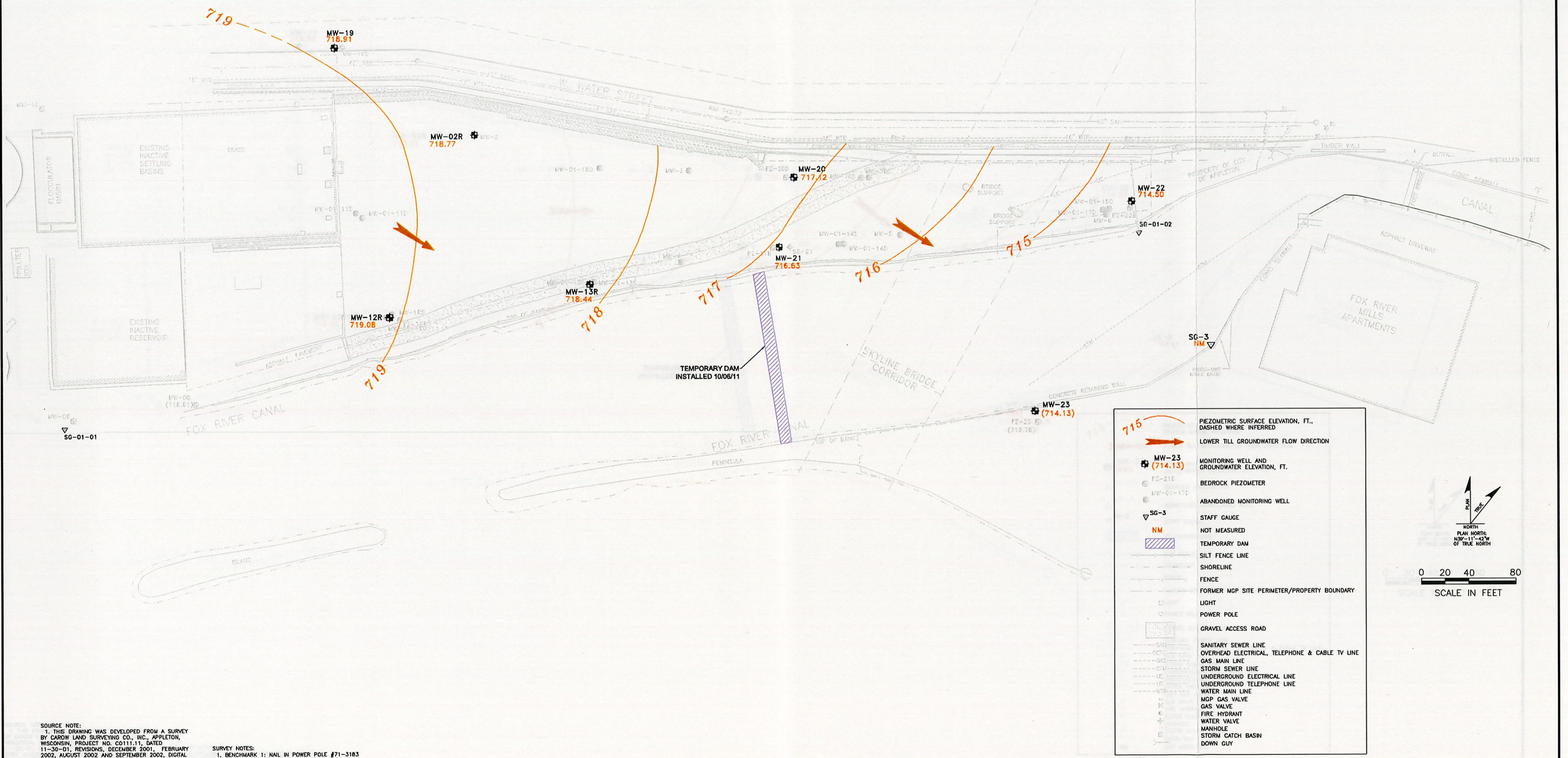
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2. PORTIONS OF THIS DRAWING WERE DEVELOPED FROM A DRAWING BY STS CONSULTANTS LTD., PROJECT NO. 847033B, PROJECT FILE 052003, FIGURE NO. 2, DATED 8-9-98.
3. ISLAND-PENINSULA LOCATIONS DEVELOPED FROM TOPOGRAPHIC MAP BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN, PROJECT NO.1991109, DATE OF PHOTOGRAPHY: 11-8-99.
4. SURVEYS FROM MARTENSON-EISELE JANUARY 2004, 157556R1GRO.DWG, 157556R1VFN.DWG, 157556R1SUB.DWG.
5. RECORD MONITORING WELL LOCATIONS, GRAVEL ROAD ALIGNMENT AND FINAL GRADES FROM SURVEYS BY WILLIAMS ENVIRONMENTAL SERVICES, INC., DIGITAL FILES DATED OCTOBER 5, 2004.

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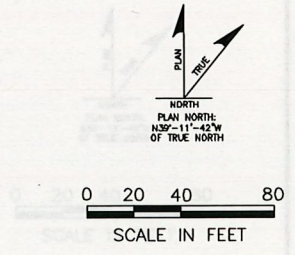


PROJECT NO. 1508/19A	LOWER TILL PIEZOMETRIC SURFACE ELEVATIONS OCTOBER 10, 2011	
DRAWN BY: RLH 07/09/12	2011 CANAL DEWATERING ASSESSMENT FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY WE ENERGIES CITY OF APPLETON, WISCONSIN	
CHECKED BY: CAR 07/09/12	DRAWING NO: 1508-19A-B02C	FIGURE NO. 3
APPROVED BY: CAR 07/12/12	REFERENCE: .	

CONTOUR INTERVAL = 1 FOOT
EIGHT DAYS AFTER DEWATERING



	PIEZOMETRIC SURFACE ELEVATION, FT., DASHED WHERE INFERRED
	LOWER TILL GROUNDWATER FLOW DIRECTION
	MONITORING WELL AND GROUNDWATER ELEVATION, FT.
	BEDROCK PIEZOMETER
	ABANDONED MONITORING WELL
	STAFF GAUGE
	NOT MEASURED
	TEMPORARY DAM
	SILT FENCE LINE
	SHORELINE
	FENCE
	FORMER MGP SITE PERIMETER/PROPERTY BOUNDARY
	LIGHT
	POWER POLE
	GRAVEL ACCESS ROAD
	SANITARY SEWER LINE
	OVERHEAD ELECTRICAL, TELEPHONE & CABLE TV LINE
	GAS MAIN LINE
	STORM SEWER LINE
	UNDERGROUND ELECTRICAL LINE
	UNDERGROUND TELEPHONE LINE
	WATER MAIN LINE
	MGP GAS VALVE
	GAS VALVE
	FIRE HYDRANT
	WATER VALVE
	MANHOLE
	STORM CATCH BASIN
	DOWN GULLY



0 20 40 80
SCALE IN FEET

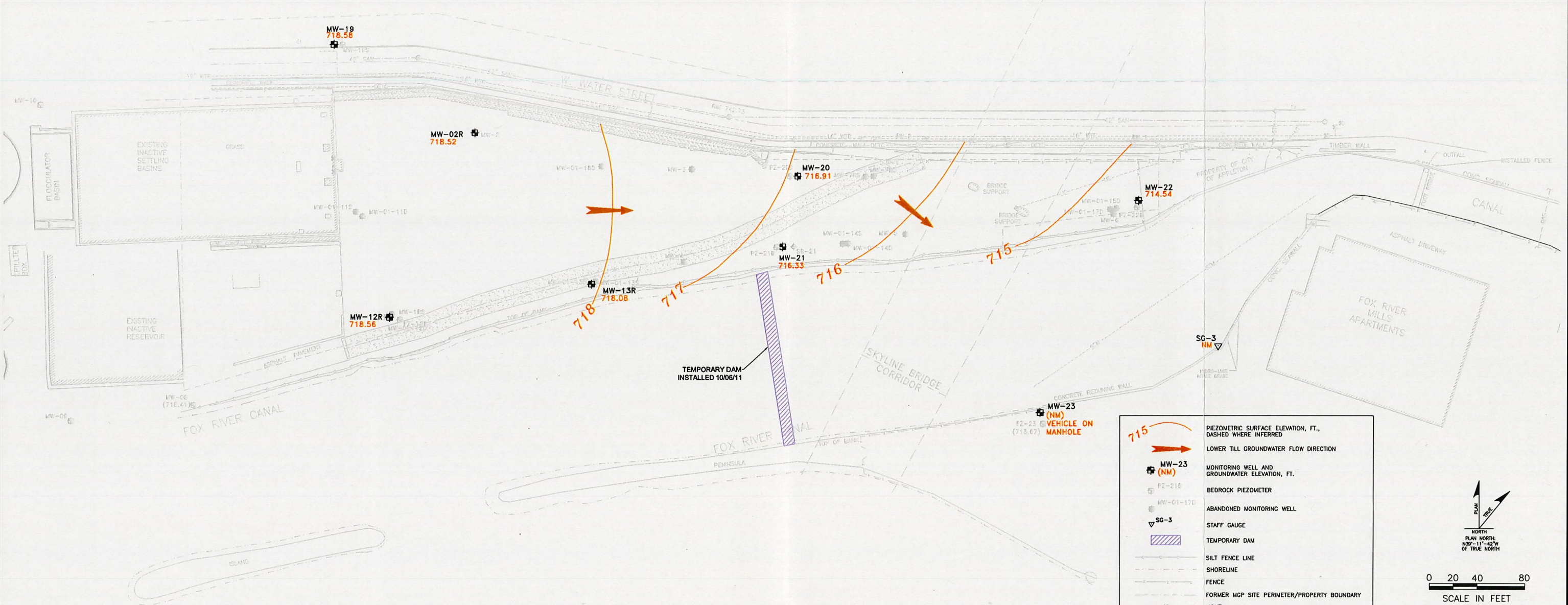
NOTE:
1. WATER LEVELS IN PARENTHESIS WERE NOT INCLUDED IN CONTOURS.

SOURCE NOTE:
1. THIS DRAWING WAS DEVELOPED FROM A SURVEY BY CAROW LAND SURVEYING CO., INC., APPLETON, WISCONSIN, PROJECT NO. C0111.11, DATED 11-30-01, REVISIONS, DECEMBER 2001, FEBRUARY 2002, AUGUST 2002 AND SEPTEMBER 2002, DIGITAL FILE WEWATER.DWG. REVISION RECEIVED FROM CAROW 8-15-02.
2. PORTIONS OF THIS DRAWING WERE DEVELOPED FROM A DRAWING BY STS CONSULTANTS LTD., PROJECT NO. 84703XB, PROJECT FILE G52003, FIGURE NO. 2, DATED 8-9-98.
3. ISLAND-PENINSULA LOCATIONS DEVELOPED FROM TOPOGRAPHIC MAP BY AERO-METRIC, INC., SHIOBOGAN, WISCONSIN, PROJECT NO. 1991109, DATE OF PHOTOGRAPHY: 11-9-99.
4. SURVEYS FROM MARTENSON-EISELE JANUARY 2004, 157556RNF0RD.DWG, 157556RNFV.DWG, 157556RNFV.DWG.
5. RECORD MONITORING WELL LOCATIONS, GRAVEL ROAD ALIGNMENT AND FINAL GRADES FROM SURVEYS BY WILLIAMS ENVIRONMENTAL SERVICES, INC., DIGITAL FILES DATED OCTOBER 5, 2004.

SURVEY NOTES:
1. BENCHMARK 1: NAIL IN POWER POLE #71-3183 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR THE NORTHWEST PROPERTY CORNER, ELEVATION = 734.68 (CITY DATUM).
2. BENCHMARK 2: NAIL IN POWER POLE #71-3184 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF LINE OF WATER STREET NEAR ENTRANCE, ELEVATION = 739.80 (CITY DATUM).
3. SUBJECT PROPERTY IS ZONED M-2 & PD/C2: GENERAL INDUSTRIAL DISTRICT & PLANNED DEVELOPMENT OVERLAY DISTRICT/GENERAL COMMERCIAL DISTRICT.
4. CURB ELEVATIONS SHOWN ARE TOP OF CURB, SUBTRACT 0.5'± TO OBTAIN GUTTER ELEVATIONS UNLESS NOTED OTHERWISE.

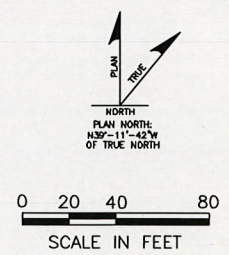
	PROJECT NO. 1508/19A	LOWER TILL PIEZOMETRIC SURFACE ELEVATIONS OCTOBER 14, 2011	
	DRAWN BY: RLH 07/09/12	2011 CANAL DEWATERING ASSESSMENT FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY WE ENERGIES CITY OF APPLETON, WISCONSIN	
CHECKED BY: BGH 07/09/12	APPROVED BY: CAR 07/12/12	DRAWING NO: 1508-19A-B03C	FIGURE NO. 4

CONTOUR INTERVAL = 1 FOOT
FOURTEEN DAYS AFTER DEWATERING



	PIEZOMETRIC SURFACE ELEVATION, FT., DASHED WHERE INFERRED
	LOWER TILL GROUNDWATER FLOW DIRECTION
	MONITORING WELL AND GROUNDWATER ELEVATION, FT.
	BEDROCK PIEZOMETER
	ABANDONED MONITORING WELL
	STAFF GAUGE
	TEMPORARY DAM
	SILT FENCE LINE
	SHORELINE
	FENCE
	FORMER MGP SITE PERIMETER/PROPERTY BOUNDARY
	LIGHT
	POWER POLE
	GRAVEL ACCESS ROAD
	SANITARY SEWER LINE
	OVERHEAD ELECTRICAL, TELEPHONE & CABLE TV LINE
	GAS MAIN LINE
	STORM SEWER LINE
	UNDERGROUND ELECTRICAL LINE
	UNDERGROUND TELEPHONE LINE
	WATER MAIN LINE
	MGP GAS VALVE
	GAS VALVE
	FIRE HYDRANT
	WATER VALVE
	MANHOLE
	STORM CATCH BASIN
	DOWN GUY
	NOT MEASURED

NOTE:
1. WATER LEVELS IN PARENTHESIS WERE NOT INCLUDED IN CONTOURS.

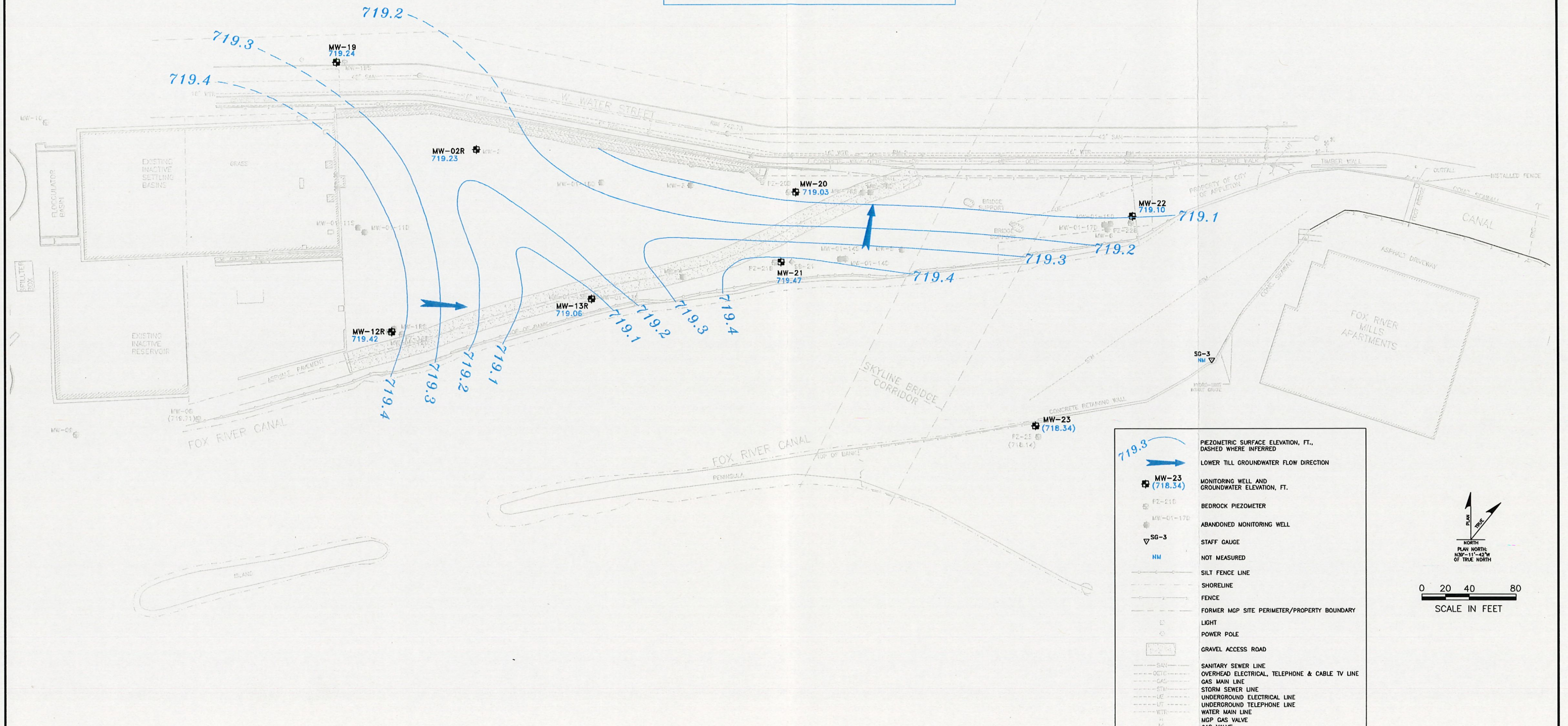


SOURCE NOTE:
1. THIS DRAWING WAS DEVELOPED FROM A SURVEY BY CAROW LAND SURVEYING CO., INC., APPLETON, WISCONSIN, PROJECT NO. C0111.11, DATED 11-30-01, REVISIONS, DECEMBER 2001, FEBRUARY 2002, AUGUST 2002 AND SEPTEMBER 2002, DIGITAL FILE NEWATER.DWG. REVISION RECEIVED FROM CAROW 8-15-02.
2. PORTIONS OF THIS DRAWING WERE DEVELOPED FROM A DRAWING BY STS CONSULTANTS LTD., PROJECT NO. 84703XB, PROJECT FILE 652003, FIGURE NO. 2, DATED 8-9-98.
3. ISLAND-PENINSULA LOCATIONS DEVELOPED FROM TOPOGRAPHIC MAP BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN, PROJECT NO.1991109, DATE OF PHOTOGRAPHY: 11-9-99.
4. SURVEYS FROM MARTENSON-EISELE JANUARY 2004, 157556INTORD.DWG, 157556RWFN.DWG, 157556RVSUB.DWG.
5. RECORD MONITORING WELL LOCATIONS, GRAVEL ROAD ALIGNMENT AND FINAL GRADES FROM SURVEYS BY WILLIAMS ENVIRONMENTAL SERVICES, INC., DIGITAL FILES DATED OCTOBER 5, 2004.

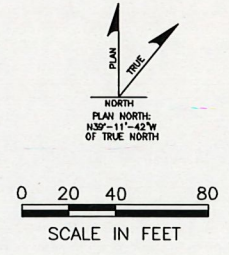
SURVEY NOTES:
1. BENCHMARK 1: NAIL IN POWER POLE #71-3183 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR THE NORTHWEST PROPERTY CORNER, ELEVATION = 734.68 (CITY DATUM).
2. BENCHMARK 2: NAIL IN POWER POLE #71-3184 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR ENTRANCE, ELEVATION = 739.80 (CITY DATUM).
3. SUBJECT PROPERTY IS ZONED M-2 & PD/C2: GENERAL INDUSTRIAL DISTRICT & PLANNED DEVELOPMENT OVERLAY DISTRICT/GENERAL COMMERCIAL DISTRICT.
4. CURB ELEVATIONS SHOWN ARE TOP OF CURB, SUBTRACT 0.5' TO OBTAIN GUTTER ELEVATIONS UNLESS NOTED OTHERWISE.

	PROJECT NO. 1508/19A	LOWER TILL PIEZOMETRIC SURFACE ELEVATIONS OCTOBER 20, 2011
	DRAWN BY: RLH 07/09/12	2011 CANAL DEWATERING ASSESSMENT FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY WE ENERGIES CITY OF APPLETON, WISCONSIN
CHECKED BY: CAR 07/09/12	DRAWING NO: 1508-19A-B04C	FIGURE NO. 5
APPROVED BY: CAR 07/12/12	REFERENCE:	

CONTOUR INTERVAL = 0.1 FOOT
EIGHT DAYS AFTER DAM REMOVAL



	PIEZOMETRIC SURFACE ELEVATION, FT., DASHED WHERE INFERRED
	LOWER TILL GROUNDWATER FLOW DIRECTION
	MONITORING WELL AND GROUNDWATER ELEVATION, FT.
	BEDROCK PIEZOMETER
	ABANDONED MONITORING WELL
	STAFF GAUGE
	NOT MEASURED
	SILT FENCE LINE
	SHORELINE
	FENCE
	FORMER MGP SITE PERIMETER/PROPERTY BOUNDARY
	LIGHT
	POWER POLE
	GRAVEL ACCESS ROAD
	SANITARY SEWER LINE
	OVERHEAD ELECTRICAL, TELEPHONE & CABLE TV LINE
	GAS MAIN LINE
	STORM SEWER LINE
	UNDERGROUND ELECTRICAL LINE
	UNDERGROUND TELEPHONE LINE
	WATER MAIN LINE
	MGP GAS VALVE
	GAS VALVE
	FIRE HYDRANT
	WATER VALVE
	MANHOLE
	STORM CATCH BASIN
	DOWN GUY



SOURCE NOTE:
1. THIS DRAWING WAS DEVELOPED FROM A SURVEY BY CAROW LAND SURVEYING CO., INC., APPLETON, WISCONSIN, PROJECT NO. C011111, DATED 11-30-01, REVISIONS, DECEMBER 2001, FEBRUARY 2002, AUGUST 2002 AND SEPTEMBER 2002, DIGITAL FILE NEWATER.DWG. REVISION RECEIVED FROM CAROW 8-15-02.
2. PORTIONS OF THIS DRAWING WERE DEVELOPED FROM A DRAWING BY STS CONSULTANTS LTD., PROJECT NO. 84703XB, PROJECT FILE GS2003, FIGURE NO. 2, DATED 8-9-98.
3. ISLAND-PENINSULA LOCATIONS DEVELOPED FROM TOPOGRAPHIC MAP BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN, PROJECT NO.1991109, DATE OF PHOTOGRAPHY: 11-9-99.
4. SURVEYS FROM MARTENSON-EISELE JANUARY 2004, 157556NTRD.DWG, 157556RVPN.DWG, 157556RVSUB.DWG.
5. RECORD MONITORING WELL LOCATIONS, GRAVEL ROAD ALIGNMENT AND FINAL GRADES FROM SURVEYS BY WILLIAMS ENVIRONMENTAL SERVICES, INC., DIGITAL FILES DATED OCTOBER 5, 2004.

SURVEY NOTES:
1. BENCHMARK 1: NAIL IN POWER POLE #71-3183 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF WATER STREET NEAR THE NORTHWEST PROPERTY CORNER, ELEVATION = 734.68 (CITY DATUM).
2. BENCHMARK 2: NAIL IN POWER POLE #71-3184 LOCATED ALONG THE SOUTHEASTERLY RIGHT OF LINE OF WATER STREET NEAR ENTRANCE, ELEVATION = 739.80 (CITY DATUM).
3. SUBJECT PROPERTY IS ZONED M-2 & PD/C2: GENERAL INDUSTRIAL DISTRICT & PLANNED DEVELOPMENT OVERLAY DISTRICT/GENERAL COMMERCIAL DISTRICT.
4. CURB ELEVATIONS SHOWN ARE TOP OF CURB. SUBTRACT 0.5'± TO OBTAIN GUTTER ELEVATIONS UNLESS NOTED OTHERWISE.

NOTE:
1. WATER LEVELS IN PARENTHESIS WERE NOT INCLUDED IN CONTOURS.

	PROJECT NO. 1508/19A	LOWER TILL PIEZOMETRIC SURFACE ELEVATIONS NOVEMBER 17, 2011
	DRAWN BY: RLH 07/09/12	2011 CANAL DEWATERING ASSESSMENT FORMER APPLETON MANUFACTURED GAS PLANT (MGP) FACILITY WE ENERGIES CITY OF APPLETON, WISCONSIN
CHECKED BY: CAR 07/09/12	APPROVED BY: CAR 07/12/12	DRAWING NO: 1508-19A-B05C
		FIGURE NO. 6

ATTACHMENTS



Photo Number: 1

Date of Photo: 8/10/2002

Description: Excavation operations during 2002 Interim Remedial Action

View Direction: SW toward Site



Photo Number: 2

Date of Photo: 8/21/2003

Description: Excavation operations during 2003 Fox River Canal Excavation

View Direction: S across Fox River Canal

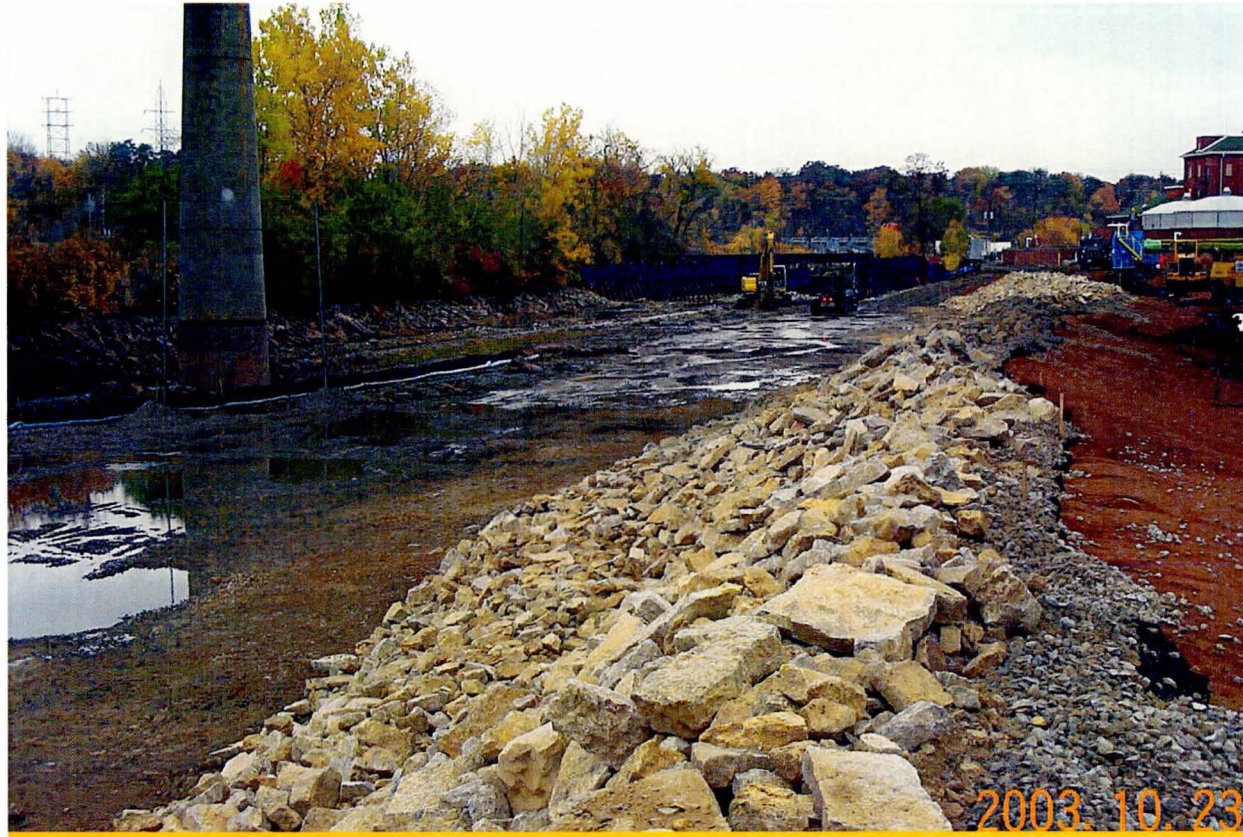


Photo Number: 3

Date of Photo: 10/23/2003

Description: Restoration of Fox River Canal; near completion of stone placement along canal bottom

View Direction: SW along Site riverbank



Photo Number: 4

Date of Photo: 10/2011

Description: Repair activities at Neenah Paper Hydroelectric units

View Direction: E from Site across Fox river Canal



Photo Number: 5

Date of Photo: 10/2011

Description: Temporary dam installed by Neenah Paper

View Direction: SE from Site across Fox River Canal



Photo Number: 6

Date of Photo: 10/11/2011

Description: Riverbank inspection adjacent to former Appleton MGP site

View Direction: SW along riverbank

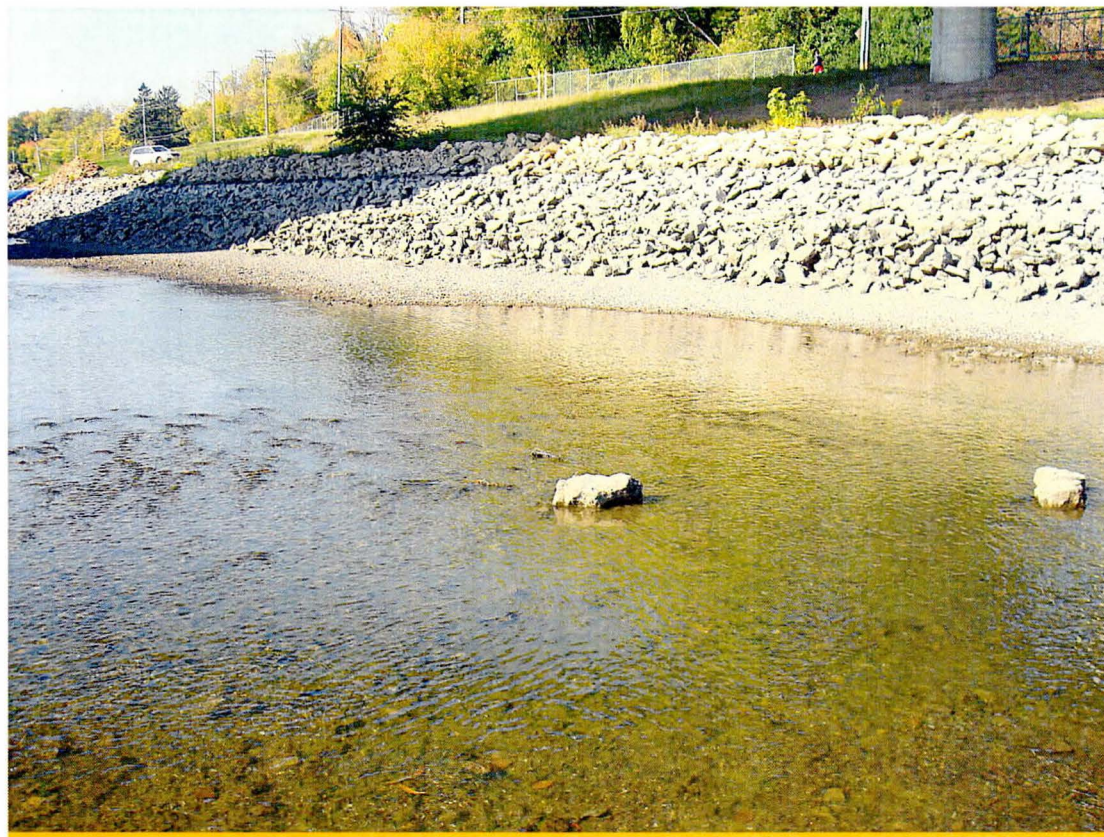


Photo Number: 7

Date of Photo: 10/11/2011

Description: Dewatered canal inspection adjacent to former Appleton MGP site

View Direction: W towards Site



Photo Number: 8

Date of Photo: 10/11/2011

Description: Dewatered canal inspection adjacent to former Appleton MGP site. Sheen observed when canal bottom disturbed.

View Direction: Down toward canal bottom



Photo Number: 9

Date of Photo: 10/20/2011

Description: Poling/disturbing canal bottom. Sheen observed when canal bottom disturbed.

View Direction: Down toward canal bottom



Photo Number: 10

Date of Photo: 10/20/2011

Description: Poling/disturbing canal bottom.

View Direction: SE from Site



Photo Number: 11

Date of Photo: 10/20/2011

Description: Poling/disturbing canal bottom. Red arrows indicate free phase droplets.

View Direction: Down toward canal bottom



Photo Number: 12

Date of Photo: 10/20/2011

Description: Evidence of upper weathered bedrock (“lower till”) at bottom of Fox River Canal. Green line outlines flat plane of upper weathered bedrock. Additional planes of upper weathered bedrock can be observed in photo.

View Direction: Down and S toward canal bottom